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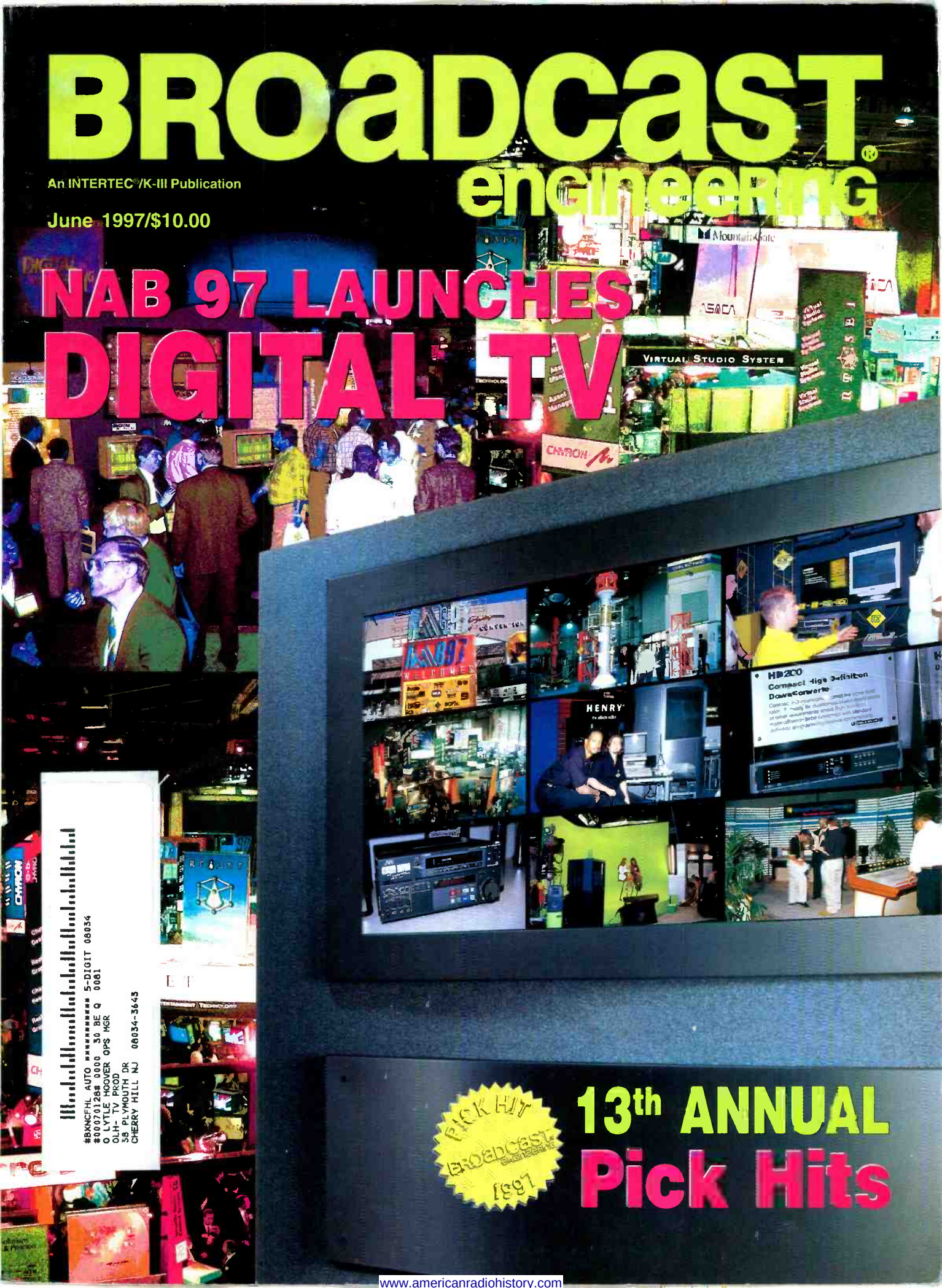
NAB 97 LAUNCHES DIGITAL TV



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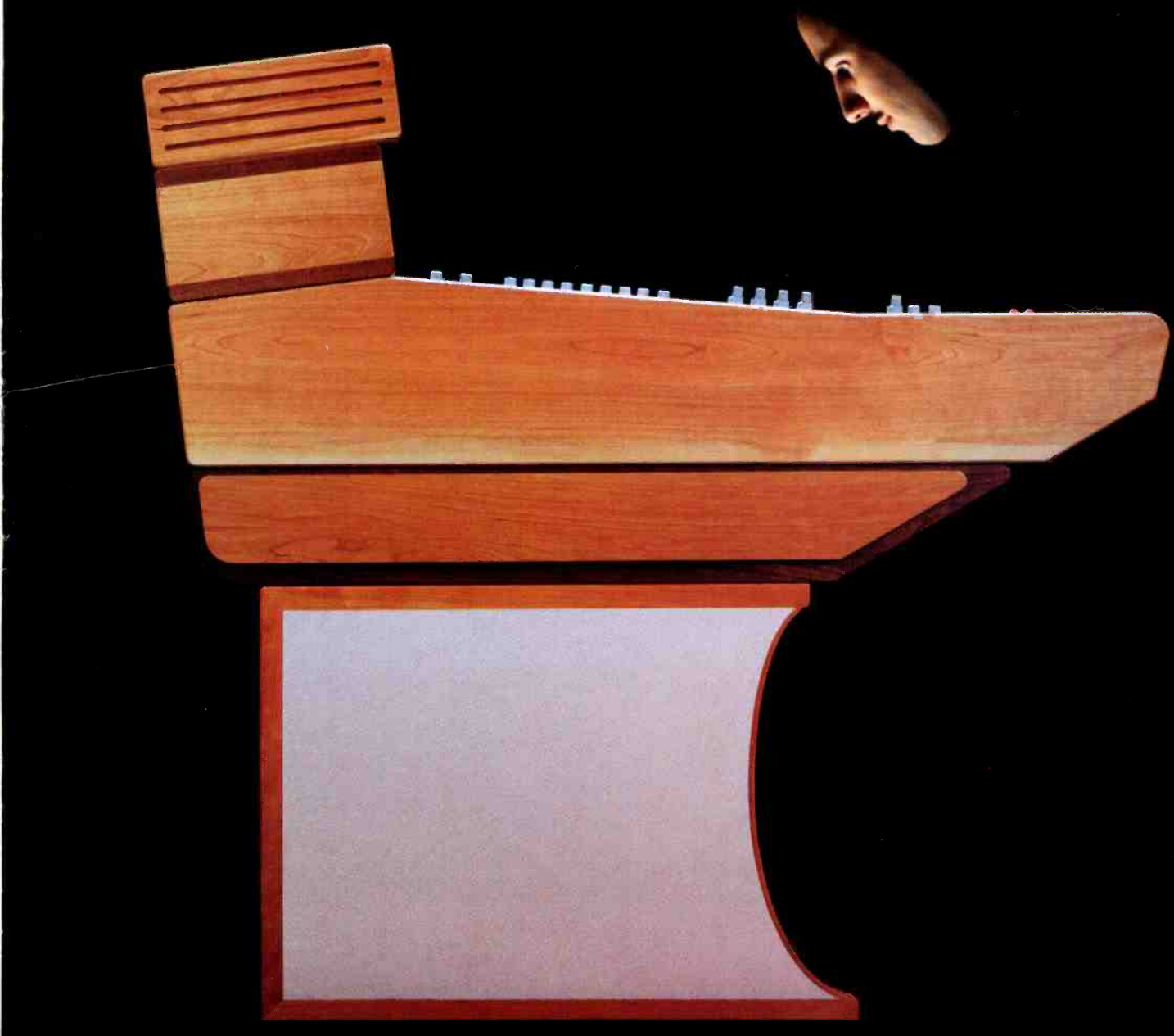

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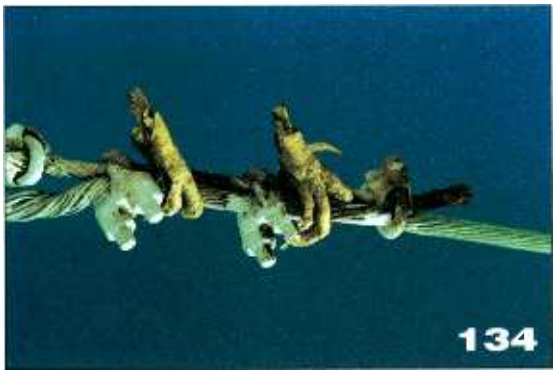

ON THE COVER: This year, digital television took center screen as more than 100,000 attendees and exhibitors filled the convention halls. Cover design by *BE* art director Stephanie Masterson.

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DTV kick-off

It was more like a political convention than a trade show. Everyone seemed so happy and upbeat you'd have thought they were on happy gas. The optimistic mood was further enforced by a record-breaking attendance of 100,049 exhibitors and attendees. I'm talking, of course, about the 1997 NAB convention.

Everyone was talking about digital television. While attendees asked vendors for solutions, vendors asked attendees for direction. There were far more questions than answers. Despite the confusion, the 1997 NAB convention was certainly a high for those involved in digital transmission. There were many new technology transmitters on the exhibit floor, some even working. To complement the RF side, there was a surprising number of cameras and production products already available to handle the DTV challenge.

After spending three days at the LVCC, I went to the Sands to get "the rest of the story." The difference between the two sites was amazing. The coats and ties at the LVCC became polo shirts and Dockers at the Sands. One admittedly new-wave computer type referred to the LVCC as the "rust belt." It was definitely a culture shock between the two halls.

At the Sands, with the mixed culture of vendors, there wasn't an identifiable focus like at the LVCC, but the attendees didn't seem to mind. They still sat through demonstration after demonstration, occasionally glassy-eyed, even though some of the products weren't real yet! The Sands exhibitors provided an abundance of software-based products. However, calling the products "desktop solutions" isn't even close to accurate. To these guys, a desktop computer is more like a Ferrari than a PC where horsepower is measured in hundreds (not tens) of megabytes. A word of caution, lest you be fooled by the glitz.

Taking anyone's word, especially when it comes to software, is tantamount to professional suicide. It won't be fixed in version 2.0. There isn't 24-hour support. And you're not, despite what you're told, the only one to ever discover that problem. When it comes to software, I recommend an old Reagan phrase, "Trust, but verify."

Anyway, it was a good show. One of the few over the past 15 years I felt deserved the effort it requires to cover it. The kicker was, of course, all the DTV announcements. By next year, we should see a wide range of products and solutions available. I can hardly wait — OK, so I can wait.

Brad Dick

Brad Dick, editor

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news

By Dawn Hightower, senior associate editor

Will DTV require directional antennas?

As broadcasters have begun evaluating the FCC's DTV table of allotments and channel assignments, some potential flaws in the commission's work have come to light. Broadcasters are questioning the methodology that was used to assign the second channels and the fact that there hasn't been any proper documentation of the process.

Many broadcasters are not aware that the FCC assumed a hypothetical directional antenna pattern for most of the DTV stations. Now, these patterns will need to be clarified by the commission. There is no requirement in the new DTV rules to use a directional antenna. However, the service, interference, population and area data in the table are based on these hypothetical directional antennas. The pattern that was used by the FCC is a result of a process that calculates the necessary DTV ERP to replicate a station's NTSC Grade B contour. The power levels published in the FCC DTV table are the maximum values that are necessary to achieve replication of the NTSC service area.

The Longley-Rice predictive program, developed by the Institute for Telecommunications Sciences (ITS), is being used by the FCC to check individual station studies where changes have been requested. When the FCC was putting together the allotment table, this ITS program was not used for nationwide assignments because the program's higher terrain resolution would have taken much more time to run.

Every station needs to look closely at its predicted contours. If your station is requesting a change in the table of allotments, chief engineers should read Appendix B of the adopted rules, pgs. B1 and B2. They should also ensure that their station is maximized and determine its own interference statistics, so they can be properly positioned for DTV transmission.

For more information, check out "DTV Update," on p. 34.

President names two to FCC

President Clinton has appointed William E. Kennard and Harold W. Furchtgott-Roth to the Federal Communications Commission. Kennard is general counsel and replaces Jim Quello. Kennard will serve as the FCC's principal legal adviser and represent the agency before the courts.

Furchtgott-Roth is chief economist for the House Committee on Commerce, which is responsible for telecommunications. He replaces Andrew Barrett.

Hundt tenders FCC resignation

In a surprise move, Reed Hundt has resigned as the chairman to the Federal Communications Commission. He was not due to step down until next June. President Clinton will accept Hundt's resignation when a successor has been appointed to fill his shoes. Hundt's resignation came two days after the President nominated William Kennard and Harold Furchtgott-Roth to commission appointments.

Reed Hundt

The big question now is who will fill the void when Hundt vacates his position? Current speculation is upon William E. Kennard, FCC commissioner Susan Ness, Kathleen Wallman, staff chief at the National Economic Council and Ralph Everett, ex-counsel and Democratic staff director to the Commerce Committee.

Harris buys French company ITIS

Innovation Telecommunications Image & Sound (ITIS), a French company has been bought by Harris Corporation.

According to Harris, the purchase will allow the company to provide digital TV products that will meet both U.S. and European standards. ITIS specializes in technology for digital video broadcasting systems that are standard in Europe and other parts of the world.

ITIS is based in Rennes, France, and will serve as an engineering center and will still provide equipment and services to its existing customer base. The French company will retain the ITIS name.

ATSC membership open to the world

The Advanced Television Systems Committee (ATSC) has opened its membership to interested organizations and government entities around the world, which are interested in developing TV standards.

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According to chairman Robert Graves, now that the ATSC is reaching beyond North and South America to encourage adoption of the ATSC DTV standard, interested parties all over the world should have the opportunity to participate in the ongoing standardization and implementation activities of the ATSC so that its standards meet the needs of all potential users around the world.


Robert Graves

The ATSC is developing voluntary standards for advanced TV systems and developing DTV implementation strategies. To learn more about ATSC call 202-828-3130 or visit the web site at www.atsc.org.

The ATSC also is developing a certification program to certify TV sets, computers and consumer video devices that are capable of receiving all ATSC video formats for the digital era.

The program is simple and will indicate that a consumer video receiver will work with all of the video formats in the ATSC DTV standard. In order to avoid consumer confusion as digital televisions come to the market, the program will provide information to indicate whether a television will receive all of the ATSC video formats. It will leave the display type, such as progressive or interlace scan, high-definition or standard-definition, to the consumer.

Local TV reception possible with Thomson Digital Satellite System

After an 18-month development program, Thomson Consumer Electronics will offer an advanced RCA-brand digital satellite system next month. The 18-inch satellite dish contains an embedded TV antenna and will have the ability to receive one or more local station signals without the need for an off-air TV antenna or cable connection. Although the unit is designed primarily for receiving satellite signals, the system can receive local station signals when properly installed and adjusted. This third generation of 18-inch satellite systems includes three new models with a beginning list price of less than $450.

The company has applied for two patents to cover the antenna dish, which is proprietary to Thomson.

Markey proposes to ban analog TVs

Congressman Edward Markey (D-MA) has filed an amendment proposing that all TV receivers, VCRs, and set-top boxes sold receive a digital signal. This proposal would ban sales of every TV and VCR now being sold and would effectively ban the sale of analog televisions after the year 2002.

This proposal came about in response to the federal budget package and the analog broadcast spectrum auction set for the year 2001. Although Markey opposes using spectrum auctions to meet budget goals, he feels that steps should be taken to accelerate acceptance for digital television in the consumer market.

An amendment to the budget bill also has been put forth by John Dingell (D-MI) requiring that all analog TV receivers sold in the United States be labeled with language stating that they will be "obsolete" after the year 2006.

U.S. and Japan test high-definition video network

NASA's Jet Propulsion Laboratory and Japanese government and industry teams have begun a series of transmission experiments. The experiments will test the transmission of high-definition video (HDV), computer data, high-resolution images and video signals over the Pacific Ocean with a combination of satellite links and fiber-optic cable.

The experiments could lead to the creation of new, high-performance global telecommunications networks. Many of these tests are planned for coming years to develop techniques, standards and protocols for the satellite transmission of high data rate images and scientific data, which until now have been transmitted solely via fiber optics.

The first experiment tested the ability of satellites to carry high-definition video signals from Tokyo to California. Specific goals included sending and receiving images back and forth across the ocean in real time using a moderate amount of compression and sending master tapes back and forth in slightly less than real time without any compression.

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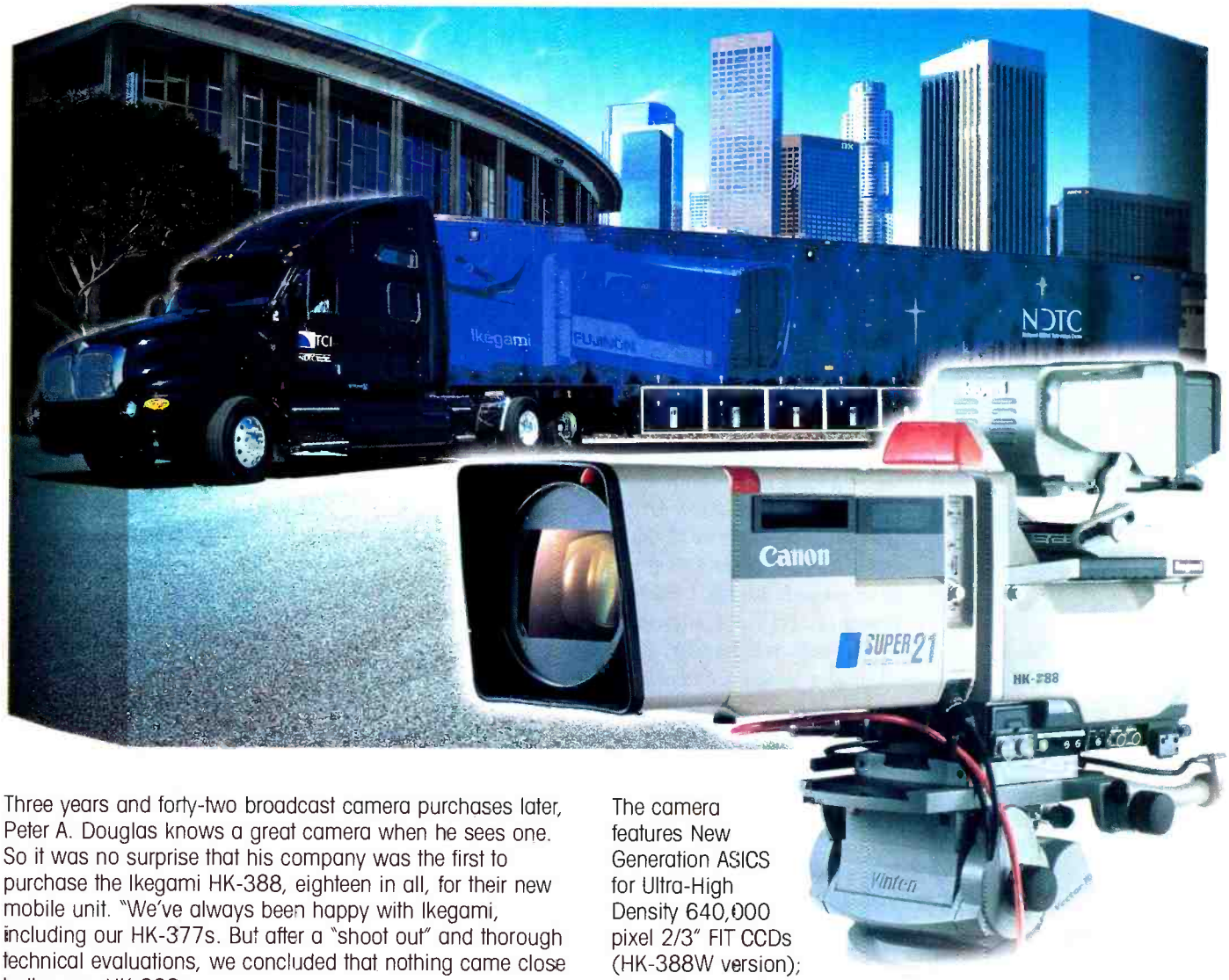
Peter A. Douglas, Vice President Operations & Engineering, National Digital Television Center



Three years and forty-two broadcast camera purchases later, Peter A. Douglas knows a great camera when he sees one. So it was no surprise that his company was the first to purchase the Ikegami HK-388, eighteen in all, for their new mobile unit. "We've always been happy with Ikegami, including our HK-377s. But after a "shoot out" and thorough technical evaluations, we concluded that nothing came close to the new HK-388s.

"The camera performs beyond expectation, holding resolution and colorimetry even in very low and "colorful" lighting conditions. Skin Detail (an Emmy-winning feature) is also a must with our customers who demand this important Ikegami advantage. All in all, we could not have found a better camera or a better manufacturer to deal with."

The Ultra-wideband HK-388 and HK-388P hand-held companion are full digital cameras that combine Ikegami's vast studio experience with today's digital technology. Switchable 16:9/4:3 models are available.

The camera features New Generation ASICS for Ultra-High Density 640,000 pixel 2/3" FIT CCDs (HK-388W version); Skin, Slim and Diagonal Detail; Ultra-wideband Component Triax Transmission System, Optional Digital Fiber and Interface for RGB Triax; Analog and Serial Digital Component Outputs; a modulation depth of 80% at 5mHz; Sensitivity of f8, 2000 Lux; and a S/N ratio of 62dB.

"Our HK-388s consistently perform beyond our expectations. That's saying a lot."

National Digital Television Center chose the HK-388W and HK-388PW companion portable 16:9/4:3 models. Shouldn't you? For more information, contact your Regional Sales Office or the Ikegami dealer nearest you.

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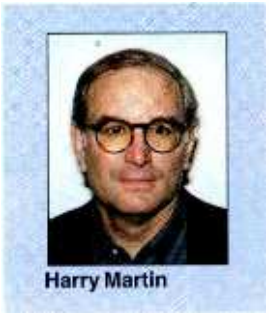
By Harry C. Martin and Richard Estevez

Taking steps to minimize DTV impact on LPTV/TV translators

The FCC, in its orders assigning DTV channels to full-power TV stations, declined to protect existing LPTV and TV translator operations or to allot specific DTV channels to LPTV licensees.

However, steps have been taken to minimize the impact of DTV on low-power stations. LPTV and TV translator stations will continue to operate on all TV channels, including Channels 60-69, until displaced by a DTV station. Displaced low-power stations can apply for a replacement channel without being subject to competing applications or waiting for a filing window.


Harry Martin

D/U signal ratios for interference between low-power and DTV operations have been established. Interference considerations between low-power and DTV operations were limited to co-channel and first-adjacent channel factors only.

Terrain shielding, Longley-Rice showings and interference abatement techniques may be used to show that no interference will occur to a DTV station. The FCC also replaced the existing TPO power limits with limits on effective radiated power (ERP). Low-power stations have been limited to total power output (TPO) of 1,000W for UHF channels and 10W for VHF channels. They will now be permitted to operate with ERPs of 3kW for VHF channels and 150kW for UHF channels.

Re-engineering broadcast ownership rules

To borrow a term from commissioner Susan Ness, the FCC is about the business of "re-engineering" broadcast ownership rules. The commission is reviewing its broadcast ownership rules regarding the "one-to-a-market" rule prohibiting ownership of TV and radio in the same market; the duopoly rule prohibiting ownership of two TV stations in the same market; and the attribution rules that define "ownership."

Insiders are of the opinion that the rulemaking will fall considerably short of broadcasters' hopes. Former FCC chairman Richard Wiley sees "little relief" when it comes to TV duopolies. FCC rules bar a broadcaster from owning more than one TV station in a market. Nor will broadcasters continue to find relief in LMAs. Others opine that TV LMAs are almost certainly going to become attributable, which will have the same effect as the duopoly ban. Any grandfathering of existing LMAs may last only for the life of the agreement.

On the positive side, many foresee some relaxation of the cross-ownership rules for television and radio and for newspaper and radio, but not for television and newspaper. However, most conclude that the FCC will not wrap up its rulemaking until a new chairman and three new commissioners are sworn in. ■

Harry Martin and Richard Estevez are attorneys with Fletcher, Heald & Hildreth, PLC., Rosslyn, VA.

dateline

Commercial stations in the following states must file their annual ownership reports by Aug. 1, 1997: California, Illinois, North Carolina, South Carolina and Wisconsin. TV stations in the following states must file their license renewal applications by Aug. 1, 1997: Illinois and Wisconsin. Tower owners in the following states must file their tower registrations on the dates indicated: Nebraska, Pennsylvania by July 1-31; Florida, Indiana by Aug. 1 through Sept. 30.

FCC eases up on interference rules for LPTV

Also in its DTV order, the FCC has:

- deleted the taboo restrictions on use of a channel seven channels below or 14 channels above the channel of another low-power station;
- permitted use of terrain shielding, so-called "Longley-Rice" showings and interference abatement techniques to show that a station will not cause interference to other low-power stations or to full-power NTSC stations;
- permitted low-power operators and applicants to agree to accept interference from other low-power stations;
- eliminated the requirement that low-power stations consider the full-power TV UHF taboo restrictions on Channels 2, 3, 4 or 5 (and in some instances, seven channels removed from an NTSC full-power station); and
- announced it will entertain requests to waive the interference restrictions where it can be shown that the low-power station will cause interference only in an area where the full-power station already receives interference from another full-power NTSC station; where a low-power station proposes to co-locate or nearly co-locate with an NTSC full-power station on the first adjacent channel above or below or the fourteenth adjacent channel below; and where the full-power NTSC station agrees to grant of the waiver. ■

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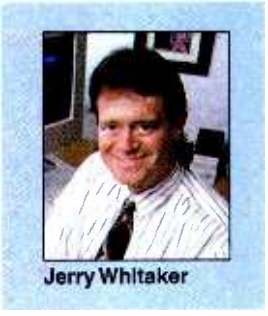
By Jerry Whitaker

Embedded audio

Digital technology has long held the promise of greater capabilities in concert with simplified operation and ease of installation. Although the promise and reality have not always coincided, in general, today's complex machines are usually easier to operate and simpler to connect than their predecessors. The promise of serial digital video has long been high performance and simple interconnection. Including audio as a part of the serial digital video datastream makes the package complete.


Jerry Whitaker

The SMPTE digital video standard refers to the process of audio signal multiplexing as embedded audio. AES-formatted digital audio signals are carried in the ancillary data space of serial digital video signals. This capability permits routing of video and accompanying multichannel audio through a single cable and through a single level of a routing switcher.

The benefits are obvious: elimination of multiple cables, elimination of tandem audio/video routers and elimination of audio-to-video timing considerations when switching. Embedded audio holds particular advantages for a facility (or portions of a facility) that route or pass signals through without modifying the content; in other words, for strictly audio-follow-video applications, such as uplink, STL and network feeds.

It is fair to note that timing considerations when using embedded audio do not disappear, they merely change form. The encoding/decoding process introduces delay into the audio element, just as it does with the video signal. For greatest flexibility, the serial digital system must be capable of delaying either the video or the audio to maintain synchronization between the two. These elements may necessitate additional expense and complexity, which must be balanced against the cost of additional audio levels in the routing matrix, and a separate level of audio wiring within the facility.

Despite its intrinsic benefits, embedded audio rapidly loses its appeal in facilities where breakaway switching is required. When either the video or audio of a combined datastream must be changed, the two signals must again be separated. Time delay compensation must be provided due to the delays introduced by this demultiplexer/multiplexer stage. The cost of the encoding/decoding hardware is also a consideration. Given these necessary tools, the desired changes can be made to the audio and/or video signal, after which the video and audio are recombined and sent on their way.

Inside AES/EBU

Most professional digital audio devices employ an output protocol developed jointly by the Audio Engineering Society and the European Broadcasting Union. This serial digital transmission format, known as AES/EBU, has seen several incarnations. The basic format was agreed to in 1985, and soon thereafter, equipment began showing up built to the standard, known at the time as AES3-1985. Subsequent revision in 1992 led to the standard in use today, AES3-1992. Figure 1 shows the basic framing structure of AES3-1992.

The AES/EBU format transmits and receives left and right channel information using a data rate that corresponds exactly to the source sampling frequency. One frame consists of two subframes, labeled A (left channel) and B (right channel), each consisting of 32 bits of information. Each subframe, in turn, contains data for one audio channel. The first four bits are used for synchronization and for preamble identification. The next 24 bits carry audio data, with the MSB transmitted last; for 16-bit audio, four of the bits are set to zero. The first four bits in the field are set aside for auxiliary audio or other data, as shown in the figure. The last four bits form a control field consisting of:

- *Validity bit* (V), which indicates if the previous audio sample is error-free.
- *User bit* (U), left uncommitted for a variety of user-related applications.
- *Channel status bit* (C), which is used to form a data block. For each channel, one block is formed from the channel status bit contained in 192 successive frames.
- *Parity bit* (P), which provides even parity for each subframe.

Sampling rate

The AES/EBU specification is capable of supporting sampling rate frequencies ranging from approximately 25kHz to 54kHz. Most equipment, however, will only operate at a given, specific sampling rate. Several standard rates have evolved over time; the most common ones being:

- 32kHz, used sparingly in broadcasting, with the exception of certain satellite distribution networks;

• 44.1kHz, the standard for the compact disc audio system;
• 48kHz, the professional standard used by most broadcasters for original recording and transmission.

Although professional digital video equipment almost always uses a 48kHz sampling rate for audio, TV stations and post-production facilities often use some quantity of CD-originated material in the production process, requiring them to deal with 44.1kHz audio as well. Such situations require the use of a sampling rate converter to avoid unnecessary A/D and D/A conversions. It should be noted, however, that although the rate conversion process operates in the digital domain, it is not completely transparent and can have an audible impact on the signal.

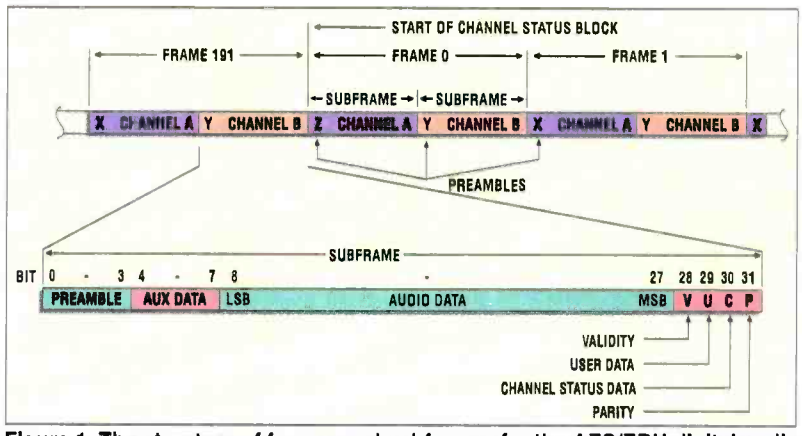
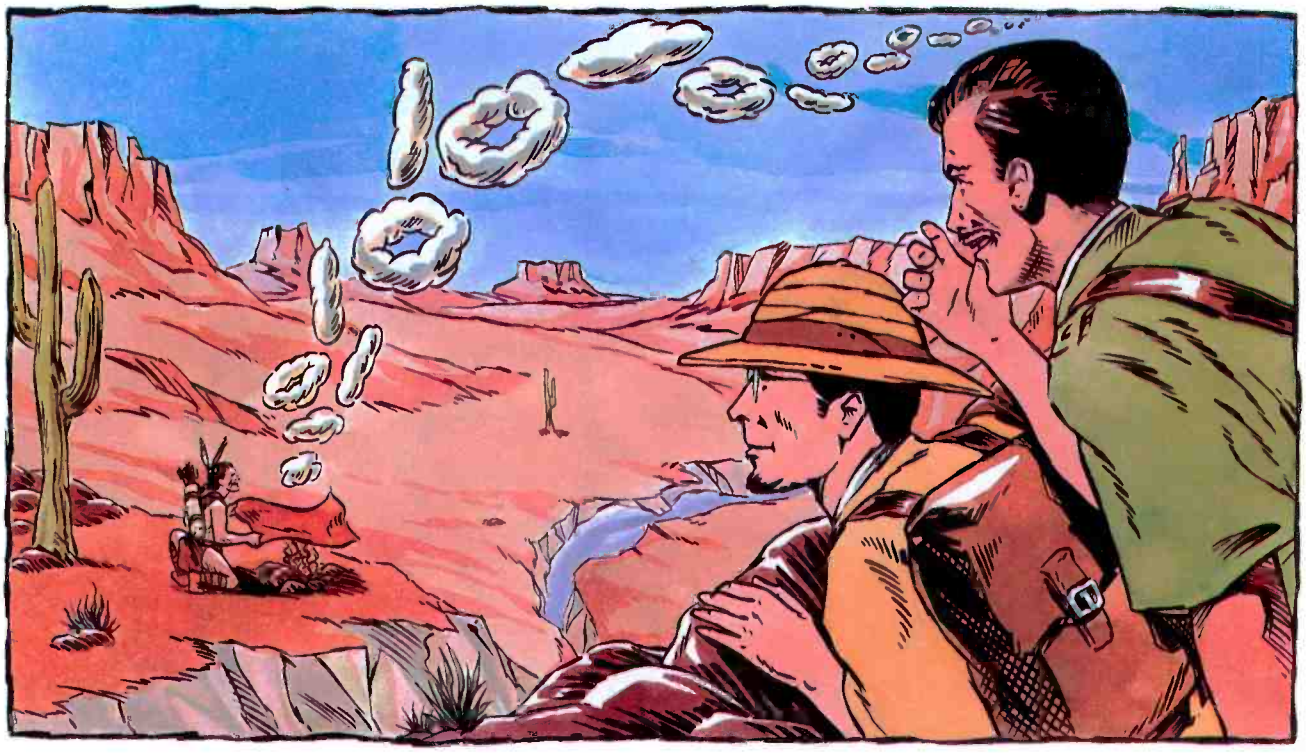


Figure 1. The structure of frames and subframes for the AES/EBU digital audio standard. (Source: AES3-1992.)

Sampling rate synchronization is a related issue for application of the AES/EBU protocol. Audio and video digital devices have their sampling rates determined by an internal oscillator/clock. This leads, predictably, to sampling rate variations between machines operating at the same nominal sampling rate. For example, consider two DAT machines running with 48kHz sampling rates and sitting side-by-side playing out material. It is possible, and perhaps likely, that the machines will drift with respect to a fixed 48kHz reference; they will tend to periodically drift in and out of synchronization. Such a loss of synchronization between devices can cause audible artifacts, typically pops and clicks when switching or otherwise processing the signals. The worst-case scenario is that the destination device will not recognize the incoming audio datastream. The result: dead air.



"LOOK WILCOX, THE DIGITAL COMMUNICATIONS TREND IS CATCHING ON EVERYWHERE," WHISPERED SNELL.

The obvious solution is to lock all of the audio equipment to a common reference, just as the video gear is. Most current-technology digital video equipment derives its video and audio clocks and sample rates from the same oscillator or time base. This being the case, the audio sampling rates should remain fixed and stable so long as the video equipment is referenced to a common source (either sync or composite blackburst). There are, however, problems with extending this gen-lock philosophy to the rest of the facility, including:

- Most digital audio gear will not accept a video signal as a reference. The reference input (if provided) on digital audio equipment is typically an AES/EBU port or a word clock signal from another digital audio device. (A word clock is a square wave signal at the sampling frequency used to synchronize digital audio devices.)
- Video equipment will not typically accept any of the audio reference signals for its video reference.

As you might suspect, the relative phase of the sample clocks is also important for proper operation of an AES/EBU-based digital audio system. The term *isochronous* is used to describe the "locked but not phased" condition; *synchronous*, on the other hand, describes two or more signals with coincident timing reference points. In order for an audio switch or mix to be clean and free of pops or other degradation, it must be made at the AES frame boundary, with the source and the destination devices having coincident frame boundaries and identical sampling frequencies. Frame discontinuities are the most common cause of pops and clicks in a digital audio system, and accurate timing between signals is the easiest way to eliminate them.

Back to video

Given the challenges of using AES/EBU digital audio in a production environment, it is clear that embedding audio in the serial digital video stream must be afforded careful consideration. The technology exists and is available today to greatly simplify cabling, routing and control functions within a TV facility. Careful consideration of what to tie together and where to tie it are the real keys to making embedded audio work for you. ■

Jerry Whitaker is a consulting editor for Broadcast Engineering *magazine.*

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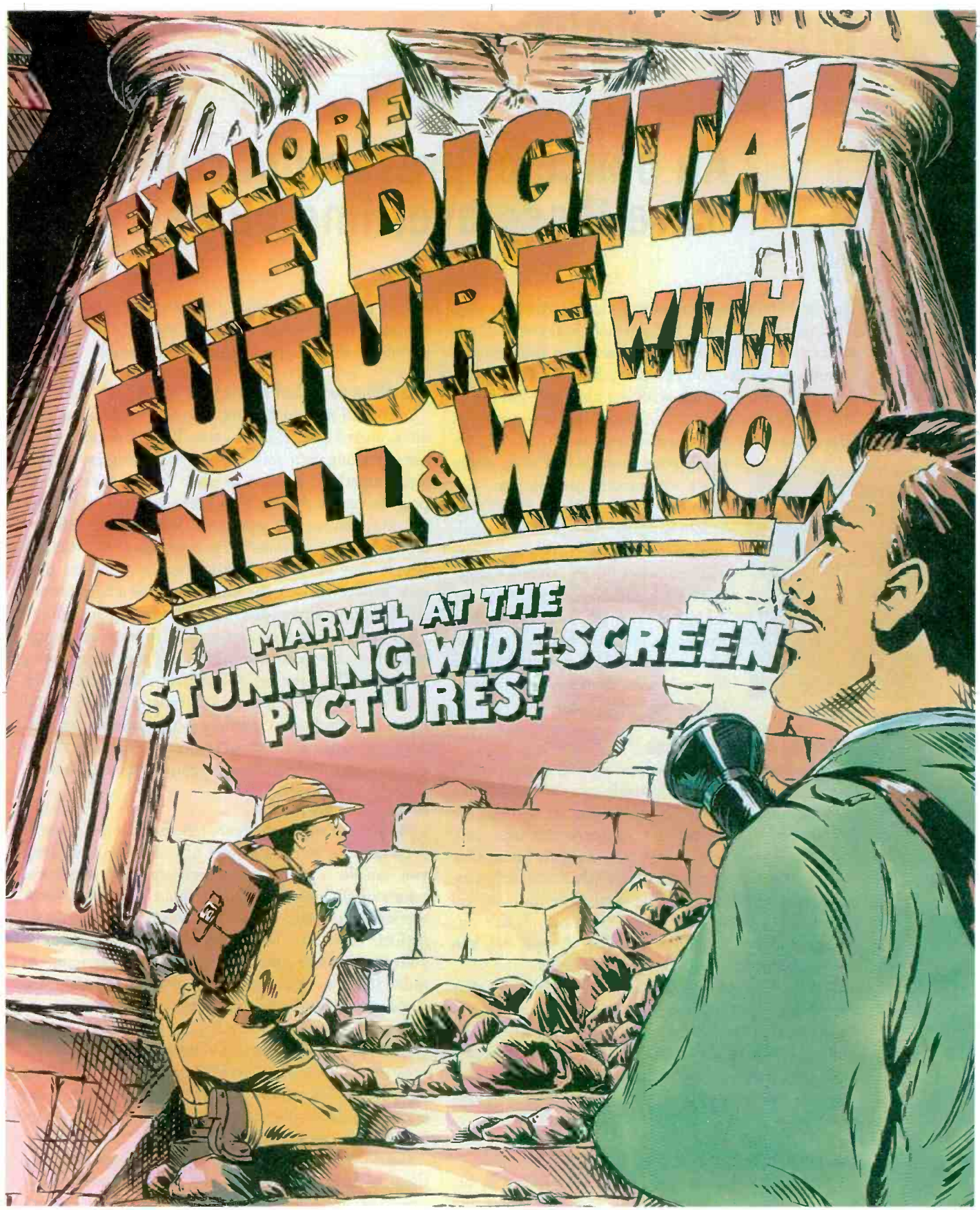
"CLEARLY THE RESULT OF AN EARLY EXPERIMENT IN COMPRESSION..." MUSED WILCOX.



SNELL & WILCOX

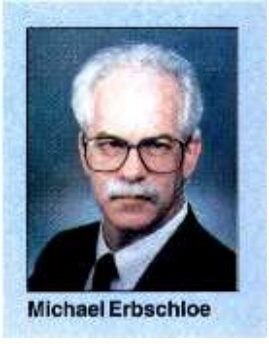
Engineering with Vision

Circle (6) on Free Info Card

By Michael Erbschloe

An ounce of prevention can cure those overtime blues

In the highly competitive broadcast industry, many managers with tight budgets and heavy workloads are expecting more out of their staff. As this pressure mounts, hopefully, you're among the lucky ones with a dedicated staff who are working hard and putting in long hours. Often times, the hours that they work can change dramatically from month to month. But through it all, your team is humming along like a well-maintained machine.


Michael Erbschloe

But beware! Serious problems may lurk beneath the surface of your hard-working team. When you manage staff that work long hours and change shifts frequently or are on call in the middle of the night, you are blending a biosocial cocktail that may result in physical, emotional or social disaster for your team members, not to mention facility or equipment break down.

Biological forces fight back

The human body has a natural rhythm that it prefers to follow. When it's light outside, we are alert. When it's dark outside, we like to sleep. When we are tired, we like to sleep. When we eat properly, our digestion, blood flow, breathing and temperament are better. Our bodies know their rhythm, and when our behavior patterns are in sync with that natural rhythm, we feel better, work better and enjoy life more. When our bodies and our behavior are out of sync, we can encounter health and emotional problems.

When our bodies are pushed beyond their limits, they fight back. Without enough rest and relaxation, exhaustion sets in, which in turn, disrupts all of our biological functioning. When this occurs, our mental capacities are impaired and our abilities to deal with complex problems and stressful situations decline rapidly.

Sociological forces take their toll

The stress caused by overtaxing ourselves goes beyond physical problems. We are social creatures and have a variety of relationships with our family, friends, lovers, neighbors and co-workers. These relationships can be demanding. Why? People in relationships want something — time, attention or affection. Like our bodies, when our social relationships are not properly attended to, we experience a backlash. This retaliation comes in many forms. Some people fight and others withdraw their support and become distant.

Stretching your staff beyond the limits

Your staff should be alert, highly functioning, creative, and of course, productive. If work requirements are stretching your staff beyond their limits, sooner or later something is going to give. You'll notice several possible trends. Absenteeism may go up. Illness may set in and spread among your staff. Morale problems and dissension may surface. Otherwise happy and friendly people may be grouchy and irritable. Conflicts may arise between people that normally have a harmonious relationship. Some people may get fed up and quit.

But worse things can happen. You may encounter more frequent production blunders that cost money and time. There is more of a chance of accidents when your staff are driving company vehicles, which could result in complicated lawsuits. Some may get careless with expensive station equipment. Others may take their frustrations out on your equipment or the facility.

An ounce of prevention

Did your grandmother ever tell you that an ounce of prevention is worth a pound of cure? The first thing you can do is come to an understanding about the potential biological and emotional impact of overworking your staff. The second thing you can do is set realistic schedules. Be careful of how much overtime your staff works and be careful about changing an individual's working hours too often or too abruptly. Rotate pager duty and emergency on-call duties.

Watch for signs of stress and poor functioning among your staff. You will find lots of variation in how people react to the stress of overtime and quickly changing schedules. This means that you need to know your staff. Be realistic about what their limitations are and keep an eye on behavior patterns.

Talk to your supervisor and other seasoned staff. Use them to help keep your finger on the pulse of the operation and encourage them to be attentive to signs of physical and emotional stress in others. ■

Michael Erbschloe is a management consultant, author and technical editor and teaches management courses at Oklahoma State University.

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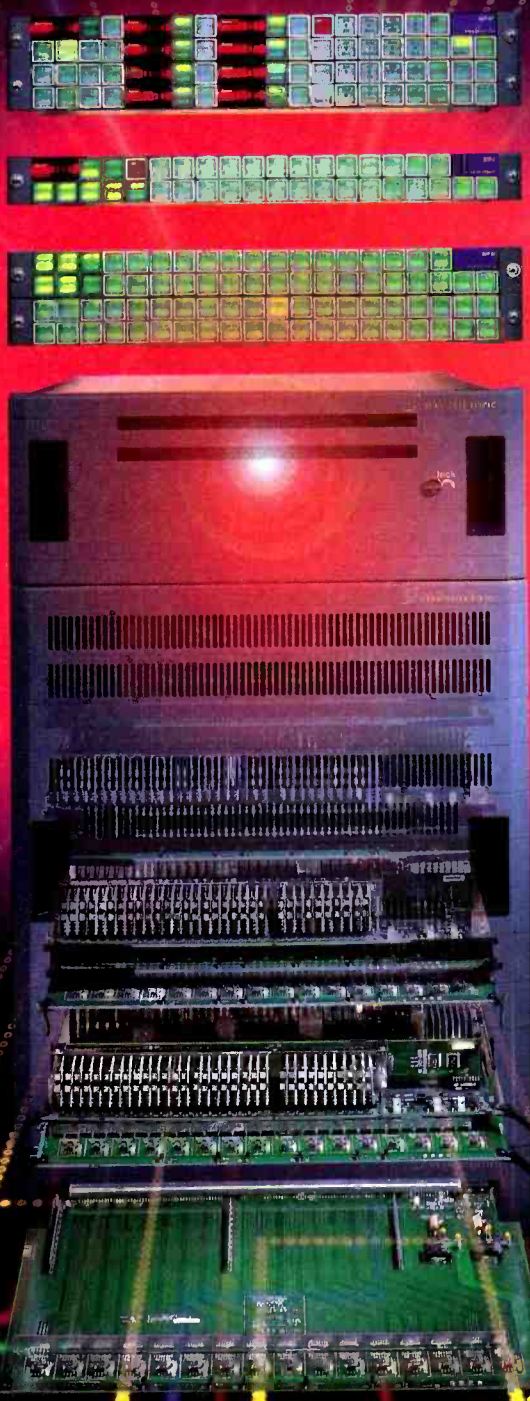

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Brad Gilmer

Selecting a network topology, part I

Computer networks are becoming more common in broadcast and production facilities. Often times, networks are an outgrowth of new equipment purchases or begin as small groups of users with a need to exchange data within a workgroup or between departments. You usually don't have the luxury of planning on how these small networks grow to be big networks. Changes in your operations require more networked equipment, and before you know it, you have a network with 30 or 40 computers, perhaps more. The problem with this kind of growth is that there can be performance problems lurking below the surface.

Brad Gilmer

Growing gremlins

Computer networks are designed to "get the mail through," no matter what. As a result, a network that grows without any plan may be costing you plenty. Your users might end up waiting long periods of time while the computers try over and over to send a message from one place to another.

Because changes in network performance can happen over months, or even years, as traffic on your network grows, it is difficult to remember how fast a particular application used to run. The problem is compounded when you consider that any waiting times are multiplied by the number of users on your network. Pretty soon, you can have a problem that is costing you some real money. Much of this can be avoided if you spend a little time up front taking a look at how networks do their work, and how you can segment areas of the network to avoid log jams.

This month, we will review some networking basics. Next month, we will discuss common network topologies you can use to optimize your system's traffic.

Networking 101

One of the key differentiating characteristics of a network is the kind of wire and connectors it employs. A 10Base-2 network uses RG-58 coaxial cable, BNC connectors and "T"s. This topology is inexpensive in terms of wiring and ease of installation and maintenance. It uses twisted pair non-shielded wire similar to telephone wiring and RJ-45 connectors (a larger version of the common RJ-11 telephone connector). The wiring is inexpensive and can be easily terminated with inexpensive tools. Thicknet, which is expensive and mostly obsolete, featured RG-11 cable with AUI boxes, sometimes called vampire taps, to clamp directly to the RG-11 cable, piercing the cable to make the connection. A 100Base-T is a network based on fiber-optic cable, with a 100Mb data rate.

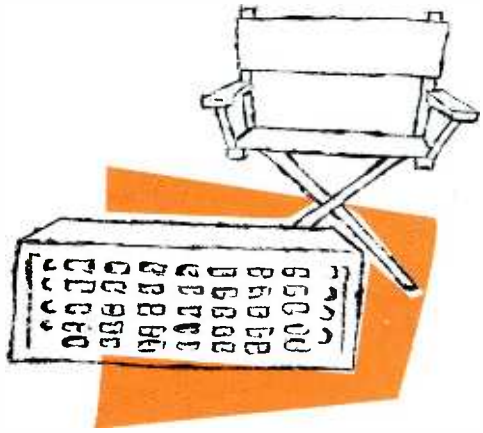
The "10" in 10Base-T and 10Base-2 signifies that the network is designed to handle a 10MB data rate. For a number of reasons, actual throughput in these networks usually averages around 6MB to 8Mb. With an improper network design, those numbers can be much lower. The designation of Base-2 or Base-T originally had to do with maximum cable length allowed on the network.

Layered standards

One of the great advances in standards is evident in the implementation of computer networks. The networking standards follow the five-layer open systems model (OSM). These standards allow for the same conversation to be supported between computers regardless of the physical form of the wire connecting them. So, for example, you can connect two computers with 10Base-T cabling or 10Base-2 cabling and they will work either way. That is because the OSM model allows you to change components at one layer without affecting other layers of the networking system (usually). In this case, you can change components of the physical layer without affecting the user application. This interchangability applies to protocols as you will see below.

Computer talk

One of the big issues to be resolved early in the history of computer networking was what language the computers would use to talk to each other. I'm not referring to "C" or Visual Basic. Instead, I'm referring to the protocol. Ethernet IEEE 802.3 is the primary protocol, or language, used to communicate between desktop computers over a network. The protocol resolves such issues as address space and convention, payload size, error correction and so on. Ethernet does not care what is being carried as a message in the payload portion of the data packet, but it cares about



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how addresses are formatted and assigned. It also cares about the overall length of packets.

The application layer, which resides above the protocol, does not need to know about packet lengths or addresses. All it needs to do is say, "Here is the data and I want you to send it to this place." The Ethernet driver handles the rest. Again, the OSM model allows you to change out this driver and your Ethernet card without having to re-write your E-mail or automation application. This can save you a significant amount of money over the long run.

Collision

Simple computer networks act a lot like old-fashioned telephone party lines. If you hook several computers together using a network, all communication that takes place between any two computers (or a computer and a server) can be listened to by all the computers on the network. When a computer is ready to send a message over the network, it checks the party line to see if it's in use. If it is, the computer defers its transmission until the network is clear. Every now and then, two computers will check the network, see that it is clear and then blast away simultaneously, creating a data collision. The network interface cards (NICs) detect that a collision has occurred, stop transmitting and then wait a random amount of time before trying again. This wait time is known as the *backoff* time.

Because both cards back off a random amount of time before trying to communicate again, the chance of another collision is extremely low. This method of collision detection and backoff works great as long as the load on the network is not too heavy. However, if the network is saturated, you can encounter situations where the NIC backs off randomly, and then tries again, only to collide with another computer. If the traffic on the network is heavy enough, the whole network may lock up causing time-out errors and other problems.

Because of the way networks handle collisions, it's impossible to know for sure when your message will arrive at another computer. It all depends on how busy the network is. This is no big problem when dealing with applications like E-mail and databases, but if you are trying to switch video with frame accuracy, trouble can develop quickly.

With this basic introduction, next month we will look at how specific network topologies can help you solve some of the problems detailed above. ■

Brad Gilmer is director of advanced network operations & technology for Turner Entertainment Networks.

