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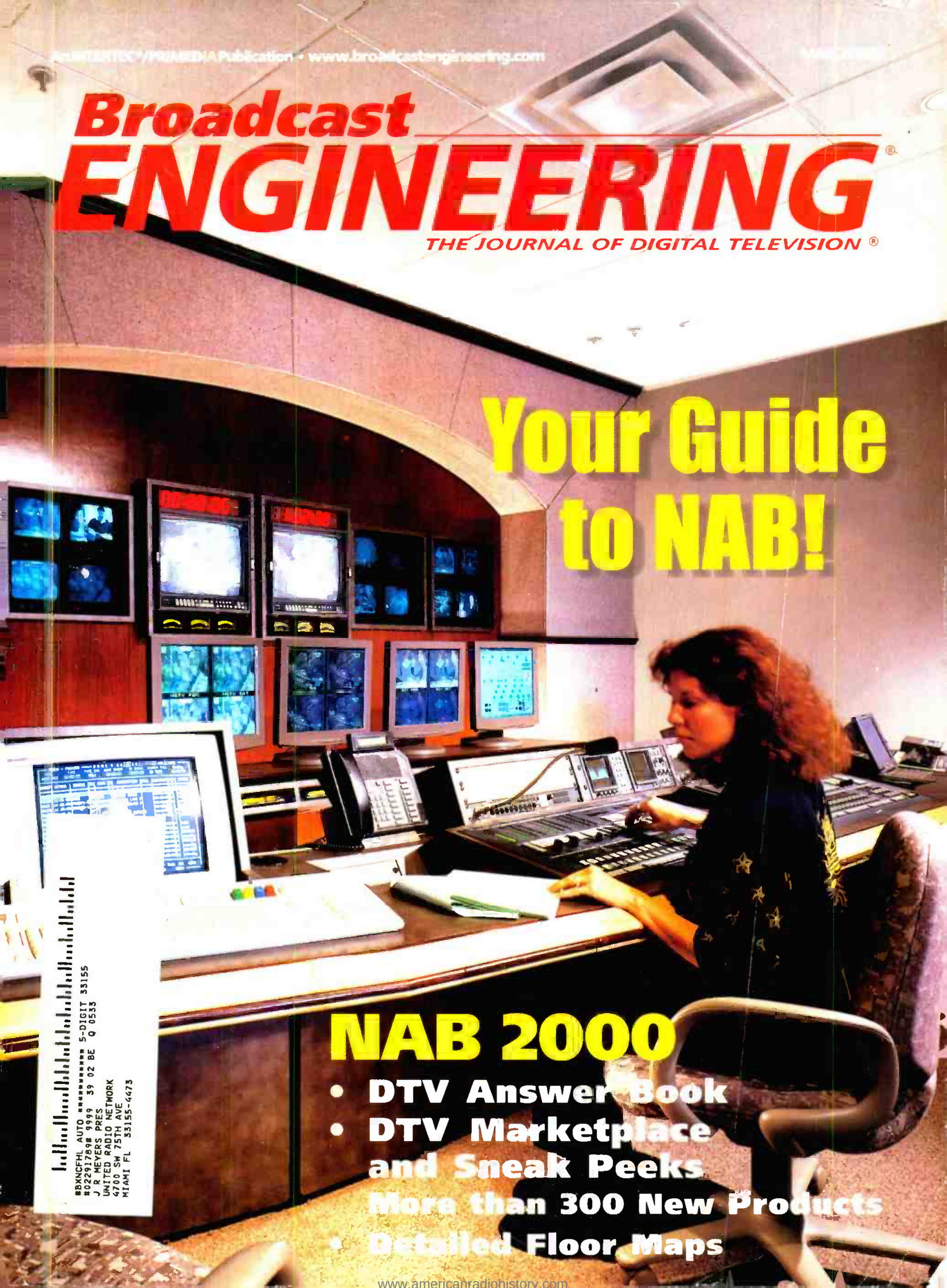

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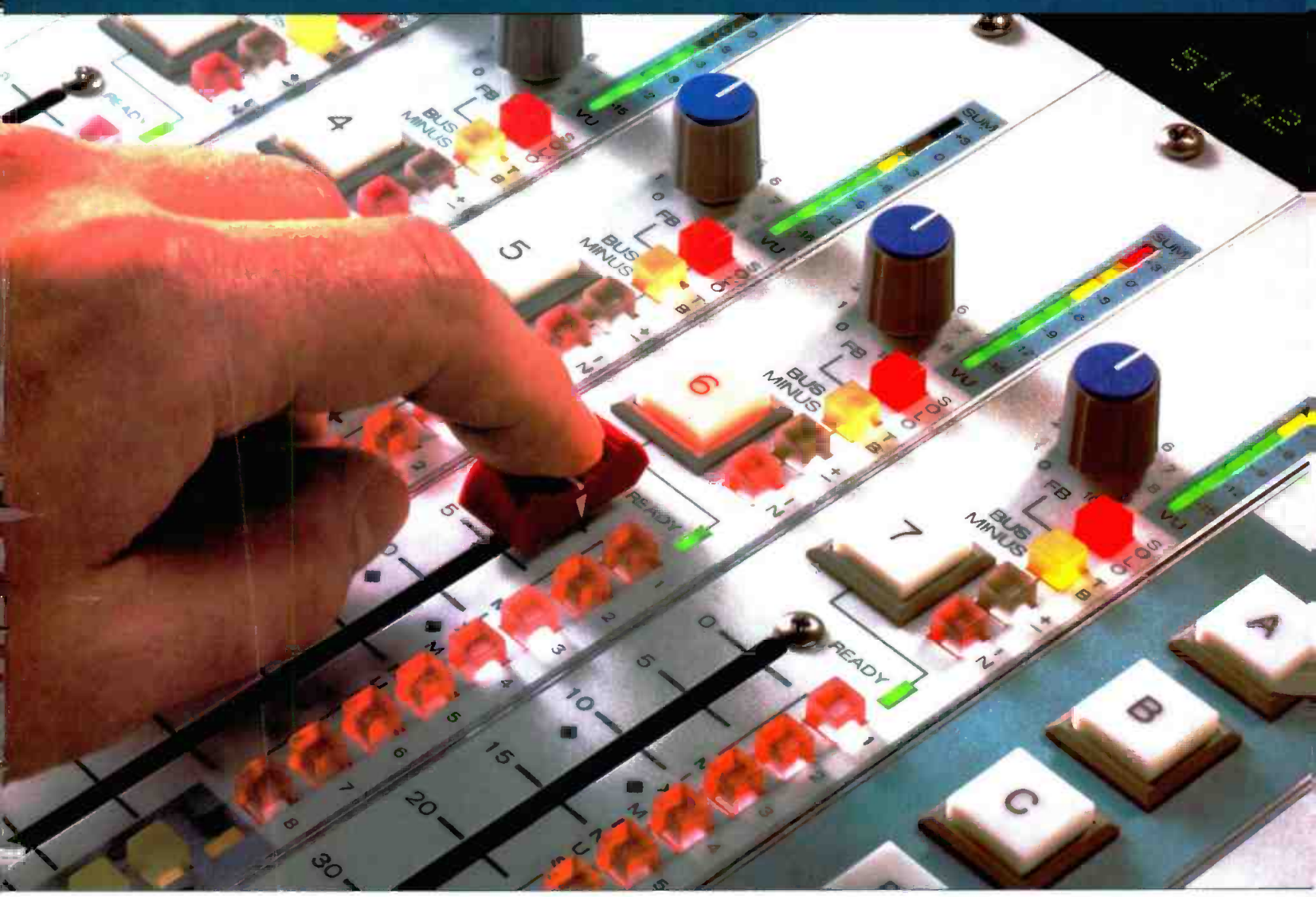

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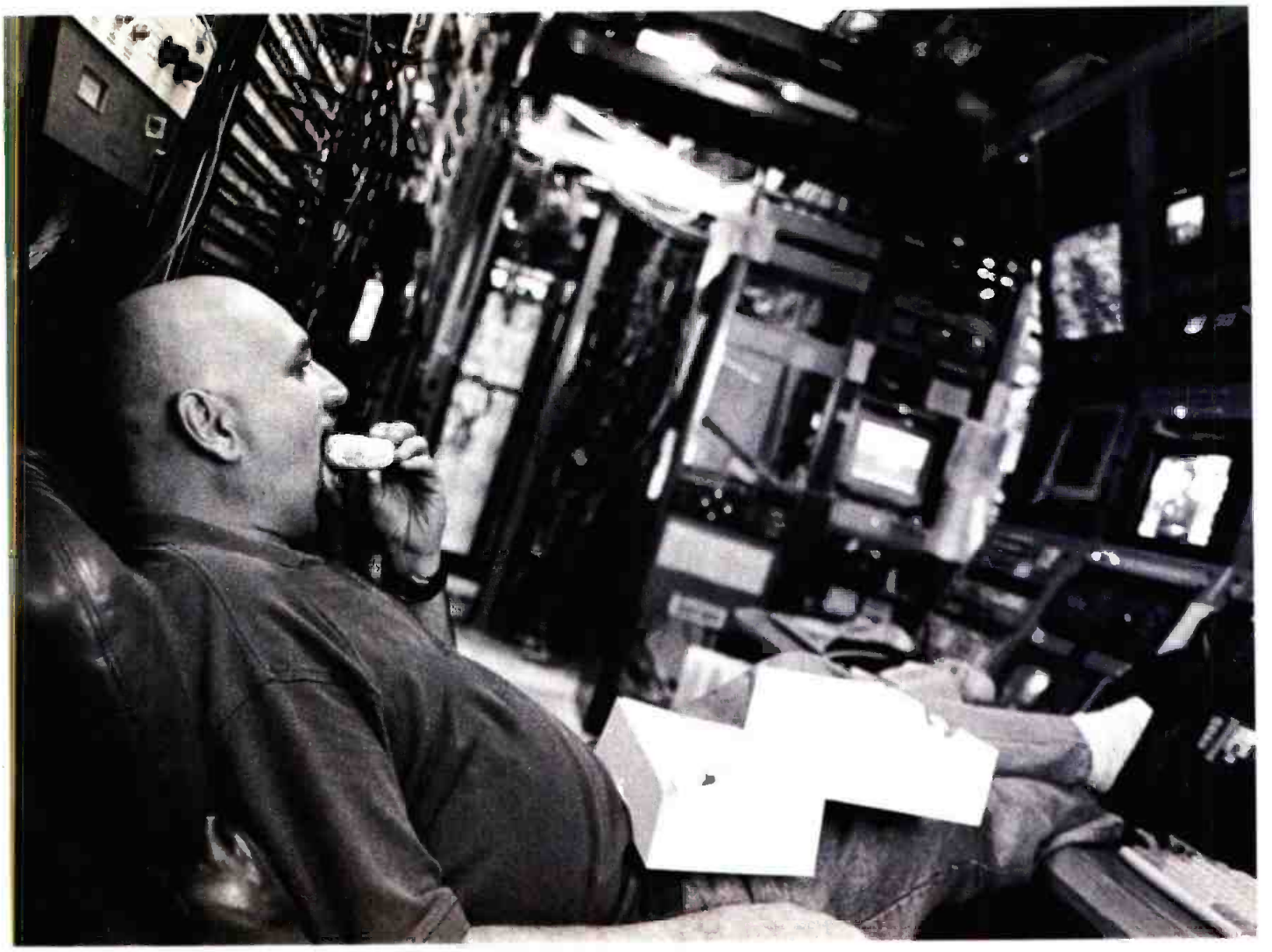

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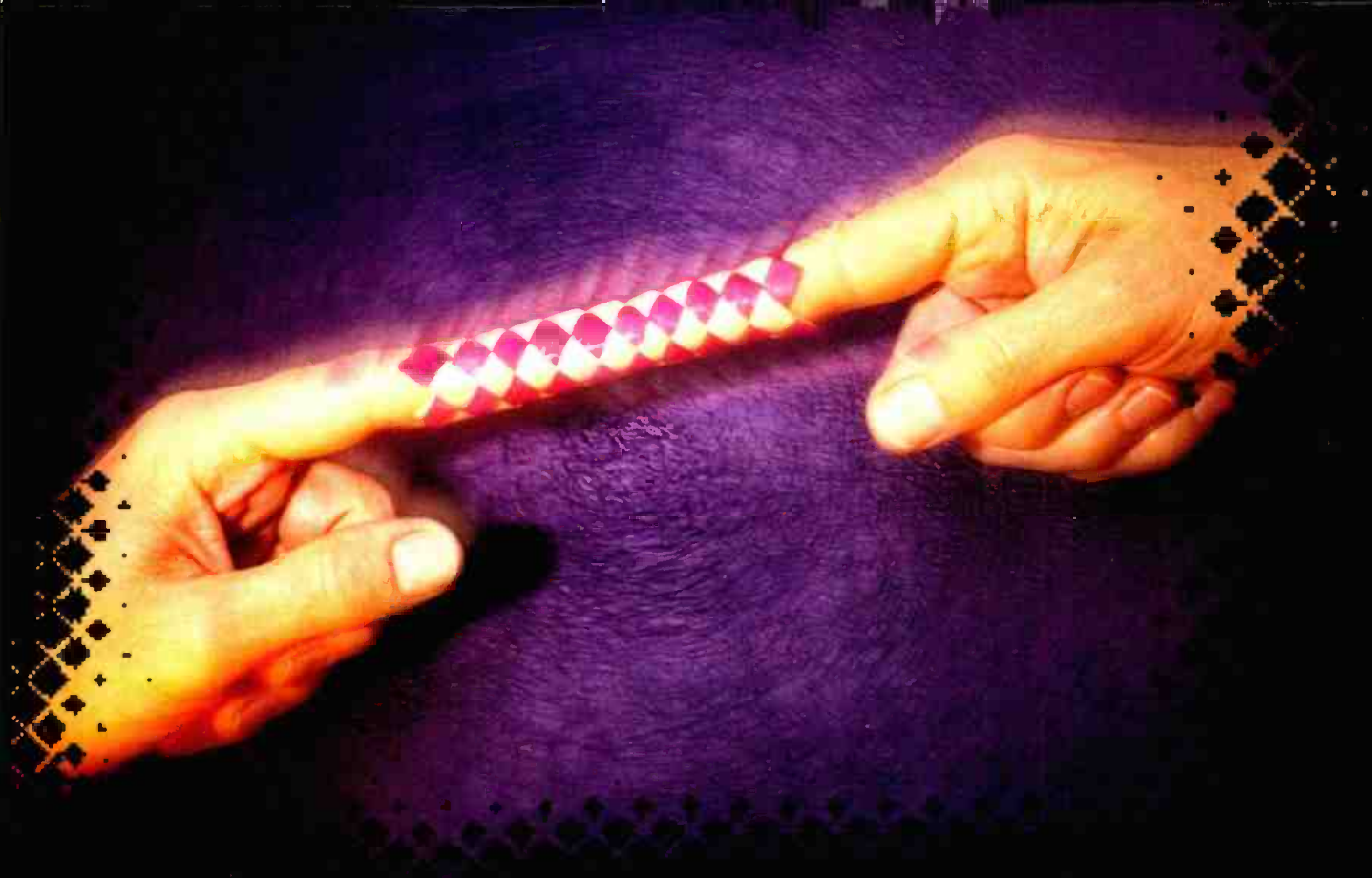

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ON THE COVER: *The Network Control Room supports the origination of three networks and employs Philips Media Pool servers and automation systems, A StorageTek Powderhorn archive system and Miranda Kaleido monitors. Photo by Robert Wolsch Designs.*

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FREEZE FRAME

A look at the technology that shaped this industry.

Do you remember?

Name the object in the center of the photo and the process being shown on the December 1985 *Broadcast Engineering* cover. Correct entries received by tax day (April 15, 2000) will be eligible for one of the *Broadcast Engineering* T-shirts. Send your entry to brad_dick@intertec.com

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Editorial

Worshiping cable

I'm never amazed at the audacity of politicians to reinvent history. Fraudulent claims, broken promises and out-and-out falsehoods are all too common. You can't turn on TV or radio without finding a politician making extravagant claims of "Look what I've done for you lately."

Before you think I'm getting off the mark and talking about Gore, Bradley, McCain or Bush, I'm not. I'm talking about the great industry savior on the Potomac, Mr. William Kennard.

In his most recent look-what-I've-done-for-you-lately ranting, he once again claims to have saved the industry with his leadership. "In January, I urged the industries to accelerate and complete negotiations to resolve four major issues that were delaying digital television sets that connect directly to the cable system, and, therefore, the transition to digital TV," said Kennard. He continued, "So, last month, I stated that if the industry could not reach agreement, I would recommend that the Commission write rules to protect the public and *speed the digital TV transition.*"

Kennard helping to speed the digital TV transition? I can't think of anyone who's done more to slow the digital TV transition than our fearless chairman. For him to lay claim to speeding the DTV transition is not only a lie, it's a damnable lie!

The FCC continues to run away from taking the very steps that would ensure a rapid and successful DTV implementation. It even refuses to force set makers to use a common DTV receiver performance definition. The result is that consumers are faced with confusing and misleading statements about what an HDTV receiver really is. Kennard's obviously satisfied with using Clinton speak, "Depends on what your definition of 'is' is."

The Commission's most scandalous inaction has centered on cable. For almost three years, Kennard and his cronies have allowed the cable industry to drag its heels on digital must-carry and other broadcast technical issues. Yet Kennard still wants us to believe he's providing leadership in resolving industry issues. Spare me the lies.

While the rest of the world is going merrily along implementing DTV on a fast-track basis, Kennard continues to protect cable from the costs of DTV. His actions are hurting consumers and slowing the very process he claims to want. If cable had to spend the same kind of money on DTV that broadcasters have, Kennard wouldn't be so quick to claim credit for his marketplace solutions.

NAB hit the nail on the head recently in a joint letter to Kennard concerning cable's continuing refusal to carry broadcasters' DTV signals. The letter notes a recent NAPTE poll showing that 78 percent of broadcasters want the (DTV) transition to be delayed. The letter also notes that with 119 DTV stations on the air, covering 61.3 percent of the country, only two DTV stations' signals are being carried on cable. The letter referred to Kennard as having accorded cable "sacred cow status." Based on his actions, I'd put it more strongly. When it comes to protection from regulation, Kennard sucks up to cable like a newborn calf to a wet teat.

Once again, Mr. Kennard, these issues need leadership and you continue to prove you're incapable of providing it.

Brad Dick

Brad Dick, editor

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Reader Feedback

Subscribing online

Either I'm really dumb or the information isn't available on your site. I received a letter from your publication saying that I could renew on the Internet. Went to the site www.broadcastengineering.com — under what category would you place renewals?

M.S. Grupp, Operator
WPXI TV
Pittsburgh

Editor replies:

Actually, you're not dumb, and the information is on the website. First, go to "Reader Resource." Then click on "Subscription Information." There, you will be given a link to a subscription form page (www.intertec.com/forms/subforms/be.htm).

No support for MIPS

To: Brad Gilmer:

In your article you stated that Windows 2000 will only run on "Intel x86." Could you clear this statement up for me? Did you mean that it will not support Intel clones (AMD, Cyrix, etc.), or did you mean that it will not support Alpha, MIPS, PowerPC?

Sean Scott
Software Engineer, Navidec

Gilmer responds:

Thanks for the question Sean. I received several comments on that column where readers asked for confirmation that the new Windows NT — now called Windows 2000 Professional — does not run on MIPs or DEC machines. I contacted Microsoft, for verification and unfortunately, it seems to be the case. A Microsoft product manager said, "Windows 2000 supports Intel clones such as AMD, Cyrix, etc. "We had support for DEC Alpha and MIPs in previous versions. DEC dropped support for Alpha.This was widely covered a couple of months ago.The market for MIPs chip sets went away a long time ago."

So the answer from Redmond seems to be that, if you want to upgrade to Windows 2000, you will have to change machines. I believe Linux is available for both of these platforms.

Sorry the news is not more positive.

Tower co-ops

Editor:

Can you please enlighten me as to how many groups you have heard of combining forces to construct a community DTV tower, and where these groups might be located? I do know that DTV Utah was formed by KSL and seven other local broadcasters to get all of them on the air by the FCC date.

Any info you might have as to other stations doing this would be helpful to me, as there is some thought here in the Albany, NY area to a project such as that.

Tom McCabe
TomCDI@aol.com

(Readers can contact Tom directly at his email address with suggestions and help in the community tower question.)

BE archive?

From the *BE* website:

Dr. Digital Has a few good things to say. Is there an archive online or do I have to go searching through old issues of *BE* to research info?

Dr. Digital responds:

The BE website contains an online archive of more than two years worth of articles and columns. To access these nuggets of information: Go to the website and click on "Archives." The material is broken down first by year and month, then by features and columns. You can find Dr. Digital under "More columns and features." Click there and you'll find the "Digital Handbook," under which that month's Dr. Digital column is carried.

Broadcast Engineering's *website is among the most complete archival resource on broadcast and production technology out there, so give it a look. Thanks for the question.*

Preparing for tomorrow

From the website:

As an engineer working in a college I need to prepare for the transition to digital. How do my staff and I adequately prepare ourselves for the future of television and radio?

Editor replies:

Good questions. First, you're doing the right thing by reading Broadcast Engineering magazine. You'll always be up to date on the latest technology if you continue reading BE. Second, check with your local SBE chapter. You should be attending the meetings. If nothing else, you'll get to tour the local radio and TV stations, which are always good training experiences.

Finally, consider getting SBE certified. Just studying for the certification tests will help you confirm your own skills. When you pass, you'll have confidence that you're ready to face today's transition to digital. ■

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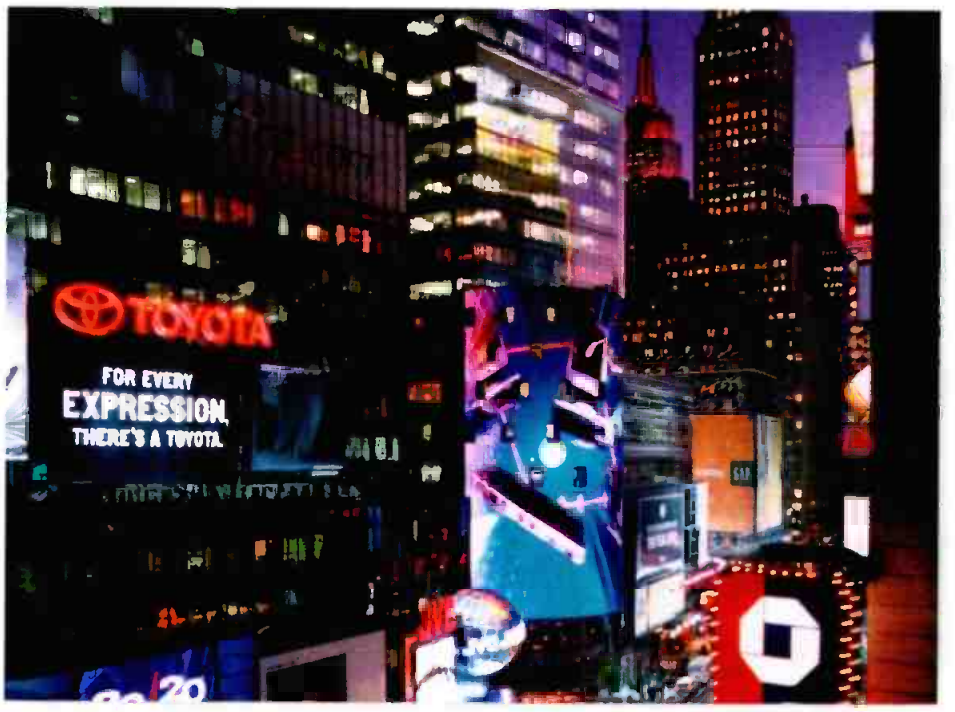
News

Big screen in the Big Apple

BY LARRY BLOOMFIELD

While Texans may have their fair share of things to brag about, when it comes to the world's largest video "super-screen," the rights of bragging pass to New York City, where a super-bright, high-resolution, nine-story-tall, quarter-acre (10,736 square feet of viewable picture) display device hangs from the cavernous walls of Times Square. Residing on the exterior of the Nasdaq Communications Center at the southeast corner of Seventh Avenue at West 43rd Street in Times Square, it is promoted as being the biggest TV screen anywhere.

Dwarfing other devices of its type, this computer-driven super-screen device displays full-motion video and computer-generated graphics with amazing clarity, producing a palette of 1.07 billion colors achieved by 1024 gradations per color, full-spectrum, of crisp, clean and clear text, graphics and video.



At 88-feet by 122-feet, the superscreen display on the Conde Nast building in New York is described as the world's largest outside video screen.

Not exactly an NTSC or HD aspect ratio, this 88-foot by 122-foot behemoth uses a total of 18,677,760 red, green and blue light-emitting diodes (LEDs) with a pitch of only 20mm and a 120Hz screen refresh rate. The blue LED is a recently perfected Japanese crystal combination that can produce a good quality blue light. The pixel count exceeds that of the best HDTV transmissions with 2,334,720.

Many outdoor display devices suffer in bright sunlight. This is not the case with the world's biggest; it produces more than 5000 candelas per square meter, which allows the display to be as bright in direct sunlight as at night.

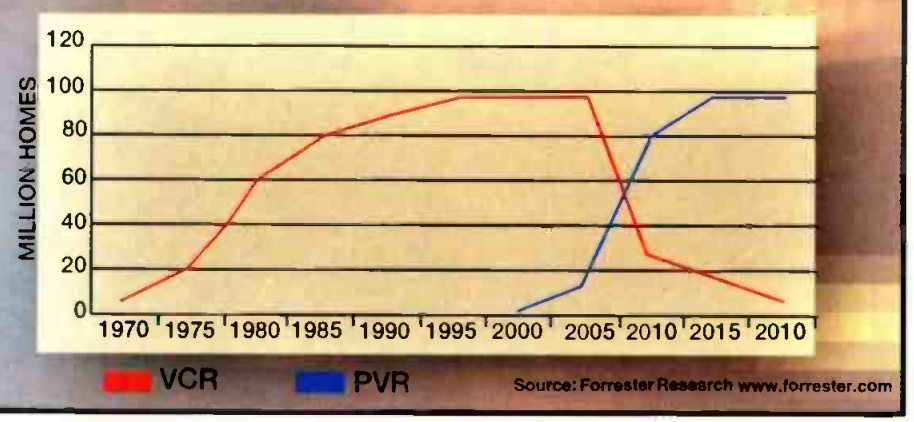
Along with its modular construction, the LED approach permits the screen to be form fitted to its location on the front of Times Square's new Conde Nast building. This mega-screen is over twice the size of the previous record holder, which was a 50-foot by 100-foot screen of this type that SACO did for the Irish rock group U2.

FRAME GRAB

A look at the issues driving today's technology

Personal video recorders to kill the VCR

The meteoric rise of PVRs will doom the VCR to museum status



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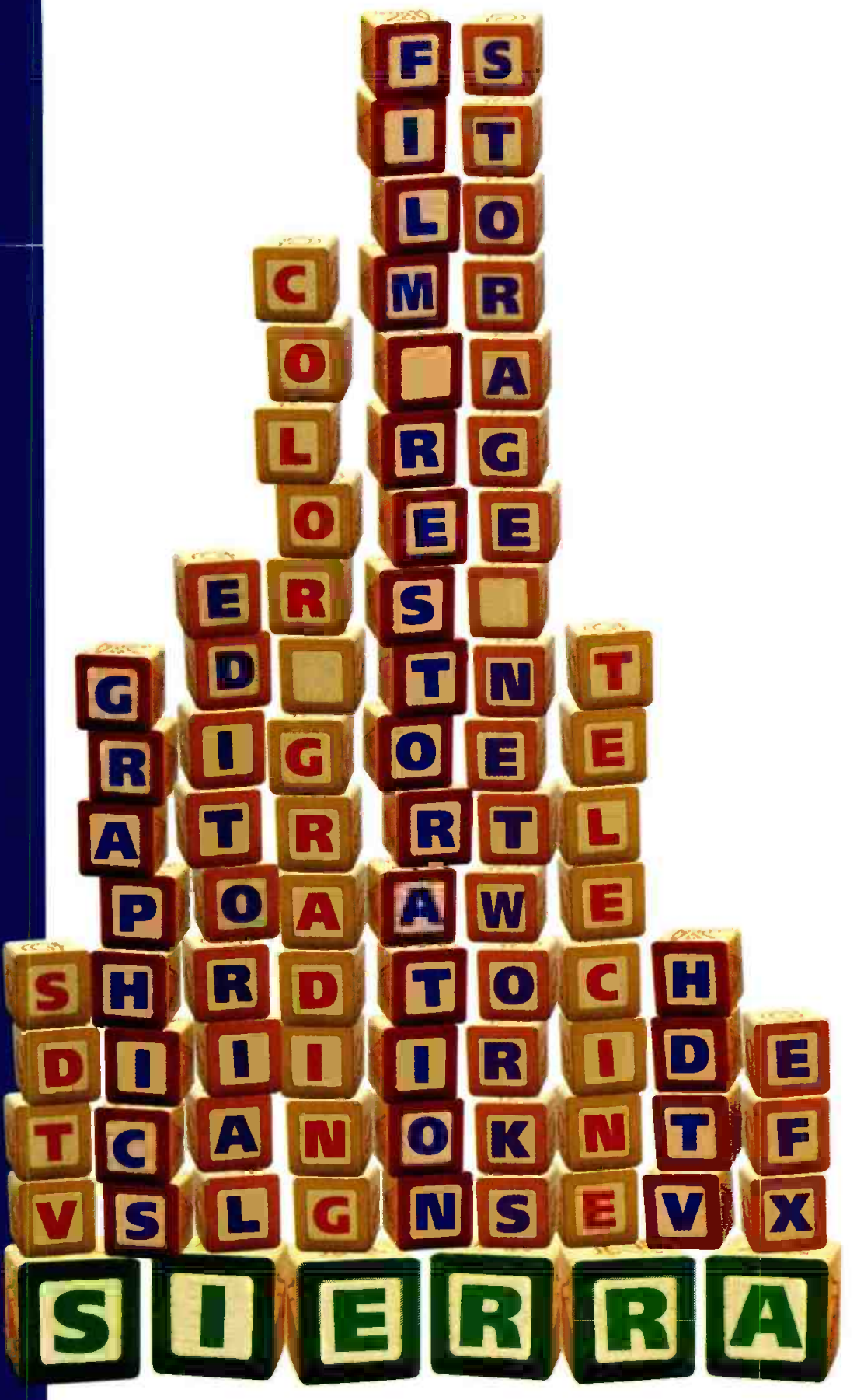

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Unlike other display devices, this kind of large screen device is constructed of lightweight, five-inch-thick panels, weighing in at 12 pounds per square foot and can be made to conform to flat, curved, spherical and even custom surfaces. Should the lease run out or should you want to move the super-screen; not a problem. The lightweight, modular construction allows for extreme versatility, portability and ease of installation. This feature is very popular with traveling concert groups who like to have large screen displays to enhance their performance.

The Times Square super-screen and other displays of this type are built up from millions of discrete, individually energized red, green and blue light-emitting diodes (LEDs). The recommended distance from most NTSC television viewing is eight screen heights and three screen heights for HDTV. This is called "viewing angle." By virtue of its construction and geometry, the super-screen should offer a far better, clearer resolution and a greater viewing angle than any type of projected or cathode ray tube (CRT) display.

Most large screen presentations degenerate when you get around to the sides. Because of the construction of these LED screens, it is possible to get nearly all the way to the right or left extremes, off center, before any appreciable degradation in color or sharpness can be perceived. This is why they can be wrapped around buildings or other structural contours without any significant loss in quality

This mega-screen is over twice the size of the previous record holder.

Maintenance is always a big consideration when acquiring any piece of equipment. With life expectancies of over 11½ years (100,000 hours), which is nearly twice that of the industry standard, replacement maintenance is not an issue. Most display devices have a certain amount of dimming typically associated with them as the result of aging; not so with LEDs. Worst case is only 15 percent degradation.

It was mentioned that the Times Square mega-screen was not in any of the standard television formats. That is not an issue as these LED display devices can be fabricated in any format desired. Because it is driven from a standard video or SVGA computer source and uses "intelligent controllers," the images can be configured into any aspect ratio or display size the user may wish. The computer interface allows the display to be divided virtually to produce multiple images, picture-in-picture, and graphic special effects mixed with video. Because of the very nature of its construction, additional panels can be added to expand the screen size as needed or desired.

As a promotional device or for advertising purposes, this is a very item and will most likely find its way into not only sporting venues or on concert tours, but also as a way to show the public what you've got on your station.

For more information visit SACO Smartvision's website at www.smartvision.com ■

New PSIP features proposed

One of the latest wrinkles in the DTV fabric comes from ATSC in their second amendment to "Doc. A/65" — The Program and System Information Protocol for Terrestrial Broadcast and Cable, or PSIP, for short. The T3 working group and full ATSC membership have concluded their respective deliberations and balloting. So what makes Amendment #2 so special?

It's called "Directed Channel Change" (DCC). DCC, which will work in conjunction with PSIP, would permit broadcasters, cable operators or other system operators the means by which they can "steer" viewers between linked, alternative program streams. Viewers have the decoder before it will work, and this new system only works if the viewer volunteers information that would be programmed into their equipment enabling "the control of the functionality of their set."

Broadcasters have always looked for ways to target specific localized programming, news, advertising and emergency information to specific audiences. A joint venture of Tribune Broadcasting and the Fox Network, the DCC technology adds system information to a transport layer within the MPEG bitstream that can focus different kinds of program material to different audiences, providing the receiver was appropriately equipped and the viewer gave his consent.

The idea is to provide program providers with the ability to enhance program content with alternative choices that can be selected directly or be automatically selected in the display system, based on information that the viewer has provided indicating their specific or special interests.

It allows the person or service operating the system to call the attention of the viewer to content which the program distributor has categorized and the viewer has elected to receive, when available.

This DCC innovation provides broadcasters and system operators a great deal of flexibility in programming the DTV multiplex to provide content delivery services to targeted audiences. DCC is designed to be useful on display systems that implement PSIP without requiring additional, complex data processing capability.

A DCC request is a trigger event sent within the PSIP stream of the DTV multiplex that will cause a DCC-capable DTV receiver to select a different virtual channel from that to which it is already tuned. Depending upon the kind of DCC request, the change to a different virtual channel can occur without intervention by the viewer, if, and this is important, the viewer has enabled the capability by providing required information during a setup process or during operation of the display. Alternatively, the change can

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take place under direct control of the viewer, if, for instance, the viewer uses his or her remote control device.

To enable the automatic carrying out of a DCC request within a receiver equipped to handle this system, the DTV viewer will be required to provide personal information to the display system. This may be done through an interactive setup session or may be done while using the DCC system, as different viewing options become available. The information provided by the viewer to the system interface or receiver, will permit the unit to determine which, if any, alternate virtual channel the viewer's TV should display upon receipt of a request. This selection will take place through comparison process, which matches the viewer information with categorization information or other selection criteria sent by the broadcaster or system operator. There are also forms of DCC request that enable real-time viewer selections among alternate program streams, such as the alternate camera views of a sporting event DTV is capable of.

A switch from a currently viewed virtual channel to another virtual channel may be done when the system recognizes any one of eight categories of trigger information. The trigger information may be seen by the system individually or may be used in combination. The first four categories of the eight are required as minimal to support the DCC system here in the U.S. They are the unconditional switch; postal code, zip code or location code; program identifier; one of eight user categories; demographic; subject content; authorization level; and content advisory value.

This DCC innovation provides broadcasters and system operators a great deal of flexibility in programming the DTV multiplex.

In addition to these eight, criteria include groups of viewers into a DCC request. Several of the criteria may also be used to exclude viewers from inclusion in a request. Instead of listing many zip codes for inclusion of viewers in a DCC request, the reverse approach may be used to specify the group of viewers not included within a group of zip codes.

In addition there are two other DCC request actions have also been defined: an action to be taken upon a viewer switching away from a channel, and an action to be taken upon a viewer switching into a channel.

The broadcaster may specify more than one type of selection criteria within a single DCC request. For example, it is possible to specify several individual zip codes by employing the loop structure within a DCC table.

An unconditional switch would cause all viewers' channel, regardless of any other DCC selection criteria selected within their receiver, to switch to a specified virtual channel. A po-

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Craig Claytor
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tential use of these criteria would be to aggregate viewers on different virtual channels to a single channel or could be used in conjunction with an emergency alert system message.

A channel change based upon the viewer's postal code, zip code or location code may be accomplished by using one or more of these criteria. Broadcasters may use these capabilities to provide targeted programming based upon a viewer's location within the viewing or coverage area.

The Program Identifier executes a channel change based upon a program's episode and version number. Use of this function would permit a broadcaster to direct a viewer's attention to a broadcast of a particular program having a specific episode and version information. If enabled, the function within the receiver would "remember" that the viewer had watched a program's previous episode/version, the system would direct the viewer to that program again upon detection of this criteria within the multiplex.

The user-specified category would allow a broadcaster to specify one of eight classifications of a program so that if a viewer pressed one of eight "viewer-direct-select" buttons on a remote control, he or she would be directed to a virtual channel airing a program having that classification. This function would permit a broadcaster to define classifications not anticipated by this standard and then permit the viewer to be directed to programs or segments having those classifications.

Demographics such as age group and gender can be selected as switching criteria.

The DCC system has designated nearly 140 categories of subject matter have been tabulated that can be assigned to describe the content of a program. The subject content can be used to initiate a channel change. A broadcaster may use this category to direct a viewer to a program based upon the viewer's desire to receive content of that subject matter. Although nearly 140 subject categories have been identified for inclusion in this revision of the specification, additional categories may be determined in the future and may be transmitted to the reference receiver through a table revision mechanism.

In the event that a viewer attempts to switch to a virtual channel that he or she is not authorized to view, the authorization level will preclude them from doing so. The system is set up to direct the viewer to an alternative channel such as a channel informing the viewer that he or she is ineligible to view the channel the viewer attempted to tune. This is helpful if the station wants to offer pay-per-view.

The content advisory level category is similar to that described in the Authorization Level, but would redirect the viewer to a different channel providing the content advisory level in the system has been previously set above or below the value specified within the request.

A departing request descriptor may be used within a DCC signal to cause a text box to appear for a definable amount of time prior to performing a channel change requested by the viewer. The text box may be used by the broadcaster to present information to the viewer, such as plot elements remaining in the program or upcoming segment schedule information.

An arriving request descriptor may be used to signal the occurrence of an arriving request or cause a text box to appear for a definable amount of time upon arrival at a newly tuned virtual channel. The broadcaster, to bring the viewer up to this point in time in the program, may use the text box. It could also be used to inform a viewer of a program schedule change or preemption.

Through an optional downloadable table mechanism called the DCC Selection Code Table, up to 255 content descriptions and selection codes may be delivered to DCC capable DTV receivers over the broadcast link. The table may be updated in the future to provide additional, or alternate, selection categories. An initial set has been provided within the new standard to permit a baseline capability, which may be extended, if required, by industry agreement and revision to the standard.

Through a downloadable table mechanism, data necessary for a viewer to identify important aspects of the system may also be acquired without placing stringent memory requirements upon receiver designs to accommodate potentially voluminous data useful only during setup.

The table is transmitted within the multiplex on a fairly infrequent basis - for example, no more frequently than once per hour. New category table editions may be identified by a table identification having a higher number than that currently loaded within the reference receiver.

More information on the particulars of this new system can be found on the ATSC webpage at www.ATSC.org. ■

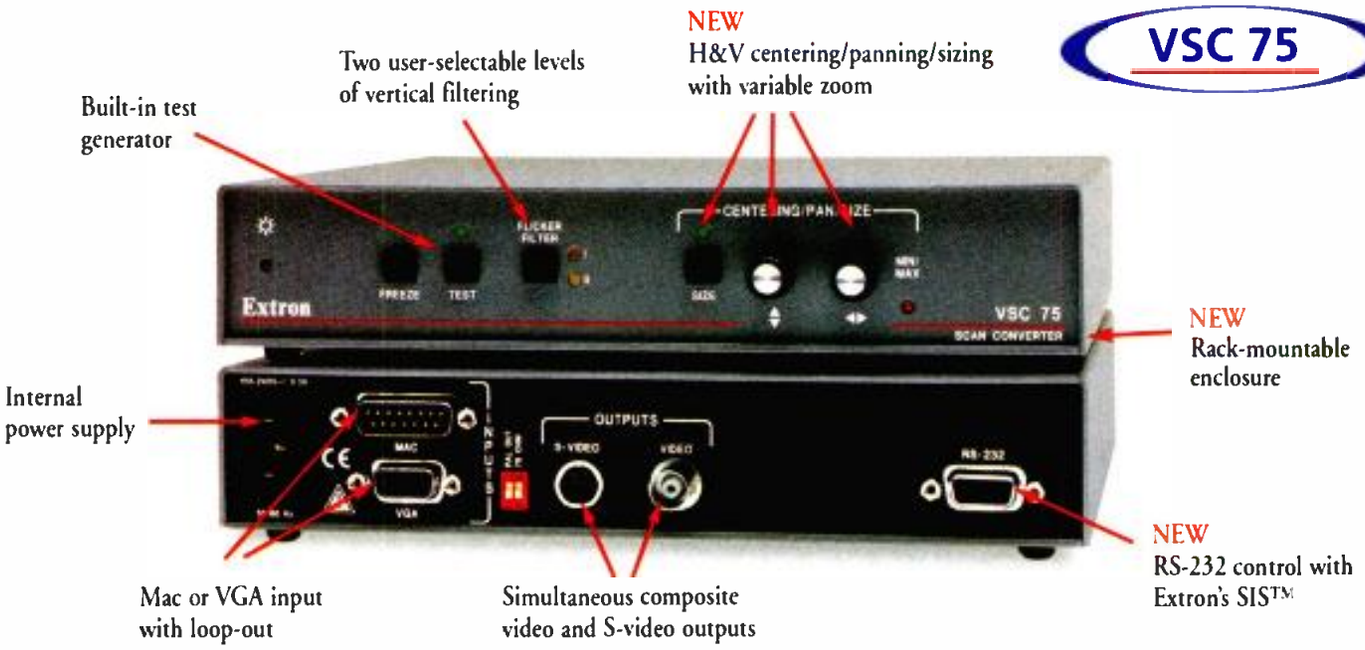
DOD sent packing

In a meeting held earlier on January 13, in the offices of Art Money, Assistant Secretary of Defense, Pentagon officials reiterated their position that the U.S. digital television standard fails to support the "unique needs" of DOD. Among those present at that meeting were representatives from the Consumer Electronics Association (CEA), ATSC, Thomson (a French firm), Zenith Electronics, Nxtwave, Dick Wiley and a battery of lawyers. This group went to the Pentagon in an effort to reverse its stand on the current U.S. digital television (DTV) standard, 8VSB. Instead, the DOD reaffirmed its concern for the FCC-imposed 8VSB. Pentagon officials cited "jurisdictional concerns," as the only reason for removing itself from direct involvement in the civilian DTV standard.

The Department of Defense has no desire to revisit the 8VSB U.S. transmission standard adopted by the FCC.

In that January meeting, Money stated the DOD requires "DTV to support portability, mobility, and

VSC 75



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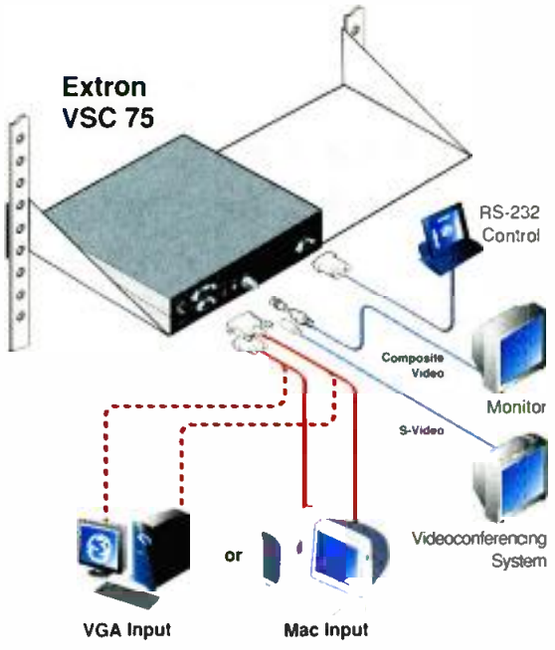

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their petition, David D. Smith, president of Sinclair Broadcasting Group, said, "Although the Commission dismissed our petition, we welcome their larger interest and intent to investigate all aspects of DTV and its fundamental failure to date. Further, we are hopeful that our continuing efforts to shed light on the relevant DTV issues affecting our industry can now be supported by the industry as a whole. We look forward to participating in this review which the Commission committed to begin within 30 days." It is no secret the ATSC and the Consumer Electronics Association (CEA) lobbied hard to bury the SBG petition. In a press release issued the same day of the FCC decision, the Consumer Electronics CEA President and CEO Gary Shapiro issued a victory statement. "As the only organization to file a petition with the FCC calling upon the agency to dismiss Sinclair's proposal, we commend the commissioners for today's unanimous decision. With this ruling, DTV's future is clear and paved for success. The FCC has wisely provided broadcasters, manufacturers and consumers with the certainty they need to move forward with the transition to digital television.

The FCC has said it has recognized the importance of the issues raised and would seek further comment. on the issue.

"Today's ruling will allow television manufacturers, broadcasters and all others involved in the DTV transition to return our full attention to what matters most - providing consumers with the full benefits of digital television," Sharpiro said. "I hope this ruling will close the door on this issue. As demonstrated by more than 10 years of laboratory and field tests, 8VSB is clearly the best system for broadcasting digital television in the United States. And retailers report that consumers who are viewing over-the-air digital television love what they're seeing."

CEA may not have had the last word. The FCC has said it has recognized the importance of the issues raised and would seek further comment on the issue during its biennial review of the progress in DTV rollout. ■

Motorola patches

In the world of digital, a correction to a problem is often called a "patch" and Bob Stokes, director of operations at Motorola, says that his company has a "patch" for the woes of 8VSB multipath reception.

Stokes says, "Motorola supplies chips to both standards; 8VSB and COFDM. Our company led the launch in Europe for DVB. We are experienced and now have our third generation on the street. Our MCT2100 is our entry into the VSB market for ATSC and represents our first generation in VSB which is equivalent to the industries third-generation VSB chip."

Stokes said both 8VSB and COFDM technologies are good, but both have tradeoffs. "There is no free lunch. VSB is superior when it comes to impulse noise. Threshold is superior in VSB," Stokes continued. "For mobile reception, COFDM is better under multipath conditions."

It is Stokes' opinion that in the North American market, VSB has the edge in trying to reach the maximum number of households. Stokes said, "In Europe, particularly England, where there are single-frequency operations, COFDM has advantages." Stokes compared this kind of coverage to

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Component

AUDIO:
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AES/EBU Digital
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AUDIO:
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being like cellular, where frequency usage is duplicated over comparatively short distances.

Stokes said that Motorola has visited and tested problem NTSC sites. Stokes stated: "With this generation of VSB chips, the coverage at the same power level as NTSC is the same."

Stokes said the VSB chip is very much akin to the QAM technology and would require very little else in the current chip to accommodate both technologies. In reference to Sinclair's recommendation to have both 8VSB and COFDM, Stokes said, "The ability for a single chip to accommodate VSB and COFDM, however, would be nearly unmanageable, requiring a considerably larger amount of silicon real estate and coming at a much higher price."

James Farrell, Marketing Communications Manager for Motorola's semiconductor business, said, "Motorola's position is that the reception issues would be improved with new technology coming to market." Farrell thinks that the FCC's decision reflects that thinking. When asked, Farrell said, "Motorola plans to ship its third-generation chips for DTV sets that offer improved reception in volume within the next few months so manufacturers can get products into the hands of the consumer by Christmas." Stokes said, "The tests conducted late last year in Philadelphia, Washington, D.C., and San Francisco showed that multipath is a major concern and software enhancements, not a redesign of the chip will provide a viable defense."

Ray Herring, Transmitter Supervisor at KGO-TV/DT in San Francisco, was present during Motorola's San Francisco testing. Herring said, "I was impressed with Motorola's chip. The equalizer was working very hard in the multipath conditions."

Addressing the various test situations, Herring said, "We found that all three: Motorola, the RCA DTC-100 and the Panasonic box all worked fine in a moving vehicle. We even had reception in some tunnels going up U.S. 101, north of the Golden Gate Bridge."

"We even had good reception using a small $10 indoor antenna in many locations," he said.

Herring said that the tests that Motorola conducted showed that "they had to do a lot more software work to the equalizer for it to handle pre-ghost and post-ghost conditions."

Herring concluded: "We did these tests in December (1999) and I have no doubt that Motorola has probably done a lot of software work since then."

Motorola has been hard at work making software improvements to its MCT2100 8VSB receiver chip. Following up on tests conducted in November and December, Stokes said that Motorola is expecting to post the results from field tests from a site in Phoenix using signals from three DTV stations. Stokes said, "The results will reflect software enhancements, which reduce tuner noise and allow the chip's equalizer to combat noise within the signal, and the chip's ability to handle impulse noise better. The advanced software can go into different modes of operation, making the software able to handle different signal conditions and situations." ■

Send questions and comments to:
larry_bloomfield@intertec.com

FCC Update

FCC denies Sinclair DTV petition

BY HARRY MARTIN

The FCC has denied the much-publicized Sinclair Broadcast Group petition, which asked the FCC to modify DTV rules to the use of COFDM in addition to the current 8VSB modulation standard.

Sinclair conducted a series of field tests comparing the performance of the COFDM and 8VSB modulation standards. The tests revealed that certain first generation 8VSB receivers do not operate satisfactorily in strong multipath environments using a simple indoor antenna. The Commission concluded, however, that rather than demonstrating a problem with the 8VSB standard, Sinclair's petition only demonstrated some of the shortcomings of early DTV receivers. The FCC believes equipment manufacturers are aware of the problems noted by Sinclair and are taking steps to resolve multipath reception problems in first generation DTV receivers.

The FCC's Office of Engineering & Technology (OET) concluded that, although both the 8VSB and COFDM standards have certain advantages and disadvantages, it did not find the performance of either system to be superior to the other in all respects. OET further concluded that the relative benefits of changing the DTV transmission standard to COFDM are unclear, and, in its view, are significantly outweighed by the costs of revising the transmission standard at this late date. The Commission also believes the development of a COFDM modulation standard would result in a multiyear delay in the implementation of DTV.

In denying Sinclair's petition, the Commission stated that concerns regarding the adequacy of its current DTV standard are more appropriately addressed in the context of its review of the entire DTV transition. The Commission will commence its biennial review of the DTV transition in the first quarter of 2000, and, as part of that proceeding, will encourage parties to address concerns regarding the 8VSB standard.

FCC examines DTV public interest obligations

The Commission has released a Notice of Inquiry into the public interest obligations of television broadcasters as they convert from analog to digital transmission. The Commission called such requirements the "touchstone" of its duty in licensing the public airwaves.

Among the topics in the Notice of Inquiry are suggestions that broadcasters be required to devote five minutes of evening airtime to candidate-sponsored discourse 30 days before an election; provide forums to local and national candidates; and be prohibited from imposing blanket bans on selling political candidates airtime.

The Notice also solicits comment on the following issues:

- Disclosure. Whether broadcasters should make their public files available through Internet postings and electronic mail, and whether broadcasters should use the same means to disclose a station's public interest programming and activities.
- Multichannel Capability. Whether television stations' public interest obligations should apply to the new capabilities of digital television, such as multiple channel transmission. Specifically, the Commission asks how broadcasters should apply the children's informational and educational programming guideline when offering more than one programming stream through DTV multiplexing. The Commission also asks what public interest obligation, if any, should apply to a DTV broadcaster's channel that is used to provide ancillary and supplemental services, such as datacasting.
- Disaster. Whether digital television should be used to pinpoint emergency warnings, such as those directed at specific households or neighborhoods.
- Disability. How broadcasters might make their programming more accessible to persons with disabilities, such as by enabling viewers to change the size of captions or to make video descriptions more widely available.
- Diversity. Whether there are ways unique to DTV to encourage diversity.

In separate statements issued with the Notice, Commissioners Michael K. Powell and Harold Furchtgott-Roth expressed concern about the majority's request for comment on ways to increase political candidate access to airtime. Powell said the Commission "risks opening a back door to the legislative and electoral process" by soliciting comments on these issues, and that "a federal agency of unelected officials should not on its own initiative tread in an area that may fundamentally affect the electoral process." In commenting on other new obligations suggested in the Notice, Commissioner Furchtgott-Roth said DTV public interest obligations should be no greater than those required of analog broadcasters. ■

Dateline

All non-commercial TV stations must submit their DTV applications by May 1, 2000. All commercial TV stations must complete construction of their DTV facilities by May 1, 2002. Non-commercial stations must complete DTV construction by May 1, 2003.

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

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

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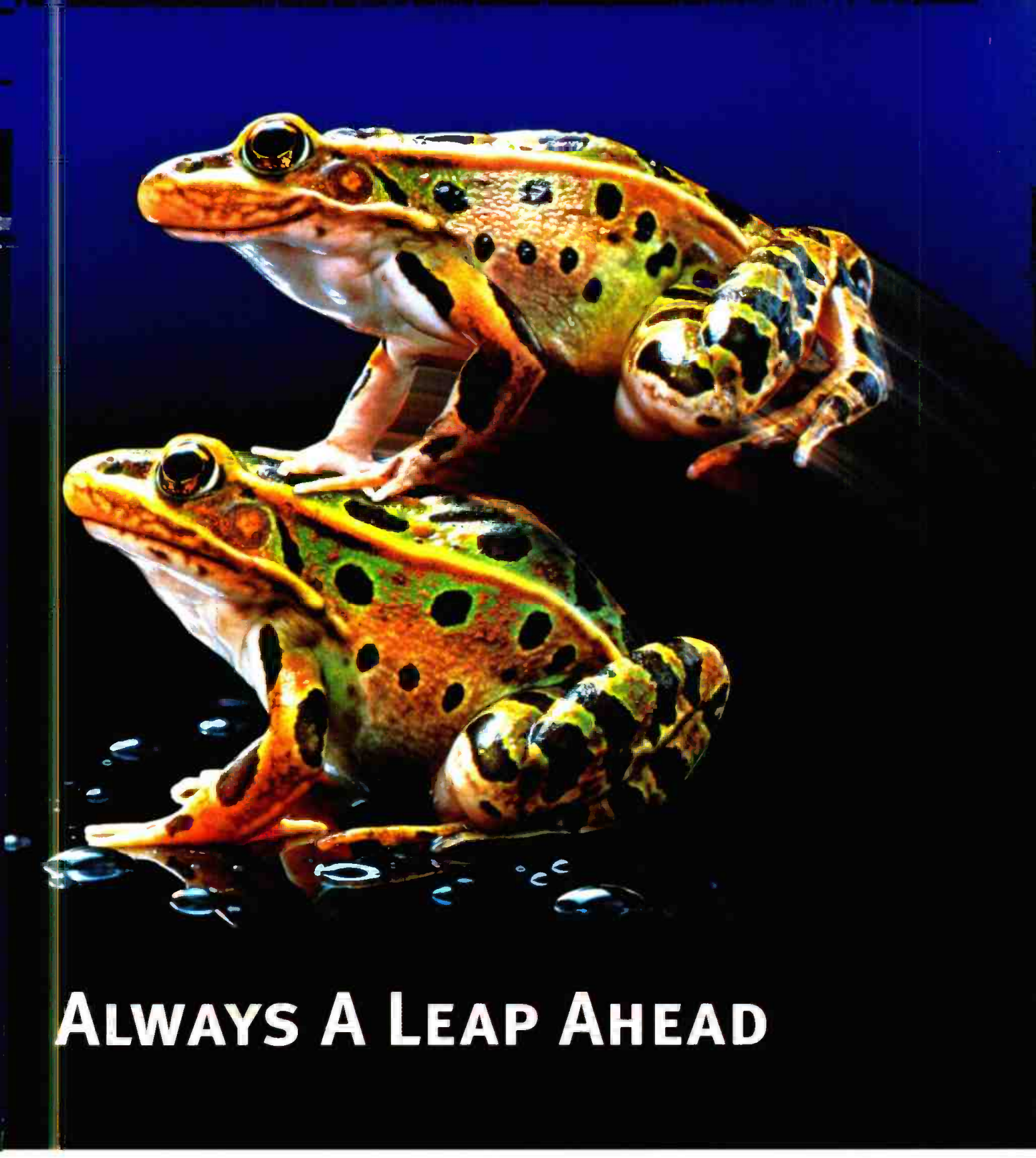

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Virtual set in your future?

BY JIM SALADIN, SENIOR ASSOCIATE EDITOR

About five years ago, virtual sets burst onto the broadcast scene with all manner of wide-ranging promises. And while several of those promises centered on truths inherent in the design of virtual sets, among them unheralded levels of dynamism, flexibility and technological integration, virtual has remained a horizon technology.

How long will it remain so? Enough deep-pocketed network installations are up and running – network news and sports operations, Turner, The History Channel – that it must make sense at some level to make the jump to a virtual set. What are the benefits of using virtual sets? Is there a future for virtual at the local production level?

For guidance on these questions we turn to two leaders in the field of virtual sets: Dan Devlin of Devlin Design Group, and Ann Cudworth, a freelance designer known for her work with CBS. ■

Send questions and comments to:
jim_saladin@intertec.com

VENDOR

Dan Devlin, Devlin Design Group

In order to explain the benefits of using virtual sets for local production, it takes a general understanding of the end-user's needs. From a creative director's perspective, one of the three main benefits, of course, is having creative freedom: A set designer's creativity/imagination is absolutely limitless. The other two benefits (outlined below) are physical size and ability to change, and its cost effectiveness.

Physical size and ability to change

Virtual sets, depending upon the system, grant the following benefits to the user.

1) The production facility can be fairly small. You only need about 15'x20' to begin with and about 25'x35' for better optimization of the set design. The parameters can go far beyond these sizes as well for a full-scale video or film production at 50'x60' or larger. (Again, depending upon the virtual system used.)

2) Along the same lines of the size of the blue stage is the size and location of the set itself. There are possibilities to use larger areas in which it is not physically possible to create on a soundstage.

3) A virtual environment means freedom. Often, directors want to do a move that is not possible in real life, i.e. video panels coming from impossible areas such as the floor or wall, or moving the talent across the floor with a magic carpet (for those into a more sci-fi look). Virtual allows such things.

4) Within broadcast and production, there is always a need to change the backdrops - occasionally, a number of times per day. With virtual, you can change the design at any time. You can treat foreground elements the same as regular props. People can be positioned and placed as usual. This is a great benefit for live production. News directors, for instance, have a certain way of delivering a broadcast and do not like to change it to fit the needs of hardware and software.

5) With some virtual set tracking systems, there is ability to dolly and track cameras on tripods or steadycam units. This allows the director to use the entire space in the bluescreen studio.

Cost effective

Virtual technology also offers benefits to the bottom line:

1) Because, like a real set, you can use multiple sets daily within the same studio, a virtual set will minimize the need to have staff tearing down and building backdrops. You will only need to change the foreground elements and a software file. Labor fees for a construction crew as well as the fees for supplies and storage to hold the backdrops would be reduced.

2) A single virtual studio system can work on a variety of methods. With one virtual studio, you can pipe the information into different bluescreen studios whether it's on the other side of the door or in another building 50 yards away. Since all cables are digital video, parallel, serial, or Ethernet, the routing can be fairly simple.

3) The ability to change positioning of cameras is critical in all broadcast and post-production situations. The virtual set allows you to move the camera very quickly to almost any position in any part of the set. If a real set is very large, it becomes too difficult to move equipment.

4) If you are creating a flythrough of a set design it would not be very cost effective to do it on a real set. Hanging camera equipment, lighting, and mechanics is expensive and time consuming.

5) You do not have to purchase extra lighting to get effects on different parts of the set because only the talent needs to be lit to match the background. Understand that you still need a good lighting director to create the feel that you are in the virtual set instead of on it, but it is much easier than trying the light the entire set or even a section of it again in real life. ■

Dan Devlin is the creative director and CEO of Devlin Design Group.

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Transition to Digital

MPEG systems

BY MICHAEL ROBIN

Standard-definition (525/60 or 625/50) studio applications are generally based on the use of ITU-R BT.601 concepts and values. Constraints related to the limited bandwidth of recording and transmission systems require compression of the 270Mb/s bit-serial digital signals to lower bit rates. Ideally, the signals would remain digital to permit full-quality reproduction of pictures.

In an analog transmission world, these signals are encoded into NTSC or PAL for transmission to home viewers. The analog transmission of SDTV signals can be accomplished using analog (AM-VSB) transmission methods as was done during the last 60 years. Using a similar approach for the transmission of HDTV signals with serial digital bit rates of the order of 1.485Gb/s is unrealistic. Here, compression is not a choice but a necessity.

The now pervasive method of compression, MPEG, was developed in the early 1990s. MPEG-1 was developed to compress low-resolution pictures (one quarter CCIR 601) to data rates not exceeding 1.5Mb/s. MPEG-2 was developed for the delivery of compressed video for home entertainment. It is a set of defined compression and systemization algorithms and techniques with well-defined guidelines allowing variations in the values assigned to many of the parameters. It is the specified digital encoding for DTV transmissions in a 6MHz channel with a bit rate of 19.4Mb/s.

Removing redundancies

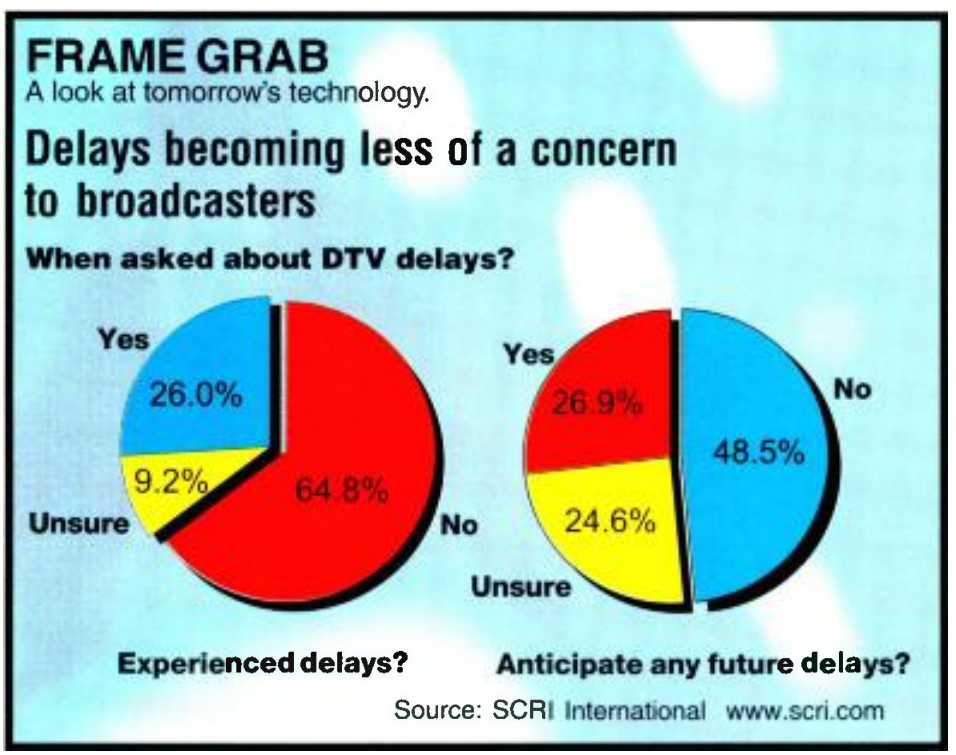
The MPEG compression concept is remarkably simple: Discard video signal redundancies to reduce the bit-rate. To do this one must identify the redundancies and then apply methods of removal. In the end the human visual system (HVS) is the judge so the compression methods have to take into consideration its characteristics. Video signal redundancies fall into three categories:

- **Non-essential data:** Non-essential data are vertical and horizontal blanking data. These do not contribute any picture information and can be removed without affecting the picture.
- **Statistical redundancies:** Including spatial, in which large areas of the picture adjacent pixels have identical values, and temporal, in which consecutive pictures are similar.
- **Perceptual redundancies:** The HVS has a reduced sensitivity to fine luminance detail and chrominance detail.

The MPEG toolkit

MPEG offers a "toolkit" of useful bit rate reduction schemes briefly described below:

- **The discrete cosine transform** (DCT): The picture is broken into blocks of eight pixels x eight lines (8x8 block) of luminance (Y) and corresponding color-difference (CB and CR) samples. Each 8x8 block is transformed into 64 coefficients describing the amplitude of the DC component and that of 63 discrete spatial frequencies. No information loss results.
- **Requantizing (REQ):** Upon quantization, a large number of coefficients resulting from the DCT process have zero or near zero values. Because these need not be transmitted, the result is considerable compression. This is a lossy process achieved by assigning short wordlengths (few bits per sample) to low-level signals, e.g. representing high frequencies to which HVS is insensitive, and long wordlengths to higher-level signal, e.g. low frequencies.
- **Run-length coding (RLC):** The DCT results in significant amplitude coefficients located near the top left area of the block. Reading the data in a zig-zag manner results in sending non-



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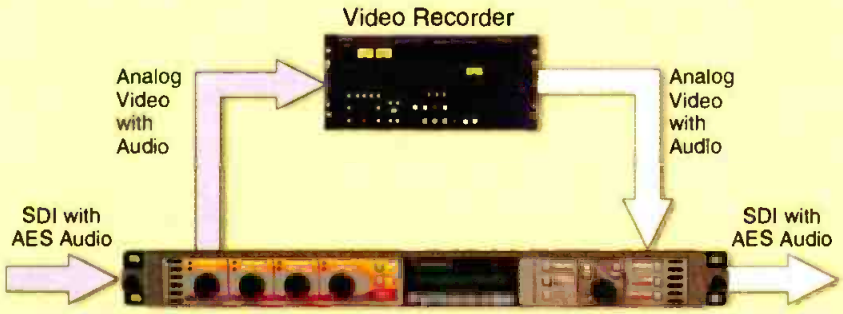

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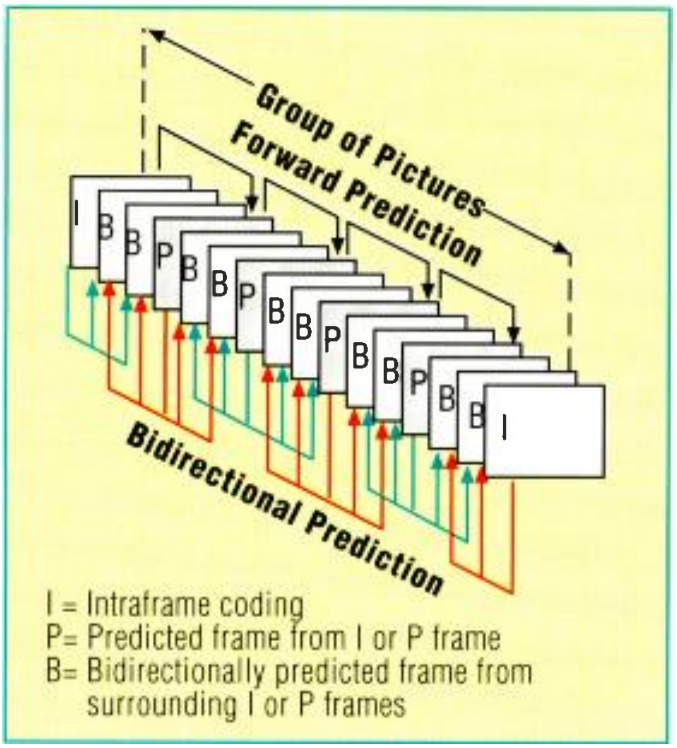

Figure 1. An MPEG group of pictures (GOP). A GOP starts with an I frame and typically contains up to 15 pictures. I frames are reference frames from which both P and B frames are predicted. P frames use motion-compensated predictions from a past P or I picture and are generally used for further predictions, whereas B frames are bidirectionally predicted from surrounding I or P frames.

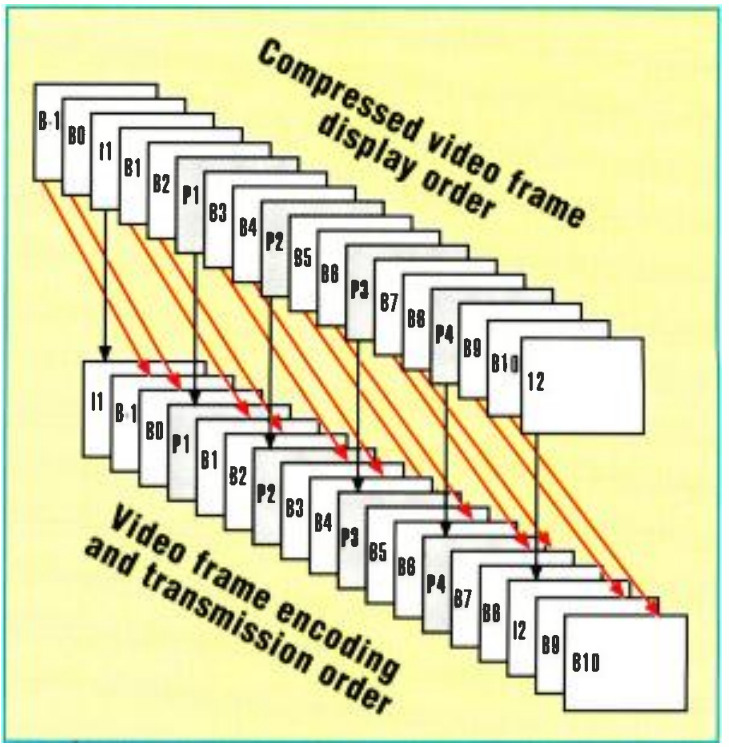

Figure 2. The reconstruction of a B frame requires that the preceding I and following P pictures arrive first, necessitating a reordering of frame sequence from transmission to display.

zero coefficients followed by a long string of zero values. The RLC process efficiently encodes the sequence of DCT coefficients by sending a unique codeword in place of a long string of zeros, thus resulting in a further compression of data.

• The variable length coding (VLC): The DCT, REQ and RLC processes result in certain coded values occurring more often than others, giving rise to a predominance of near-zero coefficient values. The VLC allocates short codewords to frequently occurring values, such as a stationary picture, and long codewords to infrequently occurring values such as moving objects.

• The buffer: All previously mentioned processes result in a variable bit rate (VBR) depending on the picture complexity. Recording and transmission require a constant bit rate (CBR), which is achieved by a buffer. The input to the buffer is VBR and the output is CBR. To avoid buffer overflow or underflow the buffer generates a rate control that adjusts the quantizer step depending on the video content and activity. This results in CBR but also in a variable picture quality (VPQ).

MPEG hierarchical layers

MPEG-1 and MPEG-2 data structures are made up of six hierarchical layers. These are:

• The block: Luminance and chrominance data are separated in 8x8 blocks of Y, Cband Cr values;

• The macroblock: Four 8x8 blocks of Y values in a window of 16x16 pixels and their associated Cb and Cr values. In the 4:2:0 format there are four Y and one each Cb and Cr blocks in a macroblock;

•The slice: Is made up of several contiguous macroblocks;

•The picture: Is made up of a group of slices constituting the active picture. Pictures can be I (intraframe coded), P (predicted) or B (bidirectionally coded);

•The group of pictures (GOP): is made up of a sequence of various combinations of I,P,B pictures. It contains a maximum of 15 pictures and starts with an I picture; and,

•The video sequence: is made up of one or more GOPs as well as a sequence header and end-of-sequence code.

The original signal is preprocessed to reduce redundancies before any compression takes place. This includes noise reduction, subcarrier residue filtering and, if required, 4:2:2 to 4:2:0 downsampling. The MPEG compression scheme results in three types of pictures: intraframe (I), interframe (P) and bidirectional (B).

I pictures are generated in a spatial coder. This type of coder uses a combination of lossy and lossless-intraframe compression schemes applied only to the picture (frame or field) itself to remove spatial redundancies. It provides only moderate amounts of compression. The I pictures contain full picture information and provide access points to the coded sequence where decoding can begin.

P pictures are generated using interframe compression schemes to reduce spatial and temporal redundancies. They are coded more efficiently by using motion compensated predictions from a past P or I picture and are generally used for further predictions. Data representing P pictures are stored and subtracted from the next picture and the difference is spatially coded. A motion vector is also generated and added to the compressed data.

B pictures are generated using forward and backward predictions. B

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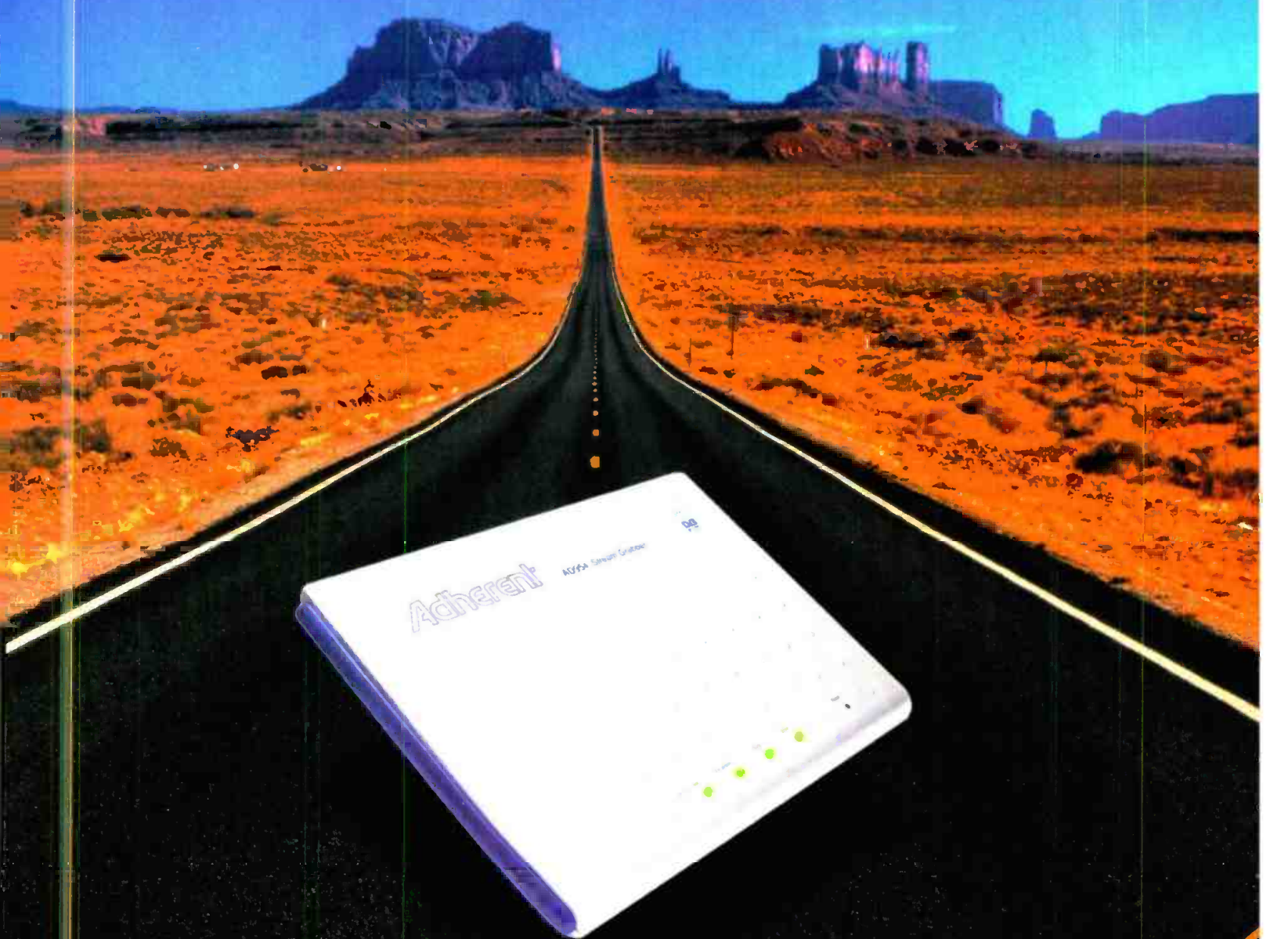

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PROFILE LEVEL	SIMPLE I,P 4:2:0	MAIN I,P,B 4:2:0	4:2:2 PROFILE I,P,B	SNR I,P,B 4:2:0	SPATIAL I,P,B 4:2:0	HIGH I,B,P 4:2:0 OR 4:2:2
HIGH		1920 X 1152 80Mb/s				1920 x1152 100Mb/s
HIGH 1440		1440 x 1152 60Mb/s			1440 x 1152 60Mb/s	1440 x 1152 80Mb/s
MAIN	720 x 576 15Mb/s	720 x 576 15Mb/s	720 x 608 50Mb/s	720 x 576 15Mb/s		720 x 608 20Mb/s
LOW		352 x 288 4Mb/s		352 x 288 4Mb/s		

Table 1. Maximum constraint parameters for MPEG-2 levels and profiles.

pictures provide the highest degree of compression but require both past and future reference pictures for motion compensation. They are never used for reference prediction and are most sensitive to errors.

The organization of I,P,B pictures in a sequence is application dependent and implemented in the coder. Figure 1 shows a sequence of I,P,B pictures. The correct reconstruction of a B frame in the decoder requires that the preceding I and the following P pictures arrive first, so the order of frame transmission must be different from the order they appear on the screen. Figure 2 demonstrates this reordering.

Profiles and levels

MPEG-2 offers a wide choice of parameters resulting in millions of possible combinations. The concept of profiles and levels was introduced to restrict the choice of parameters.

- **Profile:** A subset of the entire bitstream syntax. Within the bounds imposed by the syntax of the specification, it is possible to require a very large variation in the performance of encoders and decoders depending on the values taken by parameters in the bitstream.
- **Level:** A set of constraints imposed on parameters in the bitstream. These constraints may be simple limits on numbers. Alternately they may take the form of constraints on arithmetic combinations of the parameters e.g. frame width (H pixels) multiplied by frame height (active lines) multiplied by frame rate.

Table 1 shows the constrained parameters imposed by various profiles and levels. The figures listed are maximum permitted values in the respective profile and level and can accommodate a wide range of applications from SDTV to HDTV. The SNR and spatial profiles are scaleable to allow for the simultaneous transmission of a main signal and a helper signal. The main signal, when decoded, produces a picture with reduced SNR and/or spatial resolution for low-cost receivers. The helper signal allows for increased SNR and/or spatial resolution for high-end receivers. ■

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

Send questions and comments to: michael_robin@intertec.com

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—Angus Yates, Executive Producer for Discovery Channel's Eco-Challenge

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ISDN vs. DSL

BY BRAD GILMER

In the beginning there was Plain Old Telephone Service (POTS), and it was good (for its time). Computer users typically used their 1200 baud modems with POTS to dial into local Bulletin Board Systems (BBS). As PC capabilities increased, BBS download file sizes increased and users became impatient with the increase in download times. PC users who had been happy with their first modems began the quest for more speed. The jumps to 2400, 9600, and 28.8 happened quite quickly through the late 1980s and early 1990s. Then the Internet began to take off, specifically with its graphics rich Web interface. As designers became more creative, connection speeds needed a boost. Unfortunately, POTS technology was unable to support anything faster than 56K, and even this is a bit of a misnomer since throughput using a 56K modem is more like 43kb/s.

In the early 1980s, the telephone companies anticipated the need for increased bandwidth. They developed ISDN or Integrated Services Digital Network. ISDN would operate at speeds up to 128kb/s, a great improvement over the 2400 baud modems prevalent at the time. It would use existing telephone lines, and even better, it would allow voice and data to be multiplexed over the same wire. The service would be metered, that is, customers would be charged based on how much time they spent being connected to the network. Digital technology would be used within the telephone company facilities, but the signal would be converted to analog to be sent over existing phone lines and converted back to digital by the user's ISDN modem.

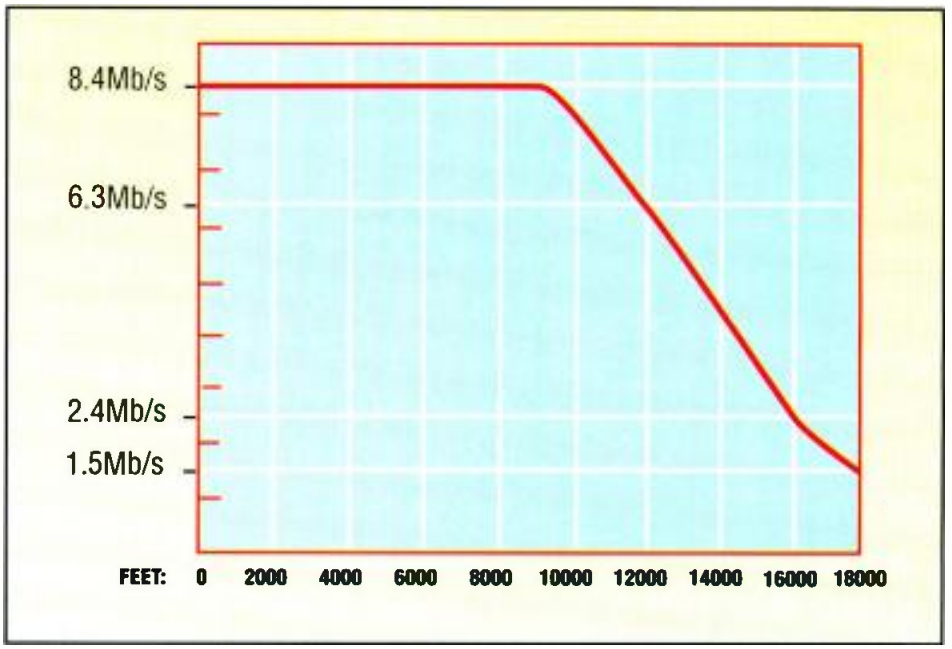

Figure 1. DSL speed vs. distance from phone company central office. Note that after about 9000ft. performance drops off considerably due to physical limitations of the cabling involved.

While ISDN had some benefits, availability of ISDN was limited. Pricing based upon usage was not very popular. Modem speeds increased dramatically during the 1990s, and many potential ISDN users were unable to justify the cost difference between POTS at 56K and ISDN at 128K.

Enter DSL. Some describe DSL or Digital Subscriber Line as the next generation of ISDN. As with ISDN, DSL provides both POTS and data connectivity over one wire. However, as shown in Table 1, it has two very big advantages over ISDN, and both of these are related to the way that DSL service is marketed. First, it is always on, and second, it is a flat-fee service. No matter how much you surf the Web, your bill will always be the same. There is a third advantage: DSL is fast when compared to either ISDN or POTS – up to 8.4Mb/s receive and 1.5Mb/s transmit. However, as the Figure 1 illustrates, you may or may not achieve the blinding speeds advertised for DSL. DSL performance is directly related to line length. DSL can provide receive speeds of up to 8.4Mb/s up to about 9000 feet from the telephone company Central Office (CO). At a little over two miles, DSL speeds drop to approximately 6.3Mb/s. At a distance of three miles, receive speed is down to 2Mb/s. Transmit speed from the user back to the CO is at a speed of up to 1.5 Mb/s. As you can see, what you get may be determined by where you are.

DSL may not have the screaming speed you expect.

You probably noted that DSL is not always symmetrical. Asymmetrical DSL (ADSL) is designed to take advantage of a characteristic typical of Web browsing. Messages sent to the user are usually large, but commands sent back from the user are small. ADSL takes advantage of this by providing a high-speed receive path and a slower return path.

So if DSL is such a great thing, why bother with ISDN? The answer is that

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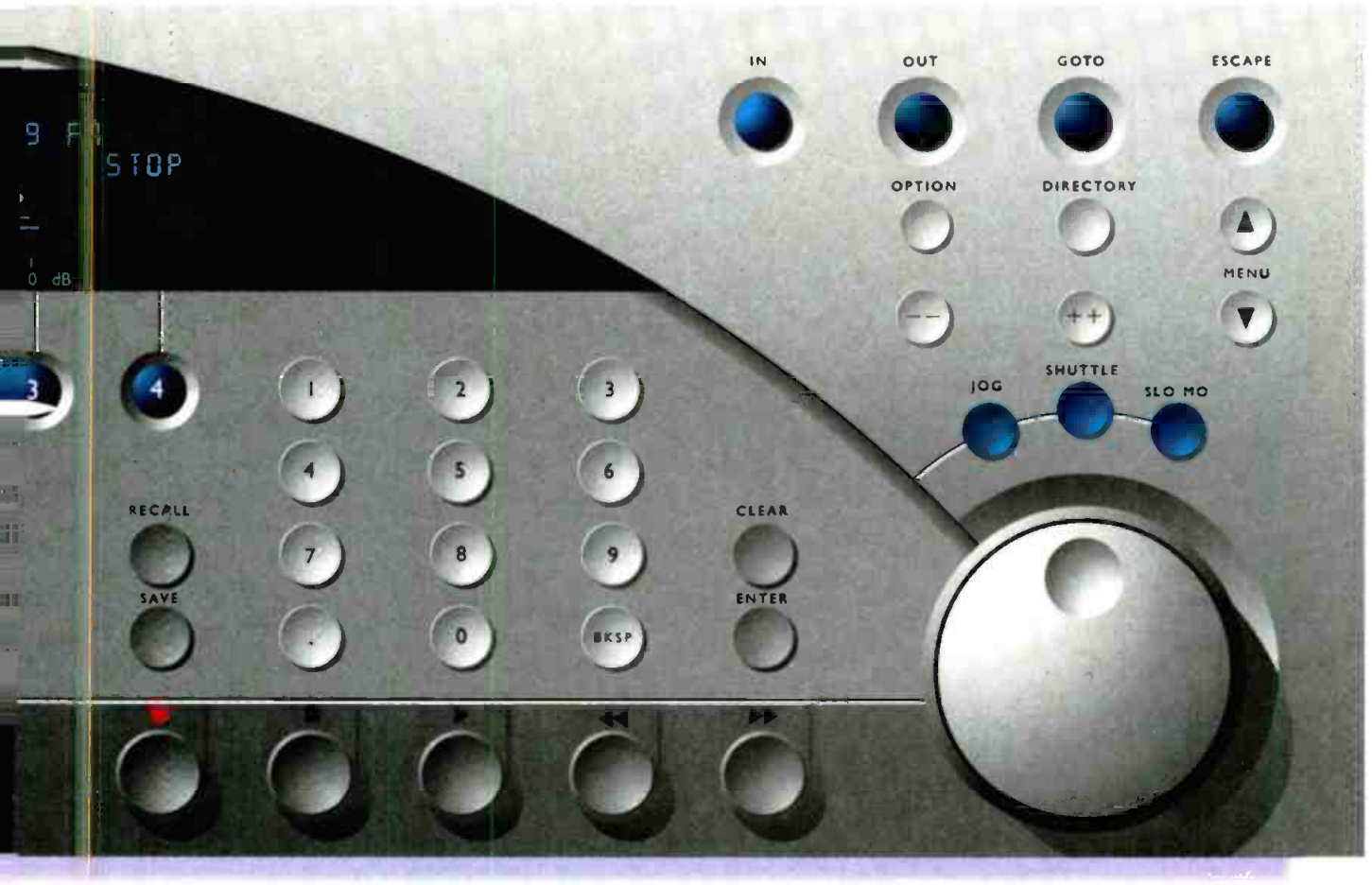

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ISDN may be the only high-speed connection you can get in your area at the moment. While DSL has many advantages over ISDN, it is still not widely available. You can expect this to change, but it will take time for the telephone companies to get the required equipment in place. Furthermore, while DSL is supposed to be able to use existing phone lines, you may find that this is not the case. If your analog telephone line is a long distance from the CO, it may be "loaded;" treated with equalizing coils to meet analog telephone performance specifications. If this is the case, it may take the telephone company quite some time to provide you with a "dry" line (no equalization). To sum up, you may or may not be able to get DSL in your area, and if you do, it may not have the screaming speed that you expect.

One more issue to consider with DSL is security. While almost all DSL providers have features to make their service secure from hackers, in some cases it is possible for someone to get access to your computer through your DSL connection. While the same may be said of ISDN, one big difference is that most ISDN users are not connected to the network full time. In contrast, almost all DSL users are connected to the network from the time they turn their computer on until they turn it off. You should discuss security with any potential DSL provider.

One might argue that since DSL is vastly superior to ISDN, why don't the telephone companies offer DSL and dump ISDN? One issue is that there is not a worldwide standard for DSL. The two major modulation schemes for DSL are Carrierless Amplitude/Phase modulation (CAP) and Discrete Multi-Tone (DMT). Of course, the two are incompatible. CAP is predominant in the U.S., but DMT is used almost exclusively in Europe. Another option, rate-adaptive DSL is also available. Rate-adaptive DSL adjusts speed based upon line performance. With all the competing formats of DSL, the phone companies may be reluctant to make major investments in DSL until there is a clear winner.

If you sign up for DSL service, you will need a DSL modem for your computer. You plug your standard analog phone line into the modem. The modem first splits the POTS service off from the high-speed data service and provides a telephone connection at the back of the computer for a standard telephone. The data service is further split by a channel separator which divides the datastream into a receive channel and a transmit channel. As described above, most DSL subscribers receive asymmetrical service, so the receive channel is substantially larger than the transmit channel. From there, the computer interfaces to the DSL modem much like a standard network interface card.

At the telco end, your signal is fed into an ADSL modem. The voice transmissions are split from the data service and sent to the public switched telephone network (PSTN). The data transmissions are fed to a Digital Subscriber Line Access Multiplexer (DSLAM), where many ADSL data channels are combined. These multiplexed signals are routed to an ATM switch and on to a high-speed Internet connection.

It appears that the advantages of DSL are clear. Demand is strong, and telephone companies are answering by rapidly increasing the availability of this technology to customers. DSL has some limitations, but it will provide a great increase in speed for Internet users who are now using 56k modems and POTS technology. ■

	ISDN	DSL
Always Connected	No	Yes
Per-minute billing	Yes	No
Uses existing telephone lines	Yes	Yes
Max receive speed	128kb/s	8.4Mb/s
Max transmit speed	128kb/s	1.5Mb/s
Widely available	In most areas	In some areas
Security	Not permanently connected	Always connected to network
Time to download a 10MB file	6 minutes	48 seconds
Digital from CO to subscriber	No	Yes
Setup or dialing required	Yes	No

Table 1. A comparison of the features of ISDN and DSL. Be aware of your needs and keep in mind that there is not one solution for every need.

DSL Glossary:

ADSL – Asymmetric Digital Subscriber Line. Provides up to 8.4 Mb/s receive channel and 1.5Mb/s transmit channel.

CDSL – Consumer Digital Subscriber Line. A trademarked version of ADSL providing lower speeds but reduced cost. Uses proprietary modulation scheme that is not compatible with either CAP or DMT.

HDSL – High bit-rate Digital Subscriber Line. A high-speed version of DSL which has been used in some areas for connection between COs and commercial customers. This service is symmetrical providing approximately 2.3Mb/s connectivity.

IDSL – ISDN DSL. DSL at ISDN rates 128kb/s (why bother...)

RADSL – Rate-adaptive Digital Subscriber Line. Same as ADSL, but rates are automatically adjusted for line conditions.

SDSL – Symmetrical Digital Subscriber Line. Similar to HDSL with symmetrical data connections operating at speeds up to 1.544Mb/s.

Brad Gilmer is president of Gilmer and Associates, a management and technology consulting firm.

Send questions and comments to: brad_gilmer@intertec.com

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Massive disk bandwidth ensures 100% performance on all ports 100% of the time, with simultaneous access to all material from all ports. Additional bandwidth ensures network transfers can run simultaneously as background tasks across Clipnet, Quantel's open network.

complete.connectivity

An open control protocol and simultaneous background networking based on Gigabit Ethernet ensure Cachebox integrates seamlessly into virtually any production application. SDI, SDTI or faster than realtime transfers on every port and the ability to dynamically match workflow by instantly re-assigning any one of up to eight ports as either input or output, plus simultaneous control by multiple automation/application suppliers, means each user gets the interface and functionality they need.

robust.reliability

Cachebox recovers from external faults such as the loss of incoming power quickly and automatically. Raid-3 storage ensures data is preserved, automatically rebuilding data in the event of drive failure. For applications requiring high capacity, storage can be expanded from hours to days. Hot swappable drives and dual power supplies provide uninterrupted operation and additional resilience.

solid.support

Comprehensive diagnostics and engineering set-ups can be accessed locally or remotely via modem to provide instant analysis and adjustment.

amazing.agility

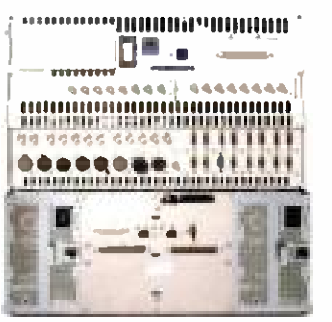
Agile disk architecture is achieved by high performance disk control circuit design. With Cachebox, fragmentation issues are a thing of the past. Instant access to any frame results in instant playing of any clip at any time with no complicated pre-cueing, just instant changes to the running order.

flexible.formats

Working in either DVCPRO, DVCPRO 50 or MPEG-2 format, Cachebox can accept, store and transmit native data, as well as integrating perfectly with 601.

comprehensive.control

Quantel's high level realtime Remote Control Protocol matches Cachebox's high performance and is easy to implement. RCP is widely supported by the leading industry automators, providing high level access to library, port direction/format and faster than realtime transfer commands.



high.quality versatile.performance

Cachebox is a high-performance video server for broadcasters in the digital age. Available with up to eight ports and scaleable storage, it offers great versatility with applications spanning capture, production and playout.

server.advantage

Quantel has extensive experience of working at the leading edge of disk applications in video and a unique depth of knowledge in the area of storage technology and the workflow benefits it can bring to broadcast. **Cachebox** bears all the essential Quantel hallmarks of quality, performance and reliability, all so necessary in critical on-air broadcast operations. **Cachebox** not only seamlessly integrates into any current production environment, but represents a future-proof investment with its HD upgrade path.

Cachebox is the complete server solution - powerful, versatile and highly cost-effective.

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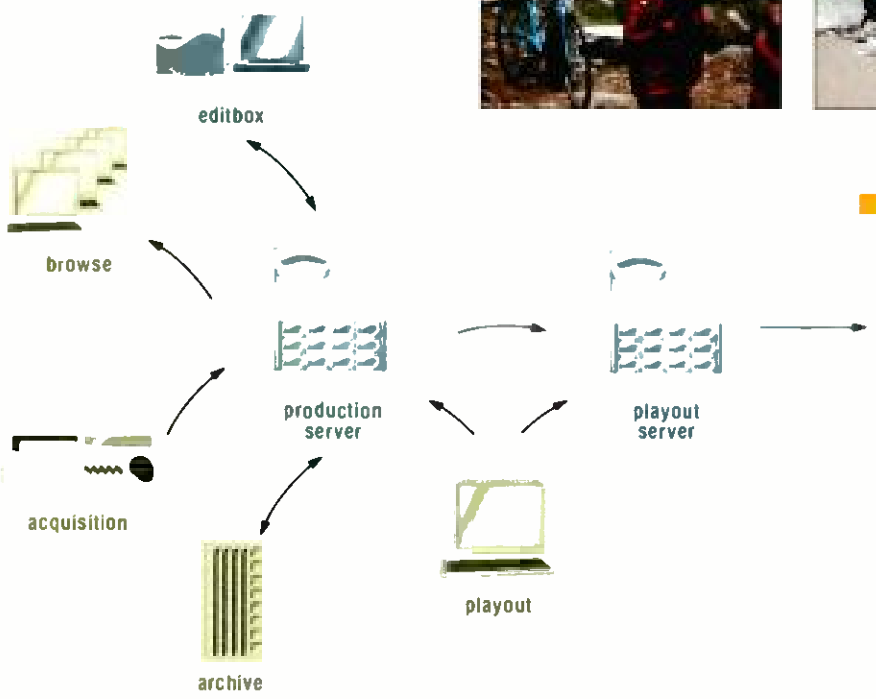
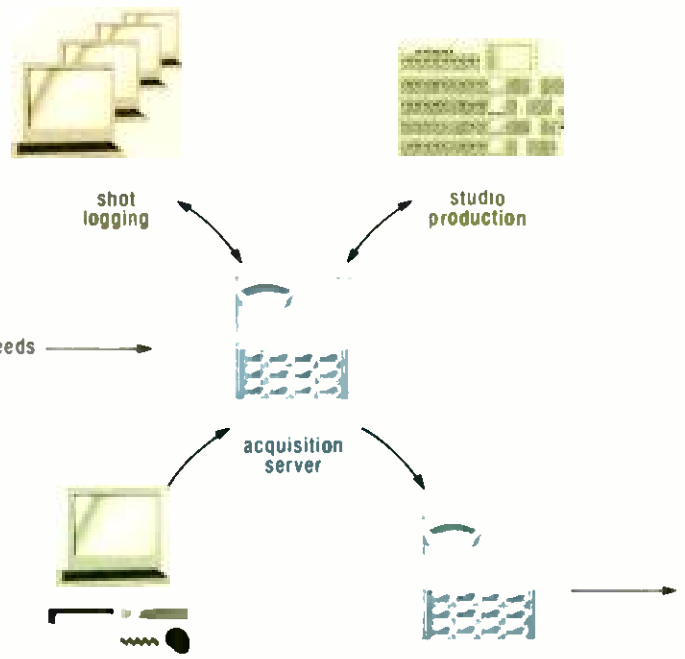


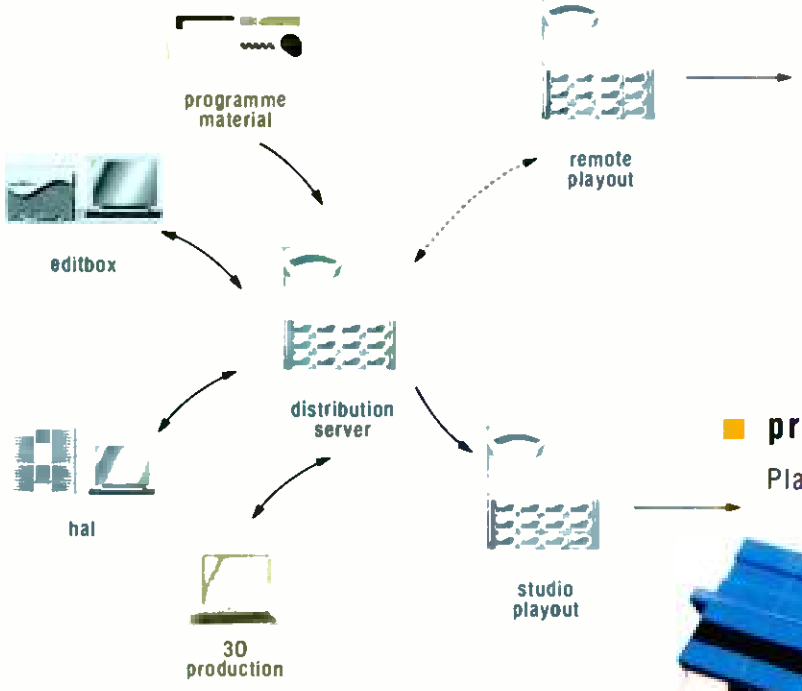
news/sports.applications

Cachebox provides the building blocks for news and sports production - acquisition, production storage and playout. Systems can be stand-alone or integrated around a Clipbox® editing server to provide a complete news system. Working with our partners Omnibus, Inspiration systems provide highly integrated, scaleable, digital newsrooms that combine high quality, high performance server technology with journalist browse/edit, media management and playout functionality.

acquisition.agility

Working with automation partners such as IBIS, the real power of an agile acquisition server becomes apparent. For example, utilising Cachebox's Loop Record sections of material can be selected, trimmed and saved as they are recorded. Production decisions are moved back into the acquisition process, saving precious time and providing the fast turnaround demanded in live programming such as sports.

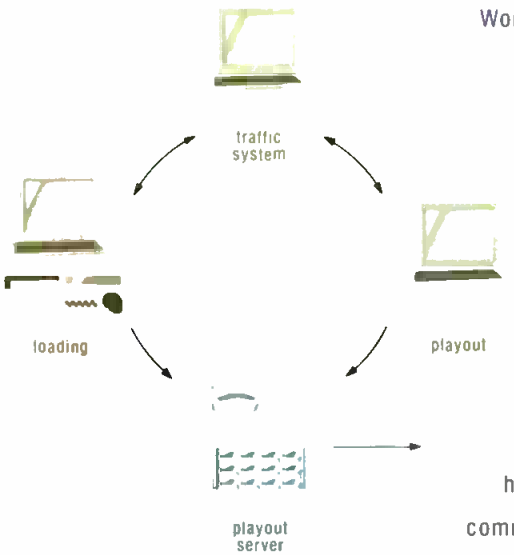




production.distribution

Placing a high quality production server within the production environment creates a digital store which enables users to store and retrieve source, in progress footage or finished material. Using Cliplink, SDI devices can search, select, or record material over an existing infrastructure, providing seamless connection to Quantel's editing and graphics devices or, because Cliplink is an Open protocol, third parties. Networking over local or wide area networks is achieved with Clipnet - Gigabit, fibre-based networking technology that enables fast transfers of native-format data or 601 video using NFS.

commercial.insertion



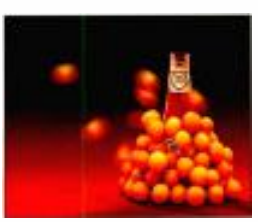
Working with automation partners such as Crispin Corporation and ABIT, critical playout applications such as commercial insertion can benefit from the high quality and high performance of Cachebox. With its lightning agility Cachebox can accept split second changes to the running order right down to the wire, dropping the next item while the current one is playing out, or replacing a commercial with only seconds to go. With Cachebox systems operating mirror or library/cache configurations, commercials availability under fault conditions is guaranteed. Taking advantage of Cachebox's huge bandwidth means an upgrade path to HD working - ensuring commercial quality into the future.

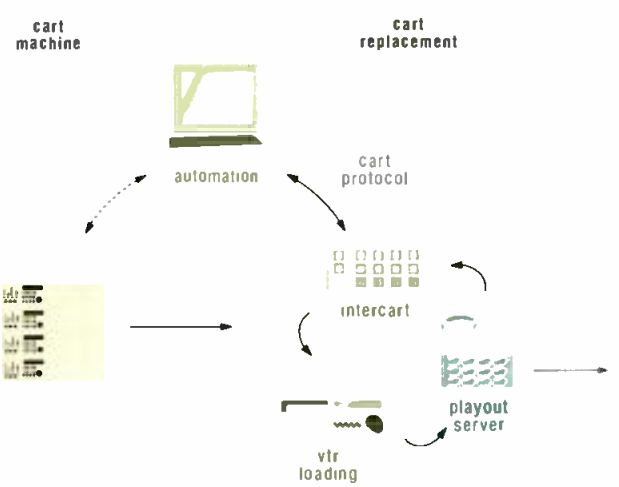
server.applications

cart.replacement

Cachebox replaces aging cart machine installations using Flash Interlinear automation. Cart protocol is emulated so the automation system sees Cachebox as an identical system. The Cachebox/Flash Intercart combination provides all the advantages of server performance, including low maintenance costs, while retaining the existing automation system. Options include dual redundant server and control configurations for systems requiring total redundancy.





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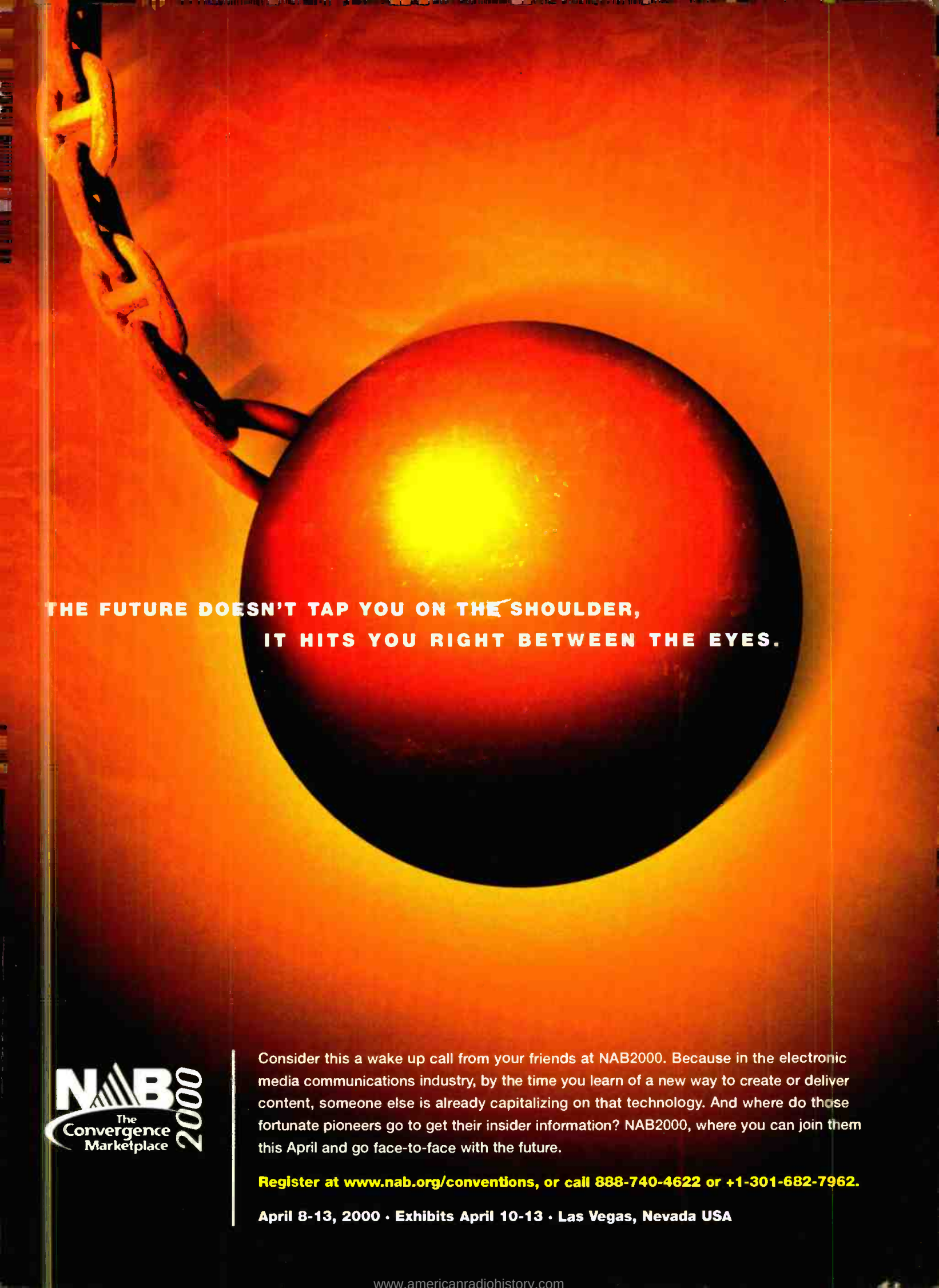

NAB 2000 The Convergence Marketplace

Consider this a wake up call from your friends at NAB2000. Because in the electronic media communications industry, by the time you learn of a new way to create or deliver content, someone else is already capitalizing on that technology. And where do those fortunate pioneers go to get their insider information? NAB2000, where you can join them this April and go face-to-face with the future.

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Disk drive differences

BY STEVE EPSTEIN, TECHNICAL EDITOR

We have had a strange problem with one of our (now) Grass Valley Group Profile PDR 200 video servers. When the Profile's record capacity shows 00:00:00 (meaning that the disks are full), we have tried to record over an existing clip. According to our logic, this should have worked—we were only replacing existing video, not adding any more. However, we found that the existing clip did not get recorded over. On the other hand, if there was even 10 sec of record capacity left over, then the existing clip was successfully written over. Can you please explain this phenomenon to us? Thanks

H.Rajasekharan
Engineer
NDTV
India

At first glance, it seemed logical that you could record over an existing clip. However, after checking with the folks at the Grass Valley Group, I learned that you (we) were thinking like videotape engineers. In this instance, we need to think like computer types (a terrible thought, but someone has to do it). In the computer world, and in the Profile, nothing is ever "written over." First, sufficient disk free space is verified. Second, the file is written to disk. If this is successful, then – and only then – is the previously used disk space freed up. So in order to write 30 seconds of video to the disk, you need 30 seconds of free space on the disk. If you choose to "overwrite" something, you will still have 30 seconds of free space once the cleanup is done.

Can you recommend — or even identify — a design, CAD, drawing, program that I can use to layout a small studio? I am looking for something with industry-standard sized equipment. I want to be able to drag, say, a waveform monitor into a rack, see the back, and do a cable index. Is there such an animal? I have wasted about two hours on the Web looking, so I thought I'd ask an expert. Thanks.

David A. Sánchez
NHCCNM Technology

Yes there is. A broadcast-specific CAD program called VidCAD Plus is available from VDP. You can check it out at www.vid-cad.com or call them at 800-VID-CAD6. there are one or two others, but VidCAD Plus has been around for quite some time and has been used on numerous large and small projects.

Planning a project is one of the most important things you can do. I have found that the time spent planning a project rarely adds any time to the overall project. This happens simply because during the execution phase, you execute, rather than backtracking and trying to find your way out of unanticipated problems. Thoroughly planning a project allows most, if not all, problems to be identified and solved long before you have committed to a specific execution plan.

When planning, the place to start is with the problem at hand – not a proposed solution. Once the problem is identified, a range of solutions can be explored, as can the pros and cons of each solution. From that, the path toward solving the problem should emerge. From there, plans can be assembled on the best way to create the solution. In the end, this should result in both the problem and the solution being well documented. Then you can go back and determine how well things worked and where improvements are needed.