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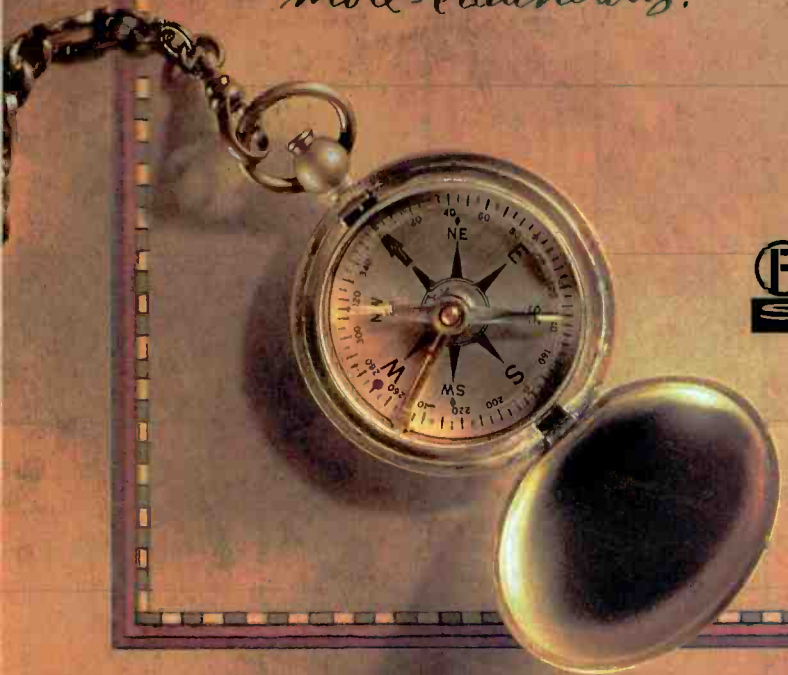

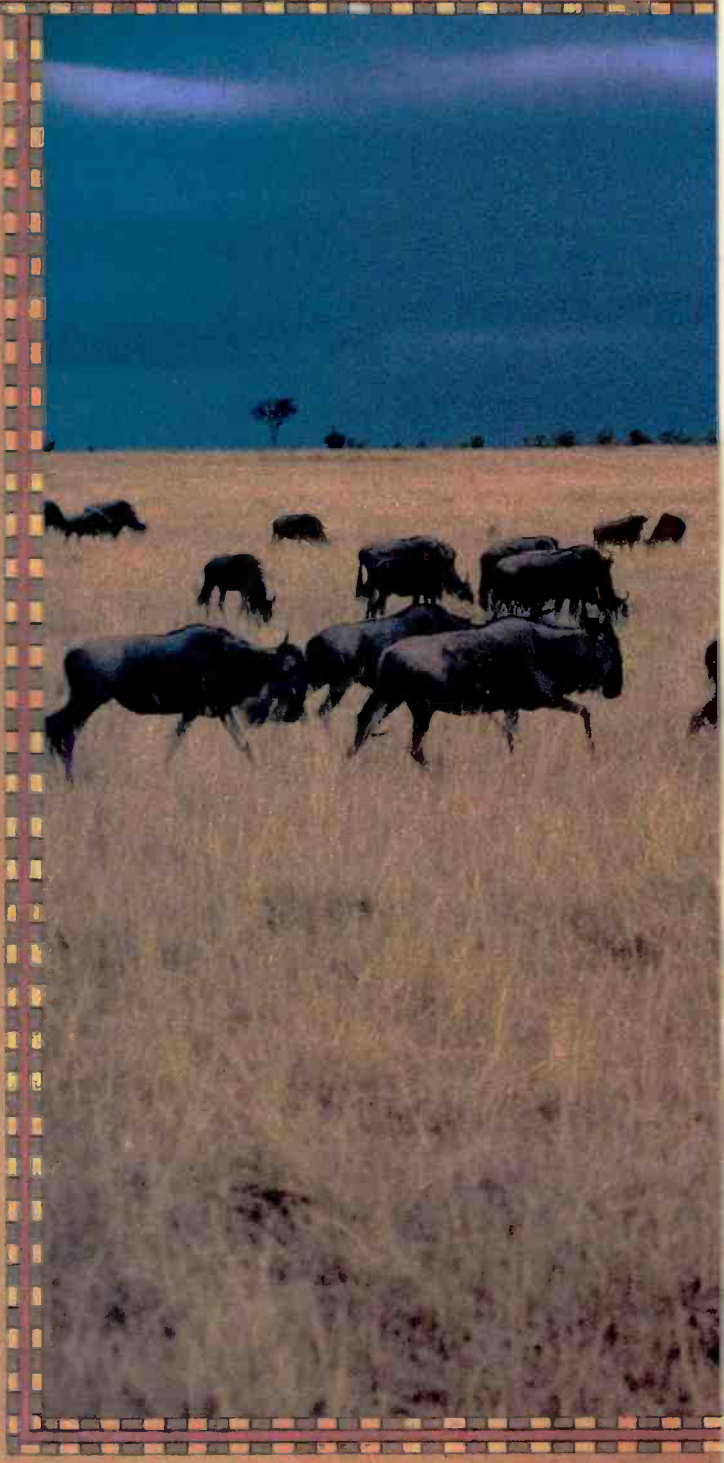

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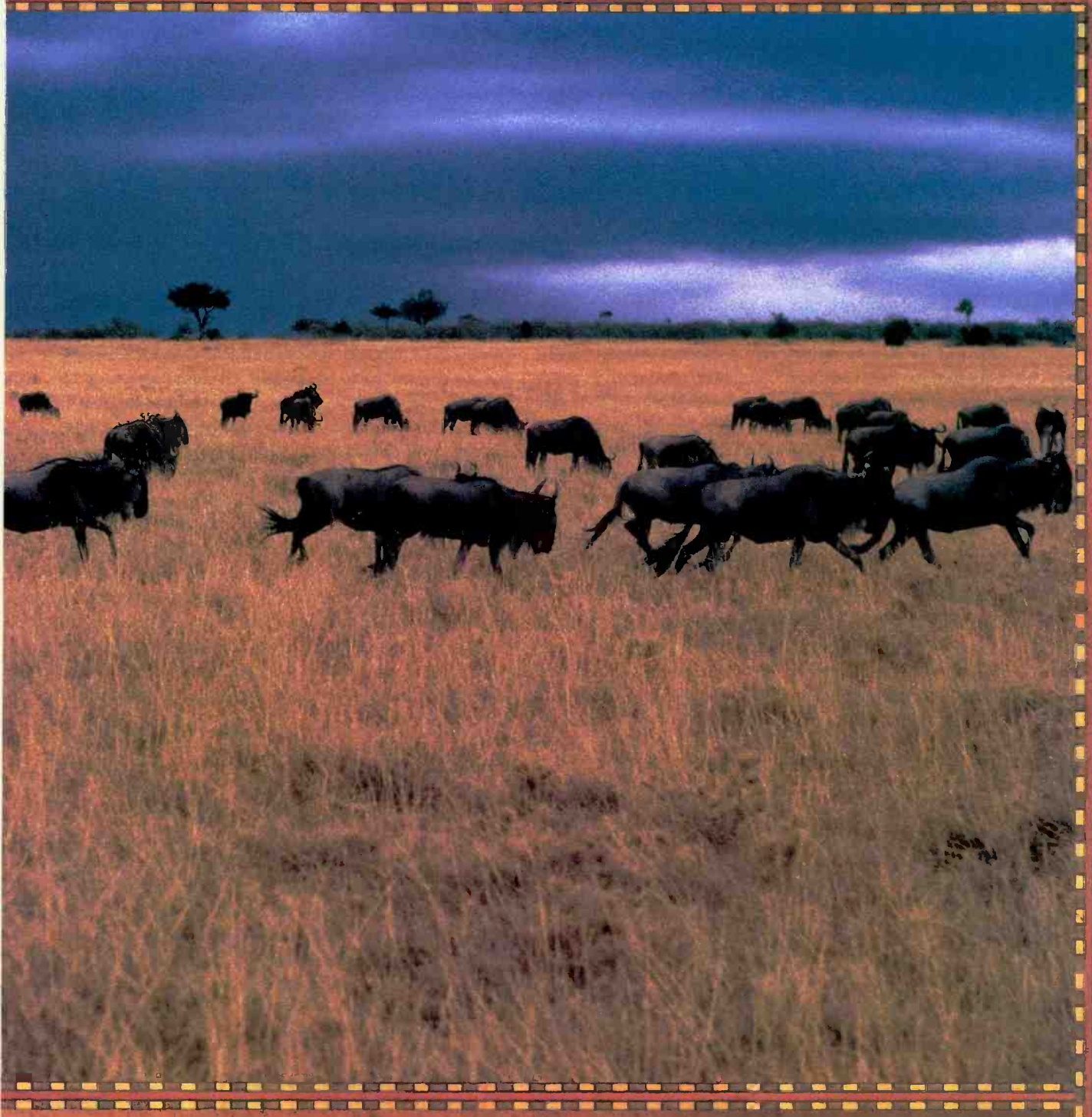

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digital DREAM Digital Dream Kids

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By Peter Bryenton

Lighting on location

When you are out in the field having to setup lighting equipment, one rule of the road is to *travel light*. Having to carry a camera, tripod, tapes, batteries, lights, extension cables and sundry other paraphernalia as a single person teaches you to juggle successfully or leaves you with a healthy respect for automatic doors.

In keeping your load light, try to manage with a box of three portable lamps. For a "talking head" shot, a *key*, *filler* and *backlight* are used for traditional three-point lighting. In lighting, lamp names generally relate to their functions:

- *Key* makes the main modeling statement.
- The *filler* lightens the shadows made by the key. These may look acceptable to our eyes, but video has a less forgiving dark response. The tonal values of shadows need to be raised artificially by filling them with light to overcome the technical limitations of the TV process.

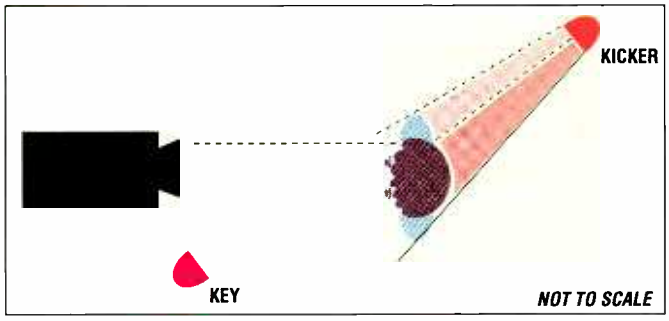

Figure 1. The "key and kicker" technique. Key provides main frontal light, while kicker serves double duty as backlight and shadow filler as it bounces off the dark side of the face and reflects toward the camera.

Ideally, this fill needs to be undetectable. Consider intangible light at the dawn of the day. It seems to illuminate everything, while appearing to come from nowhere (because its source is still below the horizon). Unfortunately, for lighting folk, that kind of light doesn't come on a stand. The best you can do is use a soft filler, which is there simply as a technical fix for the shadow-blind video camera.

- A *backlight* separates foreground from background wherever dark tones coincide. Our video system is really a low-resolution imaging process. It has become a convention to rim subjects with light from behind to preserve edges. Because people look odd with a lighting stand sprouting from their heads, a single backlight must be placed off to one side. I usually allow about five minutes for rigging, setting and dressing each lamp I use, so key, filler and backlight technique can eat up 15 precious minutes.

With three lamps burning nicely, Murphy's Law always comes into play: *Bang*! One of the bulbs blows just as you start to record. This leaves you in the embarrassing position of either having to burn your fingers changing a lamp in a red-hot head or waiting for what seems like an eternity for things to cool down. As the tension on the production mounts during those unbearably lengthy minutes, you usually end with up with a hot head yourself. You may be forgiven for wondering why we don't get four lamps in a box these days. A spare would certainly leave you looking cool, although lugging that extra weight around might not leave you feeling cool.

A different approach

How about a setup that looks like three lamps but only uses two? *Key and kicker* does this. The third lamp stays in the box until needed; then it can be produced with a confident flourish to accent a potted plant or relieve a dull background.

Figure 1 shows how one part of the kicker puts light into the dark side of the face by bouncing it off the skin straight toward the camera lens. This makes a highlight called a *kick* right where most of the shadows from the key would have fallen. The rest of the beam rims the subject. Careful barn-dooring keeps flare out of the camera lens.

The exact position of each lamp depends on individual attributes of the talent, such as facial features, skin tone and hair type. The lighting balance dictates contrast and is a function of the relative output from each lamp. Exposure can be varied by altering a lamp's distance or modifying its effect by dressing it with *silks*, neutral-density gels or wire scrims. One portion of the kicker can be treated appropriately for the skin tone, leaving the other part for the hair color and texture. Then it really becomes two lamps in one.

Using key and kicker you'll gain a reputation for clean images, while saving time and your back. ■

Peter Bryenton is a lecturer at the BBC's Centre for Broadcast Skills, Worcestershire, UK.

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Circle (17) on Free Info Card

By Steven Blumenfeld and Mark Dillon

Making $$$ with TV-web partnerships

As millions of Americans watched Ellen come out on ABC, hundreds were chatting about it on the Internet. This is an amazing phenomenon — people on-line discussing what is going on in television and a number of sites are popping up that are dedicated to this type of entertainment.

Mark Dillon and Steven M. Blumenfeld

Chat TV

First, let's look at a start-up service called Chat TV. This free service recently went on-line and is accessible with any major web browser that allows the I-Chat plug-in. It attempts to give a voice to millions of TV viewers, as the action happens.

Specifically, Chat TV provides an on-line channel guide where the users can check to see which TV shows are currently on air. A chat room is available for every TV show. As you can imagine, as broadcast and the Internet converge, services like this will allow the audience to have direct contact with the shows' creators. Also, with the advent of full-screen video over IP, the possibility to have a chat (text, audio or video) with others in real time becomes a reality. All it takes is bandwidth and some genius programmers/network engineers.

Chat TV claims to support "family values" and has taken measures to ensure that the Chat TV chat rooms remain free of offensive content, so parents can feel safe about letting their children use the service. The web site contains a software "nanny" that continuously monitors the chat rooms for inappropriate language and conversations. The nanny gives you one warning before you are kicked out of the system.

So, how does a service like this make money? Advertising, of course. Chat TV plans to make money by following the Network Television model for advertising. There are national advertisements that Chat TV will sell, and these banners will have broad appeal to the sites' users. Additionally, local advertisements/sponsors will be sold by local TV stations affiliating with Chat TV.

Making money from the web

Another Internet TV site coming on-line is CityWeb, a venture between Warner Brothers, CNN Interactive, PEOPLE Online, Lycos, Netscape and Telepictures Distribution. Its charter is to enable local TV stations to establish customized, market-specific, revenue-generating web sites.

CityWeb will sign an exclusive agreement with one TV station per market and provide affiliates with the structure and packaging to establish their own station-specific, fully branded web sites with revenue-producing capabilities. Each affiliate can offer its audience local, national and international news; weather; sports; TV listings; community affairs; and original programming for men, women, children and teens. In addition, each affiliate can offer classified advertising, educational information and interactive educational support.

"We see this as the second great evolution in the history of local broadcasting — allowing stations to extend their local TV franchise into the new interactive on-line medium," said Jim Moloshok, senior vice president, Warner Brothers Online. "Just as radio stations evolved their local franchises into brand-new television franchises 50 years ago, CityWeb allows a TV station to evolve its present franchise and reputation for servicing its community into the interactive world. It allows stations to protect and extend the brand that they have spent the last half-century building, while positioning themselves for the digital future of their industry."

The site will be completely branded by the local station/affiliate and will provide new revenue streams for the affiliates. Web advertising, classified ads, coupons and promotions will be the vehicles for generating money and also ratings (hits/page). The proposed interface will allow the affiliates to offer on-line advertisements that will appeal to the station's current clients and hopefully attract new ones.

In this new era where televisions are supposed to become computers and the distinction between broadcast video and the Internet narrows, there will be opportunities for new types of revenue-generating entertainment. It's our responsibility to identify these early on and move decisively to capture market and mind share. ■

Steven Blumenfeld is general manager for GTE Internet Television, and Mark Dillon is vice president, on-line services with GTE, Carlsbad, CA.

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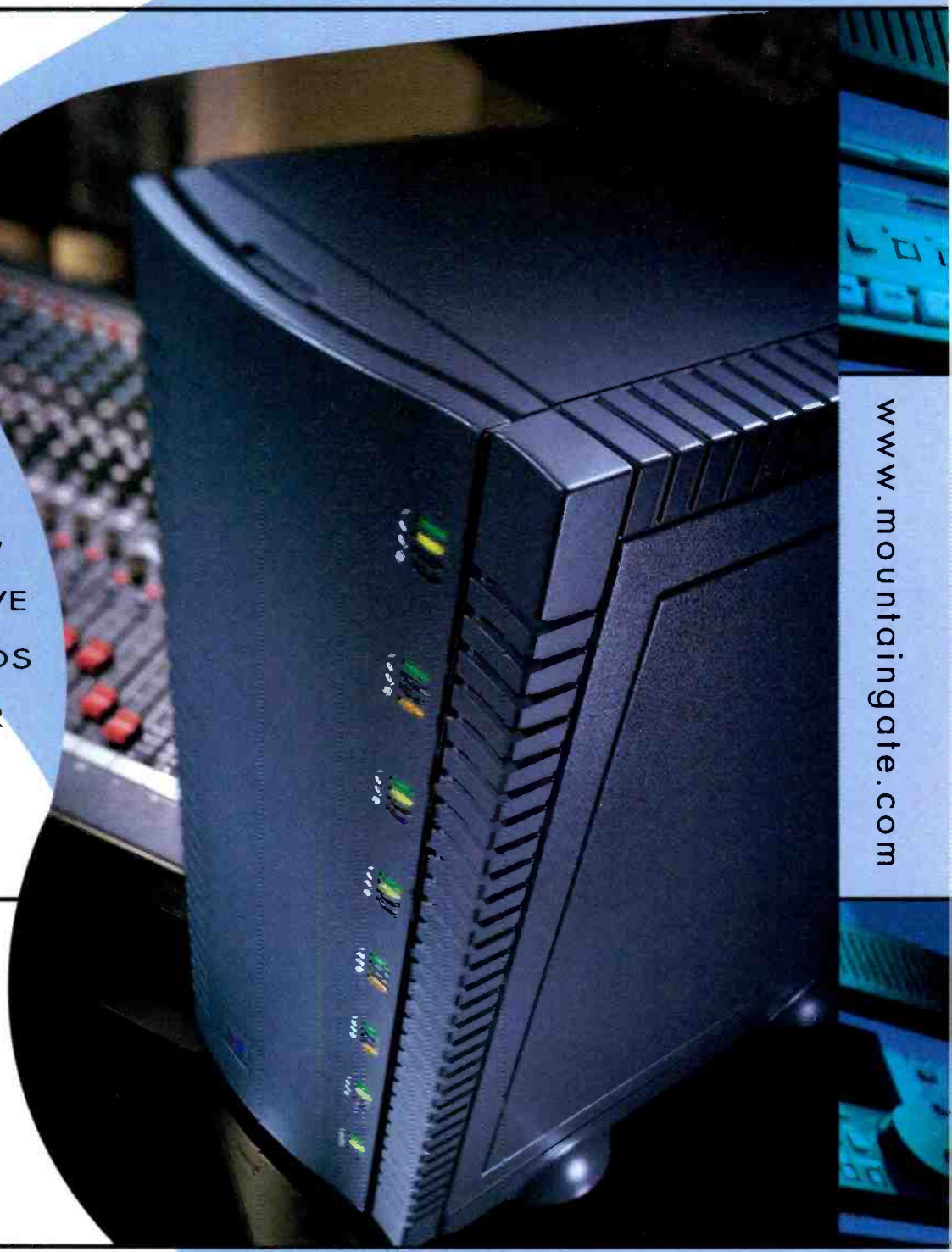

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By Louis Libin

The DTV allotment and assignment

The FCC has done a terrific job of assigning second channels to every TV station in the continental United States. According to the FCC numbers, most will be able to replicate their coverage, and in a great number of cases, actually do better with their DTV channel, both in terms of replication, as well as picking up new populations for the DTV service. However, as broadcasters evaluate the FCC's allotment/assignment software and channel assignment process, they have unearthed some potential flaws in the commission's work.


Louis Libin

One area in particular under scrutiny is the methodology the commission used in assigning the second channels. Another fundamental problem in replicating the FCC's work is simply the lack of proper documentation to know what's been done. The commission's sixth Report and Order released last month makes several references to a technical publication, OET Bulletin No. 69, which is supposed to detail the FCC's methodology. Unfortunately, this document is currently being written.

These factors make it more unlikely that broadcasters are going to "buy into" the commission's channel allocation scheme. And these problems create an interesting scenario for the FCC's timetable of a 30-day period for consideration.

The use of directional antennas

Unknown to some is that the FCC assumed a hypothetical directional antenna pattern for most DTV stations. This pattern is a result of a process that calculates the necessary DTV ERP to replicate a station's NTSC Grade B contour. This is done along azimuths from the NTSC stations at 5° intervals. However, because of the propagation differences in VHF and UHF signals, the power required to replicate an NTSC (50, 50) Grade B service area signal by a DTV F (50, 90) can vary along different azimuths. These varying ERPs produce hypothetical antenna patterns. The power levels published in the FCC DTV tables are the maximum values necessary to achieve replication of NTSC service area.

Stations currently using non-directional NTSC antennas will probably want to use non-directional DTV antennas. Unfortunately, the FCC did not follow this assumption and there is no requirement in the new DTV rules to use a directional antenna. However, the service, interference, population and area data in the FCC table are based on the use of these hypothetical directional antennas. Although many stations have minimum/maximum ratios that are so low they may be considered non-directional, some stations have minimum/maximum ratios on the order of 3dB or more, which for all purposes, results in directional patterns.

The commission must clarify "hypothetical directional antennas" under the reconsideration. A non-directional NTSC station should be able to operate as a non-directional DTV station. If in the table, the FCC said that your stations' new DTV coverage is now directional, and your station chooses to putup anomnidirectional antenna, you will not get full replication. For example, a station might ask for omni at 3dB down, but will remain within the NTSC envelop—the implication will be that you have given up your NTSC contour and now you are a smaller contour, a "subcontour" of your NTSC.

Also when you go to an antenna manufacturer and say, "Here is my theoretical pattern, can you match this?" It is unlikely that the manufacturer will be able to match the pattern exactly. So your station will take a second hit. That is the perceived reality of the FCC's methodology. That is the reason we need to see the FCC OET Bulletin 69.

The FCC has to come up with a definition: What is the definition of diminimus? 1dB, 2dB or 3dB? That is, if your pattern is directional and is within 2dB or 3dB, go ahead and use your omni pattern. Don't worry about it, it is diminimus —the difference is the noise. It is in the publics' benefit to define a minimum/maximum ratio of zero to 3dB that would fall into diminimus and within those numbers, the use of an omnidirectional pattern is possible.

Terrain and power issues

In the past, the FCC used a 30-second terrain database. In this case, the FCC used the higher-resolution three-second database, but extracted the data at a significant distance. This extraction gave the apparent resolution of a 30-second database. Thus, the terrain is averaged over two to 10 miles.

The power capping for DTV of 1MW lowered the

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required transmit power for a large number of stations.

Because UHF reception is line-of-sight, it's important that the correct terrain be included in any channel assignment program. The Longley-Rice predictive program, developed by the Institute for Telecommunications Sciences (ITS), is being used by the commission to check individual station studies where changes are requested. However, this ITS program was not used by the FCC for the nationwide assignment of DTV stations because the commission claimed the program's higher terrain resolution would require much more run time.

Land-mobile

Another major DTV channel assignment issue centers on the protection of land-mobile radio services in certain cities. The Broadcasters Caucus assignment plan, as well as all past FCC assignment plans, never before protected adjacent channels. It was believed that, technically, spurious emissions could be filtered out. The large land-mobile manufacturers said, "Just provide us with 25 miles of protection and that is sufficient."

However, in the new allocation table, the FCC gave full protection to land-mobile in the top 13 markets. Each must be protected, as though each was a true DTV assignment. The result is that some important DTV assignments were removed from the available pool of frequencies.

Reduced headroom and build-out difficulties

The FCC has not made clear "What is service area?" There are two service areas: protected and interference-free. The NTSC Grade B contour was never considered interference free. In all likelihood, DTV service area will not be interference free. It is most similar to NTSC. The FCC said in the adopted rules — Longley-Rice predicted F (50,90) is limited by noise — there will be interference in that contour, but not much.

What should stations do?

Stations should go through the replication process and take issue if they see a major difference with their new contours. Chief engineers should carefully read Appendix B of the adopted rules, pages B1 and B2. They should ensure that their station is maximized and not bound because the commission decided why waste power over the water, for example. Each station needs to determine its own interference statistics. Look closely at your predicted contours (from more than one source). The station managers must then determine how they are positioned for digital market penetration and the transmission of digital services. ■

Louis Libin is a broadcast/FCC consultant in New York and Washington.

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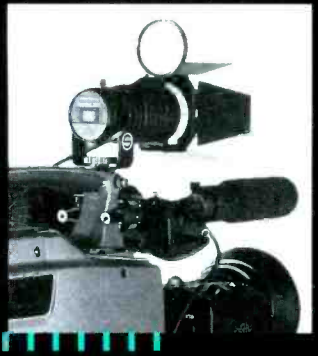

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By Steve Epstein, technical editor

Cameras for cable

Cable companies looking to expand their operations many times find that a likely area is local production and/or news. Typically, local production consists of programming and/or commercials. Although cameras for ENG/EFP and studio use are available, cable operations typically don't have the budget for these specialized models. More than likely, one to three matching cameras will be purchased that must be used for all applications. To make matters worse, many times these cameras will be used by inexperienced operators. Faced with the scenario of having to purchase an all-purpose, easy-to-operate camera, where do you start?

Choosing the camera

In most applications, the cameras will not be used in a "live" situation, and, therefore, a recording needs to be made. In the field, onboard recording is desirable. However, for studio applications, the camera's signal will typically be recorded after going through the production switcher. Although dockable units are the most flexible, in many situations, it's rare that the units will be "undocked." If that's the case, a camcorder may provide all the required features at a lower price. Whichever you choose, the recording format should be compatible with existing studio equipment.

For cable LO, cameras have to do field and studio work. (Photo courtesy of TCI Media Services, Manhattan, KS.)

For field use, typical production applications require reasonable record times (20 minutes), battery life of at least one full tape (two would be better) and the ability to connect one or two external microphones. Depending on the mics used, phantom power may be desirable. During production shoots, it's often necessary to playback the recorded footage on a monitor. Not all cameras or camcorders are capable of doing this without an adapter. The cost of the adapter needs to be considered, as well as the possibility of needing it in the field when it's still back at the studio. Having this capability built-in makes things easier on everyone.

If the camera is to be used for news, mounts for lights and a shotgun microphone will be required, as well as at least one input for an external microphone. Longer battery life, or at least higher battery capacity, can be helpful, especially in situations where crews may have to run entirely on batteries. Batteries are heavy and adding cells to the back of the camera simply adds to the camera operator's load.

. . . and the accessories

Many cameras come with a particular lens standard. However, the standard lens may not be the most desirable for all-purpose operation. Take the time to determine the best lens for your needs. Rental or loaner lenses are available before and after you purchase the camera and as expensive as a good lens is, it's usually less than an additional camera. Adapters are also available that extend the range of your current lens. These can be purchased from several sources and can add to the versatility of the unit.

Additionally, you'll need to consider support options such as tripods. Durable, lightweight units are available that provide stable platforms and can be used in studio and field operations. If you intend to use the cameras in the studio, remote CCUs (camera control units) simplify setup and operation. Teleprompters are also a consideration in many production settings. By determining all the options up front, one or two field packages can be assembled that make it easy to meet the majority of your production/news needs with a minimum amount of equipment and expense. ■

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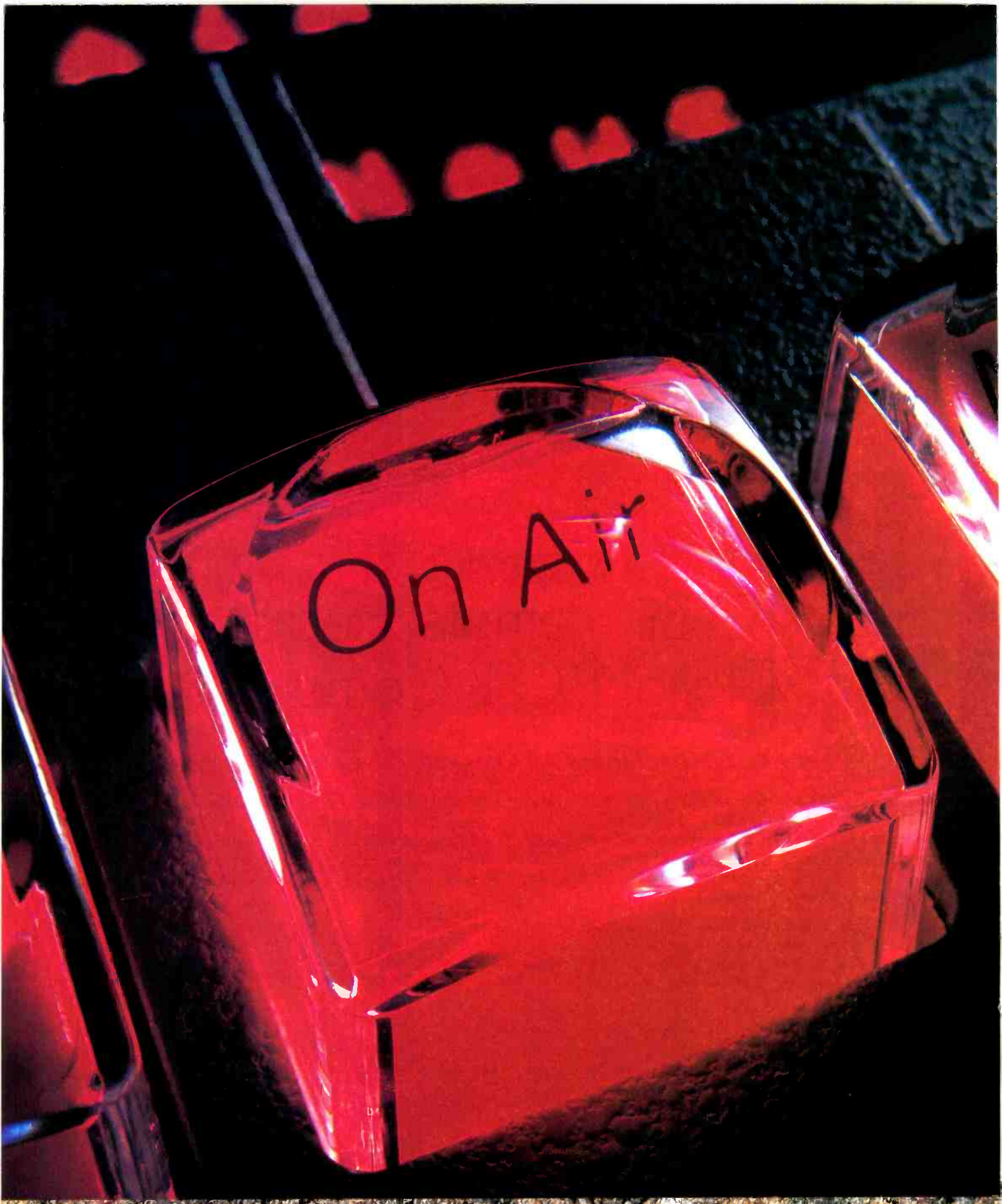

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Pick Hits of NAB 97

By Steve Epstein, technical editor

Started in 1985, the *Broadcast Engineering* Pick Hits awards are the oldest publication awards given as part of the NAB convention. They are considered to be the most prestigious awards of the show. They are also the *only* awards chosen *on-site* by a panel of experts.

In 13 years of Pick Hits, only 260 Pick Hits have been awarded. Other publications have given that many away in the last year or two. *Every* Pick Hit is awarded for technical merit; the winners are among an exclusive group and can be proud of that fact.

Our judges represent the real visionaries and leaders in their respective areas. They are VPs of engineering, directors of engineering or chief engineers of large and small facilities, including major broadcast, cable and post facilities. They work within budgets and report to supervisors just like you do. Although collectively they may consider many millions of dollars in equipment purchases, they still have a responsibility to their superiors and to the bottom line. Next month and next year, they will have to live with their equipment decisions just like you do. So in random order, here are this year's winners.

Snell & Wilcox HD50 upconverter

The HD50 provides upconversion of standard-definition TV signals to analog HDTV. Aspect ratio control, noise reduction and color correction can be done on 525 or 625 signals. 16:9 and 4:3 aspect ratios are switch-selectable. The unit supports 1,080 and 1,035 active line interlace signals, as well as 720 active line progressive signals. Component inputs and outputs are standard, with eight-bit processing throughout the unit. An optional composite analog decoder is available. Remote control can be accomplished using the Snell & Wilcox Rollcall interface or through a standard RS-422 connection. (Photo unavailable.)

Snell & Wilcox, 1289 Hammerwood Ave., Sunnyvale, CA 94089; 408-260-1000; fax 408-260-2800; www.snellwilcox.com

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Snell & Wilcox MVA100 MPEG video analysis

The MVA100 is an MPEG-2 video analyzer that provides information about how images are encoded. The MVA100 makes it possible to verify the performance of MPEG-2 encoders and decoders. Real-time analysis of data at the picture, slice and macroblock levels is possible with this unit because it can display prediction error, predicted or decoded pictures and can overlay vectors or prediction modes on the video output in real time. Along with capture and playback of short sequences combined with data analysis, the unit includes a high-quality decoder. Separate and independent decoder and analyzer video outputs are provided for flexibility and ease-of-use. (Photo unavailable.)

Snell & Wilcox, 1289 Hammerwood Ave., Sunnyvale, CA 94089; 408-260-1000; fax 408-260-2800; www.snellwilcox.com

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Tektronix Grass Valley M-2100 digital master control system

For those looking to upgrade their master control switchers, the M-2100 addresses the requirements for today's component digital facilities, as well as tomorrow's multichannel needs. The M-2100 makes it easy to move from single- to multichannel operations using only one control panel. Extensive keying capabilities, separate and embedded internal digital audio processing, along with a variety of software-enabled options, provide users with the flexibility needed to meet the demands of the future. Up to 16 on-air channels can be controlled from a single panel. Squeeze-Back effects provide an integrated DVE squeeze-and-tease effect along with image positioning and resizing capabilities. An external background input can be used for a variety of promotional purposes in conjunction with SqeezeBack effects and without the need for an external DVE.

Tektronix Video & Network Division, P.O. Box 500 M/S 58-965, Beaverton, OR 97077-0001;800-547-8949; fax 503-627-7275; www.tek.com/vnd

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Telecast Fiber Systems Cobra fiber-optic triaxial interface

The Cobra triax-to-fiber interface is a fiber-optic camera snake system designed to extend or replace triax cable in remote production environments. With Cobra, both the camera and CCU ends are mounted in portable Mussel shells with triax cable in and out. It is compatible with Ikegami and Sony systems, and all two-way triax functions are provided through a single fiber. Distances of up to 10km are possible without repeaters. Cobra provides power along with all necessary signals to the camera and does so without the need to modify cameras, vehicles or the CCUs.

Telecast Fiber Systems, 102 Grove St., Worcester, MA 01605; 508-754-4858; fax 508-752-1520; www.telecast-fiber.com

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Sony Electronics HDW-500 HD recorder

The HDW-500 is a ½-inch videocassette recorder that is part of Sony's new high-definition studio VTR system called HDCAM. The deck is the same size as a Digital Betacam deck, and it operates in a similar manner making it easy to upgrade facilities to the new format without extensive remodeling and retraining. These units use the same size cassettes as Digital Betacam and offer two hours of recording time on a large cassette. I/O is a standard HD SDI signal and optional 525 system outputs allow the deck to be used in various applications. An enhanced video-processing board provides improved video quality, variable speed playback and bidirectional vertical filtering between the two 1,125 active line standards of 1,080 and 1,035. Four 20-bit/48kHz audio channels with analog or digital I/O round out this latest VTR from Sony.

Sony Electronics, Sony Dr., Park Ridge NJ 07656;
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Modulation Sciences msi 320 precision video demodulator

The msi 320 precision video demodulator offers documented performance with features that include a Nyquist SAW filter, selectable line zero-carrier reference, synchronous video detection and continuous all-channel tuning. Each rack-mountable unit comes with a documented performance report for quality assurance. The msi 320 is designed for use at the studio or transmitter and features a streamlined, easy-to-read front panel. Other features include wideband composite aural, quadrature output for ICPM measurement and a choice of non-intercarrier or quasi-parallel aural. Options include measurement-grade BTSC stereo and high RF sensitivity. Status alarms are provided for sync, audio and RF.

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Philips VS-4 video sweetener

The concept of sweetening audio is a familiar one, and now there is video sweetening. Philips VS-4 video sweetener is a result of the experience gained from three generations of noise reducers. The VS-4 includes completely redesigned processors for noise and grain reduction, dirt and scratch concealment and contour enhancement. A PC-based GUI improves user control and allows scene-by-scene programming. The standard unit provides 4:2:2 processing, with an upgrade path to 4:4:4. Besides the 4:4:4 upgrade, other options include an MPEG pre-filter and a contour processor with "Digital Make Up" to enable operators to solve problems considered insoluble. Applications for the video sweetener include film post-production, MPEG encoding and tape duplication, archiving and re-mastering among others.

Philips Broadcast Television Systems, 94 W. Cochran St.,
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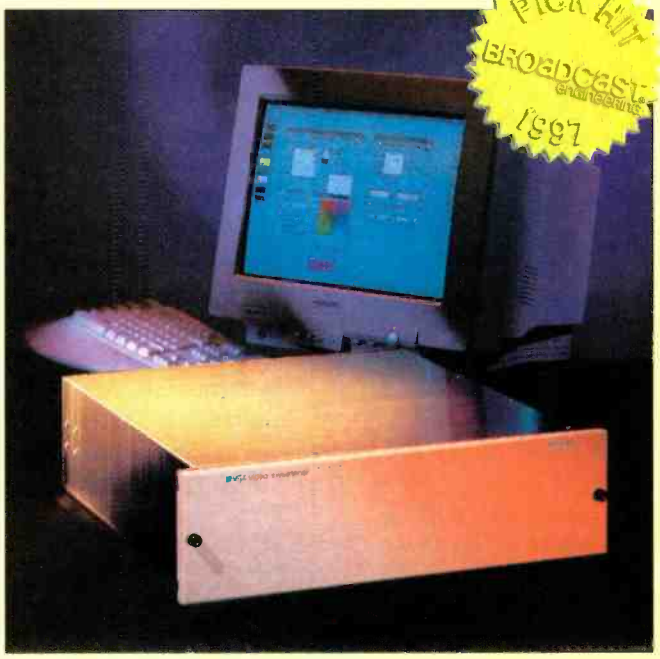

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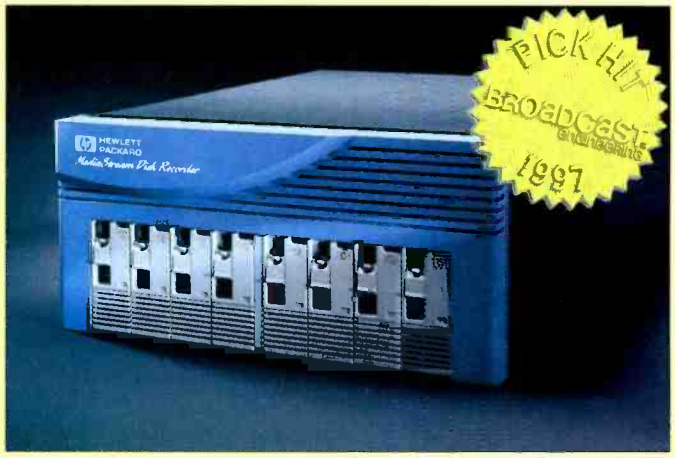
Hewlett-Packard MediaStream disk recorder



The stand-alone MediaStream disk recorder offers up to five video channels (each with up to four audio channels) and 18 hours of integrated RAID-protected storage. Hot-swappable drives combined with redundant fans ensure high reliability. With MPEG-2 compression and Fibre Channel networking, this VTR-sized unit can be used in a variety of applications including a cart machine cache or as a backup for other servers. Although the unit uses MPEG-2 compression for efficient storage, many VTR-like features are included, such as arbitrary frame play, variable rate jog and shuttle, as well as frame-accurate mark in/out. The modular design of the MediaStream disk recorder allows users to start small with a two-channel configuration and expand as necessary.

Hewlett-Packard Video Communications Division, 5301 Stevens Creek Blvd., Santa Clara, CA 95052-8059; 800-452-4844; fax 408-553-3001; www.hp.com/info/forhptv/

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Graham-Patten Systems SoundPals

The SoundPals from Graham Patten address many of those audio tasks that crop up during the normal course of events. These compact units operate on 6VDC, can be rack-mounted (three units side-by-side, 1RU tall) and are small enough and rugged enough to take on location. Currently, the SoundPals family consists of six units: the ADC-20, a stereo 20-bit A/D converter; the DAC-20, a stereo 20-bit D/A converter; DATS models 10, 20 and 21, converters for unbalanced transmission; DFADE-2, a stereo or two-channel gain trimmer and full-depth remote-controlled digital fader; and the DMIX-41, a four-input, one-output stereo or two-channel digital mixer. Each of the units has status LEDs, as well as easily accessible connectors for quick connection and setup.

Graham-Patten Systems, P.O. Box 1960, Grass Valley, CA 95945-1960; 800-422-6662; fax 916-273-7458; www.gpsys.com

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Barco Vivaldi II video display system

In many space-limited situations, it can be difficult to provide a sufficient number of color monitors. The Vivaldi II solves that problem by allowing four analog or digital video images to be displayed simultaneously on a standard VGA monitor. The modular design allows units to be tailored to current needs while providing the flexibility for future upgrades. Typical broadcast features that can be created by the Vivaldi on any multisync VGA display include auto-alignment, pulse-cross, blue-only, integrated undermonitor display, source ID and on-screen tally. Additionally, any one input can be enlarged for full-screen display. Other features include a freeze function and the capability to generate an on-screen white reference for accurate color evaluation.

Barco, 3240 Town Point Dr., Kennesaw, GA 30144; 770-218-3200; fax 770-218-3250; www.barco.com

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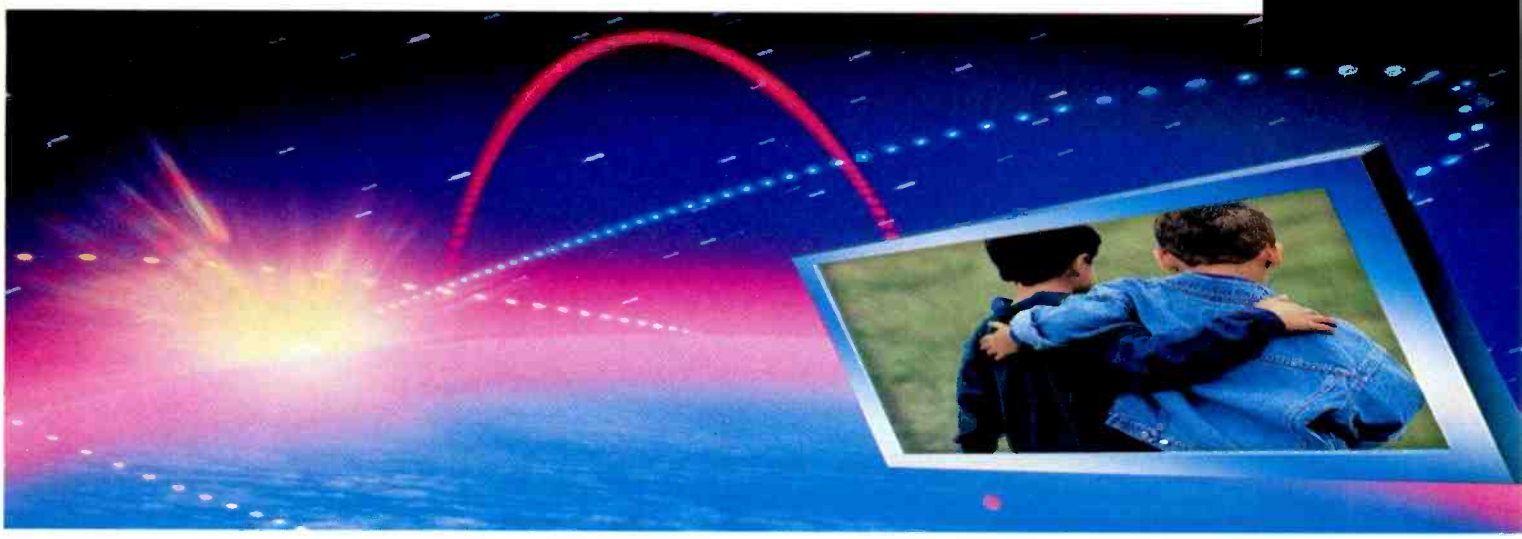
The second in a series of DTV updates from Comark.



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The new Optimum line of VHF transmitters are the first VHF systems designed for all digital standards.

Unparalleled quality and service.

Comark offers comprehensive installation, support and maintenance services—around the clock, and around the world. Based on an independent survey, Comark is consistently rated by broadcasters as having the best after sales support in the industry.

The AdvantageTV series of UHF transmitters was the first designed to meet the ATSC standard.

Shouldn't Comark be your digital partner?

Our vision is being shared. NBC, Paxson and several major groups have recently selected Comark to provide digital systems and engineering services to all of their owned-and-operated stations.

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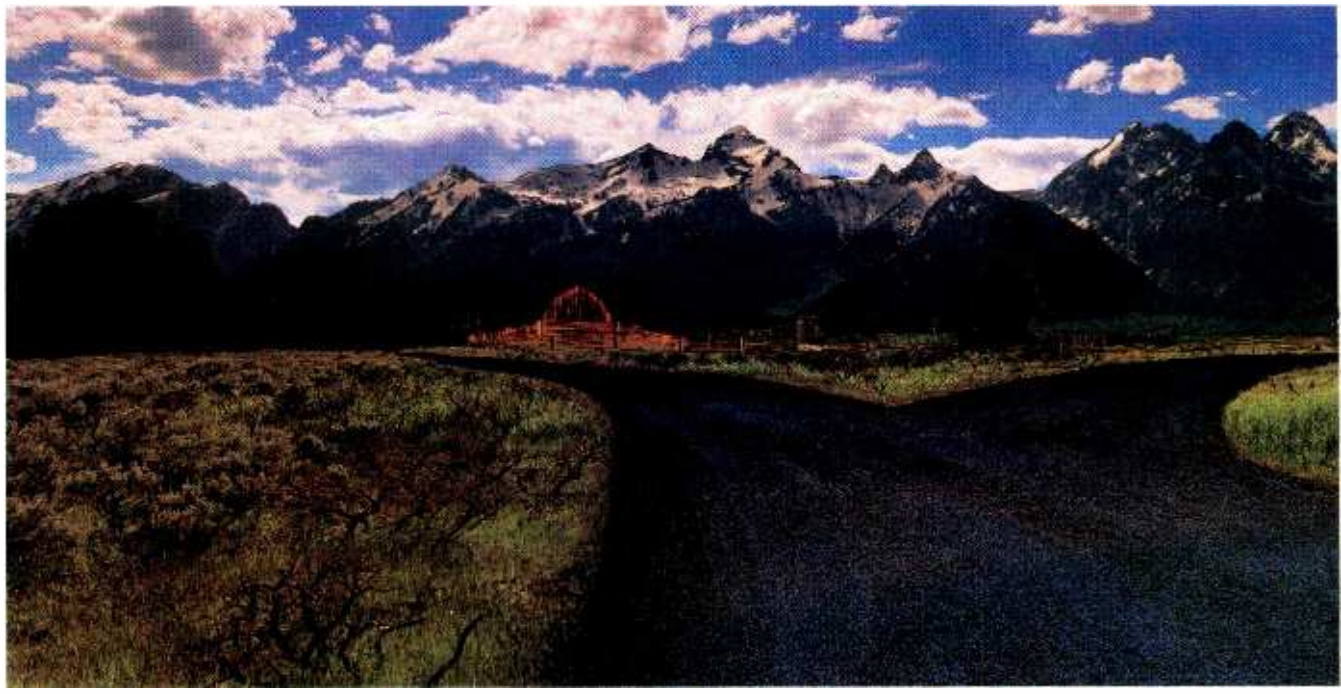
Your company will take either one road or the



Our VideoStore™ Multichannel Video File Server: This solution is ideal for broadcasters, telcos, cable systems and interconnects who are looking for a cost-effective, stand-alone, complete commercial insertion package.

And it is, indeed, a complete package. The VideoStore System has the capacity to offer hundreds of hours of storage and hundreds of channels of programming. Not to mention MPEG-2 Main Profile at Main Level (MP@ML) for the outstanding picture quality that you've come to expect from Sony.

One Road For Digital Ad Insertion.

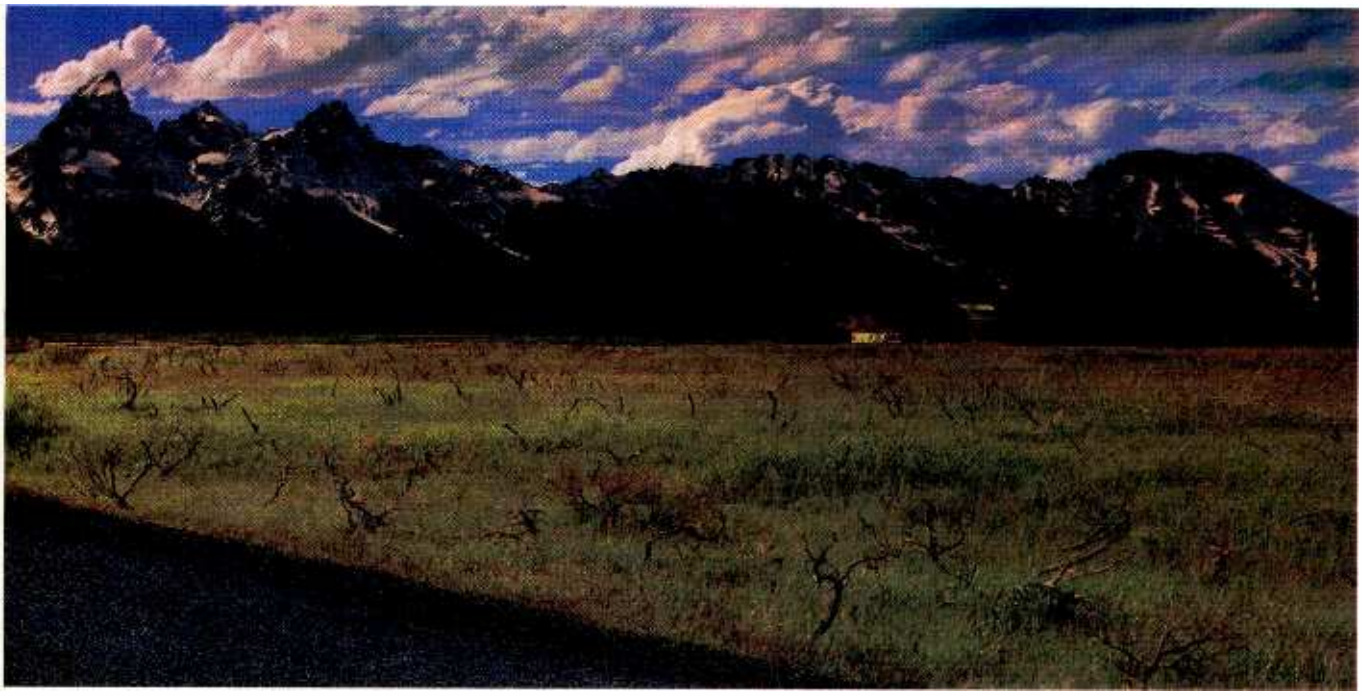
Our VideoStore file server is a complete cost-effective package for automated broadcast master control.

It's also entirely broadcast ready, with support of closed-captioning and expanded motion estimation, four channels of audio, and instant access to all video clips in your library.

Yet its highlights don't stop there. There's also our Predictive Maintenance™ feature. Its built-in redundancies offer maximum protection against mishaps while letting you know of virtually all potential problems before they become real ones.

Plus, with the VideoStore System's open protocol, even third party automation vendors can use any control platform to operate the VideoStore System. In other words, you get the flexibility that you want, that you require, and that is so necessary to integrate the automation software package that's best for your station.

other. Which explains why we've taken both.



FlexSys™: Our FlexSys System is modular, making it well suited for broadcasters of most any size, network control environments, cable networks and programming originators.

That's especially true if you consider configurability, growth and comprehensive management of both program and commercial material into a plant-wide digital format to be important requirements.

With hundreds of hours of storage capacity, the FlexSys System is more than capable of handling all your long- and short-form programming needs. You can use it for the origination, contribution and distribution of all your transmission materials. And with its MPEG-2 4:2:2 profile compression technology, our FlexSys System consistently delivers superior signal quality, enhanced chroma, full VBI support, frame accuracy and minimum degradation during subsequent recompression.

What's more, with its Component Serial Digital outputs, the FlexSys System offers complete digital signal integrity while being the transmission component of your digital environment.

Another Road For Digital Ad Insertion.

Our FlexSys System is a modular system for integrating commercial and program material into a plant-wide digital solution.

For additional information on our VideoStore and FlexSys Systems, simply call us at 1-800-472-SONY, ext. INSERT. Or you can visit us on the Internet. Our address is http://www.sel.sony.com/SEL/bppg/videostore/index.html.

SONY

Panasonic AJ-D230 DVCPRO desktop VTR

For those who would rather have a compact VCR instead of a studio deck sitting on their desktop, the AJ-D230 from Panasonic may be just the ticket. At only 8 7/16 inches wide, 5 1/4 inches high and 15 3/8 inches deep, this compact unit can provide high-quality playback and recording of DVCPRO tapes and playback of Mini-DV cassettes. Features include a time-code reader/generator, RS-232 serial interface and an on-screen setup display. Forward and reverse search at 10x play speed and independent adjustment of audio input levels make the unit easy to use in a variety of applications. For easy connection, the AJ-D230 has a sync input and I/O for analog composite and S-Video, along with two channels of audio (unbalanced). A wired remote control and a nine-pin remote interface board are optional.

Panasonic, 1 Panasonic Way, Secaucus, NJ 07094; 800-524-0864

FOR MORE information
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FOR MORE information
Circle (216) on Free Info Card

Hughes-JVC model 370SC ILA projector

If you are looking for bigger and better ways to show off your latest production, the model 370SC ILA projector from Hughes-JVC could be what you are looking for. Although this is not the giant gun that blew away everybody in the Hughes-JVC booth at the Sands, it is capable of some incredible images. With 6,000 ANSI lumens, a throw distance of up to 360 feet and digital remote control of the projector functions, this unit can be used in venues both large and small. This is one of several Hughes-JVC Image Light Amplifier (ILA) projectors that uses a 100% solid-state liquid crystal light valve to deliver an unparalleled combination of color, contrast, brightness and resolution.