If you need help with a problem, feel free to drop me a note at *drdigital@compuserve.com.* ■

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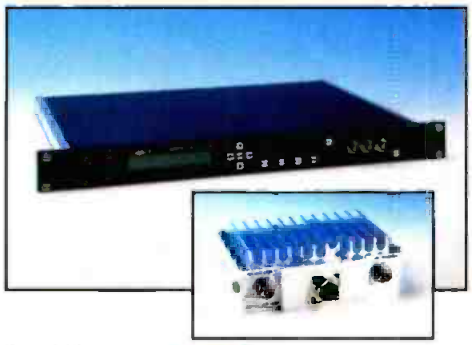

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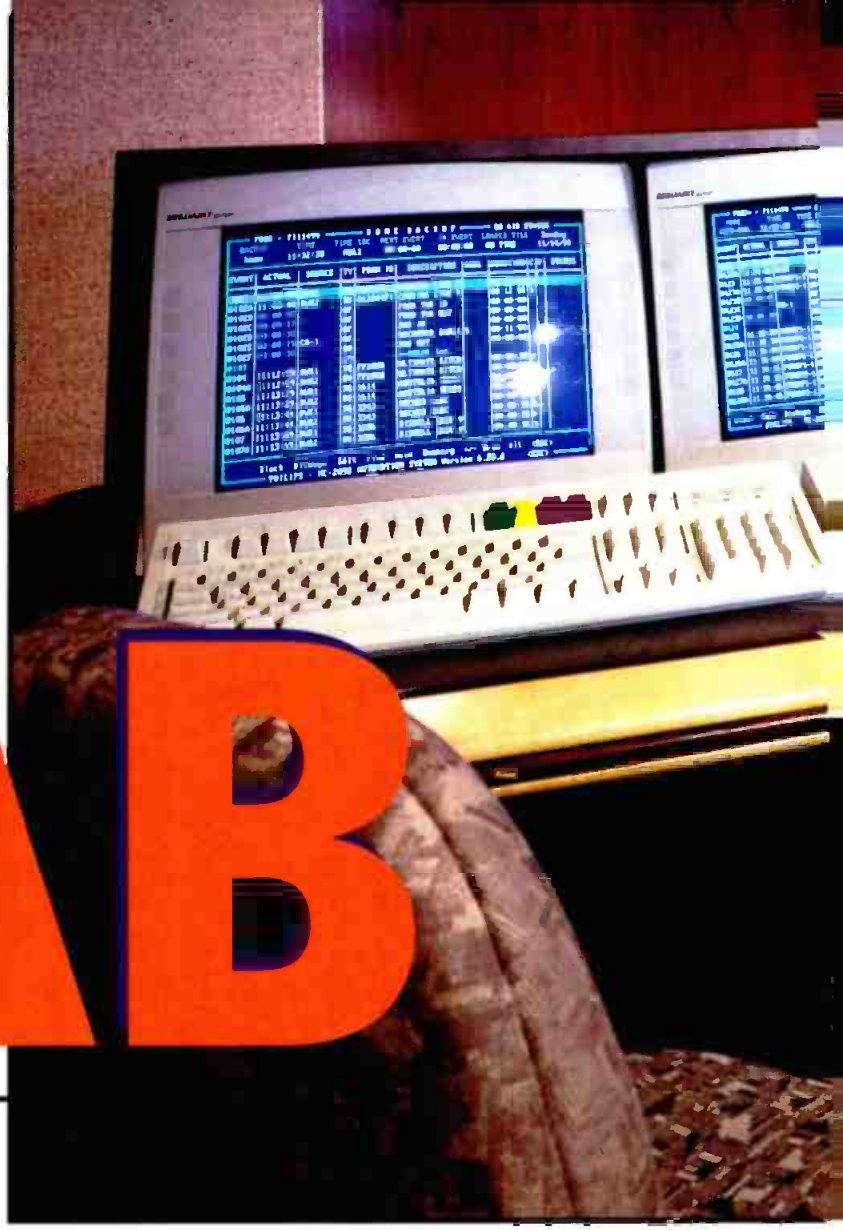

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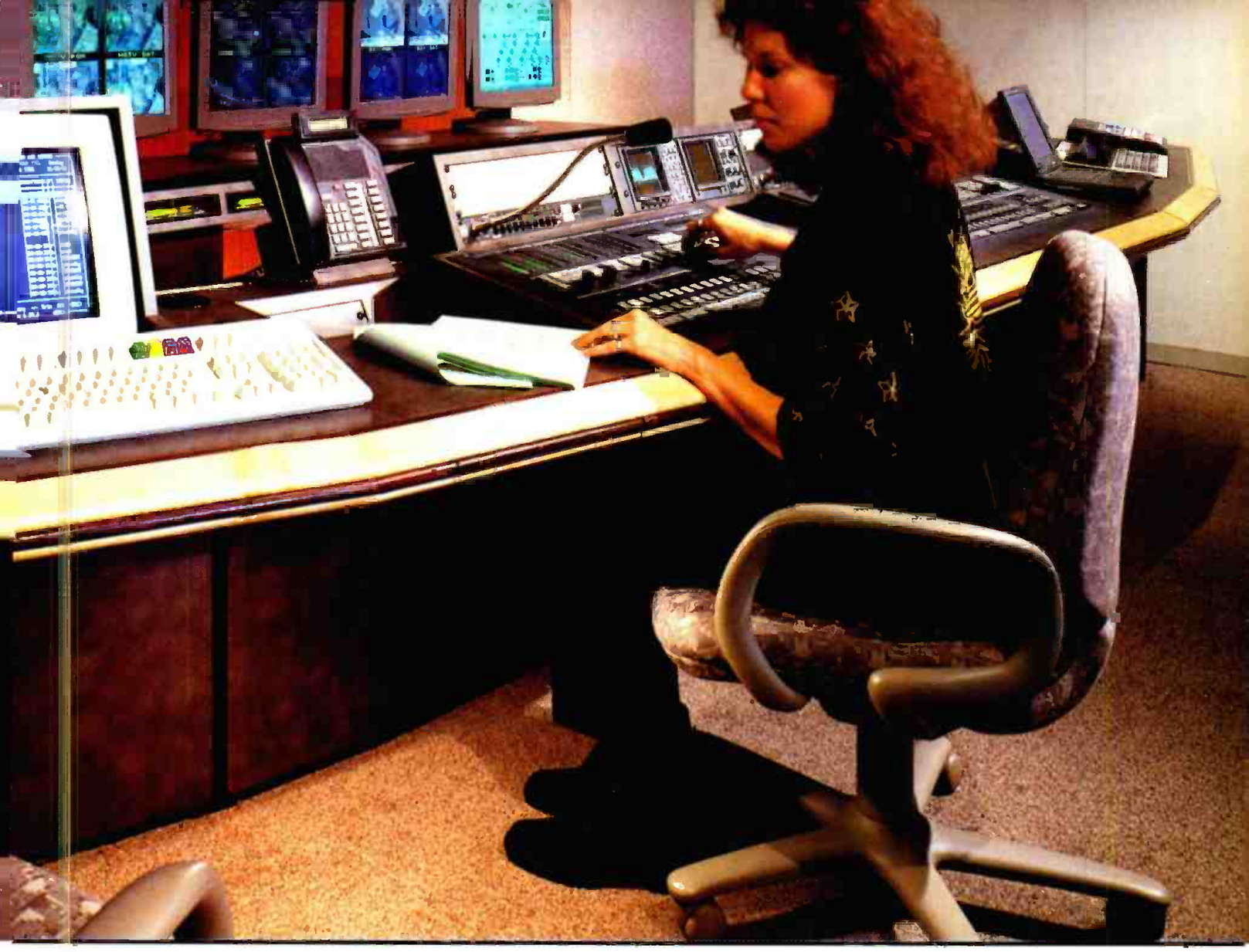

EW

Your technology guide to NAB

Your goal is to visit more than 1400 exhibits, covering more than 900,000 square feet of exhibition space spread among two large exhibit halls — and do it all in four days. Impossible? Not with the help of *Broadcast Engineering* magazine. The editors at *BE* help to make your trek to Las Vegas easier by doing a lot of your homework for you.

We have assembled more than30 experts to help you understand key issues in broadcast and production technology. We've also assembled coverage of more than 400 new products and services to be highlighted at this year's convention. Gathered together in more than 100 pages of new technology and product coverage, this year's NAB Preview represents the most comprehensive pre-show coverage anywhere.

To help *Broadcast Engineering* readers gain the advantage, we've broken down product coverage into two general categories: DTV Marketplace and Sneak Peeks. In the DTV Marketplace coverage you'll find the latest new digital products and services being announced at this year's show. Sneak Peeks covers everything else a facility might need. Finally, FASTtrack is your show floor guide to the shortest distance between all the products you need. Pick an equipment category and you'll find a list of the companies that produce them. Neat huh?

Get your walking shoes ready and see you on the show floor.

known as IEEE 1394b. The new specification allows IEEE 1394 devices to incorporate Glass Optical Fiber (GOF), Plastic Optical Fiber (POF), and Unshielded Twisted Pair (UTP Category 5) at distances up to and exceeding 100 meters. This new specification also allows for IEEE 1394 bus bandwidth to increase from 400Mb/s to 800Mb/s and beyond. The proposed standard actually specifies link bandwidths of 800Mb/s, 1600Mb/s, and 3200Mb/s. This new specification has been forwarded to the IEEE for formal balloting and prototype 800Mb/s devices are already appearing at certain trade shows.

How can an effective network be built with cable distances of only 4.5 meters?

With Gigabit Ethernet and Fibre Channel already on the market and running at gigabit speeds, what makes IEEE 1394 different from the other networking technologies? IEEE 1394 is unique in its ability to provide Class of Service (or Quality of Service). It was designed as a multimedia technology for carrying audio, video, control and data. It provides two Classes of Service, isochronous (guaranteed bandwidth and latency) service, and asynchronous service. Its most attractive feature is that it provides the ability to allocate discreet bandwidth channels for delivery of isochronous data streams such as video and audio. This means that a device can reserve exactly 25Mb/s of bandwidth for streaming of DV 25 video and no matter what other traffic is on the network, the reserved data channel is never interrupted. Another interesting capability of this technology is that it can support up to 63 individual isochronous channels on a single link. For example, up to 63 different MPEG-2 video streams can be transported simultaneously and continuously, without interruption, on a single wire.

Any bandwidth not actually used for isochronous channels can be used for asynchronous traffic (control and legacy IP network data). In order to guarantee that at least some asynchronous packets can be transported on the link, only 80 percent of the available bandwidth can be reserved for isochronous data channels. On a 400Mb/s link this equates to approximately 320Mb/s for isochronous traffic (such as video and audio), and approximately 80Mb/s for asynchronous packets (such as IP). Using IEEE 1394b at 800Mb/s, this means that up to 640Mb/s can be used for video, leaving 160Mb/s for asynchronous packets. These numbers are a maximum for isochronous bandwidth.

If less bandwidth is required for isochronous channels, any remaining bandwidth can be used for asynchronous packets up to the maximum of the link bandwidth. For example, using 800Mb/s IEEE 1394b with only 40 MPEG-2 streams (10Mb/s per stream), 400Mb/s of bandwidth is available for asynchronous traffic.

IEEE 1394 is the ideal technology for professional video applications. It provides connectivity directly to audio/video devices for streaming of compressed DV, MPEG, ITU-601, and a multitude of other video and audio formats. It also connects directly to computers for audio/video I/O as well as asynchronous I/O such as TCP/IP (Internet), AV/C (digital consumer electronics), and SBP-2 (computer peripherals). New professional IEEE 1394 devices such as the Miranda DV Bridge and the Omneon Video Area Network will offer a new class of high-performance compression, networking and storage options for any professional video/audio application. The ability to network IEEE 1394 will enable transport, switching and routing of video and audio entirely in the compressed domain as well as enabling the sharing of digital resources within a facility. High-performance IEEE 1394 Network Attached Storage will provide the capability of streaming video and audio in any format over an IEEE 1394 network. At the same time, it also allows file access to the data in storage for use in video/audio/graphics editing applications, media management applications, transmission applications, and Internet applications.

AUDIO EQUIPMENT

Question:

How should stations plan on handling 5.1 audio in their facilities? Now, for the future.

By Jason Power

Jason Power is a product specialist for AMS Neve, New York.

Now that digital delivery mechanisms have been established, a major issue facing broadcasters who wish to deliver their audiences multichannel soundtracks with greater impact is the creation of appropriate content in the first place.

Techniques and tools for creating 5.1 format soundtracks are already established in film post production. Many broadcast post facilities already have experience in mixing matrixed LCRS formats like Dolby Surround. Many film mixing techniques can be directly translated into the broadcast post environment. New consoles such as the Libra offer film-standard surround features like automated joystick panners and stem-based mixing. Of course, budgets and timescales are not generally of film industry proportions, so all surround features are designed to enable mixing to be as quick as in stereo.

While surround techniques for post production are well proven, broadcasting live in surround is still a relatively new area. However, as most broadcasters consider that, after feature films, sport broadcasts are the programs that would be enhanced most by surround audio, live creation of 5.1 soundtracks is rapidly becoming a major issue. As in TV post, some tools can be taken directly from the film

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Question:

How should stations plan on handling 5.1 audio in their facilities? Now, for the future.

world, like joystick surround panners. Rather than purely transplanting all the surround features from their film console onto a broadcast console, AMS Neve is currently working with broadcasters to adapt tools to suit the unique requirements of live broadcast. Key innovations for 5.1 broadcast include simple ways of handling multichannel sources on a single fader and creating multiple versions of the mix in different formats simultaneously.

By Kenneth Hunold

Kenneth Hunold is a broadcast applications engineer for Dolby Laboratories, Inc. New York

The new digital television system has the capability of delivering up to 5.1 channel audio. Even some programs for analog television are being mixed in 5.1-channel formats to protect their shelf life for the future. The question for broadcasters is "How do I get six channels of audio through my audio system?"

Broadcasters usually do not have the capacity to route six channels of audio. Even the better-equipped broadcast facilities have only four channels of audio routing, matching the number of audio channels on their VTRs. Adding more audio routing levels is not a viable solution in most stations.

One solution would be to use audio data compression to fit the 5.1 channels of audio into a form that can be routed as a single signal. Dolby Digital (AC-3) has been selected as the audio compression standard for digital television. However, AC-3 was designed as an emissions coder for the final link to the consumer, be it DTV, DVD, or DBS satellite. Because of the very low data rates that are used in DTV and DVD, the system was optimized for only one encode-decode cycle, and is not recommended for broadcast distribution use.

To overcome the data rate limitations of the consumer system, Dolby E, a higher data rate compression system was designed and implemented. Dolby E will never reach consumers; it will be re-encoded into AC-3 for transmission into the home. Dolby E is designed to be more production-friendly, with audio data frames that line up with the video frames (for ease in editing.) It was designed

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To begin an upgrade to digital transmissions, there is one expense that can't be avoided: A digital transmitter must be purchased. However, a station doesn't have to buy a full power transmitter immediately, especially if the take up of digital services in its market is relatively slow. There are transmitter manufacturers today who are marketing low power transmitters for relatively little money—less than $200,000 in most cases. The cost savings in electricity use alone vs. the larger systems can enable this purchase to pay for itself in as little as 12 months. Then, as the volume of installed digital sets in homes grows—or as a station discovers ways to make digital signals pay for themselves—the transmitter can be either upgraded or replaced as needed.

Once a digital transmitter is in place, how can a digital signal be cost effectively generated for transmission? There are a couple of options for this. The first involves taking the digital signal being transmitted by the network and simply passing it through to a transmitter. While requiring only the purchase of a receiver in most cases, the limitations of this approach include an inability to generate any digital signals locally and an inability to regenerate any PSIP information for the local transmissions.

Once a digital transmitter is in place, how can a digital signal be cost effectively generated for transmission?

To resolve these dilemmas, a digital encoder can be purchased. Yes, this is another expense, but if handled properly the costs can be incurred only as needed. Assuming that a station in the beginning of its digital transition doesn't have high definition equipment, and maybe doesn't even generate serial digital signals, a standard definition encoder can be installed. These units generally handle both analog and digital video inputs, and can be purchased for as little as $30,000. For a slightly higher cost, some encoder manufacturers offer the possibility of buying an HD-ready encoder but loading it only with 480i30 software. Then, as the rest of the station is gradually upgraded in the future, the hardware remains the same and only software upgrades to HD formats need to be purchased and installed. Taking this route allows a station a minimal outlay of money today, while future proofing it for further upgrades tomorrow.

It can take a bit of research and planning, but there are ways to save money in a station's transition to digital technology. And just remember, despite what might be assumed, an all-or-nothing approach to high definition transmissions is neither required nor, in some instances, even the most logical route to a station's digital future.

PRODUCTION SWITCHERS AND EFFECTS

Question:

How important is HD capability when considering production switchers and effects systems? Should stations pay for upgradability now or stay with SD quality for the near future?

By Mark Narveson

Mark Narveson is product marketing manager, video production systems for the Grass Valley Group, Grass Valley, CA

Broadcasters and production houses are facing enormous financial decisions as they move toward a DTV environment and start defining their production needs. While the FCC mandate calls for digital broadcasting, there is not a requirement to specifically broadcast in high definition. So broadcasters are struggling to create a new business model that maximizes revenue and profit for the available bandwidth and determine the right mix of video and data services. An important element of that is the mix between standard definition broadcast and high definition, and if high definition, what format?

The need to provide DTV (and specifically high definition HD) starts at the transmitter and moves back through the production chain from there. Thus, the first demand for HD equipment was for transmitters, master control, VTRs, small routers and a variety of glue products. Then comes the issue of producing content. At least to begin with, a small production switcher is needed for telecine work and for long-format conforming. With all of this in place, a broadcaster can begin HD transmission of any number of productions that originated on film (like full-length feature films, as an example). By adding HD cameras and a larger production switcher to the mix, coverage of live events becomes realistic.

It will be very difficult for management to chose a production switcher that will satisfy future needs.

While there is a strong demand for HD with high production value, the price of equipment has limited the installed base to a few key fixed studios and remote truck operations. Also, the viewership for HD, at least today, is

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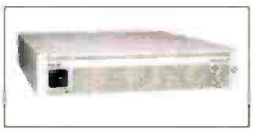

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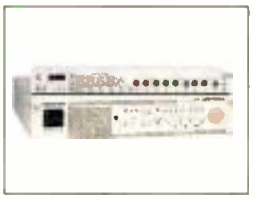

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Question:

How important is HD capability when considering production switchers and effects systems? Should stations pay for upgradability now or stay with SD quality for the near future?

By Ed Fraticelli

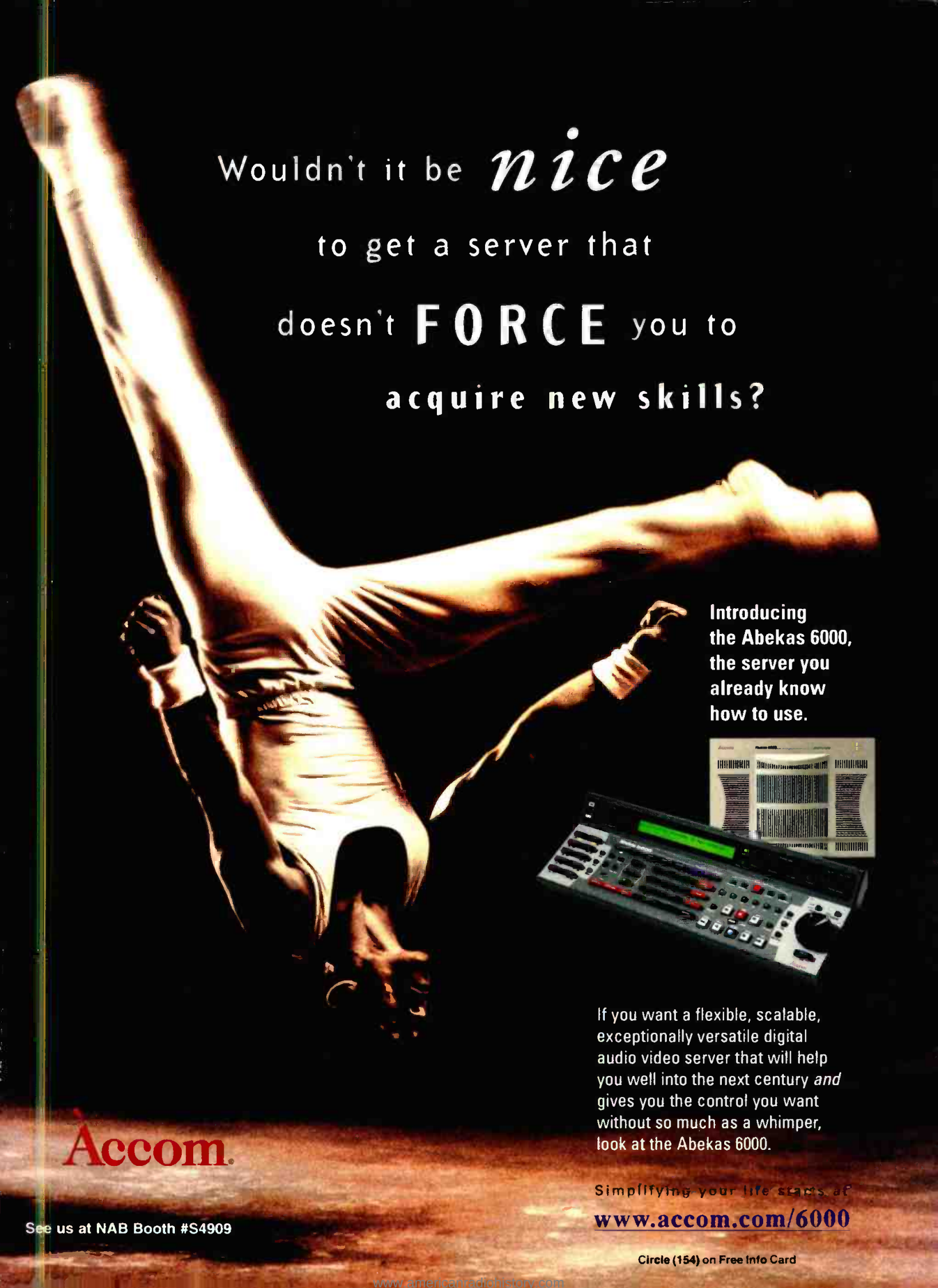
Ed Fraticelli is Director of Engineering & Post Production for Production Masters, Inc., Pittsburgh, PA

still in its infancy, making it difficult for broadcasters to justify a heavy investment in HD production.

Thus, other than a few early adopters, the demand for large HD production switchers has been relatively low. There is a strong requirement for a migration path for SD switchers purchased today, however. It seems clear that the right path is to make an investment in a standard definition system that provides the maximum production value for today's needs without paying a price premium for future HD capability. It is equally important to select a manufacturer who is committed to providing that production capacity in high definition when the market is ready and when the price premium for such equipment is much lower. Format flexibility is also essential, especially for station groups that might have operating stations with 1080i and 720p in their portfolio. Finally, the system selected should be post-friendly to support mastering and post-production work in 1080p24.

Certainly, a large and exciting aspect of the world of DTV is the ability to transmit high definition pictures into homes. But at this time, HDTV is a moving target, since there is no definition of what high definition really is. Is it 1080 interlaced lines at 30 frames per second, or is it 720 progressively scanned lines? Or is it something else, like 480 progressive, or 1080P at 24 fps? And unless a station has already chosen the internal HD production standard that they will use, it will be very difficult for management to choose a production switcher to satisfy future needs.

For some stations, the choice will be made easier by their network's decision or by the joint decision by the owner group. For others, no clear choice is best. In these cases, it may be better for stations to plan to migrate first to digital production switchers, at standard 601 resolution. Existing analog sources can still be accommodated with the use of A/D converters, and the output could also



Question:

How important is HD capability when considering production switchers and effects systems? Should stations pay for upgradability now or stay with SD quality for the near future?

be upconverted to higher definitions with any of the quickly developing up-converters being offered.

At least two major digital switcher manufacturers are offering the ability to have one switcher's control console switch between multiple sets of electronics chassis. This way, a switcher could be used to produce SD video in the morning, and switch a live HD newscast that afternoon.

It would be wise to check out all that is available and to look 5 years or so into the future. What needs will your station or facility have during that time? Then one can only make an educated guess as to what choice would be best.

By Mark Sharp

Mark Sharp is Applications Manager – Production Switchers for Philips Digital Networks.

Before you answer high definition question in your production switcher selection, fundamental short-term and mid-range planning has to happen. Then you should weigh HD factors.

First of all, you know that the news and local productions are the lifeblood of your station. And you know that the model you buy needs to give you a look that will set you apart from your competitors.

Even in an all-digital plant, digital reference generators still lock to good old analog black-burst signals.

With this in mind, you have to consider the features that are delivering today:

Is the layout of the switcher a classical design (cascading M/E architecture with unlimited re-entry)?

How many keyers are on each M/E?

How many downstream keyers are available?

How does the switcher integrate with other manufacturers' DVEs, DDRs, DSKs, servers and other machines?

Is the machine control interface frame accurate?

How simple is the chromakeyer to operate?

Is the manufacturer actually delivering field tested units, or offering features that will deliver "someday"?

You also know that installing a new digital switcher is going to take a lot of time and money. It is not just the cost of the switcher to factor in. There are costs for converters, frame syncs, audio delays, cables, consoles and training. With all these expenditures, the prudent buyer wants to be sure that whatever is purchased has enough flexibility to grow with the facility and changing production values.

Now the questions become:

How many auxiliary buses are available?

Are you going to permanently burn up auxiliary buses feeding the DSK's?

How old is the operating platform being proposed? Is there enough headroom in its design to adapt to changes?

These are the type of questions that go to the core of being able to operate profitably in the near future. Once these issues are answered, then you should look at the HD issue.

When you think about HD, think in terms of insurance against uncertainties. If, for instance, your network affiliation changes from one that uses 1080I to one that requires 720P, your switcher manufacturer should be able to deliver an HD box that would be flexible enough to change with the different HD formats.

Another form of insurance is to buy from a manufacturer who recognizes the need to seamlessly integrate other companies' ancillary devices. As HD becomes more of a reality, there will, undoubtedly, be changes in companies who lead in DVE or DDR technology. Hooking up with manufacturers that design equipment that forces you to stay with them could lock you out of great accessory equipment options down the road.

The good news for today's buyer is that questions like these are less ominous as manufacturers, like Philips, are designing systems (like the DD35 and the HD35) with these variables in mind. Uncertainties about the future require agility in equipment design. It is up to us, as manufacturers, to design equipment that can cover our customers' needs for the long haul.

Digital Implementation

Question:

As facilities transition to digital, new problem areas such as lip-sync, arise. What new tools are available to help minimize these digital problems?

By Tom Tucker

Tom Tucker is a product marketing manager for the Video Business Unit of Tektronix, Inc., Beaverton, OR.

The transition to digital television has brought many challenges for broadcasters. Controlling video signal latency through the program contribution chain has turned out to be one of the biggest. Since the video signal requires much more network bandwidth than the audio signal, it receives the majority of the processing attention. This produces more latency in the video channel than is common in the audio channel. The resulting timing

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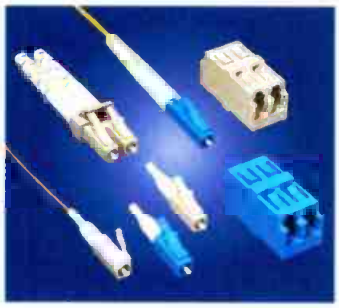

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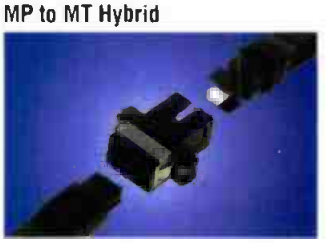

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mismatch can produce the annoying lip-sync error common in television today. Partial solutions for this problem in the studio include an audio delay unit slaved to a video synchronizer. However, this approach only corrects for delay added at the studio and cannot compensate for variations in audio-to-video timing common in the television contribution network. A new solution to this problem is to embed an audio timing reference directly into the video signal using digital watermarking at the point of program creation such as an ENG truck or sports stadium. At this point an audio-to-video timing mark has been created in the video signal effectively locking them together. Then anytime later in the program distribution chain this audio time reference can be extracted from the video signal and compared in time with the actual program audio signal. Any timing difference detected between the embedded reference and the program audio is an indication of audio-to-video delay, otherwise known as lip-sync error. The measurement can also be used to control an internal or external audio delay corrector to automatically retime the audio signal to the video signal, effectively eliminating this error from the broadcast distribution chain.

IOTs are not only meeting expectations, they are exceeding them and still improving.

TEST EQUIPMENT

Question:

What test equipment is needed to get a DTV/HDTV facility up and running? What will be needed to keep it going?

By Jeff Noah

Jeff Noah is a product marketing manager for the Video Business Unit of Tektronix, Inc., Beaverton, OR.

The basic needs of any television facility start at the source — that is, a dependable master video sync generator source with an audio reference out, preferably digital AES. Master timing sources are fanned throughout the facility ensuring the desired frequency and phase locking of all equipment to a single traceable source. The fan-out also allows testing and fine-tuning of cable lengths and delays to ensure proper phasing of all equipment on the test signal path. High-quality SDI waveform monitors for both SDTV and HDTV are needed to validate the jitter stability of the SDI transport stream and verify signal strength. This monitoring helps avoid the digital cliff effect from excessive cable lengths. Monitoring the digital audio signal is also necessary to identify undesirable mutes, pops and clicks and to format the signal properly. This will require an AES digital audio monitor.

In a hybrid SDTV/HDTV facility, reference generators for both standards will be necessary. It is interesting to note that even in an all-digital plant, digital reference generators still lock to good old analog black-burst signals. Therefore, a stable source of analog black-burst will also be needed, preferably locked to a traceable timing source such as a GPS receiver. Incoming program feeds will be both baseband and analog. An automated measurement set can provide verification of signal quality and hardcopy documentation. Some incoming feeds need to be checked for problems such as blockiness, frame drops and other MPEG artifacts before archival and editing.

In a DTV facility, an ATSC Grand Alliance MPEG encoder is most likely found at the output of master control and not at the transmitter. A source of video and audio programming chosen for testing the ATSC encoder's ability to compress with acceptable visual effects is needed. This test is best performed with a reference-based picture quality analysis system that streams out special video sequences chosen for their ability to stress an MPEG encoder, measuring any visual degradation as would be perceived by a human viewer. The bit rate of the GA transport stream and individual program streams needs monitoring as well, to ensure that adequate bandwidth has been allocated to each. Some test equipment can monitor up to eight MPEG transport streams and all included programs simultaneously. At the DTV transmitter, an 8VSB digital modulation analyzer should provide the features needed to keep the DTV transmitter within FCC specifications as well as provide remote monitoring to the studio.

RF AMPLIFIERS

Question:

Theory vs. reality. With more than 100 DTV stations on the air, how well are the various transmitter amplifier types (Diacrode, IOT, solid state) performing relative to expectations? What has gone right, what has gone wrong?

By John Allan

John Allan is vice president, marketing for Eimac, a division of CPI.

Field experience is showing that IOTs are not only meeting expectations, they are exceeding them and still improving. Since WCES went on the air in 1988 imac Klystrode IOT in NTSC service, marking the beginning of the IOT

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era, IOTs from the two major manufacturers have rolled up an impressive reliability record. There are well over 1000 IOTs in service, some with operating hours greater than 60,000 – 70,000 and still going. It has not been long enough yet for the 100 DTV stations to establish such an impressive history, but since the digital IOTs are the next generation of these proven designs, there is every expectation that similar results will be achieved. With this level of performance, claims of greater reliability by solid state seem illusory, and the IOT's position as the heart of DTV broadcasting seems well established.

The IOT's position as the heart of DTV broadcasting seems well established.

This is not to say there have been no problems as the DTV stations were brought on the air. There has been the occasional infant mortality failure, as at WBTV-DT, the 1MW station in Charlotte. This transmitter is configured with 4 OTs running at 66% power for the final amplifier stage. If one IOT fails, the station is able to still make full power with the three remaining IOTs. There have been a few reports of high rates of crowbar events from some sites, but these are not always IOT related. At WNYW-DT, the FOX station in New York, the FOX engineers have been experimenting with optimizing the operating conditions of the IOTs, and in one of their cabinets have managed to go since November without a single crowbar event. They are now looking to apply those techniques to their other IOTs in service.

There has also been progress improving the cavity hardware which is an integral part of the IOT system. Earlier, some of the transmitter manufacturers had difficulty meeting the FCC mask for out-of-band signals, which ultimately proved to be interplay between the cavity input circuit and the transmitter precorrection circuitry. This was overcome through teamwork between the transmitter manufacturers and the IOT manufacturers. There have been some cases of RF leakage from the IOT input cavity into the transmitter, again at certain channels and in certain equipment. These have been addressed on a site-by-site basis, but they do point out the need for a more robust design of the cavity/hardware supplied with the IOTs. We are introducing our next generation system hardware at this year's NAB show, and this problem too will be relegated to history. So as you can see, the first-level problem, that of reliability, has been put to rest, and now the second level problems, mostly with the associated hardware, are being resolved. This is normal evolution of a product, and we expect that these and other improvements will continue during the entire product lifetime.

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8VSB/COFDM

Question:

Many stations are wondering just how rugged are DTV transmissions? What technologies are now available to help solve DTV reception problems? How will you be supporting the local broadcast station in the implementation of DTV?

By Gary Shapiro

Gary Shapiro is president of the Consumer Electronics Association.

Unfortunately, rumor and proprietary demonstrations have prompted questions about the DTV broadcast standard. In early February, a unanimous Federal Communications Commission (FCC) decision put these concerns to rest. The fact is digital television reception has successfully undergone extensive indoor and outdoor field tests at thousands of sites in cities across the United States. More importantly, retailers and CEA surveys of DTV owners report that consumers who are viewing over-the-air digital television love what they're seeing. Reception in challenging areas will only continue to improve as manufacturers introduce new generations of products.

Broadcast television is just one part of the programming picture. Nearly two-thirds of American homes currently receive their TV programming through a cable system. For this reason, it is critical to ensure that the full benefits of digital and high-definition television reach cable subscribers. CEA believes that "must carry" rules must apply in the digital world.

Consumer DTV Acceptance

Question:

Is DTV acceptance on track? Can the FCC's 2006 deadline hold up?

By Mark S. Richer

Mark S. Richer is executive director of the Advanced Television Systems Committee (ATSC), Washington, DC

DTV is certainly on track. According to the National Association of Broadcasters (NAB), there are 117 DTV stations on the air. These stations provide digital television to over 61% of all U.S. TV households. That's a clear commitment from the broadcast industry to implement ATSC DTV. At the same time, the consumer electronics industry has shown their commitment by the broad range of ATSC DTV products that have been announced. From plug in PC cards to home theater systems, the consumer has a great deal of choice. I think that just about everybody who attended this year's Consumer Electronics Show (CES) left with a great deal of excitement about DTV. While I was there, I personally counted 17 different manufacturers of ATSC receivers (devices with 8VSB demodulators). Most of these companies showed multiple products.

Of course content is king and we are starting to see more and more high definition programming. In addition, enhanced television and data broadcasting services are also starting. With broadcasters on the air, consumer product on the market, and new programming and services expanding we will start to see significant penetration of ATSC receivers in the marketplace.

Of course the 2006 deadline is quite aggressive and may never have been practical. I believe that the government will be conservative about the termination of analog television. In fact, I predict that broadcasters will want to shut off their analog transmitters before the government will let them.

By Ed Grebow

Ed Grebow is President of Sony Electronics' Broadcast and Professional Company.

Consumer acceptance of DTV has been more sluggish than most industry analysts and I had anticipated. Sales of home receivers have been slow due to lack of programming, high cost, doubts about technical and copyright protection standards, and cable compatibility issues.

However, the advent of lower cost, higher quality sets being released this year, the availability of more HD programming and the FCC's recent decision to dismiss Sinclair Broadcasting's petition to modify the DTV broadcast modulation standard, should stimulate consumers to jump on the DTV bandwagon. As far as whether the 2006 deadline will hold, probably not. Although digital broadcasting is evolving at an accelerating pace, the FCC will need to extend the deadline to allow for an effective and complete transition to digital television. This will possibly take until about 2010.

For broadcasters, the economic models for digital television are still evolving. What is apparent today is that the broadcast, cable and telecommunications industries will all play a part in providing a wide range of consumer services utilizing the digital receiver and infrastructure. Partnering among companies will become an essential part of doing business. Television will become a multipurpose entertainment and information appliance. The digital world will become a rich mixture of HDTV, datacasting, multicasting and a combination of other services that will produce a viable business model.

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Bill Thompson

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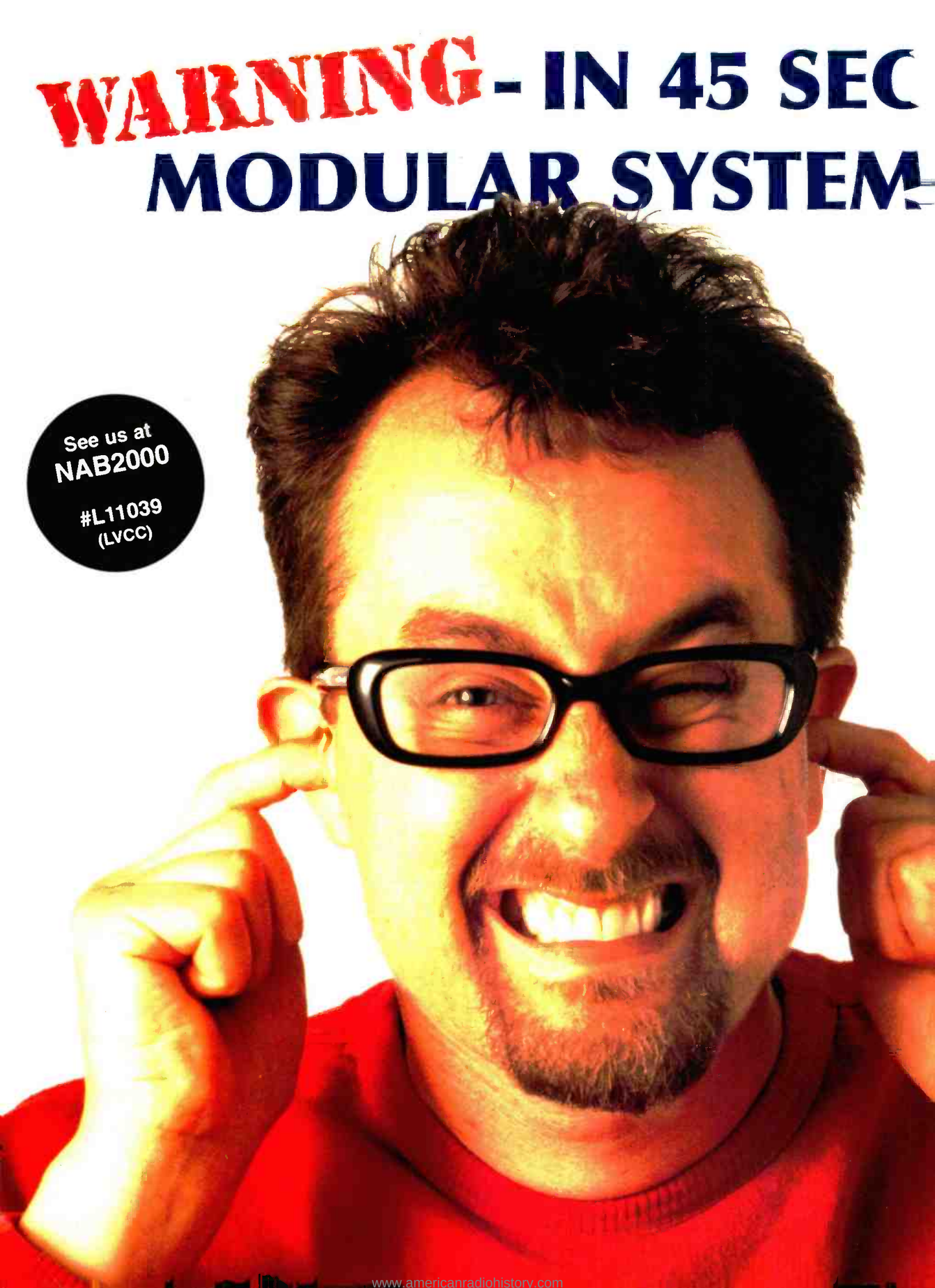

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Question:

Is DTV acceptance on track? Can the FCC's 2006 deadline hold up?

By Gary Shapiro

Gary Shapiro is president of the Consumer Electronics Association.

DTV acceptance is right on track. More than two dozen manufacturers have introduced DTV products and retailers across the country are selling DTV. In 1999, DTV product sales exceeded industry projections of 120,000, and we expect to sell five times that number this year.

Consumer reaction to DTV has been what we expected – enthusiastic. Retailers report increased store traffic and sellout sales in 1999. As with all consumer electronics technologies, DTV adoption has been fueled by content — an increase in available DTV programming led to double-digit sales growth during the fourth quarter.

DTV is on its way to becoming a mass market product as prices come down and the range of available products grows. By 2006, the target date for ending analog broadcasts, CEA conservatively estimates that 30% of U.S. households will have DTV – or 30 million DTV products will have been purchased. After 2006, CEA projects quicker adoption rates.

In 1999, DTV product sales exceeded industry projections of 120,000, and we expect to sell five times that number this year.

To keep the DTV transition moving, the industries involved in the transition must keep looking forward, avoiding unnecessary delays and distractions. Manufacturers are committed to providing consumers with subsequent generations of DTV products that incorporate performance improvements and additional features. But adoption rates will be driven in large part by available programming. It is critical that broadcasters, cable and satellite providers continue to invest in digital facilities and HDTV production.

DTV BUSINESS MODELS

Question:

There have been plenty of discussions about the business models for DTV. Just where are the opportunities with DTV from a business standpoint?

By Wayne Ruting

Wayne Ruting is CEO of Columbine JDS Systems, Denver, CO.

DTV business opportunities, as they pertain to terrestrial DTV in the U.S., are still more theoretical than real. Obviously the increased available bandwidth will allow broadcasters to do more, if they so choose. And herein lies the challenge that broadcasters have been wrestling with for the past year or so — with the ability to offer viewers more choices, broadcasters also face the danger of fragmenting their own market. In essence, every additional programming option can become a threat to the broadcaster's existing programming. That is, say for instance a broadcaster decides to offer a pay-per-view movie channel. Will added revenues from the new channel justify stealing viewers from the broadcaster's existing channel? I think that right now no one really has good answers for these types of issues, and that the answers will actually vary in different locations depending on market conditions. But, given this caution, one thing that DTV certainly offers is flexibility, and I think there are a number of interesting business opportunities, that, while still untested, seem to be very promising.

One of the most promising opportunities lies in the ability for broadcasters to do more precision demographic targeting. With the added bandwidth and the ability to transmit a number of channels, different programming streams can be directed at subsets of what had previously been a single large audience, which should allow broadcasters to be able to charge a premium for advertising spots. With sophisticated automation and management technology, this type of service could be implemented without significantly increasing existing operational costs beyond those of a basic service.

A second interesting opportunity is in datacasting and any number of specialty subscription services. Even after increasing the number of channels for programming, broadcasters should have bandwidth capacity to offer these types of community information services. These could be anything from specialty classified advertising or real estate listings to financial updates. Local newspapers, for instance, could partner with broadcasters to offer classified advertising services or news update services.

Some of the most interesting opportunities are in the area of sports broadcasting. For instance, sporting events

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Question:

There have been plenty of discussions about the business models for DTV. Just where are the opportunities with DTV from a business standpoint?

could utilize the DTV bandwidth to transmit multiple camera angles, allowing viewers to select the camera angels which they would like to view and switch between cameras at will. Experiments with these types of offerings have already been tried by some of the satellite broadcasters in Europe, with much popular success.

By Tony Gargano

Tony Gargano is president and CEO of Agilevision.

Originally, the broadcast community was extremely concerned as they saw incursion into and erosion of the spectrum allocations assigned for their use. With the broadcasters' push to HDTV (in large part to protect that spectrum) and the FCC's eventual adoption of a DTV service (note the distinction between HDTV and a DTV service) and the assignment of a second channel to each broadcaster, the FCC unleashed a huge new revenue opportunity to the broadcast industry. This revenue opportunity arises as the only mandated requirement on the broadcaster for that second channel is the digital carriage of an NTSC service equivalent quality signal. This mandate can be met utilizing but a few Mb/s of that almost 20Mb/s per second channel 6MHz pipe. That leaves a huge portion of that 'pipe' available for the discretionary use of the broadcaster for alternative revenue generation opportunities.

No matter what the format, resolution or aspect ratio someone must produce content.

With the current penetration of true DTV receivers perhaps on the order of a tenth of one percent of television households, legal impetus aside, there is little fiscal impetus for the broadcaster to invest in lighting up his DTV transmitter. What is evolving, however, are new applications and services that can utilize a portion of the DTV stream. There are various types of such services coming to the fore. Some are open, some are proprietary; some propose broadcasting to the PC, while others to a STB on the television receiver. Most involve some level of interactivity utilizing a telephone connection for the upstream channel. The final point of understanding is a dedicated data channel vs. opportunistic data. In some cases the data service can utilize free portions of the DTV stream to drop in data packets while in other cases the level of intensity of the data service requires the dedication of a portion of the DTV stream.

One of the initial companies proposing such a service has already announced plans for a nationwide roll-out early next year. Thus, given the current lack of DTV receiver penetration and the looming must-carry issues for the DTV service, the broadcaster may find that the real near-term revenue opportunity for his DTV pipe is the transmission of data services. So, in an interesting juxtaposition, over the short term what was initially believed to be an ancillary revenue opportunity to the DTV service may prove to be the primary revenue generator to an ancillary DTV service.

By Aram Friedman

Aram Friedman is director of engineering, Hayden Planetarium & Broadcast Systems, American Museum of Natural History, New York.

During my 25 years in this industry I have participated in several technical revolutions, each requiring broadcasters and post production facilities to retool and upgrade. These overhauls have always been profitable for manufacturers and engineers but can be costly, if not disastrous, for the facility owners. One group, however, has always managed to resist these technological changes. No matter what the format, resolution or aspect ratio someone must produce content.

When we introduced the first generation of 16:9 plasma screens and HD players to the American Museum of Natural History here in New York, we were encouraged by the low cost of playback and display. We were not as enthusiastic about the initial investment in production hardware. The price of the HD camera and lens was once again $100k, not to mention the high price of the MPEG encoder, recorder, edit system and peripherals.

However, with tools in hand, our documentary production unit was more than delighted to provide content for this new format. Almost immediately, these original stories and images have been requested by our less funded museum cousins. For them a single HD player and Plasma screen can be purchased for under $20k. Multiple screens can be added with a modest investment in fiber or copper distribution. So long as they are not required to purchase their own production and post facility these organizations can afford the display system.

Broadcasters are most powerful as content providers in the new paradigm.

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By John Luff

John Luff is president of Synergistic Technologies Inc., Canonsburg, PA.

I wish I could look forward in time and put my finger on the killer app that will make the most economic sense in 2006. If I were to put a bet on it, a high-bandwidth DTV service pipe providing Internet content to PCs which can cache it locally for offline access, and advertising support material are the most likely to drive additional revenue to the broadcaster in the next five years. Notice though, I said additional revenue. Broadcasters will need to concentrate on their core strength —broadcasting.

Broadcasters are most powerful as content providers in the new paradigm, for it will be increasingly difficult for them to compete as a delivery medium alone, as they have had the luxury of doing for the last quarter century. HDTV offers the promise, largely unfulfilled at this juncture, of providing the consumer with a new canvas with new paintings. Digital broadcasting allows a range of services that permits broadcasters to compete effectively in a new marketplace. To do this, they will need to rebuild their facilities for DTV. This will mean changes in a variety of areas. What follows is a quick look at some of those areas and thoughts on some of the changes needed.

One of the toughest problems to be faced is architecture. The monitoring of an HDTV program cannot be done effectively on a 19" monitor (in 16:9 that monitor is only 8.5" high), so monitor walls for production will need to accommodate a change to considerably larger monitors to allow the production staff to compose the visual effects, and replicate the viewers' perception of the program in a meaningful way.

With a single channel of DTV operating today, most stations are simply simulcasting the NTSC program with the DTV channel. When HDTV material is present it is separately rolled (at the network or locally), but switched largely in unison on both services. It is not hard to concoct a system that allows the DTV channel to follow the NTSC channel by using tallies or GPIs for a low-intensity problem like this. However, when commercials are separately sold and aired, or when a second SDTV channel is added to the DTV stream, it will become more complicated to switch two stations without automation. There needs to be interaction among several pieces of software, including station automation, PSIP generation and insertion, potentially data services, and encoder/multiplexer control systems if one is to successfully assemble a DTV stream. The control of the multiplexer and encoders can require a large number of commands to set bit rates, coding standards for audio and video, and the contents of the multiplex — something it will be impossible to do manually.

The quality of upconverted pictures is highly suspect. You simply cannot match HDTV quality with upconverted pictures, especially if they were ever imprinted with the NTSC footprint. Stations should consider broadcasting SDTV, or at most 480p/60 upconversion, in 4:3 until they can make the switch to acquisition to at least 480p/60 16:9 production facilities. Our tests have shown that 480p/60 converted to 720p/60 for transmission provides a very pleasing picture after ATSC decoding at the home. Consumers are turned off to HDTV when they see the poor results of NTSC converted to HDTV on their new (expensive) sets. If we expect them to accept HDTV we need to provide compelling programming and exceptional quality, not upconverted images.

For audio, both the acquisition of the audio and the monitoring of the mix throughout the production process are significantly different for surround sound. First, it takes a special audio console with the ability to pan among all six channels of the sound field. Second, the system must be either six channels of analog or three AES pairs deep, and differential phase must be held to very close specifications to prevent uncontrolled effects on the audio image. Lastly, the monitoring of the signal is fundamentally different. The absolute levels are not very instructive, but the relative effect on the vector audio image is very important if the mixer is to understand the meaning of the levels on each channel. Six channel vector displays exist and are helpful in understanding the total sound field. Better monitoring tools and more training for audio operators in how to mix surround sound are needed to facilitate the transition in mixing skills.

Every consumer I have shown HDTV to responds uniformly with either a four-letter expletive or a simple "WOW!"

On the reception side, I think the problem is an unfortunate mix of changing desires on the part of broadcasters, and technology that was designed to do a job no longer needed exactly as was originally thought. The demonstrations put on by Sinclair and NBC are quite compelling, but an equal number of demonstrations have shown success in admittedly less challenging topography. A small custom electronics manufacturer asked my opin-

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ion about a box station technicians could use to test 8VSB reception without monitors and decoders. I told them stations won't have people to send out for field tests with their audience. Rethinking that position, it may well be that broadcasters need to do some hand holding and use entry-level technicians to assist consumers in getting adequate performance. The result could be raising the consumer support for DTV.

Anecdotally, every consumer I have shown HDTV to responds uniformly with either a four-letter expletive, or a simple "WOW!" As set prices drop, I think acceptance of HDTV will move more rapidly than was once predicted. The success of HDTV in the consumer marketplace rests entirely in the hands of the owners and producers of programming who need to step up to the plate boldly and provide the content. Without content we have a situation analogous to a tree falling in a forest where no one is present, with the outcome that it genuinely will not make a sound. But if innovation and creative use of the tools of the new medium abound the future is bright indeed. Remember what Ernie Kovacs said, "Television must be a medium...because it is not rare and seldom well done."

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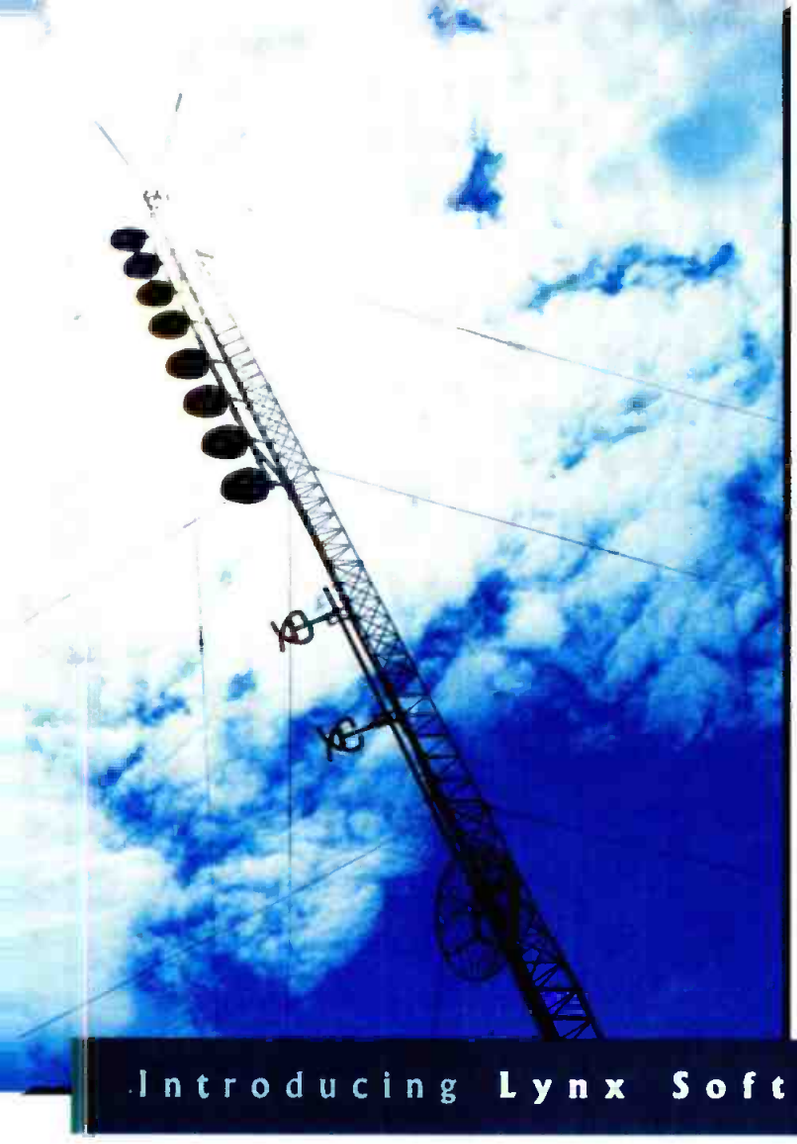

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Microsoft is a registered trademark of Microsoft Corporation

Studio/field and portable cameras

Ikegami HDK-790D/ HDK-79D:

delivers leading HD formats without external converters; offers 2.2 million pixel 2/3-inch CCDs that provide selectable native interlace and native progressive read-out modes; can be swithced to provide 1080i, 720p and 480; outputs are provided for HD and SD in both digital and analog, NTSC signals can be independently switched to 16:9, 4:3 side-cut or 4:3 letterbox aspect ratios.

201-368-9171; fax: 201-569-1626; www.ikegami.com

Booth: L11831 Circle (478) on Free Info Card

16:9/4:3 switchable cameras

Ikegami HK-387W/387PW:

employs 640,000 pixel 2/3 inch IT CCDs (16:9/4:3 switchable; deliver high-resolution, low-noise image quality and a wide dynamic range and accurate color fidelity.

201-368-9171; fax: 201-569-1626; www.ikegami.com

Booth: L11831 Circle (445) on Free Info Card

Portable multi-standard digital camera

Hitachi SK-3000P:

includes newly developed 2.2 million pixel CCDs that provide 1080i output for HD; modular design allows for 720p and 480p formats; NTSC (480i) outputs are provided in digital and analog.

516-921-7200; fax: 516-496-3718; www.hdal.com

Booth: L 7507

Circle (362) on Free Info Card

HD camera system

Philips LDK6000:

2/3-inch CCD HDTV camera system; supports 1080I and 720p as native formars; CCD sensor enable production of native pictures in interlaced or progressibe formats, unaffected by format conversion-related artifacts; Triax-HD transmission system transmits HD video across 3000 feet using SD triax cable.

800-962-4287; 818-729-7700; fax: 818-729-7710; www.broadcast.philips.com

Booth: L 6910 Circle (629) on Free Info Card

DVCPRO camcorder

Panasonic AJ-D610WA:

a 16:9/4:3 switchable, 2/3-inch IT three CCD camcorder; allows users to shoot in 4:3 or 16:9 widescreen; features 66 minutes of record time, 10-bit digital signal processing, a S/N of 55dB and a minimum illumination of 0.5 lux; offers optional Picture Link, which stores shot logging in camera memory and records it on tape during the eject cycle; Picture Link information can be read by newsBYTE editing systems.

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

Booth: L 8236 Circle (657) on Free Info Card

The People.
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The Company.

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TANDBERG Television believes that a lasting partnership with a customer is as important as the technology we provide. And for that partnership to grow, the people and technology involved must be open enough to fulfill the broadcast demands of today, yet flexible enough to meet the unknown requirements of tomorrow.

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EXHIBITOR MAP

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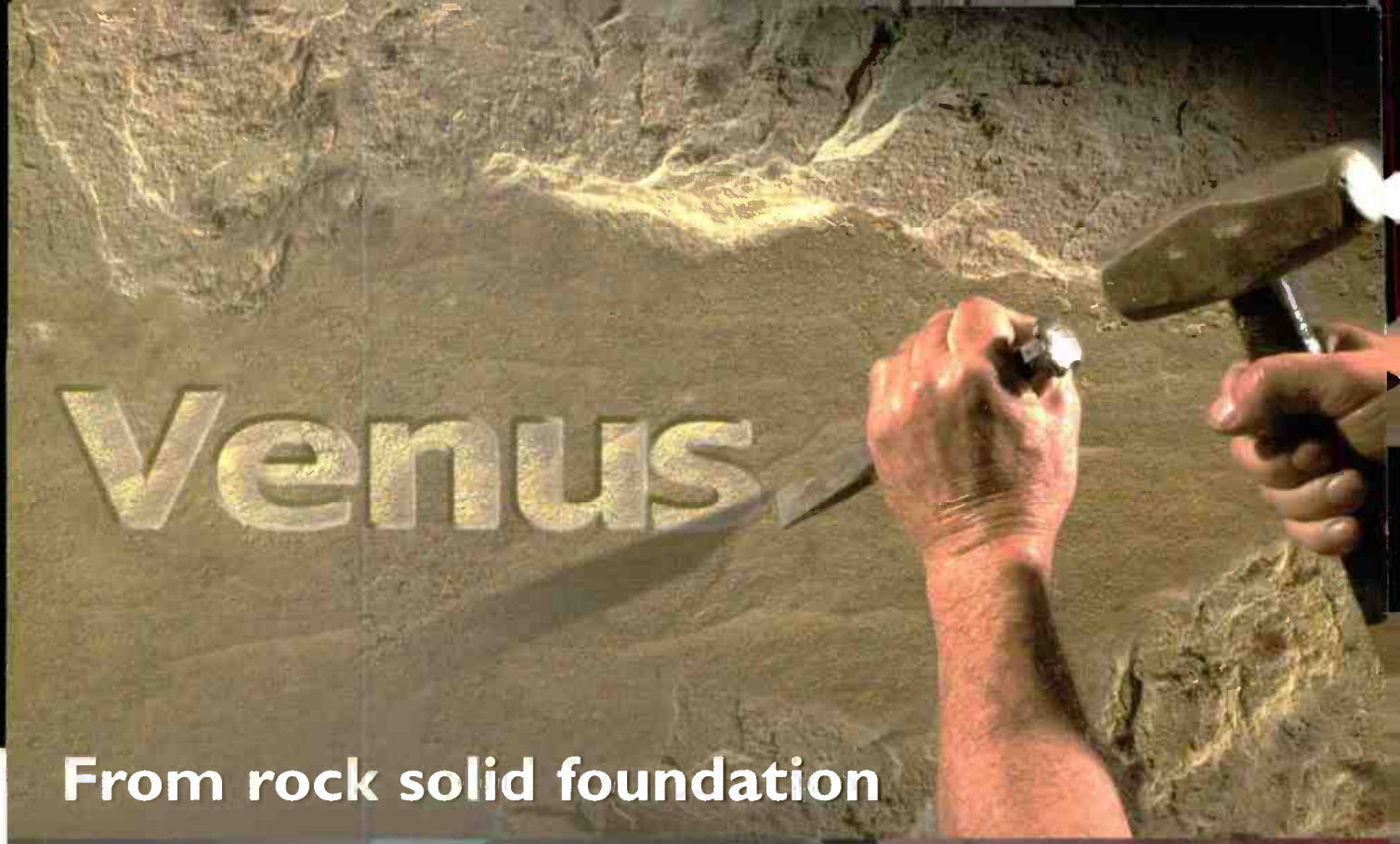
3501 Jamboree Rd. Suite 200
Newport Beach, CA 92660
949.725.2552
www.tandbergtv.com

Circle (195) on Free Info Card



From rock solid foundation

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We're bringing
tomorrow
together

Venus2001
modular universal router

See uas at NAB Booth #L6910

The new Venus 2001 modular universal router is the next generation in routing switcher technology from Philips. It fits perfectly with any existing Venus system, so you are assured of instant compatibility. Mix and match your choice of new signal modules (SD/HD video, AES audio, data, etc.) all within the same chassis. Just plug in the card you want and build to any size. There are no limits with Venus 2001. To learn more, call us toll free at [illegible], or visit our web site at www.broadcast.philips.com.

For Y2K information about Philips, BTS, and Asmar products, please refer to our website www.broadcast.philips.com

PHILIPS

Let's make things better.

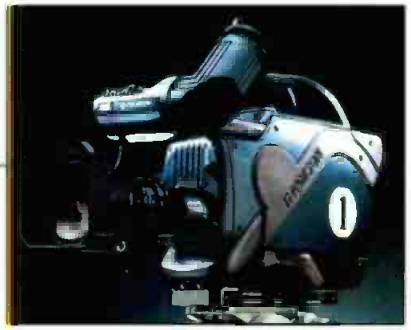
Circle (288) on Free Info Card

HD studio cameras

Sony HDC-900/950: features a newly developed CCD images, 12-bit A/D and DSP LSI; features five selectable capture rates, 1080i at 60i or 50i or 1080p at 30p, 25p, or 24p; can include optional 720p outputs, in addition to SD outputs at 480p, 480i or 576i and options for NTSC or PAL; support 24p HD for DTV production.

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

Booth: L12107
Circle (621) on Free Info Card



12-bit digital triax camera

Thomson Broadcast 1707: designed for intensive use in all kinds of studio and many OB applications; an all-digital camera from acquisition to transmission over triaxial cable; features digital triax link with no compression and lightweight, easy-to-handle, single-piece configuration; offers 12-bit acquisition and 24-bit signal processing.

800-882-1824; 201-569-1650;
fax: 201-569-1511;
www.thomsonbroad.com

Booth: L 9609
Circle (375) on Free Info Card

Switchable aspect ratio camcorder

JVC DY-90W:
uses 4:2:2 sampling and 50Mb/s; switches from 16:9 aspect ratio to 4:3; uses three 2/3-inch CCDs, LoLux low-light capability, four channels of audio, 124-minute recording time and other professional features.

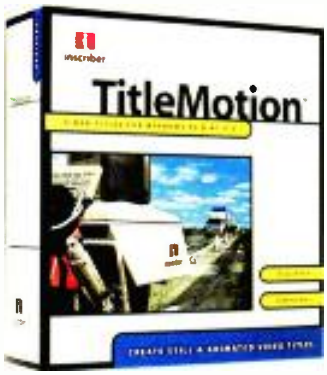
800-JVC-5825; 973-315-5000; fax: 973-315-5030;
www.jvc.com/pro

Booth: L12118 **Circle (686) on Free Info Card**

Character Generators, Prompter and Captioning

Pro graphics plug-in for Win95/NT NLEs

Inscriber TitleMotion:
this graphics plug-in for creating video titles and motion effects for nonlinear editors running on Windows 9x/NT; features extensive attribute controls for design and output aspecs; include full key-channel support; operates as a standalone titling package.



800-363-3400; 519-570-9111; fax: 519-570-9140;
www.inscriber.com

Booth: S 4751 **Circle (447) on Free Info Card**

Live titling tools

Inscriber Inscriber RTX:
includes development tools for creating live titling systems for sports, broadcast, elections, financial news, stock tickers, home shopping channels, weather displays, subtitling, info channels and more; provides an environment of high-level productivity tools that allow broadcaster to quickly create solutions for custom data-driven programming.

800-363-3400; 519-570-9111; fax: 519-570-9140;
www.inscriber.com

Booth: S 4751 **Circle (446) on Free Info Card**

Text and character generators

Collage Graphics Collage:
a range of character generators, from entry-level to systems with integrated still stores and sophisticates paint and animation; characters prepared on Collage GX can be played out on any Collage system; range includes the Collage TG, Collage CG and Collage GX.

561-395-4000; fax: 561-395-4065; www.pixelpower.com

Booth: L6356 **Circle (674) on Free Info Card**

NT-based character generator

Inscriber Inscriber Live!Studio:
features modular artstic and media management tools; network compatible for seamless file sharing; uses productivity tools including CG creation capabilites; real-time motion effects editor, a video paint system and an integrated digital store, which catalogs and accesses still images and video clips across the network.

800-363-3400; 519-570-9111; fax: 519-570-9140;
www.inscriber.com

Booth: S 4751 **Circle (435) on Free Info Card**

Character generator software

Pinnacle Rocket for FXDeko:
a software option that allows users to enhance titles and create sophisticated business graphics using both 2D and 3D elements, including slabs, line charts, bar graphs and clocks; graphics can be manipulated in real-time in 3D space; uses template-based approach to configure graphics for playback from the powerful sequence tool.

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

Booth: L 9457 **Circle (417) on Free Info Card**

Desktop Video

Real-time uncompressed digital editing system

Accom Affinity Nonlinear editing system:
controls respond with zero rendering; provides an open environment with Quicktime file format; allows user to use any paint, 3D graphics or effects application that Quicktime compatible; give user true three-point editing or drag & drop plus new tools for both long-form and short-form work.

650-328-3818; fax: 650-327-2511;
www.accom.com

Booth: S 4909 **Circle (414) 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:

Serial Digital Video

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Asynchronous Digital Audio

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Datatek Corporation
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Mountainside, NJ 07092
Tel: 908-654-8100 • 800-882-9100
Fax: 908-232-6381

DATATEK CORP.

Circle (184) on Free Info Card

See us at NAB Booth #L5610

Uncompressed HDTV board

■ **DVS Digital Video HD StationPRO:** supports HD and post-production standards, such as 1035/1080i, 720p and 1080p24/30; include analog HD monitoring output with overlay as well as real-time digital color space converter to support YUV/4:2:2 and RGB 4:4:4 data storage modules; RS-422 ports interface for VTR master control and VTR emulation purposes and Sony RS-422 nine-pin protocol; slow motion, 3:2 pulldown and 24/25 conversion are supported as well.

818-241-8680; fax: 818-241-8684;
www.digitalvideosystems.com

Booth: S 4941 **Circle (441) on Free Info Card**

Digital Audio Workstations

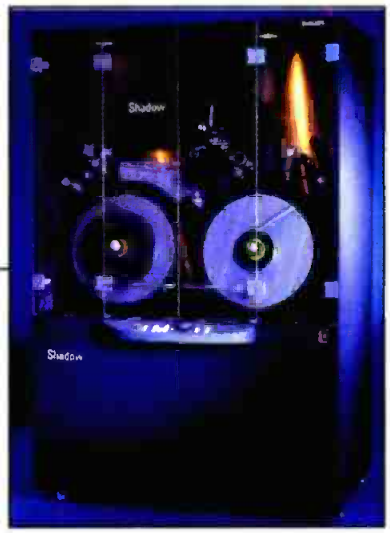
32-track editor

■ **Soundscape R.ed:** features up to 32 tracks of 24-bit audio and supports two removable EIDE drives per unit with a limit of 137GB per disk; includes two AES/EBU input channels and four AES/EBU output channels; provides recodring, editing and playback functions with Version 2 software from Soundscape'd PC-based SSHDR-1 Plus systems.

805-658-7375; fax: 805-658-6395;
www.soundscape-digital.com

Booth: I 6939 **Circle (453) on Free Info Card**

Film Equipment & Services



Telecine

■ **Philips Shadow:** ensures high digital quality with excellent S/N performance; features high-speed CCD 1332-pixel line array and front-end processing that employs advanced correlated double sampling; also features an internal secondary six-sector color corrector that operates at 2K 14-bit resolution.

800-962-4287; 818-729-7700;
fax: 818-729-7710;
www.broadcast.philips.com

Booth: L 6910
Circle (415) on Free Info Card

A Full House of Transmitters

With nearly twenty years' experience in the design and manufacture of television transmitters, we continually strive to build a product line that is responsive to the needs of any broadcaster. Our vast product line is built with the latest RF technology, coupled with a strong commitment to quality. We offer more product flexibility to meet your needs and we deliver it.

The Innovator™ Series of high-power solid-state transmitters is available in power levels up to 120kW analog or 60kW digital using the latest LDMOS transistors. If your application requires an IOT, our Visionary™ Series high-power transmitters with up to 420kW analog or 180kW digital power levels is the card to play. ADC's hand includes the 800 Series of low- and medium-power transmitters, available with either solid state or diacrode amplifiers at powers to 10kW analog and 5kW digital. With so many choices, you can bet that we have a product to meet your application.

For additional information about our full line of products, please visit our web site at www.adc.com/broadcast or call (800) 215-2614.

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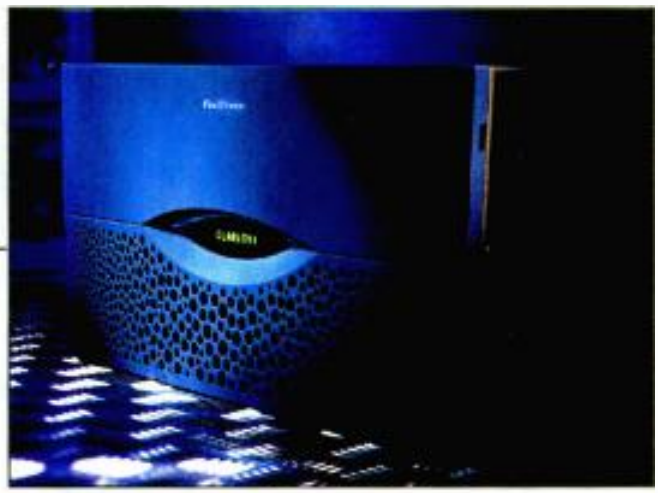
Graphics and Animation Systems

Animation system

Play Electric Image:Universe:
a new hybrid surface and solids modeler, an incredibly deep animation toolset; provides faster rendering power with sophisticated ray-tracing, and cross-platform support for Windows NT, Macintosh, Sun and SGI.

800-306-PLAY; 916-851-0800; fax: 916-851-0801;
www.play.com
Booth: L10982 **Circle (665) on Free Info Card**



HD/SD graphic systems

Collage Graphics Clarity SD/HD:
real-time,multilayer, multiformat HD graphics systems; runs HD formats up to 1080p at 24-, 25-, 50- and 60Hz rates; offers production-level paint, stills store, real-time animation effects, transition effects, event sequencing and motion effects; SD configurations include dual channel HD, single channel HD and dual channel SD and quad channel SD.

561-395-4000; fax: 561-395-4065;
www.pixelpower.com
Booth: L6356 **Circle (673) on Free Info Card**

Uncompressed studio DDR

Digital Processing Systems dpsReality:
an animation and compositing system designed for animators, 2D artists and broadcast designers; software features include a cuts editor for clip preview and final video output, real-time logo/graphic overlay, deck control, four-track audio with volume and pan control and support for Inscriber titling package; hardware features mixed-mode compressed and/or uncompressed video and alpha channel storage and playback (4:2:2:4); offers support of multiple real-time webstreaming output formats such as MPEG-1, MPEG-2 and RealVideo.

800-775-3314; 606-371-5533; fax: 606-371-3729;
www.dps.com
Booth: L 9383 **Circle (433) on Free Info Card**

64-bit graphics systems

Collage Graphics Graphite CG, GX:
combines 64-bit dedicated hardware with SSA disk technology; systems deliver presentations in seconds, create and manage unlimited graphics layers and make last-minute changes while on air; Graphite CG allows single user to air CG pages, play bumpers or teasers and air animations with optical associated audio strings; Graphite GX allows users to add animated backgrounds to full or partial screen CG pages, animate over-the-shoulder graphics and create 2D and 3D animations.

561-395-4000; fax: 561-395-4065; www.pixelpower.com
Booth:L6356
Circle (675) on Free Info Card

Lighting Equipment

Camera mounted lighting system

Anton/Bauer ULTRALIGHT:
new accessories complement the on-camera light; special purpose heads, lighter weight and special system package make studio-quality lighting in the field easier.

800-422-3473; 203-929-1100; fax: 203-925-9935;
www.antonbauer.com
Booth: L11862
Circle (344) on Free Info Card

Portable chroma key and lighting system

Play HoloSet:
allows chroma key background and lighting system to be portable and used in a wide range of lighting environments; customized flexible reflective backdrop and emitter ring of green or blue LED lights works with any hardware or software-rendered keyer, producing a flawless key source in almost any situation including minimal lighting.

800-306-PLAY; 916-851-0800; fax: 916-851-0801;
www.play.com

Booth: L10982 **Circle (666) on Free Info Card**

Microphones, Accessories

Battery powered, frequency agile receiver

Lectrosonics UCR210D:
A synthesized UHF, diversity ENG receiver; will run four 1/2 hours on four AA batteries; tunes across 256 different frequencies in 100kHz steps; offers balanced audio output.

800-821-1121; 505-892-4501; fax: 505-892-6243;
www.lectrosonics.com
Booth: L 5812 **Circle (428) on Free Info Card**

World-Class Intercoms

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Microphone systems

Audio-Technica AT895 Adaptive-Array:

output of the array is manipulated and filtered by acoustical, analog and digital means to enhance the pickup of a sound source from a desired direction relative to unwanted background noise or interference, providing cancellation of up to 80dB.

330-686-2600; fax: 330-686-0719;
www.audio-technica.com

Booth: R 2970 Circle (398) on Free Info Card

Broadcast mic

Audio-Technica AT4047/SV:

a large diaphragm cardoid capacitor microphone designed for studio production, voice-over, on-air and other critical broadcast application.

330-686-2600; fax: 330-686-0719;
www.audio-technica.com

Booth: R 2970 Circle (662) on Free Info Card

Dual audio embedder/de-embedder

Crystal Vision TANDEM:

this audio embedder/de-embedder features two removable piggyback units on one card; can be configured to any two of four possible functions at once — embedding analog or digital audio into SDI or de-embedding analog or digital audio from SDI; can be a single embedder, a single de-embedder, a dual embedder, a dual de-embedder or a mixed embedder/de-embedder; the kit format means that the customer can build the exact product required and can reconfigure it in the field.

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

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Wavetek Wandel Goltermann offers a full range of innovative test and supervision solutions for world-class support of all the players in digital-TV provision.
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mpeg@wwgsolutions.com

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Communications Test Solutions

Circle (189) on Free Info Card

Microwave, Fiber Optic & Telco Equipment

ATSC/NTSC microwave link

RF Technology UNI-Plex:
for combined ASTC/NTSC studio-transmitter links and other microwave applications; supports transmission of 19.39Mb/s ATSC digital signal and NTSC analg video and multiple channels of audio within a single microwave channesl, can be reconfigured as two seperate links for ATSC, digital traffic up to 45Mb/s or analog video.

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

Booth: L13235 Circle (683) on Free Info Card

Portable microwave link

RF Technology UCL series:
flexible, portable link that supports both digital and analog transmission; for digital video operation, the UCL-series combines COFDM and MPEG video compression; digital operation configurations support single or multiple channels of video in a reduced RF bandwidth and provide excellent performance especially in multipath environments; can be reconfigured for analog NTSC operation.

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

Booth: L13235 Circle (374) on Free Info Card

Digital ENG truck transmitters

Nucomm Newscaster MMPT6 Series:
able to deliver analog video and audio and digital video; a heterodyne transmitter that can accept any 70MHz digital modulator signal including COFDM, QPSK and 8PSK; offers increased control through coax/triax cable and four individual conductors, allows ENG truck operator to control and monitor the RF section of the ratio, control antenna polarity, pan and tilt and other mast-mounted equipment.

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

Booth: L 5451 Circle (651) on Free Info Card

DTV STL

Nucomm Dual Stream Plus:
tranports both analog NTSC and digital ATSC signals side by side within a 25MHz STL channel; overcomes shortages of STL frequency channels in many of the broadcast markets in the U.S.; does not require digitizing/encoding of NTSC signal; offers up to four audio channels.

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

Booth: L 5451 Circle (653) on Free Info Card

Serial Digital Video distribution products

Multidyne HD1500 series:
a series of 1.5GB/s serial digital video distribution and fiber optic products; provides solution for coaxial and fiber optic transport and distribution of any digital signal from 50Mb/s to 1.5Gb/s; supports SMPTE 292M SDI; 4:2:2 component and wide screens, 540Mb.s 4:4:4:4, Sonet/SDH and ATM; available in compact standalonw or rack-mount packages.

800-4TV-TEST; 516-671-7278; fax: 516-671-3362;
www.multidyne.com

Booth: L 9144 Circle (682) on Free Info Card

Fiber optic video SDI system

Opticomm FMX-5000:
an uncompressed 10-bit serial digital video system at 143, 166, 270, 360, 540 and 622Mb/s data rate is free of adjustment over a wide dynamic range; single mode 1310nm or higher wavelength at 1550nm is used; assures best possible signal uniformity and is ideal for the transmission of multiple digital video with audio and or data.

800-8-OPTICOMM; 858-450-0143; fax: 858-450-0155;
www.opticomm.com

Booth: I 7424 Circle (383) on Free Info Card

Studio LINK Transmitter

Choose the better path with an integrated BARCO solution. A family of ATSC/HDTV products to ease your digital transition.

PYXIS MPEG-2 Encoder
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- *Complete VBI Support*
- *Programmable Delay Coding*

Multiplex ATSC & NTSC

Encode HDTV

PICTOR HDTV Encoder
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- *AC-3 and Layer II Audio*
- *Industry Leading Motion Estimation*
- *Static and Dynamic PSIP*

STELLAR MPEG-2 Decoder
- *ATSC Demultiplexing*
- *Redundant Interfaces*
- *Single Unit for NTSC/ATSC*

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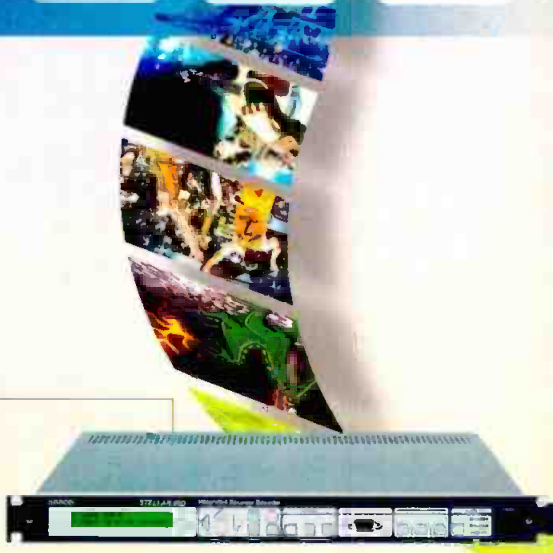

BARCO

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Circle (190) on Free Info Card

Digital/analog fixed microwave links

RF Technology ACL series:
advanced digital/analog link for STL, TSL, ICR and other fixed applications; for digital operations the series is compliant to DS3, E3, SMPTE 310M, E2, E1 and T1; for analog operation the ACL-series supports the transmission of video and up to six audio or data subcarriers.

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

Booth: L13235 Circle (321) on Free Info Card

Modular communications platform

Telecast Fiber Systems Viper II:
features transmission of multichannel audio and video, HD serial digital video at 19.4Mb/s to 1.5Gb/s; 601 serial digital video, wideband NTSC/PAL video, 24-bit digitized audio or AES/EBU, data, including RS-232, RS_422 or CCU; includes universal 16-slot card cage, rack-mount or throw-down modules.

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

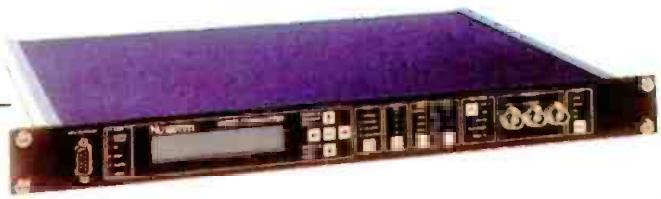
Booth: L13275 Circle (454) on Free Info Card

ATSC/NTSC STL

Broadcast Microwave STarLink:
simplified operation with internal MPEG-2 encoder, variable bit rates and options for 4:2:0 or 4:2:2 operation, preprogrammed CODM/MPEG modes for ease of operation.

800-669-9667; 858-560-8601; fax: 858-560-1637;
www.bms-inc.com

Booth: L 5430 Circle (436) on Free Info Card



Digital-ready ENG transmitter/receiver

Nucomm PT/RX6:
combines Nucomm's PT6/RX6 series digital-ready portable transmitter and receiver or Nucomm's MMPT6 NewsCaster digital-ready ENG van transmitter and CR6 series central receiver system with NEC's COFDM modulation and MPEG-2 encoding system.

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

Booth: L 5451 Circle (353) on Free Info Card

Need conditional access versatility? Get an OMNI Digital 4:2:2CI.

If you use conditional access to insure network integrity and security, your job has just gotten a lot easier. Because Standard's new OMNI Digital 4:2:2CI receiver/decoder features a common interface capability that makes it compatible with most conditional access systems.

But that's not the only reason you'll want to own it.

The OMNI Digital also gives you simultaneous analog and digital outputs as well as DVB ASI, 8PSK, and QPSK inputs. It's software addressable for remote control on your enterprise network, but still gives the onsite engineer an intuitive front panel design to make navigation easy and straightforward. You'll also like the wide symbol rate input range, a frequency range from 950-2150 MHz, and the fact that the OMNI Digital, like all Standard receivers, is backed by the 7-year Gold Standard Warranty and exclusive Standard loaner program.

That's a lot of capability for a receiver only one rack-unit high.

But it's just what you'd expect from Standard.

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www.standardcomm.com

U.S.: (800) 745-2445 • Canada: (905) 665-7501 • Europe: 44 1923 800 510 • South America: 55 11 887 6598

Circle (192) on Free Info Card

Edge networking device

Tiernan Communications TUI30:
extracts DVCPRO data from SDTI and encapsulates it in an MPEG-2 transport stream on DVB-ASI and vice versa; IT allows DVCPRO over satellite, ATM and PDH; automatically supports DVCPRO 25 and DVCPRO 50 in both PAL and NTSC formats.

800-323-0252; 858-587-0252; fax: 858-587-0257;
www.tiernan.com

Booth: S 4162 **Circle (595) on Free Info Card**

Dual-mode STL

Broadcast Microwave COFDM:
dual-mode studio-to-transmitter link; capable of simplex, duplex or hot standby baseband diversity operation; available in 2GHz to 5GHz frequencies; upgradable to full digital operation.

800-669-9667; 858-560-8601; fax: 858-560-1637;
www.bms-inc.com

Booth: L 5430 **Circle (622) on Free Info Card**

Power Products, Batteries, Generators, UPS

Charger for Ni-Cd/Ni-MH/Li-Ion

PAG USA AR Series 2:
adapts the charge program to sequentially fast-charge any mix of Ni-Cd and Ni-MH batteries within the ranges 4.8- to 14.4V and 1- to 10Ah; selectable 2A charge rate for smaller Ni-Cds and non-PAG Ni-MH batteries; analytic Discharge/Charge Program benefits batteries which have been repeatedly subjected to partial discharge in use; true available capacity is displayed on the large backlit LCD; the current load and status for each channel, as well as discharge capacity and terminal voltage, are also displayed; models with two or four low-profile Paglok connectors are available for the direct connection of Paglok batteries.

888-PAGUSA1; 805-520-4911; fax: 805-520-6949;
www.pagusa.com

Booth: L12912 **Circle (450) on Free Info Card**

Three-phase UPS

North Star/Best Power Unity/I:
employs one power module and performs only a single power conversion; uses as little as three percent of incoming power; from 10kVA/kW to 220kVA/kw.

800-842-1671; 954-921-5868; fax: 954-927-0501;
www.nstpower.com

Booth: L12852 **Circle (332) on Free Info Card**

Line of patented ferro-resonant UPS

North Star/Best Power FERRUPS:
provide regulated output voltage without drawing power from the batteries for input voltages as low as 38 percent below nominal; has ability to work with all types of input sources and loads; Active Voltage Regulation converts power from almost any AC source into computer-grade power; from 500VA to 18kVA.

800-842-1671; 954-921-5868; fax: 954-927-0501;
www.nstpower.com

Booth: L12852 **Circle (331) on Free Info Card**

Packs for Ni-Cd/Ni-MH/Li-Ion

PAG USA Lithium-Ion time batteries:
a 72 watt-hour pack which displays remaining runtime, on-load, in hours and minutes; 14.4V, 4.5Ah.

888-PAGUSA1; 805-520-4911; fax: 805-520-6949;
www.pagusa.com

Booth: L12912 **Circle (451) on Free Info Card**

Production Switchers & VideoEffects, Keyers

DVE

e-StudioLIVE (formerly ECHOlab Inc) 2D DVE option for ECHOlab 5000 SuperSwitchers:
new DVE enables compressions, such as over-the-shoulder and split backs; up to six DVEs may be installed on each 5000 system, each independently controllable; allowing the user to create customized, dynamic effects.

978-250-3334; fax: 978-250-3335; www.echolab.com

Booth: I 5819, L 9780 **Circle (661) on Free Info Card**

Production switcher

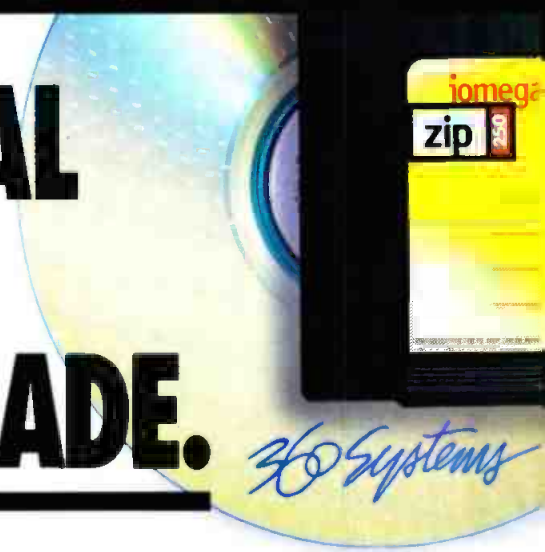
Pinnacle PDS 9000:
a 36-input, 2.5 M/E production switcher aimed at mid-market live production, pecifically news amd local interest programming; offers nine built-in 3D DVEs, 19 multipage framestores and RGB color correction; the multipage framestores can be loaded from Pinnacle's Lightning, Deko, Thunder and DVExtreme over a 100BaseT network

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

Booth: L 9457 **Circle (521) on Free Info Card**

TCR8 MASTER RECORDER

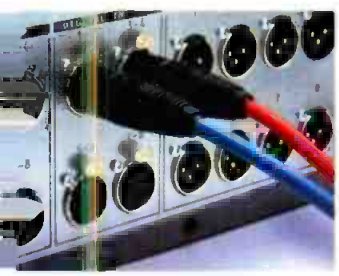
MEET THE BEST DIGITAL AUDIO MULTITRACK MASTER RECORDER MADE.



360 Systems designed the TCR8 with one goal in mind: To deliver a Master Recorder that faithfully captures the results of your work.

The Difference is in the Details

To provide the level of sonic accuracy that critical projects demand, you have to sweat the details. TCR's design specifies gold XLR connectors, metal film resistors, no capacitors in the audio path, and a patented low-noise circuit to suppress RF, hum and cable noise. Put all of this on shielded PC boards with double-regulated power, and the result is a 24-bit audio recorder of unprecedented quality.



Defining the Master Recorder

The TCR8 Master Recorder includes the tools you'll need for professional work— solid synchronization, the right connectors, and a feature-set focused on commercial audio production.

Today's high-resolution audio formats need a new generation of recorders that deliver on the promise of 24-bit audio. By actual measurement, the TCR8 Master Recorder far exceeds the specs of competitive machines, and actually approaches the limit of today's art.

Today's "24/7" studio makes very real demands on audio equipment. Which is why 360 Systems designs for reliability, just as we design for audio quality. But then, we also have 30 years experience building equipment for round-the-clock professionals.

From original recording to final mixdown, the new TCR8 Master Recorder delivers performance without compromise. Should you expect anything less?

Superior Audio Quality

- Measurable improvement of 20-dB in SNR and dynamic range over conventional designs
- Bit-for-bit™ reproduction of 24-bit PCM, Dolby®-E and AC-3 recordings
- Record across all tracks, at any sample rate
- Workstation file interchange with SD-II and WAV files
- Complete Cut-Copy-Insert-Erase editing features
- The best digital scrub editing on the market
- Time offsets, track slip, varispeed and audio delays
- Up to 24-hours of recording time in a single file

Standard Equipment

- DVD-RAM drive for 10 hours of 24-bit audio on low-cost disks
- Internal 9GB SCSI hard disk (up to 50 GB available)
- 250 MB Zip® drive
- A complete set of XLRs for analog and AES/EBU
- Rear panel SCSI port for external drives
- Large display for full length file names
- Multi-machine sync provides up to 64 tracks
- Flex-Format™ drive bay for removable media, such as DVD-RAM (standard), Magneto Optical or removable hard disks
- Complete SMPTE time code features:
  - > Support for all frame rates
  - > VTR emulation with P2 control
  - > Reads LTC or VITC
  - > Hard lock to Digital Betacam® for tight sync during scrub-edits
  - > Reference to Video, AES, Word Clock, or LTC
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5321 Sterling Center Drive, Westlake Village CA 91361
Tel (818) 991-0360 Fax (818) 991-1360 E-mail: sales@360systems.com

GVG compatible switcher frame

Ross Digital upgrade for GVG 100/110: switchers:
Grass Valley Group 100 and 110 switchers can be made digital by replacing frame with a Ross Synergy Digital switcher frame; features include 2D DVE, preview overlay and Ultimatte Insider.

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

Booth: L12326 Circle (514) on Free Info Card

Video production system

For-A VPS-400:
serial digital component I/O vision mixer with a DVE option; features eight standard digital inputs with eight additional inputs optional offers 4:2:2:4 digital component and 10-bit processing, as well as two independent keyers and 80 wipe patterns.

352-371-1505; fax: 352-378-5320; www.for-a.co.jp

Booth: L9217 Circle (403) on Free Info Card

Stand-alone DVE

Snell & Wilcox HD 1200 DVE "DaVE Alone":
a stand-alone, dual-channel HD DVE; includes classic DVE moves; can be used with any HD switcher.

+44 1730 821 188; fax: +44 1730 821 199;
www.snellwilcox.com

Booth: L11039 Circle (626) on Free Info Card

Tracking AI software

AFA Products Group Traxim:
available in HD or SD; a tool for isolating objects from their background since the chroma key; defines the edge of objects or elements; follows object or element as it moves in the scene using advanced image processing techniques; integral DDR chases telecine or VTR providing real-time object-based auto-tracking windows for use in color correction.

201-750-3200; fax: 201-750-3049; www.afassoc.com

Booth: L11522 Circle (423) on Free Info Card

Digital production switcher

Ross Synergy 1:
16 input, single M/E version of Synergy Series switchers; features include Aspectizers for simultaneous 4:3 and 16:9 production, 2D DVE, preview overlay and Ultimatte Insider.

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

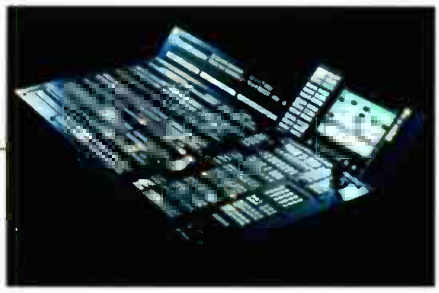
Booth: L12326 Circle (691) on Free Info Card

SD switcher

Snell & Wilcox Golden DaVE:
a high-end SD switcher; gives 10-bit performance in SD; designed for broadcast and post-production world.

+44 1730 821 188; fax: +44 1730 821 199;
www.snellwilcox.com

Booth: L11039 Circle (627) on Free Info Card



Digital video mixers

Thomson Broadcast Alteo series:
range of digital video mixer suited to a variety of applications from 1.5 M/E to 3.5 M/E and especially live production, module-based architecture allows operators to combine panels of different sizes to meet their needs; in operation, features can be configured live.

800-882-1824; 201-569-1650;
fax: 201-569-1511;
www.thomsonbroad.com

Booth: L 9609
Circle (610) on Free Info Card

Video production center

Grass Valley Group Kalypso:
offers powerful M/E architecture with four keyers per M/E for more flexible layering and two utility buses per M/E allows separate program mix, video in borders or masking; includes built-in device control for Profile XP Media Platforms and video servers, GVG routers, DVEs and VTRS; features built-in DVE with six channels of effects plus external DVE support; up to 80 inputs and 40 outputs.

800-998-3588; 800-547-8949
fax: 503-627-7275;
www.grassvalleygroup.com

Booth: L11018
Circle (408) on Free Info Card

TBCs, Frame Syncs and Conversion Equipment

Upconverter

TeraNex XA4110PXC-1x3x1:
converts from 480i60 to 1080i60, 720p60 and 480p60 or vice versa; features gamma correct colorspace conversion; 32-point optimal interpolation, 3:2 pull-down removal and insertion; aspect ratio conversion and test-pattern generation; SDI/HD-SDI I/O.

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

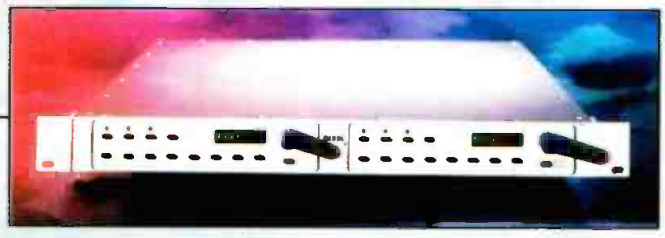
Booth: L 3723 **Circle (670) on Free Info Card**

Computer to video scan converter

Communications Specialties Scan Do Pro II:
features studio timeable genlock, component output (YUV or RGB format), switchable vertical filter and optional SMPTE 259M serial digital output; true multiscanning with support for resolution up to 1280x1024 (at 60Hz) ensures it will work with almost any computer; also includes three-line flicker reduction filter and multilevel input zoom processing.

888-4 FAX NOW; 631-273-0404; fax: 631-273-1638; www.commspecial.com

Booth: M 8968 **Circle (543) on Free Info Card**



10-bit synchronizer

Pixel Instruments VS-5200:
features multiformat I/Os and built-in Heterodyne TBC; serial digital, composite, analog, component analog and Y/C selectable inputs and simultaneous outputs are standard, allowing users to transcode from one format to another; the DDO pulse output of the VS-5200 is used to control the audio delay of the AD-3000 for automatic lip sync correction with analog or AES/EBU digital audio; rapid delay tracking is made possible by the automatic pitch corrector in the AD-3000.

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

Booth: L 3529 **Circle (347) on Free Info Card**

Serial digital video router

Quartz Electronics Q128:
accommodates matrix sizes up to 128x128; routers can be stacked to make 256x256 and larger; high level of modularity is employed with I/O added in blocks of four; modules are hot pluggable.

888-638-8745; +44 1189 350 200; fax: +44 1189 350 202; www.quartzuk.com

Booth: L 7456 **Circle (474) on Free Info Card**

Video format converter

Folsom Research VFC2200:
designed to implement dissolve, fade and clean synchronous switching between two video sources; VFC-2200 automatically locks to two interlaced or non-interlaced RGB/YUV inputs with resolution from 480i up to 2048x1280 progressive and directly scales them to a user-programmable output format with resolutions up to 1280x1024; unit contains two independently-programmable high-resolution scalars so inputs can be completely different resolutions and formats.

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

Booth: M 8532 **Circle (352) on Free Info Card**

Seamless switcher w/six HR inputs

Analog Way Graphic Switcher:
seamless switcher offering six high-resolution inputs; cuts, fades and mixes instantaneously between six high-resolution sources up to 1600x1280, with no synchronization dropouts; scales the inputs to a VGA, SVGA, XGA.2 output format and works with staging live events, conferences, exhibitions and conventions.

212-269-1902; fax: 212-269-1943; www.analogway.com

Booth: M10171 **Circle (425) on Free Info Card**

1RU aspect ratio converter

Leitch Monarch:
architecture allows I/O processing to be configured to match the demands of the application; offers 10-bit digital decoding and encoding for processing composite video signals; features 10-bit resolution, preset and variable ratios, selectable transition types and serial I/O; offered in 1RU frame.

800-231-9673; 757-548-2300; fax: 757-548-4088; www.leitch.com

Booth: L 9328 **Circle (405) on Free Info Card**

HD cross converter

Snell & Wilcox HD 9000C cross converter:
capable of accurate, transparent conversion between different numbers of active lines or between different frame rates.

+44 1730 821 188; fax: +44 1730 821 199; www.snellwilcox.com

Booth: L11039 **Circle (628) on Free Info Card**

We Were Making TV Transmitting Systems Long Before Man Walked on the Moon.

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Quantum: *Advanced Technology, Elegant Simplicity*

Serving both analog and digital applications, with power levels up to 280kW analog and 120kW digital, Acrodyne's new IOT-equipped UHF Quantum line of TV transmitters was conceived by broadcasters and designed by the EMMY award-winning talent that invented the technology.

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Acrodyne now offers exclusive U.S. sales, service, and tech support for solid-state, digital or analog, air- or liquid-cooled Rohde & Schwarz medium to high power television transmitters. Power levels to 15kW UHF DTV and 40kW peak visual UHF analog. VHF models up to 20kW peak visual analog, can be supplied for DTV service up to 5kW.

Three Decades of Service and Transmission Experience:

As always, Acrodyne's Diacrode-equipped UHF television transmitters are available up to 240kW analog and 100kW digital. Adjacent Channel Technology (ACT™) transmitters offer simultaneous transmission of NTSC and DTV signals.

Taking small steps is easy. Acrodyne is taking giant leaps . . .

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www.acrodyne.com | 516 Township Line Road | Blue Bell, Pennsylvania 19422 | 800-523-2596 | 215-542-7000 | **Fax:** 215-540-5837 | **E-mail:** acroinfo@acrodyne.com

Circle (201) on Free Info Card

Stand-alone HD converter

AJA Video HD10A:
companion to the HD10C HD A/D converter; a stand-alone HD A/D converter; features include 10-bit conversion of RGB or YPrPb sources with internal or external sync; works with nine popular HD formats and provides three SMPTE 292/296 compliant HDSDI outputs.

800-251-4224; 530-274-2048; fax: 530-274-9442; www.aja.com

Booth: L 3314 **Circle (641) on Free Info Card**

Aspect ratio converter

Axon Digital Design ARC-3000:
this 19-inch, 1RU unit offers quality, optimized conversion for post-production and broadcast applications; all major controls and presets can be accessed via the unit's control panel, which includes a comprehensive jog dial rotary encoder; up to 16 presets, including horizontal scale, horizontal pan, vertical scale, vertical tilt, GPI output selection and output timing, can be stored in the nonvolatile memory.

+31 13511 6666; fax: +31 13 511 4151; www.axon.nl

Booth: L 2006 **Circle (370) on Free Info Card**

Broadcast-quality scan converter

Focus Enhancements TView Pro AV:
provides horizontal and vertical sizing and positioning to maximize viewable area; features color bar test generator to calibrate color accurately; provides component, Y/C and composite outputs and computer passthrough; controlled through RS-232/422, backlit keypad or IR remote.

800-538-8865; 978-988-5888; fax: 978-988-7555; www.FOCUSinfo.com

Booth: M 7964
Circle (443) on Free Info Card

HD D/A converter

AJA Video HD-10C:
supports seven 1.5Gb/s HDSDI SMPTE-292/296 formats, including 1080i at 50/59.94/60Hz, 720p at 59.94/60Hz and 1080p SF at 29.93/24Hz; 1080p SF displayed as a 48Hz interlaced signal; unit automatically switches between input formats and provides two equalized SDI looping inputs; analog output fomrats are user selectable with choices of YPrPb, RGB, and computer multisync SVGA.

800-251-4224; 530-274-2048; fax: 530-274-9442; www.aja.com

Booth: L 3314 **Circle (399) on Free Info Card**

S-video aspect ratio converter

Miranda Technology ARC-372P:
a miniature S-video I/O aspect ratio converter that can be used to convert from 4:3 to 16:9 or from 16:9 to 4:3.

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

Booth: L 3330
Circle (529) on Free Info Card

1600x1280 scan converter

Focus Enhancements TView Pro AV 1600:
features seven selectable 2D flicker filter settings for sharp images and text; provides 16 user-definable memory settings for use with multiple sources; includes high-quality variable zoom and vertical sizing and positioning to maximize viewable area and eliminate black borders.

800-538-8865; 978-988-5888; fax: 978-988-7555; www.FOCUSinfo.com

Booth: M 7964
Circle (444) on Free Info Card

Total DTV

On the Air with Just ONE Box.

With AgileVision's AGV-1000 you'll be ready to broadcast fast, with lots of rack space to spare.

The AGV-1000 is a multifunction platform for the new age of television. It does station IDs and logo insertion, compressed content storage, emergency warning insertion, even seamless splicing of compressed program materials, all controlled by your station automation system.

Start with the cost-effective standard package. As your DTV operation expands you can add modules for more capacity or additional functions such as local content origination. You'll still have room to hang your coat or display that prized plant.

The AGV-1000 works with existing equipment, and runs with mission-critical reliability. See it today at NAB in the LVCC North Hall, booth #L1746.

AgileVision

201 Washington Rd • Princeton, NJ 08543-5300
Phone (609)514-4032 • inquiries@agilevision.com

Circle (203) on Free Info Card

Frame synchronizer

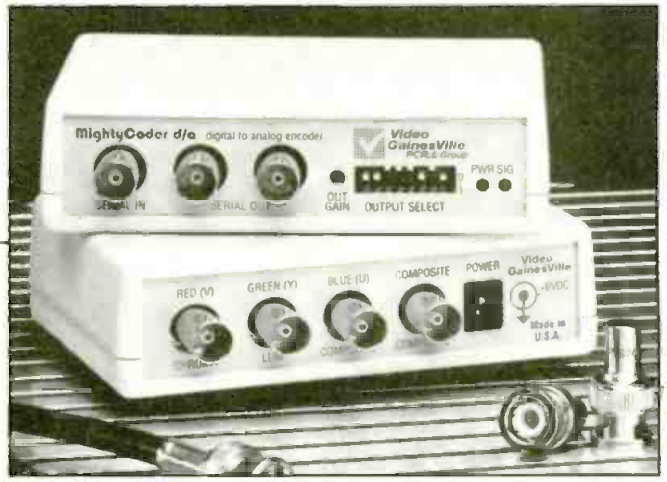
Crystal Vision SYN102:
this frame synchronizer features two operational modes — synchronizer and delay line; a remote freeze function can be used in either; has both horizontal and vertical output timing adjustment, with a full two fields of adjustment.

+44 1223 506 515; fax: +44 1223 506 514; www.crystalvis.com
Booth: L 9525 Circle (463) on Free Info Card

Video scan converters

RGB Spectrum RGB/Videolink:
accepts computer signals up to 1600x1200 pixels and automatically adjusts for best-quality output, which includes SMPTE259M, NTSC, PAL, S-Video, component analog video and double-scan rate RGB signal at 31.5kHz for projection; includes multiple levels of flicker filtering.

510-814-7000; fax: 510-814-7026; www.rgb.com
Booth: M 7967 Circle (329) on Free Info Card



Digital/analog converter

Video GainesVille MightyCoder:
The Mighty Coder is a compact serial digital component to analog converter. It accepts one serial digital component input, and it outputs composite, component and reclocked serial digital (input) simultaneously.

352-372-0270; fax: 352-378-5320; www.vgv.com
Booth: L 9217 Circle (357) on Free Info Card

Signal processor

TC Electronic M*One/D*Two:
general-purpose dual-engine processor features 128 ROM presets and 128 RAM preset locations; include 24-bit A/D-D/A converters with 24-bit internal processing driven by a 100 million IPS DSP engine; includes 50 ROM presets and 128 user RAM preset locations; also features 24-bit A/D-D/A converters.

805-373-1828; fax: 805-379-2648; www.tcelectronic.com
Booth: R 1059
Circle (479) on Free Info Card

D/A converter

Evertz 7730DAC-HD:
supports all signal standards specified in SMPTE 274M and SMPTE 296M; allows user to select between RGB or YPrPb for VGA; has user-controlled 4:3 alignment markers for convenient framing of video signal; with passive rear modules, unit can interface with both standard broadcast monitors and VGA computer monitors; also features analog audio monitoring of serial HD images and embedded audio.

905-335-3700; fax: 905-335-3573; www.evertz.com
Booth: L13261
Circle (534) on Free Info Card

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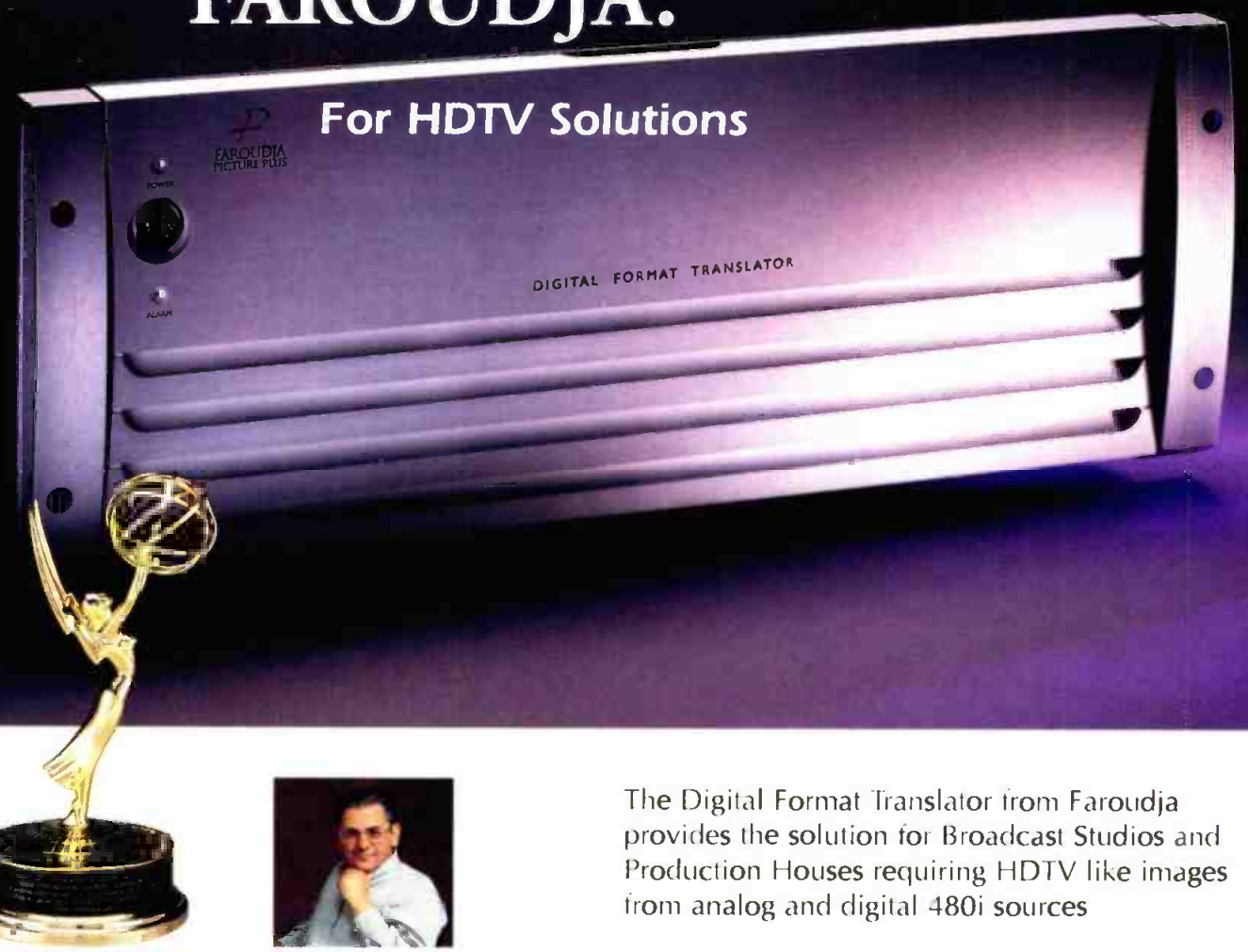

On June 24, 1998 Yves Faroudja, founder and chief technical officer of Faroudja Laboratories, was awarded the prestigious Charles F. Jenkins Lifetime Achievement Award from the Academy of Television Arts & Sciences for the development of key patents in the area of video processing, encoding, decoding, enhancement and noise reduction.

The Digital Format Translator from Faroudja provides the solution for Broadcast Studios and Production Houses requiring HDTV like images from analog and digital 480i sources

Faroudja's Picture Plus applies a number of patented technologies -

- 3:2 Film Detection and filters to reproduce cinema-like images
- Directional Correlative DeInterlacing (DCDi) for unparalleled motion video images
- Bandwidth Expansion to provide crisp lines and sharper details

Along with flexible scaling and aspect ratio control, the DFT offers ATSC output options in 480p, 720p and 1080i. Other options include Analog Inputs / Outputs, Digital Noise Reduction, and Windows based System Control Software.

Don't settle for anything less than the finest images in every instance, from any source.

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PICTURE PLUS™

See us at NAB Booth #L12382

Visit us at: *www.faroudja.com*

Circle (205) on Free Info Card

Picture quality analyzer

Pixelmetrix VP2000 series Picture Quality Analyzer:
provides real-time objective quality evaluation of picture quality, source independent; monitors all types of content; uses "Three Layer, Bottom-Up Noise Weighting Model, which provides a running visual indication of video picture quality; available in two versions the VP2000S for SD and the VP2000H for HD; the HD version is helpful for evaluating equipment before purchase.

1877-717-4935; +65-5474935; fax: +65-5474945;
www.pixelmetrix.com

Booth: L 206 Circle (600) on Free Info Card

ATSC stream player

Sencore Electronics AD991 Stream Source:
provides a flexible playout source for compressed digital video transport streams; Source Scheduler provides added degree of control and flexibility by enabling automated or manual remote control of stream playout, offline schedule creation and editing as well as looped playout of a schedule or stream.

800-SENCORE; 605-339-0100; fax: 605-339-0317;
www.sencore.com

Booth: L 3107 Circle (644) on Free Info Card

HD onscreen monitor

Videotek VTM-400HD:
offers increased resolution and enhanced audio displays; includes on-screen measurement cursors for waveform amplitude and time, vector phase and real-time signal quality alarms with user-adjustable limits; also features 720p, 1080i and 1080p/24sF serial digital input formats, analog, AES/EBU and embedded audio inputs with analog monitoring.

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

Booth: L12924 Circle (551) on Free Info Card

Lip sync analysis software

Interra SyncCheck:
a software application designed to view and measure the synchronization between video and audio pairs in a MPEG bitstream; is designed to measure the accuracy of lip sync in the compressed domain and helps MPEG developers and users of coding devices to test, fine tune and trouble-shoot synchronization-related issues and problems; supports ATSC and DVB; operates on standard PC hardware and with Windows.

800-646-4434; 408-573-1400; fax: 408-573-1430;
www.interra-video.com

Booth: I 6120 Circle (422) on Free Info Card

Handheld Dolby E/Dolby Digital monitor

Dolby Laboratories DM 100:
lightweight, handheld monitor that will allow audio system integrators and service engineers to test the integrity and composition of Dolby Digital, Dolby E and PCM signals in a production or broadcast facility; also generates Dolby Digital, Dolby E and PCM test bitstreams.

800-33-DOLBY; 415-558-0200; fax: 415-863-1373;
www.dolby.com

Booth: L12335 Circle (585) on Free Info Card

Impairment and performance monitor

Pixelmetrix DV Station:
modular multilayer system simultaneously monitors on up to 21 ports and multiple layers of the video transmission chain; RF, protocol, multiplexing and content errors propagating through the network can be traced and pinpointed to the faulty link or component; incorporates a Linux-based presentation engine and integrated LCD touch panel.