Hughes-JVC, 2310 Camino Vida Roble, Carlsbad, CA 92009; 800-225-4582; fax 760-929-5410

Pluto Technologies Space digital video recorder

Space is a full-bandwidth CCIR-601 eight- or 10-bit video recorder that uses disk drives with RAID level three protection to record up to two hours of video and audio data. Hot swap drives combined with automatic drive rebuilding in the event of drive failure ensure data integrity. Designed as a VTR emulator, Space provides uncompressed recording of video and four channels of 24-bit AES audio. Along with its standard video and audio I/O, connections for Ethernet and SCSI, plus support for NFS provide compatibility to the computer world. Space handles 525 and 625 signals, film rates and pull-down. Recordings can be made in 4:4:4, 4:2:2:4 and even 8:8:8 modes. An RS-422 port provides control in professional environments and a modem allows remote diagnostics, software upgrades and the enabling of new features. Time code, SMPTE alarms and even analog monitoring outputs make connection and integration quick and easy.

Pluto Technologies International, 2511 55th St., Boulder, CO 80301; 303-402-9000; fax 303-541-9343; www.plutotech.com

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Web page: www.telex.com, E-mail: pro.sound@telex.com

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Truevision Targa 2000 SDX PCI video card

Truevision's Targa 2000 SDX is the latest entry into the Targa family of PCI video cards. Targa cards have been an integral part of a variety of desktop video systems for years and are designed to provide simultaneous full-motion video or animation playback support on computer monitors up to 21 inches, as well as on NTSC or PAL video displays. The 2000 SDX handles eight- or 10-bit 4:2:2 serial digital video and AES/EBU digital audio I/O. The board supports real-time 2-D digital video effects at full resolution. For a single video stream, visually lossless compression rates as low as 1.5:1 are possible, with better than 3:1 rates for dual-stream operation. These single slot cards are gen-lockable and can be used on Mac and Windows NT machines.

Truevision, 2500 Walsh Ave., Santa Clara, CA 95051; 800-522-TRUE; fax 317-576-7770; www.truevision.com

FOR MORE information
Circle (214) on Free Info Card

FOR MORE information
Circle (202) on Free Info Card

Tektronix PDR 200 Profile networked video file server

The latest version of Tektronix's Profile, the PDR 200, is a full-featured network-ready video file server that can handle two or four channels of video, along with up to 16 channels of analog or digital audio. Features include 9GB Ultra-SCSI disk drives, AES/EBU digital audio, 30MB/s internal bandwidth and Fibre Channel networking. Fibre Channel networking allows users to create a virtual server with clips that can be accessed by any PDR on the network without tying up Profile video and audio channels or the facility router. Serial digital I/O, analog composite I/O and analog component video inputs make it easy to integrate the PDR 200 into any facility. Sixteen RS-422 ports allow the Profile to be controlled by external devices or act as a device controller.

Tektronix Video & Network Division, P.O. Box 500 M/S 58-965, Beaverton, OR 97077-0001; 800-547-8949; fax 503-627-7275; www.tek.com/vnd

Nagra ARES-C solid-state recorder

For those that have depended on their Nagra series IV recorders or for those who have wanted a Nagra-IV of their own, it may be time to move up to the ARES-C. This new solid-state recorder/editor offers portable high-performance continuous digital recording on PCMCIA cards. With two slots, non-stop recording is possible. The system automatically switches to the next card when the current card is full. A single 64MB card provides more than two hours of mono recording time (one hour for stereo). An onboard editor provides instant random access to recordings for non-destructive editing. The ISDN codec module allows digital material to be sent to the studio via phone lines. Additional features are available when the unit is connected to any PC via an RS-422 port.

Nagra USA, 240 Great Circle Rd., #326, Nashville, TN 37228; 615-726-5191; fax 615-726-5189

FOR MORE information
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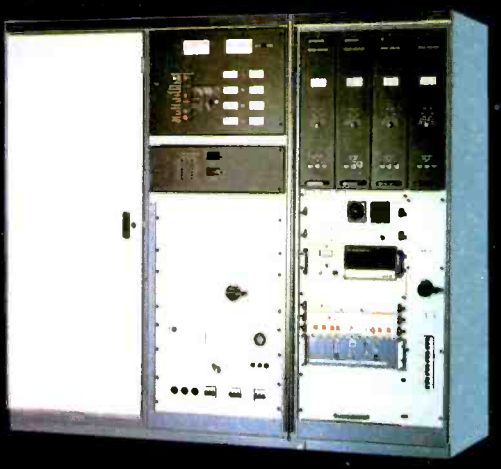
ACRODYNE

The UHF High Power Leader.



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Acrodyne introduces the Highest Power Single Tube UHF Transmitter, the Au60D!

NAB 1997

Acrodyne introduces the Highest Power Single Tube DTV UHF Transmitter!

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Phone: (800) 523-2596 / (215) 542-7000 *Fax:* (215) 540-5837 e-mail: acrodyne@pond.com
Worldwide Web: http://www.acrodyne.com

Harris CD 1 8-VSB DTV exciter

Getting that HDTV multichannel signal on the air is easy with the Harris CD 1 exciter. This Harris exciter performs the complete signal conversion from the output of the STL to the RF input of the transmitter, including frame synchronization, data randomization, Reed-Solomon encoding, data interleaving, Trellis coding and DTV sync insertion. The CD 1 accepts the 19.39Mb/s DTV transport layer signal and outputs a 1W on-channel 8-VSB RF signal that fully conforms to ATSC specs and is suitable for high-power amplification in subsequent transmitter stages. Pre-correction circuits assure optimum signal linearity and minimum out-of-band emissions. The 19-inch, rack-mountable three-drawer system occupies only 4RU. Front-panel power control, power readout and status indicators make operation a snap.

Harris, 3200 Wismann Ln., Quincy, IL 62305-4290; 217-222-8200; fax 217-222-0581; www.broadcast.harris.com

FOR MORE information
Circle (219) on Free Info Card

Leitch STA-7000 serial digital timing analyzer

This serial digital timing analyzer can be used for setting up and maintaining serial digital video signals. Two versions are available, a hand-held unit, as well as a half-rack version. The STA-7000 accepts NTSC, PAL or sync signals as reference and serial digital signals as signal under test or reference and provides an active loop-through for the serial video input. An LCD readout displays the data rate, signal standard (525/625), timing information, as well as EDH status relative to the signal being tested. Unique to this product is its ability to remain accurately gen-locked for up to five minutes after being disconnected from reference video. A rechargeable NiMH battery provides stand-alone operation for up to one hour of continuous operation. An automatic power-down feature extends battery life. Two units can be rack-mounted side-by-side and an optional 3RU bezel allows the unit to be mounted beside a half-rack waveform monitor/vectorscope.

Leitch Inc., 920 Corporate Lane, Chesapeake, VA 23320-3641; 800-231-9673; fax 757-548-4088; www.leitch.com

FOR MORE information
Circle (200) on Free Info Card

Sony Electronics LMD-1041 flat-panel display

This 640x480 pixel thin film active matrix display will accept VGA, Macintosh and NTSC/PAL signal inputs. It measures only 12 1/3x8 1/2 x2 1/2 inches and is compatible with computer-locking systems and features a 10.4 inch (diagonal) viewing area, a long-life backlight, a light output of 200nit and underscan for the video inputs. The LMD-1041can be wall-mounted or set on a stand (included). Screw mounts are also included for custom mounting. An ID remote function allows the remote control of individual monitors or by setting groups of monitors to the same ID, simultaneous control of the same function on all the monitors in the group. This flat panel includes built-in stereo speakers and an on-screen display that provide for quick setup and adjustment.

Sony Electronics, Sony Dr., Park Ridge NJ 07656; 800-686-SONY; fax 201-358-4058; www.sony.com

FOR MORE information
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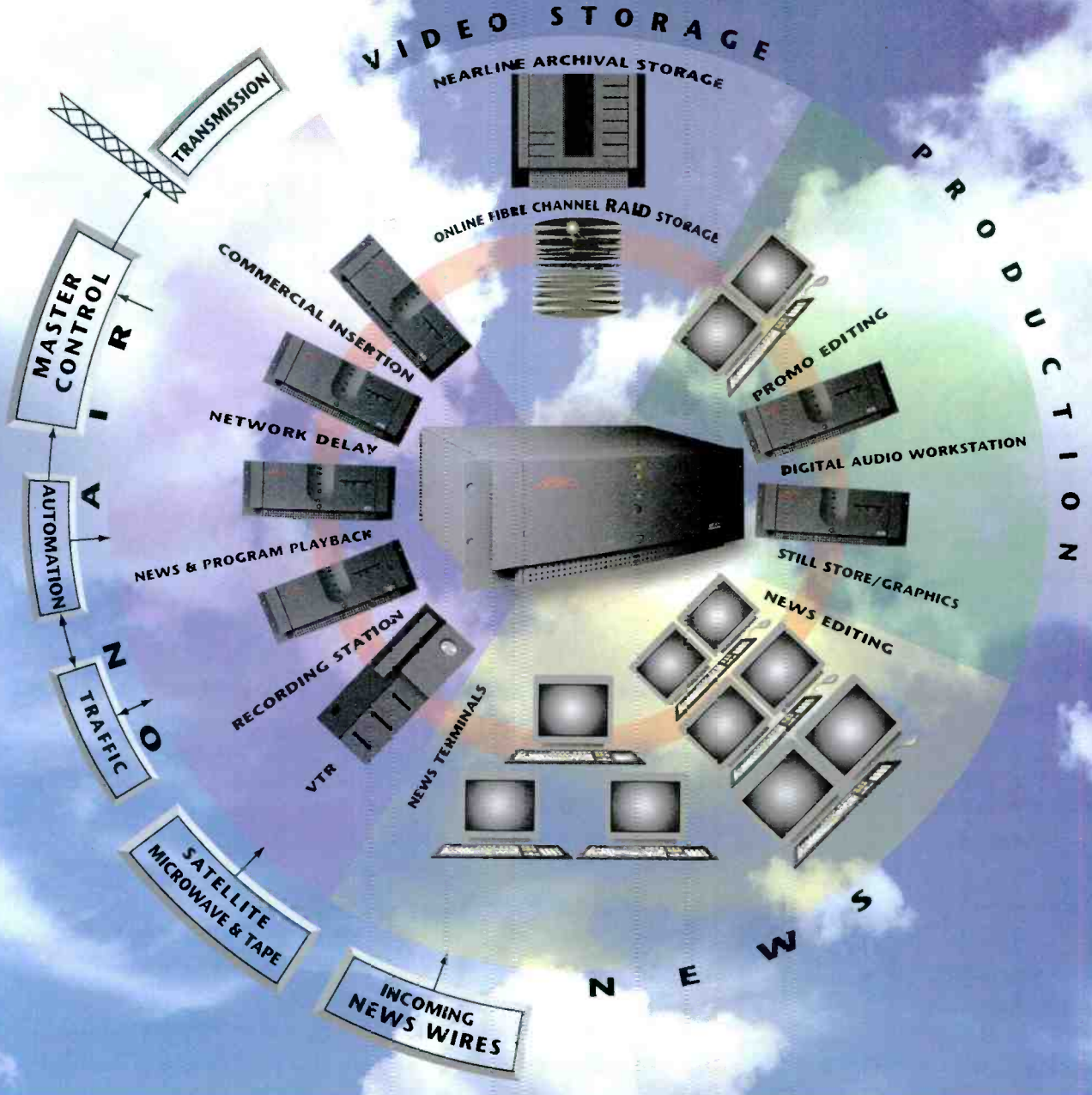
NO OTHER BROADCAST VIDEO SERVER DELIVERS MORE.



ASC's VR300™ Broadcast Video Server is more flexible, more scalable, and more reliable. With 1,066 Mb/sec available bandwidth, it provides up to 24 simultaneous channels and 96 hours of online digital storage.

VR300's building-block approach makes it easy to expand channel capacity without purchasing unneeded storage. ASC's open systems design ensures compatibility with leading automation and newsroom systems.

VR300 features hardware redundancy, software RAID technology, and *FibreDrive*,™ ASC's exclusive Fibre Channel architecture.

FibreDrive incorporates high-bandwidth Fibre Channel RAID storage to eliminate bandwidth restrictions, SCSI bottlenecks, and single points of failure. Direct access to digital storage means last minute changes can always be made easily and instantly.

With no tapes to transport and no data files to transfer, VR300 takes integrated digital operations to new heights.

For more information, call 818-843-7004 for a free white paper, "The *FibreDrive* Difference."

ASC
The *FibreDrive* Difference™

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Judges

MARVIN BORN
Vice President of Engineering
WBNS-AM/FM/TV
Columbus, OH

RICK EDWARDS
President
TowerCom
Ft. Lauderdale, FL

DAVID FELLAND
Director of Engineering and Operations WMVS/WMVT, and Director of Engineering
Wisconsin Educational Communications Board
Milwaukee, WI

KEN HUNOLD
Audio/Video Project Engineer
ABC Engineering Laboratory
New York, NY

DANE KISTNER
Chief Engineer
WKTV
Utica, NY

PHILIP A. MENDELSON
Vice President of Engineering
Hollywood Digital
Hollywood, CA

KARL RENWANZ
Vice President
Video Transfer Inc.
Boston, MA

RICH SCHMELTZ
Vice President
Tele-TV Systems Digital Service Bureau
Reston, VA

The Rules

BE's Pick Hits judges operate anonymously. Each year they look for new products that meet the following criteria:

1. Products must be new and not shown at a previous NAB convention. In some cases, distinguishing a new product from a modified older one is difficult. For "Pick Hits" purposes, a new product is one with a new model number or designation.

2. Products must have some positive impact on the intended user's everyday work. Judges search for equipment to be used on a regular basis. Products should provide new solutions to common problems.

3. Products must offer substantial improvement over previous technology. Unique circuit architecture need not be included, but some new approach or application must be involved in the product's design.

4. The prices of the products must be within reach of their intended users. The judges seek products appropriate to a wide range of facilities.

5. The products must be available for purchase within calendar 1997. Equipment must be on display on the show floor and currently (or imminently) in production. Judges take the exhibitor's word on availability dates.

DIGICART/II. THE VOICE OF MASTER CONTROL. No wonder it's used by virtually every major television network in the world. Fact is, DigiCart®/II is the industry standard for playback of bumpers, voice-overs, stingers, and effects. Nothing else organizes, archives, and instantly retrieves more than 10,000 sounds with digital quality and precision. It's networkable, uses both hard disks and removable media, and supports both fully linear digital audio and Dolby® compression. With programmable playlists, full GPI, and serial control, DigiCart/II is your best insurance against dead air, missed cues, and make-goods. So test drive a DigiCart/II in your facility at our expense. Call today and we'll send you one tomorrow.

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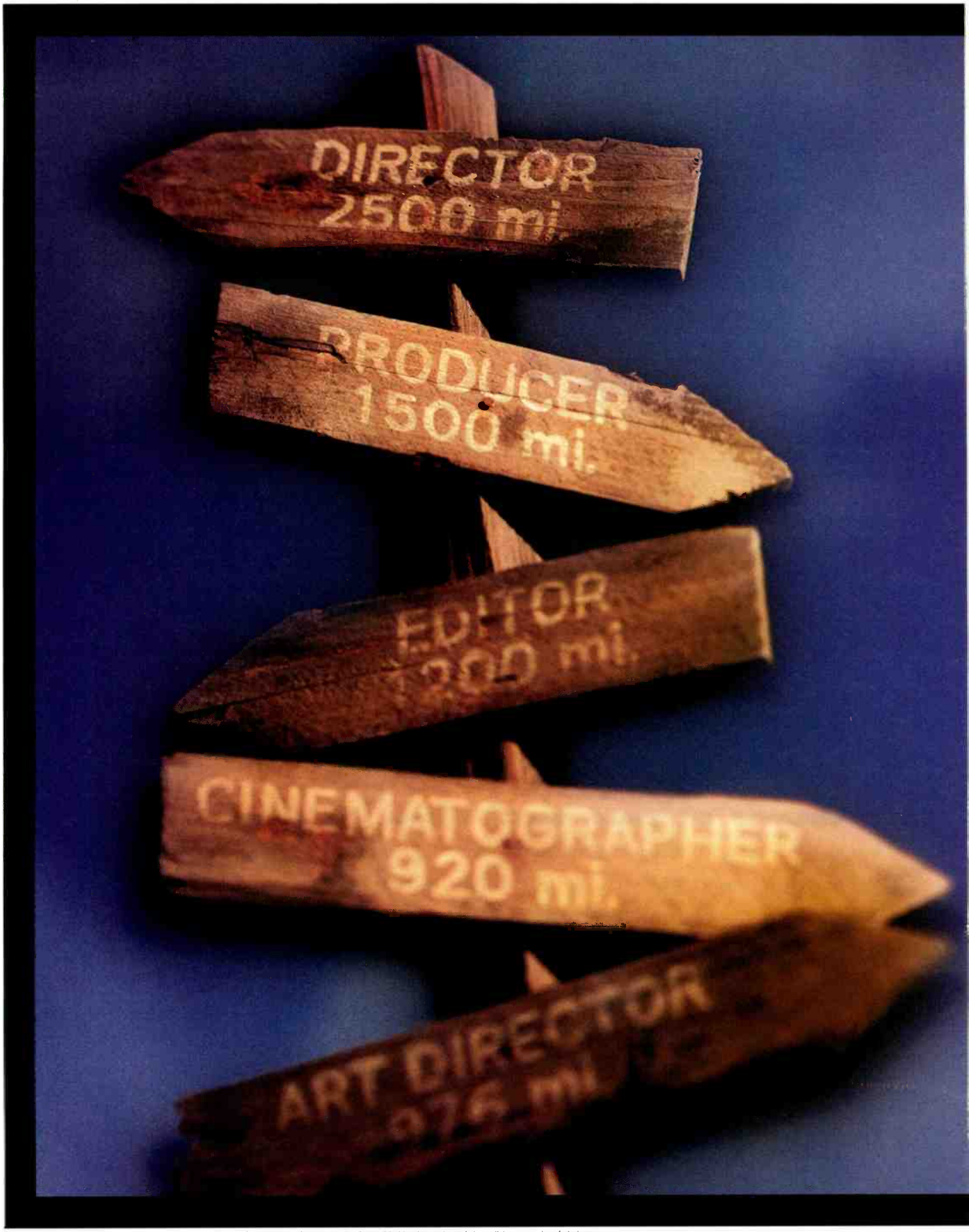

Not to worry, now they can all be part of the edit.

(Oh joy.)

When different people in different places need to see the same footage at the same time, there is a solution. FasTrak℠ Advanced Video Services [*FasTrak AVS*] from Pacific Bell. Using fiber optics, both digital and analog video can be sent in real time to a remote location, as it's being edited. That way, everyone sees the same thing, the same way, at the same time. Just think where that could lead. *Call 1-800-400-6594 ext.31 or visit our Web site at www.pacbell.com.*

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NAB 97:

Broadcasters race for digital solutions

Table of Contents

VIDEO RECORDERS, SERVERS AND STILL-STORES

By Kenneth Hunold

Kenneth Hunold is an audio/video project engineer at the ABC Engineering Laboratory in New York.

Avid announced the availability of the EditCam hard-disk camera/recorder/editor combination unit. The company also announced a joint venture with Pluto Technologies for the development of a DV-based multichannel playback server. Also shown was the entire line of Avid playback servers and editing systems. Version 2.0 of Avid's Digital News Gathering (DNG) server-based news production system was introduced. The DNG solution links Avid's disk-based recording, editing and playback systems with a production server and central storage areas via high-speed networking. DNG 2.0 incorporates support for up to 12 client workstations, support for Fibre Channel RAID and features enhancements to the Media Recorder, NewsCutter and AirPlay client workstations.

ASC introduced the VR300 broadcast video server. The VR300 uses Fibre Channel as a disk storage interface, as well as a network architecture. Data compression ratios of 2:1 and greater are available, and up to 24 streams of video can be manipulated at once. Data protection is handled with a software implementation of RAID called RAIDsoft. The software eliminates the need for a dedicated hardware RAID controller, and allows a failed drive to be replaced with the data rebuilt in the background.

Philips introduced the Media Pool XL series, including the XL-2100 two-channel, XL-3100 three-channel and XL-4100 four-channel systems. Through a partnership with StorageTek, Philips has an archive system for the Media Pool that consists of the Media Pool video server, StorageTek's Media Vault robotics tape library and the Media Pool Archive Manager software application. Philips also continued to show its DVCPRO products, including the DCR75 laptop editor.

DPS showed two disk recorder interfaces, the Perception video recorder series and the Hollywood uncompressed video recorder. These products are PCI and ISA bus computer cards and must be installed in a host computer system complete with storage devices. The Hollywood board set consists of three cards with an optional fourth card for a key channel. Also shown was the Vclips full-motion/still-store. Storage times start at 15 minutes and the unit can store any combination of audio/video clips and still images.

Dwight Cavendish showed its line of VCR duplicating systems, including the Copymaster 2500 and 5000. Quality control and management systems were also shown, as well as the company' full line of support components.

EMC Corporation was showing its Symmetrix Network Media Storage (SNMS) video and multimedia server. SNMS stores and streams video files in multiple formats and compression standards. The integrated cached disk array can be scaled for storage from 72GB to nearly 3,000GB with up to 4GB of cache memory. SMNS is an open solution that can be easily integrated into such applications as video asset management and tapeless broadcasting.

Hewlett-Packard featured its MediaStream broadcast server, as well as the new MediaStream disk recorder. (See "Pick Hits," p. 42.) The MediaStream disk recorder offers many of the features of a broadcast server in a smaller package at a smaller price. It features up to 18 hours of storage, RAID protection and Fibre Channel networking. The recorder can be used as a stand-alone unit or combined with the MediaStream broadcast server.

IBM announced LogiCast, which includes the video server, along with IBM system integration and support. LogiCast also includes key products and services from leading companies in the broadcast industry. IBM's server, the MediaStreamer, provides multistream playout of video content. MediaStreamer can be expanded to deliver from one to 42 streams of MPEG video over standard NTSC and PAL interfaces. Using an RS/6000 RISC-based platform, the MediaStreamer can store more than 1.2 terabytes of content.

Leitch introduced a new version to the StillFile system called StillFile 2. The unit features a new GUI interface to allow users to customize their informational displays to show such information as thumbnail images and/or file information. Also introduced was a Gateway Object Server (GOS) to perform graphic file format translations and network file transfers.

JVC demonstrated a prototype of the four-audio-channel Digital-S VTR that can also transfer data at 2x normal speed. While four-channel audio has always been a part of the Digital-S specification, current machines only use two of those tracks. Expansions to the Digital-S line include the BR-D750U recorder and BR-D350 player, BR-D40 dockable recorder and BR-D51 digital S/SVHS player. Also shown were the BR-DV10 mini-DV dockable recorder, MW-S1000 non-linear editor and SR-W5U W-VHS HDTV recorder/player.

Matrox showed its DigiSuite board set for video recorders running Windows NT. These boards have been used in video recorders from many non-linear editing system vendors. The DigiFusion addition allows DV video to be recorded on hard disk using IEEE1394 (Firewire) and other interfaces.

Newtek announced an upgrade to version 5.5 of the Lightwave 3-D animation package. Also shown was the Video Toaster Flyer with record times available from 3.5 min/GB (HQ5) to 7.5 min/GB (EP). Toaster products include a switcher, CG and paint functions.

Odetics introduced its Roswell Facility Management System, a new design to manage media and material. The system can provide multichannel automation and machine control for all types of broadcast facilities. (See "Pick Hits," p. 42.) Odetics also announced an enhancement to its SpotBank insertion and automation system, as well as low-cost archive systems using DLT tape technology.

Panasonic showed its DVCPRO product line with a new 4x transfer recorder/player AJ-D78 and AJ-D220 and 230 desktop viewer and recorder (see "Pick Hits," p. 42). A new 50Mb/s version of DVC known as DVCPRO50 was introduced. Products included AJ-D950 studio VTR and AJ-D900W camcorder. HDTV and 525P adapters were shown to allow D-5 VTRs to be used for recording 1125I HDTV and 525P signals. Panasonic also introduced its NewsByte system that stores more than 70 minutes of video and audio that have been compressed with the DVCPRO algorithm. Included in this system is a tape drive that allows DVCPRO tapes to be transferred to the NewsByte hard drive at 4x speed. Analog I/O is standard and SDI video and CSDI (4x speed) interfaces are available.

At the Pioneer booth a variety of products were shown, including several of the new VDR series of video disk recorders. The VDR-2000 is an entry-level recorder that can be controlled using RS-422 serial links. The VDR-2100 and 2200 models offer front-panel controls and are easily expandable with SCSI-2 hard drives. The VDR-3500 offers unlimited storage with dual-channel motion-JPEG compression. On the still-store and graphics side, Pioneer was

showing its Digital FastFile, which is an integrated still and clips storage system that runs on Windows 3.1 or higher systems and offers a variety of I/O configurations for easy integration into facilities.

Pixel Power showed its Collage series of products, the Collage character generator and still-store and the Collage ED uncompressed non-linear editing system. The Collage ED also features Collage captions and graphics.

Rorke Data showed its line of digital recording products including the VMOD-100, capable of providing 90 minutes of SVHS-quality video. Designed to add random access video to an audio workstation, the VMOD-100 is compatible with many DAW products. Also shown were the Maxxarray disk array and Rack 'n Roll custom configurations. Interface options include ATM, Fibre Channel, Ultra-SCSI, FDDI and 100baseT.

Sierra Design Labs introduced the QuickLook system that allows full-resolution file images (up to 2K pixels by 2K pixels) to be inserted in 720x486 pieces on standard RGB monitors. Also shown was the complete line of Sierra Design Labs devices, which allow one to 120 minutes of uncompressed digital storage and a dedicated multirecorder control panel for VDRs and VTRs. Also from Sierra Design Labs is NFS Server, which makes it easy to get files from a large network to a digital video disk recorder. NFS Server allows any connected NFS-compliant device on a network to access a Quickframe or Diskcovery as a fully mounted disk drive with file structure support.

Sony introduced many new products and enhancements to existing product lines. Enhancements to the Betacam SX line include the DNW-A220 portable field-editing system, DNW-A20 digital portable field viewer, DNW-A31 high-speed feeder and recorder (allowing up to 4x transfer), DNE-700 digital news-editing system, DNW-A30 and DNW-30 videotape players, DNE-100 non-linear news-editing station, DLE-110 non-linear live-editing station and DNE-50 digital editing systems. For HDTV recording, Sony introduced the HDW-700 digital widescreen high-definition camcorder and introduced a new recording format, HDCAM, to go with it. Also introduced was the HDW-500 editing VTR (see "Pick Hits," p. 42) for editing tapes recorded in the camcorder and for standalone compressed HDTV recording. Sony also showed its full line of analog Betacam, Digital Betacam and DVCAM products. On the server side, Sony introduced AirTraC, a customized software application for the Sony VideoStore.

Quantel introduced upgrades to many of its graphics and storage systems. EditBox features advanced image tracking capability, keyframeable color correction and an extra video layer. For ClipBox, the video server, Quantel introduced Highlight. Key sequences from sporting events are saved into predefined categories and then a highlight package can be built using these categories. Also announced was support for the Java programming language across Quantel's product line.

QuVis showed the QuBit Intelligent video recorder. QuBit uses wavelet compression and compression ratio is selected based on the signal-to-noise ratio of the quality video that you desire. Other parameters that can be adjusted are bandwidth and data rate. Internal hard disk and tape drive options are available.

Tektronix announced the new PDR200 disk recorder. (See "Pick Hits," p. 42.) The PDR200 features 9GB drives, 24-bit AES audio, RAID operation and Fibre Channel networking. The PDR200 can also work with a DLS200 data library system and a PDX208 external eight-drive expansion chassis.

In the MountainGate booth, it was hard to miss CentraVision. Billed as the first complete Fibre Channel network solution, CentraVision allows multiple workstations to be linked to large storage systems. All workstations, whether Mac, SGI or other PCI-compatible stations can run on the same network, share the same files and work together. The CentraVision network will operate at speeds up to 100MB/s and storage capacity can be built from 36GB to more than 1TB. The CentraVision VDR treats control and storage independently and allows users to configure systems with the amount of storage they need today and expand in the future. Also at MountainGate was the RCM, a rack-mountable stand-alone RAID controller module. A single RCM allows multiple hosts to be connected to multiple storage systems, each independent of the other.

Silicon Graphic's Streamcaster is multichannel digital broadcast playout soft-

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The Good News: The US HDTV

The Not So Good News: Your

The HD6000, with serial digital I/O and a data rate of 1.5Gbps, is one of a range of ten HDTV processors from Snell & Wilcox designed to provide a seamless transition between all conventional and high definition standards.

Standard has been agreed existing equipment is incompatible

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HDTV by SNELL & WILCOX

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ware that enables the management, scheduling and playout of more than 100 channels of stored MPEG-2 compressed digital video, audio and data. Key components include an asset manager and a playlist manager that are based on Java technology. Streamcaster includes support for RAID disk solutions and MPEG-2 multiplexers and can be customized to meet specific output stream, compression rate and storage requirements.

In the Sun booth, the company was showing its MediaCenter media server. MediaCenter is based on the UltraSparc platform and uses standardized hardware, a 64-bit file system and software packages to build media servers that meet the demands of a variety of applications. It can playback any combination of MPEG-1 and MPEG-2 compressed video datastreams up to a 100Mb/s sustained total output rate.

At Storage Concepts, the VideoStar MPEG-2 video server is aimed at high-quality video on-demand markets and the FibreRAID disk server array, which is targeted at high-end uncompressed storage applications.

Speaking of uncompressed storage, another product to enter the uncompressed video storage market was Space (see "Pick Hits," p. 42) from Pluto Technologies. Space is a full-bandwidth eight- or 10-bit digital video recorder that operates just like a VTR, but uses disk drives instead of tape. With network interfaces, Space can replace your VTR and be the beginning of facility-wide networked storage. Depending on the disk drives installed, it can provide storage of 10 to 120 minutes of video and two channels of audio.

You can replace your broadcast analog tape deck with a state-of-the-art digital video recorder Omega series from Fast Forward Video. The series includes a range of stand-alone, multifunctional digital video decks that includes the Omega Deck single-channel digital video recorder, the Omega Double Deck dual-channel version featuring independent and simultaneous record and playback capability and the Omega RAID Deck dual-channel recorder with a built-in RAID (disk array) controller.

The MegaDrive Systems booth featured data management, mass storage and network topology solutions connected to state-of-the-art systems interconnected to machine room storage over a fiber network. The EV-1000 is MegaDrives' next-generation storage system that is based on the Enterprise E-8 disk array. The EV-1000 Fibre Channel and Ultra SCSI RAID systems provide up to 200MB/s throughput while delivering continuous on-line availability.

The GigWorks line of Fibre Channel networking solutions from Ancor Communications could be found at the Silicon Graphics booth. Demonstrating Fibre Channel solutions for the most popular Silicon Graphics workstations and servers, the GigWorks products enable the high-speed transfer of large video, graphics and data files between servers, workstations, storage arrays and other peripherals typically used for video post-production, digital compositing and other production applications.

Cinebase DMMS offered a complete, all-digital media management system that can handle large archives of any digital content. The client/server application allows unlimited concurrent users to browse, output and manage content over any type of local-or wide-area network.

FOR MORE information
(221) on Free Info Card

TV AUTOMATION, MASTER CONTROL, NEWSROOM AND BUSINESS SYSTEMS

By Tom Rush

Tom Rush is operations manager, ad sales for TCI Media Services, Overland Park, KS.

Lower pricing and scalable entry-level products for "the little guy" seemed to be the focal points for TV automation at this year's NAB.

Philips new XL series supports all Media Pool applications, but pricing for the XL models begins at a more modest $69,995 — a significant reduction that brings the features, scalability and applications of the Media Pool MPS system within reach of smaller stations and teleproduction facilities.

The two-channel XL-2100, the three-channel XL-3100 and the four-channel XL-4100 (all currently available) support Media Pool's expandable architecture, integrated applications and industry-standard protocols. The base XL series system includes Splash administrative software, Pool Net Native System Protocol, Beta CP Serial Control Protocol and Stream VTR emulation software. Other applications can be added for cart emulation, caching or editing.

Alamar USA, Inc.'s release of version 4.2.3 of its station automation software allows remote, multichannel disk caching — four independent channels off each Alamar computer — over a WAN. The software, which is deliverable now, is capable of multicasting up to 200 channels.

Florical Systems, Inc. announced its newest product, the CachePlayer. It is a low-cost automation solution designed to reduce robot, VTR and tape usage by as much as 90%. CachePlayer is a Pentium-based PC/software package that will automatically cache spots from a cart machine to a third-party server/cache. It will then manage the air playback of those spots based on the traffic schedule. Its interface gives it much of the editing functionality and database features popularized by Florical's AirBoss and SpotCacher systems. CachePlayer hopes to fill a niche by extending the life of existing Betacart systems, while newer technologies mature.

Odetics Broadcast announced Roswell, the "first broadcast management system designed from the ground up since the advent of digital disk storage." (See "Pick Hits," p. 42.)Using Windows NT 4.0 and the SQL-compliant Oracle database management system, Roswell delivers an open system interface to traffic and accounting; supports standard networking connectivity via an Ethernet LAN; features a familiar Microsoft GUI; supports object-oriented programming; and is completed by at least one device control server (DCS) capable of controlling up to 16 peripheral devices.

A small TV station with a single workstation/DCS configuration or a large multichannel facility with multiple workstations and up to 10 DCSs can efficiently manage on-line, near-line and off-line video material storage, as well as a variety of switching devices through Roswell's distributed client/server software. Roswell automates material and media tracking, while providing automation and total database integration from just one channel or to the 50 or more channels of broadcast operations the industry anticipates in the next five years.

Odetics also introduced its Data Library Manager. Developed for SpotBank systems, it provides an integrated solution for archive, backup and restoration of video server contents using compressed video based on the DLT tape technology. Hav-

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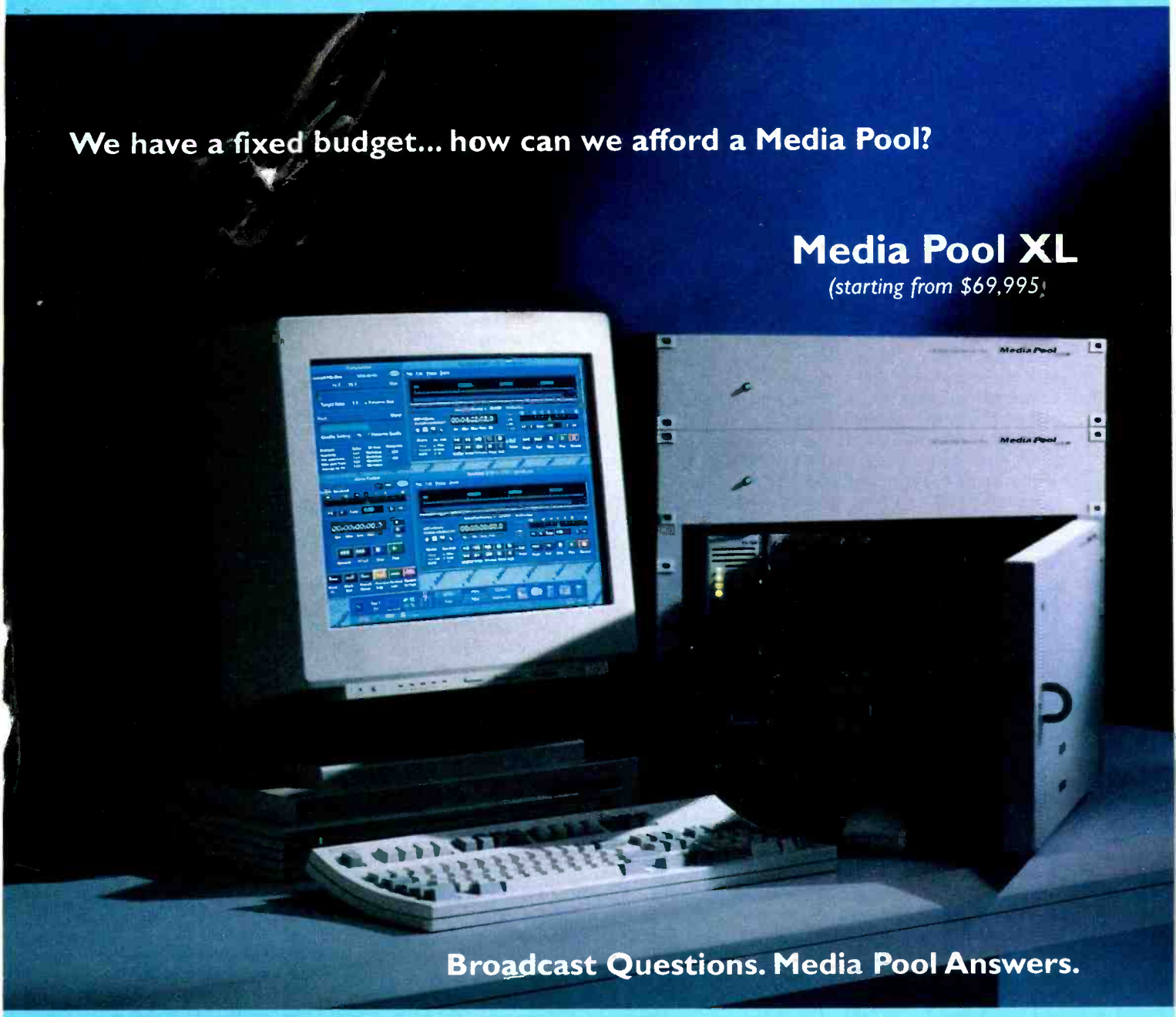

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ing previously coordinated efforts with Odetics on its Profile PLS200 library system, Tektronix has committed resources to develop the protocols necessary for seamless integration with the new data library technology

As part of its DVCPRO line, Panasonic introduced a Smart Cart automated record/playback system with a dramatically increased capacity for station automation and archival applications. The expanded system robotically links up to three Smart Carts, yielding the same tape storage capacity (an average of 450 cassettes) as larger library systems in only half the space. Each discrete Smart Cart is a true multichannel system that can provide a completely different set of commercials and programs to two separate stations.

A typical expanded Smart Cart system would hold 450 cassettes and six VTRs. With one VTR, the system could hold a maximum of 600 cassettes. All VTRs and drives can be used simultaneously, and each cassette is accessible regardless of its location. The large-capacity Smart Cart

can interface to automation or information retrieval systems, with single or multiple links to disk cache systems.

This year, Louth Automation introduced the ADC-50 featuring the same features and functionality as its ADC-100 broadcast automation system, but with one functional limitation: no serial control of master control switchers or related secondary events. Equipped with a 4RU 12-slot PC Pentium device server, the basic system includes one ADC-50 play list and device interfaces for two VTRs, two video file server A/V streams and a 10x1 switcher (optional drivers for other peripherals are available). Also included are four-port serial cards and a Windows client workstation. Already shipping, base system prices start at $50,000.

New for Matco this year is the MA-400 video server, a turnkey, Motion-JPEG-based system designed for the efficient insertion of commercials and promotional materials. The MA-400 comes complete with 9GB of fixed disk storage; definable compression rates; inventory management and scheduling software; assignable GPI trigger, tally closure or other automation control; and integrated control of an RS-422 VCR or VTR for use as a source deck in capture. With up to 75 minutes of Beta SP-quality video and CD-quality audio, the low-priced MA-400 is well-suited to the needs and capital resources of many smaller broadcast stations.

Leightronix introduced a surprisingly low-priced event controller and digital video player ideal for automating closed-circuit systems, access channels or similar applications with limited demands. The MVP-2000 features a built-in 4x3 router with stereo audio, 2GB storage of MPEG playback, control of 16 tape decks and network control by LAN or WAN. No literature or shipping date was available at the time of the show, but a working model was on display.

The Tektronix Grass Valley M-2100 digital master control system (see "Pick Hits," p. 42) made quite a splash at the Tektronix booth this year. Allowing multichannel operation from a single control panel, the M-2100 has some unique features — integrated SqueezeBack and Profile Professional Disk Recorder (PDR) clip stacking. SqueezeBack eliminates the need for an external DVE by incorporating digital 2-D picture manipulation in the video processing path. Integrated Profile PDR clip stacking offers single-point control for viewing/stacking of clips stored on a Profile disk recorder and for their replay to air. The event stacker provides almost instant access to a large variety of filler or promo material. Integrated audio/video and control processing frame and hot-pluggable modules are more of the unique features offered by this scalable switcher.

The Associated Press NewsCenter is touted as the newsroom system you'll never outgrow. It equips any TV newsroom with key functions, such as scripting, closed captioning, assignments and more, through software that runs on personal computers linked via a local area network. AP also offers ENPS, a revolutionary new TV production system; APTV, a global video service that unilaterally gathers its own material; SNTV, a unique sports video service; and The WIRE, a 24-hour multimedia service for the Internet.

VidCAD Documentation Programs (VDP) is helping to make your job easier with VidCAD SPECS. With SPECS, you can quickly locate specification information on thousands of products from hundreds of manufacturers on CD ROM. The comprehensive catalog contains technical product descriptions and options lists that are updated quarterly, with weekly updates on the web. In addition, VidCAD Diagram Tools, a computed-aided documentation program, is now available in Level 2 featuring more than 12,000 equipment models, custom drawing styles, cable number labels and a run-time version of AutoCAD R13 for 2-D or 3-D drawings. Level 2 also allows you to diagram sketches without linking to cable or equipment databases.

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TBCs AND SIGNAL CONVERSION PRODUCTS

By Phil Hejtmanek

Phil Hejtmanek is vice president of engineering for WTVS, Detroit.

NAB 97 featured many products designed to process and encode video (and, in some cases, audio) prior to transmission. Most of these products were designed to minimize bandwidth requirements for transmission, but the Minicrypt VES-TM hand-held scrambling system from Macrovision has an entirely different purpose. This compact codec effectively encrypts and decrypts a video and audio signal for transmission via satellite or microwave. Two external hexadecimal switches set a unique security code, in addition to a customer-specific code, that adds an additional level of security. The lightweight unit operates on 7VDC to 30VDC and can encrypt either NTSC or PAL.

LNR is offering a digital video exciter that combines a DiviCom MPEG-2/DVB-compliant encoder with a specially designed, frequency-synthesized RF exciter section for C-, Ku-, Ka- or L-band in SCPC or MCPC configurations, all in a 2RU package. The MPEG-2 encoder section operates at data rates from 1.5Mb/s to 15Mb/s and supports digital and analog inputs for video and dual-channel audio. This low-cost, high-quality exciter series is ideal for flyaway or mobile digital SNG systems and distance learning applications.

Leitch showed an MPEG-2 compression system. The compressor is a single-board module that fits into a 3RU DigiBus frame. It supports the 4:2:2P@ML and uses the latest IBM MPEG chip set with bit rates from 2Mb/s to 40Mb/s. It also supports a variety of GOP structures and provides audio and data timing and multiplexing functions. The accessory noise-reduction module and the companion decompressor module are also single-board DigiBus plug-ins. All compression and noise-reduction

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parameters are controlled from the standard Leitch DigiBus control panel.

Tiernan Communications featured a broad line of MPEG-2 encoders for digital satellite newsgathering (DSNG), program distribution and backhaul applications. The versatile TE4 encoder supports the 4:2:2P@ML or the MP@ML MPEG-2 standards for high-end professional broadcast applications. Input video can be analog composite or serial digital and either four monaural audio channels or two stereo pairs can be compressed following the MPEG-2 audio layer I and II standard. Output data rates are programmable up to 70Mb/s and the output transport stream can be output to either of two output option modules, which can support interfaces for SCPC or MCPC applications.

Scan converters typically convert or reformat graphic images from computers or other similar devices into broadcast video formats. The Folsom 9700XL accepts high-

resolution RGB computer video at horizontal scan rates up to 100kHz and converts it to broadcast-quality NTSC or PAL, in composite, analog component, S-Video or, optionally, serial digital component formats. The 9700XL also supports 31.5kHz RGB output. It has full front-panel control, a versatile zoom function, gen-lock and adjustable horizontal, vertical and flicker-reduction filters for the highest possible video quality.

The award-winning RGB/Videolink 1700-D1 scan converter from RGB Spectrum accepts input video from desktop or workstation computers at resolutions up to 1,600x1,280 pixels and converts it to NTSC or PAL composite video, S-Video, component analog video (Betacam or MII), as well as CCIR-601 component serial digital video. A powerful zoom function allows continuous pan and zoom effects smooth enough for on-air use. The 1700-D1 also features RS-232 serial control, as well as a full-function front panel and the ability to overlay computer-generated graphics on video using either a built-in linear keyer or chroma-keyer on composite or S-Video backgrounds.

The ScanDo Ultra from Communications Specialties combines advanced features and a compact profile with an affordable price. This product can accept computer graphic input resolutions up to 1,600x1,280 pixels at horizontal scan rates from 24kHz to 90kHz, and will output either NTSC or PAL composite video, S-Video and analog component video (Betacam or MII). The ScanDo Ultra also features continuous 50% to 200% image sizing and a built-in test pattern generator, as well as an adjustable flicker filter and downconverted outputs for VGA, Macintosh and S-Video.

The Transphix from Snell and Wilcox applies high-resolution 3-D filtering technology to convert all popular non-interlaced computer video formats to NTSC or PAL output for recording or broadcast. This device automatically senses the input format, up to 1,600x1,280 pixels, and produces output in PAL, NTSC, PAL-M, PAL-N and an S-Video (Y/C) output. Optionally, the Transphix can output analog component or digital component signals. Other features include a 4x zoom with pan and tilt and a freeze function.

New from Miranda is the VIVO digital video gateway that provides a 4:2:2 serial digital input and output for the new Silicon Graphics O2 workstation. The VIVO also provides GPI input and output and is powered by the O2 workstation. This compact unit plugs into the workstation's digital video port connector and works in 525- and 625-line formats.

Two new video processor products for high-end home theater and large-screen display applications were shown. The first is Feral LD-2000 line doubler features digital processing with motion detection, three-field processing for motion video sequences, with temporal and vertical filtering and a freeze function. The LD-2000 can accept input in composite, Y/C, analog component and VGA formats and outputs LVDS video at a resolution of 852x480 pixels. System setup is accomplished through the use of an on-screen menu. The second is the Interpolator is a unique display processor from Snell and Wilcox that can integrate a PC environment into a 1,280x1,024 pixel combined visual display. Home theater owners can mix interlaced TV video with progressive scan computer graphics on the same screen, allowing them to view feature films on video, while simultaneously accessing PC programs, the web and other computer applications. Video inputs can be composite, analog component, S-Video, IEEE 1394 FireWire and 4:2:2 serial digital. Multiple computer resolutions are also supported.

Several manufacturers showed comprehensive, modular video transcoding and conversion solutions this year. Sigma Electronics introduced three transcoders and one decoder for analog video, as well as a serial digital product for PAL applications; all of which can mount in the series 2100 modular mounting frame. The TPS-2112 transcodes a PAL Y/C signal to PAL component analog video; the TXP-2113 transcodes PAL composite video to PAL component analog video; and the TXC-2114 transcodes a Y, R-Y, B-Y component analog signal to NTSC composite video or Y/C. The Sigma DEC-2192 decoder converts a PAL composite analog or a PAL Y/C signal and divides it into RGBS, while the DPC-2171 converter takes a 4:2:2 component serial digital and converts it to PAL component analog video.

Prime Image showed Pick-2, a modular mainframe product, designed to house any two of a wide selection of TBCs, standards converters, frame synchronizers, audio delays or logo inserters. All of these building blocks can be controlled from the front panel of the Pick-2 frame or through an optional remote control. Also from Prime Image was the Twister, a new product designed to transmit high-quality stereo audio and video signals through a simple twisted pair of wires, up to 5,000 feet in length.

Avitel Electronics displayed the 3300-K series of modular video equipment featuring the DART frame management system, which allows for control and remote status monitoring for all modules from a central location. The associated modules include a variety of analog and serial digital video distribution amplifiers, serializers and deserializers, A/D and D/A converters and serial digital frame synchronizers. Analog and digital modules may be mixed freely within a 3300-K series frame.

From Telect comes the VersaFrame 2000, billed as the "All-In-One Modular Pro A/V System." This flexible, modular system includes plug-ins for distribution and routing of analog and serial digital video, serializers and deserializers. All modules can be mixed within a frame and can be "hot-swapped" in the event of failure.

Plenty of other specialized encoders, decoders, transcoders and standards converters were also shown. AJA Video Systems featured the D5E serial digital encoder, a low-cost 4:2:2 serial digital-to-analog NTSC or PAL conversion device with "better-than-expected" performance. It features three analog outputs, two of which are switchable to S-Video and a reclocked serial output. The D5E operates on 5VDC.

Beck Associates featured two serial digital-to-analog composite video encoders designed for monitoring use. The SDV 4/4 is a serial digital monitoring distribution amplifier with four equalized and reclocked outputs designed for use in a Grass Valley Group 8900 frame. The SDA 4/1 is a self-contained, self-powered model with a sin-

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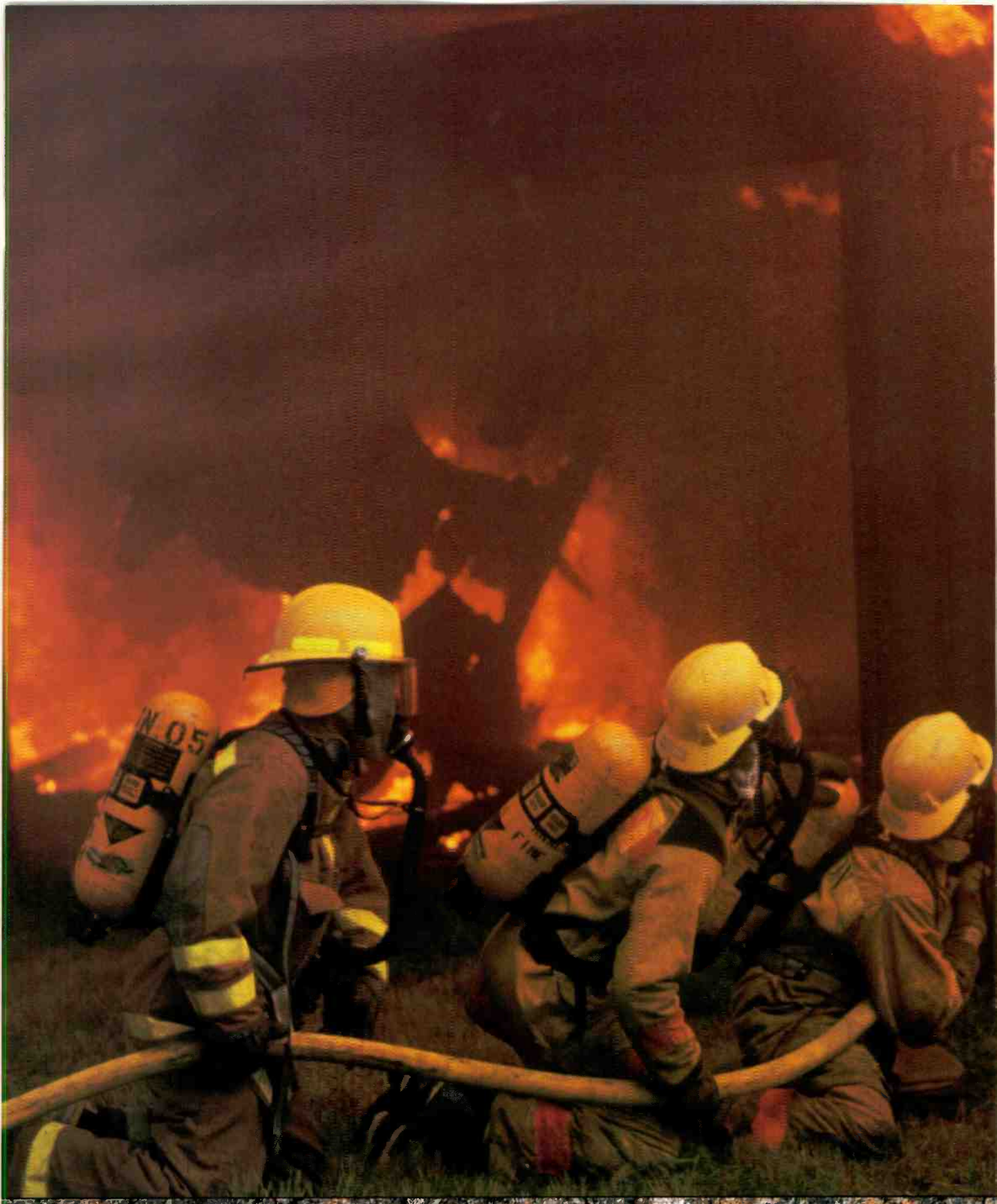

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gle reclocked output. Both models have four analog outputs, equalize up to 300 meters of coaxial cable and have an on-board color bar generator.

Broadcast Video Systems introduced a Y/C-to-component transcoder. The model 738 is available in the 525/3.58MHz or 625/4.43MHz format and plugs into the same FR730 frame used by the companion 734 and 735 component transcoders. Up to three transcoder modules may be accommodated in a 1RU space.

Digital Processing Systems introduced the DPS-465 serial digital synchronizer. Four different input and output formats are provided: serial component (D-1) digital, analog component video (Betacam or MII), S-Video and composite NTSC. This allows the DPS-465 to act as a transcoder. The internal signal processing is 10-bit CCIR-601 serial digital and a built-in TBC circuit allows heterodyne input signals from camcorders to be integrated into a broadcast environment.

The Hotronic AR71-PAL is a full-bandwidth TBC/frame synchronizer designed for a PAL composite video environment. It features composite input and output, 4:2:2 eight-bit processing and a TBC function. The AR71-PAL is designed to be a TBC card for a PC-compatible computer, but an optional rack-mount chassis allows stand-alone operation.

The DTC 4600MV universal motion vector standards converter from Video International Development is a competitively priced, high-end video standards converter. This unit will input and output virtually any video format and features smooth, judder-free conversion of moving images, including captions and sports. It also features a two-channel audio delay circuit to prevent lip sync problems.

Harmonic Lightwaves is moving into the digital arena and is expanding its product offerings with solutions for the broadband digital communications market. The company is developing a line of digital products for the head-end level of HFC networks, which will allow the convergence of television, cable and the Internet to provide user applications.

Digital Transport Systems offered hardware and software solutions for real-time MPEG-2 and DVB test and measurement. The company has announced a new line of PCI-compatible transport stream generators that complement the existing family of transport stream analyzers and EISA bus-based TSGs for sending or receiving pre-generated data, such as MPEG-2 transport streams across DVB ASI high-speed asynchronous serial, DVB LVDS or RS-422 eight-bit parallel connection.

To simplify the process of video networking, Heuris is distributing the MPEG PowerMUX multiple channel live video multiplexing unit for use with ATM networks. With the PowerMUX, your broadcasting and post-production facilities can be wired for ATM transmission within and between facilities instead of traditional analog transmission, allowing data to be manipulated quickly, easily and inexpensively in digital formats.

For those needing to upconvert to HD, Snell & Wilcox's HD50 provides apsect ration control, noise reduction and color correction. (See "Pick Hits," p. 42.)

FOR MORE information

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VIDEO ROUTING AND DISTRIBUTION

By Tom Rush

Tom Rush is operations manager, ad sales for TCI Media Services, Overland Park, KS.

This year's NAB offered quite a variety of routing and distribution choices in all formats, sizes and price ranges.

For big performance on a small budget, AutoPatch introduced its "half-Y" series of routers. Available in 6x2, 8x2 and 8x4 configurations for mono audio, stereo audio and composite video, each features a constant full-matrix status display. With choice of connectors, the half-Ys complement the 1Y, 4Y and 8Y AutoPatch series by providing small footprint, low-cost options for non-expandable applications.

Di-Tech introduced a new version of its expandable Meridian series 64x64 serial digital router that also accepts analog video, DS-3 and MPEG-2 signals. The unit is compact (6RU) with loop-through inputs, selectable reclock/non-reclock and redundant power supplies.

At the Datatek booth, four systems were introduced to complete the all-format capability of the D2600 series: a 32x32 AES/EBU digital audio, 2RU; a 16x4 digital video/digital audio, 1RU; a 32-port RS-422 data, 2RU; and a 64x16 digital video, 2RU. The control system advantages of Datatek's larger D2800 series are also available with the D2600 series.

Utah Scientific displayed some advanced features of its SC-3 control system that allow greater facility management of the Utah-300 and all other Utah Scientific or Dynatech routers and control panels. Beyond open control protocols, the SC-3 offers reserved control ports, memory and processing for third-party control and switching equipment. A "two-level tie line switching" option allows speedy control of multiformat routing. The advanced SCP-series control panels provide 16 levels of switching and eight-character pmnemonics to handle current or future system configurations.

AJA Video announced the NTV series of framestores scheduled for release this August. The series will add full SMPTE 259M serial digital video I/O to most PCI 2.1-compliant computer platforms, simplifying the export of computer graphics or other computer-managed material to ITU-601 digital video. All models will feature a reference input with adjustable output timing, auto timed inputs, dual frame buffers per channel and full 132Mb/s PCI burst capability.

Video Accessory Corporation introduced the HBVB/VDA, "Video Brick Humbucking Video Distribution Amplifier." Designed to reduce or eliminate hum and herringbone interference resulting from a ground loop, the single input/four-output VDA also provides additional gain to compensate for system losses. The EQVB/VDA-XL Brick Equalizing VDA is available to compensate for timing and amplitude errors, as well as interference created by long cable runs.

PESA introduced the Ocelot family of routers. The series can adapt to dynamic environments, and is based on basic 8x8 and 16x16 analog and digital modules that can be mixed and changed within the same compact 1RU chassis. An X/Y control panel is built into the front panel and computer control is possible through the RS-232/RS-422 serial interface. Virtual panel software allows powerful, remote feature control through direct connection or over a network using the companion VPNet software.

The RS-12A 12x1 routing switcher is the newest member of Videotek's routing switcher family. Providing standard features like 12 video and stereo audio inputs, video or audio breakaway, serial interface and GPI control, the RS-12A offers high performance in composite, Y/C and RGB/component models.

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Leitch made additions to its Xplus and XPRESS router series. The Xplus series is a modular system featuring one- and two-rack unit mounting frames. New are an AES 16x16 module with coax interface and 32x4 video and audio matrices. The new AES module offers optional "quiet-switching" outputs that provide clean, pop-free switches. The 32x4 video and audio matrices can be combined to form 64x4, 96x4 and 128x4 systems. The XPRESS switchers are low-cost, 12x1 monitoring routers, which include built-in analog video monitoring, eliminating the need for an external video converter.

Leitch also released upgraded versions of its router control software products. EventWorks is now capable of VTR machine control through V-LAN interfaces. New RouterWorks features include an improved matrix view, preset/take operations, support for locks and protects, a touchscreen interface and "wild mapping," which makes the mapping of inputs and outputs completely virtual.

Multidyne offers the AIA-880 for the Leitch 880 series of audio DA trays. The interface uses ribbon cables to adapt the screw terminals of the Leitch tray to two panels housing 60 XLR connectors each, converting all 120 terminals to XLR. XLR panels are also available for Grass Valley and other DAs.

Digital products were highlighted in the Sigma booth with the introduction of several routing switchers. The DVS-1616, a 16x16 serial digital matrix routing system, along with serial digital 16x1, 16x2, 32x1 and 32x2 source selection switchers were introduced. Two new DAs accept a SMPTE 259M signal and output four of the same serial digital signal. The DAs also have a composite analog video output for monitoring. Each of these new products is available in NTSC or PAL versions. On the analog side, Sigma introduced an editing router offering 4x4 switching of audio and video sources, plus a 4x1 RS-422 switch module to switch the editor control of source machines.

Additions at the NVision booth included the NV1025 AES DA, which actually removes jitter in addition to re-clocking and EQing digital audio, and the NV1308SA synchronous AES routing module, a small router that ensures error-free switching of 44.1kHz or 48kHz AES audio signals by correctly aligning AES frame boundaries prior to switching, eliminating the need for downstream re-framers.

Telect unveiled an enhanced version of its VersaFrame 2000, which supports several new audio and video modules including a color bar and tone generator, a 16x16 digital video routing switcher and a digital distribution amplifier. Hot-swapping capabilities allow reconfiguring of analog and digital audio and video signal management without shutting down the system.

Although Tektronix presented no new routers this year, the company has added the ability to network multiple 7000 series units with remote control (across town or across country) via DS-3 phone lines.

Tekniche exhibited the TACS (Technical Assessment and Control System), which uses the SMPTE 273 standard status monitoring and diagnostics protocol to provide a mechanism for communication among equipment racks, remote-control panels and a system supervisor PC.

Kramer Electronics showed its TP series, which includes the TP-1 and TP-5 video line transmitters and the TP-2 and TP-4 video line receivers. The TP-1 and TP-5 transmit video over any twisted pair wire to distances up to several hundred meters.

MetaWave debuted its MX256 SDI routing switcher. The MX256 is housed in an 11RU rack frame, which can contain up to a 128x128 serial digital routing switcher with redundant control and power supply. The MX256 is available in sizes from 32x32 and is expandable in blocks of 32 inputs or outputs.

Along with a large matrix (256x256) router available for either audio or video, Sierra Video Systems showed its DigiLinx series, a family of digital terminal equip-

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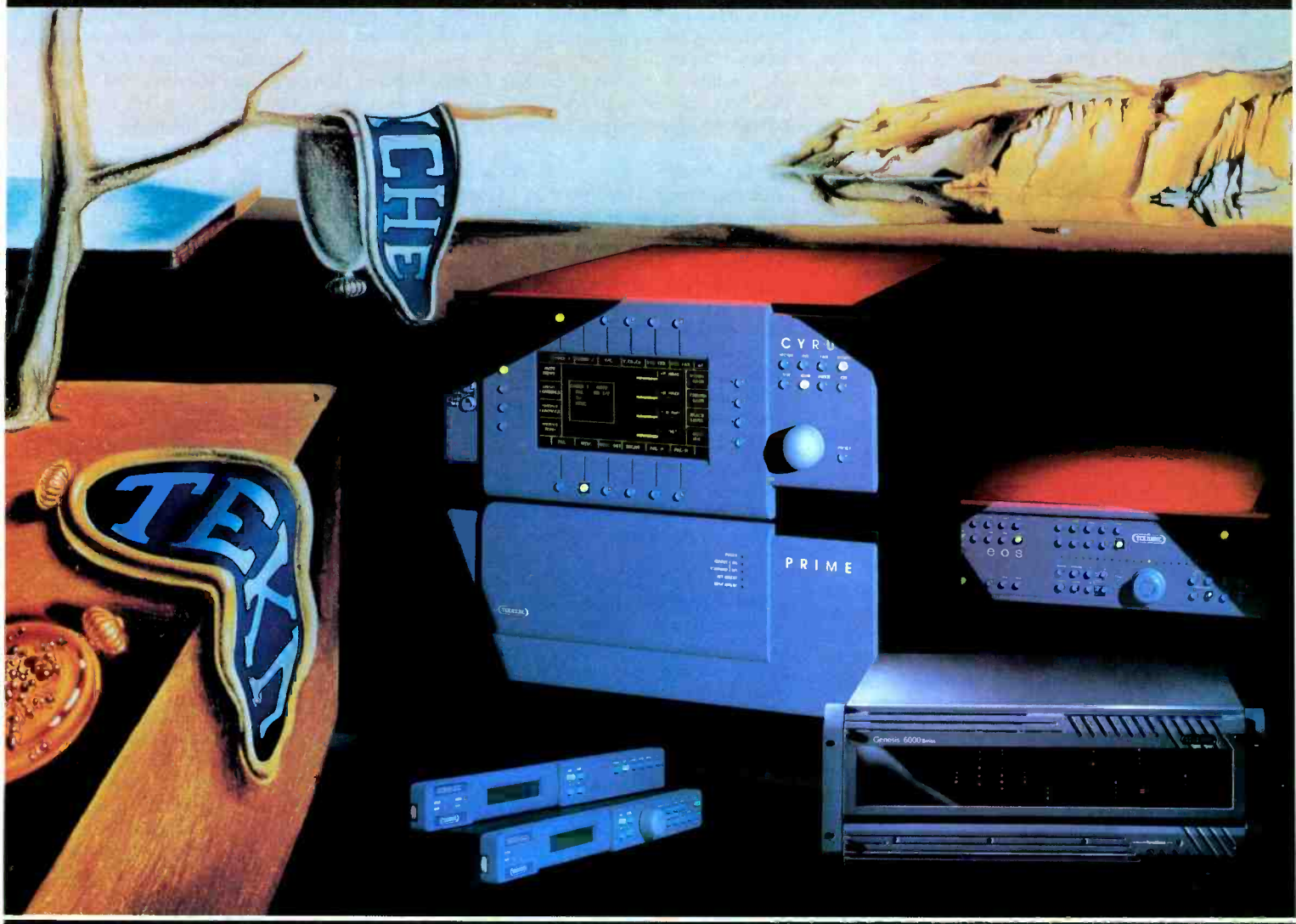

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ment. Among the modules are analog and digital DAs, A/D and D/A converters for component video and the OnScreen-601, which overlays picture information onto the video signal. Also in the booth was the Siskiyou series of digital routing switchers, the Alpha/One alphanumeric control panels and a mini production switcher remote-control panel for the Mirage digital compositing system.

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VIDEO STUDIO EQUIPMENT

By Michael Heiss
Michael Heiss is a marketing and technology consultant based in southern California.

With digital television, HDTV and small-format systems very much in the news at NAB this year, there is the temptation to think that the light weight of all the new gear would mean that heavy-duty professional studio equipment would no longer be required. After all, this stuff is so easy to handle that you can pick your support gear up at the local photo shop, right? Think again, for the exact opposite is the case. The high resolution of digital cameras requires even more precision from camera heads, tripods and grip equipment. Looking at it another way, the new DTV gear isn't always light and cheap, and you wouldn't want to trust the new cameras to something you bought at the hardware store and then have to explain to the GM how the station's new pride and joy was unceremoniously dropped. Getting the right support equipment makes good sense.

The same goes for other parts of the studio infrastructure: support area furniture and prompters. After all, the way to meet the flexibility of new digital gear is not to compromise. A well-designed studio environment helps the new equipment do its job by making it easier for you to use it. Anything less is a false economy.

The recent trend in field camera support gear has been toward carbon fiber-based products. Light, yet strong, carbon fiber has replaced older wood and metal tripod products in many applications. This NAB was no exception to the trend. Gitzo's Mountaineer series, distributed by Bogen, uses fiber material to achieve a 30% weight advantage over similarly constructed aluminum tripods.

Other manufacturers, such as Sachtler with its popular Video 60 Plus CF series, have also jumped on the fiber bandwagon. One of the more interesting aspects of this product category at NAB, however, was to see how manufacturers have adapted the material for other support applications. O'Conner, for example, now has a tripod dolly constructed of fiber material. As you would expect, it offers the durability of heavier materials without their weight. It is also available with a 27-inch spread for wheeling through narrow doors.

Although tripods are nice, there are times when nothing less than a full studio pedestal will do for the ultimate in control over camera movements. Setting the pace in that category is the new Quattro Studio Pedestal from Vinten. A sleek design with a new triangular column structure provides maximum rigidity with minimum tortional twist. The Quattro provides perfect balance for payloads up to 242 pounds from 16¼ inches off the ground to a height of 56¾ inches.

The trend toward lightweight cameras and camcorders places special demands on mounting heads, as well as the actual support legs. Miller Fluid Heads came to NAB with a series of products designed for the new age of cameras. Its Arrow 50 product line makes effective use of colors to make adjustments easier, and all adjustments are rear-mounted and illuminated for use in low-light conditions. Miller also introduced a pair of complete support systems for DV, DVCAM and DVCPRO camcorders, the DS-5 and DS-10.

Cables and cords can be a pain in any location, forever getting tangled, and reeling them in is one of the most burdensome jobs during a remote strike. A great answer to that is the new Quick Winder from Reel-A-Pail that was displayed by Nalpak. Looking for all the world like a bright-yellow five-gallon paint bucket, the stackable Quick Winder models hold up to 750 feet of ¼-inch cable or 100 feet of ¾-inch cable. Exit access is through a wide hole in the front of the pail, but when the shoot is done, you simply wind the cable back without a mess, pick up the handle and carry it off.

Among the most innovative makers of consoles and mounting equipment, Nigel B. Furniture showed off its latest creations. One of our favorites was a monorail-type ceiling-mount system that permits everything from speakers and monitors to new flat plasma displays to move across a room so that clients or editors can place them in the right spot. Unlike conventional track systems, Nigel has cleverly built tracks and cradles that resist swaying, and more importantly, they have a parallel track that allows the audio or video signal to follow the monitor without the need for wire paths.

A number of prompter vendors are now offering Windows 95-based systems, including QTV, CPC and Comprompter. This brings the 32-bit speed and crash-proof operation of the newer operating system to the world of prompting. Interestingly, some vendors, such as Telescript, actually prefer to stick with DOS as their operating system, because crashes are simply not an issue with DOS. Despite the age of the DOS system itself, Telescript has a new package called Tele*script*PRO, which features big system performance on small computing platforms.

If your prompter display requirements require a larger panel than the smaller sizes adapted from laptops, Mirror Image Teleprompters brought the wave of the future to NAB, with its 14-inch VGA prompter panel. If your need for prompters is at the other end of the size spectrum, the place to look was Fujinon, where the company introduced an LCD-based prompter for use with portable cameras. The WP-16B-04A is designed to function as a lens accessory, as one would expect from a leading lens manufacturer.

Rosco Labs introduced the Horizon PC-based lighting control console, which operates under Windows 97. The Intelligent Power System is an innovative range of IGBT-based dimming and control products with dimmer technology that changes TV lighting practice in ways that SCR dimming products cannot. It reduces studio lighting setup time and labor requirements.

Prompters were the featured products at Tekskil Industries, which included the Genesis 12-inch computer prompter and the Companion nine-inch portable prompter and a lightweight gas plasma ENG prompter.

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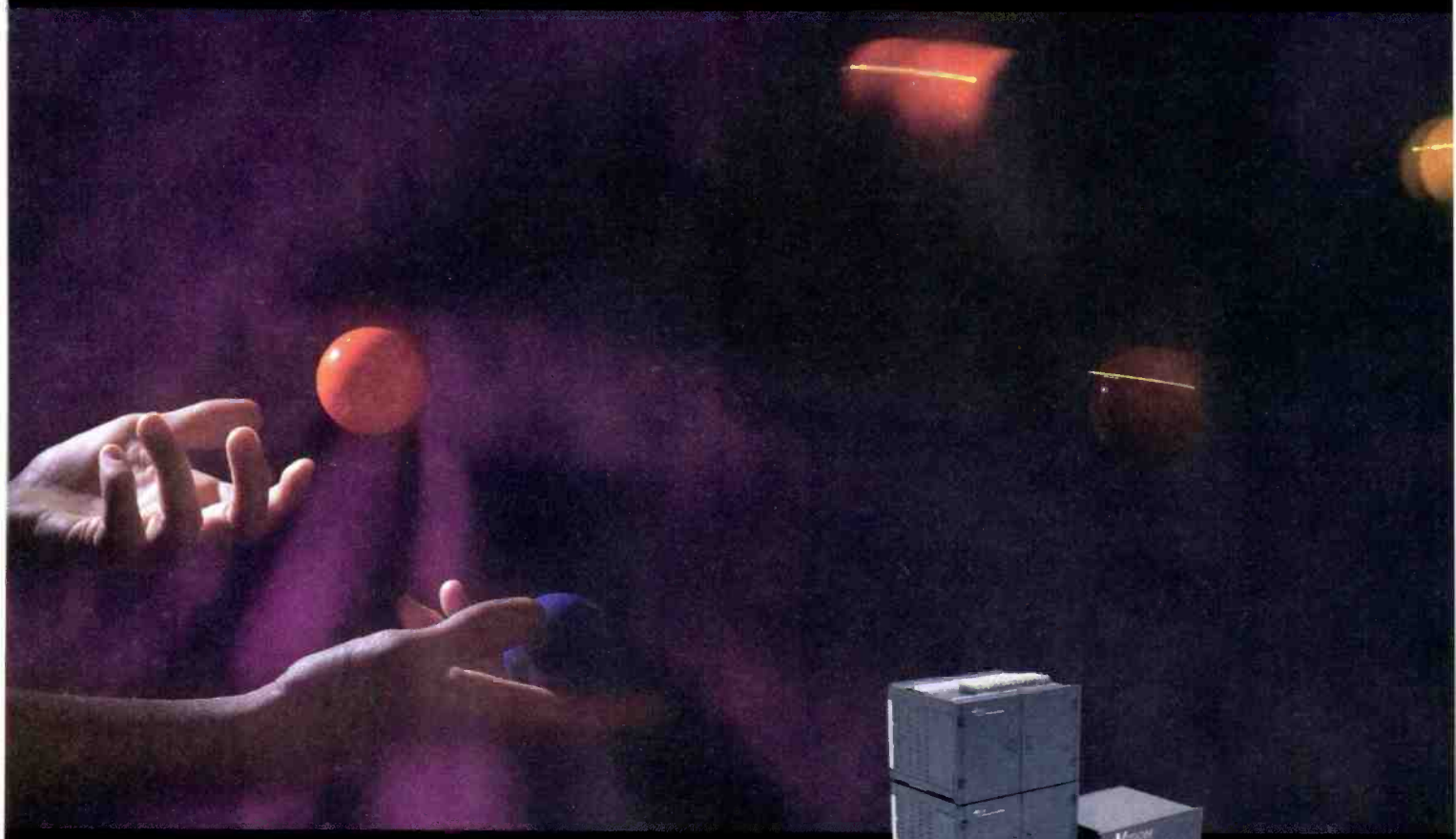

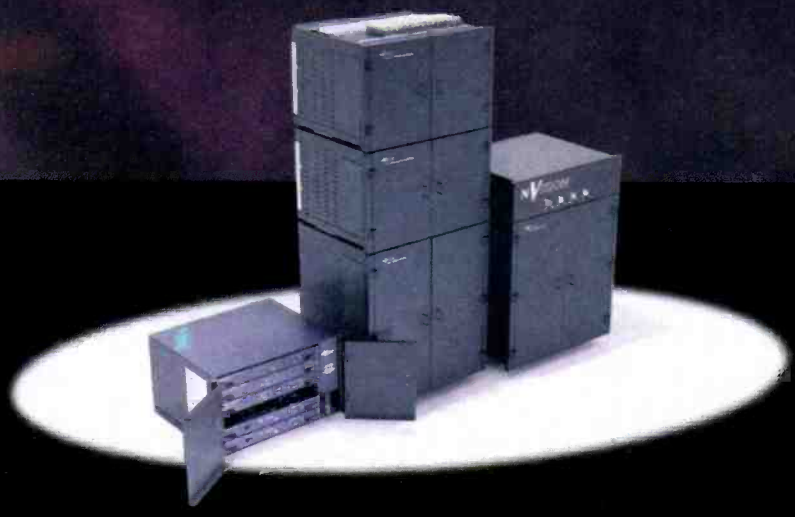

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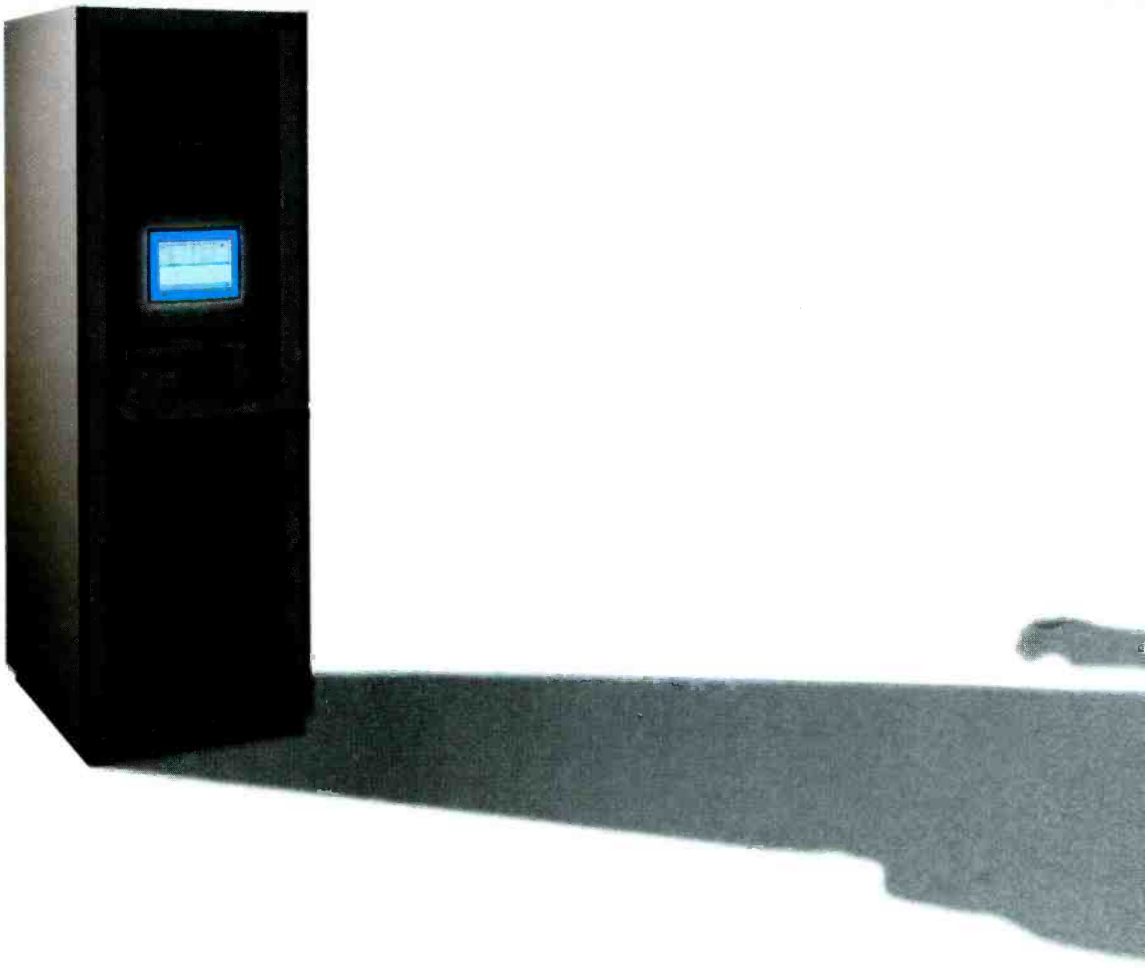

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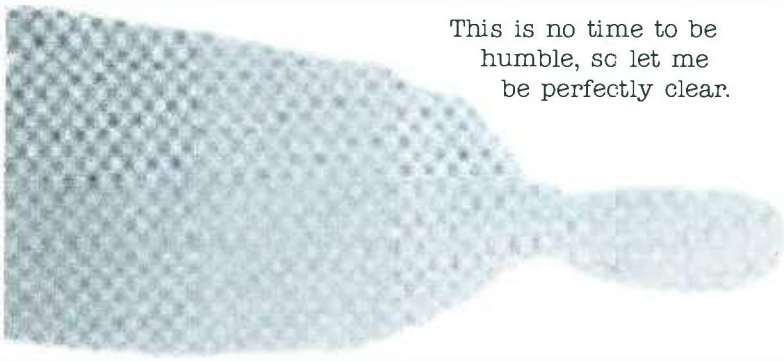

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thing usually gets the spotlight when you visit a show as important as NAB, it is just as true that you should remember to include the behind-the-scenes support gear in your travels. This may seem to be boring stuff, but without it, everything else falls apart!

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VIDEO ACCESSORIES

By Michael Heiss
Michael Heiss is a marketing and technology consultant based in southern California.

"Video accessories, are you kidding me? This is the age of digital stuff and computers, not tape and batteries!" That was our reaction as the editors handed us our NAB assignments. After all, this was to be the most exciting NAB in years, the one in which the mighty forces of high definition meet the powerful computer industry head on. Did the editors really think that there would be anything interesting at NAB in the seemingly mundane area of tape and batteries?

Much to our surprise, our tour of the convention floor revealed a number of interesting new products.

Indeed, some of the advances come to the broadcaster courtesy of developments spawned by the computer industry. Lithium Ion batteries, for example, are a mainstay in cellular phone and laptop applications, and they powered the very machine we wrote this report with. At NAB, one of the first broadcast-oriented applications of that technology was in the form of NP format batteries from IDX Technology. Lighter than either NiCads or Nickel Hydrides, they pack 50% more power in 40% of the weight. As you would expect, IDX premiered a companion charger that will simultaneously charge four of the new batteries.

Power was also the word at Anton/Bauer, coming to NAB this year under new ownership due to its recent merger with England's Vitec Group. The new Hytron system takes advantage of products developed for mobile computers by using high-performance metal hydride cells equipped with onboard "fuel computers" that monitor charging and usage to optimize battery performance. More impressive was a newly patented interface from the digital battery that provides instant remaining capacity information to an LCD display on the cell and in the viewfinder of most popular camcorders. Hytron batteries are compatible with existing Anton/Bauer chargers, as well as newer Logic Series and InterActive 2000 models.

If you already have all the batteries you need, but are looking to update your chargers, two companies offered new options. Christie Electric premiered its CASP/1500 and 1100 charger/analyzers. The former is a six-output user-programmable system, while the latter is a more economical four-output, preprogrammed system. Of course, both models join the other members of the CASP family in supporting all types of professional video system batteries.

Frezzi's new M2100 will also give you a charge — literally. Designed to discharge, charge and maintain most video and lighting batteries, the M2100 is built from aircraft aluminum for light weight and durability, while a RISC processor powers the operating system to offer simple, user-friendly operation and displays.

One interesting accessory area that has always held our fancy is clocks and timing, particularly analog clocks. No, we're not Luddites in the new digital world, but when timing live productions, we prefer the reference to end times that sweeping hands offer over clicking digits. Long-time (no pun intended!) clock supplier ESE seemed to be reading our minds as it introduced five-inch and 16-inch clocks.

The LX-5105 and LX-5116 are auto setting to time-code inputs or low-voltage impulse signals and offer sweep or step modes with optional lighted dials.

Of course, digital time is the order of the day, regardless of the display and Horita, another timing stalwart, came to NAB with its usual wide variety of models. New this year is the PR-232 that operates in conjunction with a DOS "TSR" program that automatically keeps your computer's clock updated to time code or GPS time input through an RS-232 input. The MTG-TIME program that accompanies the PR-232 not only updates your computer's time to prevent drift from unreliable PC clocks, but it provides easy offset to differing time zones or UTC time.

Not to be outdone, Skotel brought software updates to its popular Little Red time-code reader that permit computer-based logging with correct time code fed to the PC clock. Version 2.0 of the LR-Clipboard program even detects which software applications are installed and inserts a "time" icon on the application's clipboard. When combined with the Little Red's own feature set, the result is a powerful combination.

Unfortunately, you can't erase time, but in the digital world, you still have to erase your tapes. Indeed, with the higher coercivity of the newer metal-based tapes, erasure is not as easy as it used to be. While on patrol at NAB, we found a new answer to degaussing problems from Research Technology International (RTI). Its model 5300 Pulsar series conveyor degaussers use a new pulse discharge technology and a pivoting erasure coil to provide fast, full erasure of all tapes up to 1,650Oe, with reduced energy consumption. An optional automatic feed hopper accepts multiple cassette sizes and types for unattended operation.

Of course, without tape, there would be nothing to erase, and with all the interest in digital tape formats, it is only natural that there would be tape to accompany them. Maxell is meeting the digital world head-on with a new, advanced one-inch cassette designed for HDTV machines. A high-performance binder system and ceramic armor metal particle coating keep the tape from flaking under the high stress of fast shuttle modes and slow motion. Maxell also introduced a D-5 cassette product specially designed to maximize D-5 performance when the format is used with Panasonic's adapters that allow the recording of HDTV signals.

The System RTI from PAG Ltd. provides viewfinder readout of battery power remaining in hours, minutes and seconds. The MC124 was also introduced, which is a four-channel charger for Nicads in the 4.8V to 14.4V range. It measures battery performance and restores lost storage capacity to tired cells. The PP240 battery features true series configuration of 10 5/4 sub-C cells and operates stand-alone or PC-controlled.

Looking at the new products in the accessories category maybe this wasn't such a bad assignment after all. The products in this category are the unsung heroes of the broadcast and production world. We don't think too much about them, but without them, it would be hard for the more glamorous products to function in a system.

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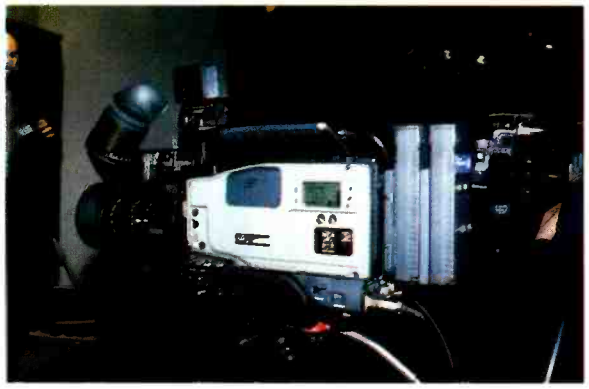
CAMERAS, LENSES AND ACCESSORIES

By Barry Hampe

Barry Hampe is a partner of The Writing & Editing Company, Inc., Las Vegas.

This year's NAB was brought to you by the letter *D* — D for digital and D as in HDTV.

Sony, with the largest booth at NAB, proudly displayed one of the smallest cameras, the DSR-PD1. It fits in the palm of your hand and uses a 1/3-inch color CCD with 680,000 pixels. It was specially designed for the DVCAM format and includes a 2 1/2-inch Swivel screen color LCD, an advanced color viewfinder and supersteady shot picture stabilization.



Sony also showed its digital High-Definition Video System (HDVS), which produces images on a par with 35mm film. The HDC-700 high-definition studio/OB camera uses Sony's two million HAD FIT CCD imagers, along with the HDC-750 portable digital HDVS camera. The cameras — designed to bridge the transition from 525-line NTSC to all-digital HDTV/SDTV — will be available this fall. The HDW-700 digital widescreen high-definition camcorder, a full two million-pixel RGB camera that incorporates a new 2/3-inch CCD design, is expected to be available next spring.

At the JVC booth was the new KY-D29, a three-CCD 14-bit digital signal processing camera that allows you to shoot in light as low as 0.35 lux. JVC's exclusive 3-D DNR dramatically reduces visible noise, allowing a 65dB signal-to-noise ratio. The KY-D29 can be docked with JVC's BR-D40 Digital-S recorder, which allows shooters to achieve quality far superior to component analog for a fraction of the cost of high-end digital systems. With a suggested list price of $8,990, the KY-D29U is now available.

Hitachi Denshi America Ltd. showed its new Z-2010, a 2/3-inch, three-CCD portable digital camera with one full f-stop more sensitivity than its predecessor, the Z-2000A. Also shown was Hitachi's SK-3000P HDTV camera that operates in a 16:9 format and provides simultaneous HDTV and NTSC outputs. The 1.5GB/s digital output from the camera head is brought to the CCU via optical fiber cable. At the CCU, the data is digitally converted to NTSC (16:9 or 4:3) and serial digital component outputs, in addition to the standard digital HDTV output. Hitachi also showed the Z-V1, a high-sensitivity, one-piece camera/recorder using Panasonic's DVCPRO tape format. Also at Hitachi was the SK-2060PW, a cost-effective EFP camera switchable between 16:9 and 4:3 aspect ratios.

Ikegami Electronics lined up an impressive family of new cameras with advanced features. At the high end were the HDK-790 studio camera and the HDK-79 portable camera, both fully digital, employing three 2/3-inch two-million-pixel CCDs. The CCU incorporates a down/upconverter allowing input and output of HDTV and NTSC signals. The HK-525 studio/field and HL-525P portable companion digital cameras support progressive scan and NTSC and are switchable from 16:9 to 4:3 format. The HDL-10 is a single-chip, 2/3-inch two million-pixel ultraminiature HDTV camera, and the HDL-37 is a three-chip 2/3-inch two million-pixel compact HDTV camera.

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Ikegami also showed the new HL-45 lightweight digital portable camera featuring 520,000-pixel 2/3-inch IT CCDs with 900 TV lines of resolution and a 62dB signal-to-noise ratio.

Philips introduced the LDK-20 and the portable LDK-20P high-resolution digital camera systems that use Philips's Frame Transfer (FT) sensors for no smear, no lag performance. These chips can handle exposures up to 600% above normal video levels. With 12-bit A/D video conversion, the cameras offer 24-bit HiRes digital internal processing and produce the equivalent of 800 TV lines of resolution. The LDK-100 digital camera series, built around 12-bit A/D and 24-bit dynamic digital signal processing, can be converted using dedicated adapters to such diverse configurations as Triax, DVCPRO camcorder and Betacam SP. It operates in either 4:3 or 16:9 format, switchable at the touch of a button.

Panasonic showed its new, lightweight AJ-D800 high-performance DVCPRO digital camera/recorder. The camcorder uses three 2/3-inch CCDs, features 10-bit digital signal processing and offers a 63dB signal-to-noise ratio. The unit requires a minimum illumination of 0.5 lux, consumes less than 24W of power and weighs less than 13 pounds.

NEC showed its DP-850 high-sensitivity digital portable camera with dockable Diskcam digital optical video disk recorder with 4.1GB per side and a recording capacity of 20 minutes.

Thomson Broadcast had its new family of 12-bit digital cameras that are based on the 1657D. The 1657D is available in several configurations, such as camcorder, conventional portable camera, Microcam or Sportcam. The Microcam is a 1657D with the CCD block mounted remotely. The camera body and scanning assembly are linked with a 26-pin cable. The Sportcam configuration allows a portable camera to be transformed into a multifunctional unit that can be used for sports coverage, field production or in the studio with a teleprompter.

The IK-TU40A is Toshiba's three-chip, 10-bit, digital P.O.V. camera. The use of Toshiba's 10-bit DSP architecture combined with three 410,000-pixel results in 750 horizontal lines of resolution with 62dB signal-to-noise ratio for bright and sharp color video.

Burle Industries is maintaining a standard of excellence as a supplier for broadcast power tubes, with dedication to customer support after the warranty is over.

Canon USA, Inc. has made its internal focus (IF) technology available to provideo with two new lenses, the YJ18X9B KRS 2/3-inch 9-162mm zoom lens and the YH18X6.7 KRS 1/2-inch 6.7-121mm lens. Both feature a minimum object distance of 0.9m for close focusing. Internal focus allows the barrel of the front glass elements to remain stationary during focusing, permitting the use of a rectangular lens hood and filters and eliminating much of the ghosting and flare associated with focus when using a moving front element.

Canon also showed the IS-20B II image stabilizer adapter that can be used with most popular Canon IF lenses for broadcast-quality, shake-free images.

Angenieux showed a new digital broadcast lens 15X8.3AIF f/1.7 2/3-inch with assisted internal focus (AIF). The lens is compatible with 16:9 format with optional accessories. Angenieux's Cine Digital Kit offers cinematographic control with a camcorder lens.

Fujinon brought several new lenses to Las Vegas including its high-end A10X4.8EVM/ERD wide power lens, which provides a 90 degree horizontal range of view in the 16:9 format and offers the highest zoom ratio of any wide angle lens with a 0.3m minimum object distance. That's a wide picture up close. Other new lenses include the standard A15X8 and the standard telephoto A20X8. The new lenses all use Aspheric Technology to reduce distortion at wide angles, improve corner resolution, reduce glare and reflections and allow chromatic aberration to be managed throughout the zoom range.

Century Precision Optics showed a variety of lens adapters including a .65X wide angle adapter for zoom lenses, a .6X non-zoom wide angle adapter and a 1.6X teleconverter.

Schneider Optics showcased reflective and absorptive neutral density filters, diopters and split diopters, clear water-white optical flats, corals, color combinations and the True-Polarizer. Another nifty product was the special brass rings, which prevent cross-threading or binding on the front of ENG lenses.

Asaca/Shibasoku Corporation of America is tuned into the future of video with its Executive Suite series, the ES-42, 42-inch flat panel display and Media Suite HDTV monitor, the MS-32 with a capability of displaying 25-inch NISC imaging. The CM202H reference-quality monitor will offer NISC and HDTV digital control features and remotecontrol setup.

Sony Electronics also showed a flat panel display adaptable to computer and TV signals. The LMD-1041 is a 640x480 pixel thin film active matrix display that features a 10.4 viewing area. It includes built-in stereo speakers and an on-screen display for quick setup. (See "Pick Hits," p. 42.)

For live remote color camera productions, Camplex Concept W Corporation's CP-301B is ideal. It's a high-performance, low-cost, bidirectional multiplexing system that uses only one 75 ohm coaxial cable to simultaneously send the composite video audio and data signals, along with the camera power required. It reliably passes more than 600 TV lines of resolution and is field-adaptable to any NTSC and PAL broadcast or industrial color camera.

For running camera cables over long distances, Telecast Fiber System's Cobra (see "Pick Hits," p. 42) fiber-optic triaxial interface allows distances up to 10km without repeaters. Cobra provides power along with all necessary signals to the camera without having to modify cameras, vehicles or CCUs.

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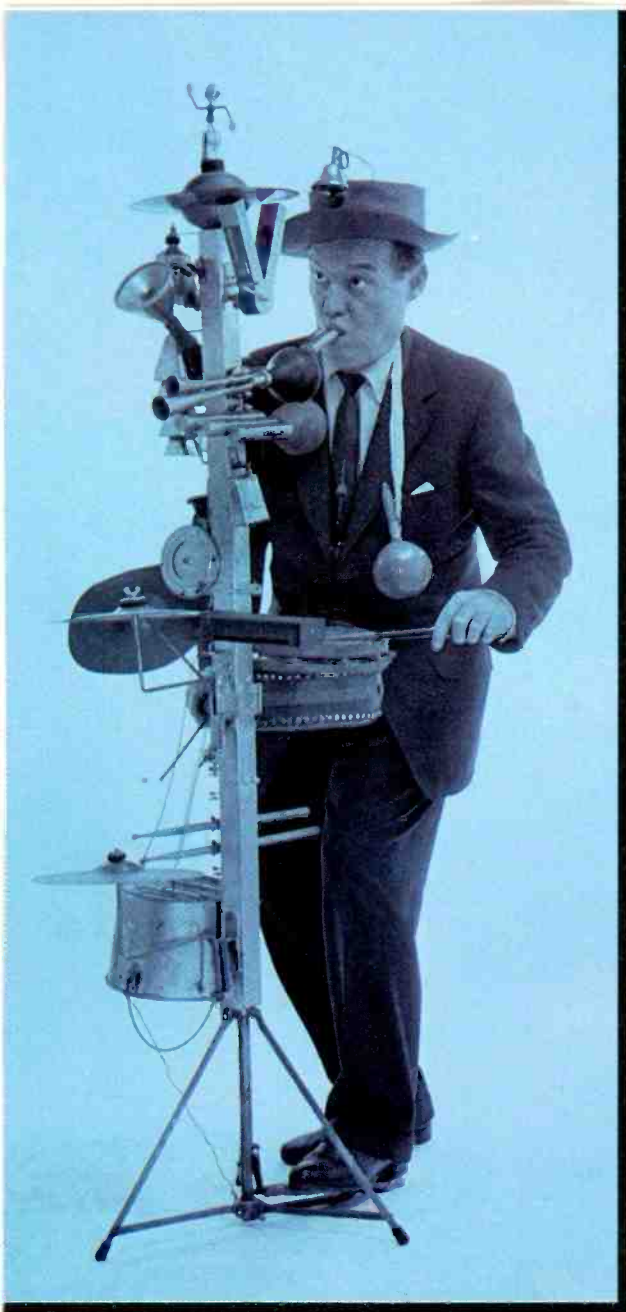
CAMERA ROBOTICS, SUPPORT AND VIRTUAL SETS

By Marc Boeddeker
Marc Boeddeker is in the digital video division of Producers Post, Burbank, CA.

Out on the show floor, Chapman/Leonard featured a full line of camera cranes, dollies, remote arms, bases and pedestals that offer virtually everything conceivable in terms of studio and field camera mounts. The company's PeeWee dollies are the standard in affordable, transportable dollies, and the six-wheel steering crane trucks are a marvel of practical engineering. It's only natural that the Power Pod (load capacity of 80 pounds) and the Hot Head (max load of 176 pounds) camera remote systems are available to mount on the end of some of these exotic camera mounts.

In 1992, the Academy of Motion Picture Arts and Sciences recognized Dr. Cartoni for his contributions to the fluid head tripod as we know it today. From the Alfa I and II, designed for today's lightest ENG cameras, to the high-end C40s "Dutch



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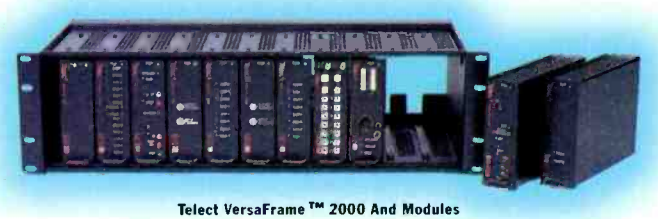

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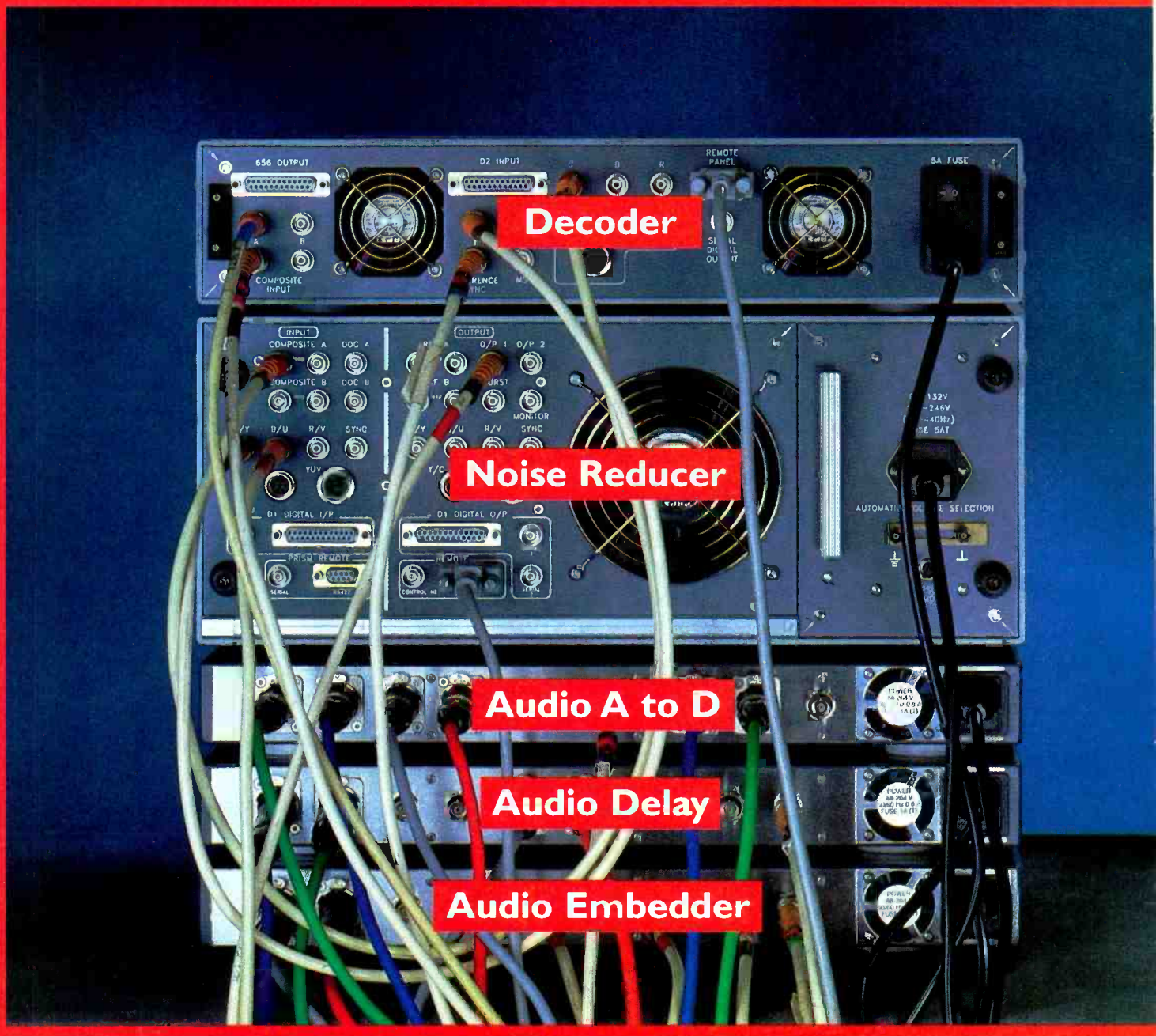

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Head," Cartoni fluid heads feature patented Cartoni fluid damping "Labyrinth Modules" to ensure precise, repeatable drag control settings. The Delta has LED position indicators to facilitate repeat setups and the new Gamma head, specifically designed for dockable ENG/EFP cameras and 16mm film cameras, incorporates the same damping technology to provide infinitely adjustable tension setting for both pan and tilt.

The DV-2 and DV-4 are Sachtler's offering to the lightweight DV cam market. The DV-4 features a sliding balance plate and a higher load capacity (12 pounds). These products are lightweight and bring Sachtler's leak-proof fluid head and the "touch-and-go" release system to DV shooters at a reasonable price. It's good to see professional products for this segment. Also new from Sachtler was a series of heads based on the evolution of its "Plus" technology, featuring more finely tuned drag-and-counter balance control. The new VIDEO 60 Plus uses a modular design that permits easy field conversion between various camera and dolly/crane fittings. Anyone who"s ever gotten all the wrong fittings on a rental should appreciate this.

The Radamec Virtual Scenario is comprised of a 2RU CPU chassis unit, user workstation and a serial-controlled pan-and-tilt head equipped with high-resolution optical encoders. Developed in conjunction with the BBC, this product is a cost-effective virtual set solution. The workstation stores camera position and lens information, which it then incorporates via standard blue-screen technology with a variety of background sources, including live video and CG environments. The subject's relationship to the background changes as camera position changes. A new hardware defocusing product (D*Focus) allows variable focus (de-focus) of any virtual background, enhancing realism. Radamec's RP2 robotic pedestal, combined with the same 421 pan-and-tilt head used in VirtualScenario and the eight-channel ARC 2000 touch control panel are used in robotic TV installations all over the world.

Cinema Products line of Steadicam products has been responsible for innovations in camera technique and cinematic concept. With lightweight materials and technical innovation, Cinema Products takes Steadicam into the future of professional videography. The ProVid 2 for nine- to 19-pound cameras is lighter, yet stronger, than its predecessors because of carbon fiber construction. The top-of-the-line "EDTV" supports camera loads up to 45 pounds (prompter, etc.) and can be hard-wired via triax to a remote camera CCU. As with the Broadcast Steadicam (18 to 35 pounds capacity) the "EDTV" features "no tools" adjustment and balancing. The "SK" is the most compact steadicam and offers an affordable product for industrial/educational applications. New at NAB was the smallest, "Name This Steadicam" product, for two- to six-pound DV cameras.

Manufactured in Costa Mesa, CA, O'Connor fluid heads and tripods are precision engineered and manufactured from aircraft-grade components. An industry standard in the United States since the '50s, O'Connor products offer exceptional field reliability with good customer support. O'Connor offers improved calibration features, infinite drag settings, carbon fiber tripod elements, and in general, lightweight/high-strength aluminum and magnesium components. Little extras like a phosphorescent level bubble and ergonomic controls, such as a counterbalance knob that extends to a crank handle for faster action, bear witness to O'Connor's ability to incorporate customer input into its product designs. The new "Randall Handle" extension is a different take on increasing operator control of the system when leaning in on the camera. Basically just a bent handle, it offers surprising advantages to the experienced cameraman. From the affordable model 515 to the sophisticated model 2527, O'Connor offers standard head/tripod/accessory packages, but the product line-up is such that virtually any combination of components can be ordered to create a unique camera support system for your application.

Vinten's AutoCam system was introduced 10 years ago to implement automatic camera control in a newsroom environment. Since that time, the system has shown utility in a variety of applications including education and government video. To date, more than 2,500 systems are in place throughout the world. The ACP-8000P touchscreen controller is a Pentium-based upgrade of Vinten's HCP-8000. The ACP controls pedestal movement, as well as pan and tilt, on Vinten's family of "Robo-Heads." Expanding this line of pan-and-tilt heads is the HS-2010R, designed for a camera/accessory load of up to 125 pounds and the HS-102P, which is designed for loads up to 35 pounds. The AutoCam system can control up to eight of the HS-102P units. For smaller systems, the AutoCam multicontroller provides "live" control for pan and tilt, zoom and focus for up to four cameras, as well as a store/recall mode with access to a 100-shot memory per camera. An interesting twist on the shot storage/recall concept is the "Legislative AutoCam System" or LCP 8000, which uses a "cue" concept to assign a collection of information to a specific legislator's preassigned shot/location. Up to 1,440 shots per camera can be stored. When the cue is recalled, specific graphics can be recalled with the camera parameters, displaying such information as the member's name, title, (pending litigation, affiliated special interests and so on). Augmenting Vinten's line of tripod camera support is the new Pro-Touch PRO 130 System. Designed for ENG crews on the move, the system components include the Vinten LF drag (fluid lubricated friction) head, lightweight aluminum vision tripod with spreaders and soft carrying case. Total package weight is 13 pounds.

Telemetrics fields an impressive line of heavy hardware remote systems; the kind of stuff you see on the morning news freezing on a mountain-top in the winter as a "SNO CAM" (the TM-9400, RS-232-controlled weatherproof robotic camera system). But what I enjoyed was the newest smallest pan-and-tilt head, the PT-MP, which measures less than three inches at its base. This unit responds to remote function as reliably as its larger relatives. To complement the PT-MP, Telemetrics intro'd a compact color CCD camera, the CAM-SCL. The camera comes with a 12x zoom lens and features Y/C output. Intermediate size pan-and-tilt heads, a robotic pan-and-tilt trolley system and a host of joystick control panels are all part of the Telemetrics product line, as are the other requisite bits of hardware, like control receivers and power supplies. Telemetrics introduced TM-CPS control panel software. This is a comprehensive Windows-based system that interfaces with all of Telemetric's other robotic/remote systems and offers productivity enhancements at every level. Joystick control of that "SNO-CAM" I mentioned is also possible with this package. Telemetrics is a systems integrator for People Tracker, a software-based auto-tracking system that eliminates the need for the "talent" to wear some kind of tracking badge. Telemetrics also introduced a triax camera control system, the TM-9660, that is an alternative to manufacturer's solutions for accessing component signal output from the multitude of Y, R-Y, B-Y cameras on the market.