1877-717-4935; +65-5474935; fax: +65-5474945;
www.pixelmetrix.com

Booth: L 206 Circle (482) on Free Info Card

Color corrector

Axon Digital Design CCR-200:
a digital SDI I/O color corrector; targeted for CCD camera sources or other monitor application; calculation domain is 4:4:4; linear frequency response is maintained when a color gain is corrected; has four presets available on a board; operation is possible through RS485 remote protocol or front-panel full user interface; reset switch and full EDH processing are also available.

+31 13511 6666; fax: +31 13 511 4151;
www.axon.nl

Booth: L 2006 Circle (493) on Free Info Card

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Circle (206) on Free Info Card

Serial digital monitoring system

Magni Systems SDM 560:
offers day-to-day monitoring of serial digital 601 and composite signals displayed on a composite or SDI video monitors; features include jitter measurement, waveform, vector, audio, EDH and gamut monitoring, error detection and reporting.

800-237-5964; 503-615-1900; fax: 503-615-1999;
www.magnisystems.com

Booth: L 9361 **Circle (564) on Free Info Card**

Serial digital video router

Quartz Electronics Q128:
accommodates matrix sizes up to 128x128; routers can be stacked to make 256x256 and larger; high level of modularity is employed with I/O added in blocks of four; modules are hot pluggable.

888-638-8745; +44 1189 350 200; fax: +44 1189 350 202;
www.quartzuk.com

Booth: L 7456 **Circle (474) on Free Info Card**

ATSC transport stream monitor

Tandberg Television TT4000:
handles both DVB and ATSC standards, including ETR290 error detections; ATSC version supports PSI, PSIP table decoding; SMPTE 310 input option is available for the TT4030 StreamTracker version of monitor.

949-725-2500; fax: 949-725-2545;
www.tandbergtv.com

Booth: S 4168 **Circle (577) on Free Info Card**

Digital broadcast monitoring system

Wavetek Wandel Goltermann WWG DTS-400:
allows user to identify and isolate faults on the DVB network and remotely troubleshoot head-ends and DTV stations; features a scaleable and flexible system, modularity for future network expansion and advanced channel monitoring with service checks and play-out list verification.

800-854-2708; 858-279-2200; fax: 858-627-0146;
mpeg.wwgsolutions.com

Booth: L13286 **Circle (606) on Free Info Card**

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Direct Line: 1-605-339-0100 • Fax: 1-605-339-0317

Circle (209) on Free Info Card

SENCORE

DTV transmitter test system

Harris CD-Eye:
an integrated digital transmitter tests test system; a software-based system that provides measurements for spectrum, out-of-channels mask, eye diagram, constellation, signal-to-noise ration and error vector magnitude, pilot level, nonlinear analysis and real-time adaptive correction metrics.

800-622-0022; 513-459-3400; fax: 513-459-3890;
www.harris.com

Booth: L 6524 Circle (505) on Free Info Card

Program QoS analyzer

Tektronix PQM300:
allows users of multichannel systems to identify common MPEG-related visual impairments including blockiness, frozen frames and Gaussian noise; monitors all pixels and fields simultaneously; allows users to establish quality histories and defect logs for simultaneously monitored programs; provides users a systematic and quantifiable method for assigning bit rates to individual channels.

800-426-2200; 503-627-7111; fax: 503-222-1542;
www.tektronix.com

Booth: L 913 Circle (434) on Free Info Card

Transport stream analyzer

Wavetek Wandel Goltermann WWG DTS-A:
offers monitoring, analysis and capture of MPEG-2/ATSC or DVB transport streams; channel-/program- and network-based supervision windows; full PSI/PSIP or PSI/SI table and discriptor analysis in real time; provides uninterrupted PCR and PTS/DTS synchronization monitoring, including jitter and PCR arrival graphing over time.

800-854-2708; 858-279-2200; fax: 858-627-0146;
mpeg.wwgsolutions.com

Booth: L13286 Circle (426) on Free Info Card

37-inch video monitor

Panasonic PT-37P1:

a 37-inch 16:9 aspect ratio gas plasma monitor; offers 550:1 contrast ratio; provides 852x480 XVGA resolution with up to 16.77 million colors and 256 gray-scale definitions; offers a more than 160 degree viewing angle (horizontally and vertically); compatible with 480i, 480p, 720p and 1080i signal formats and accepts most international video signals, including NTSC, PAL, SECAM and PAL-60.

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

Booth: L 8236 Circle (656) on Free Info Card

HD and SD analog sync generator

Evertz 7750SRG-HD:
generates various HD and SD analog & tri-level sync signals; can be referenced to input black NTSC, PAL or free-run; generates all analog sync signals per SMPTE 274M and 296M, as well as NTSC, PAL and slow PAL; via card edge control, all common combinations of HD and SD analog sync outputs can be generated.

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

Booth: L13261 Circle (537) on Free Info Card

DVCPRO tools

Tentel DVCPRO tools and test equipment:
a set of 30 tools and test measurement devices for Panasonic's DVCPRO format; kit provides all the tools and test equipment needed to perform various tests and measurements; kit performs more accurate/faster testing; improve detected signal shape, obtain longer video head life and reduce tape guide wear.

800-538-6894; 916-939-4005; fax: 916-939-4114;
www.tentel.com

Booth: L 9756 Circle (392) on Free Info Card

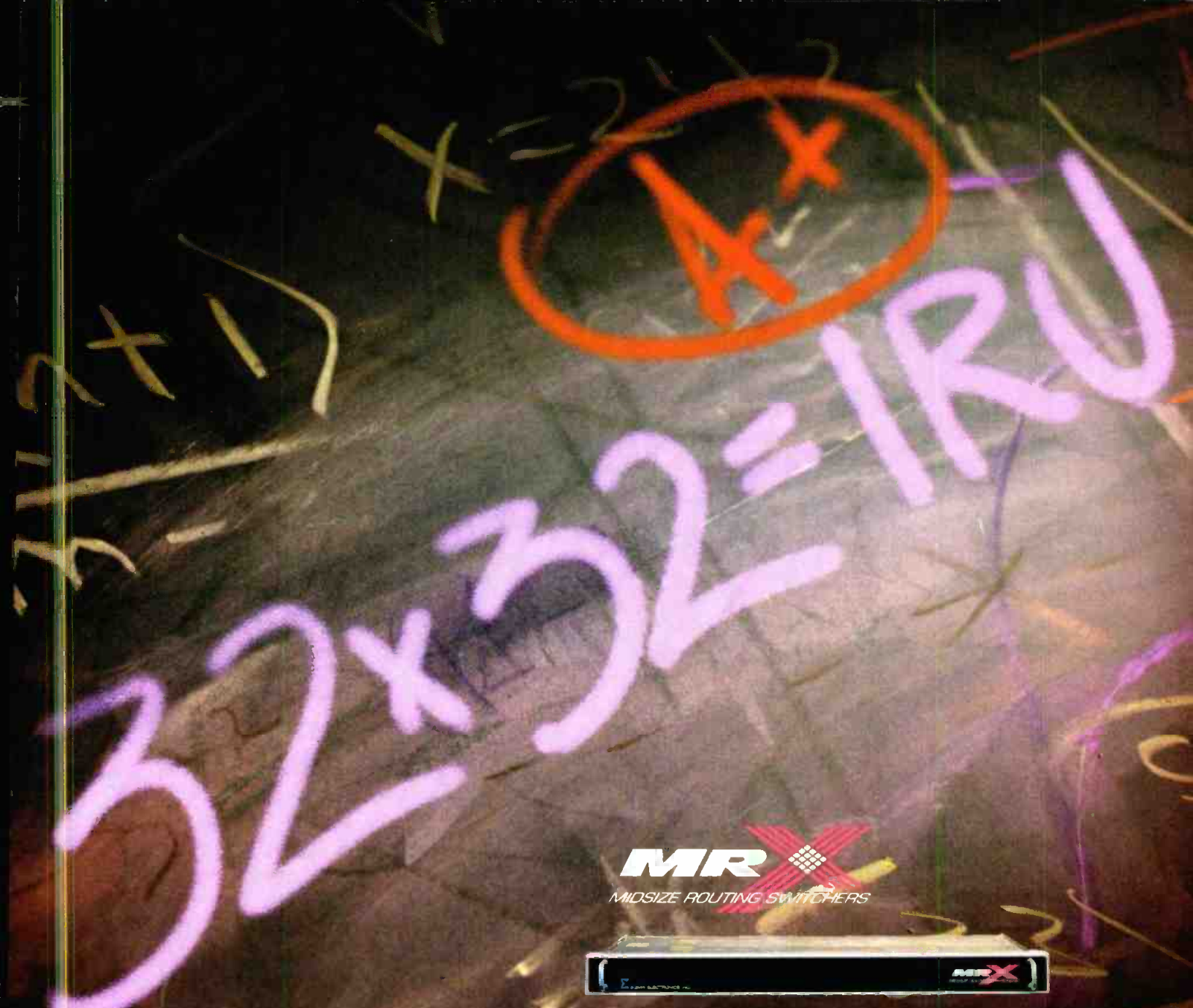
TV Transmitters, Translators, Exciters & Antennas

DVB-T exciter

ITIS Innovation Telecommunications V-XCAST:
can be supplied with an IF output, or direct VHF/UHF output for channels with a width of 7MHz or 8MHz with ad single frequency network option; includes advanced digital pre-correction function; controlable from headend of network or by the transmitter; available in a standard version; in a chassis ready for transmitter installation or in OEM form.

+33 2 99 23 72 20; fax: +33 2 99 23 10 91;
www.itis.fr

Booth:L5358 Circle (448) on Free Info Card



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Circle (211) on Free Info Card

HDTV/ATSC broadcast encoder

Tiernan Communications THE 10:

a 4:2:0 video compression encoder, factory configurable as one HD or four SD services and can handle up to 16 audio channels to accompany video; supports one HDTV serve on 1080i or 720p with a 1.5Gb/s SDI; SD service can be either PAL or NTSC formats with 270Mb/s SDI video inputs.

800-323-0252; 858-587-0252; fax: 858-587-0257; www.tiernan.com

Booth: S 4162 **Circle (355) on Free Info Card**

DSNG encoder

Tadiran Scopus CODICO E-1500:

encoder developed for DSNG operators to be used in Earth station or mobile applications; can be installed both in a vehicle flyaway or helicopter; offers fast access keys for modulation, courier on/off and convenient preprogrammed set-ups; modulator is full controlled from encoders front panel.

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

Booth: M10135 **Circle (542) on Free Info Card**

DTV/HD image processor

Digital Vision Valhall:

latest in user interface technology; precision control of all DVNR tools and gateway to compressed file delivery; designed for use with both SD an and HD images.

888-914-5200; 310-914-5200; fax: 310-914-0011; www.digitalvision.se

Booth: S 4156 **Circle (582) on Free Info Card**

HDTV program encoder/decoder

Digital Vision BitLink:

dual-standard DVB/ATSC encoder, decoder, multiplexer and data processor; designed for DTV and media network applications including broadcasting, contribution, special networks and HD/SD infrastucture; both offline and online transmission is supported.

888-914-5200; 310-914-5200; fax: 310-914-0011; www.digitalvision.se

Booth: S 4156 **Circle (354) on Free Info Card**

Professional HD receiver

Tandberg Television PRMX5800:

capable of mulitchannel HD decoding; receives contributed material into the broadcast headend or affiliate studio and provides monitoring of professional signals; has a flexible choice of I/Os, including a SMPTE 292M HD digital video output and ATM input.

949-725-2500; fax: 949-725-2545; www.tandbergtv.com

Booth: S 4168 **Circle (489) on Free Info Card**

Transport stream multiplexer

Wavetek Wandel Goltermann WWG-DTS-M:

offers real-time continuous stream creation of MPEG-2, ATSC or DVB transport streams; generation and editing of MPEG-2 video and audio formats, including AC-3; support for all MPEG-2 video and audio formats.

800-854-2708; 858-279-2200; fax: 858-627-0146; mpeg.wwgsolutions.com

Booth: L13286 **Circle (605) on Free Info Card**

HDTV

Tools for the Transition!

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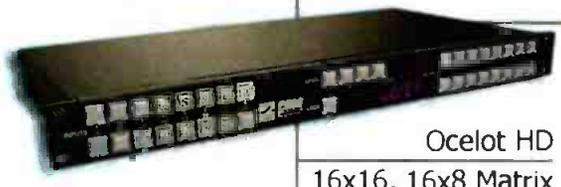
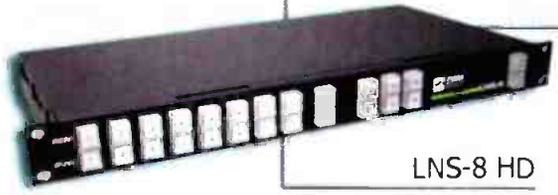
Digital Master Control

Cougar HD
32x32 Matrix



Ocelot HD
16x16, 16x8 Matrix



LNS-8 HD
8x2 Matrix

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888-914-5200; 310-914-5200; fax: 310-914-0011;
www.digitalvision.se

Booth: S 4156 **Circle (583) on Free Info Card**

Video Editing Systems

Nonlinear real-time editing system

Digital Processing Systems dpsVelocity:
a non-linear real-time video editing system combines dual stream real-time hardware with NLE software; features MPEG-2 and web-streaming capabilities; has ability to handle up to five layers of combined video, graphics and titles, four channels of stereo audio, advanced clip trimming and a complement of timeline editing features, such as three and four point edits overlay and fit-to-fill modes; can create an unlimited number of effects over 400 user customizable real-time 12-bit 2D wipes and 3D transitions.

800-775-3314; 606-371-5533; fax: 606-371-3729;
www.dps.com

Booth: L 9383 **Circle (427) on Free Info Card**

Uncompressed nonlinear editing system

Collage Graphics Collage Edit:
a fast, uncompressed nonlinear editing system featuring real-time text and graphics capability and expandable storage; incorporates character generator, stills store, graphics system, color corrector; mixer/downstream keyer and four-layer DVE with audio mixing and effects; offers open architecture enabling PC files and ASCII text to be imported into a Collage EDit job.

561-395-4000; fax: 561-395-4065;
www.pixelpower.com

Booth: L6356 **Circle (676) on Free Info Card**

MPEG-2 NLE with DVD output

Fast Multimedia 601:
edits in real time with two video, one titling and eight audio channels; analog and digital interfaces let users work with the video device of their choice; features unlimited number of video, overlay and title tracks, editors for DVEs, wipes, keying, color effects and filter effects and integrated title generator for still, roll and crawl titles in real time.

800-249-FAST; 425-354-2002; fax: 425-354-2005;
www.fastmultimedia.com

Booth: S 4150 **Circle (356) on Free Info Card**

Hybrid editing system

Incite Multimedia Incite Editor 2.5:
a hybrid editing system with multiple VTR control, batch capturing with up to 31 VTRs; real-time 3D with subpixel rolls and crawls; 64 audio tracks with real-time audio effects, three real-time layers of video plus one graphics layer and background rendering.

800-641-7322; +41 22 308 57 57; fax: +41 22 308 57 58;
www.inciteonline.com

Booth: M 7970 **Circle (507) on Free Info Card**

Nonlinear editing software

Fast Multimedia 601 PrintDVD:
this software option offers professional editing with the use of MPEG-2 with DVD applications and is now possible within the modular concept of the 601 system; the DVD-compatible datastreams created by 601 PrintDVD can be played directly into 601-DVDVirtuoso and DVDConductor.

800-249-FAST; 425-354-2002; fax: 425-354-2005;
www.fastmultimedia.com

Booth: S 4150 **Circle (460) on Free Info Card**

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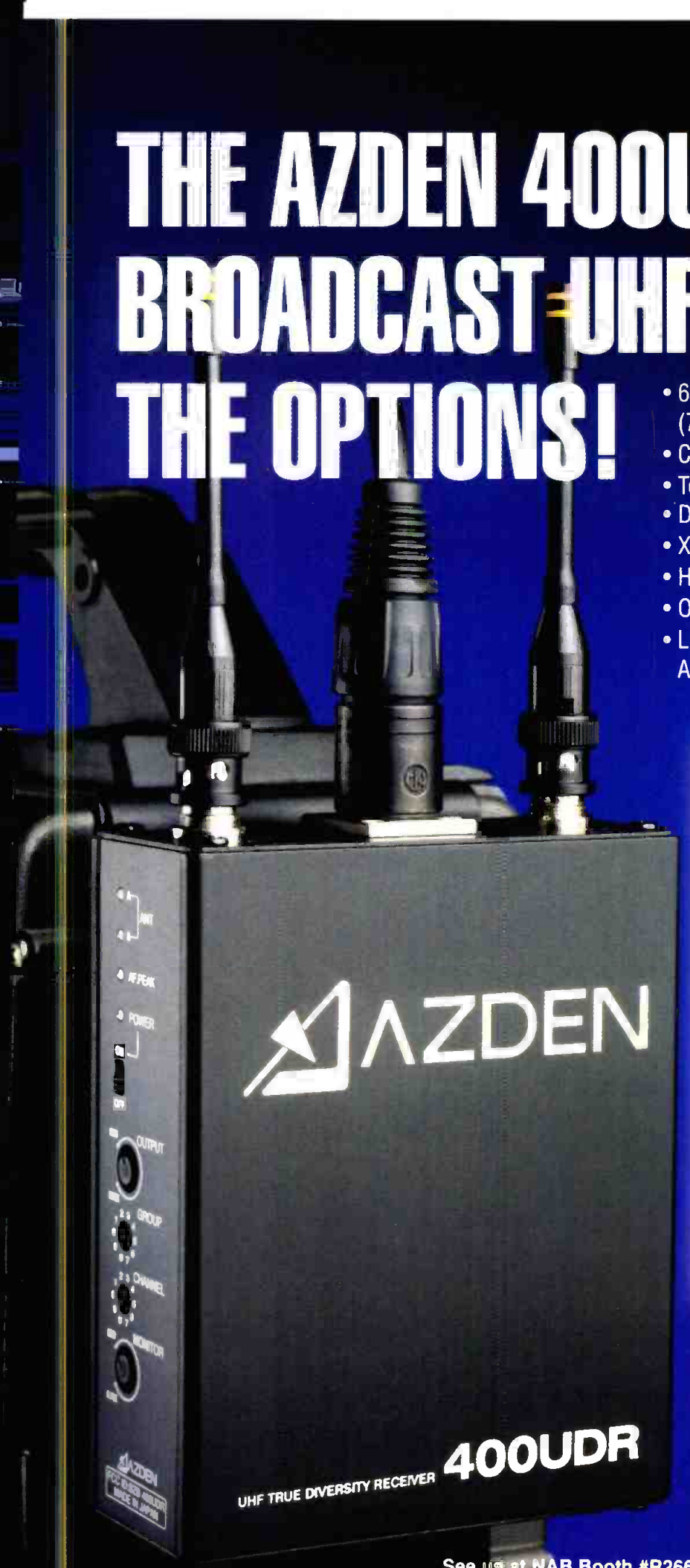

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Networked news editing system

Philips EditStream:
advanced nonlinear editor incorporating a highly intuitive user interface; system enables full integration with newsroom computing asset management, and forms part of a comprehensible server-based system offering loading, browsing and playout.

800-962-4287; 818-729-7700; fax: 818-729-7710;
www.broadcast.philips.com

Booth: L 6910 **Circle (402) on Free Info Card**

Digital news editing system

Sony DNE-2000:
a nonlinear editing system designed for needs of news editing; uses the MAV-555 video disk recorder as its local storage; available as both a stand-alone system combined with local storage or as one of several workstations connected to NewsBase.

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

Booth: L12107 **Circle (618) on Free Info Card**

Offline editor

Incite Multimedia Media Assistant:
a hardware independent offline editor, features drag and drop EDL from Media Assistant to Editor; offline media logging and batch capture, and batch convert media types, and batch convert between media types.

800-641-7322; +41 22 308 57 57; fax: +41 22 308 57 58;
www.inciteonline.com

Booth: M 7970 **Circle (508) on Free Info Card**

HD and film workstation

BOXX Technologies 3DBOXX:
Windows NT or Linux workstations designed for digital applications such as film, HDTV or video; includes Intel 800MHz Pentium III Coppermine processors in single or dual configurations; systems are customizable and easily upgraded and expanded; up to 13 drive bays, six expansion slots and up to 1Gb system memory; features include support for OpenGL, 9GB Ultra66 hard drive and 3Dlabs VX1 AGP graphics card.

877-877-BOXX; 512-835-0400; fax: 512-835-0434;
www.boxxtech.com

Booth: S 6066 **Circle (636) on Free Info Card**

Software-based editing system

Vibrint Technologies Journalist Suite:
a new suite of low-resolution video, software-only applications offering desktop video browsing, interactive feed capture and editing functions; designed to run alongside existing newsroom computer systems; consists of NewsBrowse LR; FeedClip LR and NewsEdit LR, all software-based MPEG-1 browsing, viewing and editing applications.

877-842-7468; 781-275-4088; fax: 781-275-5070;
www.vibrint.com

Booth: L 2637 **Circle (671) on Free Info Card**

HD editing and compositing system

BOXX Technologies FusionBOXX HD:
a turnkey, uncompressed HD editing and compositing system for Windows NT; I/O architecture and PCI bus architecures are designed to enable fast, uncompressed HD editing and composition, supports 1080i and 720p standards, available in 15-, 30- and 60-minute configurations with higher configurations available.

877-877-BOXX; 512-835-0400; fax: 512-835-0434;
www.boxxtech.com

Booth: S 6066 **Circle (634) on Free Info Card**

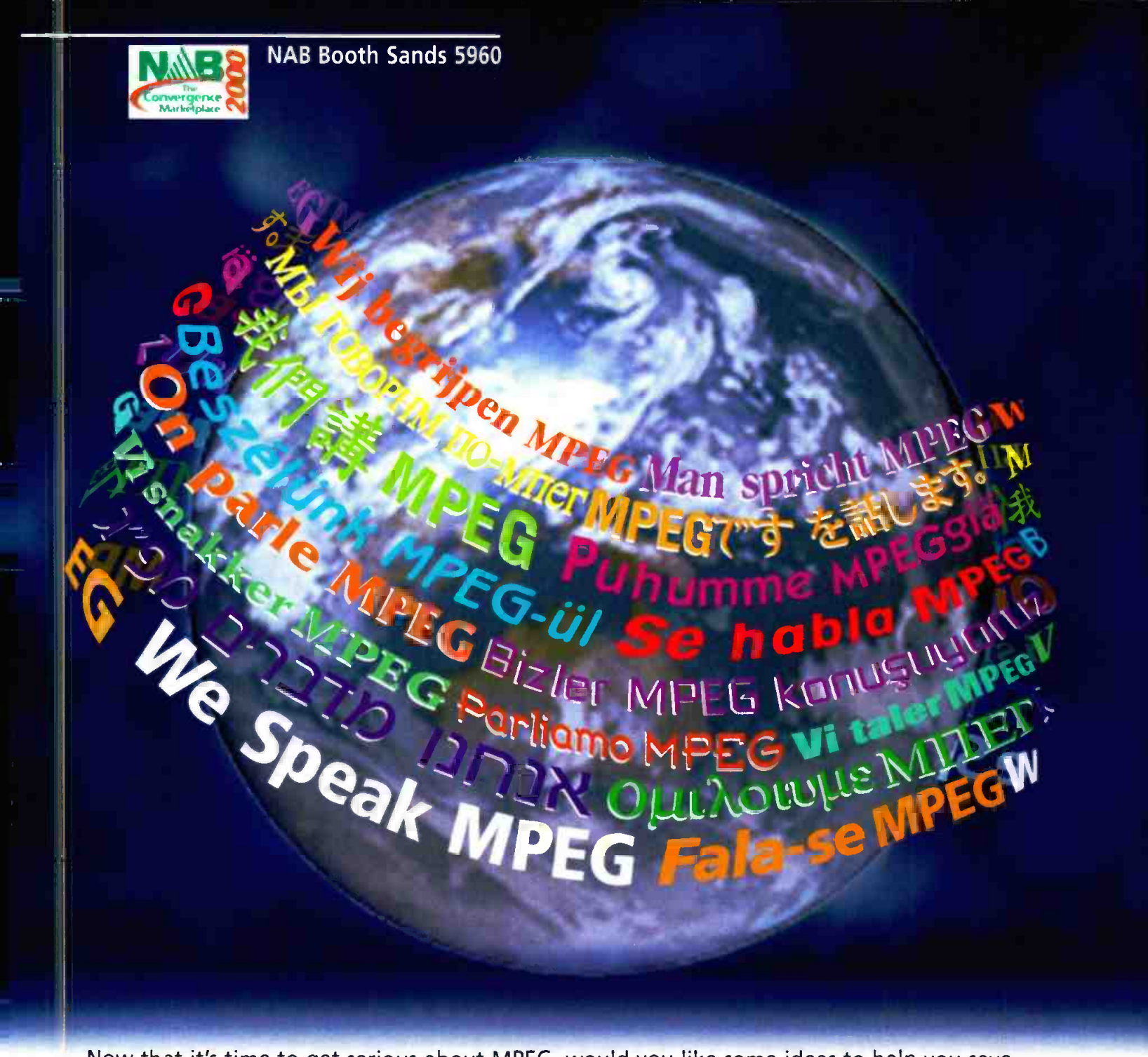
Rendering engine

BOXX Technologies RenderBOXX:
features 800MHz Pentium III or Xeon or Alpha processors; multiple cabinets can be connected to deliver the rendering power of up to 1000 processors; supports all material libraries and 3D animation software including 3D Studio MAX, Maya, Softimage and LightWave 3D; render management software takes advantage of multiprocessor configuration to reduce rendering times and increase workflow.

877-877-BOXX; 512-835-0400; fax: 512-835-0434;
www.boxxtech.com

Booth: S 6066 **Circle (635) on Free Info Card**

NAB Booth Sands 5960



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Circle (219) on Free Info Card

On-air server control

Editing Technologies CPR/4:
system is designed for on-air server control with time delay; allows user to sequence up to four channels of a video server or digital disk recorder; event display provides instant access to play or record status; events can be entered, modified or deleted prior to pre-selected amount of time before scheduled on-air time.

818-840-1101; fax: 818-556-3973;
www.etcedit.com
Booth: L 928 Circle (557) on Free Info Card

Multichannel broadcast server

Pluto Technologies AirSPACE:
multichannel broadcast server, includes fully editable bit streams; conforms to any video format and any compression standard; upgradable to high definition, features advanced list management capabilities, high-speed networking and DV-25/DVCPRO 50 selectable bit streams.

303-402-9000; fax: 303-541-9043;
www.plutotech.com
Booth: L 1516 Circle (336) on Free Info Card

MultiFlex DTV server for multiple applications

Accom Abekas 6000 Multiflex:
designed for multiple applications; features DVCPRO compression with user-selectable bit rates of either 25Mb/s or 50Mb/s; can be configured with two, four, six or eight digital I/O channels and Fibre Channel networking; offers more than 127 hours of local RAID-3 disk storage in a single server; new features include a VTR-style hardware control panel for full system operation; each I/O channel can be independently controlled by station automation (using Louth or Odetics protocol); future-proof, modular architecture separates video and networking I/O from the ultra-high bandwidth disk recording system.

650-328-3818; fax: 650-327-2511; www.accom.com
Booth: S 4909
Circle (391) on Free Info Card

Server control for on-air play-out

Editing Technologies Quartet:
allows user to sequence one to many commercials, news or program elements per group; initiates each play-out group and preceding elements and initiates following elements within a group; elements can be entered, modified or deleted at any time within a pre-selected span prior to scheduled on-air time.

818-840-1101;
fax: 818-556-3973; www.etcedit.com
Booth: L 928 Circle (364) on Free Info Card

Post-production mastering VDR

Doremi Labs V1-HD100:
designed for high-end post-production HD mastering and graphics applications; record and playback 1080I, 720p, 24p; records uncompressed 4:2:2 with 10:10:10-bit channel encoding; offers with channels of uncompressed AES audio and timecode; archives sustained transfer rates of 155Mb/s component video tri-level I/O; optional 1.5Gb/s SDI with embedded audio and D-VITC.

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www.pirod.com

Circle (221) on Free Info Card

10-bit uncompressed DVR with SDI

Doremi Labs V1U:
a 10-bit uncompressed recorder featuring a serial digital interface (SMPTE259M, 270Mb/s); unit is 3RU high and front panel controls include jog/shuttle wheel, autolocator and audio input level controls, V1U is ITU601/SMPTE125M compliant, offering full screen NTSC and PAL resolutions, records field accurate, uncompressed video with four audio tracks and timecode; two RS-422 serial ports are available.

323-874-3411; fax: 323-874-3401; www.doremilabs.com

Booth: L 517 Circle (388) on Free Info Card

DTV/HD recorder

Sierra Design Labs HD270:
able to record and play standard uncompressed eight- or 10-bit 4:2:2 video and then, with a simple software switch, record and play a 1080i HD signal when used in conjunction with the Sony HDCAM HD SDTI processor card set; the HD270 offers the same capabilities of the Quickframe, making it an ideal video disk recorder for HD edit, telecine, duplicating, still/clip store and server for broadcast and playout applications.

800-400-8002; 775-831-7837; fax: 775-886-5060; www.sdlabs.com

Booth: S 5515 Circle (393) on Free Info Card

Studio editing VTR

Panasonic AJ-D960:
provides broadcasters with 25Mb/s and 50Mb/s recording and playback in 525- and 625-line standards with advanced digital slow motion and audio scrub capabilities for frame-accurate machine-to-machine or edit-controller-based editing; DVCPRO50 mode features provide 4:2:2 signal processing; records up to 92 minutes in DVCPRO50 or 184 minutes in DVCPRO modes; also plays back consumer DVCAM and DV cassettes.

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

Booth: L 8236 Circle (658) on Free Info Card

Media platform

Grass Valley Group Profile XP Media platform:
offers up to eight channels of broadcast-quality video per frame; with shared storage is able to support up to 32 channels accessing a common storage network; additional mainframes in a networked environment for hundreds of channels; easily upgradable from SD to HD; new features include the InSync software which provides automatic mirroring software to assure uninterrupted content flow.

800-998-3588; 800-547-8949; fax: 503-627-7275; www.grassvalleygroup.com

Booth: L11018 Circle (409) on Free Info Card

Real-time VDR

Prime Image DM:
a real-time unit that creates 30-seconds extra commercial time in a 30-minute program.

408-867-6519; fax: 408-926-7294; www.primeimageinc.com

Booth: L10186 Circle (588) on Free Info Card

Video server

Pluto Technologies AirSPACE CartPLAYER:
designed for commercial spot, newsreel or other program play-to-air applications; will replace or significantly reduce cycle time on BetaCart, LMS or Mark tape robotic systems; in its standard configuration yields ap-proximately five hours of expandable storage capacity; may be configured for up to four serial digital video channels along with four discrete audio channels (two AES pairs) for each video channel; can grow with the customer, offering a range of upgrades to 12-, 24- or 48-hour storage capacities.

303-402-9000; fax: 303-541-9043; www.plutotech.com

Booth: L 1516 Circle (456) on Free Info Card

Data storage system

Ampex Data System Corporation Quad Density Data Tape Drive:
provides uncompressed storage of 660GB on a single cartridge; new DST data drive doubles the storage capacity of the Ampex automated archive libraries.

800-752-7590; 650-367-2011; fax: 650-367-2841; www.ampexdata.com

Booth: L 2003 Circle (580) on Free Info Card

Turning the high-end wireless market upside down

The UCR210D wireless microphone receiver is a compact assembly built around a solid aluminum, monoblock chassis. The chassis provides exceptional RF isolation between critical sections of the circuitry and the ruggedness to deal with the real world, wherever you have to work.

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581 Laser Road, Rio Rancho, NM 87124 USA - ph (505) 892-4501 fax (505) 892-6243 - e-mail: sales@lectrosonics.com

Circle (223) on Free Info Card

High-capacity storage video server

Seachange 1230 Broadcast Media-Cluster:
designed for large-scale television operations; a clusterable unit with up to six channels at 30Mb/s per channel and 360GB of RAID 5 storage using 36GB disk drives; when interconnected with six other 1230 BMC units; provides up to 42 I/O channels and over 2TB of storage.

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

Booth: L 1523 **Circle (594) on Free Info Card**

Digital video server

Pluto Technologies AirSPACE HD:
HD play-to-air server; compatible with Sony HDCAM and Panasonic HD-D5; offers up to eight hours of online storage, fully AC-3-compatible; interfaces with popular database tape archiving systems and station automation systems.

303-402-9000; fax: 303-541-9043; www.plutotech.com

Booth: L 1516 **Circle (366) on Free Info Card**

Video server

Thomson Broadcast Nextore:
in two- or four-channel configuration designed mainly for studio applications; based on PC/NT computer standards, integrating consumer components and dedicated boards developed by Thomson; offers compatibility with AVI/OpenDML and NTFS file formats; supports lossless compression mode; offers video/audio/timecode I/O in baseband; will now feature new compression formats.

800-882-1824; 201-569-1650; fax: 201-569-1511; www.thomsonbroad.com

Booth: L 9609 **Circle (376) on Free Info Card**

Multi-access video servers

Sony MAV-2000/S2000
offers MPEG-2 4:2:2P@ML compression at 30-50Mb/s; able to configure various I/O by using a combination of optional I/O boards; supports both synchronous or asynchronous I/O providing real-time record and playback using SDI/SDTI-CP interface and FTP on the network by using Gigabit Ethernet; chassis provides up to 12 SDI I/O channels or eight HD SDI I/O channels.

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

Booth: L12107 **Circle (620) on Free Info Card**

Is the video jack you're using today designed for the signal standards of tomorrow? If not, it's time you started thinking about Switchcraft's video jack.

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www.switchcraft.com

Circle (225) on Free Info Card

Add commercial time

Prime Image Time Machine

creates up to 30 seconds of extra commercial time in a 20-30 minute program; digital input and output are standard; offers four channels of analog or AES/EBU audio; optional features include analog component or composite video I/O; four additional analog or AES/EBU audio channels and multiformat HD I/O.

408-867-6519; fax: 408-926-7294;
www.primeimageinc.com

Booth: L10186 **Circle (338) on Free Info Card**

MPEG IMX VTRs

Sony MSW-2000 Series

VTRs that adopt MPEG-2 4:2:2P@ML I-frame up to 50Mb/s compression; supports SDTI-CP interface on all three models, migrates to MPEG bitstream infrastructure; provides Betacam SX playback capability as a standard; series consists of three models, MSW-2000, MSW-A2000 and MSW-M2000; series provides playback for digital Betacam, MPEG IMX, Betacam SX, and analog Betacam.

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

Booth: L12107 **Circle (617) on Free Info Card**

SD/HD multiformat mastering VTR

Panasonic AJ-HD3700

plays back existing 525-line D-5 or D-5 HD cassettes, can record 10-bit uncompressed 480/60i SD video, in addition to 1080/24p, 1080/60i, 1080/50i, 1035/60i and 720/60p HD; can slew between 24- and 25Hz frame rates; offers eight digital audio channels providing support for 5.1 channel surround sound in HD format and Dolby E noise reduction, records up to 124 minutes in 1080/60i, 720/60p, 480/59.94, for 149 minutes in 1080/50i, 1080/25p, and for 155 minutes in 1080/24p.

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

Booth: L 8236 **Circle (659) on Free Info Card**

DVCPRO server

Panasonic AJ-HDR150

offers multiresolution recording and playback in the DVCPRO format; supports up to 25Mb/s DVCPRO, 50Mb/s DVCPRO50 and DVCPRO Progressive, and 100Mb/s DVCPRO HD; stores up to 20 hours of footage (five hours at DVCPRO HD resolution) with full data protection provided by an internal RAID-3 video disk array; additional channels and storage can be added using a Fibre-Channel based SAN.

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

Booth: L 8236 **Circle (655) on Free Info Card**

DTV.
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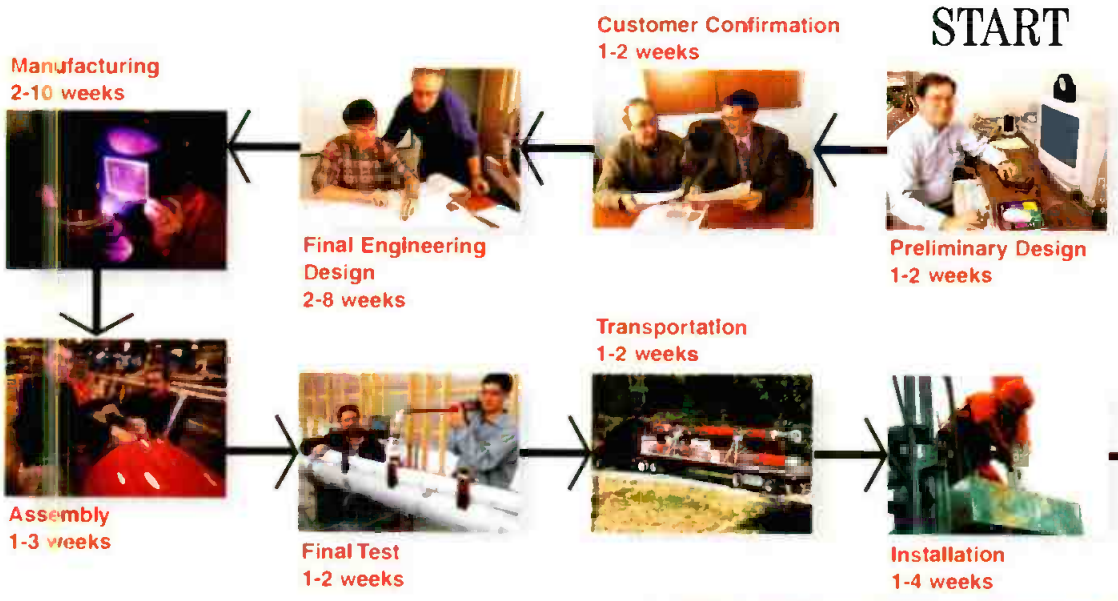
Dielectric Communications • 22 Tower Road • Raymond, Maine 04071



Note: In the first two years of the digital television changeover, 115 stations went on air with DTV. In the next three years, the remaining 1,485 must be on air.

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Processing equipment rack

NVISION NV500:

2RU frame for processing equipment; holds 10 modules per frame; modules available include 1x9/ dual 1x4 distribution amplifiers for ASE, SDI and HD-SDI; passes SDI and HD-SDI pathological signals; modules provide glitch-free digital data transfer; modules are hot swappable.

800-719-1900; 530-265-1000; fax: 530-265-1010;
www.nvision1.com

Booth: L 543 Circle (499) on Free Info Card

Reclocking electrical to fiber conversion DAs

Evertz 7705EO-HD, 7705OE-HD:

HD 7705OE-HD provides conversion from optical signals sent over fiber to two outputs reclocked of 1.5Gb/s serial video via coax; provides conversion of 1.5Gb/s serial video via coax to optical for signal distribution via fiber and distribution of two reclocked 1.5Gb/s serial video outputs.

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

Booth: L13261 Circle (380) on Free Info Card

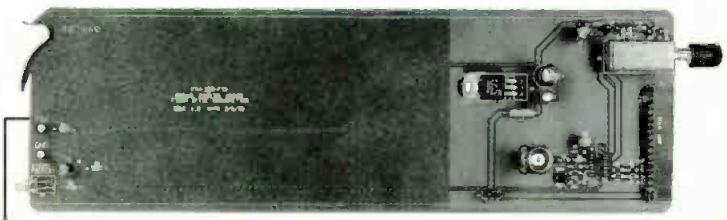
Serial digital video legalizers

Videotek DL-800:

legalizes 601 video for encoded and vector-based limiting rules, provides presets and automatically detects input video format; signal is evaluated in real time on a pixel-by-pixel basis and provide an output that is guaranteed to be within user specifications; features full EDH support, RS-232/422 and GPI control and 16-bit 4:4:4 internal control.

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

Booth: L12924 Circle (330) on Free Info Card



Modular serial digital video DA & fiber optics

Multidyne DTV-200:

intended to ease the engineering and financial difficulties associated with migration to DTV; line includes DTV-220-FTX serial digital video fiber optic transmitter and DA; DTV-220-FRX serial digital video fiber optic receiver and DA; DTV-201 serial digital video fanout DA; DTV-202 serial digital video fanout DA; DTV-210 automatic standard reclocking DA.

800-4TV-TEST; 516-671-7278; fax: 516-671-3362;
www.multidyne.com

Booth: L 9144 Circle (369) on Free Info Card

Stand-alone serial digital fiber optic products

Multidyne DTV-100 series:

DTV-120-FTX serial digital video fiber optic transmitter and DA provide one coaxial input, output and fiber optic output; offers an economical solution for distributing digital signals from DC to 650Mb/s up to 10Km over single- and multimode fiber optic cables; available in 1300nm and 1550nm wavelengths; DTV-120-FRX serial digital video fiber optic receiver and DA provide one fiber optic input and two reclocked coaxial outputs.

800-4TV-TEST; 516-671-7278; fax: 516-671-3362;
www.multidyne.com

Booth: L 9144 Circle (368) on Free Info Card

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Circle (231) on Free Info Card

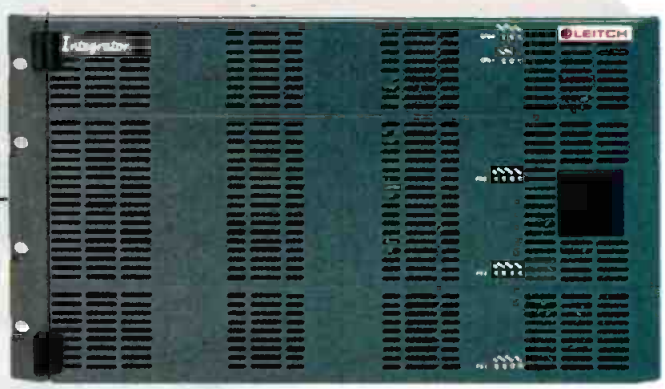
Digital or analog router

Sierra Video Systems Yosemite:

frames range from 64x64, 96x96 and 128x128; supports both analog and digital video and audio; users can populate frame with analog components and later subsittute any digital module as needs arrive; also permits cohabitation of analog and digital modules on the same frame; frames can be populated at 32x32 and then expanded.

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

Booth: L 4654 Circle (455) on Free Info Card



512x512 HD router

Leitch Integrator:

offers field -accurate switching in 4-, 6- or 8RU frames and is available in HD, coaxial or fiber SDI, analog video, AES audio, mono or stereo analog; features dual outputs, references and individually configurable serial ports, hot-swappable power supplies and control logic.

800-231-9673; 757-548-2300; fax: 757-548-4088; www.leitch.com

Booth: L 9328 Circle (334) on Free Info Card

Control panels with LCD buttons

Quartz Electronics CP-2000:

a flexible range of control panels with the display built-in the buttons; buttons display up to 10 characters; designed for applications where changes to sources and destination names are needed regularly; operation of panel is completely user definable.

888-638-8745; +44 1189 350 200; fax: +44 1189 350 202; www.quartzuk.com

Booth: L 7456 Circle (475) on Free Info Card

Digital or analog matrix

PESA Switching Systems Cougar:

now includes a 32x32 video and audio switcher in a compact 4RU frame; analog and digital version are available; Cougar HD provides a 32x32 HDTV matrix in only 3RU.

800-328-1008; 516-845-5020; fax: 516-845-5023; www.pesa.com

Booth: L12961 Circle (394) on Free Info Card

Graphics routing switcher

PESA Switching Systems Tiger 250MHZ 144x144:

designed to route high-resolution graphics in large monitoring systems; RGB or RGBHV are available to meet the mission-critical routing needs of network reliability centers.

800-328-1008; 516-845-5020; fax: 516-845-5023; www.pesa.com

Booth: L12961 Circle (389) on Free Info Card

Router control system

NVISION Envy:

provides a quick and efficient method to control multiple NVision routers; unit also interfaces with routing equipment of other manufacturers; system features GUI for SQl database configuration and routing control; expandable system components, configurable control panels, error logging and diagnostics.

800-719-1900; 530-265-1000; fax: 530-265-1010; www.nvision1.com

Booth: L 543 Circle (386) on Free Info Card

MPEG and DVB-ASI DA

Videotek DDA-104MPEG:

distributes MPEG-encoded serial digital signals and handles MPEG data rates from 19.39Mb/s to 270Mb/s; compatible with DVB-ASI signals; designed for use in systems that require the distribution of MPEG or DVB-ASI encoded video data.

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

Booth: L12924 Circle (432) on Free Info Card

Serial digital video amplifier

Miranda Technology SDA-172P

a miniature, stand-alone, three-output digital video distribution amplifier with reclocking and automatic cable equalization; supports uncompressed digital video signals at 143 to 540Mb/s; also compatible with DVB-ASI compressed bitstreams at 270Mb/s; can be ordered to support DVB-SSI/SMPTE 310M at an specified bit rate up to 540Mb/s

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

Booth: L 3330 Circle (530) on Free Info Card

Circle (227) on Free Info Card

recording or incoming material. Editors, never left talking about the clip that got away.

Circle (228) on Free Info Card

Button-per-source control panel

Single and multicast router

Philips CleverCast Router

an integrated satellite DV unicast and multicast router; supports an unlimited number of multicast user and mulitple concurrent users with high-speed Internet access; desiged for Internet unicasting and multicasting via satellite.

800-962-4287; 818-729-7700; fax: 818-729-7710;
www.broadcast.philips.com

Booth: L 6910 Circle (630) on Free Info Card

Router module

NVISION ENVOY6904

allows expansion of SDI or Super Wideband routers to 1024x1024; Super wideband modules support from 15Mb/s to 1.5Gb/s; passes SDI and HD-SDI patho-logical signals; offers simultaneous routing of SDI and HD-SDI signals; modules load via the front of the frame and are hot swappable.

800-719-1900; 530-265-1000; fax: 530-265-1010;
www.nvision1.com

Booth: L 543 Circle (498) on Free Info Card

Digital routing system

Video router

Utah Comteck Utah-1500

provides flexible migration into the HD environment, flexible control systems interface with all current Utah series routers, master control and the earlier AVS routers

801-524-9999; fax: 801-524-0555;
www.utcomteckvideo.com

Booth: L 2027 Circle (517) on Free Info Card

Wire, Cable & Connectors

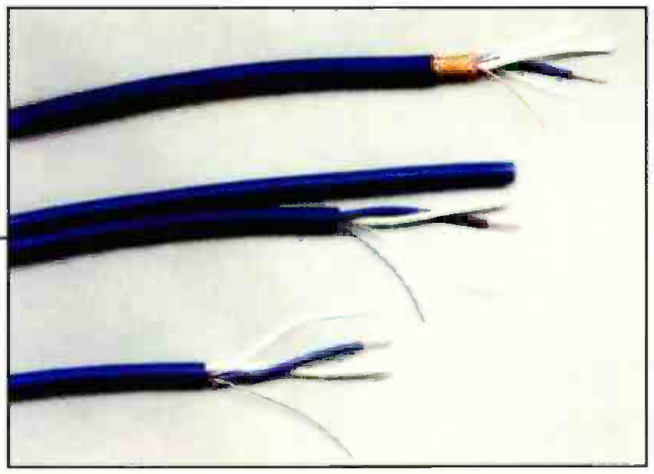
Fiber-copper composite cable

Mohawk/CDT M 96040:

a fiber-copper composite cable; consists of two tight buffered single-mode optical fibers and four 20 AWG an two 24 AWG tinned copper conductors; insulated with PVC.

800-422-9961; 978-537-9961; fax: 978-537-4358;
www.mohawk-cdt.com

Booth: L11933 Circle (483) on Free Info Card



Digital audio cable

Gepco International 5596 EZ and 5596M:

110Ω AES/EBU digital audio cable; provides accurate transmission of all formats of AES-3 audio, including 24-bit/96kHz; features an 12.3MHz bandwidth, low attentuation and jitter, and mechanical stabilty; optimized for 96kHz bandwidth requirements; also ideal for extended distance runs of 44.1kHz or 48kHz formats.

800-966-0069; 847-795-9555; fax: 847-795-8770;
www.gepco.com

Booth: L 5660 Circle (569) on Free Info Card

Demo an affordable Precision Video Demodulator

	msi 320	Tek/Rohde[1]
Differential Phase	1.2°	2°
Differential Gain	1%	2%
ICPM Accuracy	±2° from 75° to 105°	not specified
Aural Signal Demodulation	Visual carrier not required	Requires a sync modulated visual
Zero Carrier Reference Line	User selectable between 11 and 36	Must be factory set

Here's what you'll find when you compare the msi 320 with the Tektronix/Rohde demodulator:

But don't just take our word for it. Put the **msi 320** side by side with the demodulator you're using now. If it's a legendary 1450[2], you'll find the performance of the **msi 320** nearly identical. If it is anything else, you'll find there's no comparison.

Don't wait. Just tell us you want to try the **msi 320** with absolutely no obligation. We'll send you a demo request form. Fill it out and return it, and we'll send you a demo unit that you can test and evaluate. It's that easy. If you have any questions, we'll even help you set up a valid comparison test.

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2. 1450 is a mark of Tektronix, Inc.

Circle (230) on Free Info Card

SNEAK PEEKS

Latest new products

If you need it, you'll find it at NAB. The problem is "finding" it at NAB. In Sneak Peeks, we've listed hundreds of new products by equipment category making it easy to find whatever you're interested in. Need camera robots? It's here. Need audio products? They're in this section too. Any product information we received not specifically identified as "digital" or "DTV-related" is listed here. So read on, solutions are dead ahead.

Audio Accessories

Audio matrix mixer

Lectrosonics AM8/4:
an automatic matrix mixer with eight mic inputs, two auxiliary line level inputs, four output channels and full crosspoint matrix in 1RU space; eight memory presets and RS-232 control.

800-821-1121; 505-892-4501; fax: 505-892-6243;
www.lectrosonics.com

Booth: L 5812 Circle (650) on Free Info Card

Multifunction audio processor

Lectrosonics DSP4/4:
A four-input, four-output processor with 12 filters per channel for EQ, notch filtering, high and low pass filters, feedback extermination, compressor/limiter and 182ms of delay per channel; there are eight memory presets and the unit can be controlled via RS232.

800-821-1121; 505-892-4501; fax: 505-892-6243;
www.lectrosonics.com

Booth: L 5812 Circle (624) on Free Info Card

Portable recorder

Sonifex Ltd Courier ISDN:
Version 2.5 software for brings the unit up to the level of a portable ISDN codec to provide live audio as well as powerful recording and cut-and-paste editing features; uses MPEG Layer II compression to send mono 11kHz bandwidth audio using an ISDN line. Compatible with Telos, CCS, Dialog 4 and Prodys codec equipment; uses a PCMCIA hard disk or card as its recording media to record MPEG, BWF or WAVE audio data files; has scrub-wheel graphical editing facilities and built-in communications software.

+44 1933 650 700; fax: +44 1933 650 726;
www.sonifex.co.uk

Booth: R 2296 Circle (412) on Free Info Card

Surround decoder

Dolby Laboratories DP563:
a digital implementation of the industry-standard SEU4 Dolby Surround encoder; complements the SEU4 decoder; with digital I/O, unit is ideal for digital production environments.

800-33-DOLBY; 415-558-0200; fax: 415-863-1373;
www.dolby.com

Booth: L12335 Circle (586) on Free Info Card

Single- and double-ear headsets

Clear-Com Systems CC-95 and CC-260:
designed for intercom applications; feature custom foam-filled ear cushions that provide acoustic isolation in moderate noise level environments; the flexible boom arm features a specially designed, noise-canceling microphone.

510-496-6666; fax: 510-496-6699;
www.clearcom.com

Booth: L10776 Circle (461) on Free Info Card

Embedded audio codec

Gennum Corporation GS9023:
designed for SMPTE 259M applications; operates as an embedded encoder/decoder and supports 48kHz synchronous 20/24-bit audio; supports four channels of audio per device; cascadable architecture supports up to 16 audio channels.

800-263-9353; 905-632-2996; fax: 905-632-5946;
www.gennum.com

Booth: BH203 Circle (584) on Free Info Card

Audio Mixers-On Air

Digital broadcast maximizer

TC Electronic DBMAX Mark II Version 2.02:
This new software provides several new functions including dynamic stereo enhancer insert, ability to handle analog I/O levels up to +26dBu (requires field hardware modification), new presets and level setups; phe presets have the ability to call level setups if desired.

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

Booth: R 1059 Circle (410) on Free Info Card

Audio Mixers-Portable

Portable mixing console

Calrec Audio M3:
available in two frame sizes; the 19" rackmount version is a 10x4x2 and the desktop version is a 20x4x2; features include four auxiliary sends, choice of input module types and a mix-minus send on each input; offers an internal power supply; monitor section has multiple source selection, control room, studio and headphone outputs, and LED bargraph meters.&

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

Booth: R 491 Circle (652) on Free Info Card

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Warp Engine™
Breakthrough Real-Time 3D DVE

TitleWave™
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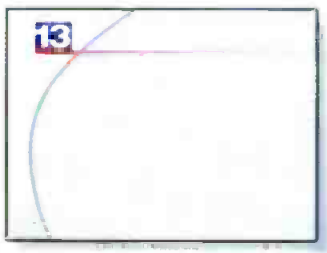
Panamation™
Paint, Animation and Compositing

Deep Freeze™
Instant-Access Still & Clip Store

DeepFreeze

When you're in the heat of sending a show to air, you need a clip and still store that can keep up. Trinity's Deep Freeze media store was created to thrive in even the fastest live production environments. Powerful media management tools let you view, organize and manage tens of thousands of images with ease. Deep Freeze's optional clip store records up to four channels of audio per video clip and uses advanced wavelet compression technology to deliver better quality video than Motion JPEG systems. Its modular input and output cards support any combination of digital component (SDI), analog component (RGB/YUV) and analog composite formats. Deep Freeze delivers everything you expect and more, including powerful 3D DVE transitions, overlaid animating graphics and automated timeline playback.



Of course, video production requires more than just a lightning-fast clip and still store, and that's why Trinity includes a broadcast-quality switcher and powerful real-time CG. In fact, Trinity delivers all the tools of live and post production in one integrated, easy-to-use system at a fraction of the cost of comparable gear. Visit our web site today to see for yourself just how far Trinity can take your productions.

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play.com/store

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Trinity

The Complete Broadcast Production Studio-In-A-Box

PLAY

Circle (232) on Free Info Card

Audio Mixers-Studio, Recording

Compact studio mixer

Solid State Logic Aysis Air Mobile:

a compact format console for outside broadcast vehicles and space-restricted studios; using Aysis Air software, the consoles channel layering function enables a fully specified 96-channel console to be fitted in a 48-fader frame less than 92 inches wide; in even more space restrictive environments; a 64-channel version is available with 32 faders in a width of 66 inches; both versions provide four subgroups plus four control groups with full-featured controls and an ergonomically optimized master center section.

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

Booth: R 2074 Circle (541) on Free Info Card

Digital processing unit

Klotz Digital Vadis Core 6400:

digital processing unit is heart of Vadis product line, compatible with Vadis audio media platform; open architecture DPU is also an excellent solution for third-party partners looking to seamlessly implement Klotz technology.

678-966-9900; fax: 678-966-9903;
www.klotzdigital.com

Booth: M 7173, R 3798 Circle (633) on Free Info Card

Digital on-air console:

Arrakis Colorado Digital Revolution series digital consoles

rack-mounted, digital broadcast console with both digital and analog inputs; occupying 3RU, the console is controlled by an external PC running the Cool-Mix software or from a slide-fader control surface; available with 12 or 18 channels with two inputs per channel, three PGM buses, two mix-minus buses, stereo monitor, headphone output, cue bus output; includes machine control logic, remote channel on/off, five on-board mic pre-amps; 12 channel version can be upgraded to the 18 channel version.