Canare's line of cables, connectors, patchbays and snake systems has proven its

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reliability and dedication to quality for more than 20 years. For NAB 97, Canare introduced its DVJ-W (normal through) and DVJ-S (straight through) video jacks. These front-mounted (no more lost screws) jacks are designed for DC to 1.4GHz bandwidth usage. Ancillary patchbays and specially designed and terminated patch cables ensure the integrity of 1.4GHz data/video patching. As with most Canare products, a wide variety of cable colors are available to facilitate color-keyed cable organization.

ParkerVision's CameraManSTUDIO is a unique approach to one-man studio automation. All aspects of real-time video production are included in this package. Billed as a TV studio for less than $100,000, the CameraMan STUDIO offers switcher effects like chroma-keying, transitions, keying on-air graphics and DVE. It also provides programmable robotic camera control (up to 64 cameras), as well as audio mixing. All of the above can be preprogrammed using transition macros, which allow the camera settings, dynamic moves, etc. to be saved to hard disk for playback, either for rehearsal, editing or on-air. The CameraMan 3-CCD pan/tilt system is a modular camera unit that incorporates POWER HAD CCDs (380,000 elements, 750-line resolution) with 13x or 17x zoom, a serial-controlled pan/tilt head that can be mounted anywhere, and it can be fitted with a prompter that tracks with the talent.

RT-SET demonstrated the Lorus and Otus turnkey 3-D virtual studio systems designed for use in live and taped broadcast and cable television, post-production, interactive programming and other content-intensive video productions.

FOR MORE information

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VIDEO EDITING SYSTEMS

By Yasmin Hashmi and Stella Plumbridge

Yasmin Hashmi and Stella Plumbridge are partners in the consultancy firm Sypha, and publish "The Nonlinear Video Buyers Guide."

As expected, this year's developments focused on faster processing, support for Windows NT and PCI platforms and open or cross-platform solutions. However, the promise of seamless transfer, from acquisition through editing to finishing, saw new digital video formats at the top of the agenda.

Keeping tape in the loop

Avid threw its weight behind the DV format by announcing a joint development with Pluto Technologies for a DV-native editing and playback solution for broadcast news. Pluto will develop a DV-based multichannel server providing compatibility with the Avid NewsCutter, a DV-based Windows NT version which is also under development.

With the announcement that the FAST Electronic Windows 95/NT-based DV Master is now shipping, came the introduction by ProMax of DV-Max, a non-linear system using an OEM Power Mac version of the DV Master. Sporting Sony DVBK-1 decode/encode hardware and bundled with Adobe Premiere 4.2, the system supports a range of I/O, including direct transfer of DV material from camcorders via FireWire.

Another system bundled with Adobe Premiere and featuring Power Mac-based

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DV editing was the DPS Spark, the prerelease version which uses the Adaptec DVSoft DV format codec to convert footage into QuickTime files in real time.

Showcasing its "next-generation video" solutions, Panasonic announced DVCPRO50, which expands the DVCPRO format to 4:2:2 processing. New products include a studio editing VTR, a camcorder, the AJ-LT75 laptop editor and the AJ-D780 4X recorder/player supporting transfer at four times play speed via CSDI to editing systems, such as Panasonic's new Windows NT-based NewsBYTE. Panasonic also unveiled DVedit, a multimedia kit for NT platforms that uses a DVCPRO version of the Truevision Targa 2000 RTX board. (See "Pick Hits," p. 42.)

DVCPRO was also featured in the Philips BTS booth, in the form of the DCR 75 digital laptop editor. Designed as a lightweight portable for on-site field editing, the unit uses the DVCPRO large cassette, includes two digital VTRs and an editing controller with two color LCD monitors and is powered by a 12VDC supply or optional AC adapter.

Toshiba previewed its Nonlinear Editing System with various interfaces, including DVCS (DV format serial), FireWire and SMPTE 259M. Designed to run on Power Mac or NT platforms, the system can be linked to a multifunction server, as well as Panasonic DVCPRO cameras via a special interface. The system shown at NAB used the Targa 2000 card and a preview version of the new Macromedia Final Cut software, which is designed to be a cross-platform product using the latest versions of QuickTime for Windows and Mac platforms.

Promising "digital solutions for today and tomorrow," Sony announced a Technology Partners Program for its Betacam SX format. Betacam SX was demonstrated with a range of products aimed at news applications, including camcorders and the DNW series of hybrid recorders with tape-to-disk transfer at four times play speed via SDDI. A range of non-linear editors was also on display including the DNE-50 portable field editor, DLE-110 live editor, DNE-1000 news editor and the new DNW-A200 field-editing and DNE-700 digital news-editing systems.

Under the "Planet JVC" banner, JVC introduced a range of products to its Digital-S family. These included editing recorder and feeder/players, a dockable field recorder and the MSW-S1000 non-linear editing system. Designed to be used with Digital-S VTRs, as well as all serial digital connections, the system features 4:2:2 sampling, real-time 2-D and 3-D effects, graphics and chroma-key. JVC also demonstrated a prototype Digital-S recorder that supports two times faster than real-time compressed serial data output via standard SDI.

Open solutions

"Delivering the unexpected," Quantel announced that third-party Java applications will be supported by the entire family of Quantel products. These applications will run seamlessly alongside the Quantel feature set and be represented on the GUI by an extra menu box. According to Quantel, this is "a move that turns the established notion of open vs. closed platforms completely on its head."

Meanwhile, to expand its products into open platform solutions for the desktop and corporate video markets, Chyron announced its acquisition of software developer Axis Holdings. Axis specializes in video and audio tools under Windows NT, and Chyron maintains that its technology will also help the company enhance its traditional high-end product offerings. New releases include version 14.0 for the CMX Omni family of edit controllers. Demonstrated using the Sierra Design Labs Quickframe DDR, the new software includes look-ahead auto assembly and a new disk interface with enhanced disk handling and caching.

Claiming "every in, any out" format freedom, FAST Electronic announced Blue, its all-format digital editing system. As well as supporting MPEG-2, the system has been designed to allow any digital or analog video format to be used on the same platform at the same time, while keeping the signal in its native format. Data can then be transferred via SDI, FireWire or QSDI, the latter being a compressed serial digital interface licensed under an agreement with Sony.

Tektronix was keen to be seen "delivering it all together" with a range of open platforms and systems for news, on-air, live and post-production applications. Among these were the Lightworks Newsworks non-linear editing system for tape-to-tape edit suite replacement and the four-channel Lightworks V.I.P 4500 on-line broadcast-quality editing system.

In response to the never-ending demand for faster operation, Discreet Logic announced an overall speed improvement of two times, with its 2.0 release of Fire that runs on the SGI Onyx graphics workstation. The release also includes clip compatibility with Discreet effects products and the addition of fast text and color-correction capabilities, as well as high-speed archiving.

Another new release offering double the speed of its predecessor is the Windows 95/NT-based Ulead MediaStudio Pro 5.0 software, which also includes new paint and titling programs.

One software developer of note was Broadware, a company that has revived the EMC non-linear editor with an impressive list of bug fixes and enhancements, including the ability to playback 16:9 material in real time. Additionally, a PCI/NT version is planned.

Accom described its Axial 3000 as the "un-linear" editor, not to be confused with systems that use a computer-based user interface. Designed as a true hybrid editor, the system supports linear, non-linear or a combination of both types of operation. Similar capabilities are claimed for the ETC "multilinear" Ensemble Gold, which has been joined by the new Ensemble Pro-H series of cost-effective hybrid editing systems.

Another system offering an alternative method of operation was the Draco Casablanca. Comprising a unit the size of a VCR and controlled by trackball, the system simply requires the addition of a monitor and source machine, with no software installation necessary.

While the new in:sync Speed Razor 3.51 sports 450 improvements, third-party plug-ins, a color-coded compact keyboard for all shortcuts and an accelerator card that speeds up the rendering process by seven times, the preview version 4.0 on display featured real-time operation by supporting the Targa RTX and Matrox DigiSuite boards.

D-Vision, which currently uses the Targa RTX for the real-time version 3.0 of On-LINE, also intends to port OnLINE to DigiSuite. United Media will use DigiSuite for its On-Line Express for Windows NT. Furthermore, Matrox has announced a DV/DVCPRO addition to the DigiSuite family in the form of DigiFusion.

Media 100 previewed its HDRfx 4:2:2 digital component effects processing engine which, when used in conjunction with the Vincent 601 card, provides 21 real-time transition effects at 2:1 compression, with two streams of video and an alpha key channel. Truevision meanwhile, announced the Targa 2000 SDX with SDI, and an agreement with Scitex Digital Video (SDV) to port the DveousFX real-time 3-D card to Windows NT. SDV intends to migrate not only toward NT, but also toward developments by Apple, as well as migrating DveousFX to the desktop for incorporation into the MicroSphere editing system. SDV demonstrat-

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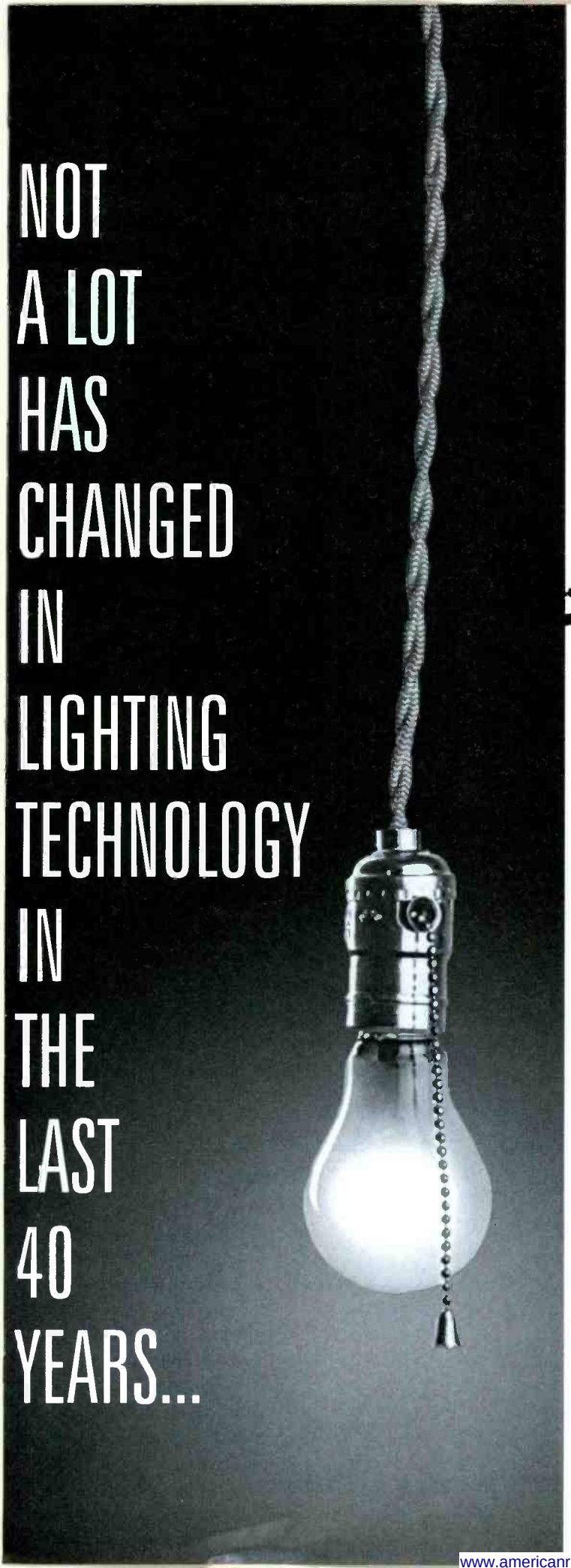

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ed drag-and-drop network transfer between its Sphere editing systems, and has an agreement with Pathlight Technologies to develop real-time networking using SSA technology.

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PRODUCTION SWITCHERS, DVES AND EFFECTS

By Ed Fraticelli

Ed Fraticelli is director of engineering for Production Masters, Inc., Pittsburgh.

While the last few years have seen a reduction in innovative video manipulation products, such as production switchers, digital video effects systems and standalone keying devices, NAB 97 saw a return, of sorts, of these items. Over the past five years or so, production switchers have seen a trend toward smaller size, with increased capabilities, as digital processing has taken over. DVE systems have tended to also reduce their footprint, or disappear altogether, as integration into switchers has become popular.

The return to larger, live-style switcher consoles was noticeable on the show floor. Several manufacturers have taken last year's high-end digital production switchers and have added live, button-per-function consoles. Still others have beefed-up their existing lines to promote their choice for live broadcast events. Broadcast production equipment manufacturers are seeing the need for live digital switchers with the advent of the digital TV, which specifies component digital programming.

Digital production switchers

In the extensive Sony exhibit was the expanded line of 7000-series of digital production switchers. The 3-M/E DVS-7000 and 2-M/E DVS-7200 lines have had live models added to their offerings. Functions such as DME integration, expanded tally and source ID have increased their value for broadcast event production. With up to 36 inputs, crews are assured all of the sources needed are available at one time.

Tektronix's Grass Valley switchers, long known for multiple M/E, large-format switchers, has maintained and expanded its selection of digital production mixers. The 3000 composite digital and 2000 and 4000 component digital lines offer various sizes to suit any live or post-production need. All high-end models include standard features as Time Align Editing time-line functions, E-MEM effects memory, Chromatte Chromakey and Lamina Image Layering System, which allows up to four key layers on each M/E.

The Diamond Digital line of production switchers from Philips has expanded to include live models. The top-end DD-30 component digital system was modified to form the DD-35 live switcher. The new console's button-per-function layout makes it more suitable for this type of

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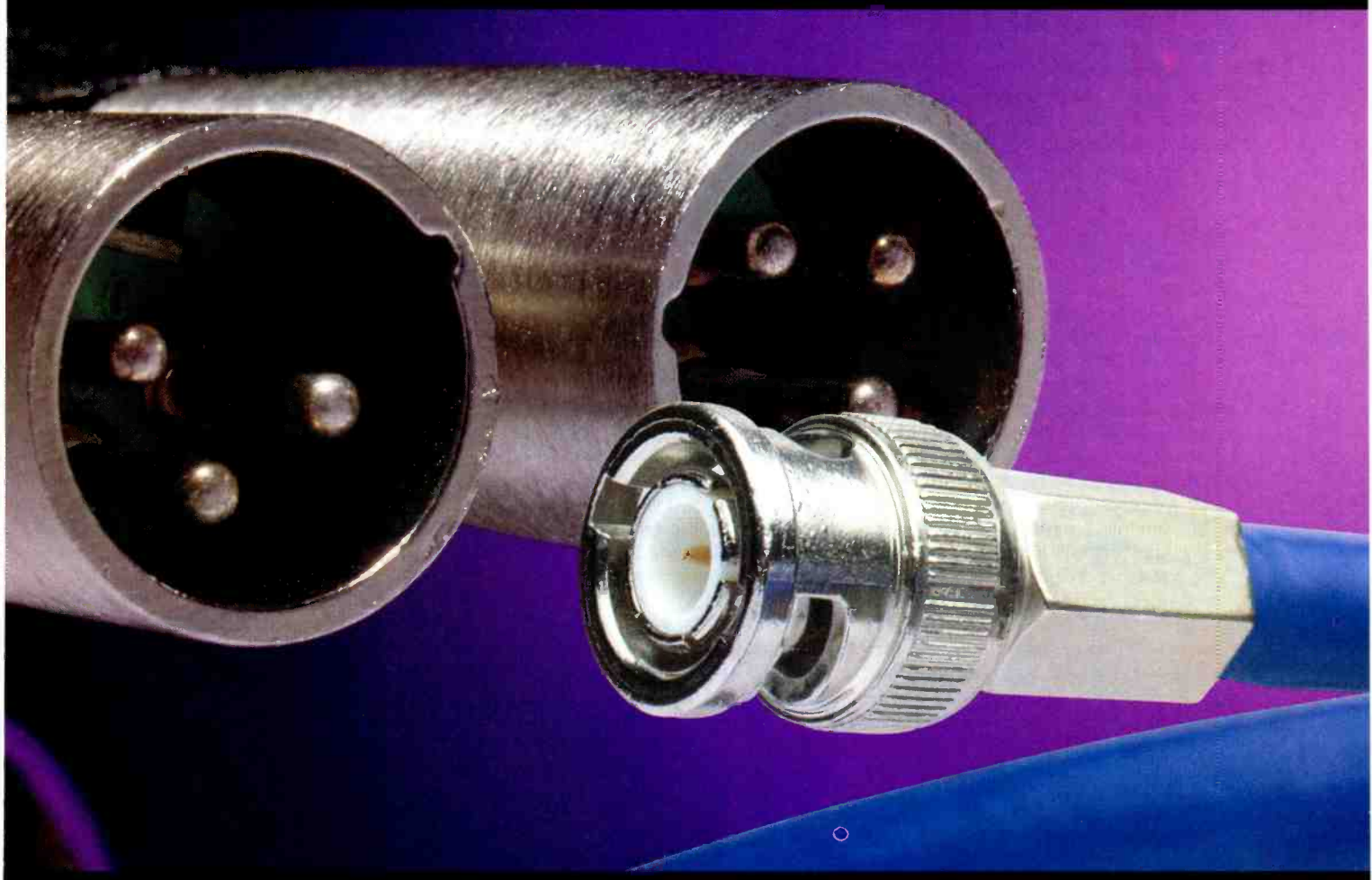

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situation. Also from Philips is the VS-4 video sweetener (see "Pick Hits," p. 42). Applications include film post-production, MPEG encoding and tape duplication, archiving and remastering.

From For.A and Video Gainesville comes the new production power house, the CV332 component digital production switcher. Offering 32 inputs, two M/Es and two downstream keyers, the switcher also features keyer functions, including VGV's Cyber Key. Interesting options include Ultimatte keyers, integrated For.A DVEs, built-in framestores and differential or balancing color correction. The console had a large, live feel and included a readable color plasma status/menu display.

Other innovative switcher designs

One of the more interesting design concepts in production switchers was at ECHOlab. Its 5000 series line is based on a unique Windows NT chassis. There are two separate Pentium processors, one to operate the base switcher and the other to run user-selected PCI video accessory cards. The switcher has up to 34 inputs, 17 outputs and 2½ M/Es. It boasts 10-bit 4:2:2 video processing and a selection of I/O module options to allow various analog (and digital) inputs.

The accessory PCI-based Windows NT system uses the Movie-2 internal video bus for fast multi-D-1 video streams. The Windows NT workstation can run various software systems to allow functions, such as still-store, editor and DVE to be fully integrated into the switcher operation. Examples of PCI cards that could be used include the Matrox DigiMix and Pinnacle Genie DVE. Software examples include Chyron Winfinit!, Image North Technologies' Inscriber CG and Adobe Photoshop, among others.

Other ECHOlab switchers include the smaller component digital 2000 series and the analog 5800 and 5900. All were demonstrated and can be upgraded to the higher models in the future.

Ross Video Ltd. premiered its CDK 104 telecine switcher. This miniature "stripped down" component digital switcher has features especially designed for the needs of the film transfer suite. Capabilities include side-by-side and diagonal picture comparisons, a linear keyer, a basic chroma-keyer and an interesting method of producing precision letter boxing. The 12-bit internal video processing lets operators rest assured that their film transfers are being precisely processed by this miniature wonder. Its small footprint and autoline standard detection would be welcome in any telecine environment.

Scitex Digital Video displayed the production model of the well-known 8150 switcher with integrated Dveous digital video effects. Now users can have the high quality of the venerable Abekas 8100 D-1 switcher and the effects capability of the Dveous, seen extensively in the '96 Olympic Games, in one control panel. It is perfect for compact post suites. Dveous features, such as Ultra-Warp, dual light sources and texture mapping were all demonstrated.

Digital video effects systems

Sony's DME-3000 digital video effects system showed many new effects capabilities. The new Digital Sparkle option provides such effects as kaleidoscope, explosions, swirls and melts. The Digital SKETCH option offers "painted" effects textures to the picture, such as oil paint, relief and enhanced edges.

Tektronix has maintained the Grass Valley Krystal 4300 DVE system. Krystal offers features such as Kurl non-linear effects and Trailblazer recursive effects. Operational features include independent function time lines, two global channels and a camera channel to make effects creation as simple or as sophisticated as desired.

Pinnacle Systems introduced the DVEXtreme stand-alone digital video effects system. Based on a Windows NT platform, the DVEXtreme provides up to three channels of video, each with its own key channel. Although the system does all of the typical 3-D DVE effects transforms, it adds a few interesting twists with ParticleFX and PainterlyFX technologies. ParticleFX provides effects such as blowing sand, melts, bursts and swirls. PainterlyFX gives the video unique surface properties, such as crystals, bubbles and beveled and stained glass. While D-1 serial digital input/output modules are standard, a variety of analog composite and component I/Os are also available.

Many integrated systems

Several integrated switcher/DVE systems have been developed and shown this year. Snell and Wilcox first showed its Magic DaVE system in 1996, but has brought the product to maturity this year. A new control panel offers easy-to-use dedicated feature buttons and a group of effects sequence buttons that stores sets of on-line effects, selectable for several different operators. Many new warp-type effects were added to DaVE and the four-input digital switcher has been enhanced with the addition of synchronizing TBCs on the inputs and an optional still-store. DaVE also offers eight- and 10-bit serial digital I/O for integration into component digital suites. Composite and component analog systems also are available.

The Pinnacle Alladin DVE/switcher system now offers component digital inputs and outputs and a stand-alone control panel. The panel offers freedom from cumbersome slider operations of the GUI interface, allowing faster effects construction and a "tactile" feel for the operator. The SDI I/O option indicates Alladin's seriousness about its place in high-end digital post-production.

Another newsmaker was Play, Inc., the makers of the Trinity digital production system. The Trinity system has been shown at the last several NAB shows, but this year it finally reached the market, with deliveries promised in July. The system includes the Trinity chassis housing a D-1 digital production switcher, "Personal FX" 3-D digital video effects, "Preditor" non-linear and linear edit controller, "Titlewave" character generator, "Panamation" paint and animation, dual D-1 framestore, chroma-key and dual time base correctors.

Stand-alone keying products

While the trend at NAB was toward larger, live-event production systems, there were still several new offerings in the area of small, dedicated keying and effects devices.

Broadcast Video Systems expanded its Masterkey series of low-cost stand-alone keyers with the Masterkey 6, which offers serial component digital I/O and 10-bit processing. Features include an adjustable size/position mask, key invert and master fade to black round out the keyer. With RS-232 control, it is also useful in computer-controlled broadcast automation systems.

The superb matting capabilities of the Ultimatte 8 compositing system have been brought to the desktop user. Plug-in software modules are available for Macintosh, Windows NT and SGI computer platforms for software packages, such as After Effects, Premiere, Media 100, Avid, Flint, Flame, Chalice, D-Vision and others. All include Ultimatte features, such as Screen Correction and Grain Killer, along with the familiar matting controls that have made Ultimatte famous.

Ensemble's Catalyst CV offers a unique system that combines a component digital keyer with a D-1 Ethernet graphics gateway. Based on its DS-1 Multibuffer system, still graphics can be transferred via LAN to the Catalyst keyer and combined with live D-1 digital video. The Catalyst CV can be used in several other ways, such as adding a downstream keyer to a digital production switcher or adding a digital keyer to an existing analog switcher. This hybrid digital/analog system could be used to extend the life of past equipment investments.

PSP digital, manufacturer of the Alpha Image line of digital layering switchers, showed the A500, Alphie and the Elite. The high-end Elite features a chroma-keyer with secondary suppression as standard.

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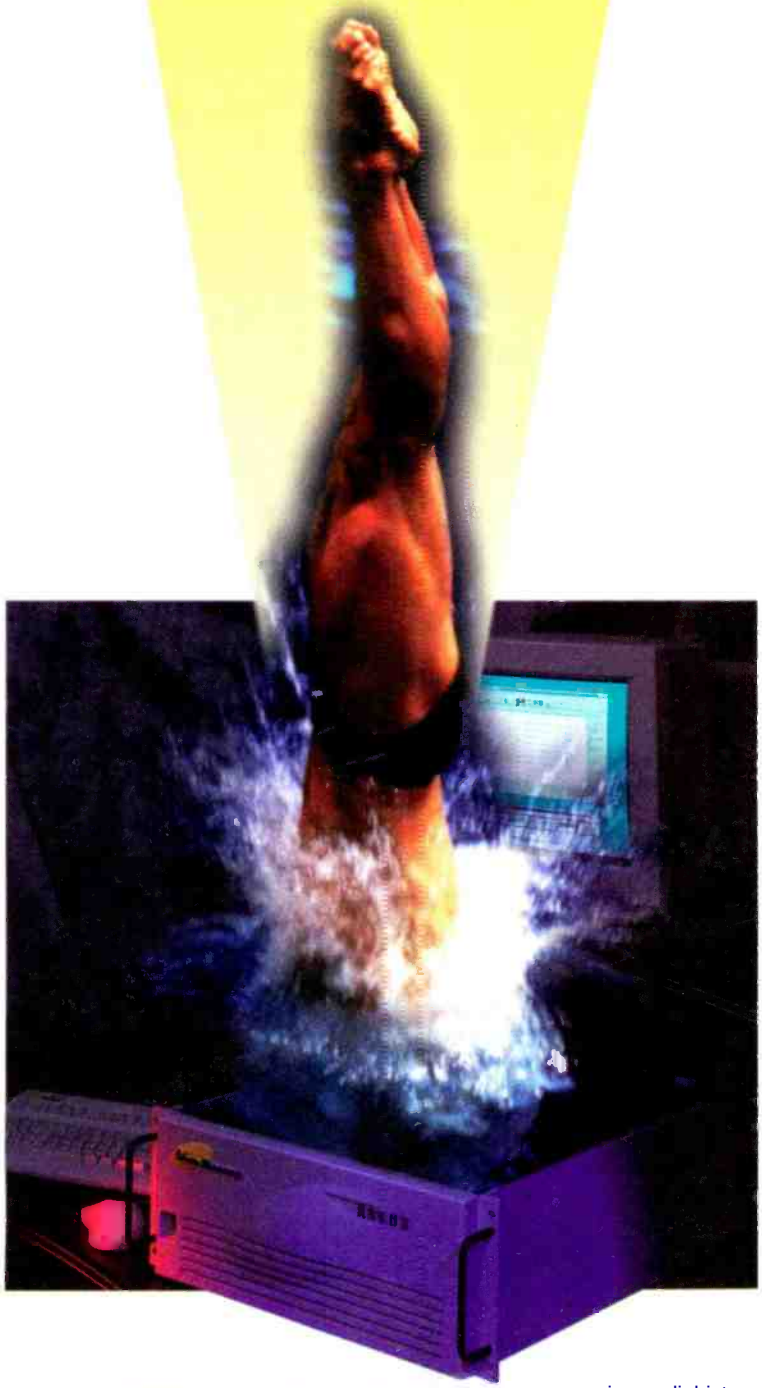

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PRODUCTION GENERATION EQUIPMENT

By Rick Shaw

Rick Shaw is managing director of Z Post, Atlanta.

Videonics announced the acquisition of Kub, a company that has done some interesting things with real-time layering and compositing. Surprisingly, this merger doesn't seem to have upped Videonic's stock value, even though I think this was a great move for them.

In a secluded Hilton room, I saw an early version of Effetto Pronto, an application that works a lot like Adobe After Effects, but uses hardware acceleration. Effetto Pronto also has additional features, like a character generator, texture and bump mapping and actual light sources. Also, the system is completely resolution-independent — meaning that you can mix any size video or graphic and composite it all at a specified size, up to film resolutions.

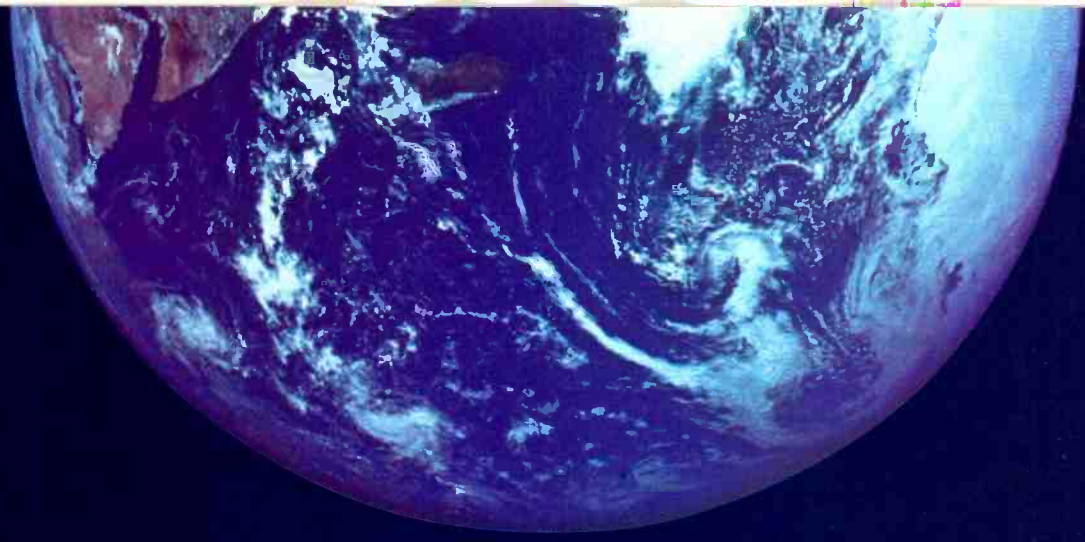
It's time to attach drool cups and mortgage your studio. Quantel has done it again by providing the fastest compositing system I saw at the show. Henry is a video compositing system, and Domino is much like Henry, but operates at much higher film resolutions. Even though Domino is handling these higher resolutions, it performs similarly to Henry's speed at the smaller NTSC frame sizes.

At the Apple booth, I saw a great demo of the Scitex Stratosphere. It's now shipping, and the demo unit I saw was working well. The hardware looked great, the picture quality was more than acceptable and the real-time effects worked. The editing interface is much like the one used on the now discontinued Video Cube with the addition of 3-D DveousFX.

In comparison with Avid's Pinnacle 3-D option, the Stratosphere had an almost identical set of effects available, except I thought the Dveous lighting effects were superior. You could have lights moving across a supplied background and the background would react realistically — selectively highlighting reflective areas more than dull areas. You could also add glints and light passes through logos and other art elements — a feature needed in a typical editing suite. Playback of all effects and edits were smooth. The Stratosphere handles two video streams in real-time and all transition and DVE effects are also real-time. Beyond two layers, you'll need to render a composite.

Near the top of the announcement pile was Intel's purchase of $14 million of Avid stock. In spite of Avid's past few months of corporate shake-ups, there are significant and positive changes coming once again. Avid has taken some of its Parallax and Elastic Reality technology and is sharing it on the Composer platform. The new version (code-named "Jaguar") will eventually be called MC 7.0.

On the video side of the Composer, Avid is introducing "intraframe editing" a catchy buzz phrase that simply means you'll be able to work within a single video frame to rotoscope and colorize individual elements. This means you won't have to jump out of the Composer software to do the effect by other means. Avid is also



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beefing up its color effects for greater adjustment capability. The company also added rolling titles, which means you'll be able to do actual credit rolls without it taking all afternoon. Additionally, Avid is adding a downstream keyer to its titles so that you essentially get a third real-time video stream. On the audio side, Avid is replacing the Digidesign 442 module with a new box that will have eight ins and outs for outboard mixing of eight discrete audio channels in real-time. If you have an audio console with MIDI faders, the Media Composer will remember your fader motion via MIDI data, making it also act like a serious audio workstation.

Apple made a much larger impact on the NAB this year than last. Macs were back and used in many of the NLE systems on the floor. The company was the first computer manufacturer to provide operating system support for FireWire with a new system extension that developers can use to connect FireWire peripherals to Apple PowerMacs and PowerMac clones. It was announced that Radius, miro and Digital Processing Systems are going to provide solutions to allow PowerMac computers to work directly with Sony or Panasonic DV camcorders using the FireWire interface.

Another Apple announcement was QuickTime 3.0 availability for all Windows and Mac systems. Additionally, the new QuickTime will support MPEG, AVI, OMF, DVCAM and Open DML files. New audio support will include Wave, AIFF, Sound Designer II, AU and MPEG Layer 2, as well as many common still image, animation and MIDI formats. With this much flexibility, Apple's QuickTime should become even more entrenched in the industry.

At one of the smaller booths at the NAB, I enjoyed a real treat. A new software product (it's currently for Windows only, but may be ported to SGI and Mac) was making quick work of the masking process on a piece of video. One of the most arduous tasks a graphics expert ever has to do is to create multiframe masks of a person or object so that a matte can be made. Many times, a character on the screen needs to be made a different color or even edited into a different background. Unless your subject is shot against a blue screen, it takes time and a lot of patience to trace the object and make mattes of what could be several hundred frames of video.

Using Automedia's AutoMasker, once the video is brought into the system, the computer helps define the edges of the area you want to cut out. After a couple of quick tests, the computer will proceed with cutting out all the frames automatically. At $2,000, this is a product that will pay for itself on the first job.

Out of all the products shown at Macromedia, Final Cut was the one to see. Although it's still not in beta, and it crashed a couple times at the show, this software may provide the first real competition to many of the other more-expensive NLE systems at the show. Final Cut is patterned after all the best editing systems out there, including Avid. The editing interface uses a single-track approach for creating cuts and transitions, eliminating the hassles of juggling tracks around and sliding video to allow an overlap of a simple effect like a dissolve. Final Cut will be supporting all of the most popular video cards, including those from Media 100 and Truevision.

With an expensive introduction to the video community, ICE (Integrated Computing Engines) has come way down on the price of its hardware for speeding up filters within Adobe After Effects. Some of the most time-consuming rendered effects are the complex ones available from Digi-Effects. The effect called Aged Film is a great example, but it can take a long time per frame to process normally. However, the ICE board stepped though this effect at about a second per frame. Other effects include Waterwaves (ripples or wind movement), 3-D Relief (creates a 3-D bump map based on alpha, luminance or RGB channel information), Lightblast (a superfast lighting effect great for logo treatments), Video Fragment (multiple overlapping copies of an image that can fly apart or come together) and many others.

At the show, we learned that Metatools acquired Specular. However, a pre-beta version of Infini-D 4.0 was being demonstrated. The new interface and speed of previews was impressive. Let's hope that Metatools continues the work being done on Infini-D, because it offers some new features that are definitely worth taking a look at.

Electric Image (EI) continues its move into higher and higher levels of animation. It is now close to releasing the new modeler, which looks SGI'ish. The modeler takes on some of the appearance of EI, with its four world view windows. Shading was quick and features were on a par with those you'd expect on the high-end SGI systems. EI is also going to offer a rendering engine for the SGI O2 and Octane. In initial tests, EI has found this method of modeling on the Mac and rendering on SGI to deliver rendered results several times faster than on the current PowerMac systems.

It was amazing for me to see just how many companies are using Truevision products as part of their own systems. With that much confidence from other developers, it would seem that Truevision is firmly planted in the industry from every angle. Among these other developers are Adobe, Macromedia, Avid, Scitex, D-Vision, Sony and Toshiba.

Truevision announced Madras, a real-time transcoder for all audio and video formats, including SMPTE 259M and DV/1394. Madras can be used in conjunction with Truevision's TARGA 2000 SDX, and will support the following standards: IEEE 1394 DV compressed bitstream; SMPTE 259M serial digital video; AES/EBU serial digital audio; YPbPr/GBR component analog video; balanced analog audio; composite and Y/C video; and unbalanced analog audio. The Madras allows video professionals to interface their desktop systems with other SMPTE 259M-compatible equipment. Madras will be $6,995 for a stand-alone unit and $15,995 with a TARGA 2000 SDX. (See "Pick Hits," p. 42.)

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VIDEO COMPRESSION AND FIBER-OPTICS EQUIPMENT

By Merrick Ackermans
Merrick Ackermans is the advance operations manager for Turner Entertainment Networks, Atlanta.

For many years, the options for transporting a video between two locations were few and the choices simple. If the distance was too great to run cable, the choice was to either construct a point-to-point microwave system or entrust the signal to a telco or other common carrier. The carrier would then use its own mixture of microwaves, cables and diplexers to move the signal to the desired destination(s) with varying degrees of quality and reliability. Then satellites came along. First, there was C-band, followed by Ku-band. Soon, analog satellites became the preferred method of sending video between locations hundreds or even thousands of miles apart. Lately, the hottest products changing video transport have been fiber optics and digital video compression.

MPEG compression

New systems were on display from several vendors using MPEG-2 at Main Level at Main Profile (ML@MP), as well as the new Main Level @ 4:2:2 Profile. The 4:2:2 Profile is making its long-anticipated debut in deliverable hardware this year, and offers broadcasters some technical advantages over the existing 4:2:0-based (ML@MP) systems.

The 4:2:2 Profile can operate over a wide range of data rates up to 50Mb/s. At high data rates, it can operate with high quality using a "group of pictures" (GOP) as

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small as a single frame. This short GOP permits simplified editing of MPEG-compressed files. When lower data rates are required, a long GOP such as 15 frames can be used. As its name suggests, the MPEG-2 4:2:2 Profile has full 4:2:2 digital sampling of the Y, R-Y and B-Y video components, as compared to MPEG-2 ML@MP, which only samples the R-Y or B-Y on alternate fields. Although 4:2:0 sampling works well most of the time, limitations can be seen on the reproduction of on-line graphics with high chroma. A good example is the thin red line above names on *CNN Headline News*, which looks purple when viewed on DBS satellite systems.

Several companies, including Leitch, Lucent Technologies, RE America, General Instruments (GI) (which is spinning off its video division into a new company named Next Level) and others had displays highlighting their MPEG 4:2:2 codecs. These units were in various stages of development ranging from ready for production through still in the lab.

Another hot transmission topic, which has proved to be somewhat difficult to implement, is statistical multiplexing (a.k.a. statmuxing). Statmuxing multiplexes several compressed video signals with continuously variable bit rates together into one fixed-rate bitstream. This allows the fixed number of bits in the overall bitstream to be more effectively allocated than in fixed data rate-per-channel systems. Potential benefits of statistical multiplexing include: 1) allocating additional bits to a video channel when it has a complex or rapidly moving picture to increase video quality; 2) reducing the number of bits used for coding simple pictures; 3) adding additional channels without increasing the overall bitstream; 4) using unused bits for data applications.

Companies showing statistical multiplexing equipment at various levels of development included General Instruments, Scientific Atlanta, Divicom and Imedia. With statmuxing, some vendors claim that they will be able to carry as many as 24 video channels on one satellite transponder. It is important to note that "24:1" compression would be at "half D-1 horizontal resolution" (352 x 480 pixels). In order to provide images at full 704x480 pixel resolution, the compression rates would drop to somewhere between 8:1 and 12:1.

General Instruments entered the DVB-compatible satellite business with its new Magnitude line of DVB compression equipment. This product line is a result of GI's acquisition of Compression Labs' broadcast products division last year.

Wegener Communications displayed its multiple-channel-per-carrier DVE-2000 MPEG-2 encoder and DVM-2000 multiplexer. This equipment is an addition to its existing line of single-channel-per-carrier equipment.

Fiber optics

A number of fiber-optic products debuted this year at NAB. ADC Telecommunications premiered its new SAS system, which stands for "Synchronizer and

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Switch." The SAS is built for the company's popular DV 6000 fiber-optic video line. The SAS consists of a 128x128 digital switch and a GPS-based clocking reference system to lock the digital clocks of all the systems together. Using the system, signals can be routed from one DV 6000 ring to another without the need to convert back to analog, as is currently the case. This system could be used by telcos or other interconnection providers to provide uncompressed switchable routing of digital signals. ADC also showed its new MPEG-2 (ML@MP) compression unit and interface for sending multiple MPEG-2 signals over the DV 6000 system.

Telecast had on display its new "Viper" camera interface, which is designed to replace triax cables on long cable runs. The unit allows full-camera functionality, including return monitoring, intercoms and remote CCU control over a pair of fiber-optic cables.

On a related issue to fiber-optic camera cables, Fico, Inc. had a demonstration of a cute little quick-splice kit for hybrid fiber-optic/copper cables (fiber for the video and copper for the power) used for many cameras. The kit consisted of a box with a watertight entry way for the cable, gel-filled quick splices for the fibers, crimp splices for the copper and a kit containing all the required tools for two technicians. Manufacturers' representatives demonstrated how two trained technicians can splice a broken camera cable and return it to operation in less than five minutes.

Continuing to provide integration of video, audio and data technologies across local and wide-area networks, Osicom Technologies announced a new high-resolution video graphics fiber-optic product. The VGL-312L high-resolution monochrome video graphics link provides great performance for the price and solves the problem of limited distance between workstations and remote graphics terminals using coaxial cable — typical distance limitations of less than 100 feet can be extended to over 5km by using the benefits of wideband fiber optics. Osicom has also released the AL3300 satellite TVRO L-band fiber-optic link providing a cost-effective solution for transmission of L-band signals from remote antenna sites to satellite receivers and head-ends. The AL3300 solves the distance limitation problem of waveguides or coaxial cable, providing a transparent path for L-band signals of up to 20km.

Integrated Photonic Technology (Ipitek) premiered the IMTRAN DS-3 interface, a data communications module for the IMTRAN digital fiber-optic transmission systems. When used with the IMTRAN-CQ series, the new plug-in module set provides fiber-optic transmission of two 45Mb/s, DS-3 channels for applications such as compressed video transport or two-way telephony systems. Ipitek also attracted some attention with its live demonstrations on the Dense WDM Transmission System, an optically multiplexed fiber-optic transmission for 80 uncompressed video channels on one fiber.

The Ortel Corporation offered fiber-optic interfacililty links for satellite earth stations. The company manufactures RF and microwave fiber-optic interfacility links for small and large satellite earth terminals, PCS and cellular systems and cable TV distribution. The satellite links meet Intelsat and broadcast requirements and are available for covering bands from 10MHz to 14.5GHz.

Fiber Options displayed the 1250B fiber-optic transmission system. Digital processing, 12-bit video and 20-bit audio ensure transparent transmission of composite video and up to eight channels of audio. The system is designed for use within broadcast facilities, as well as remote field production.

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PROJECTION AND VIDEO DISPLAY

By Peter H. Putman
Peter H. Putman owns PHP Consulting/Keystone Media Group, Doylestown, PA.

With the advent of NAB Multimedia World in 1995, NAB became more important to the large-screen display and computer/video interface industries as a new product showcase. Previously, manufacturers exhibited at smaller shows or computer graphics-oriented events, while waiting for INFOCOMM in June to strut their stuff.

This year's show didn't disappoint. In addition to such veteran exhibitors as Sony, Panasonic, Mitsubishi, Hughes-JVC, Faroudja, Ampro and Electrohome, companies like ASK LCD and In Focus decided to visit Las Vegas. The reason? Plenty of floor traffic with a record-breaking attendance of 100,245.

Large-venue projectors

In the large venue arena, Hughes-JVC Technology showed the new 340SC and 370SC (see "Pick Hits," p. 42) image light amplifier (ILA) projectors rated at 4,200 and 6,800 lumens respectively. Both offer true graphics resolution of 2,000x1,340 lines and each is claimed to achieve a 1,000:1 peak contrast ratio. (See "Pick Hits," p. 42.) Hughes-JVC also displayed a yet-unnamed 12,000 lumens ILA projector showing HDTV images on a 30-foot wide screen.

Barco unveiled its BarcoData 9200 and BarcoGraphics 9200 LCD projectors, both of which claim to produce 5,000 lumens. The Data 9200 uses three 756x556 active matrix LCD panels, while the Graphics 9200 uses three 1,024x768 panels. Both employ pixel map processing to handle higher-than-native resolution signals.

On the digital side, Electrohome, Sony and Digital Projection all showed high-brightness projectors using Texas Instruments' digital light processing (DLP) technology. Electrohome's Vista Pro (first seen at INFOCOMM '96) develops 1,200+ lumens, using (three) 848x600 DMD imaging devices for large room projection. Sony's VPD-S1800Q also employs (three) 848x600 DMD chips and a 1,000W xenon projection lamp for 1,200 or 1,800 lumens, using a normal/high-power setting.

Digital Projection's Power 4DV claims 3,500+ ANSI lumens using proprietary xenon lamp technology for superior color fidelity, again with the 848x600 DMD devices.

CRT projectors and LCD/DLP portables

Things were pretty active in the CRT projection world, as well. Sony upgraded its CRT line with two multiscan projectors. The VPH-G70Q replaces the VPH-1272Q and uses eight-inch CRTs to produce 240 ANSI lumens, has a bandwidth of 120MHz and maximum resolution of 1,700x1,200. The VPH-D50Q uses seven-inch CRTs and is rated at 160 ANSI lumens. Bandwidth is 75MHz and the projector can support up to 1,280x1,024 signals.

Barco introduced the BarcoData 708 CRT projector with optional auto-con-

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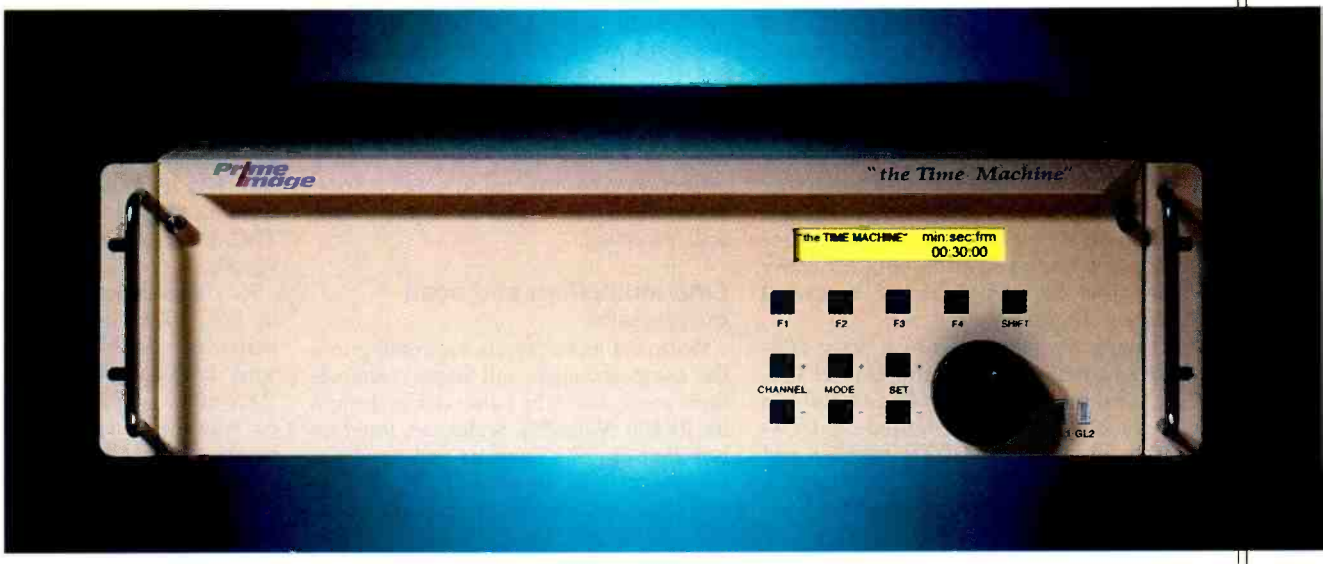

The Time Machine is a new, technological break through product, which reduces program time, to create commercial insertion time. it is a self contained, small 3U rack mountable unit which requires no data compression.

The Time Machine is capable of changing time without changing the pitch (frequency) of the video or audio programming. The Time Machine consists of a main frame which houses the memory and all of the electronics necessary for control of the video and audio-Time Machine storage. A maximum of 30 seconds of video and two channels of time reduction audio is available.

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vergence, using seven-inch CRTs to produce 1,200 peak lumens. It accepts horizontal scan frequencies from 15kHz to 69kHz and has a 75MHz bandwidth. Barco's BarcoGraphics 1209 was also on display, using nine-inch CRTs to display images with a maximum horizontal scan rate of 135kHz. Electrohome also announced an upgrade to its Marquee 9500 to allow higher scan rates and wider bandwidth.

Monitors and video walls

Plasma displays attracted considerable interest this year. QFTV, Mitsubishi and Pioneer all showed direct-view plasma monitors based either on Fujitsu or proprietary technology. QFTV's display monitor had a 16:9 aspect ratio and measures 40+ inches diagonally, while Pioneer's was a 4:3 aspect ratio with a similar screen size. Mitsubishi's display also measures 4:3 and measures 40 inches diagonally. All three use active display elements with extremely wide 160 degree vertical and horizontal viewing angles.

Among the monitor crowd, Sony Electronics unveiled a line of professional PVM-M video monitors with 600- and 800-line resolutions . Sony also showed the PVW-series 20-inch 16:9 HDTV monitor and the 29-inch PGM-2001RU multimedia monitor. The latter comes wired for VGA displays, but an optional BKM-201SC plug-in scan converter increases the horizontal scan rate to 85kHz. Ampro introduced the 3600 Widescreen Retro rear-projection monitor for viewing HDTV images on a 54" x 31" screen, while Barco debuted the RetroData and RetroGraphics 808 monitors, both using eight-inch CRTs to illuminate a 67-inch diagonal screen.

Among the video-wall crowd, GVC is now Toshiba's distributor for North and South America and to celebrate, demonstrated the new SLIMLINE 2x2 and 2x3 video walls. Both can be configured with either 15.75kHz or 31.5kHz projection cubes and require only 26 inches of depth. Over at the General Instruments booth, Imtech showcased its 150HD NewsWall, using 12 Pioneer RM-V4000VFS 40-inch projection cubes arrayed in a 3x4 matrix. It uses Imtech's UltraMax digital video wall processor.

Line multipliers and scan converters

More and more players are coming into the computer/video and image enhancement arena. Faroudja Laboratories demo'd its PV400 Video/PC Scalar, an interface box that digitally converts and gen-locks composite, Y/C, RGB or YUV video to non-interlaced computer displays up to 1,024x768. Vertical refresh rates are optimized for the output display up to 75Hz, allowing overlay of any computer-generated images. Faroudja also showed the VS550 chroma decoder/TBC for enhancement of composite or Y/C images when played through DLP and LCD projectors.

Extron Electronics formally launched its line quadrupler unit, the System 4IQex. It accommodates RGB, composite and S-Video through four inputs and increases the horizontal scan rate to 63kHz. Motion Mode Compensation is used to reduce line multiplier artifacts. Miranda Technologies also showed the Quartz line quadrupler, which not only accepts composite, Y/C and component inputs, but also 4:2:2 serial digital video. It will line-double signals to 31.5kHz, and all outputs are analog. Not to be outdone, Feral Industries launched its LD-2000 line doubler with eight-bit digital processing and built-in TBC. It accepts composite, Y/C and YUV signals.

Sony announced gen-lock capability for its DSC-1024 "do-everything" scan converter/line doubler/standards converter, while RGB Spectrum introduced the RGB/View 600 and SuperView 1000 multivideo windowing systems for workstation monitors. The RGB/View 600 can provide up to six real-time video windows while the SuperView 1000 is capable of

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24. Feral also entered the multiplexed display game with the QS-400 quad split processor, while Folsom Research showed off its 9700XL workstation graphics scan converter, the first to offer serial D-1 output with full gen-lock capability and a wide range of image adjustments.

Barco's Vivaldi II video display system solves the problem of providing a sufficient number of color monitors by allowing four analog or digital video images to be displayed simultaneously on a standard VGA monitor. Features include auto-alignment, pulse-cross, blue-only, integrated undermonitor display, source ID and on-screen tally. (See "Pick Hits," p. 42.)

To paraphrase an old prospector, "There's gold in them thar screens!" It was interesting to see broadcast-oriented companies, such as Feral and Miranda, jump into the large-screen marketplace, and they won't be the last to do so. Interest in high-quality projected and direct-viewed video images continues to climb, spurred by advances in image brightness, resolution, bandwidth and processing. Look for more projector and interface companies to climb aboard NAB 98.

FOR MORE information
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DIGITAL AUDIO WORKSTATIONS

By Yasmin Hashmi

Yasmin Hashmi is a partner in the London-based consultancy firm Sypha, and co-author of "The Tapeless Audio Directory" buyers guide.

Along with increased integration of non-linear video and expanded editing and mixing functions, some of the most popular DAW developments shown at NAB 97 included support for Windows 95/NT, PCI platforms and 24-bit recording. There was also increased support for plug-ins, the introduction of next-generation systems and revitalized initiatives for file import/export.

New and next-generation systems

While many manufacturers are now offering more compact versions of their systems, Solid State Logic has moved in the opposite direction with the introduction of Altimix. Designed as an integrated 48-track recording, editing and mixing system with non-linear video and dedicated control surfaces, the system is expandable up to 128 channels, supports surround-sound capabilities for all major formats and can be networked with other SSL systems, such as the Axiom and new Aysis digital mixing consoles.

AMS Neve, on the other hand, is offering a cut-down 16-bit version of AudioFile called AudioFile Prolog. Designed for a range of editing functions, including operating as a feeder system for larger 24-bit Audio File/Logic mixing systems, the Prolog supports 16 channels with six hours of storage, includes a comprehensive ADR package and can be upgraded in a variety of ways.

An upgrade path to the new Orban Audicy will also be available to existing DSE-7000 users. As with its predecessor, Audicy provides high-speed RAM-based editing, with background shadowing to hard disk or removable Jaz drive. Launched as a second-generation workstation supporting 24 tracks and time code, it features a new contoured mixer/editing surface with assignable controls and effects including Optimod EQ and compression and Lexicon reverb.

Announced by Digidesign as "the single most important evolutionary step in Pro Tools development since the introduction of TDM," the new Pro Tools 4.0 software uses native PowerPC programming and supports the new PCI and NuBus-based Pro Tools III, Pro Tools Project and Audiomedia hardware. It includes new editing and mixing capabilities, an improved GUI, faster processing and dynamic automation of virtually all TDM plug-in parameters. In addition, the system can be operated using the new Mackie HUI controller. This features touch-sensitive motorized faders, rotary controls that can be assigned to DSP plug-ins, metering, a scrub wheel, edit, transport and navigation controls and an analog control-room section.

Furthermore, having taken over development of the Avid AudioVision, Digidesign also introduced AudioVision version 4.0 that features native PowerMac PCI support. Available as an upgrade to Pro Tools III PCI users, the software can read and write Pro Tools 4.0 session files, will operate with the Digidesign Universal Slave Driver and includes CCIR-601 broadcast-quality integrated digital video.

With growing demand for faster operation, it was not surprising that support for digital video was featured by a large number of systems, including the third-generation Doremi Dawn 4. Supporting up to 48 tracks and the third-party Airworks S/Link software for OMF translation of files and compositions, Dawn 4 also allows control of the Doremi V1 non-linear video recorder/player. The V1 is a stand-alone unit that can be used for VTR replacement by any workstation supporting RS-422 control.

Indeed one of the first systems to integrate non-linear video recording and playback alongside audio recording, editing and mixing, was the dSP Postation. New features for this system included 24-bit recording, high-performance networking and 32-track playback.

Other next-generation systems included the Korg SoundLink DRS with Mac-based GUI and dedicated control panel and the Fairlight MFX3plus. According to Fairlight, the MFX3plus runs up to 40 times faster than its predecessor and features an upgraded CPU, improved graphics, PCI bus for high-speed networking between workstations and a compact controller.

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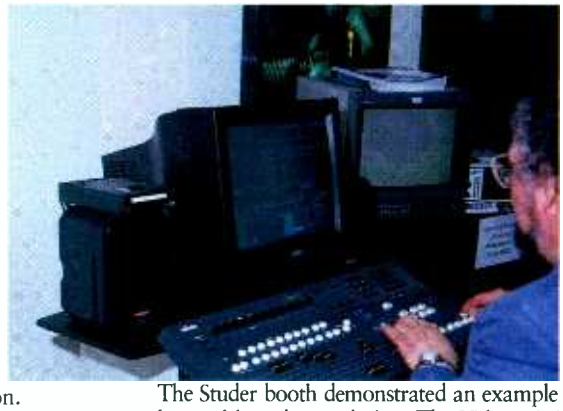
New releases

After a marked absence for a number of years and having been purchased by managing director Mike Parker, Digital Audio Research (DAR) made a welcome return to the United States at NAB 97. On show were SoundStation Gold and Sabre Plus, both sporting new audible editing features and the Translation Station featuring compatibility with Lightworks and Avid files.



The Studer booth demonstrated an example of a total broadcast solution. The Videoquip/ASC Dave 2000 was used for acquisition of audio and text files, which were sent via the Merging Technologies new Audio Mail feature to the Pyramix system for editing and then forwarded in real time to the Studer Digimedia for broadcast.

Networking was also one of the highlights for Sonic Solutions, which announced its new Fibre Channel-based MediaNet FC for uninterrupted delivery of D-1 digital video and multitrack surround-sound audio. In addition, the new SonicStudio version 5.3 includes support for four channels of 96kHz 24-bit high-density audio, an extended list of supported CD-R drives and support for the new JL Cooper MCS 3800 motorized moving fader controller.

Another company to introduce 96kHz, 24-bit sampling was Studio Audio & Video for its SADiE3 software, which also includes support of DSP plug-in architecture for both proprietary and third-party processes.

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DSP plug-in support, in the form of Firewalkers and the Osiris real-time sound restoration system, was also one of the new features for the Creamware CUTmaster and tripleDAT systems. These now include support for Audiobahn cards, such as the TDAT 16 PCI card for 16-channel I/O and two ADAT optical interfaces.

Other new releases of note included version 4.3 of the Pacific Research & Engineering ADX Eight, which supports editing and backup of entire mixes to removable Jaz drive and version 2.0 for the SoundScape Digital SSHDR-1. This now supports up to 12-track playback per SSHDR-1 unit and, by using the new SoundScape SSAC-1 accelerator card, allows each channel of the integrated mixer to run any number of real-time processes.

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Hard-disk recorders

Modular eight-track recorders on show included a beta version of the DAR OMR-8 and a production model of the Timeline MMR-8 featuring 24-bit resolution, built-in multimachine synchronizer and OMF compatibility. Meanwhile, both the Genex 8000 eight-track recorder on show at the HHB booth and the Akai DD8 modular dubber demonstrated instant lock in any direction to time code or bi-phase at any speed. The DD8 can use hard disk or removable media, can be controlled via its front panel, RS-422 or the DL1500 edit controller and is compatible with other Akai systems, such as the DD1500 editor and DR8 and DR16 recorders.

For those who need fewer tracks but more storage, version 1.1 for the Studer D424 four-channel recorder now supports more than two hours, as well as 16-, 20- and 24-bit recording, PQ editing and transfer to CD via SCSI. Conversely, for *more* tracks, the Otari RADAR version 1.4 allows two units to be connected via a single cable for 48-track operation, being controlled by a single *RE-8* remote for recording and editing.

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Compact workstations and portables

A growing number of self-contained compact workstations with built-in hard drive, mixer and editing sections were on show, such as the "V-Xpanded" version of the Roland VS-880. Additional features of this model include an auto-mixing function, effect insertion for master output, 10 additional effects algorithms, a voice transformer and a microphone simulator.

Fostex has also added to its range of compact workstations by introducing the D-160 16-track and D-90 eight-track units. Both allow simultaneous recording up to the maximum number of channels and support backup via SCSI, DAT or ADAT.

Taking advantage of the newly launched Digigram PCXpocket PCMCIA audio card, the Dalet Free Edit laptop is designed for journalists in the field and allows recording of linear or compressed audio, cut-and-paste waveform editing and advanced processing, with transfer of files back to the studio via modem.

Another portable on show was a production model of the Zaxcom Deva four-track recorder. Complete with mixing and monitoring, the battery-powered unit weighs six pounds, supports 24-bit recording and provides 2.5 hours of storage to a removable drive that can be inserted into a rack-mount version serving as a four-track source.

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Cards and software

Spectral launched new versions for its Express and Producer software packages, which run under Windows 95 and include device drivers for operation of the Spectral Prisma card under Windows NT. The company also launched the optional Transfer Agent software, supporting compression, file conversion and database insertion for direct LAN transfers to a range of on-air delivery systems.

Windows 95/NT support was also announced for the new Antex StudioCard multichannel board, the new IQS SAW Plus 32 software package and the Digital Audio Labs (DAL) CardD family. DAL also demonstrated the production model of its V8 16-channel card, with optional ADAT and DA-88 interfaces, a comprehensive synchronization interface and support for editing and DSP plug-ins. Digigram also presented its new PCX11+, an ISA bus card with balanced I/O.

Sonic Foundry announced a range of new plug-ins for Sound Forge version 4.0. These include the CD Architect for Red Book CD-Rs, the Acoustics Modeler for reverb, support for Microsoft ActiveX plug-ins including ActiveMovie, support for RealAudio 3.0 and noise-reduction and spectrum-analysis plug-ins.

On the Mac front, the Macromedia Deck II version 2.6 supports multiprocessor platforms for increased real-time effects processing, 64-track playback, support for the Korg 1212 I/O PCI card and downloadable plug-ins from the Macromedia web site.

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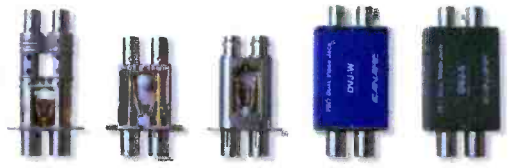

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Macs are also supported by the Sonic Solutions SonicStudio Engine, an application programmer's interface for controlling SonicStudio hardware. Co-development efforts with third parties have resulted in releases, such as Opcode Studio Vision Pro 3.5, which adds MIDI sequencing capabilities to SonicStudio, as well as pitch processing, support for Adobe Premiere plug-ins and an integrated QuickTime movie player window.

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MICROPHONES AND AUDIO MIXERS

By Brian Sanders

Brian Sanders is program director at KUNV-FM, Las Vegas.

A product sector of the broadcast industry that remains largely analog is the one where the audio signal chain starts: microphones and their associated electronics. Until recently, the same could be said about audio mixing consoles, but at NAB 97, this was decidedly in question. Numerous new mixer products were offered in digital and analog forms.

Microphones and mic accessories

Sony has added to its already diverse line-up of UHF wireless systems with a quartet of new products. The WRT-800A is a hand-held cardioid microphone/transmitter package with 5mW RF output and a miniature helical antenna. The WRT-805A is a body-pack design with 10mW of power and compatible with musical instruments, as well as lavaliers. Frequency agility is broad, with 94 channels available. On the receiver side, the WRR-800 is a single-frequency receiver in a half-rack-space enclosure. The WRR-801 receiver is a modular design, able to accommodate six mics simultaneously, all in a 1RU space. Both receivers and the body-pack transmitter offer multifunction displays. These products are compatible with other Sony series 800 units.

"Revolutionary" is how Telex describes its new UHF intercom. The BTR-600 two-channel system goes the extra yard and provides digital encryption for ultrasecure transmissions. It was developed to eliminate wire tangle for football coaches on the sidelines without compromising game tactics. Security-minded news crews on a breaking story could take a page out of the NFL playbook. A non-encrypting ENG version, the BTR-500, is also available. Camera crews also have a new UHF wireless mic system from Telex, the ENG-500 receiver and UT-500 universal transmitter. The receiver operates on either internal or external power and is designed specifically for camera-borne operations. A headphone jack is provided and metering indicates battery, RF and audio levels. The universal transmitter accepts any standard dynamic or electret low-impedance microphone.

EVI Audio has repackaged its popular Electro-Voice CO2 lavalier microphone as the CO2 Pro. Eight different cable- and mic-mounting clips are included, along with a zipper pouch. E-V's RE500 is a new hand-held, true condenser cardioid mic with a 128dB dynamic range. Durability and handling noise issues are addressed by a patented internal shock system and the rubberized grip, factors appreciated in the live performance or ENG trenches.

New from EVI's Vega division is a 16-channel, computer-controlled UHF wireless mic receiver, the R-672. It can be used with any fixed-frequency UHF wireless transmitter operating with Vega's exclusive Dynex III companding. To complement the R-672, Vega introduced the T-690 hand-held transmitter and T-772 body-pack transmitter. Several mic heads are available with the T-690, including Shure's SM87 supercardioid condenser and EV's N/D-857S. Both transmitters offer user-programmable channel and microphone gain controls.

Sennheiser's catalog has been enlarged by a pair of new UHF receivers. Both units offer 32 programmable frequencies and boast a signal-to-noise ratio of more than 100dB. The EM3031-U is a single-channel unit. The EM3032-U houses two receivers plus antenna splitter in just one rack space. Sennheiser's new hand-held transmitter will soon join the line: The SKM30721-U will have 50mW of RF power, frequency response of 80Hz-20,000Hz and a supercardioid condenser mic element. And the Sennheiser Class (400) series of dynamic mics has grown. The latest addition is the MD425 hand-held supercardioid vocal mic. Owners of MD421s will appreciate the 425's elegant solution to a persistent problem with the older mic's design — the mount. A new elastic-suspension mount fully, but unobtrusively, isolates the mic from physical shocks and provides a significantly more secure lock-down. This accessory is backward-compatible with the classic and the new versions of the 421. (The latter, called the MD421-II, features a more rugged body made of glass-composite material, with acoustic components moved deeper inside the mic's housing, thus reducing problems due to dust and moisture.)

Prototypes of three new miniature microphones by Danish Pro Audio's Bruel & Kjaer were on display at the Tannoy/TGI America booth. The tiny (only 5.4mm) DPA 4060/61/62 series comes in three sensitivity levels for applications from on-camera studio work to location special-effects recording. The 4062 model will handle up to 152dB-SPL before clipping. Each mic is identical in frequency response, although spectral performance can be tailored with the use of two differently shaped "protection grids" that alter the tonal pickup. The system offers optional cable adapters to fit nine different wireless mic "standard" pin configurations. (After all, what good are standards if you can't have lots of them?)

In microphone-associated gear, Shure Brothers presented an interesting new product, the DFR11EQ feedback eliminator. At the first sign of audio feedback, the unit identifies the offending frequencies and activates one or more of its 10 adaptive notch filters in order to control the problem. Broadcasters will be especially interested in the unit's other mode of operation — a PC-programmed, one-third octave graphic EQ. Tune your studio mics or monitors with a PC interface and your settings are rendered accident- and tamper-proof.

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Mixing consoles

Wheatstone's D-500 digital board has the look and feel of a traditional console, making operator transition a non-issue. First shown at NAB 96, the console is now ready for shipment. It offers four stereo output buses and large analog VU meters, but beneath the surface is formidable signal-processing power from 40-bit floating-point DSP processors. Each input position accepts analog signals, as well as

digital information, so present equipment is not rendered obsolete. A snapshot feature saves individual configurations, such as bus assigns, fader levels and user preferences. Meanwhile, Wheatstone presented its many analog console designs across a wide range of prices, including two new TV audio consoles: the versatile SP-8EX (with built-in source selection of more than 300 inputs) and the impressive TV-1000 (intended for high-end facilities and appropriately loaded with features).

In the production room, Mackie Designs continues to advance. Preliminary information on the new Digital 8 bus mixer promises a console absolutely loaded with features: automation, DSP, machine controls, MIDI, built-in hard drive and modem, plus the flexibility for which Mackie is known. Pro Tools users will appreciate Mackie's new human user interface (HUI). Complete bidirectional interaction is possible with Pro Tools 4.0, eight motorized faders, two mic pre-amps, transport/locate functions and a large scrub wheel, plus control room monitor operation and much more. Broadcast users can only wonder if or when Mackie will introduce a dedicated on-air console.

Long considered a master of the digitally controlled analog mixing environment, Euphonix displayed its latest, the CS3000, designed for broadcast and post-production uses. Its control surface is significantly redesigned from the company's earlier products, and it includes moving-fader automation. A versatile surround-sound option handles any existing format with ease. Formats of the future can also be incorporated by software updates, adding to the console's longevity and value.

A lot of heads were turned at the Graham-Patten Systems booth by the company's new SoundPals line, a series of low-cost, problem-solving modules for digital audio interface, level-control and conversion (see "Pick Hits" on p. 42). In a more characteristic vein, GPS presented the new and highly cost-effective D/ESAM 230 digital edit-suite mixer, along with some substantial enhancements to the existing D/ESAM 400 mixer.

Similar to Yamaha's earlier 02R, the company's newest digital production mixer is the 03D. Although smaller than its predecessor, the 03D still has a healthy 26 inputs, including eight mic inputs, AES3 and eight-channel digital I/O with one of the optional interface cards. Though a four-bus system, there is enough built-in flexibility to adapt to many situations, including surround mixing. The goodie list is extensive: two internal effects processors, up to 50 scene memories, motorized faders, parametric EQ and dynamic processors for each channel. Meanwhile, new version 2.0 software for the 02R offers improved automation, surround sound, more digital sends, remote control and 24-bit recording. Another relatively new entry from Yamaha is the analog MX 12/4 mixer. Designed with the musician in mind, broadcasters will also find it useful for remotes, in the edit/dubbing studio and for other basic production.

Ward-Beck Systems was showing its totally redesigned Renaissance for television. This analog console is aimed at the news/sports market and can handle 48 inputs (mono or stereo) in its grandest configuration. Eight stereo submasters, two stereo masters and mono sum are supported by six auxiliary output channels.

Several other manufacturers displayed digital consoles with surprisingly reasonable price tags. The MX/D by Fidelipac is a 16-channel (eight-stereo input) mixer designed in collaboration with Graham-Patten Systems. Each interchangeable input module is either analog or digital, allowing the user to select according to need at time of purchase, then upgrade gradually. An optional outboard 4x1 mixer with built-in sample-rate converter easily accommodates additional inputs.

Many digital consoles physically separate the signal processor unit from the mixing control surface (which could be thought of functionally as an overgrown computer mouse). Two new products from Logitek, the ROC-10 and the NUMIX, take this approach. Central to both systems is Logitek's Serial Sound digital audio engine. The rack-mount engine comes with a DSP processor module (capable of EQ, pan and profanity delay), a communications processor for machine control, a four-channel mic pre-amp section and one 8x8 I/O card available as either analog or digital. The ROC-10 is a one-piece controller with 10 faders and a traditional — almost "retro" — look, while the NUMIX control surface is made from RF-shielded ABS plastic, with a futuristic, low-profile wedge design. Both controllers feature LCD displays over the faders to show source and destination information.

Auditronics' NuStar 3000 also stands at this level. The intuitive, straight-ahead layout fits 16 faders comfortably. Eight additional universal module positions carry traditional monitoring and other controls. Four large mechanical VUs share the meter bridge with a cue speaker. The mainframe processor accepts any combination of analog or digital input cards. Comprehensive fault-detection software is intended to make both operator and chief engineer comfortable. Several fail-safe modes ensure uninterrupted signal flow in near-catastrophic situations, and self-diagnostics are well thought out. Remote operation is possible via modem.

Pacific Research & Engineering demonstrated new entries in the digital and analog classes. Its AirWave is a medium-size (12- to 14-channel) analog board with basic features. Nice touches include combined control room and studio monitor module with talkback, an optional telco module, several neat things under the hood (including a snappy no-tools-required access compartment for easy maintenance), and a moderate price point. At the other end of the spectrum is the digital Integrity. This sleek, highly automated controller allows smooth transitions from show to show with set/save/recall functions, dedicated mic inputs and large LED channel-ID displays. Ten digital input channels come standard with sample-rate conversion and all digital input channels also accept analog signals. A flat-screen display complements the package.

Finally, Autogram released its Solution-20, a clever method of accessorizing any simpler, or perhaps older, console. A 10-space rack frame holds a number of problem-solver cards, such as relays, tone generator, DAs, monitor amp or a mic processor.

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AUDIO PROCESSING, RECORDERS AND STORAGE MEDIA

By Chriss Scherer

Chriss Scherer, CBRE, is chief engineer at WMMS-FM, Cleveland.

Audio processing and recording was almost exclusively digital at NAB 97, indicating how far the industry has come in about the last dozen years. Some analog elements exist, of course, and these are driven to even higher performance levels by their close proximity to digital components. Overall, this year's show indicated a maturing trend that moves beyond pure fidelity issues toward increased convenience, reliability and cost-effectiveness for both the processing and the storage of audio programming.

Audio processing

Yamaha announced the release of the REV500, a 1RU multiple-effect reverb that uses a high-quality, third-generation DSP chip that Yamaha uses in several of its other recent products.

Continuing its commitment to high-quality mic processors, Symetrix presented the 628 digital voice processor. Modeled after the 528E, it adds the quality of DSP to its power, allowing for multiple presets.

Eventide displayed its line of profanity delays and the recently released DSP4000B production ultraharmonizer. It includes numerous presets, and using the built-in flash card reader, program cards can be

loaded for additional effects.

FOR MORE information

Circle (241) on Free Info Card

Audio recording and playback

360 Systems has made a change to its familiar DigiCart, now called the DigiCart II Plus, which now supports up to two internal hard drives (instead of just one) and ZIP-drive removable media (replacing the Bernoulli disks used in previous versions). An update to the Shortcut hard-disk recorder/editor now provides a SCSI interface, which also allows it to write ZIP discs that can be used with the DigiCart II Plus.

DRS Ahead Technology announced that it has taken over the support of ITC cart machines.

Eastman Kodak demonstrated its PCD Writer 600, which can be used for writing audio CDs, and the Disc Transporter, which will record up to 75 CD-Rs in an unattended fashion.

Fidelipac has repackaged its popular floppy/MO audio recorder as the DCR-10. This new unit is fully compatible with the previous DCR-1000, but is only available as a recorder/player.

Fostex demonstrated the D-90 and D-160 removable hard-disk recorder/editors. The D-90 is an enhancement of the D-80 eight-track with additional ADAT functions, better A/D converters and a larger hard drive. The D-160 has 16 tracks,

time code and a SCSI interface. Also displayed was the DMT-8VL, a self-contained eight-track recorder/editor/mixer.

Sony continues its commitment to the Mini-Disc format with the release of the MDS-35 recorder and MDS-B6P player. Both have cart machine-style layouts for broadcast. Also new to the Mini-Disc line is the MDM-x4, a four-track recorder/editor. New to the DAT line is the PCM-R500 mastering DAT recorder and the PCM-7040 time-code DAT recorder.

Denon has added two products to its already large line of recording and playback devices. The DN-M1050R is a rack-mountable Mini-Disc recorder/player with all the features available to Mini-Disc. Also available is a HotStart feature that allows up to 20 tracks to be loaded into memory locations for instant playback. The DN-C680 is a CD player with a jog shuttle wheel, AES3 output, XLR-balanced and RCA-unbalanced analog outputs and a large fluorescent display.

Otari presented the DTR-8S Pro DAT machine, supporting sample rates of 32kHz, 44.1kHz and 48kHz. An added feature is the ability to monitor the input without a tape being loaded in the machine.

Sonifex introduced the Courier, a portable recorder that uses PCMCIA cards. This recorder is designed for field use with stereo analog XLR inputs and outputs and an AES3 output. Internal editing and ISDN transfer capabilities are also offered.

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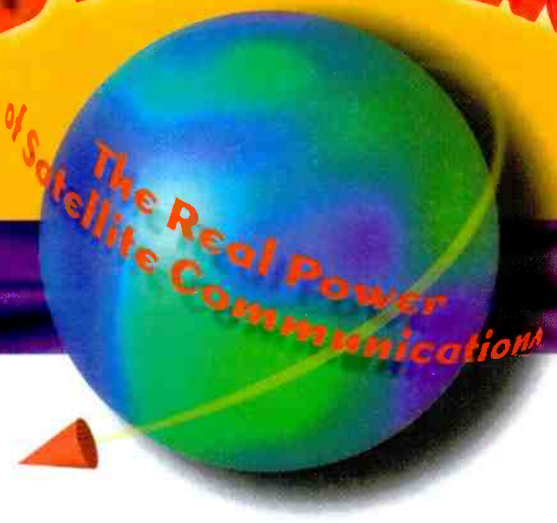

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Nagra's ARES-C solid-state recorder offers portable high-performance continuous digital recording on PCMCIA cards. Non-stop recording is possible with two slots. The system automatically switches to the next card when the current card is full. A single 64MB card provides more than two hours of mono recording time. (See "Pick Hits," p. 42.)

Superscope Technologies/Marantz unveiled the PMD350, a rack-mounted cassette deck and CD player combo. Each section has independent unbalanced audio connections, with an optional balanced XLR kit and an additional combined output. Remote control, cassette vari-speed and CD digital output are some of the additional features.

TASCAM has added two new products to its ever-growing family of audio recorders. The DA-302 is a unique double-well DAT deck. Each section has fully independent transport controls and audio connections, and the unit can also perform internal 2x speed dubs or "relay" (i.e., continuous) recording/playback, with sample rates of 32kHz, 44.1kHz or 48kHz. The DA-98 is an addition to the DTRS line of recorder/players. New features include off-tape monitoring (selectable by track), switchable reference level, 20-bit conversion and full parallel remote control.

FOR MORE information

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Storage media

Eastman Kodak displayed its line of recordable CDs, originally developed for Photo CD, but usable for any recordable CD application.

Maxell presented its full series of audio recording media, including DAT, MS series cassettes and recordable CDs.

Sony also showed its complete array of audio media products, which includes some new tape lengths for the ProDAT, DARS-MP and DARS-116 (for eight-track DTRS), and DASV (ADAT) formats.

FOR MORE information

Circle (243) on Free Info Card

AUDIO BACKHAUL, MONITORING AND ACCESSORIES

By Kevin McNamara

Kevin McNamara is president of Exegesis Technologies, a consulting firm in New Market, MD.

Many interesting products fall into this category, which include several relatively narrow, but vitally important niches of studio equipment. There was no shortage of new products in these areas at the NAB convention this year.

Audio backhaul products

Comrex presented three new products at NAB 97. Most notable was the Hotline POTS codec, which can provide up to 10kHz of full-duplex audio (with a modem connection of 33.6kb/s), using a proprietary algorithm written specifically for the low bit rates obtainable on analog telco lines. Two units are required — one at each end of the circuit. It can be purchased as a rack-mount or in a small rugged remote package. The remote unit features a keypad, two inputs, one output (1/4 inch or XLR) and even a remote contact closure.

Also from Comrex was the new Mix-Minus Bridge, which can create and conference up to five mix-minus feeds. This is particularly useful when doing an occasional broadcast requiring multiple simultaneous remote feeds, such as during election night coverage. Finally, Comrex introduced a rack-mount version of the NEXUS ISDN codec that premiered in its portable form at last year's show.

The NXL256 and BCF256 from Audio Processing Technology (APT) give broadcasters more options for sending full-duplex digital audio over dedicated lines or STL systems that can support transmission bandwidths from 56kb/s (for 6.8kHz mono audio) to 256kb/s (15kHz or 20kHz stereo). The systems use the company's well-known apt-x coding. The NXL256 is a 1RU basic device, while the BCF256 at 2RU offers additional interface options and possibility for integral ISDN backup.

Intraplex announced a partnership with Telex to provide digital intercom via ISDN. The Intraplex IntraLink ISDN codec connects a Telex intercom panel at a remote site to one or more ADAM digital intercom matrices at the studio site. Intraplex also presented its solution for auxiliary audio on video microwave, replacing multiple analog subcarriers with a single T-1 signal in the subcarrier region of the microwave channel.

Three new telephone hybrid products were unveiled by Gentner Communications. The SPH10 analog hybrid replaces the SPH-3 and adds such features as a built-in monitor amp. The DH20 replaces the DHA-1A digital hybrid and features improved 16-bit DSP technology, selectable automatic gain control, automatic mix-minus bus, auto-answer/disconnect and monitor amp. The DH22 has the same features, but adds a second digital hybrid.

JK Audio presented a host of devices that can help you interface a telephone to an audio source. The RemoteMix 3 is a small audio mixer that can attach to a POTS telephone line, modular handset cord or even a cellular phone (with the proper fax/modem adapter from your cellular dealer). It has two XLR mic inputs, RCA line in/out, XLR-balanced output, VU meter, dial keypad, built-in monitor speaker and microphone. The company also offers a variety of devices that can tap audio from any handset cord.

FOR MORE information

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Audio monitoring

Wohler Technologies makes the monitoring of those digital signals easy with its latest offerings. A series of rack-mounted, self-powered speakers are offered in a number of configurations that permit monitoring and metering of analog, AES3 and/or SDI signals. These units can also be used as digital-to-analog converters of these digital formats. Other products included a line of stand-alone audio D/A converters and an audio error alarm system that can remotely report error conditions on up to 800 digital or analog stereo channels.

Wireless headphones can be helpful in many remote situations. The Sennheiser RS-8 wireless headphone system features a 900MHz transmitter and HDR-8 stereo headphone with an integral receiver. The headphones can be operated for up to three hours per charge on internal NiCad batteries. The system features three switchable frequencies and offers a range of up to 250 feet. The RS-6 wireless headphone system is similar to the RS-8, but intended for a more casual user.

In the TGI North America booth, Tannoy presented its line of studio monitors, including its PBM series, ideal for near-field monitoring in audio control rooms.

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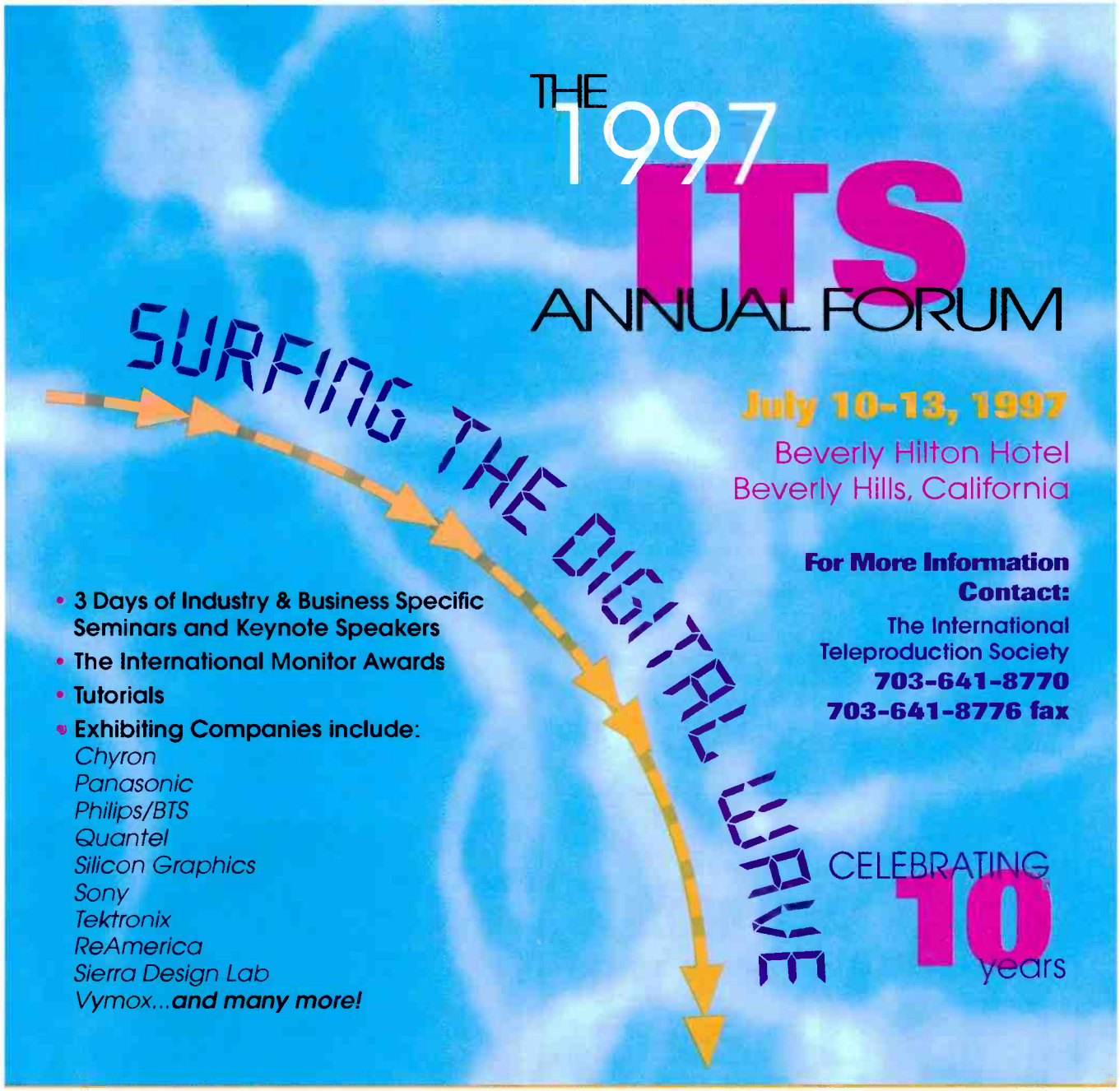

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Audio accessories and furniture

Looking for a simple solution for creating a listener information line or audiotext service? Audio Online is a product from Henry Engineering that can handle up to 16 incoming phone lines simultaneously. Callers can select from a menu of messages, and hundreds of messages can be available to callers. The best part is that it is DOS-based and can run on that old 386 in the closet.

The PC-471 is a plug-in PC card from ESE that hooks to your house master clock system and synchronizes the PC clock to the master using either the ESE or SMPTE time-code format. This has many potential applications in the broadcast facility.

For those that design and build equipment, Selco has a new family of Soft Touch knobs that can be purchased in a variety of knob/cap color options. Also for the do-it-yourselfer was Opamp Labs, presenting its ever-growing range of modules and systems for audio circuitry.

More and more stations are expanding their use of computer networks within their facilities. The problem of what to do with the network servers and disk arrays is addressed by the File Server Station from Winsted. This is a steel, open-frame shelf unit that features space for multiple servers/monitors/keyboards, pull-out shelves and extensive cable management capabilities.

A more custom approach to studio furnishings was advanced by Murphy Studio Furniture, as well as a wide range of items and options from Spacewise Broadcast Furniture. For furnishing your remote, KD Kanopy presented its clever series of promotional and easy-to-assemble tent structures, including a new line marketed under the Party Shade name. Also in the remote area was Kart-a-Bag, presenting its Kartmaster 500 and a wide variety of other hand trucks and equipment cartage systems.

New this year at Acoustic Systems — well-known makers of acoustical doors, windows and modular studios/control rooms — was a fully glass acoustical door. One was installed in the company's display booth, which provided a welcome moment of quiet respite from the show floor.

The Stock 200 vertical cabinet from Zero Stantron features a fully welded, rugged construction. Standard features include 78"x30" vertical frame, two removable solid side panels, removable solid top panel, two pair of fully adjustable mounting angles and a pontoon base.

FOR MORE Information

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VIDEO BACKHAUL

By Peter Douglas

Peter Douglas is vice president of operations and engineering at TCI, Littleton, CO.

This year's NAB show contained a multitude of products and services aimed in some manner at the video backhaul market. The usual assortment of hardware associated with uplinking and downlinking, analog and digital was very much in evidence. I could burn up thousands of words talking about all of the products involved in traditional satellite video backhaul; fly-away links, new SNG trucks, new dishes, exciters, compression and the list goes on. But many of you are familiar with these products because they have been around for several years and are quite prolific in their use.

Rather than re-hash the obvious and because of the limited space set aside for this topic, I'm concentrating on new and

unique services and products as they relate to video backhaul. The first topic is one that is rapidly growing in popularity.

Linking the production community

Over the years, companies like Federal Express, UPS and many small courier services have profited from the need to quickly deliver video to the southern California production community from various field locations. Besides taking precious time and being expensive, the old methods did not allow much flexibility.

Now, the production community has several new and different options. One option is being offered by Pacific Bell in conjunction with several companies. Vyvx has a Pac Bell connection for its First Video Affiliates system. This service offers everything from full 270Mb/s uncompressed video transport to and from post houses, to compressed video transport of "dailies" from the shooting location. The initial deployment of the 270Mb/s trans-

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port will link companies, such as 4MC, All Post, Sunset Post, 525 Hollywood, Encore Video and others. No cost on this yet, but historically, Pac Bell has been competitive.

RE America has a new product using DS-3 lines that allow the producer or special effects people to have control of a tape machine located on the set to view and edit the day's material. An editor or producer located anywhere with DS-3 capacity can review material and compose edit lists from the comfort of the home facility. Sprint offers its Drums service for faster special effects work by being linked to the site of the shoot. Drums is available via ISDN or T-1 lines and was recently used for the production of "Dante's Peak."

Retrieving sports and news

For years, many broadcasters have used traditional satellite transport for their sports, news and events backhaul. Although still a viable and cost-effective service, especially for the facility without fiber access, there are now several new and exciting alternatives.

For several years, Vyvx has been providing cost-effective and reliable service to the broadcaster, and now, new efficiencies are being introduced with the addition of compressed video on existing fiber paths. This technology allows for many more users on the same fiber paths. By using MPEG-2 compression, Vyvx is offering transport that may not have been available before because of excessive cost or lack of capacity. The standard bit rate for this service is 6.312Mb/s. With high-quality codecs, this should prove adequate for most applications. Vyvx will offer the service initially in most of the highest-demand market cities.

A newcomer in the field of domestic backhaul, but certainly a recognizable entity, IBM has introduced its Video Services business. This service will use local loops into ATM nodes in IBM's global network and will offer a broad spectrum of broadcast-quality MPEG-2 video for backhaul usage. One of the most interesting parts of this service is the self scheduler available on the Internet. Simply log on and get full booking, pricing and status reports, which is sure to beat the tedious telephone waits experienced in more traditional booking systems. This is intended to be a global service by the end of 1998. IBM has an arrangement with Keystone for satellite services that may be needed in conjunction with the service.

International backhaul

Not that long ago, you could super "via satellite" across the bottom of your picture and everyone understood the bad video. That age has gone the way of the dinosaurs. Today, international backhaul is an everyday occurrence. Major providers, such as Intelsat, PanAm Sat and a variety of regional providers, do a commendable job keeping up with the demands of the international news community by providing quick delivery of quality video. Companies, such as Deutch Telcom and Hong Kong Telcom, are quickly becoming significant regional backhaul full-service companies.

A smaller player in this community also deserves some notice. Columbia Communications Corporation uses a creative approach that uses the C-band capacity onboard NASA's Tracking and Data Relay Satellite System (TDRSS) to provide cost-effective video transmission across the Atlantic. Although these are inclined orbits, they work well for short-duration transmission with any dish. The TDRSS satellites can be viewed from most CONUS locations (admittedly at a low angle).

My personal pick for the "neatest thing at the show" comes from a company in Norway. Nera Communications has introduced its "SuperViSat" on-demand video backhaul system. Built into a VW van, this unit has a 1.2m dish mounted on the roof and is designed for full operation by one non-technical person (a reporter). Simply park the unit, start the generator, power up the equipment and push the "call" button. This activates a mechanism, which locates the home satellite and establishes a two-way data link. Then you call up the scheduling screen and follow the instructions. As late as 10 seconds prior to needing video push, the "hot" button and the unit self-tunes, aligns and begins transmission. All transponder assignments, tuning, steering, cross-pol and other checks are fully automatic. Even remote-control cameras can be used with the system. All that is missing is a big "tally" light on the top of the truck. These units are now deployed by several broadcasters in Europe.

Broadcast Microwave was showing new ENG vehicle packages for single- or dual-band transmitter operation. These packages included offset feed antennas and control panels with built-in test generators. In addition, the company had new helicopter systems with omnidirectional antennas and GPS-steerable antenna pods.

Communications & Power Industries (CPI) Satcom Division was showing its latest offering, the CMPA (Compact Medium Power Amplifier). This 5.25-inch unit features microprocessor control and can be used in SNG, flyaway and small earth terminal applications. Built-in fault diagnostics and modular construction make the unit easy to maintain.

EEV featured the Stellar range of high-power amplifiers (HPAs) in its booth. Stellar HPAs offer up to 500W outputs from units that weigh only 55 pounds and are only 3RU tall. They can operate on voltages from 99V to 264V without adjustment and can be used for analog and digital uplinks. Comprehensive remote control is provided through an RS-422/485 port.

Thomson Broadcast introduced its DSG 2500 system, which uses MPEG-2 MP@ML compression. The DSG 2500 complements Thomson Broadcast's current range of DSNG products. Also new from Thomson is the 8522 encoder/8523 decoder. Designed for satellite news links, these 4RU units provide selectable video and audio interfaces, as well as compression ratios.

To meet 20th century weather needs and beyond, AccuWeather, Inc. offers a complete package of high-quality, high-impact services. The Ultragraphix weather system includes custom 32-bit graphics, Weathermation instant time-line animations, VirtualWeather and Forecast Fly-Thru animations, animated transitions, non-linear editing, automatic show creation, real-time Doppler radar, satellite images, weather maps and feature graphics. Complete weather forecasts are available for your web site and ready-for-air via satellite. The FirstWarn system is EAS-compatible and automatically generates crawls, map icons and radar to notify viewers of severe weather.

Allen Osborne Associates, Inc. can get it up fast with the Hilomast telescopic pneumatic masts. The masts can be used for remote ENG, communications, field-strength measurements, pop-up jamming, remote surveillance and noise level measurements.

BAF Communications Corporation offers a range of satellite news vehicles. The Navigator 'flyaway' satellite uplink portable, pack it up system is the latest offering. The fold-up antenna is the Centurion 1.5m offset fed diamond-shaped parabola with Intelsat and Eutelsat approval and complies with CCIR-280. The unit can withstand inclement weather and winds and will withstand repeated assembly and disassembly while maintaining the integrity of the positioner geometry.

Hughes Communications, Inc. offers a range of commercial satellite communications services. Its Galaxy Satellite Services (GSS) unit offers satellite services in cable video, broadcast video, video timeshare, VSAT data, voice and video, international television, satellite newsgathering and SCPC audio and data.

LandSea Systems introduced the millenniuM-phone (Mini-M) for global voice, fax and data communications. The terminals use the latest INMARSAT 3 satellites via Spot Beam. The phone is the size of a PC notebook and weighs less than five pounds, including antenna and battery.

Standard Communications manufactures video rebroadcast-quality satellite TV receivers and broadband RF products. The Global VU model CAM830 control

access monitor used in conjunction with the Agile Omini receiver gives you access to all satellite formats from front-panel controls or from a PC. The monitor lets you add or modify formats, then scan them by RF frequency and or audio subcarrier and gives you control over all three audio subcarrier demodulators, as well as international video features.

In a media industry alliance, AT&T has allied with Sony Electronics, Nortel and Lucent Technologies to give broadcasters turnkey, end-to-end transmission solutions. With AT&T's networking ability and some of the industry's specialized equipment, customers have one source to turn to for networking and video transmission when addressing their digital networking needs.

FOR MORE information
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AUDIO TESTING, DISTRIBUTION AND COMMUNICATIONS

By Garrett Wood
Garrett Wood is chief engineer at WUKY-FM, Lexington, KY.

This behind-the-scenes group of products is deceptively important to getting the program on the air and keeping it sounding good. As the rest of the industry moves forward, so too must these areas, although not everyone notices. But each year at NAB, those who labor in such obscurity come out to display their progress. Here's what they had to show at NAB 97.

Audio test and measurement equipment

Audio Precision introduced the SWR-2122 series of audio switchers that can be configured to allow for large-scale production testing of audio devices. This switcher occupies one rack unit and is available in balanced XLR and unbalanced BNC connector configurations. The standard 2x12 arrangement can be cascaded to 16 units that allow up to 192 channels

to be addressed. This new series replaces the current SWR-122 line.

Tektronix introduced two new options for its 764 digital audio monitor. Option 01 adds a serial digital video input with embedded audio demultiplexing that provides operators real-time monitoring of audio level, data and phase relationships. The logging and reporting features provide continuous monitoring of groups of four channels of audio activity. The Option 02 analog line output can be used to drive an audio amplifier, allowing the monitoring of one stereo pair of any of the various inputs provided to the 764.

The NC10 digital sound and noise analyzer was displayed by Neutrik Cortex Instruments. This portable unit contains the industry's first hand-held, battery-powered, psychoacoustic loudness analyzer, capable of providing live loudness calculations. Standard features include a precision sound level meter, third-octave spectrum analyzer and a data logger with 340MB capacity. Optional software modules provide frequency-selective reverberation time calculations and FFT analysis.

Two new CD/CD-ROM jitter meters were demonstrated by Leader Instruments. The LE-1853 and LE-1854 jitter meters facilitate the optimization of disc mastering and multimedia player systems. The LE-1853 handles CD-ROMs up to 8x operating speeds, while the LE-1854 manages up to 12x operating speeds. Leader also displayed the LG-3226 synthesized signal generator, offering fully programmable operation from 100kHz to 2GHz. Its dynamic range of -133dBm to +13dBm facilitates the testing of sensitive receivers.

Prism Media Products attracted significant attention with its new version 2.0 software for the PrismSound DSA-1, a hand-held AES3 test system. The unit includes generator and analyzer capabilities, allowing it to examine electrical, timing and data-content parameters of AES3 signals and paths. An AES11 reference signal input is also provided for time-base measurements and synchronization of the internal generator. Also on hand were Prism's Dream DA-1 and AD-124, which are 24-bit D/A and A/D converters, respectively, as well as the MR-2024T, an interface to TASCAM's DA-88 and DA-38 that provides AES3 or SPDIF I/O for eight tracks at 16 bits, six tracks at 20 bits, four tracks at 24 bits or two tracks at 24-bits with 96kHz sampling.

The Q-Box from Whirlwind is a battery-powered audio line tester capable of performing various checks on microphones, speakers and cabling. A source selector allows the selection of a built-in condenser mic or 440Hz tone generator that can be used to talk back up the line at +4, -20 or -50dB levels. A speaker selector can be used to confirm mic or line levels and test dynamic microphones. Outputs for standard headphones or a 2kW earpiece are provided, as well as voltage-presence monitoring for phantom or intercom power.

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Audio distribution

Synchronous AES3 digital distribution is now available with the introduction of the NV3064SA router displayed by NVision. AES3 audio can be switched cleanly without the clicks and glitches normally associated with asynchronous routers. The NV3064 uses proprietary ASIC technology to provide error-free crosspoint transitions. System architecture allows a 32x32 router to be expanded to a full-framed 64x64 with the addition of an I/O card. The NV1025 AES3 distribution amplifier (with EQ, jitter removal and reclocking) and the NV1035 AES3 20-bit analog-to-digital converter were among several other new NVision products at NAB 97. Also shown was the NV1050 AES3 sample-rate converter that can simultaneously convert multiple AES3 inputs of different sample rates to a common output rate.

New to the Leitch XPlus series of routing switchers is an AES3 16x16 module with an optional quiet-switching output for clean, noise-free switches. The XPlus uses 1RU and 2RU mounting frames for installation of various modular components. AES3 and analog audio modules can be installed in the same rack unit and expanded with the use of multiple frames. New to the Xpress series of monitor routers is the 12x1 serial digital video and analog stereo audio units. The VIA32 series of routers can be configured for 32x32 distribution of serial digital video, AES3 and analog audio.

Leitch also has added products to its AES Glue family — a series of versatile plug-in audio modules that address a wide variety of analog/digital signal processing, distribution and routing needs. The DAR-6880 digital audio reference/tone signal generator combines timing functions and a full-function audio tone generator. The ADC-880 and ADC-6880 are low-cost/high-performance 20-bit A/D converters.

Pesa Switching Systems introduced the Ocelot family of routers. The basic system is built on 8x8 and 16x16 matrix sizes that are housed in a compact 1RU chassis. X/Y control is provided by front-panel operation, with Windows-based computer control available via RS-232/RS-422 serial interfaces. A total of seven Ocelot switchers can be addressed via a single RS-422 control port.

Fidelipac showed the DMR-4x1, a four-input/one-output AES3 combiner. This unique product is ideally suited for applications where multiple AES3 channels need to be combined into a single feed.

Telect presented its full range of audio DAs, routers and digital converters, as well as its audio patch panels, fiber-optic distribution and associated hardware. The company also specializes in cable management systems for a number of different industries including telecommunications and broadcasting.

Circle (249) on Free Info Card

Communications systems

Clear-Com unleashed its new Matrix Plus 3 digital intercom system at NAB 97. It uses distributed digital signal processing to connect up to 200 full-duplex ports for voice and program audio. Variable individual listen levels are available at each station, with adjustable dip control on IFB interrupts. The level of each input/output port is also variable. Various modules can be used to interface two-way radios, telephones and two- or four-wire equipment.

The RadioCom line of UHF wireless intercom systems was featured by Telex Communications. The BTR-600 model is a two-channel, encrypted digital system that provides secure system transmissions via UHF base stations. Operations are fully agile in the 524MHz to 608MHz and 614MHz to 746MHz frequency bands. A cipher code provides 65,536 possible combinations of encrypted delivery.

Circle (250) on Free Info Card

Wire, cable management and connectors

Gepco International showed the 7537 super trunk cable designed for digital audio distribution. Up to 50 channels of AES3 audio can be carried at distances up to 2,500 feet with a bandwidth of 450MHz. It's available with five, 10, 12 and 25 color-coded 75 ohm coax cables per bundle. Also offered was a low-loss miniature serial digital coaxial cable, model 7538, which uses gas-injected foam technology to provide extremely low signal loss. This 75 ohm cable is 0.159 inches in diameter and weighs 14.3 pounds per 1,000 feet, making it attractive for mobile production truck applications.

A new line of XLR panel receptacles was displayed by Neutrik USA. The A and B series offer the smallest XLR available, with a 0.90-inch center-to-center mounting density. The A series units are constructed in plastic, while the B series has a metal shell supplied in nickel or black finish. Both are available in a PC vertical or horizontal mount and left or right horizontal mount.

ADC has improved on its QCP punchdown system with the introduction of the QCPII quick connect punchdown technology. The blocks are now insulated on both sides to allow pre-lacing of wiring and permit one-handed setups. Deeper channels allow up to four wires to be punched on a terminal, and there's a new punch that doesn't require the proper orientation before punching.

Well-known high-end audio distributor Gotham Audio has teamed up with connector manufacturer/dealer Deltron to form DGS Pro Audio. The joint venture stocks a wide variety of audio cables and connectors, including a new "silent" 1/4-inch phone plug and a highly flexible, double-shielded cable for high RF rejection. A clever new XLR identification system is also offered.

The Quick Winder line from Reel-A-Pail provides an easy method of storing power and other cables used in remote production. This simple-to-operate device is available in three sizes and allows the units to be stacked for convenient storage. The Quick Winder model RAP-200 can hold up to 200 feet of 1/2-inch cable.

New items at Clark Wire & Cable included Bittree patching systems designed for digital audio, video and other high bit-rate data applications. Also on hand was Clark's wide range of analog and digital cables in single and multicore versions, plus some examples of the company's custom cabling work.

CANARE showed its full line of high-quality cables, connector reels, snake systems and tools for audio and video applications. Tools include handy crimpers and cable strippers, while the cable line features a wide spectrum of colors and the well-known Star-Quad design for maximizing common-mode rejection.

Mohawk/CDT demonstrated its new Spectrum AES3-compliant cables for digital audio applications. Single, double and multipair configurations are available.

Mohawk/CDT exhibited a new line of audio breakout boxes designed for the critical demands of remote field use. Units are available in eight-, 12-, 16- and 32-channel constructions. The eight- and

12-channel are standard and use 37 contact interconnect connectors and black-and-gold XLR panel connectors. The 16-, 24- and 32-channel constructions are available by special order.

New Hampshire-based Audio Accessories showed off its line of standard and pre-wired audio patch panels, plus a nice selection of patch cords and holders. The company also carries video and RS-422 patching equipment.

FOR MORE Information

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ADVANCED TELEVISION

By Louis Libin

Louis Libin is a broadcast/FCC consultant based in New York and Washington.

By now, U.S. broadcasters are aware of the solid agreement on technical standards for advanced television, and even more importantly, the new nationwide channel assignments. Of course, the digital TV (DTV) system needs to be fully implemented and experience needs to be acquired before all of its characteristics can be fully documented. However, it may be some time before DTV's spectrum usage is optimized. Deadlines within the accelerated timetable for implementation are rapidly approaching, and most of the major manufacturers have already made serious investments in DTV equipment and system development. Here is a sample of some of the new DTV-related transmission and production products shown at NAB 97.

TV transmitters and services

Comark showcased its complete line of DTV transmitters including the new Optimum series of solid-state UHF and VHF DTV transmitters, with power levels up to 500kW. Comark also displayed its UHF Advantage high-powered IOT transmitters, capable of up to 200kW. For existing UHF broadcasters who have received a UHF DTV channel assignment, Comark's IX dual-use analog/digital transmitters were also on display.

Comark took advantage of the NAB conference to announce and explain its new division. It will be led by Mark Richer, formally the executive director of the ATSC. This Comark initiative is called Comark Digital Services (CDS) and it will offer turnkey digital broadcast solutions. Comark was a key member of the NIST initiative that developed key DTV technologies, and CDS will take these technologies and go the next step to full realization at the station level. Stations that take advantage of CDS services will see their pass-through operations implemented seamlessly and quickly. CDS sponsored a technology demonstration that presented a cost-effective approach to implementing the basic needs of the "pass-through" facility within the domain of the compressed (19.4Mb/s) ATSC transport stream. Seamless insertion of local content, a major worry for broadcasters up until now, was demonstrated within the fully compressed domain.

Larcan exhibited its new digital IOT transmitter called the Landmark, a dedicated UHF DTV transmitter. The company also plans to manufacture a VHF DTV transmitter. The Larcan control architecture employs multiple microprocessors in a distributed network using a fiber-optic LAN within the transmitter. The LDMOS devices that Larcan employs provide higher power with less intermodulation distortion, as much as 10dB better than FET devices.

Harris showed its new Diamond CD series of DTV transmitters. These transmitters are solid-state UHF units available with either the Westinghouse silicon carbide transistors or the RF LDMOS Motorola transistor. A small price differential for the Westinghouse device is one of the few differences. The Diamond CD transmitters will begin at about $200,000. The CD-1 exciter (see "Pick Hits" p. 42) uses a non-linear digital corrector to offer linearity correction over upper and lower adjacent channels. The exciter's 32dB symbol-to-noise ratio (new term) guarantees transparent transmitter operation. Harris also has VHF transmitters for stations that received a VHF channel assignment. The Platinum CD series is a combination of a FET solid-state VHF transmitter and the CD-1 exciter. Harris previewed its Ultra-1 low-power DTV transmitter. Ultra-1 is a 1kW, solid-state device that was demonstrated live from KLAS-TV for the ATSC demonstration.