970-224-2248; fax: 970-493-1076;
www.arrakis-systems.com

Booth: R 1574 Circle (487) on Free Info Card

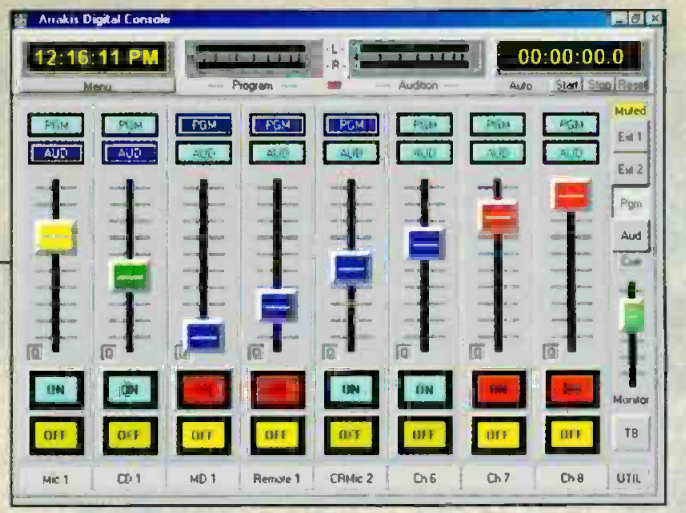
Studio network system

AMS Neve StarNet:

new features increase studio turnaround and booking flexibility by enabling projects to be stored on a central RAID StarNet controller accessible from all studios; StarNet controller stores all project data from both editor and console, including recordings, edit lists and mix automation.

888-888-6383; 212-965-1400; fax: 212-965-3739;
www.ams-neve.com

Booth: L21637 Circle (497) on Free Info Card



Universal console

AMS Neve Encore:

universal console automation options enable program data to be moved wetween consoles in different studios; latest off-line package enables patchbay settings and channel names to be setup outside the studio on a PC.

888-888-6383; 212-965-1400; fax: 212-965-3739;
www.ams-neve.com

Booth: L21637 Circle (496) on Free Info Card

Audio Recording, Storage & Playback

Digital audio recorder

Henry Engineering DigiStor II:

solid-state device can store up to 16 minutes of audio with a bandwidth of 6.5kHz. Supports multiple play modes and features full remote-control capability, an EOM tally output and an automatic phone coupler.

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

Booth: R 3389 Circle (486) on Free Info Card

Digital multitrack recorder

Otari Radar II HDR series:

a stand-alone 24-bit 48kHz sampling, 24 track hard disk recorder; features 9GB removable hard drive that records up to 42 minutes of 24-track/ 24-bit audio; additional drives can be added; enhanced RE-8 II controller provides access to system function for two RADAR units.

800-877-0577; 818-598-1200; fax: 818-594-7208;
www.otari.com

Booth: L 9741 Circle (590) on Free Info Card

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Circle (233) on Free Info Card

Audio Routing & Distribution

Audio format converter

Otari UFC-24:
features self-clocking sync from 32kHz to 48kHz and resolution up to 24-bits; supports common professional audio formats including TDIF-1, ADAT, SDIF-2, PF and AES/EBU; user-definable routing allows variable I/O assignment; user can store up to six I/O routing profiles for easy one-button recall.

800-877-0577; 818-598-1200; fax: 818-594-7208; www.otari.com

Booth: L 9741 Circle (579) on Free Info Card

Six-way distribution amplifiers

Sonifex Ltd RB-DDA6A AES/EBU and RB-DDA6S/PDIF:
designed for use as routing application or feeding outputs from a DAT machine to multiple studios; includes buffered inputs which are distributed to six outputs in perfect synchronization with the input at same level and condition as the input signal; both accept sample rates in the 30kHz-100kHz and 16-, 20-, and 24-bit rates.

+44 1933 650 700; fax: +44 1933 650 726; www.sonifex.co.uk

Booth: R 2296 Circle (484) on Free Info Card

Stereo audio DA, omniframe or stand-alone

Videotek ADS-24:
a compact, 1RU high by 1/3 RU wide unit; designed for distributing a stereo analog input to four stereo analog outputs; available as a stand-alone unit, a rack mountable unit or in a card version for the Omniframe system.

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

Booth: L12924 Circle (431) on Free Info Card

Digital audio sample rate converter

NVISION DA4060:
provides four channels of digital audio delay; delay from 0.10 to 2.73 second; two AES I/Os; connectors available in either 100- or 75ohm; controllable by NVision control panels or user API.

800-719-1900; 530-265-1000; fax: 530-265-1010; www.nvision1.com

Booth: L 543 Circle (416) on Free Info Card

Automation Systems, Newsroom Systems & Master Control

Database management system

Columbine JDS Paradigm:
end-to-end system allows single- and multistation operators to manage every aspect of the media business; ties all the key elements in the media management process together and introduces new efficiencies in departmental communications; modules include Paradigm Traffix, Program Control, Material Manager, Digital Manager, Transmission Manager, Proposer, MCAS master control automation system, Report Manager, and Billing and A/R.

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

Booth: L10471 Circle (401) on Free Info Card

Scalable automation

Columbine JDS Broadcast Master V.7:
new design and architecture allows for improved scalability, business integration, SQL database structure for open access to third part tools and simultaneous access to shared data within a workgroup; an integrated suite of software modules for acquisitions, schedule planning, program and transmission scheduling, process control program management and sales and library management.

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

Booth: L10471 Circle (524) on Free Info Card

Multichannel automation system

Columbine JDS D-MAS:
an ideal solution for broadcasters who are planning on airing multiple channels or who wish to convert existing multichannel systems to automatic operation; capable of controlling from one to hundreds of channels; channel capacity can increase without large expenditures on additional hardware.

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

Booth: L10471 Circle (523) on Free Info Card

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Tel: (317) 587-5071

NY Metropolitan Office
Englewood, New Jersey
Tel: (201) 569-1650

South East Office
Marietta, Georgia
Tel: (770) 977-8980

Circle (236) on Free Info Card

Low profile track and torlley system

Telemetrics Curved Trolley Robotics System: a low-profile track and trolley system; can be configured using curved and straight track sections; compatible with Telemetrics line of control panels and camera pan/tilt mechanisms.

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

Booth: L11852 Circle (677) on Free Info Card

Virtual set design

Devlin Design Group DDG SoftSet-Lite: provides a first-step virtual solution, other products to be highlighted include Softset, capable of developing complete virtual sets for a variety of applications; DDG offers design services worldwide from moderate makeovers to full-blown, high impact news rooms and news sets, facility and space planning.

858-535-9800; fax: 858-4556989; www.ddgtv.com

Booth: S5554 Circle (664) on Free Info Card

Desktop robotic camera control panel

Telemetrics CP-D-2A: designed to control Telemetrics' Pan/Tilt heads and serial receiver units; includes four camera select buttons and four optional select buttons that can be used to control four additional cameras or Weather-proof Camera Systems or H-track Trolley System; memory for 32 presettable shots in four banks of eight and dual proportional joysticks.

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

Booth: L11852 Circle (678) on Free Info Card

CyberSet feature option

Orad Maya Loader: enables user to load all the features of the Maya system including animations, lighting, transparencies and textures.

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

Booth: S 3132 Circle (526) on Free Info Card

Election graphics package

Orad Special Election Package: designed as a cost-effective solution for local coverage during the U.S. elections; allows users to incorporate a high-end video wall into their studio without impacting the existing studio set-up; includes a high-end graphics package that Orad will customize for individual stations; can be easily adapted for weather or other special applications.

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

Booth: S 3132 Circle (527) on Free Info Card

Free-d software upgrade

Radamec Virtual 3D Operator Interface: software upgrade allows Free-d and RP2VR users to interface directly with Radamec's Virtual Scenario system; features include sophisticated plane set-up and user memories.

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

Booth: L 2616 Circle (548) on Free Info Card

Tripod head

Bogen Gitzo DoveTail Quick Release Adapter: designed for Gitzo's G1377M Magnesium Center Ball Head; utilizes an expandable screw-lock jaw and accepts all Gitzo quick release plates.

201-818-9500; fax: 201-818-9177; www.bogenphoto.com

Booth: L12342 Circle (687) on Free Info Card

Remote-controlled camera platform

Innovision Optics Super Shuttle: a remote-controlled camera platform that travels along straight or curved track; comes with pan and tilt head and controller with eight preset memory positions, now with high-speed capability, extra memory, longer travel and more versatile track.

310-394-5510; fax: 310-395-2941; www.innovision-optics.com

Booth: L11773 Circle (382) on Free Info Card

Robotic rail track

Radamec New Track Cam: a heavy-duty camera track system featuring curved and lattice-type tracks that eliminate any vibration and allow for broadcast quality camera movement; system supports camera and lens packages up to 110lbs and integrates with existing Radamec control systems.

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

Booth: L 2616 Circle (546) on Free Info Card

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Cameras, Lenses, Accessories

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Angenieux 15x8.3AIF:
an all-purpose ENG lens; features Assisted Internal Focus (AIF) technology and is compatible with 2/3-inch, 16:9 cameras.

973-812-3858; fax: 973-812-3858; www.angenieux.com

Booth: L11835 **Circle (327) on Free Info Card**

Camera Lens

Angenieux 12x5.3 AIF HR series lens:
a wide super zoom 2/3 inch lens with F5.3mm wide angle (79 degrees) capabilty and 12x zoom range.

973-812-3858; fax: 973-812-3858; www.angenieux.com

Booth: L11835 **Circle (581) on Free Info Card**

Elevator pedestal

Telemetrics EP-PT Televator:
offers remotely-controlled motorized telescoping operation to adjust height control of robotic pan/tilt camera mechanisms; also ideal for use as a stand-alone teleprompter elevation system for studio applications.

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

Booth: L11852 **Circle (680) on Free Info Card**

Small, lightweight HD lens

Fujinon DigiPower 10:
features high performance and portability; zoom, focus and iris servo controls are fully digitized; has a focal length of 5mm and a 87.6 degree wide angle horizontal; features Inner Focus mechanism, low-dispersion glass and high-refraction and lightweight glass, also features new QUICKFRAME function that provides quick framing for operators that prefer manual zoom.

800-553-6611; 973-633-5600; fax: 973-633-5216; www.fujinon.co.jp

Booth: L12918 **Circle (572) on Free Info Card**

HD portable lens

Fujinon DigiPower 20:
features Inner Focus mechanism, low-dispersion glass and high-refraction, low weight glass; also features 20x magnification and a 7.8mm focal length; can cover applications from wide angle to telephoto; zoom, focus and iris servo control are digitized to provide new functions and a high degree of accuracy.

800-553-6611; 973-633-5600; fax: 973-633-5216; www.fujinon.co.jp

Booth: L12918 **Circle (591) on Free Info Card**

Lens system

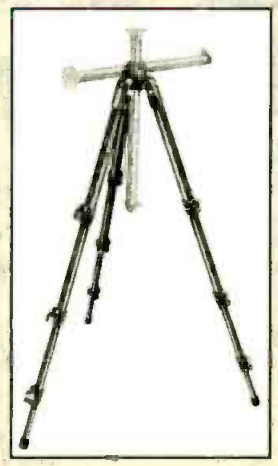
Innovision Optics Probe II Plus Lens System:
low-profile tubular lens system; features high-resolution optics, interchangeable 90 degree view and direct view modules, and improved objective lens coverage with flatter field; focusable from 5mm to infinity.

310-394-5510; fax: 310-395-2941; www.innovision-optics.com

Booth: L11773 **Circle (381) on Free Info Card**

Carbon fiber tripods

Bogen Manfrotto Carbon One series:
uses a three faceted, 1/2mm thick carbon fiber tubes; provides efficient vibration dampening and durability; also incorporated Manfrotto clamping technology combined with lightweight magnesium castings.



201-818-9500;
fax: 201-818-9177;
www.bogenphoto.com

Booth: L12342
Circle (689) on Free Info Card

Character Generators, Prompters and Captioning

Flat-panel prompter

Listec Video T-2015:
features 15-inch, high-resolution, active matrix, multisync display; supports composite NTSC, S-Video, PAL, SECAM and RS-170 video signals, PC graphics and multiple resolutions and frequencies from VGA to XGA.

561-683-3002; fax: 561-683-7336; www.listec.com

Booth: L10551 **Circle (360) on Free Info Card**

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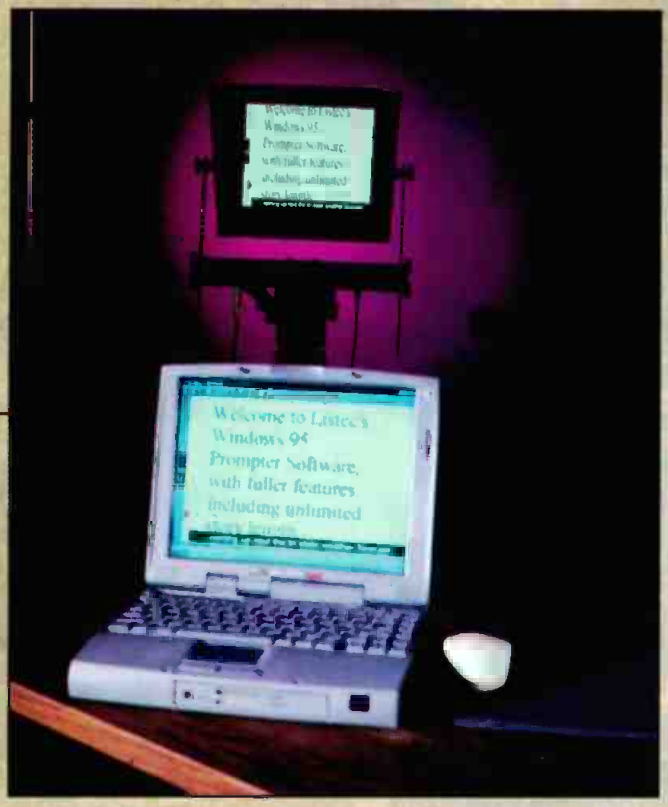

Laptop prompter

Listec Video T-2000 PromptBook: allows notebook computers to become prompters with the use of A-6000WIN for Windows98; attaches to any lightweight pan-and-tilt head.

561-683-3002; fax: 561-683-7336;
www.listec.com

Booth: L10551 Circle (361) on Free Info Card

Windows direct-view prompter

Listec Video A-6000WIN: Version 3.0 now includes its own full-featured word processor for instant editing of prompter copy; update include automatic looping of live message line, direct prompting of rich text file and simultaneous edit and prompt from a desktop computer with Windows 98/2000.

561-683-3002; fax: 561-683-7336;
www.listec.com

Booth: L10551 Circle (345) on Free Info Card

Computers & Peripherals

Fibre channel RAID storage

Hammer Storage Solutions SLPRO12-FC/FC-FT: a fault-tolerant, rack-mountable desktop or tower Fibre Channel storage subsystem; supports up to 12 FCAL disk drives per enclosure with 600GB storage per enclosure; expandable up to 25TB; RAID engings deliver up to 190MB/s throughput and are hot pluggable and hot swappable; provides maximum data availability.

510-608-4000; fax: 510-608-4010; www.hammerstorage.com

Booth: S 3431 Circle (589) on Free Info Card

CAT5 network accessory

Gefen Inc Ex*tend*it CAT 5-2000 extender: Extends any keyboard, video and mouse combination up to 300 feet using standard CAT-5 cables, to provide a quiet and clutter-free environment; can be used to extend computers with noisy components; the units extend USB, VGA, ADB and PS/2 connections.

800-545-6900; 818-884-6294; fax: 818-884-3108;
www.gefen.com

Booth: L 7038 Circle (495) on Free Info Card

WinNT PCI sound card

Soundscape Mixtreme: PCI Audio Card for Windows NT which features 16 in/out, external high-quality Breakout Converter Boxes and bundled mixing software from their high end post and broadcast workstations.

805-658-7375; fax: 805-658-6395;
www.soundscape-digital.com

Booth: I 6939 Circle (390) on Free Info Card

Digital Audio Workstations

Improved real-time audio editor

TC Electronic Spark 1.5: now features new cut editing enhancements and ability to use Master view sections as plug in; Cut Editor allows user to work on two transitions simultaneously; graphic display featuers type, length and splice settings; A/B Compare memory button allows user to compare two different sets of trnasitions.

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

Booth: R 1059 Circle (488) on Free Info Card

Large format digital mixing console

Otari ADVANTA Digital Console: A state-of-the-art, large format digital mixing system that is offered in application-specific configurations for the music recording, on-air broadcast, film and post-production industries; it accommodates up to 256 full function channel paths; three operator positions are available for film and video-post applications; users can select a combination of dedicated or mapped control elements for the assignable control surface

800-877-0577; 818-598-1200; fax: 818-594-7208;
www.otari.com

Booth: L 9741 Circle (341) on Free Info Card

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Digitally controlled analog production system

Otari Elite +:
a full-featured, large-format 24-bus digitally controlled analog console; designed to meet the requirements of 5.1 channel Surround Sound audio production; available in a variety of configuratins and options, including up to three-position topologies.

800-877-0577; 818-598-1200; fax: 818-594-7208;
www.otari.com

Booth: L 9741 **Circle (578) on Free Info Card**

Duplication& Distribution Equipment and Services

NT-based integrated duplication/ printing system

MediaFORM 3703I and 3703T:
fully automated, three-drive, one-printer system; uses the MediaFORM SmartDRIVE and the Primera Signature III inkjet printer; selectable drying feature on the printing source to cure CD-Rs before they are stacked on the output spindle; can be attached to a network with its 10/100 Base T connection and offers the capability of queuing up to five copy/print jobs from anywhere on the available network. Each job duplicates and prints entirely, in order, as it is queued.

800-220-1215; 610-458-9200; fax: 610-458-9554;
www.mediaform.com

Booth: M 7670 **Circle (485) on Free Info Card**

Graphics and Animation Systems

Broadcast graphics automation system

Vertigo Multimedia Producer ON AIR:
incorporates state-of-the-art, easy-to-use software tools for efficient creation of automated broadcast graphics for any live television production; supports Discreet's frost* as its primary graphics engine, as well as Chyron Infinit!, Quantel Paintbox, VTRs, DDRs and production switchers.

877-483-7844; 514-397-0955; fax: 514-397-0954;
www.vertigo.net

Booth: MI 726 **Circle (516) on Free Info Card**

Option for Chyron Duet

Chyron Duet MPx option:
option for Duet SD and HD video graphics systems; provides improved rendering by utilizing multiple video graphics engines; allows additional expanded screen content, dynamic effects and 3D animation; option takes advantage of Duet chassis expandability and is available for both SD and HD systems.

516-845-2000; fax: 516-845-3867;
www.chyron.com

Booth: L12908 **Circle (616) on Free Info Card**

Intercom, IFB Products

Wireless VHF intercom system

Telex Communications Radiocom BTR-300:
offers increased frequency band availability; and improved front-end filtering increases resistance to interference; up to four base stations and 16 beltpacks can be used simultaneously; compatible with RTS TW, Audiocom, RTS Matrix, Clearcom and Matrix Plus systems; as options, beltpacks include Nickel Metal Hydrid batteries and a plug-in charger for longer use.

800-392-3497; 612-884-4051; fax: 612-884-0043;
www.telex.com

Booth: L 9366 **Circle (649) on Free Info Card**

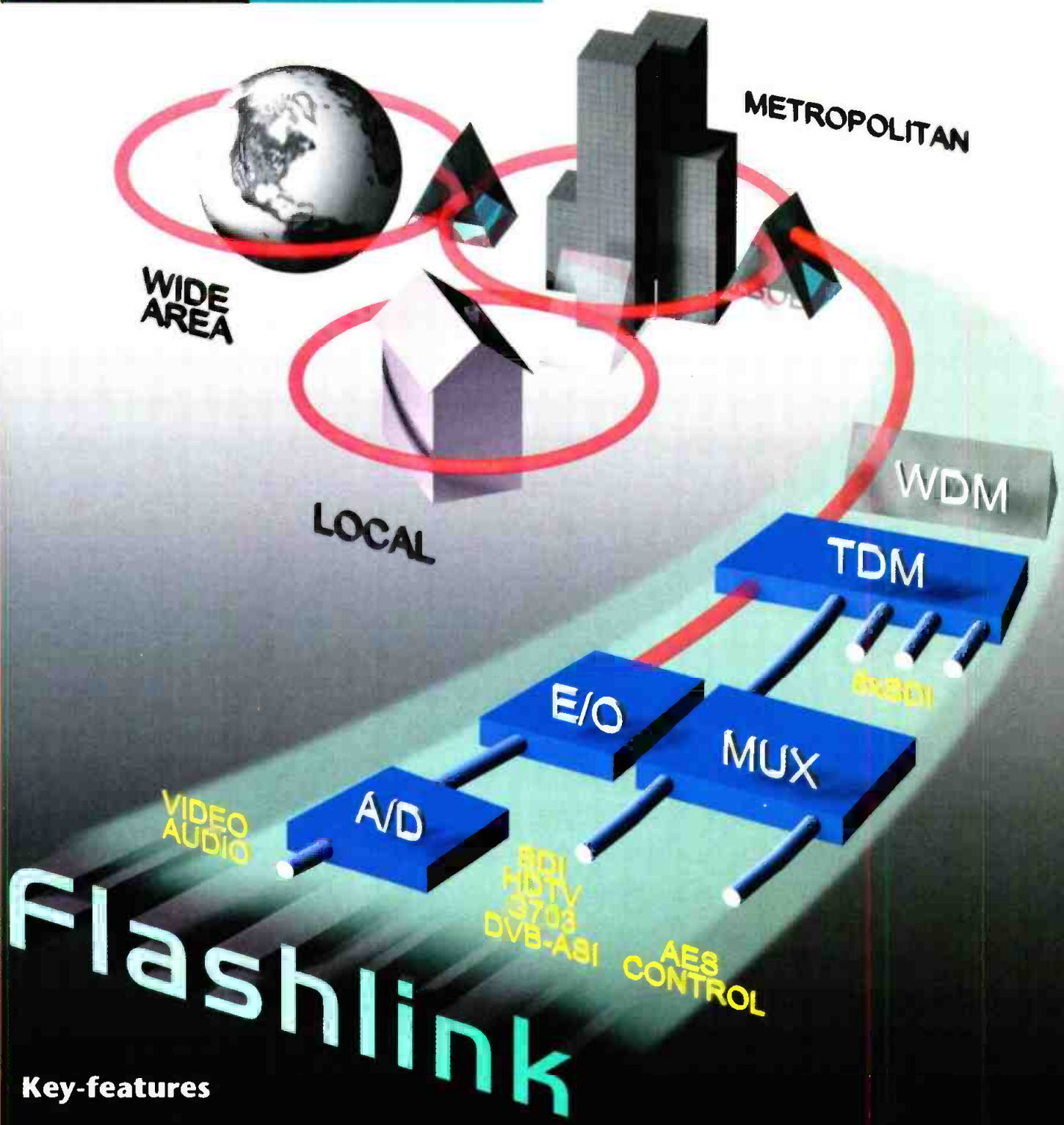
Intercom interface frame

Clear-Com Systems IMF-102:
interface frame for the Matrix Plus and MicroMatrix; provides slots for two interfaces plus power supply and connector in a 1Ru chassis; holds any of the modular interfaces, including the TEL-14 two-line telephone interface, the CCI-22 dual party line intercom interface, and the RLY-6 relay and GPI-6 general purpose input interfaces.

510-496-6666; fax: 510-496-6699;
www.clearcom.com

Booth: L10776 **Circle (491) on Free Info Card**

network Flashlink®



Flashlink

Key-features

- Fiber transmission with 2.5GBit laser technology
- 1310nm, 1550 nm and DWDM lasers, 30 dB transmission budget
- Synchronous contribution of video broadcast signals
- Pathological SDI signal transmission without additional scrambling
- 8 channel SDI Time Division Multiplexing with Add/Drop/Pass
- 4 channel audio embedder / de-embedder with optical interface
- Control via Ethernet and RS-422
- Management system with TCP/IP, SNMP and WEB support
- Ultracompact 2RU sub-rack, modular concept
- Hot swappable boards (incl. fiber connector)
- RS-422 control on each module
- Redundant power 100-260VAC and 36-72VDC

Circle (241) on Free Info Card

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Matrix Plus digital intercom systems incorporate new VOX functions; provides features such as signal-presence tallies, voice-activated talk and call functions and noise gating; capabilities are fully integrated into the system.

510-496-6666; fax: 510-496-6699; www.clearcom.com

Booth: L10776 Circle (490) on Free Info Card

Lighting Equipment

Four-lamp strobe light

GAMPRODUCTS Star Strobe

a bright, four-lamp double-ended curtain strobe in a molded body with an eight-foot power cord; strobes at a random rate of approximately 60 flashes per minute; speed can be varied by plugging unit into a dimmer.

800-GAMCOLOR; 323-461-0200; fax: 323-461-4308; www.gamonline.com

Booth: L 6819 Circle (562) on Free Info Card

Waterproof lighting housing

Bogen Luna-Marine underwater housing

designed for the Luna-pro Digital F light meter; machined from 6061 aluminum; protected with a hard anodized Type 3 Black Diamond finish; guaranteed water-tight to 120 feet; 2"x1 1/8" viewing port; pushbuttons align with meter buttons providing for easy underwater operation.

201-818-9500; fax: 201-818-9177; www.bogenphoto.com

Booth: L12342 Circle (688) on Free Info Card

Master control chase generator

GAMPRODUCTS GLC-12:

a multifunctional preprogrammed sequencer that creates electric lightning bolts, can chase strobe lights and sequence a 12-channel chase; provides four different preprogrmmed lightning effects; provides master control for up to 12 Flickermasters.

800-GAMCOLOR; 323-461-0200; fax: 323-461-4308; www.gamonline.com

Booth: L 6819 Circle (560) on Free Info Card

On Camera light

Anton/Bauer Ultra Day Light:

quick-change 20W HMI head module changes any on-camera UltraLight from tungsten to HMI and back without touching bulbs.

800-422-3473; 203-929-1100; fax: 203-925-9935; www.antonbauer.com

Booth: L11862 Circle (601) on Free Info Card

Real flame torch

GAMPRODUCTS GAMTORCH:

produces 16 inches of flame from GAMfuel pellets; a non-toxic and clean burning flame source that is environmentally safe.

800-GAMCOLOR; 323-461-0200; fax: 323-461-4308; www.gamonline.com

Booth: L 6819 Circle (561) on Free Info Card

Halogen lamp head

Cinemills Super 12/10 kW Silver Bullet:

new tungsten halogen lamp head; includes 20-inch Fresnel lens; offers durable construction and light weight.

818-843-4560; fax: 818-843-7834; www.cinemills.com

Booth: L 7327 Circle (466) on Free Info Card

ENG/EFP light

Frezzi Energy Systems 200W HMI Sun Gun:

designed for ENG/EFP applications; features a five-inch precision designed parabolic reglector; produces a unified light distribution at 10-foot distance without the use of additional lenses.

800-345-1030; 973-427-1160; fax: 973-427-0934; www.frezzi.com

Booth: L 7313 Circle (690) on Free Info Card

Microphones, Accessories

Camera-mounted wireless microphone

Audio-Technica U100 Series:

UHF system with true diversity reception, 100 selectable channels and rugged all-metal construction.

330-686-2600; fax: 330-686-0719; www.audio-technica.com

Booth: R 2970 Circle (663) on Free Info Card

Microphone windshielding equipment

Rycote Microphone Windshields Windspoiler:

an addition to the Softie range of windshields; new design adds an extra 8dB of wind-noise reduction to the Rycote Softie with mount without impairing audio quality.

+44 1453 759 338; fax: +44 1453 764 249;

Booth: R 2254 Circle (552) on Free Info Card

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Wohler in-rack audio monitors offer the most precise monitoring available. Sound is focused directly to the operator, making channels more distinguishable, reducing acoustic crossover and room noise.

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Available for monitoring Analog, Digital AES/EBU, SDI and Dolby® AC-3, most Wohler units fit into only 1 or 2 rack spaces and can feature level meters, digital conversion, demuxing and multiple channel selection. They're easy to install and fully shielded to assure no interference, even next to video monitors and testing equipment.

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We were the first to offer the Dolby® Digital AC-3 audio monitor and decoder.

This year we're introducing our latest innovation, the E-MON-1, with an internal Dolby E decoder, capable of outputting and/or displaying audio from Dolby E® streams.

Once you get started inventing, it's kinda hard to stop.

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Wohler

www.wohler.com

Circle (242) on Free Info Card

See us at NAB Booth #L6761

F/O video/audio/data PTZ

Opticomm FMV-595:

FM, LED or laser-based NTSC, PAL and SECAM compatible duplex video transmission systems with optional combinations of duplex audio and or data status indicators; units transmit over one mulitmode fiber at 865nm or 1310nm or over one singlemode fiber at 1310 or 1550nm.

800-8-OPTICOMM; 858-450-0143; fax: 858-450-0155;
www.opticomm.com

Booth: I 7424 Circle (384) on Free Info Card

Fiber optic transmission system

Communications Specialties Pure Digital, One Fiber:

line uses digital processing and transmission to send any combination of analog video, audio and data signals including "up the coax" over one fiber optic cable; system converts incoming analog signals to a digital bitstream, optically transmits the stream over a single fiber, then converts signals back to their original analog form at the receiving end.

888-4 FAX NOW; 631-273-0404; fax: 631-273-1638;
www.commspecial.com

Booth: M 8968 Circle (544) on Free Info Card

Fiber optic eight-channel video mux

Opticomm FMX-48000:

an FM, LED or laser-based NTSC, PAL and SECAM compatible multiplexer with optional combinations of simplex audio and data; multichannel transmission is achieved by using square wave frequency modulation division multiplexing techniques; ideal for the transmission of mulitple video with audo and or data where only one fiber is used; units transmit over one mulitmode fiber at 865nm or 1310 or over one singlemode fiber at 1310nm or 1550nm.

800-8-OPTICOMM; 858-450-0143; fax: 858-450-0155;
www.opticomm.com

Booth: I 7424 Circle (385) on Free Info Card

Video/Audio fiber optic multiplexer

Multidyne DVM-2000:

12-bit video and 24-bit audio fiber optic mulitplexer offers state-of-the-art performance exceeding RS250C short-haul and broadcast specifications; will support one video, up to six audio and data channels; the transmitter and receiver modules plug into a 10-channel frame with redundant power supplies are available as stand-alone units.

800-4TV-TEST; 516-671-7278; fax: 516-671-3362;
www.multidyne.com

Booth: L 9144 Circle (462) on Free Info Card

Audio codecs

Comrex Vector POTS Codec:

provides 15kHz two-way audio on one standard dial phone line; compatible with the thousands of HotLine POTS codecs around the world; has plenty of built-in mixing capabilities yet weighs only 3.5 pounds.

800-237-1776; 978-263-1800; fax: 978-635-0401;
www.comrex.com

Booth: R 3178 Circle (351) on Free Info Card

Multimedia, CD-ROM and Internet Development

Streaming video Intenet tools

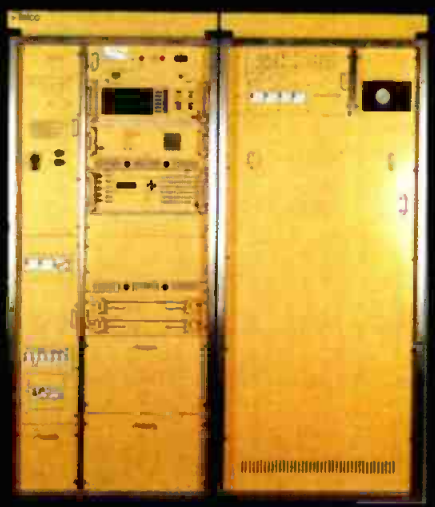
Obvious Technology Media Publisher and Web Viewer:

two tools that enable distribution, storage and access to multimedia content for the Web; Media Publisher converts OBVI files to formats readable by standard web browsers; Web Viewer allows clients to view video and integrated multimedia content without having to download applications or install plug-ins.

415-957-9950; fax: 415-957-9949;
www.obvioustech.com

Booth: M 7662 Circle (465) on Free Info Card

What is Itelco?



With Itelco's unique transmitter upgrade policy, you stay ahead of the game. Purchase an NTSC transmitter now and lock in today's pricing on your future DTV upgrade. So when you're ready for digital a year or two from now, your pricing is already set. With a deal like that, you can't lose. This includes solid state, IOT, or tetrode transmitters. It's a winning performance. It's leadership technology that is an investment in the future.

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303.464.8000 or www.itelco-usa.com/be

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Circle (244) on Free Info Card

See us at NAB Booth #L3243

Power Products, Batteries, Generators, UPS

Voltage regulators

Superior Electric (formerly Warner STABILINE WHR Series Automatic Voltage Regulator:
a single phase, 3.6kVA narrow range electromechanical voltage regulator rated for 120V, 50/60Hz single-phase duty; utilizes a solid-state control module and variable transformer-driven power module; features include low impedance and high overload capacity.

800-787-3532; 860-585-4500; fax: 860-582-3784;
www.warnernet.com/sev_main

Booth: L6046, R1191 **Circle (346) on Free Info Card**

50 watt-hour lithium ion batteries

IDX Technology/IKON Video Endura:
50-watt hour lithium ion batteries; features include Power Link with "piggyback" capability plus a separate low wattage output for wireless audio receivers, built-in digital fuel gauges; quick-release V-Mount, Digi-View for viewfinder capacity data and over-discharge protection circuitry.

619-560-9779; fax: 858-560-5075;
www.idxtek.com

Booth: L 9031 **Circle (613) on Free Info Card**

Three-phase UPS

North Star/Best Power Best Power Axxium Tri-Star:
protects your equipment against spikes, sags, surges, noise lightning and power outages; new high-frequency transformerless double conversion design delivers up to 94 percent of input power to the load from the no-break singe wave inverter output stage, provides protection from 10kVA to 40kVA.

800-842-1671; 954-921-5868; fax: 954-927-0501;
www.nstpower.com

Booth: L12852 **Circle (608) on Free Info Card**

Transformerless UPS

North Star/Best Power Best Power Axxium Pro:
a high-frequency, transformerless UPS with standard online operational modes of on-battery, double-conversion and fault bypass, as well as a high-efficiency/power-saver mode; voltage and frequency combination provide protection in 3kVA blocks up to 18kVA.

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www.nstpower.com

Booth: L12852 **Circle (607) on Free Info Card**

Snap-on power supply

Anton/Bauer SPS-70:
mounts to Anton/Bauer Gold Mount to operate camera or other portable equipment from AC mains; sophisticated circuitry eliminates video noise, 70W continuous; wide-range main input; CE approved.

800-422-3473; 203-929-1100; fax: 203-925-9935;
www.antonbauer.com

Booth: L11862 **Circle (602) on Free Info Card**

High-performance batteries

Anton/Bauer Hytron System:
50W and 100W hour high-performance batteries; can be charges on any existing Anton/Bauer InterActive charger; 14.4V design, low internal impedance offers superior performance in all operating conditions.

800-422-3473; 203-929-1100; fax: 203-925-9935;
www.antonbauer.com

Booth: L11862 **Circle (603) on Free Info Card**

Production Switchers & Video Effects, Keyers

Graphics keyer

Broadcast Video Systems Masterkey 4 Analog linear keyer:
provides seamless inlay when keying these pre-filtered sources into program video; combination of key gain and key slope controls; also accepts linear key output of modern color matting systems to produce inlays of RGB sources.

905-764-1584; fax: 905-764-7438; www.bvs.on.ca

Booth: L 9519 **Circle (500) on Free Info Card**

Remote Transmitter Indent

Broadcast Video Systems TDI-200:
automatically inserts station call letters, location, time and date at specified intervals/ generates four rows of 16 characters and is user programmable.

905-764-1584; fax: 905-764-7438; www.bvs.on.ca

Booth: L 9519 **Circle (501) on Free Info Card**

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FOR EVERY VOICE

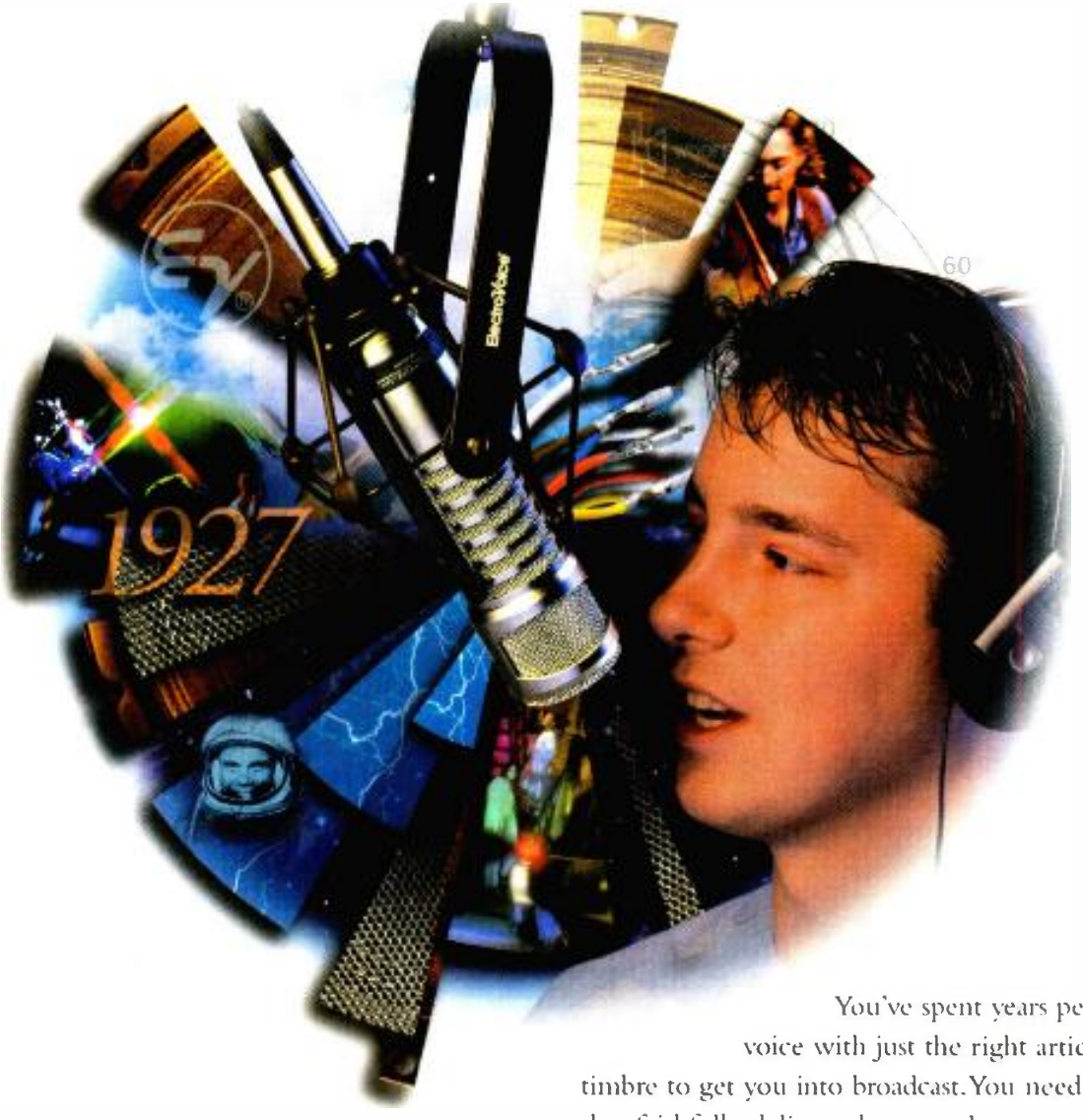

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Exhibit Booth No. L9366

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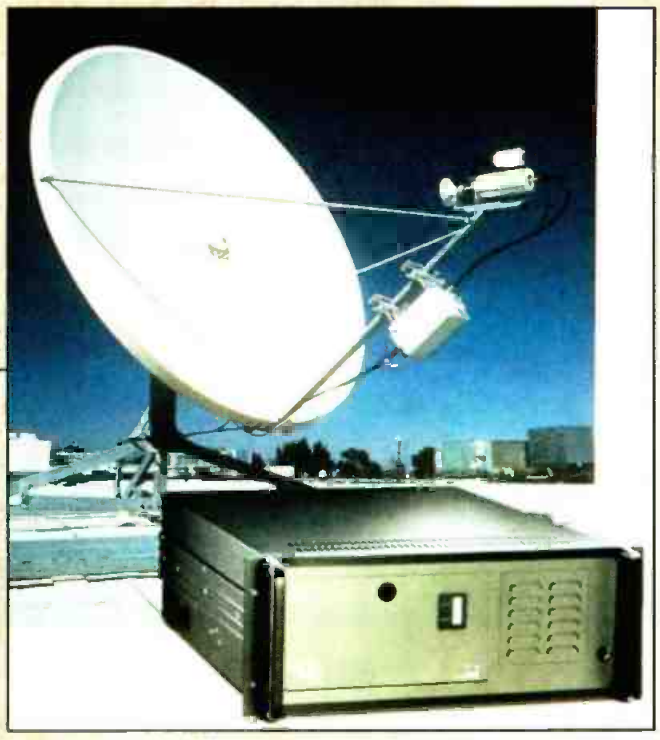
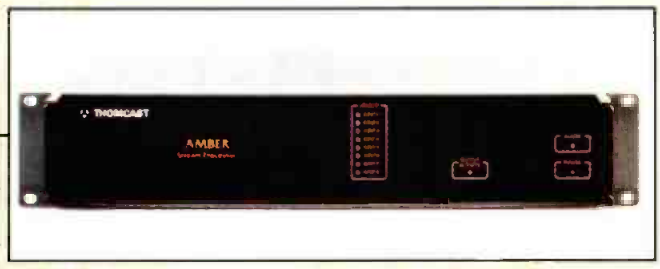


Internet Protocol Platform Processor

SSE Telecom iP3 Gateway:
a carrier grade, integrated terminal consisting of an indoor unit, outdoor unit and optional antenna; provides seamless IP connectivity; built on a rugged, high-speed PC platform with expansion capability using PCI plug-in cards and Linux operating system; proprietary transmission control increases file transfer performance an average of three times faster than convertional TCP/IP transmission.

510-657-7552; fax: 510-490-8501;
www.sset.com

Booth: T 1242 **Circle (469) on Free Info Card**



Remultiplexer and PSIP processor platform

Thomcast/Comark Amber:
this processing family supports remultiplexing of multiple input streams to create new customized services, the PSIP processor to the filtering, injection or extraction of PSIP tables with MPEG-2 ATSC transport streams; can input up to eight input transport streams with a payload bit rate of up to 50Mb/s; creates a fully MPEG-2 DVB or ATSC-compliant output multiplex and has the ability to scramble the output services.

413-569-0116; fax: 413-569-0679;
thomcastcom.com

Booth: L 9609 **Circle (556) on Free Info Card**

V-chip data decoder & monitor

Broadcast Video Systems VC-2:
provides instant indication of program content rating as specified in EIA-608 standard; unit may be mounted in any convenient location; V-chip data, embedded in loop-through video, is decoded and illuminates front-panel LEDs, indicating rating category.*

905-764-1584; fax: 905-764-7438;
www.bvs.on.ca

Booth: L 9519 **Circle (373) on Free Info Card**

Hum eliminator

Allen Avionics HEC-5000/GLE-75-VHF-5:
a five-channel hum eliminator that stops all 50Hz or 60Hz hum; eliminates hum in video applications caused by long cable runs or ground loops; has a bandwidth of over 100MHz per channel, making it suitable for most HD applications and many video projection systems with 100MHz bandwidth; channels for Red/Y, Green/CB, Blue/CR, H.Sync and V.Sync are provided.

516-248-8080; fax: 516-747-6724;
www.allenavionics.com

Booth: L12410 **Circle (406) on Free Info Card**

Closed captioning decoder

Broadcast Video Systems CC-100:
decodes line 21 data and inserts closed captioning text into baseband video; 30 second installation, switchable between language 1 and language 2, switchable between closed captioning and text.*

905-764-1584; fax: 905-764-7438;
www.bvs.on.ca

Booth: L 9519 **Circle (502) on Free Info Card**

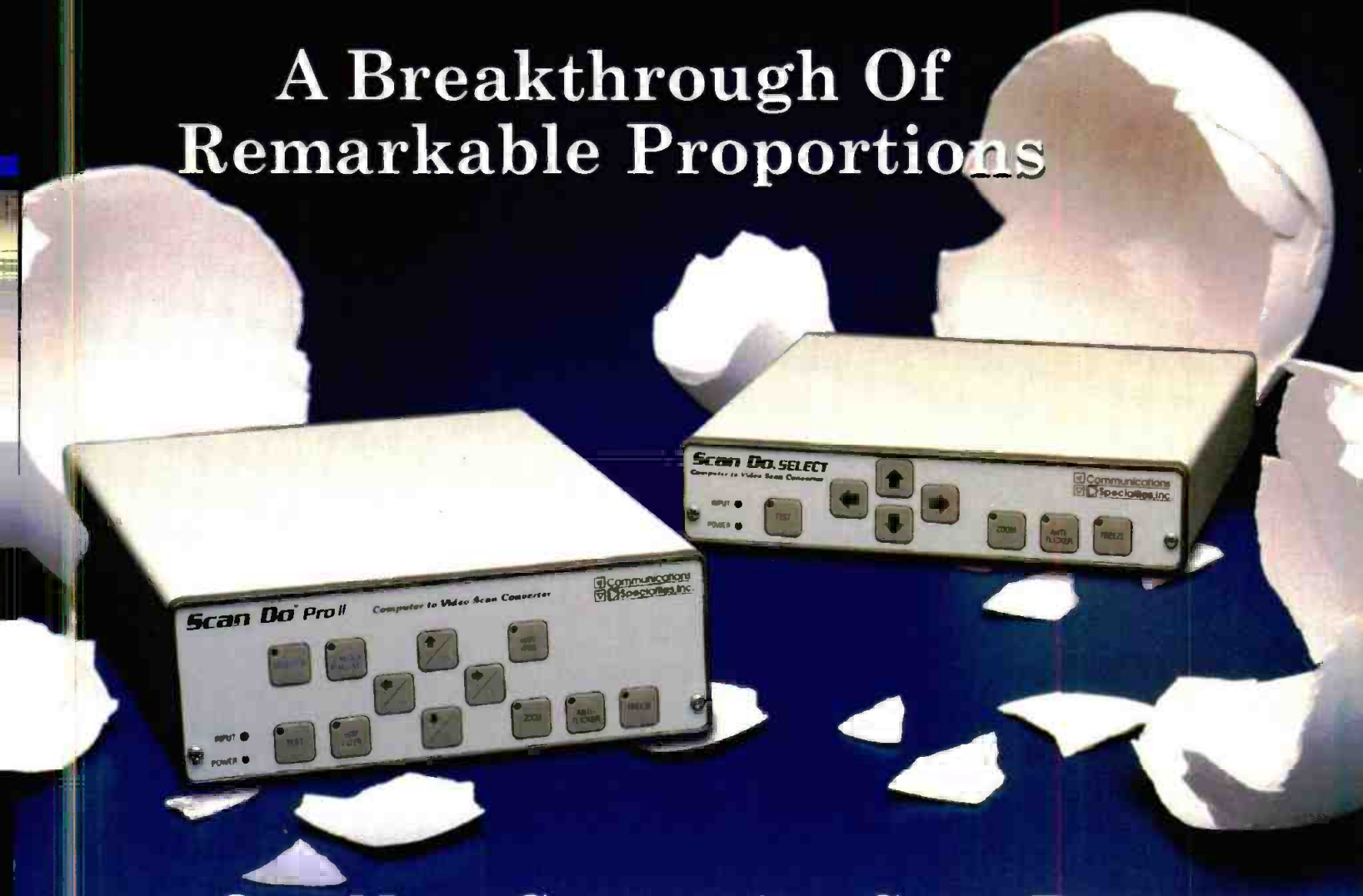
System for interactive TV

Mixed Signals/ULTECH ITV DataFlo:
integrated production suite for encoding interactive TV content into live or recorded video programs; consists of creation and scheduling software, scheduling software and a VBI data encoder; ATVEF compliant.*

888-360-0010; 203-735-5805; fax: 203-735-6653;
www.mixedsignals.com

Booth: S 3816 **Circle (449) on Free Info Card**

A Breakthrough Of Remarkable Proportions



Our Next Generation Scan Do Scan Converters Raise The Industry Standard. Again.

With the redesigned Scan Do® Pro II and new Scan Do Select, we've hatched two scan converters that offer egg-ceptional performance at an unbeatable price. Both maintain all the great user amenities and rugged dependability you've come to love, plus have these great features:

- True multi-scanning with support for resolutions to 1280 x 1024 (at 60Hz). So they'll work with virtually any computer.
- A remarkable 50% to 200% zoom with input zoom processing for enhanced resolution.
- An internal, universal power supply which eliminates the need for an external "brick."
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- RS-232 remote control for easy system integration and expansion.

Scan Do Select is the perfect presentation tool for boardrooms, meetings, training and videoconferencing applications. Scan Do Pro II has additional capabilities. Designed for top video and broadcast professionals, it features:

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- Component output (YUV and RGB formats)
- Switchable vertical filter
- Optional serial digital output (SDI)

Of course, both Scan Do Pro II and Scan Do Select are the epitome of user friendliness. They're simple to install, can be rackmounted and have easy-to-use, front-panel controls. Add a very reassuring three-year warranty on parts and labor, plus a great price, and you'll be scrambling to try one for yourself. For more information, including a printed or CD version of our catalog, contact us today.

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e-StudioLIVE (formerly ECHOlab Inc) e-Studio 5000:
webcasting systems combine a SuperSwitcher with integrated webcasting products including RealNetworks G2; new features include instant viewer surveys and polling; an enhanced character generator, streamlines effects operation, web links to other web sites and expanded support for viewers using Windows 9x/NT with Internet Explorer or Netscape.

978-250-3334; fax: 978-250-3335;
www.echolab.com
Booth: I 5819, L 9780 Circle (420) on Free Info Card

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GAMPRODUCTS GAMFLOOR:
a durable, flexible self-adhesive vinyl floor covering; available in 18f colors, both matte and glass, including chromakey green and blue.

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www.gamonline.com
Booth: L 6819 Circle (559) on Free Info Card

TBCs, Frame Syncs and Conversion Equipment

OB application encoder

Tandberg Television E5500 Mobile Contribution Encoder:
provides the functionality needed for a variety of outside broadcast applications; utilizes field-proven encoding and preprocessing technology; delivers a feature set including built-in QPSK modulation, low latency modes, optional MPEG-2 4:2:2P@ML encoding, remultiplexing and encryption options.

949-725-2500; fax: 949-725-2545;
www.tandbergtv.com
Booth: S 4168 Circle (575) on Free Info Card

Video & audio signal integration system

Ensemble Designs Avenue:
provides complete video and audio signal processing, conversion, distribution and synchronization; networkable with a flexible, configurable user-friendly interface.

530-478-1830; fax: 530-478-1832;
www.ensembledesigns.com
Booth: S 4737 Circle (342) on Free Info Card

Test & Measurement Equipment

96k audio analyzer

Audio Precision System Two Cascade:
features both 96kHz and 192k digital sampling rate capability; companion model System Two+DSP, with the new platform improvements but without digital I/O, is also available as well as a cascade digital-only model, SYS-2500A; harmonic analyzer is capable of individual and group harmonic distortion measurements; the company also has introduced APWIN 2.0.

800-231-7350; 503-627-0832; fax: 503-641-8906;
www.audioprecision.com
Booth: L 3543, S 4443 Circle (371) on Free Info Card

Audio analyzer with higher sampling rates

Audio Precision Portable One Dual Domain with 96 kHz sampling rate:
includes 96kHz digital audio sampling rate option; allows for testing of digital devices, such as DVD, which uses the new 96kHz sampling rate; features a complement of digital interface testing and monitoring functions, including jitter generation and measurement, audio bit error rate and sample rate measurement.

800-231-7350; 503-627-0832; fax: 503-641-8906;
www.audioprecision.com
Booth: L 3543, S 4443 Circle (325) on Free Info Card

Video/audio analyzer

Broadcast Video Systems VITS 2:
checks specs and audio levels from a remote site; accesses and analyzes any line, odd or even field, in the VBI or active video; interfaces to PC via modem using non-dedicated telco line, monitors an unlimited number of sites, four audio video inputs controlled from PC.*

905-764-1584; fax: 905-764-7438; www.bvs.on.ca
Booth: L 9519 Circle (340) on Free Info Card

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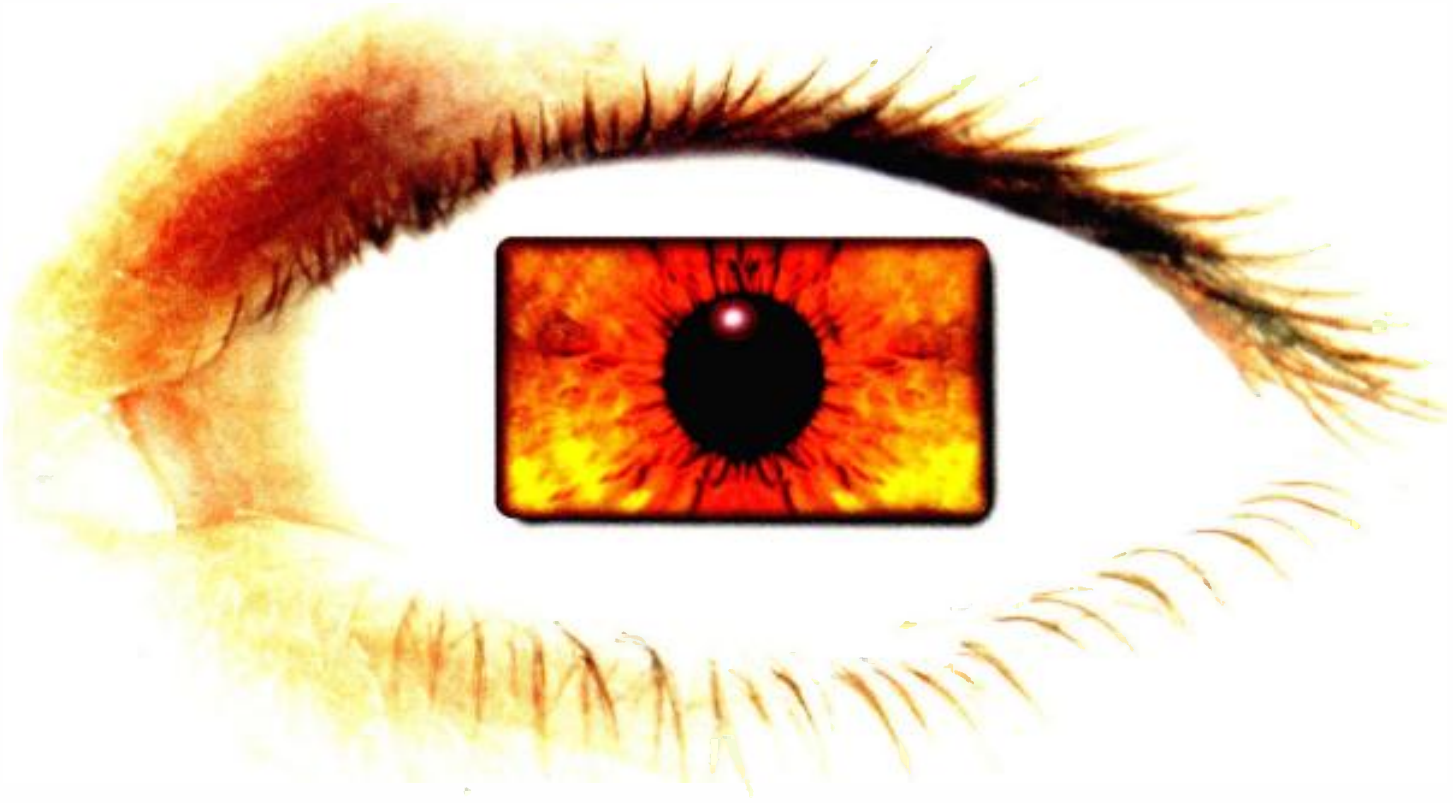
We invented it • We perfected it



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The biggest problem with the NAB convention is just getting around to see all the stuff you want. *Broadcast Engineering* can help.

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First, identify the types of products you need find. The product categories are listed below. Second, using the listing, go to the indicated page and you'll find a listing of the companies that produce that particular type of product. Finally, the exhibitors booth numbers are listed in *geographic order*. This ensures that scouring the floor for a particular type of product will be a more efficient process. You can start at the top or the bottom of the category list and know that your path will be as short as possible.

Issue advertisers are shown in red. Many advertisers have provided us with an advance look at the products they'll be showing. Those products are listed according to equipment category and the page on which you can read more about them. This allows you to get a look at those products long before you reach the show floor. Good hunting, and we'll see you there.

Audio Accessories

BE FAST TRACK

Walters-Storyk ..... S 4017
Miller & Kreisel ..... S 4175
Ensemble Designs ..... S 4737
WhisperRoom ..... S 5359
SD Tech/Div. GVC ..... S 5373

Audio Mixers-Portable

TeleCast Group AS ..... L 1823
ATI ..... L 5211
Shure Inc ..... L 5617
Zaxcom L13231
Mackie Designs ..... M 9373
Calrec Audio ..... R 491
See M3 ..... pg 238
Roland ..... R 2063
Audio Developments ..... R 2354
AETA Audio ..... R 2680
Audio Toys ..... R 3496
JK Audio ..... R 3659
Studer ..... R 4073

Audio Mixers-Studio, Recording

TeleCast Group AS ..... L 1823
Graham-Patten ..... L 2010
Graham-Patten ..... L 2010
ATI ..... L 5211
Shure Inc ..... L 5617
Harris ..... L 6524
Whirlwind ..... L 7433
Sennheiser Electronic ..... L 7530
Panasonic ..... L 8236
Telex Communications ..... L 9366
Sony L12107
TASCAM/Teac Professional L12944
Zaxcom L13231
AMS Neve L21637
Klotz Digital ..... M 7173, R 3798
Mackie Designs ..... M 9373
Calrec Audio ..... R 491
Martinsound ..... R 582
Soundtracs ..... R 669
TC Electronic ..... R 1059
AMEK US ..... R 1562
Harrison by GLW ..... R 1569
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Fidelipac ..... R 2674
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Logitek ..... R 3170
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Ward-Beck ..... R 3763
AEQ ..... R 4066
Studer ..... R 4073
Videonics ..... S 4915

Audio Processing

NVISION ..... L 543
Axon Digital Design ..... L 2006
Shure Inc ..... L 5617
FM Systems ..... L 5833
Gefen Inc ..... L 7038
Prime Image L10186
Dolby Laboratories L12335
Link Electronics L13255
TC Electronic ..... R 1059
Telos ..... R 2057
Roland ..... R 2063
Audi-Cord ..... R 2273
JOEMEEK ..... R 2299
HHB Communications ..... R 2360
Aphex Systems ..... R 2368
Circuit Research Labs ..... R 3197
Audio Toys ..... R 3496
Symetrix ..... R 3663, M 9727
Broadcast Electronics Inc ..... R 3682
Orban ..... R 3686
Dan Dugan Sound Design ..... R 3761
Eventide ..... R 4069
DigiDesign ..... R 4086

Audio Recording, Storage & Playback

Doremi Labs ..... L 517
Harris ..... L 6524
DRS Ahead Technology ..... L 9619
Otari ..... L 9741
Sony L12107
TASCAM/Teac Professional L12944
TASCAM/Teac Professional L12944
Zaxcom L13231
Alcorn McBride ..... M 9440
TeraTek Software ..... R 586
Digigram ..... R 1456
Arrakis ..... R 1574
Roland ..... R 2063
AKAI Musical Instrument ..... R 2091
Audi-Cord ..... R 2273
Sonifex Ltd ..... R 2296
HHB Communications ..... R 2360
Euphonix ..... R 2388
Fidelipac ..... R 2674
360 Systems ..... R 3163
See TCR/8 ..... pg 130
Henry Engineering ..... R 3389
Broadcast Electronics Inc ..... R 3682
Studer ..... R 4073

Audio Routing & Distribution

QSC Audio .....
NVISION ..... L 543
See DA4060 ..... pg 240
ISIS Group ..... L 1510
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Lighthouse Digital Systems ..... L 1927
Axon Digital Design ..... L 2006
Graham-Patten ..... L 2010
Utah Comteck ..... L 2027
Benchmark ..... L 2046
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Pixel Instruments ..... L 3529
Sierra Video Systems ..... L 4654
ATI ..... L 5211
Datatek ..... L 5610
Hosa Technology ..... L 5629
Harris ..... L 6524
Wohler ..... L 6761
Philips ..... L 6910
Di-Tech ..... L 7943
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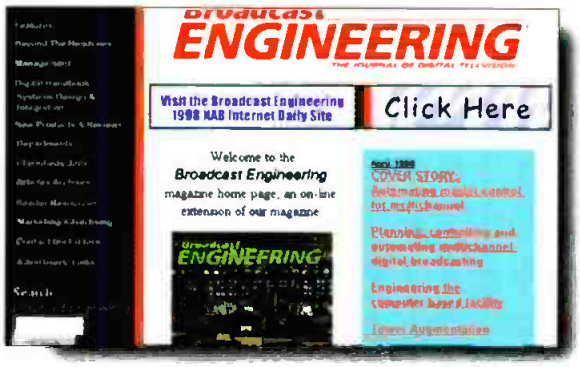

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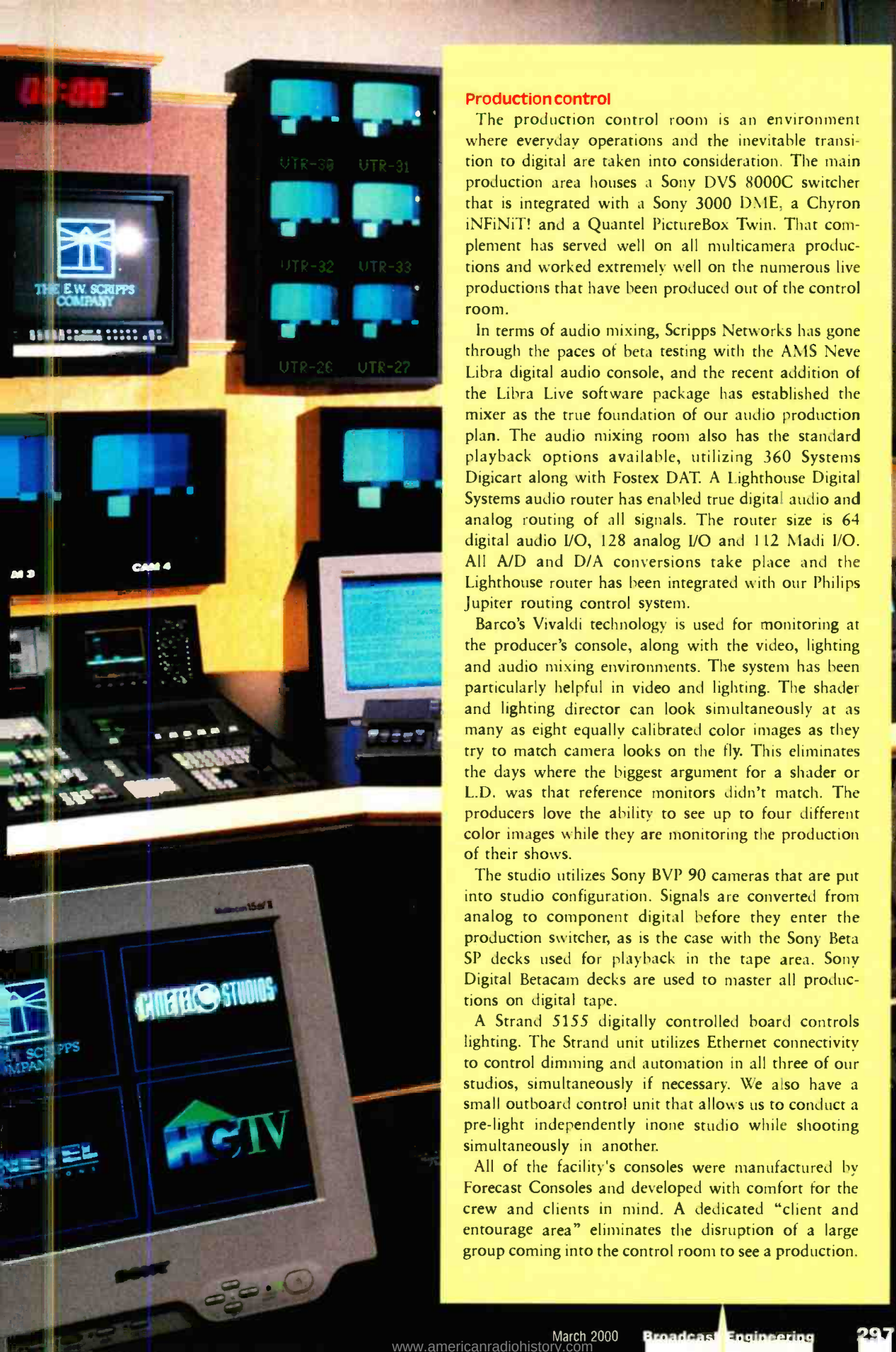
SYSTEMS DESIGN SHOWCASE

Scripps Technology Center

By John Ajamie

In 1995 Home & Garden Television (HGTV) launched out of a new digital facility in Knoxville, TN (see page 40, BE March 1996). Multiple editing, graphics and studio environments, all in a state-of-the-art setting, supported the needs of the fledgling network. By 1998 it was obvious the facility would need to be expanded and updated to meet the growing demands of the now successful HGTV and the newest additions to the Scripps Networks family, Food Network and Do It Yourself (DIY) network. Part of this expansion would include the growing on-line and convergence applications being leveraged with the multipurpose content of the networks. Adopting these new technologies into our creative process, while maintaining the integrity of the core operations throughout the expansion posed a formidable challenge to the project's team. With a pioneer spirit, and a collaborative effort from multiple disciplines, the Scripps Technology Center was successfully opened in October 1999.

The production control room at Scripps Network Center features a Sony DVS 8000C switcher, a Chyron iNFiNiT!, a Quantel Picturebox Twin and Barco Vivaldi monitors. Photos by Robert Wolsch Design.



Production control

The production control room is an environment where everyday operations and the inevitable transition to digital are taken into consideration. The main production area houses a Sony DVS 8000C switcher that is integrated with a Sony 3000 DME, a Chyron iNFiNiT! and a Quantel PictureBox Twin. That complement has served well on all multicamera productions and worked extremely well on the numerous live productions that have been produced out of the control room.

In terms of audio mixing, Scripps Networks has gone through the paces of beta testing with the AMS Neve Libra digital audio console, and the recent addition of the Libra Live software package has established the mixer as the true foundation of our audio production plan. The audio mixing room also has the standard playback options available, utilizing 360 Systems Digicart along with Fostex DAT. A Lighthouse Digital Systems audio router has enabled true digital audio and analog routing of all signals. The router size is 64 digital audio I/O, 128 analog I/O and 112 Madi I/O. All A/D and D/A conversions take place and the Lighthouse router has been integrated with our Philips Jupiter routing control system.

Barco's Vivaldi technology is used for monitoring at the producer's console, along with the video, lighting and audio mixing environments. The system has been particularly helpful in video and lighting. The shader and lighting director can look simultaneously at as many as eight equally calibrated color images as they try to match camera looks on the fly. This eliminates the days where the biggest argument for a shader or L.D. was that reference monitors didn't match. The producers love the ability to see up to four different color images while they are monitoring the production of their shows.

The studio utilizes Sony BVP 90 cameras that are put into studio configuration. Signals are converted from analog to component digital before they enter the production switcher, as is the case with the Sony Beta SP decks used for playback in the tape area. Sony Digital Betacam decks are used to master all productions on digital tape.

A Strand 5155 digitally controlled board controls lighting. The Strand unit utilizes Ethernet connectivity to control dimming and automation in all three of our studios, simultaneously if necessary. We also have a small outboard control unit that allows us to conduct a pre-light independently inone studio while shooting simultaneously in another.

All of the facility's consoles were manufactured by Forecast Consoles and developed with comfort for the crew and clients in mind. A dedicated "client and entourage area" eliminates the disruption of a large group coming into the control room to see a production.

Flat panel LCDs in the Transmission Operations room provide at-a-glance monitoring of network satellite return signals. ILC monitoring and control system are shown at right.

The monitor bridge was developed to give production and directing teams the ability to see the full scope of any production they do. Built in a wrap-around fashion, the bridge can accommodate monitoring for up to 24 different sources and eight cameras at any one time. The program and preview monitoring areas were also built with enough convertible space to accommodate 16:9 monitoring in the future.

Network operations

The network operations department consists of two rooms: the network control room and the technical operations environment. The control room uses two Philips Saturn master control switchers for redundancy. Four digital video and audio processors, one for each network and one spare, feed both switchers. Three Philips Mars bypass switchers are downstream of the master control switchers. A Philips Triton switcher enables monitor control. When the operator selects one of the three networks on the Saturn, the Triton switches to the associated network routing audio and video to various shared monitors and scopes. This cuts down on the number of monitors and scopes needed within the room.

Miranda Kaleido systems were installed for each network to ensure the integrity of the signal. Our configuration is much like a quad split giving us program video out, satellite downlink, DSS and cable TV inputs. Each network is laid out in an identical manner, which gives the operator the ease in viewing or troubleshooting simply by monitoring the various inputs. Each Kaleido utilizes tally lights that confirm the local avail tones have been sent. Three sets of Dorrough loudness meters with various audio inputs are below each Kaleido.

The monitor wall includes program and preview Barco CVM 3051 monitors. Below the Barcos are two sets of Dourrough loudness meters. The left side of the monitor wall displays Media Pool file server channel outputs for the primary Media Pool. The right side of the monitor wall is identical to the left but displays the backup Media Pool.

The Media Pool File Server System consists of three separate servers, a six-channel ingest Media Pool and two mirrored, 10-channel systems, all controlled from Philips Automation. Each Media Pool is configured for on-air operations with 88 hours of disk storage at 50MB/s. The automation system controls the playout channels in a paired design. This means if one channel is disrupted in a play list the other channel automatically switches to air without missing airtime. The ingest process is done on a Media Pool as well. Here, all program material is first dubbed into our 36-hour Media Pool, edited for correct timing and content and sent to a StorageTek near-line archive library in advance of the air playout needs.

The Philips Automation system was chosen for its multichannel reliability and inherent redundancy. But the caching, playout and purging programs are what make the system work. The Auto-Cache program gets information from the traffic system to automatically dub material from the Odetics cart machine to the Media Pool. Straylight DPL (DVS Purge Library) manages the space on the Media Pools, purging material when it is no longer required on any of the channels. Currently, the media in the Archive are moved in and out manually, but Philips Automation is working to automate that process as well. The Philips Automation System consists of a primary and backup computer system that provides interfaces to the machine control requirements as well as the traffic system. The traffic department can upload the required playlist directly onto the automation system. The system also controls a two-channel Chyron iNFiNiT!, an Oxtel animated logo inserter and three 360 Systems Digicarts for voice-overs.

XOrbit software, UltraCast, is an integrated time-of-air encoding system for all three networks. UltraCast interfaces with Philips automation and video encoders to provide timecode accurate data, such as closed captions, V-Chip, crossover links and other data during the broadcast. UltraCast works by monitoring the playlist and matching data files (such as caption provider files) with playlist items. Because the system stores the data, it automatically recalls program data as needed. As a result, HGTV, Food Network and Do It Yourself Network no longer encode tapes with captioning data, providing significant savings on tape and labor costs.

Media archive operations

Scripps Networks' vision for playback was a venue that could accommodate large amounts of stored digital video data, which could be retrieved automatically. Other requirements included investment protection and scalability to meet the needs of Scripps Networks' rapid growth. By using the StorageTek Powderhorn as more than a digital depository for network playback, the team developed a system that houses the media assets in a digital form, while gaining the advantage ofe easily repurposing that media through other forms of distribution, such as the Internet and video on demand.

The media that would fit best was the 50GB tape offered by StorageTek. The 50GB tape or cartridge is 1/2 inch, metal particle tape packed into a special cartridge shell. At 4:1 compression, typically better than broadcast quality, three to four hours of video can be stored on each cartridge. .

The tape transport that would archive and playback this stored video would be the StorageTek Redwood, model SD-3. Playback off the Read/Write Head is 11.1MB/s. The Redwood in a helical format (D3) stores the video. The Redwood transport is attachable to any server or platform via Differential Fast/Wide SCSI or ESCON. It also has an overhead display feature and can be accessed and diagnosed remotely for maintenance and problem resolution.

Another component is the repository for the Redwood tapes. Powderhorn Automated Tape Library is the best solution for scalability and reliability. The Powderhorn (Media-Vault) is expandable from 2000 to 6000 slots. Each slot is capable of storing one 50GB cartridge. Once Scripps Network reaches maximum capacity, the Media Vault will hold over 300TB of data in one library that contains 6000 50GB data cartridges.

Robotics speed is measured by the number of times a robot hand can locate and remove a cartridge from a slot and place it in a Redwood or remove it from the Redwood and place it back in a robotic slot. The Powderhorn is capable of three speeds, 190, 350 and 450 executions per hour. Up to 16 Redwoods can be attached to each Powderhorn so there is plenty of room for expansion. Other features include a cartridge access port allowing entry and extraction of tapes without halting robotic operations. The Powderhorn can also be accessed and diagnosed remotely for maintenance and problem resolution. A view window was installed to display robotic operations to visitors and employees, and a video system allows remote viewing of the robotic hand operations via external monitors.

The tape automation system (Redwoods and Powderhorn) is located approximately 400 feet away from the Philips Media Pool. Differential Fast/Wide SCSI has a distance limitation of 25 meters or around 65 feet. By utilizing the StorageTek SCSI Extender (SNSE004), this limitation was easily overcome. The SNSE004 takes either single-ended or Differential Fast/Wide SCSI and places it on a Fibre link that connects to another SNSE004 at the destination. At the destination, the SNSE004 converts the Fibre back to SCSI for use at that end. The SNSE004 is capable of bridging distances of up to two kilometers.

Control software termed ACSLS, Automated Cartridge System Library Software, provides the control of the robotics system. It typically runs on a SUN or AIX platform and instructs the Powderhorn to mount, dismount, eject, enter and query various components as well as track tape locations within the automated system. AVALON software provides tape management and is the link or liaison between the video server and the ACSLS. This program communicates via 10 BaseT or 100 BaseT twisted pair Ethernet utilizing TCP/IP protocol. AVALON essentially accepts requests from the video server about particular clips or spots that need to be archived or retrieved for playback. By accessing its relational database, AVALON determines which volume or volumes

The Data Center & Web Hosting Facility provides both traditional web hosting services and serves as a new distribution channels for content and digital assets. Currently over 1400 web sites are supported from the operation.

This archive management environment is the digital content depository for Scripps Networks—HGTV, Food Network and DIY. The robotic archive system in place is a high-density data storage device with capacity to hold up to 300TB of information.

the material resides on. AVALON will then request action from ACSLS on these. Hardware, software and operational status are passed between these components as well. This readily notifies the video server and operator of completed tasks, incomplete tasks and any problems that may have occurred.

The media archive configuration includes one Powderhorn (190) with 2000 slots, five Redwood transports, 10 SNSE004s (SCSI extender) and one SUN Ultra 10 to run ACSLS and AVALON. The 2000 slots provided the required storage capacity for the present needs. The five Redwoods allowed simultaneous archiving and retrieval of video to meet the operational requirements of the site. Significant growth since the installation last summer may require another Redwood transport, increasing the speed and capacity of the Powderhorn to 350 executions per hour and 3000 slots respectively.

Transmission operations

The original HGTV transmission area was housed in four racks within the network operations room. With the addition of two new digital networks and the prospect of more in the future, it quickly became apparent more space would be required for transmission operations. The solution came in the form of the former engineering shop. This 18' x 18' area had served as one of two engineering shops. Since both maintenance areas were combined into large shop this area came available for technical space.

The first challenge was a UPS. Since the new transmission room adjoined the main electrical room it was relatively simple to set an additional UPS panel. This close proximity was a mixed blessing, however, since it resulted in a 1000 milligauss EMI field extending nearly eight feet into the room. The interference was mitigated to tolerable levels. Strategic placement of the racks further abated the problem.

Once the room was ready the integration could begin.The digital uplink system was designed around the General Instrument (now Motorola) DigiCipher II system. The analog RF path consists of four Miteq modulators. The 70MHz IF from both the analog and digital systems is fed to an Ortel fiber optic frame. From there it is carried over single mode fiber to the uplink shelter where it is upconverted and transmitted.

All audio and video enters the transmission room in a digital format from network operations. Once in transmission the signal goes through final processing and distribution before being fed to the appropriate transmission chain. In the case of HGTV, the signal is converted to analog and then sent to the VideoCipher II+ encoder. For Food and DIY it is fed directly to the digital inputs of the DigiCipher II.

Monitoring is simple and straightforward. A Videotek VTM-200 provides first line monitoring of each network. The VTM-200 outputs picture, waveform and audio metering on a single VGA display. Three 15" flat LCD panels provide at-a-glance monitoring for the network return signals. Additional monitoring for each satellite downlink is also available at the equipment racks. Measurement critical monitoring is available at the operator console through a small digital router. The router also provides switching and distribution of contribution feeds to network operations, duplications and production. These feeds may be from satellite or fiber. A dedicated MPEG over ATM circuit connects the Scripps Technology Center to New York. This path is used for a daily live show on the Food Network, as well as national connectivity.

In addition to its obvious value as the satellite TOC, we see the transmission operations room as the area where the much-ballyhooed "convergence" of television and data will occur. The room is designed with a dedicated high-speed connection back to the building's main LAN as well has having the capability for multiple DS-3 connections to the outside world. Our belief is that no matter what form the convergence takes; it will be primarily integrated in this room. Whether it is VBI data, IP multicast over satellite, direct SCPC transmission or whatever the future holds, the data will be treated just like other media sources. It will be received in the transmission room from the data center, married to its appropriate audio/video counterpart and uplinked to the viewer.

Satellite uplink

Simultaneous to the transmission and network operations rebuild was the up-

link reconfiguration. Like transmission, this area needed to be expanded to accommodate the additional services.

The uplink is designed with the same triple backup philosophy as the rest of the facility. There are two primary transmission chains: one for the analog service and one for the digital service. Each primary chain is equipped with two, 700 watt TWTAs configured for 1:1 redundancy. Two 3.5kw klystron amplifiers serving as maintenance spares provide additional protection. This third chain, although normally reserved for backup, is also available for ad hoc uplinks should it be required. The entire operation is tied to an NT-based Industrial Logic Corp. monitoring and control system. With three terminals (uplink, transmission and network operations) the ILC monitors and controls all functions with the exception of fault detection and redundancy switching. Any loss of RF output on a main transmit path triggers a fault bringing the backup on line. This method is fast and nearly foolproof since it is not hindered by software, complicated sensing equipment or serial communication latencies.

The heart of the uplink shelter is the Pinzone Engineering custom waveguide switch matrix. Through this system any transmitter may be used to backup any other. This affords the opportunity to take a transmitter off line and still provide 1:1 automatic redundancy using either of the two maintenance spares. Because of the flexibility of the switch matrix it would even be possible (though not desirable) to use a single system in a non-redundant mode to uplink both the digital and analog service. Additionally, the waveguide matrix supports a second antenna through the use of variable phase combiners.

Data Center & Web Hosting Facility

The Data Center & Web Hosting Facility design provides both traditional web hosting services and serves as a new distribution channel for content and digital assets. The data center is built with best-of-breed hardware and software for the Internet space and is designed for high performance delivery of content and full fault tolerance and redundancy at every architecture layer.

The center is connected to the Internet via an OC-12 Sonnet Ring which yields 655Mb/s of redundant bandwidth. Internet service provisioning is via UUNET. All routing and switching is accomplished via Cisco 7200 class routers and Cisco 6000 class switches.

All of our E. W. Scripps corporate, flag-ship web sites, are hosted on Sun Enterprise class servers (E-250, E-450, E3500, E-4500, A-3500/A-5000 storage). The servers are connected to multiple internal networks; one for public access and delivery of content, one for backup, and one for communication with backend databases. All servers are architected in either a "cluster" configuration using Veritas Cluster Server or in a "load balanced" arrangement using hardware and software loadbalancing technologies. In addition to the production hardware and software, the facility is equipped with similarly architected development and test servers to serve both internal and third party development and testing.

The data center is also designed to support Microsoft NT based web hosting on a smaller scale. We currently host about 1400 third party, smaller sites on the Microsoft NT platform. The architecture for NT hosting is equivalent to that deployed for Solaris but we employ the Microsoft SQL Server database and the Microsoft Internet information web server with Active Server Page support. In addition, we also support Allaire Cold Fusion on NT.

The facility is also equipped with a Cybex Keyboard/Video/Mouse matrix which allows any of 5 flat screen stations to connect to any of the 50+ servers in the environment. In addition, the Cybex system allows us to remotely connect to the server farm from adjacent offices and conference rooms and project monitor signals onto larger flat screen displays within the data center for group viewing.

Finally, the facility was designed with the future in mind. The data center is strategically placed in proximity to the Digital Archiving operation. We soon hope to converge these two facilities to allow delivery of streaming content in non-linear fashion to the multitude of Internet capable outlets.

The Design Team:

Client - Scripps Networks consists of HGTV (Home & Garden Television), Food Network and DIY (Do It Yourself) Network.

Scripps Networks Project Team:
Mark Hale, Executive Vice President, Scripps Networks
Bob Baskerville, Vice President of Production Operations
Bryan Fails, Vice President of Post Production & Project Manager
Mike Donovan, Director of Engineering
Bryan Allen, Director of Web Services
John Ajamie, Director of Broadcast Operations
Peter Franks, Director of Computer Animation & Design
Jerry Nantz, Chief Engineer.

Architect Firm: Michael Brady Inc.
General Contractor: Richardson Turner Construction
System Integrator: A.F. Associates.
Tom Michales, Project Manager
John Holt, Senior Project Engineer
Console Design and Fabrication: Forecast Consoles

Building creative impressions

A tour through the facility today demonstrates what we describe as a content creation factory where the media assets are distributed across all media platforms. Our goal is to create an empowering environment where creative and technical talent work towards a common goal of inspiring our viewers. ■

John Ajamie is director of broadcast operations at Scripps Networks.

NEP Supershooters

NEP faced the challenge of building a robust, agile and future-ready mobile production unit, while still keeping it under the 80,000 pound gross weight limit imposed by law. Photos by Mark Brown, Phototech Imaging.

Unwilling to make any compromises on its customers' behalf, NEP Supershooters is giving its clients even more room to create by implementing a next-generation digital strategy on board some of the NEP trucks. The newest digital component truck, Supershooter 20, is about to come out of its build phase, and NEP plans to show off its new baby at NAB. The SS20 is a high-capacity truck designed and built for high-end sports and entertainment, such as ESPN's "Sunday Night Football" and the Stanley Cup playoffs. The unit's trailer is 53 feet long, and without the expandos deployed is 8'6" wide. Fully expanded, including the tractor and stairs, the unit measures 74 feet long and 18 feet wide. In keeping with gross weight standards, total weight does not exceed 80,000lbs.

> Saying, "SS20 looks just like SS18" is one of the highest compliments one can give NEP.

Those who are familiar with NEP trucks, especially Supershooter 18, will see that SS20 is more evolutionary in design and function than revolutionary. In fact, the design of SS20 is based on the proven design of SS18, which came out in June 1998 and is used for "NFL on Fox." There are several subtle differences and one major difference — the SS20 will be equipped with an 80-input, four-M/E Grass Valley Group Kalypso Video Production Center (SS18 will also be retrofitted with an 80-input, four-M/E Kalypso, freeing up its GVG 4000-3T 64-input, 3M/E for the new SS7).

Designing the SS20

The SS20 was designed not only to

Keeping in mind a truck's inherently limited rack space, products with a small footprint, like this modular series of Grass Valley 8900 syncs and converters, are a good fit in a mobile environment.

be flexible, but to provide that flexibility without going over the 80,000-pound gross vehicle weight (GVW) permitted by law. That approach to equipping the SS20 translates into account efficiency gains while using the most accommodating gear available.

NEP designs its trucks in-house, putting to good use its many years of broadcast experience. Trucks are uniform throughout the fleet, easing the engineering and maintenance burden and enabling a crew that has worked in another NEP truck to be familiar with any other. Saying,"SS20 looks just like SS18" is one of the highest compliments one can give NEP.

The technology in SS20 is based on client demand and is what helps NEP to provide flexibility to multiple clients. NEP does not make those clients using the SS20 yield to the truck design, but allows flexibility in routing, monitor wall assignments and personnel location, as well as the ability for clients to bring in additional equipment if needed.

There is probably not a single more stressful place for equipment than in a production truck. As such, the equipment in the SS20 has to be able to withstand the rigors of the road. This not only includes vibration during transport, but the wide swings in temperature and humidity that a mobile production truck might face. The environmental hardships are similar to what might be expected on the Space Shuttle. These include repeated temperature changes from well below zero degrees to more than 100 degrees in short periods of time, typically tied with temperature and humidity changes.

Making it work

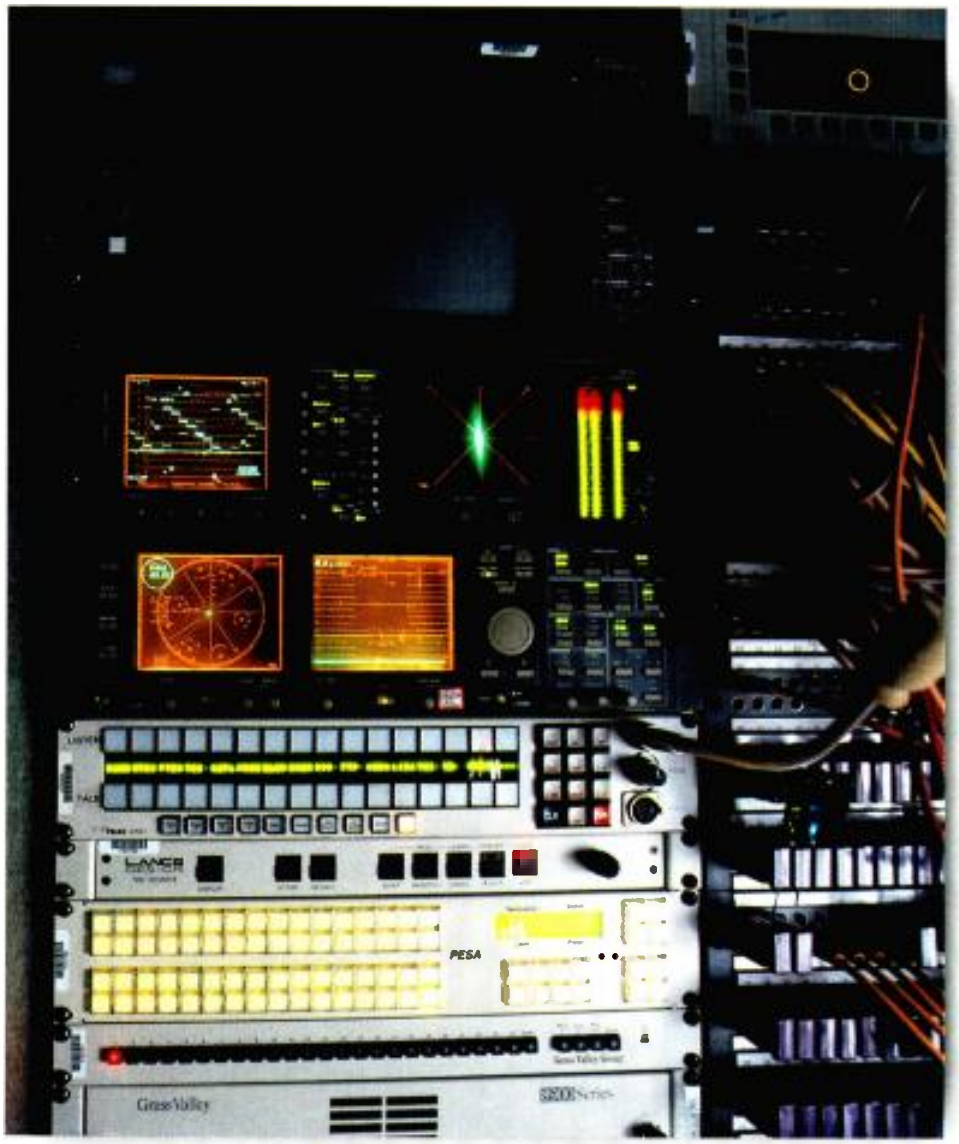
When designing the SS20, the engineering staff was consulted regarding what it needed to better help them and their clients produce shows in a mobile environment. Input was also solicited from technical directors. The production space around the TD is key: all controls and monitors have to be within good sightline and easy reach of the operators so that they don't have to strain to do something when a director calls for it. The "feel" has to be natural.

The engineering staff was challenged to avoid second guessing how different clients and TDs would be using the SS20. Because NEP's clients provided input as to how the truck would be used, the challenge was to find a compromise for all the possible uses and workflow scenarios and to make adjustments and tweaks to satisfy all parties involved.

What makes NEP trucks different is the thought put into the ergonomics of each individual piece of equipment, i.e. a giant-sized control panel for doing a simple task just won't work in an environment where space is at a premium. NEP trucks are designed to allow for the most efficient possible workflow. To that end, and keeping in mind its commitment to maintaining its reputation as innovator in leading mobile truck technology, NEP Supershooters was the first truck company to install a Grass Valley 3000 switcher on board a truck (SS12). NEP

NEP trucks are designed to allow for the most efficient possible workflow.

Tektronix 760 stereo phase meters and scope assure the quality of in-unit signal.



NEP SuperShooters

took delivery of a two M/E version of a GVG 3000, but had wanted a three M/E version — and literally sawed the 3000 switcher to better fit the truck. The panels were then mounted on the wall, which is why there are truck versions of the switchers in use today.

Another difference is the wiring for video, audio, control and signal flow. SS20 is wired with the lightest possible gauge and weight to stay under the 80,000lbs GVW limit (even the weight of connectors are considered during design). There's no fiber in the SS20, just a lot of copper for the short hauls needed in a 53-foot long trailer where the longest cable run is only 80 feet. Because the SS20 is overwired, a client who wants to add five tape machines will find sufficient wiring, that it is labeled and that enough jack space is available for added equipment. The goal again is flexibility, with the infrastructure design supporting additional or relocated equipment.

There's no fiber in the SS20, just a lot of copper for the short hauls needed in a 53-foot long trailer.

Grass Valley Profile-based Live Event Management System (LVS on PDR200) grants the production units a high level of control over content presentation.

NEP's clients have favored Grass Valley Group switchers more than any other as the industry standard for mobile production. The GVG Kalypso Video Production Center is a new concept in switchers, with up to 80 inputs and 48 outputs (with 46 outputs assignable to M/E output or auxiliary bus), four M/Es with four keyers and two utility buses per M/E. The unit's split M/E technology lets the technical director divide the four keyers in each M/E between two separate background transitions (giving the TD the power of eight M/Es in a four M/E switcher). The clean-feed system gives producers the ability to create two simultaneous, customized productions using any combination of backgrounds and keys from any combination of M/Es, built-in 2D DVE and run-time device control for external devices such as servers, routers and VTRs, all in a familiar GVG interface panel.

Once installed in the SS20, the Kalypso's ability to network the control panel and frames enables operation of the switcher and the electronics from a different location than for which it is typically configured. Also, Kalypso allows a TD to control both an SD production's electronics frame and an HD production's electronics frame from a sin-

gle control panel. Although no one thought that any production would ever need more than the 64 inputs available on the GVG 4000-3T when it was introduced in 1994, NEP realized that productions are continuously getting more complex with more feeds and thus the need for more switcher inputs. This is where the Kalypso's 80 inputs will come into play.

The engineering team is responsible for taking care of and reporting maintenance issues related to the SS20.

Couple the wiring, a bigger PESA Tiger serial digital router and the Kalypso, and the result is one powerful and flexible truck.

On-site engineering

NEP's on-site engineers comprise an important component of the overall design effort. The SS20 will be assigned an engineer-in-charge (EIC), a maintenance engineer and a driver/technician for transportation and additional support as required. The engineering team is responsible for taking care of and reporting maintenance issues related to the SS20. These engineers are savvy about the equipment they must maintain and can solve issues quickly — they know how each piece of the truck works and how the entire truck works together.

TCP/IP on board

NEP Supershooters is beginning to upgrade its current LAN installations to support next-generation digital gear requiring TCP/IP control and connections — gear such as the Kalypso, which can control other gear via standard physical connections and protocols. As well, these high-powered LANS will support the exchange of graphical data. The new media digital gear just now coming of age (such as Kalypso) will enable NEP to have a single point of connection and control for multiple pieces of equipment (via a combination of legacy serial protocols and new 10/100 Base T devices), offering NEP customers access to media in an intelligent manner, and making life much easier during the last-minute changes common in the challenging mobile environment. ■

Jeff Joslin is chief engineer and Howie Naugle is senior design engineer for NEP. For more information see www.nepinc.com.

Equipment List

Cameras/Lenses
8 Sony BVP 375s
6 Canon 70:1 lenses
2 Canon 55:1 lenses
4 Canon 20:1 IF lenses
4 Sony BVP-90s CCD Cameras w/4 point Star Filters
8 Matthews Tripods & Vinten Vector 700 Pan Heads
4 Vinten Vision 20 Panheads & Tripods for Handhelds

Production

GVG Kalypso Video Production Center 4 M/E Switcher, 80 Inputs, 2D DVE with 6 channels of effects plus external DVE support
PESA Tiger Serial Digital Router, 144x224 video, 144x144 analog audio
Abekas DVEous Dual Twin DVE
8 Ward Beck six-channel intercoms

Audio

Calrec Q2n 128-input audio console
Pesa Cougar 32x64 audio matrix
Dolby Surround Sound Encoder & Decoders
Sony V77 digital processor
2 Digicart II digital cart machines
Denon CD player
Ward Beck Audio DAs
dbx noise/signal processing
Tektronix 760 Stereo Phase Meter & Scope
ATI 8x2 Mixers/mic preamps
Shure SM267 mixers
Sennheiser, Electrovoice, Shure and Sony microphones

Videotape

8 Sony DVW-A500 Digital VTRs
2 Sony BVW-D75 Digital I/O Beta VTRs
6 Lance Slo Motion Controllers
1 Grass Valley Group PDR-200 Profile with LVS Software

Graphics

Chyron iNFINiT!
Pixel Power "Collage" still store

Communications & support equipment

Telex Adam Matrix Intercom System w/ 12 Powered RTS Channels
Gray Engineering Generator/Reader
Leitch Digibus frame syncs and encoders
GVG 8960 SDI to NTSC converters
GVG 8960 DEC NTSC to SDI frame sync/converters
GVG 8981 FF SDI frame syncs
Videotek DM141s Demodulator

Design team list

Tom Shelburne,president
Howard Naugle, senior design engineer

Transmission & Distribution

The basics of maintenance

BY DON MARKLEY

Yes, it's time to talk about simple maintenance again. While this is a subject that has been often treated in prior chapters of this column, even the most cursory visit to many stations reveals that this is still a neglected category. This must stop.

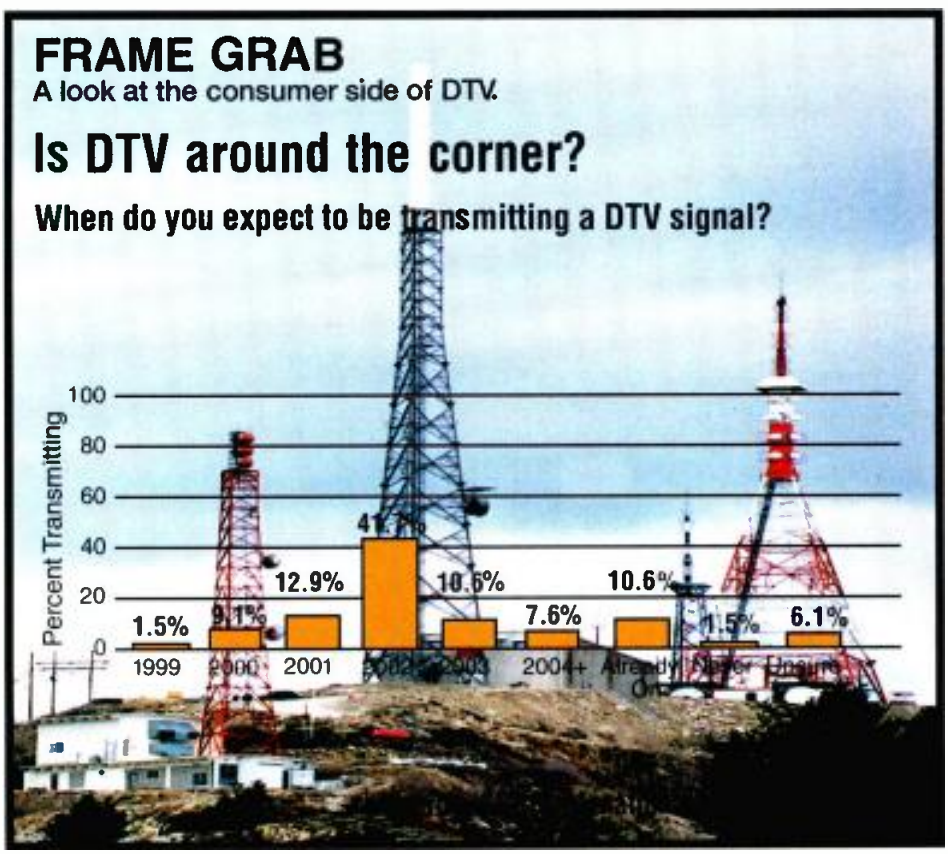
There is now a good reason to improve the station's maintenance policies. The Commission has established a new department responsible for enforcing the Rules and Regulations. The new enforcement group reports directly to the Commission, as opposed to individual bureaus. It appears that they are serious about their job. For example, at least one station has been fined $4000 for having an inoperative EAS system without either logging that fact or advising the Commission. Remember, if the EAS equipment is found to be defective during the course of a test, a notation must be made in the station's log. If the outage lasts more than 30 days, the Commission must be notified.

Maintenance simplified

Let's look at this maintenance business in a simple fashion. If equipment is well maintained, it simply works better. If it is kept free from dirt, it will be cooled as designed and will be more stable and have a longer life. The same applies to keeping the operating voltages adjusted to their proper values. Such proper adjustment results in the equipment operating as designed — which normally will mean a longer life, improved stability and simply better performance. If the equipment operates better and lasts longer, two associated responses will follow. First, the suits in the front office will be happy because the station looks better at a less-expensive price. Second, the Commission will be less likely to come down on your head, as properly operating equipment is less likely to cast off illegal signals. Come on folks, we have talked about this before. Keep it clean and properly tuned.

Markley's Law: Clean equipment works better.

It isn't necessary to make some far-reaching mathematical calculation to find out something worthwhile. For example, Newton is claimed to have reached his first great conclusion upon being bonked by a falling apple. Most of us would have reached only the conclusion that one should not sit under an apple tree when fruit is falling. But no, Newton carried this fact into the laws of physics. Now your author has determined that another simple fact of physical behavior has been long overlooked. Let this hereinafter be known as Markley's Law (well, maybe a law is a little too much – perhaps a theorem or an axiom). "Clean equipment works better." There, that's it and I offer this simple proof. Did you ever notice that your car runs better when it is clean? This is noticable even if only a simple no-brush car wash has done the job. If you have actually taken cloth in hand and done the job yourself, the car acts as if at least 20,000 miles have left. Rattles disappear, the shocks im-



prove and the handling makes a fantastic recovery.

Markley's Law also applies to electronics equipment. If the time is taken to clean up a piece of equipment, accompanied by checking all the operating voltages, touching up the tuning, replacing the burned out pilot lights, wiping off that which is oily and oiling that which is dry — it will work better. Of course, it isn't really just the dirt that is involved, it is making the attempt to bring the equipment into proper operating condition that finds the little problems and cures them. Eliminating the dirt doesn't hurt.

Go through the books and the system with the installer.

On the serious side

Now for something more serious: A good maintenance technician does not let the first failure of a piece of equipment be the first time that he looks at the book. If the manufacturer installs a system, be on hand and ask questions. Go through the books and the system with the installer to gain as much knowledge as possible right there in the field. If you get brushed off or your questions are not answered, call the installer's boss. While his primary job isn't to be your tutor, he should make every effort to answer reasonable questions and make you comfortable with the equipment.

The same applies to outside engineers brought in to check out some part of the station. Whether they may be called consultants or factory reps, the station is paying dearly to have them on site. You have the right to ask questions and to expect the time to be spent to answer those questions fully. If you don't get those answers, get a new consultant or tell the factory that their rep is lousy. It is best for everyone if the equipment ceases to be a mystery. Definitely, this is best for the station engineer. If the engineer understands the proper operation of a system, it will be possible to maintain the level of performance that will match the money the station has spent for the stuff. This doesn't mean that you can skip the manufacturer's school on major systems. It is assumed that all concerned have attended the school before the equipment is installed. The final polish on that classroom work is the adjustment and operation of your system on your site. Ask questions, read the book and keep up with the maintenance.

A similar situation exists for smaller pieces of equipment that are installed by the station's staff. Read the book. First, this will probably mean that the equipment is installed correctly. Second, reaching a full understanding of the operation of a piece of equipment will greatly increase the probability that it will be adjusted and operated properly, thereby giving the station the performance that it paid for. Finally, that same knowledge will greatly cut down on the time spent in performing repairs upon a failure. Even if the only repair work done is to take the shotgun approach and replace cards, a little reading can at least tell you which card to replace first.

To summarize: read the manuals. Upon gaining the knowledge of how a system operates, keep it clean and in good working order. Good maintenance will give the station much more bang for the buck by reducing the number of equipment failures and by improving performance. That warm and fuzzy feeling should be from walking into the equipment room and seeing everything working nicely – not from inhaling an excess of burnt Teflon vapor. ■

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

Send questions and comments to: don_markley@intertec.com

Repurposing audio and video for the Web

BY PAUL BLACK

The distinguishing suffix ".com" at the end of a phrase is recognized almost universally as being the unique identifier of a web address. At first, public acceptance was slow, but in the last several years, it has become brisk to say the least. The significance of this has not been completely lost on the broadcast industry. However, broadcasters have lagged behind in some areas related to the Web.

Many stations (and cable networks) have long since built their own websites. Some sell advertising that is placed on the website. However, the largest use of the Internet by the broadcast industry has been for promotional purposes. The site is used as an electronic billboard, accessible by the public, to get them to turn on the radio or TV. Other than that, little is done with it.

Recent advances in computer technology may change this condition permanently. The use of "streaming video and audio" is now becoming very common on the Web. "Streaming" is the term used to describe the way in which websites can provide true motion video and audio to a person connected to the Web. Interestingly enough, this concept has made large inroads in video seminars, video conferencing and the websites of some of the music-oriented cable networks, but it has not been heavily exploited by most cable or over-the-air broadcasters.

Ironically, broadcasting has an obvious advantage over the previously mentioned industries: video and audio are its end products. Others merely use these to deliver training to professionals or seminars to interested audiences. Yet, the other industries (particularly the medical and financial sectors of the economy) have lead the way in streaming, both on-demand and live.

Today, the very hardware that is the starting point for streaming on the Web, broadcast video server, exists in many broadcast facilities. The use of

Webcasting allows broadcasters repurpose video and audio for additional viewers via their PCs. Engineers should consider compressing video to decrease download times and employing a web services provider who has ample storage roomfor video files, such as the data center at Evoke, Louisville, CO.

RAID drive technology, which made broadcast servers possible, is the same technology used by the streaming video sites. The advantages of video servers — multiple user access capability, instantaneous cueing and playback and high reliability — translate well to use for websites. The use of these systems by the broadcaster is the opens the door to "webcasting."

There are some essential differences in webcasting vs. cable or over-the-air delivery. The first is *public access*. Although all broadcasters do dayparting, broadcasting really means "send it out everywhere and someone will see it." Webcasting is much more selective in its delivery method, because it is frequently an "on-demand" method. Although the home VCR has made time shifting of programming at the whim of the viewer possible, it still does not allow an on-demand choice the way webcasting does. A discriminating computer user can select and play a program over the Web at any time.

Secondly, *delivered quality to the end-user* is a much larger variable. With the exception of some possible fringe viewers, those in severe multipath situations, or other unusual scenarios, what you transmit is what they see. Everyone gets the same image and sound quality. In webcasting, the final quality usually depends primarily on the type of connection that the user has to the Web, and is much more dependent on the hardware in use. A 166MHz Pentium isn't going to create as enjoyable an image as a 500MHz MMX-equipped machine with 128MB of RAM.

Webcasting has some unique challenges—and opportunities—from an editorial and business standpoint. But what challenges are there to the production staff and engineers? Surprisingly, the answer is: "not much."

Like any other delivery medium, the Web will show good production values well and bad ones poorly. From a production standpoint, the focus should be on brevity. Increased running time translates to increased costs. If a thirty-minute "production" can be done in less time without many artistic or editorial com-

promises, the producer should consider doing it in less time.

To begin webcasting, these technical needs must be addressed:

• **A video server as a webcast source, and/or an encoder with the correct compression algorithm capability.** As the final work is output, it needs to be put into a form and stored in a method that can be used to "feed" the Web. If the destination is a video server that uses a standard video-compression technology, then nothing further is necessary. However, if tape, or some other recording method that is incompatible with webcasting is used, then there has to be "one more box." This can be a "mini-server" in the form of a computer-controlled series of RAID drives with just enough space to hold the final product. The correct encoding software, such as the encoder package from Microsoft's Media Player, will also be necessary for the encoding to take place. Keep in mind the majority of your Internet audience will be connected to the Web at connections of 56kb/s, or less. Webcasters run the risk of losing potential viewers because of long download times accompanying large, relatively high-resolution video files. Compressing video files further shortens the amount of time needed to download files.

• **A webcast provider.** This is an important step. A distinction has to be made here between *web servers* and *media servers*. A *web server* typically functions as a static-item output system. Still images, text, graphics, etc. are its domain. A *media server* has sufficient complexity to provide motion video and associated audio. The hardware is much different and extremely expensive. The decision has to be made as to whether to attempt to create and operate a *media server* in-house (along side the *web server*), or to use an outside provider.

At the current state-of-the-art, the complexity and cost involved in maintaining a media server system is very high. This leads most prospective webcasters to use a service that can accept the final produced product and put it "on the Web." Other benefits of this approach include the ability to provide true "on-demand" capability, and even a report from the provider not unlike a television rating would be. Data can include times accessed, age groups, how long the product was watched, etc. This information can help a lot in determining the success of the webcast production.

• **A "pipeline" to the provider.** Employing a hosting service also requires a high-bandwidth link. Other options, including dark fiber, are available but they can be costly. In some cases, on-site storage of the production at the provider's site may help alleviate the costs for such a service.

Webcasting is definitely here to stay. An entire generation is now emerging with the idea of going to the Web for some of the entertainment that, in the past, had been limited to broadcasting and cablecasting. Webcasting is becoming a juggernaut, and like most juggernauts, it requires those in its path to either get on board with it, or be rolled under its wheels. Broadcasters would be well advised to get aboard now. ■

Paul Black is the engineering supervisor for KPIX-TV, San Francisco.

Applied Technology

Modifying klystron transmitters for DTV

BY SAM ZBOROWSKI

Most klystron transmitters were initially designed to support aural operation at 10 to 20 percent of rated peak visual power. More recently, to conserve energy, many stations have biased their aural amplifiers lower and generate aural power in the range of 2.5 to five percent of peak visual power. Regardless of what aural ratio is transmitted, CATV headend processors are adjusted to notch the aural down to about -16dB (2.5 percent) to achieve acceptable system intermodulation distortion levels.

It is possible to modify existing klystron transmitters to operate the visual klystrons in combined aural/visual analog service, and operate the aural amplifier in DTV service. With appropriate predistortion and additional output filters, one can operate visual level at about -1dB from the existing visual power level with a -16dB aural ratio. The 1dB analog power reduction is essentially imperceptible to existing viewers. DTV service can be supported by biasing the aural klystron to the original (20 percent aural) beam power, tuning to support 6MHz bandwidth, adding a DTV exciter with appropriate predistortion and adding an output bandpass filter. This modification can be achieved at a fraction of the cost of a new full-power DTV transmitter.

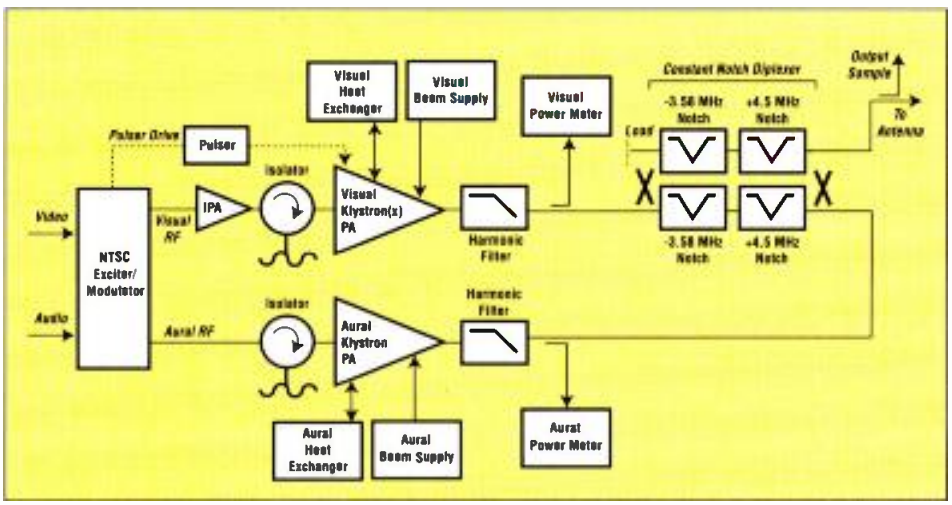


Figure 1. Block diagram of a typical Klystron-based NTSC transmitter. Note that visual and aural input are kept separate through the Klystrons.

DTV power required

Calculations by members of the Advisory Committee for Advanced Television Service (ACATS) and measurements in lab tests by the Advanced Television Test Center (ATTC) indicated that for similar coverage of DTV relative to NTSC, the DTV average power should be approximately 12dB lower than the NTSC peak visual power. Subsequent field testing in Charlotte indicated that the -12dB ratio was conservative, suggesting that even lower DTV powers could provide equivalent coverage [1].

More recently, the FCC has been wrestling with channel allocations to facilitate a smooth transition to DTV. The Commission's goal is to replicate the Grade B analog NTSC contour for DTV coverage while providing adequate interference protection for each station in a given area. Combinations of existing analog service EIRP and channel and new assigned DTV channel frequency define an enormous range in DTV transmitter power output (TPO) requirements from low VHF to the highest UHF channel to replicate the analog coverage. Across the UHF TV band the variation in EIRP is only about 4dB for equivalent coverage [2]. Since this paper deals with the case of a UHF broadcaster adding a UHF DTV channel, the -12dB power ratio goal will be assumed for discussion.