Acrodyne displayed its new dedicated UHF transmitter, the AU-DTV20, which delivers 20kW average output power from a single Diacrode. The Diacrode will be the starting point for the Acrodyne high-power solid-state transmitter system. The AU-DTV 15 Gold series can produce 15kW average power using a single Diacrode tube. Acrodyne is engineering the DTV transmitter system with cooperation from Zenith, who supplied the 8-VSB modulator.

ITS showed its solid-state digital UHF transmitters in a new series called the ITS-8800. The ITS transmitter has power levels up to 5kW average power, with an advanced feed forward amplifier and a complete redundant system of power amplifiers, exciters and power supplies.

Digital production

Snell & Wilcox used the NAB convention to explain its new range of high-quality interface solutions. The company's areas of expertise include compression pre-processing, real-time MPEG test and measurement, motion compensation and aspect ratio conversion. Among the equipment in the Snell booth was the HD 50 upconverter. (See "Pick Hits" p. 42.) The HD 50 upconverts standard-definition images to high-definition.

Panasonic exhibited advanced DTV cameras and production equipment including switchers and videotape recorders. DVCPRO's relationship to the ATSC DTV was demonstrated in the form of 525P and full 1,125-line HD. The Panasonic "Next Generation of Video Solutions" included advanced DTV solutions, such as the 1,125/60 interlaced advanced cameras and the D5/HD processor combination.

Ikegami Electronics introduced a series of cameras that will accommodate the new digital TV standards. These digital processing cameras were exhibited in NTSC and HDTV in interlace and progressive scan models, as well as switchable between 4:3 and 16:9 aspect ratios.

Sony showed off its new HDCAM format, which will offer portable and studio decks including the HDW-500. (See "Pick Hits" p. 42.)

TV RF

By Marvin Born
Marvin Born is vice president, engineering for the Dispatch Broadcast Group, Columbus, OH.

As discussed last year for the NAB wrap-up, RF and transmission are not usually bell-ringing affairs at NAB. Typically, transmitters made a slow steady pace forward into new technology and only a few RF types really care about the details. This was not the case at NAB 1997. This could even be called the year of the transmitter. With the announcements from the FCC concerning HDTV or ATV to be precise, transmitters were a popular discussion topic. At this point in time, the transmission facility is about the only aspect of ATV that has substance. At the time of the NAB convention, the channels had not been allocated, but most broadcasters had some idea of what channel they would get, based on the previous FCC table. While the power may change or have a cap, the band, i.e., UHF or VHF, is discussible. Many people were looking for transmitters, transmission line and antennas. The most popular were the tower people. At least 100 stations may need a new tower and the biggest questions are, is there enough manufacturing capability to meet the deadlines and most important, are there enough crews to construct the towers and install the antennas?

Harris had a popular booth. Its show piece was the Sigma CD transmitter, which was designed to be an ATV transmitter. The key component within the Sigma, and thus the name SigmaCD, is the CD-1 exciter. (See "Pick Hits," p. 42.) Designed to implement the ATSC vestigial sideband system, the CD-1 uses digital modulation techniques to provide proper filtering and linearity correction for the 8-VSB signal, while protecting the above and below adjacent channels. This exciter has a 32dB symbol-to-noise ratio, (new term) to provide a truly transparent transmitter.

Because the exciter accepts a digital bitstream that carries the video, audio and data, there are no separate video and audio inputs. The datastream is processed according to the ATSC specifications, filtered and upconverted to the operational UHF channel. With only one stream of information to transmit, the transmitter requires only a single amplifier channel. There is only an IPA stage and the power amplifier. Harris offers the SigmaCD with IOT or klystrode/IOT power amplifiers. Additional amplifier cabinets can be added to generate the required RF level needed.

For those of us who get the VHF channels, Harris has the Platinum series solid-state transmitter. The Platinum is the company's current production model for analog television. Simply add the CD-1 exciter, reconfigure the modules and presto, you have a highly redundant solid-state DTV transmitter.

The Platinum is a popular transmitter for digital transmission testing. The modules are hot-pluggable and have an MTBF of 500,000 hours.

Harris conducted a study of consumers regarding their plans to switch to HDTV in the future. Some of the results are: 96% liked the rectangular shape of HDTV; 71% would be willing to pay $500 more than their current TV set costs for HDTV; 18% would be willing to pay $1,000 or more; and 79% said they would purchase a new HDTV receiver rather than a converter box when HDTV is fully under way. Interesting study.

Comark Communications, Inc. showed three different models of transmitters and announced the formation of Comark Digital Services (CDS). The purpose of CDS is to "provide turnkey solutions to the broadcasting industry's transition of DTV." The CDS base of operation will be in Washington, DC.

Comark introduced its "Optimum" series of solid-state UHF and VHF digital (and analog) TV transmitters, with power levels from 500W to 60kW. An interesting feature of this transmitter is that when used as an analog transmitter, it can be configured either as a common (visual and aural) amplification system or the more traditional separate amplifiers for picture and sound. Both configurations use combiners to allow additional power cabinets to be added until the desired output level is reached.

Comark also showed its "Advantage" family of transmitters, which feature air and water cooling at various power levels from 5kW up to 200kW in the UHF channels. The Advantage is an IOT system transmitter allowing you to choose your favorite tube manufacturer to supply the IOT. Also at NAB was the IOX transmitter

line. This is a smaller footprint package featuring microprocessor control, common or separate amplification at NTSC power levels from 15kW to 28kW.

Eimac announced some significant additions to its IOT line. Three new dual-mode (analog or digital) models with power levels from 22kW to 55kW were offered. Four new IOTs optimized for HDTV were also introduced. These tubes offer power levels from 44kW to 110kW (peak).

An interesting note for those of us who use glass tubes (read that radio), is that Eimac sold the glass tube product line to Trition Service, Inc. of Pennsylvania. The sale was an effort to allow Eimac to focus its business on ceramic metal technology.

At Advanced Broadcast Systems, the company was showing its CST-II transmitters. These computer-supervised UHF units are available with IOT, MSDC and klystron tubes in power levels ranging from 20kW to 240kW.

EMCEE was showing its new TTU2500HD Transition transmitter (2.5kW average power). Its broadband solid-state driver features easy operation and low maintenance. A frequency-agile synthesizer permits channel changes in the field. The unit employs an 8VSB modulator and a tetrode power amplifier. Also on display were low-power transmitters for MMDS applications. The company also announced the DigaCom series of transmitters that are designed to operate from 2.5GHz to 2.7GHz frequencies. Its line of UHF transmitters now include the F series, which is a 1kW solid-state unit.

In the EEV booth, the IOTD2100 was being shown. This water-cooled tube delivers 110kW of peak power and is claimed to be the world's highest-power IOT. Also on display were smaller water-cooled units, the IOTD270 (70kW) and the IOTD150W (50kW), along with the IOTD150R (50kW), an air-cooled design. EEV also took advantage of NAB to announce its 24-hour technical support service.

A complete line of TWTs for C- and Ku-band uplinks was displayed at the Litton Electron Devices booth. The company also made it known that it rebuilds and repairs UHF-TV klystrons.

From Italy, Elettronica Industriale was showing the Linea Stone, a 5kW solid-state UHF transmitter. Linea Stone includes considerable redundancy, complies with NTSC standards and is compatible with DVB and 8VSB standards. Also from Italy, was Itelco, another transmitter manufacturer. It was showing 3kW-60kW liquid-cooled UHF and VHF transmitters, as well as digital exciters.

Thomson Tubes Electroniques had its tube lines at NAB. Thomson tubes include IOTs, tetrodes and Diacrodes. Both the TH 680, a water-cooled 60kW version and the TH 610, a 10kW air-cooled Diacrode were featured.

Thomcast was showing Crystal, which is a full range of DAB transmitters. In addition, Thomcast has a line of MMDS transmitters, along with the Digital Advantage line of VHF-TV transmitters.

Moving across the hall to "sky-hook" land, the antenna companies were making a big show. Antenna Concepts makes a line of antennas for FM, ITFS, PCS, UHF and VHF service. Of greatest interest in the area of HDTV is its low-power TV antennas. The series has names like Champion, E-Slot, LP line and the Blaster. The products are available as directional or omni, circularly polarized and represent a method of putting a network pass-through UHF HD station on the air. If you are one of those stations that needs a new tower for a full-power HD transmission system, consider installing one stage of amplification and an antenna similar to one of these to get on the air until you can construct your new facilities. They are available as top- or side-mount with or without radomes. The Spanner line handles power from 5kW to 150kW in the UHF band — hardly low power.

Antenna Concepts offers a line of high-power omnidirectional batwing antennas for the VHF band with power levels up to 20kW. While the batwing is a time-tested design, it still represents a less-expensive method of getting a VHF signal on the air.

Cablewave was showing its NTSC/DTV single antenna solution. The ONE solution is a wideband UHF antenna available in side-mount or top-mount configurations with power-handling capabilities of up to 60kW. Also at Cablewave was the Flexwell series of cables and connectors.

Dielectric has always been a major manufacturer of antennas in broadcasting and the company has been busy in the DTV field. Dielectric has provided antennas to many of the experimental DTV stations that have been licensed recently. The company typically uses one of its many standard antennas and models that with the presently installed antenna to provide a system for the combination of HDTV and NTSC on the same tower or even the same pole. Dielectric has the manpower and facilities to design the exact configuration needed for UHF/VHF or UHF/UHF or multiple-channel installation. The products will handle any power level legal for NTSC or DTV. The company also has the facilities to design and construct any filters required for combining multiple carriers into one transmission line and antenna. Because a typical antenna and transmission line can cost upward of $500,000, this approach bears consideration.

Jampro is also a source of DTV antennas and broadcast RF systems. At NAB, it featured a broadband UHF panel antenna that will side-mount or top-mount and is modular in design. The panels can be configured to provide various patterns, gain and power levels. The JTW series of slotted antennas will also top- or side-mount and are available up to power levels of 160kW and on all UHF channels. Jampro also offers its "dual" antennas that are designed to provide NTSC and DTV service from the same aperture. This is a combination of the JTW traveling wave antenna and the JAT batwing VHF antenna. Each antenna has a long history of broadcast service and the combinations offer good circularity and low windloading for towers close to their maximum loading. Jampro also offers the dual-mode combiners to allow different UHF channels to use one common transmission line and antenna up to power levels of 120kW.

Shively Labs introduced its series 2000 UHF antenna line. The 2000 features power levels from 1kW to 150kW, horizontal or elliptical polarization. It is DC grounded for lightning protection and is available with radomes for weather protection. Shively also manufactures a line of FM and MMDS antennas.

In the RF monitoring arena, Belar had its TVM-230 BTSC TV stereo monitor/analyzer, which operates in conjunction with its TVM-100 or 101 or other wideband aural demodulators. The TVM-230 digitizes the complete demodulated aural signal and decodes the stereo multiplex using digital signal-processing techniques. Also on display was the TVM-250 SAP/PRO monitor, a dual modulation monitor system for stations broadcasting the MTS

SAP or PRO channels.

The Modulation Sciences msi 320 precision video demodulator offers documented performance with features that include a Nyquist SAW filter, selectable line zero-carrier reference, synchronous video detection and continuous all-channel tuning. It is designed for use at the studio or transmitter and features a streamlined, easy-to-read front panel. (See "Pick Hits," p. 42.)

Before you can broadcast your signal, you have to get it to the transmitter. Broadcast Microwave Services had its new STL/TSL ICR modular system package that provides high quality at low cost and is ready to handle signals worldwide. In addition, the company was showing 7GHz and 13GHz low-cost compact transmitters for simple STL applications.

Nucomm was showing new digital-ready microwave systems that are designed to meet the bandwidth needs of the new digital TV systems. Demonstrated equipment could handle 2GHz and above, for both ENG and STL applications.

FOR MORE information
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GENERAL TRANSMISSION SITE EQUIPMENT

By Don Markley

Don Markley, Broadcast Engineering's technical consultant on transmission facilities, is president of D.L. Markley & Associates, Peoria, IL.

This product area covers everything besides the broadcast transmitter and antenna, such as towers, transmission lines, power conditioning, site control, EAS and other miscellany. With a little hunting, a number of treasures were revealed in these areas at NAB 97.

Towers, transmission line and accessories

New from Myat were power combiners. These combiners will accept multiple inputs and combine them into one common feed line. These are available in three-way to eight-way combiners for VHF and UHF frequencies.

Radio Frequency Systems (RFS) was showing new waveguide directional combiners, as well as panel arrays. The panels are designed for the UHF band to 2kW per panel. The waveguide combiner modules are designed for transmitter powers up to 60kW.

Coaxial Dynamics was showing its lines of dummy loads. One thing that was interesting at this year's show was air-cooled dummy loads up to 12.5kW, which were rated at up to 1,000MHz.

In the area of tower construction, Stainless presented evidence of its prowess in fabrication and erection of structures up to 2,000 feet in height. The company also provides structural analysis and modifications for existing tower owners who

are considering ATV installations.

FOR MORE information
Circle (254) on Free Info Card

Powering and grounding

Kay Industries was showing its standard three-phase rotary converters. As is appropriate, these units had no great horns and whistles. They are designed to sit quietly and pump out three-phase power for years on end. They really have changed a lot since the old days when they were first introduced to the industry; however, their size has gotten much smaller and their reliability much greater.

Electronics Research, Inc. (ERI) presented something this year that was a substantial departure from its conventional line of antenna products. It seems ERI has gone into the lightning protection and grounding system business and is producing cathodic ground rods and high-tech spur-type lightning rods. Together, these units should greatly reduce the amount of damage that a station experiences from lightning.

Anyone interested in quieting their AC power service, or those building new facilities, might consider the items displayed at the Equi=Tech booth. The company specializes in balanced power systems, and this year introduced a range of downsized systems ideal for remote facilities or small studio/automated operations.

MGE UPS Systems' Pulsar ES 2/4/7/10 offer inexpensive, quality battery backup and surge protection for desktop PCs, monitors, UNIX, CAD workstations and entry-level servers. Smart battery management features include: longer battery backup, fast battery recharge, increased battery life, automatic battery testing and deep discharge protection.

FOR MORE information
Circle (255) on Free Info Card

CABLE PRODUCTS

By Ken Freed

Ken Freed is a technical writer specializing in cable and interactive television, and is based in Denver.

A trade show as massive as NAB inevitably induces "information overload," yet anyone interested in cable TV systems could discern the state-of-the-industry from the exhibits at NAB 97. The evidence was not out in the open, however, since NAB is a "broadcasting" show and few there spoke openly about cable carriage to subscriber's homes. Yet, observations yield deductions that lead to inferences with far-reaching implications: Interactive TV services on cable systems are moving from hype into reality.

For instance, DiviCom, a wholly owned subsidiary of C-Cube, exhibited its new DiviSys MPEG-2 digital video networking solutions for transmission over cable, satellite, MMDS, ATM and other networks. The MediaView family of MPEG-2 encoders are DVB-C compliant. The DiviCom MediaNode MPEG-2 switcher and multiplexer regulates stream rates where multiple media sources make transport complex. These capabilities are vital for interactive TV (ITV) services.

Also providing the underpinning for ITV, Tektronix introduced the DDS200 digital demodulation system for monitoring the quality of DVB-C modulators, the first specifically designed for cable. The system includes a QAM analysis tool (four to 256 QAM) along with automatic measurements of such parameters as I/Q amplitude and phase jitter. An adaptive equalizer evaluates transmission path problems.

Tektronix also demonstrated the JND-metrix (just noticeable difference) Picture Quality measurement technology developed by Sarnoff Corporation to provide real-time quantitative measurement of picture quality before and after compression. The JND system could revolutionize compression operations for both one-way and two-way networks.

For interactive content insertion, Vela

Research demonstrated its multichannel decoders, based on SCSI-2 Fast/Wide architecture. Optivision demonstrated a high-speed quad gen-lockable MPEG-2 decoder for real-time digital ad insertion and multichannel pay-per-view systems. StarGuide Digital Networks showcased its new Local Media Insertion Technology (LMIT) for the real-time distribution of interactive store-and-forward advertising, as well as short-form programming.

For automated operations, Channelmatic introduced MVP (managed video playback) for automated management of digital content distribution and insertion. Louth Automation demonstrated the ADC-100 system for fully automated multichannel operations.

C-Cor Electronics introduced its new digital fiber-optic transmission terminal systems for digital pulse code modulation (PCM) of up to 32 video channels per optical wavelength. Terminals support NTSC, PAL or HDTV, while offering drop-and-insert capabilities along with scrambled conditional access formats transport at variable delay without degradation through the end of the line. Their optical terminals operate at speeds from 194Mb/s to 3.1Gb/s for transmission of broadcast-quality video, as well as DS3 data transport.

Nearby, Wavecom demonstrated its cable TV modulators, featuring bidirectional amplifiers specifically designed for interactive TV systems. Wavecom also was one of the few exhibitors daring to show a high-speed, spread-spectrum cable modem. Otherwise absent at NAB, the cable modem was the star of the show at Cable 97.

DiviCom exhibited its Flare set-top design for varying degrees of interactivity within the bounds of MPEG-2, DVB and DAVIC. A deal was announced for Zenith to license DiviCom's design to produce three million set-tops for Americast.

Pace Micro Technology, Europe's foremost manufacturer of cable and satellite IRDs, announced it will participate in the development of General Instrument's DigiCipher II set-top boxes for TCI's "ALL TV" service as the MSO continues converting analog systems to digital. Pace showed its DVC200 digital video cable receiver for conditional access. The DVC600 digital cable receiver supports a wide range of broadband interactive services, everything from home shopping to PPV VOD ordering. The unit has an RS-232 port for connection to personal computers along with an internal v32 phone line modem.

Not to be outdone, Scientific-Atlanta announced that the new CBS Eye on People cable channel will uplink compressed digital video to Galaxy VII using an S-A PowerVu MPEG-2/DVB system. The PowerVu system can support Internet access, data streaming and file transfers at 2Mb/s or more. PowerVu encoders are deliberately interoperable with IRDs from other manufacturers. S-A also demonstrated the PowerTV operating system for interactive data services along with video and audio streaming.

Another world-class manufacturer showing an IRD at NAB 97 was Thomson, which also was marketing MPEG-2 encoders and multiplexers, as well as digital head-end equipment for cable operators.

Until all these technologies are deployed, delivering the Internet on the TV screen remains the primary path for interactivity to migrate from the PC to the television. Toward this goal, BackWeb Technologies showed a client-server "push marketing" technology for an Internet channel, which has already been adopted by The Weather Channel. Norpak demonstrated its VBinet data broadcast system for Internet distribution. And Wavephore announced the WaveTop data broadcasting service, to be launched in 1997.

And for existing analog services, officers of Wink Communications were there to discuss its recent launch of graphical interactivity in Tokyo in cooperation with a coalition of TV set manufacturers, program producers and broadcast TV stations.

News Digital Systems (NDS) exhibited the MPEG 4:2:2 and encoder for professional broadcast with fully flexible bit rate and GOP structure, redundancy switching and mixed 4:2:0 and 4:2:2 operation. Also shown was the Reflex, a real-time statistical multiplex management system featuring efficient variable bit-rate management and automatic rescheduling.

In a nutshell, all the elements for end-to-end interactive TV operations, NTSC or HDTV are now on the market or else will become available later this year or early next year. The promise of interactive television on cable at last is being fulfilled.

FOR MORE information
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VIDEO TEST EQUIPMENT

By Bud Rigley

Bud Rigley is the director of sales and marketing for The Systems Group, Hoboken, NJ.

The FCC's announcement concerning DTV, combined with the already rapid pace of facilities converting to digital infrastructures, made anything that was digital hot at this year's show. Two of the primary facility requirements are digital test equipment and digital-ready cabling and connectors. What follows is a rundown of some of the new products offered at NAB 97 in these categories.

Trompeter Electronics introduced a BNC tester that checks for proper height of the center pin and performs an electrical test to detect opens and shorts. This battery-powered tester allows for checking of cable assemblies prior to installation, improving installation speed and quality. Other new Trompeter products include a full line of triax patch products and a line of twin-ax patch products for patching of 110 ohm twin conductor digital audio cable. Both product families include patch jacks, patch cords, connectors, looping plugs and accessories.

The recently introduced 800 series AES/EBU digital audio cables from Clark Wire

and Cable come in one-, two-, four-, eight- and 12-channel snakes that are color-coded to the resistor code for easy identification. The two-pair cable is ideal for bidirectional dubbing hookups between individual pieces of equipment, such as a DAT machine to a hard-disk recorder. The multipair cables can be used for digital duplication and digital production, while minimizing the number of cable runs between rooms and racks.

Sencore/AAVS's new PC-based SV953 MPEG-2 Stream Station provides the complete test solution for testing and analyzing MPEG-2 digital video broadcast signals. The SV953 gives the users

the capability to record, playout, monitor (in real-time) and perform a complete analysis of the recorded MPEG transport stream. The new DVA320QC digital video quality control analyzer is designed to provide a fully functional digital video analyzer and quality control tester in one comprehensive instrument. It tests component and composite serial digital video signals in 525- and 625-line formats.

Leitch showed its STA-7000, a serial digital timing analyzer designed to assist in the set up and maintenance of serial digital video signals. The STA-7000 is available in hand-held and rack-mount versions. (See "Pick Hits," p. 42.)

New products at Tektronix include the MTG200 MPEG test generator, MTD200 MPEG test decoder, DVT200 digital video transmitter and DDS200 digital demodulation system. Applications include design and development of network equipment and integrated circuits, IC sample testing, production testing for DVB decoders and operational monitoring for DVB. The products perform functions, such as creating, generating and analyzing MPEG transport streams, converting transport streams to digitally modulated RF signals, converting received signals to a transport stream and checking the RF performance of the transmitted signal. The new WFM601A provides accurate monitoring of serial component signal levels and timing. The new WFM 601 E provides transmission path analysis of digital signals.

At Philips TV Test Equipment, the company was showing the new PT 5210 VariTime digital sync generator that is designed to operate as a master or slave sync generator in digital, analog or mixed setups. The basic unit can be used for a small edit suite. Adding modules allows the unit to control large studios with several time planes and digital AES/EBU audio.

Telect introduced the VersaFrame 2000 modular frame that supports several new video and audio modules, including a color bar and tone generator, a 16x16 digital video routing switcher and a digital distribution amplifier, providing even more options for custom system configuration.

Videotek introduced the VTM-200 multiformat on-screen monitor that accepts two composite analog and two composite serial digital video inputs. The instrument displays real-time video in one quadrant, waveform in a second, vector in a third and four channels of audio and phase differences in the last quadrant. All of this is on an 800x600 SVGA display, including full-screen display of any quadrant, waveform zoom and line select. The TVM-821D serial digital waveform vector display measures 601 digital signals. This low-cost half-rack unit includes features, such as no menus, white phosphor, easy-to-read LED indicators for input EQ and gain, EDH, gamut and data errors. This unit also includes the unique feature of A/B input parade and overlay that can be used for system timing and camera matching.

New products at the Canare booth included the DVJ-W and DVJ-S digital video jacks and patchbays designed to pass signals to 1.4GHz and increase the overall transmission distance of digital video broadcast signals. Both employ aluminum clam-shell housings and high-grade, hermetically sealed, double reverse action microswitches mounted on a shielded printed circuit board. Two precision 75 ohm metal film resistors provide signal path termination and channel isolation.

Leader's new LV 5100D digital/analog component waveform monitor and vectorscope handles one component analog and two component digital sources for use with mixed systems. The unit has the features of an analog component WFM, while providing access to digital data, EDH flags, ANC data, etc. An X-Y display is provided for audio monitoring and a monochrome picture display is available for program and/or source ID purposes. The LT 425D digital component signal generator provides features, such as one parallel and four serial outputs, 12 key test patterns, plus two programmable test patterns for compression testing. Separate and embedded AES/EBU audio further enhance this unit's capabilities.

Snell & Wilcox introduced a range of MPEG test equipment that includes the MSA 100 MPEG elementary and transport analyzer that provides real-time analysis and compliance testing of MPEG transport streams. The MVA 100 video analyzer (see "Pick Hits" p. 42) for MPEG-2 encoding and decoding is designed to complement the MSA 110 unit. The MVA 100 can be used for extended MPEG-2 video analysis at picture, slice and macro block levels. The integral proprietary decoder is designed to support every encoding mode in MPEG-2 Main Profile at Main Level. A second video monitor can be connected for graphical analysis. The MSP 100 MPEG bitstream player supports 0 to 144Mb/s streams. It provides data and timing for compliance and production testing with a unique looping feature.

Marshall Electronics exhibited Mogami wire and cable, Superflex high-definition audio/video cable and patch cords and Tajimi Push-Pull BNC, a one-touch BNC connector.

Mohawk/CDT was showing its spectrum digital, audio and video cables. The company offers digital audio cables in one, two, four, eight and 12 pairs, along with coax, triax nd fiber-optic/copper composite cables. Also on display was the line of audio breakout boxes. ■

Check out the Pick Hits beginning on page 42.

OPERATIONS ALERT

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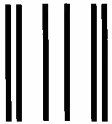

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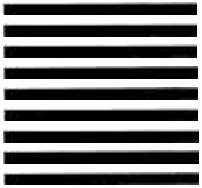

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- Stereo-audio monitoring with electronic graticule.
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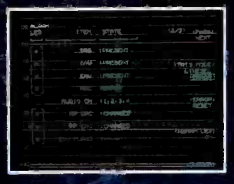
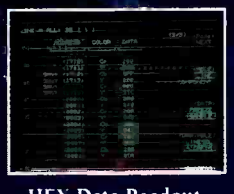


User Selected Alarms



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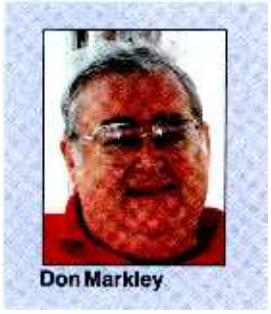
By Don Markley

Lightning protection: Remember the bird

Pilots who fly airplanes with retractable landing gear claim they fall into one of two categories. They either *have* landed with the gear up or *will* land with the gear up. Any broadcaster with an antenna can be said to fall into similar categories. They either have been hit by lightning or they certainly will be hit by lightning in the future — or both.



Don Markley

Protection

Lightning protection basically comes down to two areas. First, precautions can be taken to minimize the occurrence of lightning strikes. Note, the active word is *minimize*. Nothing out there will absolutely eliminate all lightning strikes. This leads to the second area — taking reasonable precautions to reduce as much as possible the damage from the lightning strikes. An enormous amount of energy is present when a strike occurs. To the greatest extent possible, that energy needs to be routed away from the station equipment and dissipated into the ground.

As an example of just how much energy is involved here, the photo at right shows the result of a lightning strike on a grounded tower. In this case, WMBI in Chicago was using a shunt feed wire on a tall tower. A large bird was sitting on the feed wire when lightning struck the tower. The voltage difference between the bird's feet along the wire was sufficient to cause the damage shown. The remainder of the bird was found about 40 feet away. Whenever you get the idea that you or your system is safe simply due to a ground, remember the bird.

Strike avoidance

Basically, lightning occurs after a build-up of static electricity on a structure. To avoid a strike, it is necessary to eliminate or prevent such a build-up. For insulated towers, a static drain is a necessity. For some AM towers, a standard static drain choke may have too much reactance. In such cases, a change to a Pi network for the ATU can be made resulting in a small inductor for an output branch, which will improve the grounding of the tower to reduce static build-ups.

For all towers, the device du-jour is a dissipation device mounted on the tower top. These devices claim to facilitate the dissipation of energy build-ups into the atmosphere, reducing the potential on the tower, which in turn, reduces the occurrence of lightning strikes. Several of these devices are available from different manufacturers who claim various efficiencies for their equipment. A recommendation of a specific unit would be outside the scope of this article — in fact, outside the scope of me. Instead, readers should contact the various manufacturers for further information on these products.

In all honesty, I initially looked upon these dissipative devices as being much akin to a forked stick for finding water. However, just as I have seen that work, experience certainly indicates that the dissipative devices will reduce the occurrence of lightning strikes, and they do seem to work.

Strike dissipation

The next problem is what to do with all that energy when lightning does strike. Remember, the dissipative devices, drains, etc., all serve to reduce the occurrence of strikes, but some will still occur (remember the bird). The late Jack Moffet, one of the real leaders in the consulting engineering field, used a system that he developed based on work appearing in the *IRE Proceedings* in the early 1960s. That work explained that much of the damage occurred around the base of the tower because of the inability of the grounding system to quickly dissipate the energy from the strike into the ground. To that regard, a simple ground rod simply doesn't make it.

Lightning strikes can be disastrous and fry more than just your equipment.

Moffet's system, subsequently used by me and others,

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was to place at least four ground rods at the base of the tower. These were bonded to the tower and to each other by either a strap or heavy wire (No. 2 or larger). Then, eight radials were installed, at least 50 feet long, of copper wire No. 6 or larger. These radials were buried out to where they terminated in an additional eight-foot rod at the end of each wire. The same configuration was installed at every guy point to handle the energy involved when lightning strikes the wires (which it does sometimes). Before the question is raised, let it be stated right now that this system does work well and — no — you shouldn't try to reduce it by removing the grounding on the guy points. I have seen the installation of this system change existing problem towers to docile structures where damage rarely occurs to the equipment.

The success of this grounding system is due to the fact that the energy is quickly routed away from the tower and dissipated into the ground. This reduces the voltage gradient (rate of change) along the surface of the ground. Simply stated, that means that the voltage between any two points along a line away from the structure is reduced. If the voltage is reduced between two points, the damage occurring to a structure spanning those two points is reduced. Remember the bird. (By the way, if it had been standing on one foot, it would probably have been all right.)

As a final word, use a dissipative device to reduce build-up. Then, install an extensive ground system to take the energy away from the tower. The combination of the two will reduce damage to equipment at the tower base significantly. Also, don't sit on the feed wire during storms. In fact, get far, far away from the tower during storms. ■

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

Preview

Coming in July . . .

Cover Story: New Transmitter Technology
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Special Report: MMDS/LMDS
Microwave multipoint distribution systems and local microwave distribution systems have proven highly popular in urban settings. This special report will bring you up-to-date on the business and technology side of MMDS.

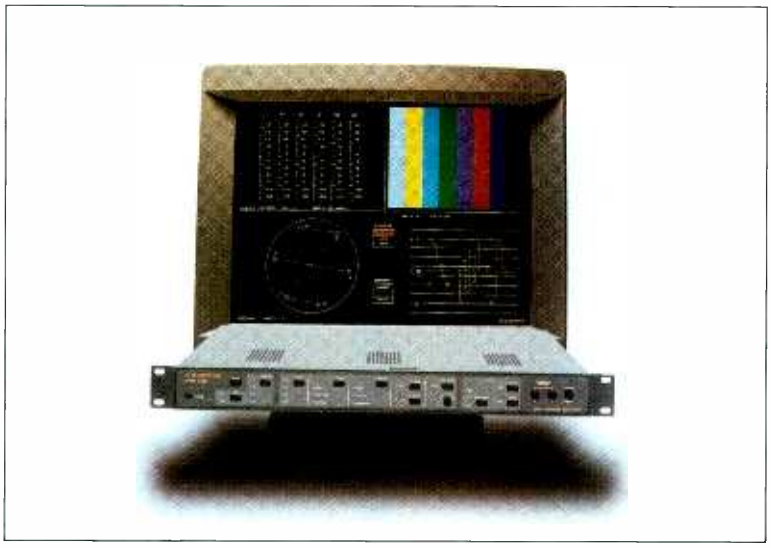
Is Your Tower Ready to go Digital?
Can your station's current tower handle the extra load of DTV operation or will you have to build a new one?

By Mark Everett

The Videotek VTM-200

NAB 1997 saw some interesting and revolutionary additions to traditional picture, waveform and vector monitoring. For Videotek, the revolution began when some design engineers visited a major TV network to discuss ideas for a new traditional-looking 601 combination waveform monitor and vectorscope. The planned scope was, and became, a traditional solution to a traditional problem, but only in terms of 601. (The TVM-821D was also introduced, but its debut was overshadowed by the VTM-200.)

The network engineers had no intentions of buying another traditional tube-based scope — ever! Well, you can imagine the looks on the faces of the designers from Videotek. The discussion moved rapidly onto what would fit their needs and answer their problems for test and measurement. There was already an existing and growing group of experience in the area of raster format displays, but these network engineers didn't like some of the basic characteristics of raster-type displays.



The Videotek VTM-200 SVGA-based multiformat on-screen monitor.

First, the necessary interlace of any 525 or 625 analog or digital video display doesn't allow for the traditional resolution of a tube solution. Furthermore, any existing raster display must always cover some or all of the target video display either by boxes, mixers or keys. There had to be a better solution.

Finally, the suggestion of an SVGA monitor came to the fore. A standard SVGA monitor is a low-cost display, it's readily available and it makes an adequate presentation. Everyone had seen some form of "video" on a computer screen, and all believed that it might be possible to display real-time, high-resolution video in only a portion of an SVGA screen. The ideas flowed quickly.

Presenting the monitor

The group defined four main sections of a proposed display screen. Active video would go in one corner, a waveform display in a second, a vector display in a third and audio in a fourth. Each area was fully described and all of the functionality was addressed.

"No more menus!" Every customer gave the design team the same directive. Operators cannot understand and use menu-driven equipment as well as they can button-per-function instruments. The challenge was clear — the operation and control had to be simple, clear and straightforward. Customers did allow the designers to consider some hidden setup functions, restricted to a one-time only use.

The video corner got an unexpected added feature. The new unit had to accept composite analog and component serial digital video inputs. The unit was to have two NTSC or PAL inputs and two 601 (525/60 or 625/50) inputs. This combination is required because one prevalent use for this instrument is in videotape playback, and analog and digital videotape formats will be around in the tape room for a long time.

The video display had to be real-time, and using the non-interlaced potential of an SVGA display would allow for a compressed picture, at a fast enough refresh rate, to look really good and complete. The standard 800x600 lines of display would allow for the video to be placed in a quarter of the screen with few lines of the video lost through decimation. A full-screen mode is also available to allow the operator to bring the video, or any quadrant, to full screen for a more discriminating view. It became obvious that this picture display would then have to switch to a more conventional 640x480 rate, at least for the video view. There was

some concern over how a non-interlaced 525 or 625 video source would look on a 640x480 display, still with some slight decimation. Subsequent tests showed that both video displays look great.

A second issue came up around the different phosphors of an SVGA monitor vs. a standard studio monitor. Most users agreed that even with a different color temperature of display, the intended use would overshadow the color variance. In addition, some users suggested there exist plenty of electronic means to correct the color temperature of the display if it becomes necessary.

A waveform display is needed in most video setup or monitoring situations. In this case, the waveform has to display NTSC, PAL and 601 waveforms. As a special case, 601 waveforms have to be viewable in Y, Cb, Cr or RGB or encoded. This display is located in the second quadrant. This portion of the screen presents some special issues to deal with, such as viewing resolution and operator uses.

More monitoring needs

The first big question was could a quarter of an 800x600 progressive scan display be suitable for checking levels and setting a VTR playback correctly based on color bars? The answer is based on the size of the SVGA monitor screen and the viewing distance for the operator. The designers solved this issue with another new viewing concept — zoom. Because the software has full control of the waveform display and the graticule, it makes sense to increase the view of waveform and graticule simultaneously. The zoom function centers on the zero unit marker and shows 20 units in both directions. A second zoom position centers on the 100-unit marker, again with a 20-unit area above and below. The result is a display that can support all of the normal waveform functions including various sweep rates, magnifications, line select and filters. The waveform view like any quadrant view, may be expanded to a full-screen view. All of the basics in a simple tool that gives the operator an easy means to do the job.

The third quadrant belongs to the vector display. Here, the challenges are different. The zoom feature could work here also, with a zoom to the center and to each quadrant of the vector display. The center zoom location includes the box graticules, which are usually at the nine o'clock position, on the circle edge, to measure differential gain and phase. The designers made some special considerations around graticule markings. Because some might want to encode the VGA display to NTSC, PAL or 601, we had to watch the amount of detail and line spacing in the graticules. In light of this, phase markers were not included on the composite vector circles, but the standard vector target boxes were included for approximation of phase and gain of any vector dot.

The last corner belongs to audio. The design team decided to let audio be an option because certain locations, like graphics, might not need audio and should not be burdened with the cost of the audio processing. It became clear that the team had to make provisions for four channels of audio to accompany each video input. We decided to include eight analog audio inputs and four AES/EBU pairs as inputs. The audio level scale could be customized to meet most customer requirements so four different scales are available. Five different reference levels and three different scaling ballistics are also available to customize the audio display to most standard requirements. The audio is displayed in pairs, and a third scale is located after each pair to indicate phase difference between the two inputs; so the audio display is two pairs and two phase-difference displays. Each set of audio pairs may be assigned to follow any given video input, and, of course, the audio may also be zoomed around the zero reference point for setting levels.

Buttons and knobs, that is how to control the VTM-200. Another user noted that because the primary output is SVGA, there should be a keyboard input for remote control. This idea allows for a simple keyboard, mouse and monitor switch to select the various computers and VTM-200s to a single monitor and control set.

A problem with developing a revolutionary approach to solving a common problem is that "feature creep" can explode.

A problem with developing a revolutionary approach to solving a common problem is that "feature creep" can explode. Since the project was started, many ideas have been added. The product now has an on-air tally, data error indications, SC/H phase indications and user ID. There are many more ideas, but they will have to wait for later versions. The biggest advantage to this approach is how the VTM-200 reduces monitoring costs. The SVGA monitor is significantly less expensive than a comparably sized composite or digital monitor. Progressive scanning makes the waveform, vector and audio display more readable than other existing raster display devices. The VTM-200 is a tool that gives the operator the option of viewing all four elements at once or any single member with a real-time, full-color, high-resolution and practical approach.

The progression, growth and maturation of the video industry demand new solutions to old problems. Solutions that are cost-effective and best address the specific problems to be resolved will move to the front. The fun of the video industry is finding the front and developing new tools to fit the needs and skills of those who will use them. ■

Mark Everett is vice president of product management for Videotek, Inc., Pottstown, PA.

new products

By Deanna Rood

Digital widescreen high-definition camcorder
Sony Electronics

• HDW-700: this digital widescreen high-definition camcorder is a full 2,000,000-pixel RGB camera that incorporates a ground-breaking 2/3-inch CCD design; designed as a robust field camera, it is versatile enough for most editing and post-production demands and features technology that reduces vertical smear artifacts from intense lights or sunshine; other features include a full-sampling CCD and a five-generation picture-quality ceiling; the HDW-700 also offers optical improvements and full aperture capture, and the CCD's design redresses the sensitivity loss that results from shrinking the format from the one-inch standard to two-thirds of an inch.

Sony Electronics, Sony Dr., Park Ridge, NJ 07656; 201-930-7834 or 800-SONY-022; fax 201-358-4058; www.sony.com
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MPEG-2 signal testing
Sencore

• SV953 MPEG-2 Stream Station: a PC-based test solution for testing and analyzing MPEG-2 digital video broadcast signals; it has the capability to record, playout, monitor (in real time) and perform a complete analysis of the recorded transport stream that contains multiple video, audio and datastream information; the unit is ideal for MPEG-2 product development, production and transmission analyzing and testing needs.

Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107; 605-339-0100 or 800-SENCORE; fax 605-339-0317
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New version of StillFile
Leitch

• StillFile 2: this version of StillFile features a graphical user interface that allows you to select how the information is displayed on-screen; StillFile 2 supports TCP/IP networking allowing the system to connect with SGI, Apple, Chyron and Windows-based computers; a new addition to the StillFile 2 family of products is the Gateway Object Server (GOS) that performs format translations, such as targa, tif and D-1 to D-2, and centralizes stills on a network; with GOS, you can build a play sequence, review it and send it to another StillFile for on-air use anytime; control of the StillFile 2 is achieved with a mouse, keyboard or remote- control panel, and it is backward compatible with all Leitch StillFiles, in addition to being upgradeable to motion in the future.

Leitch, 920 Corporate Ln., Chesapeake, VA 23320; 800-231-9673; fax 757-548-4088
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Oscilloscope
Tektronix

• TDS 700C & TDS 500C: a family of InstaVu digital storage oscilloscopes that provide design engineers with a comprehensive solution for connection, capturing and characterizing communication signals; the TDS 700C and the TDS 500C allow direct, reliable and easy connection to ensure accuracy and precision measurements; available in two- and four-channel models, the oscilloscopes offer up to a 4GS/s real-time sampling rate, a waveform capture rate of up to 400,000 acquisitions per second, up to an 8MB record length and a maximum 1GHz bandwidth.

Tektronix Measurement Group, P.O. Box 1520, Pittsfield, MA 01202; 800-426-2200 (press 3, code 1010); www.tek.com/Measurement
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12-bit digital cameras
Thomson Broadcast Systems

• 1657D: this 12-bit digital camera is available in several configurations, including camcorder, conventional PSC, Triax, Microcam or Sportcam; the cameras are available with the choice of an economical IT sensor in 4:3 format, with considerably reduced smear level, or a frame interline transfer sensor that is switchable 16:9-4:3, in a top-of-the-range configuration; all cameras in the 1657D family use the same digital image processing.

Thomson Broadcast Systems, 17 rue du Petit Albi, BP 8244 95801 Cergy St. Christophe France; +33 (1) 3420 7000; fax +33 (1) 3420 7047
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Space-saving display system
Barco

• VIVALDI II: a solution that transforms any multisync VGA monitor into a four-channel video display system; the 19-inch, rack-mountable unit accepts four analog or digital input signals, which are displayed simultaneously on a conventional multisync VGA monitor with no compromise in individual picture resolution.

Barco, 3240 Town Point Dr., Kennesaw, GA 30144; 770-218-3200; fax 770-218-3250
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Digital video recorders
Fast Forward Video

• Omega series: a range of stand-alone, multifunctional digital video decks that replaces the most commonly used broadcast tape decks; the series includes the Omega Deck single-channel digital video recorder, the Omega Double Deck dual-channel version featuring independent and simultaneous record and playback capability and the Omega RAID Deck dual-channel recorder with a built-in RAID (disk array) controller; all three versions deliver the advantages of smooth random access, nonlinear editing with the same industry-compatible controls for recording and playback.

Fast Forward Video, 18200 W. McDurmott, Irvine, CA 92714; 714-852-1226; fax 714-852-8404
Circle (260) on Free Info Card

4:4:4 color space converter
Sierra Design Labs

• Trans*coder*: a true 4:4:4 color space converter that is a fully bidirectional 4:2:2:4 to 4:4:4:4 up/down sampler in real time; the Trans*coder* works at internal 13-bit resolution providing a full 10-bit data path throughout; as a fully digital gateway to normal 4:2:2 YUV devices from a 4:4:4 source and from any 4:2:2 source to any 4:4:4 device, the Trans*coder* can also accept full range RGB images from Sierra's Quick*frame* DDR that have been downloaded from a workstation and output 4:4:4 or 4:2:2; color correction or keying of computer images can be done in real time and in their native color space.

Sierra Design Labs, 999 Tahoe Blvd., Incline Village, NV 89451; 702-831-7837; fax 702-831-5710
Circle (264) on Free Info Card

Extra-wide edit desks
Winsted Corporation

• Edit desks: several new edit desks are available from Winsted, such as a 110-inch-wide wrap-around desk with a light oak veneer or dove grey and black granite laminate; the extra-wide surface, combined with a spacious monitor riser, provides room for side-by-side operator-client editing; the desk comes with two lower 24½-inch base consoles that provide ample room for electronics.

Winsted, 10901 Hampshire Ave. South, Minneapolis, MN 55438-2385; 612-944-9050; fax 612-944-1546; www.winsted.com; racks@winsted.com
Circle (263) on Free Info Card

VDR
MountainGate

• CentraVision Fibre Channel video disk recorder: the CentraVision VDR represents a new concept that treats VDR control and storage independently, so you can configure systems with the amount of storage you need today, while permitting additional storage later on without the purchase of a new VDR; when more storage space is needed, you can add additional CentraVision disk arrays or you can re-allocate space on existing disk arrays in your CentraVision network.

MountainGate, 9393 Gateway Dr., Reno, NV 89511-8910; 702-851-9393; fax 702-851-5533
Circle (256) on Free Info Card

Logo store for animated logos
Leitch

• LogoMotion: this product range stores, replays and keys logos into program material allowing you to produce animation effects that would normally require an expensive high-end graphics system; this high-quality device called the <MGI-3701 has 10-bit technology and can have up to 72Mb of flash memory for storage of up to 99 static logos or 21 seconds of animation or a combination of both.

Leitch, 920 Corporate Ln., Chesapeake, VA 23320; 800-231-9673; fax 757-548-4088
Circle (252) on Free Info Card

Automation system
Sundance Digital Inc.

• TimeLiner: a low-cost, high-performance automation system designed for tasks where timed machine and router control are needed; the Windows-based system controls up to eight Sony protocol RS-422 machines, 16 GPIs and a router; the base system ships with a Pesa 16x2 router or it can be customized to work with an existing router; it provides clip-based control of Odetic's protocol digital disk recorders, such as the Tektronix Profile and the ASC VR-300.

Sundance Digital, 6309 N. O'Connor Ave., Ste. 217, Irving, TX 75039; 972-444-8442; fax 972-444-8450; Sales@SunDig.Com; www.SunDig.Com
Circle (259) on Free Info Card

Digital routers

Pro-Bel

• XD series routers: Pro-Bel has made analog video additions to its XD series of routing switchers that incorporate multistandard operation field-expansion capability; the XD series permits direct integration with all current Pro-Bel routing systems, providing a no-compromise upgrade path for existing users; the system control options offer scalable solutions involving conventional panels and PC control platforms.

Pro-Bel, 4480 N. Shallowford Rd. #102, Dunwoody, GA 30338-6410; 770-369-1971; fax 770-396-0595
Circle (268) on Free Info Card

Digital interface products

Tekniche

• Genesis product range: several additions have been made to the Genesis line, including the 6022 serial distribution amplifier that allows video and audio content of a 270Mb/s serial signal to be monitored in their analog form; the 6047/8/9 series of 4:1 audio compression products allows four AES signals to pass through a single AES channel, enabling up to eight AES channels to be supported by two existing AES infrastructure; another product, the 6059T dual stereo channel tracking audio delay operates as a resampling synchronizer for digital audio and is available with analog and digital interface options; another addition, the 6069 rack controller card, provides a serial communications port to the external world from a Tekniche Genesis rack.

Tekniche, 100 Stonehurst Court, Northvale, NJ 07647; 201-784-2288; fax 201-784-3860
Circle (265) on Free Info Card

The GALLERY

The GALLERY

The GALLERY

industry briefs

Business

Wheatstone will move all of its administrative and manufacturing facilities to a 51,000-square-foot office and manufacturing space in New Bern, NC. Wheatstone and Audioarts Engineering, a division of Wheatstone, have been located in Syracuse, NY, for the past 11 years.


Matt Miller

Three former employees of Tektronix/Grass Valley Products have formed Grass Valley Telecom, Inc. The new company, founders of which include Matt Miller, president and CEO; Steve Mariuz, vice president of engineering; and Dan Matthers, vice president sales and marketing, will focus on the development of high-performance broadband transmission systems for telecommunications networks, broadcasters and government agencies.

Wegener Corporation, Duluth, GA, received an order to manufacture fully addressable MPEG-2 digital video receivers for FOX Sports Net and FX Networks. The value of the order is in excess of $11.8 million, with deliveries scheduled to begin in fiscal 1998.

Hewlett-Packard, Santa Clara, CA, and Fluke Corporation, Everett, WA, signed a reciprocal distribution and marketing agreement enabling customers to purchase H-P's Basic Instruments from selected distributors of Fluke products. According to the agreement, H-P will sell and support several of Fluke's compact electronic test tools.

Canon USA, Lake Success, NY, is providing full engineering and technical support to broadcasters during the hand-over event, in which China will resume sovereignty of Hong Kong. Users of Canon broadcast products can contact Chinam Associates Ltd. at telephone: 852-2744-1186; fax: 852-2785-0852, to consult with Canon engineers during the event, which will take place in Hong Kong.

Leitch Technology Corporation, Chesapeake, VA, has formed a new subsidiary, Leitch Network Systems (LNS). LNS will market Leitch and Tekniche products to providers of video distribution services. The move will allow Leitch companies to maintain their focus on service to existing broadcast markets.

MountainGate, Reno, NV, and Sonic Solutions, Novato, CA, announced the cooperative development of a high-speed network for DVD premastering applications. By combining MountainGate's CentraVision Fibre Channel network and storage system with Sonic Solutions' DVD Creator production system, the two companies aim to improve the tools available for DVD production in the post-production community.

NBC Burbank's high-end graphics facility, NBC Magic, has added a fully specified Henry V8effects editing system from Quantel, Darien, CT. The new Henry will be used for the creation and composition of the network's on-air promotional look — including trailers, promos, movie openings and special affiliate projects.

Philips BTS, Simi Valley, CA, has announced the sale of five LDK 20PS camera systems, four SuperXpanders, a Diamond Digital 30 production switcher and a Venus routing switcher to SJC Video Corporation, Los Angeles. The equipment was purchased to outfit a new digital widescreen-ready mobile truck.

People

Ray Dolby, founder and chairman of Dolby Laboratories, Inc., San Francisco, was named as one of five 1997 recipients of the nation's highest technology honor, the National Medal of Technology.

Jean Proulx has been announced as senior vice president of engineering for Avid Technology, Tewksbury, MA.

Dr. George Waters has joined the board of Snell & Wilcox, Hampshire, U.K., as a non-executive director.

Karen Lukanovich has been appointed vice president, sales and marketing, at Miranda Technologies, Montreal, Canada.

Norman S. Stein was named director of government programs for Leitch, Chesapeake, VA.

Peter Starke has joined American Tower Systems, Boca Raton, FL, as director of broadcast tower development.

Joe Cirincione has been appointed director of U.S. sales by IMMAD Broadcast Services, Virginia Beach, VA. ■

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PHOTO - VIDEO - PRO AUDIO

NRG

QUICK DIAL 74

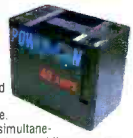
POWER VEST SYSTEM

The Power Vest combines the comfort and convenience of a photo-journalist style vest with the power of NRG's highest capacity power belt. Available in two styles, the **Field** model is designed for use in a field production environment, while the **Event** model is for shooting events where style is everything. The Field model is ruggedly constructed from black high density weatherized ballistic nylon and has an open-cut style that makes it comfortable to wear in a variety of climates. Also has a highly adjustable design to fit almost any physical proportion.

- Internal and external pockets for blank tapes and accessories, a clear insert window for a press pass or business card, D-rings for cables and microphones, and an integral padded camera rest on the right shoulder.
- Cleverly concealed inside the vest is your choice of 12-volt 86 watt hour or 13.2-volt 95 watt hour nicad cell packs.
- A control box on the front features dual power outputs (dual cigarette, dual XLR or mixed).
- 7-stage "fuel-guage", charge status indication and auto-reset short/overload protection.

The **Event** model is very similiar to the **Field** except in place of rugged fabric and pockets it features shoulder to sternum black satin tux fabric. Worn under a suit coat, the **Event** model is indistinguishable from a formal dress vest and it still retains interior and low exterior pockets. Both vests include 300-series charger (12 hrs.) and can be used with the optional Intelliquick Fast Charger (2 hrs.)

POWER CAN SERIES



For powering single or multiple pieces of 12v DC equipment for extended periods of time, nothing beats the power and convenience of NRG's Power-Can Series. It integrates an ultra-high capacity, high-discharge-capable UPS type lead acid power cell, a world-wide fast charger, and computer-controlled monitoring system with display—in a single, rugged package. Connect up to four pieces of equipment simultaneously. From a midnight emergency scene to a wedding reception in the park, the Power-Can delivers ample power for extended running time.

- Recharge in 8-10 hours by simply plugging the Power-Can into any source of AC power (90-250v AC)
- LCD display shows discharge/charge status, voltage etc.
- An optional "Power Dolly" allows the Power-Can to be rolled for easy transport.
- Available in 18, 28 and 40 amp versions, each Power-Can has either four cigarette lighter connectors, four 4-pin XLR connec-

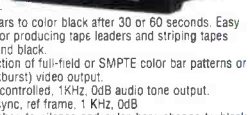
HORITA

BSG-50
Blackburst/Sync/Tone Generator

The BSG-50 provides an economical means for generating the most common RS-170A video timing signals used to operate various video switchers, effects generators, TBCs, VCRs, cameras and video edit controllers.