Existing hardware

Many full-service UHF broadcast stations presently employ transmitters using klystron tubes as output devices. (See Figure 1) Typically, the klystrons used in these transmitters are rated to produce from about 30 to 70kW peak power each in visual service. A number of recent transmitters have employed Multi-Stage Depressed Collector (MSDC) klystrons to achieve better energy efficiency than conventional klystrons [3]. Most of the operational klystron transmitters now in service in the U.S. are believed to employ some version of the ITS-20 or ITS-20A exciter/modulator. Some exciter/modulators were provided as OEM equipment incorporated within transmitters manufactured by Advanced Broadcast Systems and Astre Systems. The conversion described in this paper applies to transmitters that employ either conventional klystrons or MSDC klystrons.

The exciter/modulator includes jumpers to add the aural IF signal to the visual IF path upstream of the IF predistortion circuits. This aural/visual multiplex feature provides a convenient way to temporarily transmit the combined A/V signal through any one klystron in the event of a klystron, beam supply, heat exchanger or RF diplexer failure. The backup mode requires appropriate RF patch connections to be available in the transmitter RF output transmission lines.

The exciter/modulator RF outputs are rated at several watts peak power, which is typically sufficient to drive the aural klystron directly. On the visual side an intermediate power amplifier (IPA) is usually fitted to provide tens of watts peak power to the power amplifier (PA).

The visual and aural PA outputs are applied to a constant-impedance diplexer assembly which combines the two signals with low loss into one transmission line to drive the antenna [4].

Making the conversion

Analog NTSC side. The exciter/modulator is jumpered to the internally diplexed mode and the pulser, if used, is disabled or removed. A new power metering circuit is added to display the relative power of aural and visual signals at the PA output. The common amplification mode generates more consequential intermodulation products in the klystron amplifier than the visual-only service. In-channel intermod products are largely cancelled by products generated in the IF linearity and incidental phase correctors of the exciter/modulator. An improved incidental phase corrector, optimized for the common amplification service is available to achieve more complete in-channel intermod correction.

The relatively narrow-band klystron cavities significantly attenuate complementary out-of-channel products prior to the final drift space and cavity where most of the PA non-linearity occurs. The major out-of-channel products that exceed the spectral mask lie at -4.5MHz, -3.58MHz and +9.0MHz relative to visual carrier. A series of notch filters must be added to meet the spectral mask. A possible alternative is to retune the existing notch diplexer and add only the additional -3.58MHz notch as shown in Figure 2.

DTV side. A new DTV exciter/modulator is introduced to drive the former aural klystron in DTV service. The exciter/modulator includes an ATSC compliant 8VSB DTV IF modulator. The DTV IF signal is applied to IF predistortion, ALC, upconverter, AGC and RF drive amplifier stages similar to the corresponding sections of the internally diplexed NTSC exciter/ modulator. The former aural klystron must be retuned to support the full 6MHz channel bandwidth of the new DTV channel. (If the new UHF DTV channel assignment lines outside the tuning range of the present klystron, an exchange needs to be negotiated with the klystron vendor.)

The broadband tuning reduces the RF gain, so an additional IPA stage may be required to amplify the drive to the DTV klystron. The existing peak detectors of the transmitter are likely to have slow rise time relative to the DTV symbol rate and fast decay time relative to frequently occurring peak values of the DTV signal. A new power metering circuit must be fitted to display the average power of the DTV signal.

The DTV signal passing through the nonlinearity of the klystron generates intermodulation products similar to those described in the common amplification case. The spectral shape of the DTV signal is very different from the NTSC in that a data randomizing function disperses the spectral energy about equally across the channel. As a result, the DTV spectrum looks like bandlimited noise on a spectrum analyzer. The flat noise-like signal generates broadband intermod products that fall off gradually from channel edge into the adjacent channels; these intermod products are also called spectral regrowth. In-channel intermod products are generated as well, which are not noticeable on a spectrum analyzer display. As in the NTSC common amplification case, the in-channel intermod products can be nearly cancelled by products generated in the IF pre-distortion circuits. Again, out-of-channel products cannot be complemented well by the IF correctors due to klystron bandwidth limitations. The broadband nature of the intermod products dictates the use of a bandpass filter which must be added to meet the spectral mask requirements.

Tests were completed using a Varian (CPI) VKP 7553S klystron in an RCA TTU-110B UHF transmitter. The operation at 5500W average power with 2.6A beam current in this example is -13dB from the present 110kW peak visual power rating and is within original transmitter ratings of the beam supply and cooling system. The out of band spectral regrowth can be attenuated sufficiently to meet the DTV spectral mask with available bandpass filters.

The digital SNR achieved is similar to new high-power DTV transmitter offerings. The increased power consumption cost needs to be weighed against the initial cost of a new transmitter. Depending upon the present NTSC transmitter operation, the overall increase in power consumption for the combined NTSC/ DTV system may range from 10 to 50 percent. This conversion is one method to approach or meet the desired DTV coverage while minimizing initial hardware costs. ■

For more information on ADC transmitters, circle (725) on the Free Info Card.

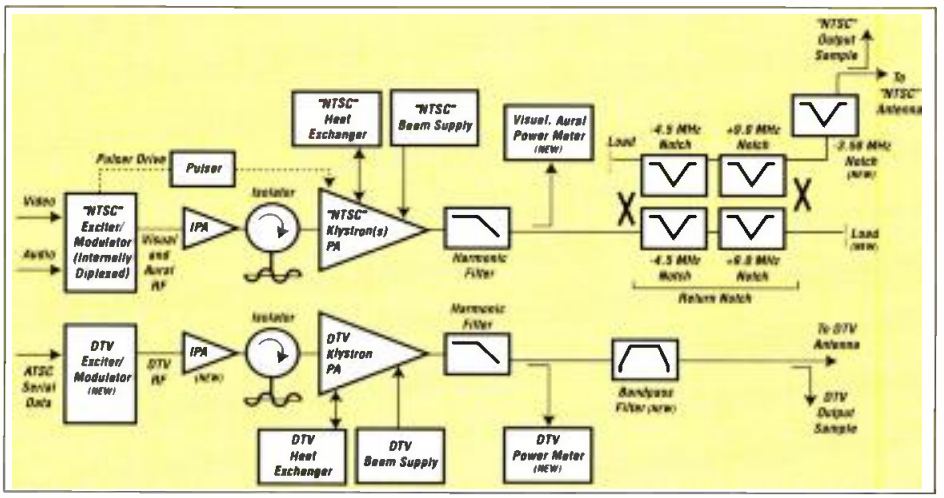


Figure 2. After conversion, audio and video are multiplexed in the old visual PA and the old aural PA is used for DTV.

REFERENCES

[1] Summary of Grand Alliance VSB Transmission System Field Test, by Gary Sgrignoli and Richard Citta, NAB 1996 Broadcast Engineering Conference Proceedings.

[2] Longley-Rice Methodology for Evaluating TV Coverage and Interference, FCC OET Bulletin No. 69, July 2,1997.

[3] UHF-TV Klystron Multistage Depressed Collector Program-Second Report, by Earl McCune, NAB 1986 Broadcast Engineering proceedings.

[4] Aural/Visual Multiplex Operation of Klystron Type UHF Television Transmitters, by R.W. Zborowski, Thesis-Master of Engineering in Engineering Science, Pennsylvania State University, March 1981

Applied Technology

Pixelmetrix DVStation: Monitoring the digital broadcast chain

BY DANNY WILSON AND HIDEKI TAKAHASHI

The introduction of MPEG-2 compression technology has dramatically changed the world of television broadcasting. Traditional analog video distribution networks have evolved into packet-based time-division multiplexed systems carrying more than just TV programs. Consumers are expecting not only new services, but also higher-quality and, of course, reliability.

The complexity of fault isolation has become a daunting task. New broadcast systems are starting to look like datacom and telecom networks and we need to start employing some of the proven network monitoring and management techniques established in this packet world. Ultimately, *multiport, multilayer* correlated testing is the key to *active* maintenance of digital video networks.

Compressed digital video

An uncompressed digital video stream has a data rate of approximately 270Mb/s. A single bit error would hardly be noticeable in the picture. MPEG-2 compresses a 270Mb/s down to around 6Mb/s. Because of this high compression ratio, a single bit error in an MPEG stream can corrupt an entire picture or series of pictures. A bit error in an MPEG stream could be noticeable. Error protection methods (Reed-Solomon) employed are robust, which can mask poor signal quality. The higher layer protocols and content will look fine until the signal degrades past the capabilities of the error protection – a cliff effect.

Digital TV systems transport MPEG-compressed programs from contribution sites to uplink facilities to downlink to customers. The programs are multiplexed, modulated, transmitted, demodulated and remultiplexed going through numerous pieces of equipment from different vendors.

These error-sensitive programs are encapsulated in multilayers of protocol and channel coding and traverse a multitude of different and potentially error-prone physical media.

Pixelmetrix's DV Station reports multiport correlated status of physical, transport, coding, and quality layers.

This complexity requires powerful, flexible and multidimensional test systems to maintain and manage the network and keep your system far from the edge of the digital cliff.

Multiple physical media

From source to viewer, programs traverse different formats. Encoders, multiplexers and modulators commonly interconnect using standard DVB Asynchronous Serial or Synchronous Parallel Interfaces (ASI/SPI). Cable, satellite and terrestrial RF transmission networks use different modulation methods: Cable – QAM; satellite – QPSK; and terrestrial systems – 8VSB or COFDM. ATM networks may link contribution sites and distribution centers.

Encoders can create poorly compressed content. Multiplexers can create protocol violations and timing errors. Modulators can output distorted RF signals. ATM networks are sources of timing-related faults due to unpredictable buffering and jitter in the ATM network. Reflections, noisy amplifiers, dirty connectors, atmospheric variations and solar flares can wreak havoc on RF signal quality.

Service providers need to monitor these test points and measure at different layers to ensure link health.

Digital network monitoring system

Maintaining a reliable broadcast system in a digital world means that you must be able to preemptively detect problems anywhere in the system and isolate and fix it quickly. Advanced network monitoring techniques enabled by powerful test systems must be employed.

Today, obtaining adequate *Broadcast Intelligence* requires data collection, analysis and correlation on three axis – geography, layer and depth.

DVStation is a multiport, multilayer monitoring solution for digital video networking. A Linux-based integrated LCD/touch panel controls any combination of up to 21 plug-in

modules. There are three types of modules for monitoring physical, transport, coding and quality:

- Physical line interfaces (ASI, SPI, RF and ATM);
- Transport stream processor; and
- Video quality monitors.

DVStation line interface modules extract transport streams from the incoming signal and data to a Transport Stream Processor (TSP) module. The RF interfaces measure carrier level, carrier-to-noise ratio, bit error rate and error vector magnitude. A constellation diagram on screen indicates any obvious problems. The OC-3 155Mb/s ATM line interface detects physical errors, displays ATM parameter information and extracts transport streams from multiple virtual channels to pass to a TSP module for higher layer testing.

The Transport Stream Processor (TSP) detects protocol errors and measures statistics within the MPEG-2 transport stream. It monitors a stream in accordance to the standardized DVB ETR-290 tests, measures PID bandwidth, PID utilization, PCR Jitter/Interval, T-STD buffer statistics, and SI table compliance, and provides real-time PSI and SI table decodes.

Two modules are available for monitoring video picture quality: a Freeze Frame Detector, which identifies momentary picture outages, and the Quality Monitor Module *(QMM)*, which measures objective picture quality.

The QMM is a single-point measurement, which doesn't require access to the original source. In addition to measuring picture quality, the module also identifies blockiness and loss of color. All impairment events can be recorded into a time-stamped log file.

A single DVStation can simultaneously connect up to 21 points along the transmission chain. Errors propagating through the network can be traced and pinpointed to the faulty link or component before serious problems develop.

Different types of modules can be combined to meet individual test requirements. If only transport layer monitoring is needed, up to 21 transport streams can be monitored simultaneously. If RF and transport monitoring is required, then just add the necessary line interfaces.

DVStation can find problems before they become visible by detecting problems at each layer of the protocol stack. This approach simplifies and reliably finds the root cause of problems.

A physical layer fault, like low C/N ratio, can create more bit errors than the RS algorithm can correct. This fault propagates to errors in transport and elementary layer leading to common errors like a missing slice in a picture. Without multilayer correlation, there would be no way to know the picture glitch was caused by RF problems.

Status at a glance

DVStation reports the status of all ports and layers on a touch-screen LCD. The port status bar at the bottom of the screen shows the health of each port at a single glance. When a problem occurs, simply touch the port showing red bars and DVStation displays all the relevant port status information. The user can pop up the log file to check for any historical problems. ■

Danny Wilson is president and Hideki Takahashi is vice president of marketing at Pixelmetrix Corporation.

Field Report

USA Network's squeezeback strategy

BY MARIO PATUTO

The broadcast industry has benefited tremendously from advances in computer technology. Six years ago, cost-effective computers began to be used for a wide range of editing and on-air broadcast applications. Constant improvements in computer performance, price and application software availability have enabled sophisticated computer driven products to take their place alongside traditional broadcast devices.

As part of this transition, on-air video servers now provide a low-cost alternative to traditional videotape technologies. Initially, Motion JPEG-based servers were pressed into service to support caching spot insertion and time delay applications. Propelled by fast-paced improvements in disk storage price/performance and MPEG-2 compression technology, on-air broadcast video servers have moved from early adopter applications to more general on-air playback uses. At network origination facilities, as well as local broadcast stations across the U.S., servers are supplanting VTRs as the device of choice for storing and playing out high-quality video content.

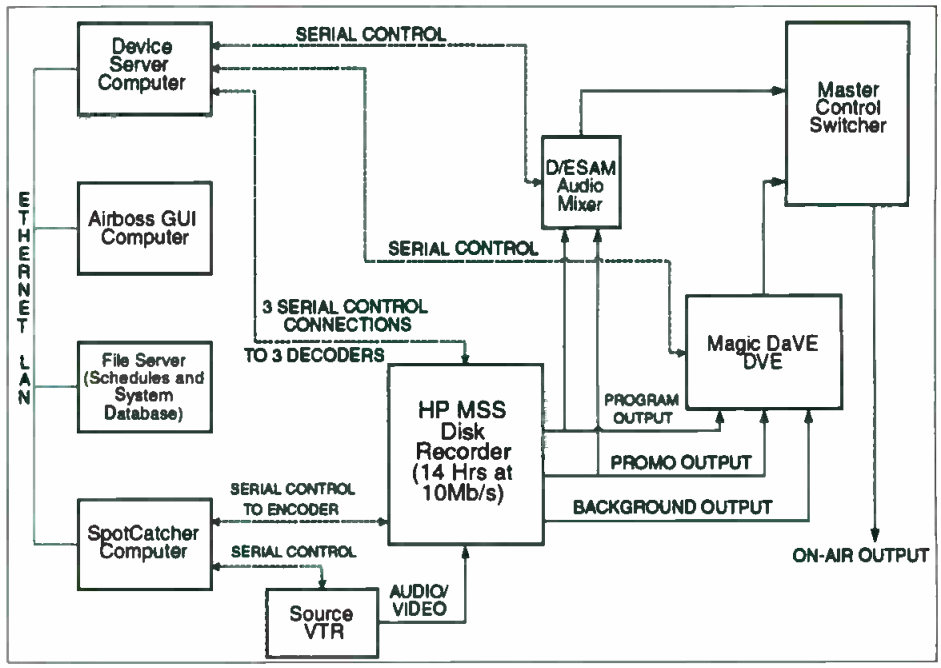


Figure 1. Three of the server outputs are feeding the Magic DaVE and D/ESAM with the output of the DaVE and D/ESAM feeding a crosspoint on the master control switcher. The output of the DaVE and D/ESAM also feed a house router to allow the squeezeback effect to be pre-recorded.

USA Network needs

At USA Networks' operations center in Jersey City, NJ, on-air playout of interstitial and program content is currently supported by a quartet of tape-based cart machines. A planned migration to server-based technology will result in increased system reliability, lower operational costs, and a dramatic improvement in system extensibility, as well as operational flexibility. However, USA determined that it would be prudent to introduce server technology into the operations center in a more limited way, thereby allowing the development of procedures and processes for dealing with server technology while gauging the real advantages in efficiency and reliability.

During the past few years, networks have tried to make best available use of every second of on-air time. As a result, the industry has taken to running promotional material in a windowed on-air transmission along with the credit rolls that appear during the last few minutes of movie and series segments. The resulting overlay of promotional material on the credit roll is known as a squeezeback effect. Both USA and the SciFi Channel had been having their squeezebacks done in post. Post-production staff indicated that there would be less expense if we could put the squeezebacks together live in the on-air control room of each channel, instead of paying for post time. A budget was created indicating that the cost of two squeezeback systems (one for each channel) could be purchased and installed for approximately the same cost of one year's worth of post-produced squeezes.

System design

A.F. Associates, Northvale, NJ, was contracted to do the system design and integration. It was decided that the finished system would be independent of the primary program streams coming out of the cart machines. This would allow operators to preview each squeeze sequence and QA the content. Isolating the system would also allow installation and training to take place with no impact on daily broadcast operations.

Two complete systems were installed, one for the USA Network and one for the Sci-Fi Channel. Each system consists of a Pinnacle (formerly Hewlett-Packard) MediaStream Disk Recorder, a Snell & Wilcox Magic DaVE 8D DVE, and a Graham-Patten D/ESAM 400 audio mixer.

Each of the two servers is equipped

with a broadcast quality MPEG-2 4:2:2 encoding system configured with one encoder and four MPEG-2 decoders. The MediaStream servers are configured with parity-protected RAID storage that yields approximately 14 hours of video content storage at an encoding rate of 10Mb/s.

After evaluating various server vendors' product offerings, the MediaStream servers were selected for our application. It provided us with the ability to size and configure the servers to fit our application needs and the price for two servers fell well within our target budget.

The basic requirements of the system included the ability to have the squeezed program and promo superimposed on an animated background. The Magic DaVE's combination of an eight-input switcher and DVE in a single box meant that this could be accomplished within the DaVE itself, instead of having to resort to the additional complexity of keying the DVE output over the background. The Graham-Patten mixer also fit the bill with its serial controlled interface and a reasonable price. It also features a separate control panel and electronics chassis that simplified cabling runs.

All the hardware for the squeezeback system is controlled by broadcast plant automation software from Florical Systems. Florical's AirBoss NT automation software and its SpotCacher server management software were chosen for this project. Florical's software met our operational requirements for sequencing the squeezeback effect. This, together with its ability to provide frame-accurate control of the system's hardware elements (HP server, Magic DaVE, and D/ESAM) on a single AirBoss output channel was a winning combination.

The basic A/V flow of the system (see Figure 1) has three of the server outputs feeding the Magic DaVE and D/ESAM and the output of the DaVE and D/ESAM feeding a crosspoint on our master control switcher. The output of the DaVE and D/ESAM also fed our house router to allow the squeezeback effect to be pre-recorded, if so desired. The fourth decoder on each MediaStream server is controlled by a single DNF Industries ST4000 device controller. The ST4000 has access to the entire clip library stored on each server and thus allows any clip in either server to be viewed without interfering with the AirBoss system.

At the start of the project, we were concerned about the difficulty associated with integrating all this new digital equipment into our existing analog facility. As it turned out, we had little difficulty with the physical integration due to the fact that our Pinnacle servers came standard with both analog and digital outputs. The digital outputs were used to feed the DaVE and D/ESAM, while the analog outputs were used for routing and monitoring. The D/ESAMs also offer analog outputs and the Magic DaVEs output was run through a D/A converter.

Operation

Since the squeezeback system is independent of the primary program stream, the master control operators must set each sequence to execute at the appropriate time based on the primary schedule and then switch to the DaVE-D/ESAM crosspoint on the master control switcher.

The basic operation of the system

has the final segment of the program playing out of one of the HP decoders as a primary event in the AirBoss schedule. All subsequent events related to each squeezeback are what the AirBoss refers to as relative events. These are events that occur at a predetermined amount of time into a primary event. Each relative event is an individual item in the AirBoss schedule and thus the timing for each relative can be changed without effecting other events. After testing a variety of schedule structures, we settled on a standard approach that works well and looks good.

The House Name column contains the material ID of the program and promo elements to be played. For the DVE1 (Magic DaVE) and GP1 (Graham-Patten) sources, this column reflects the number of the effect that gets recalled and executed on those devices.

The sequence starts with events to set up the DVE and the audio mixer to pass program video and audio. The final segment itself, event number 44 in the example, then plays out of HP11, the Number 1 server's first decoder. Events 45 through 54 are all relative events, as indicated by the 'R' in the far-left column of the schedule window. The Sched Time column reflects the start times of the relative events with respect to the beginning time of the final segment.

When the start point of the squeeze sequence is reached, in this case 00:03:01:00 into the segment, several things happen in rapid succession. An audio mix to the decoder that will play out the promos is executed first, five frames ahead of the promo actually playing. Next, the DVE squeeze move is recalled and executed at the same time the first promo, U131121, is played out of HP12, the Number 1 server's second decoder. Four additional promos are then played. Ten frames before the end of the last promo, at 00:05:50:20 into the segment, a DVE move brings the final segment full screen again and then at the end of the promo, an audio mix restores final segment audio.

Mixing to the promo audio a bit early at the beginning of the squeeze prevents the promo audio from being up cut. Starting the DVE move early at the end of the squeeze prevents the promo from going to black while it is still visible. When an animated background is used, this is played out of the Number 1 server's third decoder (HP13) being controlled by the AirBoss and rolls just before the DVE squeeze move.

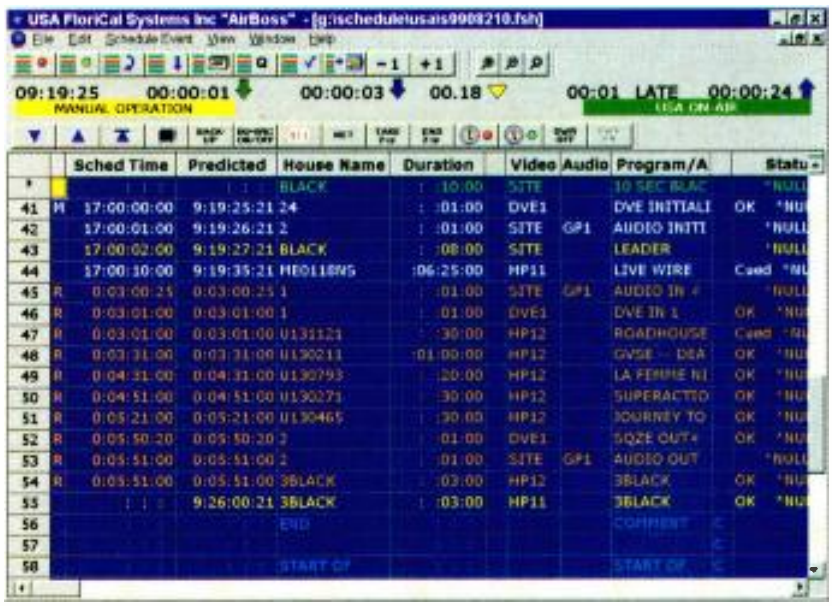


Figure 2. A typical squeeze sequence schedule in the AirBoss. The columns labeled Video and Audio indicate the source device for each event.

For each final segment to be squeezed, a screener determines the length of the segment, the starting point for the squeeze, and the length of the available window for promos. This information is then entered into an Access database that has been developed to create the effects schedules. Promo information is made available into the Access database through a link to our primary promo database. The people responsible for scheduling the squeeze effects simply choose the final segment, the date and time when it airs, the promos they want to run in the squeeze, and what squeeze effect to be used. USA's application is designed to preclude scheduling more total promo time then is available in the final segment window.

After all the schedules for a given period of time are done, an export function is performed for each day. This picks out only the scheduled squeeze effects for that day, does all the time calculations and creates a text file which is formatted for the Florical system. This text file is then imported into the Florical system and converted into an AirBoss schedule.

A single Florical SpotCacher system manages the entire material preparation procedure. It processes all the active schedules in the Florical system and generates lists for what material needs to be entered into Florical database and cached into the servers. Based on the information entered into the database, SpotCacher encodes missing material into the MediaStream servers from a VTR source. Finally, SpotCacher also manages the purging of material from the servers based on a least used criteria and kill date information entered into the database.

Additional functions

With the help of hardware and software suppliers, USA has managed to assemble an intelligent, list driven, run-time effects machine. As the network started to make use of this system to run our squeezeback effects, we realized that the system was capable of handling a wider variety of high-valued run-time effects generation. With Florical's software controlling three outputs of a video server, a DVE, and an audio mixer, we started thinking about how our initial monetary and development investment could result in additional payback by its application to secondary uses.

The most important of these secondary uses was playback of commercials during our coverage of live sporting events, such as the U.S. Open and French Open tennis tournaments. While our cart machines are capable of supporting this function, they have their limitations. Since they are tape-based, any last minute change made to a schedule involves unloading and loading tapes, which can take 30 or 40 seconds. Also, the VTRs operate on a

five-second pre-roll which is undesirable during live events.

The combination of the servers and AirBoss software results in a package that doesn't have any of the limitations of the cart machines and also offers more flexibility in terms of schedule editing. Any clip in the server can be cued and ready to play within seconds of being inserted into a schedule and the servers have no pre-roll limitations. The AirBoss features CUT/COPY/PASTE-type schedule editing as well as a variety of other editing features allowing schedule manipulations to be accomplished easily.

As still another example of an alternative function, the system has also been used to insert animated keys into our programming. Animated key insertion is normally accomplished through other means but, those times when multiple animated keys are needed for a particular event or program, it has made more sense to use the video storage capacity of the HP servers. The cut and fill components of the keys are encoded into the servers as individual elements and then played back synchronously out of separate decoders by the AirBoss software. The decoder outputs are then patched into key inputs on the master control switcher. This is a simple task to accomplish, but it serves as a good example of what is possible with the available tools and a little creative thinking.

Putting squeezeback effects on the air has become just another task in the daily routine.

Results

The system has been up and running since early 1999 with approximately 80 effects (total) being done per week for the USA Network and the Sci Fi Channel. After a period of training and acclimation for the technical staff, putting squeezeback effects on the air has become just another task in the daily routine.

The technical support supplied by our key suppliers, Pinnacle and Florical, allowed us to get the design right while still in the design phase (which isn't always the case) and helped us get past the few speedbumps we hit along the way. This resulted in no unexpected expenditures, which allowed us to complete the project within the allocated budget.

We more than achieved our objective of gaining on-air experience with servers without impacting delivery of network service. Our experience has served to convince us that digital video servers and automation are approaching the levels of reliability, function, and performance needed to replace tape for mission-critical on-air broadcast applications. The knowledge gained on this project is allowing us to further investigate, and ultimately design, a server-based solution with a level of confidence and understanding of the issues involved which can only be gained through hands on experience. ■

Mario Patuto is a project engineer at USA Networks Network Operation Center, Jersey City, NJ.

Chemistry for television ... or batteries for broadcast

BY JOHN LUFF

We all seem to be wrapped up these days in high technology. Streaming video, HDTV, wireless Internet, DTV and other cool technologies occupy our thoughts while at work and are the topics of conversation with peers. Few things, though, have become more indispensable to our professional lives than batteries.

Much of the equipment we deal with in our industry has batteries that we take for granted. Sometimes "throw away," non-rechargeable batteries will suffice, like in microphones, headset amplifiers and the flashlight you use to peer into the guts of recalcitrant equipment. The batteries broadcast engineers get interested in, however, are principally rechargeable. They provide anywhere from just over a volt to over 14V, and can cost hundreds of dollars each and much more for the charging station needed to keep them fully charged and ready for use.

Batteries are divided into two sessions in our chemistry class. There are one-way reactions (non-rechargeable or disposable) and reversible reactions (rechargable). The latter is of interest, while the former is what is forgotten in the TV station's budget. Before chemical batteries were deployed, scientists found that a charge could be stored in a capacitor, literally a device that had the "capacity" to hold a charge. If you have ever maintained equipment, you have probably been bitten by an old electrolytic capacitor.

Chemistry experiments that have the capacity to receive and hold a charge many times for later use are the ones in which we are interested. For most broadcast-related uses lead acid batteries are not practical, due to low capacity and high weight for equivalent charge capacity. Nickel cadmium (NiCad), nickel metal hydride (NiMH) and lithium ion batteries are commonly in use in our business. Each has its own place in the spectrum of uses. Each, of course, comes with its own shortcomings.

Twenty years ago, when NiCads came into regular use, we went to all kinds of lengths to manage the effects they suffer from. NiCads are inherently susceptible to an effect called "memory," the result of which is to convince us to remember to handle them properly. NiCad memory comes from an effect called surface charge where the battery can appear to have a full charge, but in reality have not achieved a "deep" charge. The charg-

Company	Model	Chemistry	Primary application	mA/h rating	Built-in metering	Computer controlled charging	Free info card #
Aspen Electronics	LB-80	Li-Ion	Cameras	5500	Yes	Yes	696
Chapman/ Leonard	Battery Pack 2432	Lead acid	Remote camera system,film/video cameras	12V/26Ah; 24v/13Ah; 30V/13Ah	Yes	No	697
Cool-Lux	Coolbrick	NiCad		5.0Ahr	Yes	Yes	698
Energex	XAB13	NiCad	Cameras	5000	No	Yes	700
	XAB14	NiCad	Cameras	5000	No	Yes	701
IDX Technology	Endura System	Li-Ion	Cameras	50Wh	Yes	Yes	702
PAG USA	Paglok Li-Ion Time Battery	Li-Ion	Camcorders	4.5Ah	Yes	Yes	703
	NMG100 Time Battery	NiMH	Camcorders	7.5Ah	Yes	Yes	704
	NMH-60 Time Battery	NiMH	Camcorders	4Ah	Yes	Yes	705
	NMH100 SuperPack	NiMH	Camcorders	7.5Ah	Yes	Yes	706
	Ni-Cd 5Ah time battery	NiCad	Camcorders	5Ah	No	Yes	707
	Paglok 2.5Ah Digital system RTI	NiCad	Camcorders	2.5Ah	No	Yes	708
	NPL	Li-Ion	Camcorders, audio equipment, VCRs, monitors	3.2Ah	Yes	Yes	709
	NPH	NiMH	Camcorders, audio equipment, VCRs, monitors	2.2Ah	No	Yes	710
	NPX1	NiCad	Camcorders, audio equipment, VCRs, monitors	1.7Ah	No	Yes	711
Sachtler	Belt-Pack	NiCad	ENG and EFP lighting	12V/4.5-7Ah; 30V/5Ah-7Ah	No	Yes	712

ing station may see the surface charge as a full charge and decide to stop charging the battery. Burping the battery (alternately forcing the battery into a high-current discharge to deplete the surface charge) can restore the ability to acquire a nearly full charge. Once a NiCad begins to show memory it acquires a smaller capacity each time it is cycled. Eventually the capacity is too low to be practical for regular use.

You might want to think about keeping a range of batteries available for different situations.

In recent years battery technology has progressed considerably, partly due to the interest in battery-powered consumer electronics, like laptops. The drive to reduce size and weight while retaining long battery life has centered around lowering power consumption and raising battery life as weight and size of the appliance and battery have both been reduced. NiMH and Li-Ion devices have lead the way to great improvements that broadcast use has benefited from without being the driving force. Both are considerably more expensive than NiCads, and both contain toxic substances that require proper disposal when depleted. Neither suffers from the degree of "memory" that NiCads exhibit, and both have improved capacity per unit of volume and per unit of weight.

In the last several years batteries have become "smart" devices. Unlike the gas tank on your ENG truck, the charge state batteries are not easy to truly measure. As the charge depletes the battery voltage drops, but the effect is not linear when memory effects are taken into account. NiMH and Li-Ion batteries are more linear in this regard.

Two devices have been added to batteries to allow them to be monitored. First a simple "charge state" meter, essentially a volt meter, can be added. If done with extremely low current draw this can be a reliable way to gauge the charge state. (A poorly designed meter could deplete the battery it is monitoring.) The second is a sensor that monitors the number of charge cycles and the current state of the battery charge. This can communicate with a smart charger that keeps a record of the battery serial number and the use pattern which the battery has been subjected to. With this information the charger can program the battery's charge cycle to insure the capacity is maintained at the highest possible state. Some manufacturers provide a computer interface to the charger to keep the records accessible and monitor the life of the battery so you can tell when it is time to replace it.

Lastly, you might want to think about keeping a range of batteries available for different situations. Keeping a camera fired up on the courthouse steps while on a tripod can allow you to put a larger capacity battery on the camera despite the higher weight so the cameraman does not have to keep as many batteries in reserve. In a run-and-gun situation where the amount of shoot time will be modest, it is more important to have light weight to allow the cameraperson to move freely. For instance, a camera that supports NP-1 batteries might have a range of NiCad, NiMH and Li-Ion batteries in the bag for various situations, and perhaps an adapter to use a "brick" style battery on a cable plugged into the external power connector. Don't forget the same adapter can be used to power a portable microwave system where shore power is not available.

As time goes on, we can expect the research from other industries to continue to benefit our small industry. The push to electric vehicles will drive major investments in battery technology, where specific capacity and size are major issues. The monitoring and control of battery charging is also of considerable interest in computers and other industries where rechargeable batteries are necessary. Look for increased capacity, better monitoring and charge control, and more exotic materials in the future. ■

John Luff is president of Synergistic Technologies Inc., Canonsburg, PA.

Business Wire

Business highlights from broadcast and production

BY LAURA COLLINS, EDITORIAL ASSISTANT

New York's Hearst-Argyle Television, Inc. purchased Panasonic's DVCPRO digital component recording equipment for its recent digital upgrades. The multi-million-dollar deal included more than 310 pieces of DVCPRO equipment for its News Service in Washington, D.C. and seven of its stations, including two in Kansas City, KMBC-TV and KCWE-TV.

Also from Panasonic, Four Media Company recently agreed to use new AJ-HD3700 D-5 HD multi-format VTR as its production standard for in-house feature film mastering and television eposodic production. 4MC's Riot, Encore and Hollywood facilities will be equipped with state-of-the-art D-5 HD recorders and AJ-UFC1800 Universal Format Converters.

In another development DVCPRO50 4:2:2 component digital recording format will be used the Official Video Format for the 2000 Olympic Games. The format will be used to acquire over 3200 hours of live Games' sporting competitions.

Discovery Communications purchased three additional Aprisa 300 Video Replay systems from Chyron Corporation to enhance broadcast quality for the Discovery Channel.

Systems integrator A. F. Associates, Inc. recently assisted in Turner Entertainment Networks' programming expansion. They also built an additional, customized channel for testing and training functions.

Granite Broadcasting Corporation will use media routers from SkyStream Networks to broadcast Internet content over DTV to its nine television stations.

THOMCAST Communications announced that it will be supplying Digital Format Translators from Faroudja. Several broadcasters, including Raycom Media, have already purchased the upconverters through THOMCAST.

NBA.com TV, the National Basketball Association's new network, is using two of Chyron's DUET video graphics systems. The systems' Lyric software allows the network to update scores and statistics in real-time.

NBC affiliate WOOD-TV recently used Quantel's Paintbox FAT to upgrade animations in their news and promotion departments.

Sylvan Tower is constructing a tower with a broadband panel array antenna to provide digital transmission facilities for a group of Portland broadcasters.

Panasonic, the prime contractor for the Sydney Olympic Broadcast Organization, has chosen Chyron to provide 55 of their Chyron Max!> television character generators for venues hosting the events.

Media 100 and Omneon Video Networks are working together to integrate Media 100's streaming media production tools with Omneon's new media networking and storage infrastructure to provide major broadcasters and content creators with the software to create and distribute video content for the Internet.

Additionally, Omneon recently expanded into a new, larger headquarters and development center, located at 965 Stewart Drive, Sunnyvale, California, 94086.

Sundance Digital provided two of its FastBreak Automation Air workstations to control four NBC stations in North Dakota from one central location.

The Shop at Home Network's station WSAH TV-43 in Bridgeport recently took delivery of A.F. Associates' master control system. The system will enable the affiliate station to insert its own local content and commercials into their network feed.

ScreenShot

CBS Selecst Peak Broadcast Systems' software for pre-game

CBS Sports has decided to incorporate software systems from Peak Broadcast Systems in its pre-game show, "The NFL Today" to create and control statistical graphic information and over-the-shoulder animated graphics.

The decision was made largely due to their success in using the software during the 1998 NFL season. At that time, it was used to create the signature "eyebox" clock and scoreboard, shown in the upper third of the screen during the NFL broadcasts.

According to Senior Vice President of Operations and Production Services, Ken Aagaard, Peak's 3D capabilities have given the broadcasts their distinct graphic look, and enabled CBS Sports' to change a "good portion of the design of our broadcasts."

Charlson Broadcast Technologies chose **Telex** RTS TW intercom system in its new broadcast production trucks. The trucks cover horseracing at Kentucky's Ellis Park.

News 12 Networks has chosen the **Associated Press**'s Electronic News Production System as its new newsroom computer system.

Euphonix, Inc. recently installed their 80-fader Euphonix CS3000 system in Award-winning television and film composer John Debney's new facility, John Debney Productions.

In other news from Euphonix, Artist/producer/engineer Geza X opened a new commercial recording studio featuring the company's 72-fader CSII series mixing console.

Pinnacle Systems recently acquired **Synergy International**, Salt Lake City-based makers of award-winning HollywoodFX software.

Tokyo companies **Kokusai Electric Co.**, **Yagi Antenna** and **Hitachi** signed an agreement to merge in order to explore total solutions in the wireless communications sector. All companies will continue to provide full support to their existing customers.

SpectraSite Holdings recently acquired broadcast transmission infrastructure companies in order to offer integrated broadcast transmission services. The acquired companies were combined into SpectraSite Broadcast Group, a division of SpectraSite Communications.

Orad's CyberSport and IMadGINE virtual advertising systems were used in February's Winter Goodwill Games to create live, in-event advertising insertions and graphics for the bobsled, luge and skeleton competitions.

The FCC granted BT North America and CBS the first licences to access **Eutelstat** from within the United States. The FCC said the move should stimulate competition in the U.S. fixed satellite services market by giving companies more alternatives in communications providers.

Keops Broadcast recently signed a deal with **SIGCOM** to include their MediaWorks assest management system in SIGCOM's integration project at a North Carolina U.S. Army training center.

AMS Neve recently received a Technical GRAMMY Award for their analog and digital expertise. The award is given for significant technical contributions to the recording field. Some of AMS Neve's include the first transistor console, the first moving fader automation system, and the first microprocessor-based digital reverbs, pitch changers and samplers, among others.

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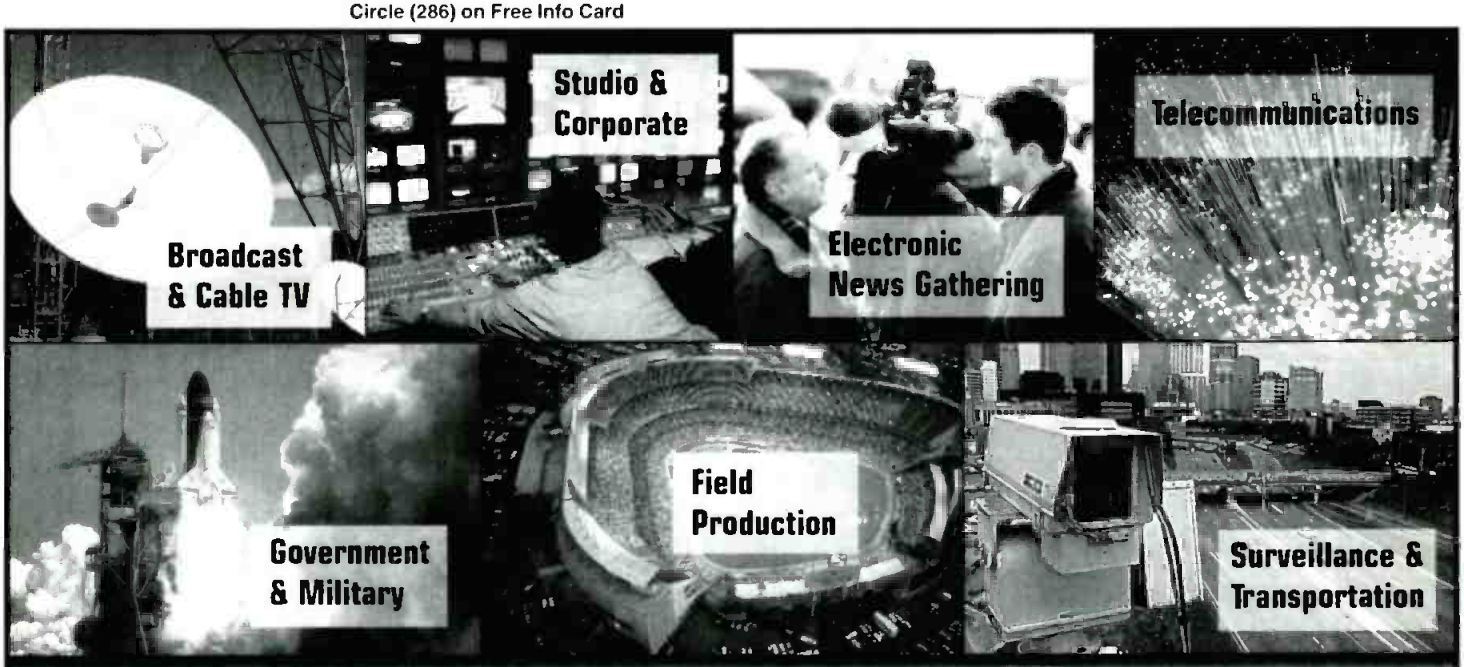

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Director of Broadcast Technologies
(Job Code: DBT)

ABC7 is looking for that rare individual with exceptional combined broadcast and information technologies experience. The successful applicant will have worked in major markets as a broadcast engineering professional, with hands-on knowledge of television from baseband Ingest to digital playout. In addition, this individual will have prior experience with high profile special events and large scale broadcast systems integration solutions. This individual will have extensive information systems/technology background, including multi-protocol networking with a strong emphasis on newsroom and station wide automation, including large scale data archiving. College degree in computer related technologies preferred. This position will manage a staff of like-minded Broadcast Technologists who will play a pivotal role in transitioning ABC7 from our current facility to our new digital broadcast center.

Maintenance Manager, Transmission/RF Systems
(Job Code: MMT)

This individual will insure optimal audio and video quality, both analog and digital, throughout the ABC7 transmission path from studio to transmitter. In addition to studio systems responsibility, this position will be responsible for all fiber, STL, ICR, VHF and DTV transmission facilities. Prior experience as a transmission engineer in an analog and digital broadcast environment, with experience maintaining VHF and/or UHF transmitters is required. The successful applicant must also have thorough knowledge of applicable industry standards and practices and FCC rules and regulations. FCC General Class, SBE certification, and experience in a union work environment a plus.

Maintenance Manager, Field/ENG
(Job Code: MMF)

This individual will work in concert with LA's #1 news team and engineering staff to insure top flight maintenance and operations of ABC7's news gathering fleet and ENG equipment. Strong team skills with significant prior experience maintaining ENG equipment and facilities in a major market broadcast news environment required. The successful applicant must have thorough knowledge of applicable industry standards and practices. FCC and DOT rules, regulations and guidelines. Experience in a union work environment a plus.

Maintenance Manager, Studio
(Job Code: MMS)

This individual will have direct staff responsibility for the ABC7 maintenance department and must possess the ability to diagnose and direct the maintenance of all studio-based broadcast equipment. Strong organizational and team building skills are a must. Prior experience in a major market television environment with hands-on analog and digital broadcast systems maintenance and operations required. The successful applicant must have prior thorough knowledge of applicable industry standards and practices and FCC rules and regulations. Experience in a union work environment a plus.

Please send cover letter and resume to: **ABC7 Los Angeles, Attn: Kimberly Castillo, Human Resources, (indicate Job Code), Dept. BE, 4151 Prospect Avenue, Los Angeles, CA 90027.**
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abc7 KABC LOS ANGELES

MEDIA GENERAL BROADCAST GROUP: www.mgbg.com WJTV-TV Reporter to write and perform on-air presentation of news stories. Provide direction to technical crew. Write news copy and travel to news scene to cover stories as needed. BS degree in Journalism, Communications or related field. Two years progressively responsible experience in a television newsroom preferred. Tape required. EOE M/F Drug Screen. Send resume to HR Dept, 1820 TV Road, Jackson, MS 39204-4148

SENIOR MAINTENANCE ENGINEER WPSD-TV. (74th market), seeks a senior maintenance engineer with at least 5 years experience. Must be capable of maintaining broadcast equipment including Chyron Max, computer graphics systems, production video switchers, still-store and DVE. RF experience a plus. Substantial technical education required. Send resume to: Dan Steele, Operations and Program Manager, WPSD-TV, P.O. Box 1197, Paducah, KY 420002-1197. M/F, EOE.

ONLINE A/V MAINTENANCE ENGINEER. ABC Internet Group, NYC The Engineer will repair audio/video equipment for the ABCNEWS.com and ABC.com facilities in New York. Specifically this will include anassortment of production equipment including Sony BVW-D75, EVO-9850, and VO-9850 studio VTRs and Grass Valley 7000 serial digital routing switcher. Seek candidates with a five years television engineering maintenance experience. E-mail resume, contact telephone number and a brief note. Contact: Ray Rizzo. E-Mail: hr.mail@corp.go.com

TV MAINTENANCE ENGINEER: Maintenance engineer with successful experience in 2 or more of the following areas: R.F. systems, Beta tape, ENG/SNG operation and repair, computer networking, ENG van operation, Quantel, Avid and/or file server experience a plus. Applicants should have 3-5 years maintenance experience in a top 100 market, be able to work all shifts, lift 25 pounds, and have an excellent driving record. KTVI/FOX 2 is a Fox O & O that produces an exciting live news product during every shift. A motivated individual, ready to move up and join our Fox 2 technical team should make immediate contact by sending resume and letter to: KTVI/FOX 2, HUMAN RESOURCES DIRECTOR, 5915 BERTHOLD AVENUE, ST. LOUIS, MO 63110. An Equal Opportunity Employer.

FT STUDIO TECHNICIAN: Formal schooling in Electronics Theory. 5 years experience in Broadcast TV bench technician. Send resume to: KOB-TV, job #32-99, 4 Broadcast Plaza, SW, Albuquerque, NM 87104. EOE/M-F.

AT&T Broadband Job Opening Broadcast Technician needed at multi-channel TV facilities in Littleton, CO. Duties include installation and repair of all types of broadcast video and audio equipment. Minimum qualifications include 3+ years of broadcast video, audio equipment repair and operations experience. The preferred candidate will also possess an SBE and/or Associates Degree in electronics and experience in maintenance and repair of analog and digital video and audio equipment including: multiple format video tape recorders, video file servers, On-Air Automation Systems, routing switchers, and master control switchers. Other duties, weekend and shift work as required. A drug and background check will be required for successful applicants. Non-smoking environment. EOE.
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Classifieds Help Wanted

WFLD/Fox O&O TV in Chicago is looking for an **ASSISTANT CHIEF ENGINEER** to supervise the maintenance department of 12-15 people, design, construct transmitter and studio facilities, monitor applicable budgets and be responsible for satisfactory completion. Train technicians and perform other duties as assigned. Must have a minimum of 10 years experience in operation, maintenance and design of TV facilities and systems. SBE certification or higher knowledge of digital formats for production, distribution and transmission and computer skills, particularly, Novell, LAN and AVID/Basys Newsroom systems required. A degree in Engineering or Broadcast Engineering, prior management skills, similar position and/or training experience preferred. Strong follow-through, and interpersonal skills required. Lifting a maximum of 50 lbs. is also required. Send application material to Human Resources, WFLD/Fox 32, 205 N. Michigan Ave., Chicago, IL 60601. No phone calls/faxes please. EOE/M/F/D/V.

CHIEF ENGINEER: WPSD-TV, Paducah, KY (74th market), seeks Chief Engineer. Candidate must be highly motivated, multi-skilled, hands-on, with management ability. You must have knowledge of broadcast studio equipment and transmitter systems. You must possess systems planning, maintenance and installation experience. You will be part of the design team that builds a digital facility. A minimum of eight years experience in television broadcasting and an FCC license required. SBE certification preferred. Respond to: Dan Steele, Operations and Program Manager, WPSD-TV, P.O. Box 1197, Paducah, KY 42002-1197. M/F, EO...

JUNIOR BROADCAST TELEVISION ENGINEER - ATLANTA, GA: Install, repair and maintain digital and analog television equipment, systems experience preferred. Three -five years experience required. Two year degree required. Submit resume to Hergo Technical Services, P.O. Box 254, Grayson, GA 30017. E-Mail hergo@speedfactory.net.

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CBS Cable TNN/CMT in Nashville Tennessee has immediate openings in their Engineering Department for the following positions:

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MAINTENANCE ENGINEER

Install, maintain and repair station equipment, requiring familiarity with such systems as Louth, Digital Betacam, Profile, production switchers and DVE. Must have a related BS degree (or equivalent experience); 2-3 years' work experience as a Maintenance Engineer; perform component level repair; read/create schematics. **(Job Code ME/BE/0300)**

We offer an excellent benefits package. Please forward your resume with salary history to: **KTLA, Attn: (indicate Job Code), P.O. Box 2309, Los Angeles, CA 90078, or E-mail: ktla-hr@tribune.com**

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ENGINEERS

Turner Broadcasting System has career opportunities for experienced television engineers. These career positions demand an extensive background in equipment maintenance, digital video and audio, and knowledge of computer systems and networks. Please mail or fax your resume and cover letter to:

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Assistant Vice President of Engineering Services
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The selected candidate will operate, calibrate, monitor and perform preventative maintenance and repair of earth station transmission equipment, cable television headend equipment, earth station air conditioning equipment, 675 KVA generators, various antenna systems and microwave and fiber equipment.

To qualify, you must have at least 3-5 years' experience and a formal education in electronics (preferably satellite communications), or military experience in satellite communications maintenance. Experience troubleshooting and repairing microprocessor equipment is also required. Working knowledge of Tek VM 700, HP 8563E spectrum analyzer, HP 8359 Sweep Oscillator, HP 8755C Swept Amplitude Analyzer, and HP 437B Power Meter is necessary, as is in-depth knowledge of satellite transmission and reception systems. At least 2 years' experience in the repair of Klystron and TWT transmission equipment in the 6-14 GHz range is essential. We offer a competitive compensation package. Please forward your confidential resume, with salary history and requirements, to: Human Resources, CBS Cable, 250 Harbor Drive, Stamford, CT 06904; FAX: 203/965-6117. Visit our website at: www.gwns.com Equal Opportunity Employer.

CBS CABLE

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Classifieds

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AETN STUDIO MAINTENANCE TECHNICIAN: Arkansas Educational Television Network, the PBS system serving Arkansas, seeks a Studio Maintenance Technician to perform routine, preventive and emergency maintenance on master control, studio, and field equipment. Candidates should have formal education equivalent of a high school diploma; plus two years vocational or related training in electronics, plus two years experience in electronic repair and maintenance. Proven maintenance experience, ability to independently trouble shoot, knowledge of digital audio/video transmission equipment, and FCC general class license is desirable. Valid drivers license, minimum requirements for the state vehicle safety program, and extensive in-state travel required. Submit a State Application, current resume with cover letter, three professional references and salary history to: AETN-Human Resources Supervisor, PO Box 1250, Conway, AR 72033 or apply online: aetn.org or arstatejobs.com. Application review begins March 6, 2000. AETN is an AA/EO/ADA employer. Minorities and Women encouraged to apply.

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EOM

The retail message is wrong

BY PAUL MCGOLDRICK

It is an 85 mile drive for me to get to a decent electronics store, so the trip is always relevant. In a "super" store, my family trailed around looking for everyday audio cables. There were multiple racks of those gold-plated things — taking full advantage, no doubt, to correct for losses due to skin effect at 20kHz — but no sign of the cheap stuff. A sales assistant led us to an inside wall in the store, not visible from the main floor, where the cheapies were racked.

The conversation that followed was truly enlightening as to the degree to which he and his friend could hear the difference between audio cables, and how little difference there was in running component from a DVD player compared to S-Video. I have to assume that this misguided bit of retail messaging originates at management levels, levels that want to obtain sales of what is most profitable, rather than what they could sell with less margin. It sends the public a terrible message about where we are in home theater quality and the advantages of digital.

We are at a stage here in the year 2000 where I can sit in my media room and enjoy superb audio through my 5.1 system with video display quality that is as good as most studio monitors — and better than some. I feed my receiver with color-difference signals from the DVD player and my only complaint is the artifacts that I can see from the telecines used.

I found a wonderful article online about video cables, where the author assigns numbers representing display quality with different video connections — and cables ("What's Up With Video Cables" by Doug Blackburn at soundstage.com.) He assigns a "1" to a composite video connection using a generic video cable, a "5"to S-Video (with a generic cable of course), and a "7" for component (again, generic). "S-Video would have been less annoying if two RCA connectors had been the connector of choice. However, the electronics industry decided to annoy people by adopting a nasty circular connector that is difficult to make and difficult to use." I must say I never enjoyed making up DIN connectors either but I haven't done that since the '70s. I wonder what sort of connector is on the end of this guy's computer keyboard?

He goes on to claim that things improve in composite video connections when you use one costing $99 (a "4" on this scale) and even up to $269 to give you a "3.5." There are others recommended that are a little less expensive ($50 being the cheapest) but they "produced a serviceable image." The things that improve with these cables, by the way, are "depth, color and blacks." I am mystified.

It sends the public a terrible message about the advantages of digital.

Are you ready for the S-Video improvements? You can get a cable for only $30 but the best, apparently, costs $249. "Problems in the video have nowhere to hide when using XXX. Every last detail is right there. The edges of scan lines in non-doubled/etc. displays get so sharp that they just may become visible at closer viewing distances." This mysterious behavior also accounts for "maximum detail, dimensionality, color range, black blacks and great gray scale performance." This cable gets a "6.8" pushing "hallowed Component."

No comparable review was done on component cables since it was assumed that three of the best composite will give the best component results. So three times $269 for a meter run from DVD to receiver should do it. Do you think this guy would keel over to hear that I use audio cables — "generic," as in cheap — for that connection? I take the view that nothing of a cabling nature can be worse than the phono connectors at each end.

But I've saved this author's most amazing statement for last. "Video cables don't seem to undergo any obvious break-in period like audio cables do." Ah, now you know what your audio problems are about!

This is hardly the only example that can be found published online and on paper. This is the kind of information that, when repeated often enough, really does create expensive niches for these manufacturers, creating at the same time urban legends that will be difficult to shift from people's psyches. If you were a neophyte purchaser of a new DVD player and receiver, and the sales assistant explained your choices to you in these terms, what would you be looking at? If you connect S-Video you will buy one cable at maybe $30 for the most popular brand, or $70 for the most popular component video brand. You are already looking at rather more for the receiver because, as far as I know, there is only one brand that provides color-difference inputs at a lowly 27" screen size (and if the store doesn't carry that model there will be no mention of it, of course.) So the buyer goes the S-Video route and loses a great deal.

This is not a one-on-one thing. Every purchaser of a DVD player who feels the quality is not as high as expected becomes a slower adopter of anything else digital — and that is not what we want or need for faster DTV adoption. ■

Paul McGoldrick is an industry consultant based on the West Coast.

SEND Send questions and comments to: paul_mcgoldrick@intertec.com

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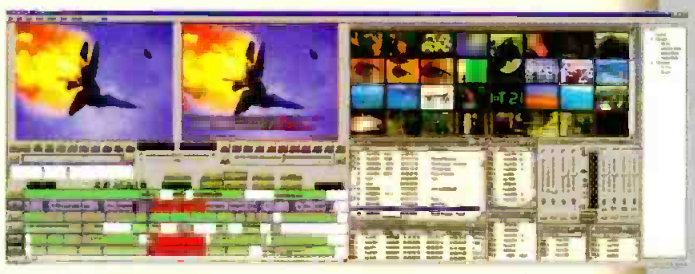

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