- 6 BNC video/pulse outputs
- Now available: 6 blackburst, 4 sync, 2 subcarrier
- Each sync output individually settable for composite sync, composite blanking, H-drive, or V-drive.
- Separate buffer for each output-maximum signal isolation
- 1KHz, 0dB sinewave audio tone output, locked to video
- Outputs can easily be configured to meet specific user and equipment needs **$269**

CSG-50
Color Bar/Sync/ Tone Generator



- Generates full/SMPTE color bars, blackburst and composite sync signals.
- Built-in timer can automatically switch video output from color bars to color black after 30 or 60 seconds. Easy and convenient for producing tape leaders and striping tapes with color bars and black.
- Front panel selection of full-field or SMPTE color bar patterns or color/black (blackburst) video output.
- Includes crystal-controlled, 1KHz, 0dB audio tone output.
- Outputs: video, sync, ref frame, 1 KHz, 0dB
- Audio tone switches to silence and color bars change to black when using 30/60 second timer
- Fully RS-170A SC/H phased and always correct. No adjustment required **$349**

WE STOCK THE FULL LINE OF HORITA PRODUCTS INCLUDING:

WG-50 -	**Window Dub Inserter**
TG-50 -	**Generator/Inserter**
TRG-50 -	**Generator/Inserter/Search Speed Reader**
TRG-50PC -	**Has all of the above plus RS-232 control.**
VG-50 -	**VITC Generator, LTC-VITC Translator**
VLT-50 -	**VITC-To-LTC Translator**
VLT-50PC -	**VITC-To-LTC Translator / RS-232 Control**
RLT-50 -	**Hi8 (EVO-9800/9850)TC to LTC Translator**
TSG-50 -	**NTSC Test Signal Generator**
SCT-50 -	**Serial Control Titler "Industrial" CG, Time-Date Stamp, Time Code Captioning**
SAG-50 -	**Safe Area, Convergence Pattern and Oscilloscope Line Trigger and Generator**

Canon

QUICK DIAL 74

IF+ Series 1/2-inch and 2/3-inch Zoom Lenses

Canon's IF+ family of lenses are engineered to meet the needs of the next generation of broadcasting while meeting the standards of today. Besides having the widest wide angle lens available, the IF+ lens series have wider angles at shorter M.O.D. (Minimum Object Distance), provide higher MTF performance and incorporate Hi-UD glass for reduced chromatic aberration. In addition to superb optics they're all designed with Canon's "Ergonomic Grip" for fatigue-free shooting over an extended time. IF+ lenses are your assurance of unsurpassed quality and performance for today and tomorrow.

J15ax8B

A next generation internal focusing lens with the shortest MOD and widest angle of any standard lens, the J15aX8B IRS/IAS is a standard ENG lens that lets you shoot in tight or restricted areas at the closest mimimum object distance ever possible and capture more of the subject. It incorporates all the great features of IF+lenses including a built-In 2X extender, high MTF performance, Hi-UD glass, square lens hood and Canon's "Ergonomic Grip".

J20ax8B IRS/IAS

Excellent for ENG, sports and production, the J20aX8B IRS/IAS lets you squeeze in shots from 8mm and still take you all the way out to 320mm with its built-in extender. Incorporates all IF+ features, plus is the only lens (besides the J9aX5.2B IRS/IAS) with aVari-Polar lens hood, enabling rotation of attached filters.

anton bauer

Logic Series DIGITAL Gold Mount Batteries

The Logic Series DIGITAL batteries are acknowledged to be the most advanced in the rechargeable battery industry. In addition to the comprehensive sensors integral to all Logic Series batteries, each DIGITAL battery has a built-in microprocessor that communicates directly with Anton/Bauer InterActive chargers, creating significant new benchmarks for reliability, performance, and life. They also complete the communications network between battery, charger and camera. With the network in place, DIGITAL batteries deliver the feature most requested by cameramen: a reliable and accurate indication of remaining battery power.

DIGITAL PRO PACS

The Digital Pro Pac is the ultimate professional video battery and is recommended for all applications. The premium heavy duty Digital Pro Pac cell is designed to del ver long life and high performance even under high current loads and adverse conditions. The size and weight of the Digital Pro Pac creates perfect shoulder balance with all cameras/camcorders.

- **DIGITAL PRO PAC 14 LOGIC SERIES NICAD BATTERY**
  14.4v 60 Watt Hours. 5 1/8 lbs. Run time: 2 hours @ 27 watts, 3 hrs. @ 18 watts
- **DIGITAL PRO PAC 13 LOGIC SERIES NICAD BATTERY**
  13.2v 55 Watt Hours. 4 3/4 lbs. Run time: 2 hours @ 25 watts, 3 hours @ 17 watts

GOLD MOUNT BATTERIES

Logic Series Gold Mount batteries are identical to the respective DIGITAL versions with respect to size, weight, capacity, IMPAC case construction, and application. They are similarly equipped with micro-code logic circuits and comprehensive ACS sensors. They do not include DIGITAL microprocessor features such as the integral diagnostic program "Fuel Computer", LCD/LED display and InterActive viewfinder fuel gauge circuit.

- **PRO PAC 14 NICAD BATTERY** (14.4v 60 Watt Hours)
- **PRO PAC 13 NICAD BATTERY** (13.2 v 55 Watt Hours)
- **TRIMPAC 14 NICAD BATTERY** (14.4v 40 Watt Hours)
- **TRIMPAC 13 NICAD BATTERY** (13.2 v 36 Watt Hours)
- **COMPAC 14 NICAD BATTERY** (14.4v 40 Watt Hours)
- **COMPAC 13 NICAD BATTERY** (13.2v 36 Watt Hours)

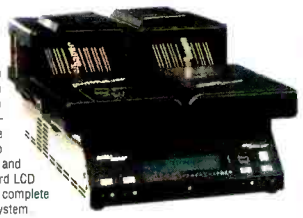
InterActive 2000 Power/Chargers

A new generation of portable power systems, the InterActive 2000 Power/Charger series was designed from the ground up to offer unprecedented flexibility and economic expansion capabilities. Fully compatible with all current and future Gold Mount batteries, the InterActive 2000 Power/Chargers deliver all the advancements and proven reliability of interactive charging plus the ability to power a camera from AC mains. They also offer a unique, totally modular design that allows economical expansion to meet future needs. Starting with a base model, upgrades can be easily added at any time. With an unparalled combination of value and features, the InterActive 2000 Power/Charger system redefines the standard of power for video applications.

Standard Features on all InterActive 2000 Power/Chargers

- Two or four position models each with the full complement of InterActive technologies (see previous page) including: Automatic balance and rejuvenation, Lifesaver Maintenance, Cold battery safety and Power Loss Memory modes.
- They have a slim, lightweight design for easy portability. The 2702 and 2401 Quad Power/Chargers fit easily in a notebook computer carrying case and the 2701 and 2401 Dual Power/Chargers weigh just 2.3 pounds. Plus, they include power supplies, so you can leave your AC supply behind!
- Built in regulated DC power supply output powers cameras from AC mains worldwide. Wide range (90-260 volts AC, 50/60 Hz) input automatically adapts to any worldwide source.
- Standard serial output for printer and PC interface.
- Two power choices for optimized performance and economy.
- LCD automatically displays critical battery and charger data.
- Expanded communications with Digital Batteries and new charging protocols improve charge times and performance.
- Modular design allows addition or upgrades after purchase:
  – A charge position expansion port allows the addition of expansion charge modules to increase charge capability to four, six or eight batteries, including NP and BP-90 types.
  – Optional Diagnostic/discharge module featuring automatic calibration of digital batteries is available for each model. (standard on Quad 2702)
  – Power supply upgrade allows 40 Watt (2400 series) to be upgraded to 70 Watt (2700 series) capability.

QUAD 2702/2401
Four-Position Power/Chargers



The 2401 and 2702 are the lightest (and slimmest) full featured four position chargers ever available. Designed for the rigors of professional use, they can fast charge four Gold Mount batteries and can be expanded to charge up to eight. They also power any camera/camcorders from any AC main: all in a package the size of a notebook computer and weighing a mere 4 lbs (1.8 kg.)! The 40 watt (upgradeable to 70 watts) 2401 will charge ProPac batteries in two hours and TrimPac batteries in one hour. Add the Diagnostic/Discharge module and the QUAD 2401 becomes an all purpose power and test system with its standard LCD providing instant access to battery status. The 70 watt QUAD 2702 bundles the complete package of all the Power/Charger features in the ultimate professional power system.

Dual 2702/2401
Two-Position Power/Chargers

The DUAL 2701 (70 watt) and 2401 (40 watt) are sleek, rugged and economical two position Power/Chargers that have all the features of Anton/Bauer InterActive 2000 technology including DC camera output and an LCD display that shows the status of each battery as well as the internal battery data communicated from Digital Batteries. The high performance DUAL 2701 will charge any Gold Mount battery in one hour, the DUAL 2401 charges ProPac batteries in two hours and Trimpacs in one. Their compact, lightweight package design makes them the ultimate travel Power/Chargers. They can also be upgraded with the Diagnostic/Discharge Module and/or with the Expansion Charge Modules to charge up to six batteries of any type.

PROFESSIONAL VIDEO TAPE

QUICK DIAL 71

FUJI

Professional Grade VHS

PG-30	2.29	PG-60	2.49	PG-120	2.69

Superior Grade Double Coated VHS

SG-30	3.39	SG-60	3.99	SG-120	4.49

H471S S-VHS Double Coated

ST-30	6.99	ST-60	7.49	ST-120	7.99

M221 Hi 8 Double Coated

Metal Particles		Metal Evaporated	
P630HMP	4.99	E630HME	8.39
P660HMP	6.49	E660HME	10.49
P6120HMP	8.49	E6120HME	13.99

M321SP Metal Betacam (Box)

05S	17.95	10S	18.49
20S	19.95	30S	22.95
60L	31.95	90L	49.95

DVCPRO

12M (Medium)	7.59	23M	9.19
33M	11.99	63M	20.49
64L (Large)	21.59	94L	32.49
123L			42.19

maxell

P/I PLUS Expitaxial VHS

T-30 Plus	1.69	T-60 Plus	1.99	T-90 Plus	2.09
T-120 Plus		2.19	T-160 Plus		2.69

HGX-PLUS Expitaxial VHS (Box)

HGXT-60 Plus	2.69	HGXT-120 Plus	2.99
HGXT-160 Plus			3.99

BQ Broadcast Quality Expitaxial VHS (Box)

T-30 BQ	5.49	T-60 BQ	6.19	T-120 BQ	7.39

BQ Certified Professional S-VHS (In Box)

ST-31 BQ	7.19	ST-62 BQ	8.09
ST-126 BQ	8.39	ST-182 BQ	14.99

Betacam SP

B5MSP	15.75	B10MSP	17.75	B20MSP	19.75
B30MSP	20.50	B60MLSP	29.75	B90MLSP	46.49

Panasonic

Mini DV Tape

AY DVM-30	9.95	AY DVM-60	11.99

DVCPRO

AJ-P12M (Medium)	10.99	AJ-P23M	12.99
AJ-P33M	15.99	AJ-P63M	29.99
AJ-P64L (Large)	29.99	AJ-P94L	49.95
AJ-P123L			64.95

SONY

HI-8 Professional Metal Video Cassettes

P6-30 HMPX	4.59	P6-30 HMEX	7.99
P6-60 HMPX	6.59	P6-60 HMEX	11.49
P6-120HMPX	8.89	P6-120HMEX	15.49

HI-8 Metal Evaporated Editor (HMEAD)

E6-30 HMEAD	10.49	E6-60 HMEAD	14.89
E6-120 HMEAD			20.19

PR Series Professional Grade VHS

T-30PR	2.39	T-60PR	2.59	T-120PR	2.79

PM Series Premier Grade Professional VHS

T-30PM	3.49	T-60PM	3.99	T-120PM	4.79

BA Series Premier HI-Grade Broadcast VHS (In Box)

T-30BA	3.59	T-60BA	3.99	T-120BA	4.79

MQ Master Quality S-VHS (In Box)

MQST-60	7.49	MQST-120	8.39

BRS 3/4" U-matic Broadcast Standard (In Box)

KCS-10 BRS (mini)	8.29	KCS-20 BRS (mini)	8.99
KCA-10 BRS	8.19	KCA-20 BRS	8.69
KCA-30 BRS	9.69	KCA-60 BRS	13.39

XBR 3/4" U-matic Broadcast Master (In Box)

KCS-10 XBR (mini)	8.79	KCS-20 XBR (mini)	10.19
KCA-10 XBR	9.29	KCA-20 XBR	10.69
KCA-30 XBR	11.99	KCA-60 XBR	15.69

KSP 3/4" U-matic SP Broadcast (In Box)

KSP-S10 (mini)	9.59	KSP-S20 (mini)	11.09
KSP-10	10.09	KSP-20	11.59
KSP-30	12.99	KSP-60	16.99

BCT Metal Betacam SP Broadcast Master (Box)

BCT-5M (small)	14.99	BCT-10M (small)	15.99
BCT-20M (small)	17.99	BCT-30M (small)	18.99
BCT-30ML	21.49	BCT-60ML	27.99
BCT-90ML			41.99

BCT Metal Professional Series

UVW-30MLA	18.95	UVW-60MLA	25.50
UVW-90MLA			39.95

Mini DV Tape

DVM-30ME	15.99	DVM-60ME	19.95

PVD Series Professional DVCAM Tape

PDVM-12ME (Mini)	24.50	PDVM-22ME (Mini)	26.95
PDVM-32ME (Mini)	29.50	PDVM-40ME (Mini)	31.95
PDV-64ME (Standard)	39.95	PDV-94ME (Standard)	44.95
PDV-124ME (Standard)	49.95	PDV-184ME (Standard)	59.95

ALL ORDERS SHIPPED WITHIN 24 HOURS

QUICK DIAL 72

nova SYSTEMS, INC.

StudioFrame Modular Video Processing System

The Nova StudioFrame Series is a modular, flexible, digital/analog signal processing system. It is designed to efficiently and effectively combine a wide variety of individual function (or processor) boards such as A-D and D-A converters, video signal encoders and decoders, audio and video distribution amplifiers and frame synchronizers into more complex function groups, all in one equipment mainframe. The scalable nature of the StudioFrame design allows it to be easily reconfigured and/or upgraded as today's video standards and requirements continue to evolve. The system is based on two rackmount frame models (the SF-3 and SF-1) allowing up to thirteen front loading processor boards and thirteen rear mounted passive interface cards to be accommodated in a single chassis. Both the StudioFrame SF-1 and SF-3 chassis are designed to meet the most stringent broadcast requirements. The SF-3 is a thirteen slot, 3RU chassis while the SF-1 is a 4 slot, 1RU chassis. All studio cards as well as the two chassis are backed by a two year warranty on parts and labor with guaranteed 24-hour turnaround service. The units are ruggedly constructed to endure studio rackmount, production van and DB (Outside Broadcast) mobile applications. A universal power supply operates at either 110 or 240 VAC, 50/60 cycle. DC operation is optionally available as is a redundant supply with automatic switchover. Dual exhaust fans maintain proper airflow and cooling. "Hot swappable" front card loading allows power-on removal/insertion of individual processing modules without disturbing others in the system. All cabling can remain in place while you service" any module. An intelligent "centerplane" provides power, sync, timing and data distribution, facilitating expansion to more complex, more cost-effective signal processing functions.

NovaASD/NovaSDA

Analog to Serial Digital & Serial Digital to Analog Converters

Components of the Nova StudioFrame series, the NovaASD and the NovaSDA incorporate the latest digital video processing techniques for high speed A-D and D-A signal conversion. They are designed to meet the most stringent broadcast requirements and their "hot swappable" front card loading facilitates servicing without disturbing other cards in the system. The NovaASD is ideal for for interfacing analog signals with digital video formats and the NovaSDA for interfacing serial digital signals with existing analog video systems as well as for signal monitoring applications.

SDA-1 Serial Digital Component to Analog Component Converter
- SMPTE 259M 4:2:2: Serial Digital Component (D1) input.
- Equalized and reclocked serial digital component output
- Analog component video (Y, R-Y, B-Y/YUV), RGB or RGB/S outputs
- 10-bit D/A converters
- Output level control
- NTSC and PAL compatible

SDA-2 Serial Digital Component to Composite and S-Video Converter
- SMPTE 259M 4:2:2: Serial Digital Component (D1) input.
- Equalized and reclocked serial digital component output
- Dual composite & dual S-Video outputs
- Color bar output selectable
- 10-bit D/A converters
- Output level control
- NTSC and PAL compatible

SDA-3 Serial Digital Composite to Analog Video Converter
- SMPTE 259M Serial Digital Composite (D2,D3) input.
- Equalized and reclocked serial digital composite output
- Four analog composite video outputs
- Color bar output selectable • 10-bit D/A converters

ASD-1 Analog Component to Serial Digital Component Converter
- Analog component video (Y, R-Y, B-Y/YUV), RGB or RGB/S input
- Dual SMPTE 259M 4:2:2 Serial Digital Component (D1) outputs
- 10-bit D/A converters
- Picture positioning control
- NTSC and PAL compatible

ASD-2 Analog Composite and S-Video to Serial Digital Component Converter
- Analog composite and S-Video input
- Dual SMPTE 259M 4:2:2 Serial Digital Component (D1) outputs
- 10-bit D/A converters
- NTSC and PAL compatible

ASD-3 Analog Composite to Serial Digital Composite Converter
- Analog composite video input
- Dual SMPTE 259M 4:2:2 Serial Digital Composite (D2/D3) outputs
- 10-bit D/A converters
- Input gain adjustment

NovaMNR Median Noise Reducer

The NovaMNR is a StudioFrame card that eliminates impulse and transmission noise, cleans up satellite, microwave and fiber feeds and fills in CODEC and time-based corrected videotape drop-outs. It features full bandwidth, uncompressed 10-bit digital processing for ultimate video transparency as well as analog composite inputs and outputs.

- Eliminates "sparklies", those black and white dots that sometimes appear on remote video feeds. The NovaMNR incorporates a proprietary adaptive three-dimensional median filter that analyzes pixels from several fields of video and replaces the impulse noise with uncontaminated, clean video
- Universal drop-out compensation replaces missing video information, whether it is from a time-base-corrected VCR source or the decoded output of a CODEC feed. The NovaMNR effectively fills in drop-outs with replacement video from the surrounding pixels and previous video field.
- Control's are accessible locally or remotely. A three position threshold switch (off/low/high) adjusts system noise sensitivity while a bypass/operate switch is also included. Both switches are remoteable via RS-11 jack.
- Also available in PAL and PAL-M versions

NC-8 RGB/Component to Composite/S-Video Encoder

The NC-8 processor module is a 10-bit digital encoder that converts analog RGB or component video input sources into Y/C and composite video. Designed to facilitate multi-format interface requirements, the module incorporates the latest digital video processing techniques along with luminance and chrominance pre-comb filtering to assure the highest quality encoding. A frame of memory is utilized to provide an effective zero insertion delay.

- 10-bit processing, 8-bit D/A conversion
- Zero insertion delay, frame of memory
- Two composite and one S-video output.
- Analog RGB (Sync on Green or all three), RGB/Sync and YUV (Betacam) inputs. Also available with looping inputs.
- Variable luminance notch filter
- Y and C pre-comb filtering for maximum encoding performance
- Remote serial control
- Output level control
- Color bar output selectable
- Designed to meet the most stringent broadcast requirements.
- "Hot swappable" front card loading facilitates servicing without disturbing other cards.
- Available in PAL and PAL-M versions

NovaRouter Intelligent Matrix Routers

NovaRouter is a series of serially controlled audio and video matrix routing switchers. These intelligent routers are available in 8x8, 16x16 and 32x32 matrices. They are capable of up to five switching levels to support unlimited combinations of Stereo Audio, Composite Video, Y/C Video, Component Video (Beta or MII), RGB/S and VGA Graphics. Audio follow video or breakaway routing is controlled by very intuitive computer software or optional XY control panels.

The computer software and VGA display provides quick visualization of all crosspoints and facilitates routing operations. An unlimited number of switching configurations may be stored and recalled at the click of a mouse. User defined labels for all sources and destinations provide positive identification of the matrix status. One computer can control several NovaRouter Systems for multiple studio or large presentation system applications.

The optional, easy to use, XY control panels provide routing functions for basic systems without the use of a computer interface. All video, audio and audio follow video switching functions are controlled by source select and destination select switches. Changing and verifying the matrix configuration is simple and clear. The XY controls may be front panel mounted or are available as a remote control unit.

Broadcast quality audio and video processing and microprocessor control ensure superior quality and performance. Yet, the simplicity and modular configurations of NovaRouters™ make them economical for broadcast, production, cable TV, graphics, presentation, teleconference and educational applications.

- 8x8, 16x16 and 32x32 switching matrices
- Stereo audio, composite video, Y/C, component video, RGB/S and VGA
- Up to five (5) levels of switching
- Audio follow video and audio break-away
- Serial control via intuitive computer software or optional XY control units
- Computer VGA monitor display provides quick visualization of all crosspoints
- Easy single "click" mouse switching control
- User labeling of sources and destinations
- Store system configurations in memories
- Multiple locations can be controlled from one computer
- Push-button XY control options, front panel mount or remote control units
- Audio and video modules provide easy system upgrade

VIDEONICS

Animated Postscript Character and Graphics Generator

POWER Script™

DIAL 74

The most advanced character generator ever designed for video production, multimedia and industrial applications, PowerScript delivers the huge range of titles and graphics supported by PostScript display technology, plus animation, effects, transparency and color keying. It features two GPI inputs, anti-aliased, 17.5 ns (nanosecond) pixel resolution and 4:2:2 broadcast-quality video. It also offers high-speed RISC processing to provide real-time Level 2 PostScript imaging and fast rendering—even with the most complex images. The PowerScript works stand-alone or with a computer, has a built-in TBC, offers a powerful and intuitive interface, and is suitable for the desktop or can be rackmounted.

Powerful Character Generator
- Choose from 35 built-in fonts or download PostScript fonts from your PC. PowerScript's high-speed RISC processor provides real-time PostScript imaging.
- Characters can be rotated at any angle, scaled to any size, stretched horizontally or vertically.
- Styles include variable bold and italic, underline and shadow (drop shadow, variable displacement and opacity). Each character can be adjusted separately.
- Text can be positioned anywhere on the screen or automatically centered, vertically or horizontally. Left, right, top, bottom and center justification is also provided.
- Characters are automatically kerned, using the font's standard kerning information. Spacing is highly flexible with variable word and letter spacing and line spacing (leading).

Intuitive User Interface
- Built-in real-time object-based drawing tool and text editor—no computer or software required. Design can be done ahead of time and displayed later, or can be done on the fly.
- Supplied keyboard and mouse are used with easy on-screen menus to place and modify graphics and text.
- Change fonts, colors, and other characters instantly.

Transparency and Colors
- Characters can be made transparent (0-100%) over video, other characters and graphics with 64 levels of transparency.
- Opaque characters can use over 4,000,000 colors , transparent characters can use over 8,000.
- Different colors can be used for fill and outline (variable width) as well as each letter and each graphic.

Roll, Scrawl, Animation, Effects
- Variable speed roll, crawl and push (slide) in all directions.
- Every text object, graphic and logo can be animated. Complex animations include having elements follow paths, bounce, etc.
- Elements can change outline and/or fill color, transparency, position as they move and results are displayed in real time.
- Move individual characters in different directions, make colors change; flash words; make letters and words bounce; spin a letter across the screen. Use fades and wipes to transition between titles and video or between two pages of titles.

Backgrounds and Graphics
- Titles can be placed on solid color, patterned or graduated backgrounds, or they can be genlocked to incoming video.
- Lines, squares, rectangles, ovals and circles can be created and placed anywhere on the screen. Each graphic object can use a different color, transparency, rotation, size, fill and outline.

Imported Logos and Graphics
- Accepts most PostScript or PCX format graphics without modification. Imported images can be any size and can be scaled, skewed, and rotated when placed on screen. Transparency and anti-aliasing can be defined when graphic is generated.

Expansion Capabilities

Although PowerScript operates on its own, you can still add peripherals and connect to a computer or network. Two PC-card slots allow the addition of non-volatile flash-RAM and Ethernet cards. RS-232 port allows connection to desktop computers for added storage and downloading of fonts or graphics from a PC.

QUICK DIAL 72

LEADER

Manufacturing test and measurement equipment for over 40 years. Leader Instruments is the standard which others are measured against for reliability, performance, and most important—cost effectiveness. Before a product is brought to market, an exceptional degree of energy and effort go into its design. Prototypes are built and tested to withstand environmental and other factors far exceeding actual operating conditions. These include high humidity, extremes of heat, cold, shock and vibration. Manufacturing quality is built in every step of the way and only the finest parts are used. At each production run, subassemblies are separately tested before they are integrated into the finished product, then each product is tested again. This is why less than half of 1% of all Leader products are ever returned for warranty repair or adjustment.

5860C WAVEFORM MONITOR

A two-input waveform monitor, the 5860C features 1H, 1V, 2H, 2V, 1 s/div and 2V mag time bases as well as vertical amplifier response choices of flat, IRE (low pass), chroma and DIF-STEP. The latter facilitates easy checks of luminance linearity using the staircase signal. A PIX MON output jack feeds observed (A or B) signals to a picture monitor, and the unit accepts an external sync reference. Built-in calibrator and on-off control of the DC restorer is also provided.

5850C VECTORSCOPE

The ideal companion for the 5860C Waveform Monitor, the 5850C adds simultaneous side-by-side waveform and vector monitoring. Featured is an electronically-generated vector scale that precludes the need for fussy centering adjustments and eases phase adjustments from relatively long viewing distances. Provision is made for selecting the phase reference from either A or B inputs or a separate external timing reference.

5100 4-Channel Component / Composite WAVEFORM

The 5100 handles three channels of component signals, plus a fourth channel for composite signals, in mixed component / composite facilities. Features are overlaid and parade waveform displays, component vector displays, and automatic bow-tie or "shark fin" displays for timing checks. Menu-driven options select format (525/60, 625/50, and 1125/60 HDTV), full line-select, vector calibration, preset front-panel setups and more. On-screen readout of scan rates, line-select, preset numbers, trigger source, cursor time and volts.

5870 Waveform/Vectorscope w/SCH and Line Select

A two-channel Waveform/Vector monitor, the microprocessor-run 5870 permits overlaid waveform and vector displays, as well as overlaid A and B inputs for precision amplitude and timing/phase matching. Use of decoded R-Y allows relatively high-resolution DG and DP measurements. The 5870 adds a precision SCH measurement with on-screen numerical readout of error with an analog display of SCH error over field and line times. Full-raster line select is also featured with on-screen readout of selected lines, a strobe on the PIX MON output signal to highlight the selected line, and presets for up to nine lines for routine checks.

5872A Combination Waveform/Vectorscope

Models 5872A offers all the operating advantages of the 5870, except for the following: SCH is deleted from the 5872A (line select retained), making it ideal for satellite work.

5864A Waveform Monitor

A two-input waveform monitor that offers full monitoring facilities for cameras, VCRs and video transmission links. The 5864A offers front panel selection of A or B inputs, the choice of 2H or 2V display with sweep magnification, and flat frequency response or the insertion of an IRE filter. In addition, a switchable gain boost of X4 magnifies setup to 30 IRE units, and a dashed graticule line at 30 units on screen facilitates easy setting of master pedestal. Intensity and focus are fixed and automatic for optimum display. Supplied with an instruction manual and DC power cable.

5854 Vectorscope

A dual channel compact vectorscope, the 5854 provides precision checkout of camera encoders and camera balance, as well as the means for precise genlock adjustments for two or more video sources. Front panel controls choose between A and B inputs for display and between A and B for decoder reference. Gain is fixed or variable, with front panel controls for gain and phase adjustments. A gain boost of 5X facilitates precise camera balance adjustments in the field. Supplied with a DC power cable.

Designed for EFP and ENG (electronic field production and electronic news gathering) operations, they feature compact size, light weight and 12 V DC power operation. Thus full monitoring facilities can be carried into the field and powered from NP-1 batteries, battery belts and vehicle power. Careful thought has been given to the reduction of operating controls to facilitate the maximum in monitoring options with the operating simplicity demanded in field work.

professional services

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FOR SALE

WANTED: VARIAN/EEV KLYSTRON used or rebuildable dud. Models: 4KM100LA-H, 4KM150LA-H, or K3230. Contact Rick Owens or Terry Day at 219-679-9758.

Circle (101) on Free Info Card

classified

FOR SALE

PRODUCTION TRUCK FOR SALE Univision Network, the predominant Spanish Television Network is selling its Production truck. This 35 ft. Ford Production truck is geared with a Grass Valley 1680 switcher, 2 VPR-6 1 inch machines, a Utah Scientific router, 4 Ikegami HK357 cameras with long lenses, 2 Soundcraft audio boards, Audio Compressors, Reverb Unit, Chyron 4200 character generator, 2 Leitch sync-test generators w/automatic change over, etc. The appraised value is $125,000. For more details and making your best offer please contact Jose Boveda, Director of Engineering 305-471-8384.

BATTERY TOWN USA Energy Plus+, Inc. http://www.mindspring.com/~battery battery@mindspring.com. 770-975-8052 ext. 6210; fax 975-8915 Cell Choices & Specifications; Best Value. BP-90's, NP1SB's, Belts, Film Packs, Chargers. Inserts & Rebuilds for Sealed Bricks, Bricks, Belts, Film, Notebooks. Rejuvenation contracts. Internet Access Special Promotion!

BVW400 CAMCORDERS (2 COMPLETE PACKAGES): Rebuilt, modified for clearscan. Less than 500 hrs. Complete with Fujinon 14X lens, perfect CCD blocks, portabrace case, air shipment case, remote zoom, new fluid head tripod with heavy duty legs and 100MM bowl, (8) NP1A batteries, DC520 dual NP batt mod, BKW401 26 pin out, RMP3 Paintbox, BC1Wb Charger, CMA8 Supply. $28,000.00 each. Contact Dale @Videofilm Systems, (203) 866-7319.

BVW35 RECORDER: Rebuilt. Like new. (4) PP90 Batts, AC Supply. (2) BP2C Overnight Dual Chargers, Portabrace Case. $4,900.00. Contact: Dale @ Videofilm Systems, (203) 866-7319.

PANASONIC BROADCAST & PROFESSIONAL Video Equipment at Wholesale Prices! Factory Sealed New With Full One Year Warranty. Factory Authorized Sales & Service! Advanced Video Systems. (800) 233-2430.

SERVICES

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HELP WANTED

DON'T JUST BUILD TECHNOLOGY.
BRING IT TO LIFE.

Sony's Business and Professional Group is seeking the following broadcast professionals:

Senior Video Systems Design Engineers

We are looking for seasoned engineers to design large-scale digital audio/video facilities, including floor plans, equipment rack layouts and detailed signal flow diagrams. Candidates must have 5+ years' experience with state-of-the-art analog and digital A/V, production and broadcast facilities, and be especially strong in system-level engineering design and technical problem-solving. Fluency in MS Excel for Windows is required; AutoCAD, Word and Access knowledge is a plus. Team-building, communication skills and the ability to work with minimal supervision are also key. We have both regular and contract positions available, but all require full-time presence at our San Jose facility. Some travel during installation/testing will be required. (Job # CY-BE1)

Project Managers

Responsible for the management of resources to execute fully integrated broadcast systems. Must be able to complete projects on time and within budget. The ideal candidate will bring 5+ years of project management in broadcast or production systems. (Job # CY-BE2)

Senior Marketing Manager

Develop and direct marketing strategy for the broadcast industry. This includes video file server-based automation systems, master control routing switches and related products. Position requires 10+ years of extensive marketing experience in broadcast or other closely related industry. (Job # CY-BE3)

Engineering Instructor/ Trainer

Develop and present courses on repairing and maintaining state-of-the-art video equipment and systems. Courses will be constructed around focused objectives and concentrate on hands-on skills development. You must have strong computer skills, BSCS/BSEE with 5 years' experience in the broadcast/professional video industry. (Job# CY-BE4)

Product Support Engineer

Manage all technical support for products such as Sony's Integrated Duplication Operation, Video Store and Edit Station. You will review all technical documentation, actively problem-solve and act as a liaison between factory design and support, and marketing, field service and product sales. Position requires a BS in EE or CS with 7+ years of experience developing and supporting software-based products and 2+ years with servicing or designing Sony products. (Job # CY-BE5)

Please send your resume, INDICATING CODE OF INTEREST, to: Sony Electronics Inc., Attn: Professional Staffing, MS SJ-2C2, 3300 Zanker Road, San Jose, CA 95134-1901. Fax: (408) 955-5166. E-mail (in ASCII text): sj_jobs@mail.sel.sony.com. For more information, visit our Web site at: http://www.sel.sony.com/HR/ EOE.

It's a Sony

SONY

WE PLACE ENGINEERS
USA & WORLDWIDE

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E-mail: keyjobs@keystone.microserve.com

ENGINEER

Maintenance Engineer

CBS News, New York has an excellent opportunity for an experienced Maintenance Engineer to join our New York team.

The selected candidate must have at least 5 years' experience repairing and maintaining ENG, news editing and video equipment. Computer proficiency and field operations experience on news remotes are essential. A BSEE degree is preferred.

We offer a competitive salary and benefits. Please forward your confidential resume, with salary requirements, to: **Director, Technical Operations Recruitment, CBS Inc., 524 West 57th Street, New York, NY 10019.**

Equal Opportunity Employer. CBS

UPLINK ENGINEER TCI's Broadcast Satellite Uplink Center is growing from 275 uplinked services to 400. We need technicians to construct and operate this state of the art facility. Several positions available with responsibilities and compensation dependent on qualifications. Experience with digital video, computer based control systems, RF and broadcast operations desired. DBE, SCTE certification preferred. Drug and background check will be required for employment. Send resume with salary requirements to: TCI National Digital Television Center, Attn: Office 105, 4100 E. Dry Creek Rd., Littleton, CO 80122, or fax to 303-486-3891. EOE.

A GREAT PLACE TO WORK KMOV-TV in St. Louis, one of the strongest CBS affiliates in the country, is looking for a Senior Maintenance Engineer. You must have at least five years experience in broadcast equipment maintenance, with excellent troubleshooting skills in a traditional broadcast plant. Strong computer skills and experience with digital video systems is preferred. With major projects in the horizon, now is the time to join our quality team of broadcasting professionals. Send resume to: Walt Nichol, KMOV, One Memorial Drive, St. Louis, MO 63102. KMOV is an equal opportunity employer.

POSITIONS AVAILABLE AT CHRISTIAN TV STATION 2-Maintenance Engr's of audio visual switching support of broadcast equipment maintaining to the component level. Must have 8 yrs. exp. ENG Operator shooting & editing of film for broadcast, min. 2 yrs. exp. as a crew member. Equal Opportunity Employer. Send resumes to: WCFC TV38, 38 S. Peoria, Chicago, IL 60607, Attn: Human Resource Dept.

MAINTENANCE TECHNICIAN Skilled technician position available requiring 5-10 years TV studio systems maintenance experience. Candidate should have working knowledge of Grass Valley Switchers, Quantel Graphics equipment, Chryon and Abukas Digital Effects systems. Please send resumes to KCNC-Human Resources, 1044 Lincoln St., Denver, CO 80203. EOE/MF.

MAINTENANCE ENGINEER 24-hour cable news station seeks bench technician. Three to five years experience with broadcast equipment and ability to troubleshoot to component level required. Some knowledge of computer systems helpful. EOE. Send resume/ cover letter to: NEWSCHANNEL 8, Director HR, 7600 D Boston Blvd., Springfield, VA 22153 or fax to: 703.912.5599.

CHIEF ENGINEER needed for high-volume, multi-faceted post-production company located in northern New Jersey. Facility operates all digital and analog tape formats in PAL and NTSC and provides standards conversion, duplication, telecine, editing, and audio services. Opportunity for travel and interaction with worldwide technical network. International technical experience a big plus. Fax resume and salary requirements to 201-784-2769.

classified

HELP WANTED

RF MAINTENANCE ENGINEER The successful candidate will need to be experienced in the installation and maintenance of television transmitters, translators, microwave systems, and related equipment. Candidate should be capable of repairing equipment to the component level. Candidate should have technical training and 5 or more years of experience. Must be able to lift 50 pounds and travel to remote locations. Self motivated, team players can send their resume to: Human Resources, KRQE TV, 13 Broadcast Plaza SW, Albuquerque, NM 87104.

TELEVISION MAINTENANCE ENGINEER Must have exp. in repairing and maintaining TV equip. of all kinds. Reg. 3-5 years extensive equip. maint. at TV station of brdcst. equip. mfr. High school diploma, or equiv., and training in electronics required. Qualified candidates should send resume to Business Office, KCTV, P.O. Box 5555, K.C., MO 64109. KCTV is an Equal Opportunity Employer. M/F/H

UHF BROADCAST ENGINEER for Telemundo station in San Jose, CA. With a new transmitter scheduled for installation in 1998, we need a team player with experience in the maintenance and repair of UHF TV transmitters, microwave links and other TV broadcast station and RF equipment. Candidates should require minimal supervision, be knowledgeable of FCC rules and regulations and possess strong organizational and people skills. FCC General Class/SBE TV Certification preferred. Submit resume and salary requirements to: Human Resources, KSTS-TV, 2349 Bering Drive, San Jose, CA 95131. FAX (408) 433-5921. Telemundo is an Equal Opportunity Employer.

MAINTENANCE TECHNICIAN Growth opportunity in a multi-media driven production/museum facility near Washington, DC. This brand-new facility includes numerous kiosks, projectors and a full broadcast suite. Primary job responsibilities include daily routine maintenance/set-up/repair of the broadcast suite, equipment room, along with projectors and associated laser disk equipment. Provide overall technical support to entire operation including touch screen based interactive exhibits. Three to five years experience in broadcast maintenance required. BVW/PVW, GVG DPM-700 training a plus. Candidate should have excellent troubleshooting skills in a traditional broadcast plant, strong computer skills, and the ability to communicate effectively. Competitive salary and excellent benefits. Please send your letter of interest and resume to: Classified Ad Coordinator, Broadcast Engineering, Dept. 786, 9800 Metcalf, Overland Park, KS 66212-2215.

MAINTENANCE ENGINEER Minimum two years broadcast experience with 3/4" VCR tape, Betacam equipment and studio maintenance. Must be able to troubleshoot to component level. Experience in computer maintenance and operations required. Experience with Novell network, Windows for Workgroups and MS Office preferred. Needs to be self motivated, organized, with good interpersonal and communication skills. UHF transmitter experience SBE certification and FCC license a plus. Send resume to Bob Hardie, UPN62, 10 E. Cambridge Circle Dr., Ste. 300, KC, KS 66103.

Maintenance Technicians

We're Group W Network Services, a Division of CBS Cable and the largest independent satellite distributor of video programming in the country. We're seeking capable professionals to keep our systems running smoothly.

The selected candidates will perform ongoing system analysis, restoration and preventative maintenance; repair, calibrate and align technical equipment; and make changes when needed. Qualified candidates must have solid electronic training and at least 2 years' on-line broadcast maintenance experience. The ability to troubleshoot at the component level and knowledge of digital broadcast equipment and video tape machines are essential.

We offer a competitive salary and benefits package and a scenic, waterside facility. Please forward your confidential resume, with salary history and requirements, to: Human Resources Department MTBE-697, Group W Network Services, 250 Harbor Drive, Stamford, CT 06904. Fax: 203/965-6117.Equal Opportunity Employer M/F/D/V.

CBS CABLE

TELEVISION MAINTENANCE ENGINEER position is now available at IN TOUCH Ministries. A bachelors degree in electrical engineering or technology desired. Equivalent experience will be considered in lieu of degree. Excellent logic skills required. Post production experience helpful. Send resume and salary requirements to Darvin Sparks, IN TOUCH Ministries, 3836 DeKalb Technology Parkway, Atlanta, GA 30340.

TV MAINTENANCE ENGINEER/REMOTES WPBT2 has opening for individual to repair and maintain equipment relating to our remote production unit, and to assist with other duties as needed. Minimum 3 to 5 years experience in TV equipment maintenance and 2 years experience in TV remote activity required. Must be flexible regarding days and hours worked. Send resume with salary requirements to: Human Resources, WPBT, P.O. Box 2, Miami, FL 33261-0002. An Equal Opportunity Employer, M/F/H/V.

BROADCAST UPLINK MAINTENANCE ENGINEER needed for broadcast/entertainment company. Exceptional opportunity for an experienced engineer to maintain and install teleport equipment. Responsibilities include maintaining satellite uplinking by interfacing with the satellite transmission control center, operating the transmitter/antennas and ensuring quality of signal. Competitive salary and benefits. Please indicate position applied for and submit resume to Dir. of Broadcast Engineering, Speer Communications, Ltd., 3201 Dickerson Pike, Nashville, TN 37207. Or fax to (615) 650-6293. EOE. No phone calls please.

MAINTENANCE ENGINEER: WECT-TV6 NBC affiliate in Wilmington, North Carolina has an immediate opening for a broadcast maintenance engineer. Candidate must have solid background in electronics, experience with both analog and digital studio and transmitter equipment and strong computer skills. A minimum of 5 years experience as a broadcast maintenance engineer. General license or SBE certification required. Send or Fax resume to Wayne Tiner, Chief Engineer, Raycom Media Inc., PO Box 4029, Wilmington, NC 28406. Fax 910-392-1509. wectce@wect.com. EOE

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cbsi
Custom Business Systems, Inc.

Windows Programmer

Located on the beautiful Oregon Coast, CBSI is the world's leading provider of business computer systems in the radio broadcasting industry. We offer a competitive comp. and benefit package including a 401(k) Match & Profit Sharing.

We are seeking individuals who have proven computer programming experience in C or C++ and can quickly transition to object oriented design & implementation in Visual C++ utilizing Microsoft Foundation Classes (MFC). Relevant additional experience could include programming for MS-DOS, Win16, Win32, multimedia, networking, and multi-user data access.

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Human Resources Manager
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e-mail to HR@cbsi-software.com
Cut & Paste doc. in e-mail

REGIONAL DIRECTOR OF ENGINEERING, EAST QUANTEL Quantel, a world leader in digital imaging equipment, seeks a Regional Director of Engineering based in their Darien, CT office. Responsibilities include but are not limited to engineering representation of the Company and its products to potential clients and industry associations. Applicants should have significant television engineering exp. Technical skills are also required. Fax resume in confidence to Human Resources Administrator 203-656-3459.

CRAWFORD COMMUNICATIONS Television Maintenance Engineer. Crawford Communications, the premier post production facility in the Southeast, has opportunity for bright, experienced maintenance engineer. Minimum five years experience with online and offline editing systems. Digital and analog tape transport experience required. Windows experience a plus. Submit resume and salary requirement to: J. Fortner, Chief Engineer, Crawford Communications, 535 Plasamour Dr., Atlanta, GA 30324 or jfortner@crawford.com

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HELP WANTED

CAREER OPPORTUNITIES

Television Engineering

We are a leader in the design and construction of many of the most prestigious broadcast television facilities in the nation.

The explosion in electronic media and the digital revolution has dramatically impacted our growth opportunities. As a result, we are looking for a number of highly-motivated people to help us grow.

Opportunities exist for ***Senior Project Managers, Engineers, Sales Technical Support Specialists, Computer System/Network Engineers*** with video experience and a number of other challenging positions.

If you have experience in television engineering or a related discipline and would like to join a dynamic company, we would like to hear from you. Please send your resume and a letter describing your career interests to:

Employment Manager, A.F. Associates, Inc.
100 Stonehurst Court, Northvale, NJ 07647
FAX: 201-784-8637

No phone calls please. We are an Equal Opportunity Employer.

CNN

TELEVISION ENGINEERS

Turner Broadcasting System, the leading News, Sports, and Entertainment system in satellite communications, has career opportunities for engineers with **broadcast maintenance** experience. These positions demand an extensive background in television engineering and at least two years of training in electronics technology. Turner Broadcasting System offers an excellent benefit and compensation program.

Send resumes to:
Mr. Jim Brown, Corp. Engineering
Turner Broadcasting System, Inc.
One CNN Center
P.O. Box 105366
Atlanta, GA 30348-5366
(404) 827-1638 office
(404) 827-1835 fax

TBS is an equal opportunity employer

MAINTENANCE TECHNICIAN WJBK-TV FOX 2 Detroit is looking for two broadcast maintenance technicians. Candidate must have solid background in electronics, experience with analog and digital studio and transmitter equipment. Minimum five years experience in the repair, installation and maintenance of broadcast equipment. Strong computers skills and SBE certification a plus. Send or fax resumes to: Gene Wilczak, Manager of Technical Services, P.O. Box 2000, Southfield, MI 48037. Fax: (810) 552-0280. EOE/MF

HELP WANTED MAINTENANCE ENGINEER SE Fox News affiliate, UHF, Microwave Engineer with 2-5 years studio experience and computer skills. EOE/AA Employer. Fax resume to 912-435-0485.

NATIONAL MOBILE TELEVISION INC. has 2 immediate openings for field engineers and 1 supervisor/maintenance engineer, to be based out of Los Angeles. Send resumes and references to 1933 Del Amo Blvd., Torrance, CA 90501.

LAKE TAHOE

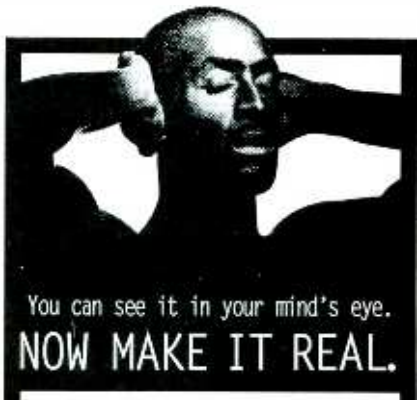
TECH SUPPORT/ PRODUCT SPECIALIST POSITIONS

Sierra Design Labs, the leader in long format video disk recorders, is seeking two technical support specialists for our New York and Lake Tahoe offices. Responsibilities include telephone and On-site support of software and hardware Products. Requirements include a strong technical understanding of the professional video post production and broadcast environments, computer literacy in SGI, MAC and PC platforms, as well as excellent written and oral communications skills. Minimum 3 years technical experience in the computer/video industry. Some travel required. Competitive compensation and excellent benefits. Mail or fax resume and salary requirements to: HR, Sierra Design Labs, 999 Tahoe Blvd., Box B, Incline Village, NV 89451; Fax: (702) 831-5710

SIERRA
DESIGN LABS

TV MAINTENANCE TECH. Ability to repair to component level. Maintain video production equipment and transmitter. Respond to emergency calls. Great benefits, including 401K. Send resume to FOX 27, 3000 Cherry, Springfield, MO 65802. EOE.

MAINTENANCE ENGINEER Great weather, great people, cost of living inexpensive. Sony and GVG 3/4 a must. Minimum 2 years experience. Fox affiliates. Resumes - Fax 915-655-8451. Women and minorities are encouraged to apply. EOE.



You can see it in your mind's eye.
NOW MAKE IT REAL.

Sony's Business and Professional Group is seeking the following broadcast professionals:

Senior Video Systems Design Engineers

We are looking for seasoned engineers to design large-scale digital audio/video facilities, including floor plans, equipment rack layouts and detailed signal flow diagrams. Candidates must have 5+ years' experience with state-of-the-art analog and digital A/V, production and broadcast facilities, and be especially strong in system-level engineering design and technical problem-solving. Fluency in MS Excel for Windows is required; AutoCAD, Word and Access knowledge is a plus. Team-building, communication skills and the ability to work with minimal supervision are also key. We have both regular and contract positions available, but all require full-time presence at our San Jose facility. Some travel during installation/testing will be required. (Job #CY-BE1)

Project Managers

Responsible for the management of resources to execute fully integrated broadcast systems. Must be able to complete projects on time and within budget. The ideal candidate will bring 5+ years of project management in broadcast or production systems. (Job #CY-BE2)

Senior Marketing Manager

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Please send your resume, INDICATING CODE OF INTEREST, to: Sony Electronics Inc., MS SJ-2C2, 3300 Zanker Road, San Jose, CA 95134-1901. Fax: (408) 955-5166. E-mail (in ASCII text): sj_jobs@mail.sel.sony.com. For more information, visit our Web site at: http://www.sony.com/jobs/ EOE.

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By Paul McGoldrick

Reverse colonization continues with DAVIC

That headline is not strictly true. The membership of the Digital Audio-Visual Council (DAVIC) consists of more than 200 companies from more than 25 countries. U.S. players include Microsoft, Intel and AT&T. DAVIC is being driven hard by the Europeans and is supported by the European Commission through its Advanced Communications Technologies and Services (ACTS) initiative.


Paul McGoldrick

The DAVIC management and technical teams meet every three months for a week. The management committee reports to the DAVIC board (industry elected) and the nine management, industry representatives coordinate the activities of six technical committees.

The main purpose of DAVIC is the achievement of international compatibility in the distribution of video and multimedia content through communications networks. The formal standards cover the specifications of interfaces, protocols and architectures of digital applications and services. DAVIC 1.0 defines the basic tool kit for the development of systems-support applications, such as video-on-demand (VOD), near-video-on-demand (NVOD), TV distribution and shopping-by-TV.

The philosophy of the DAVIC specifications is to define tools that guarantee interoperability. The tools should be reusable in different systems and locations. An individual tool should provide a unique functionality, and the lowest levels are specified to ensure interoperability over a multi-industry user base. Any distribution system for video or multimedia that is developed has to take into account the DAVIC specifications, whether terrestrial or satellite. Control is provided for sessions, access control, navigation and program choice, applications launch, media synchronization, presentation control, usage data and user profile.

What's this to me?

DAVIC has identified 19 services. Given priority in the services definitions were VOD, NVOD, tele-shopping, broadcasting, delayed broadcast, games, telework and karaoke-on-demand. Every reader is probably involved in a couple of these areas and we are all going to have to understand the basics of DAVIC, unless we are in the purely production area.

The organization of DAVIC 1.0 is in 11 parts (see Table 1), which are categorized in three groups. Those parts in Group 1 are the tools needed to build a DAVIC-conforming system, those in Group 2 describe how three main DAVIC subsystems can be constructed, while those in Group 3 address system-wide issues.

The system model for DAVIC consists of five parts: the content-provider system (CPS), the service-provider system (SPS) and the service-consumer system (SCS), which are interconnected by the CPS-SPS and the SPS-SCS delivery systems. Each port is defined as a reference point and the existence of a defined reference point guarantees DAVIC conformance. At the same time as these points are defined within the *normative* areas of the specification there are also *informative* areas that help to clarify the normative parts.

For most of us, it is the delivery system that will be a day-to-day concern with DAVIC. Although the system is in the singular, it's possible that several delivery system domains could be used with different operators. The mediums may consist of any information-carrying system, from a CD-ROM to a satellite. Networked systems are defined in DAVIC 1.0, while non-networked systems (physical-storage media) are in the later specifications. The networked delivery systems that are defined consist of cabled networks (telecommunications and cable television), Hertzian networks (terrestrial and direct broadcast satellites) and hybrid networks (with cabled and Hertzian components). Next month we will define those architectures in more detail. ■

Part No.	Title
GROUP 1 DAVIC 1.0 TOOLS	
7	High- and mid-layer protocols
8	Lower-layer protocols and physical interfaces
9	Information presentation
10	Security
11	Network management and user information
GROUP 2 DAVIC SUBSYSTEMS	
3	Service provider system architecture/interfaces
4	Delivery system architecture/interfaces
5	Service consumer system architecture/interfaces
GROUP 3 DAVIC SYSTEM-WIDE ISSUES	
1	DAVIC system function descriptions
2	System reference models
12	Dynamics, reference points/interfaces

Table 1. DAVIC 1.0 organization.

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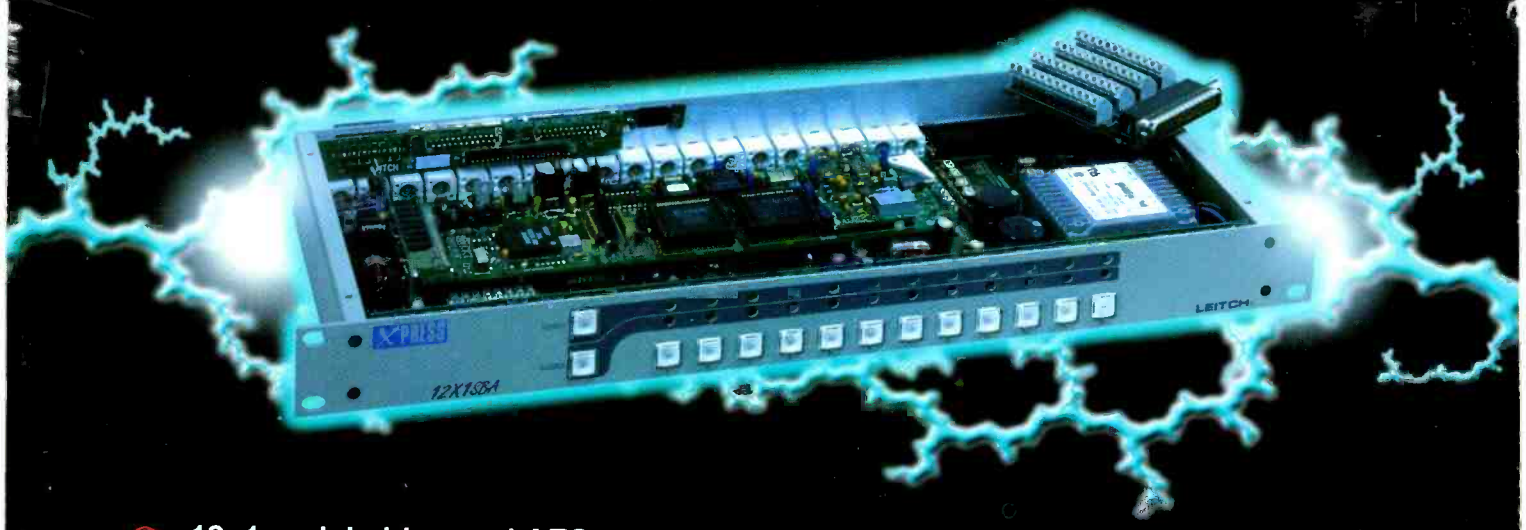

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