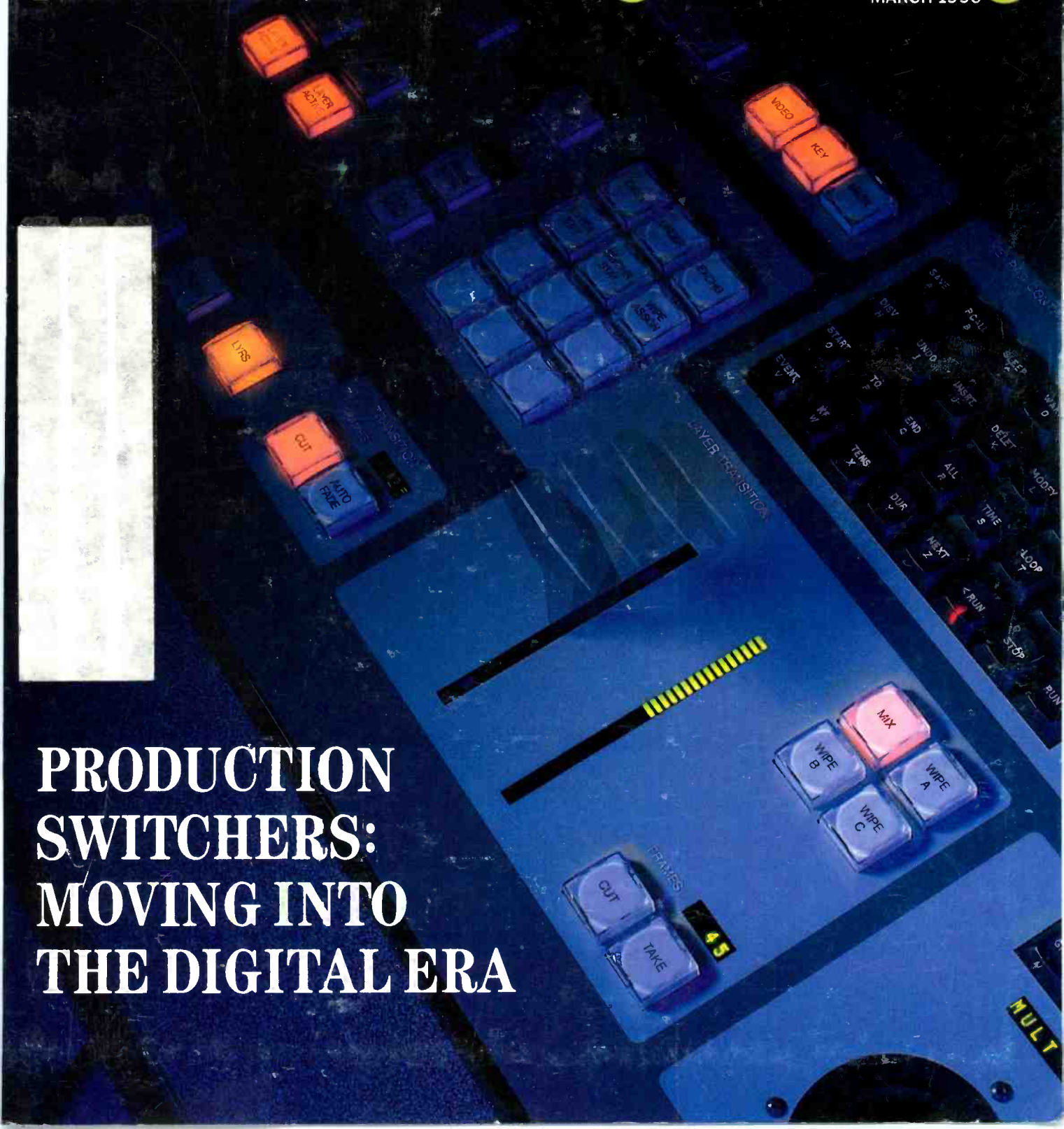
BME's

INSIDE: NEW PRODUCTS AND NEW TECHNOLOGIES AT NAB
VIDEO CAMERAS: MORE VERSATILE THAN EVER

Television Engineering

AN ACT III PUBLICATION $3.00 MARCH 1990



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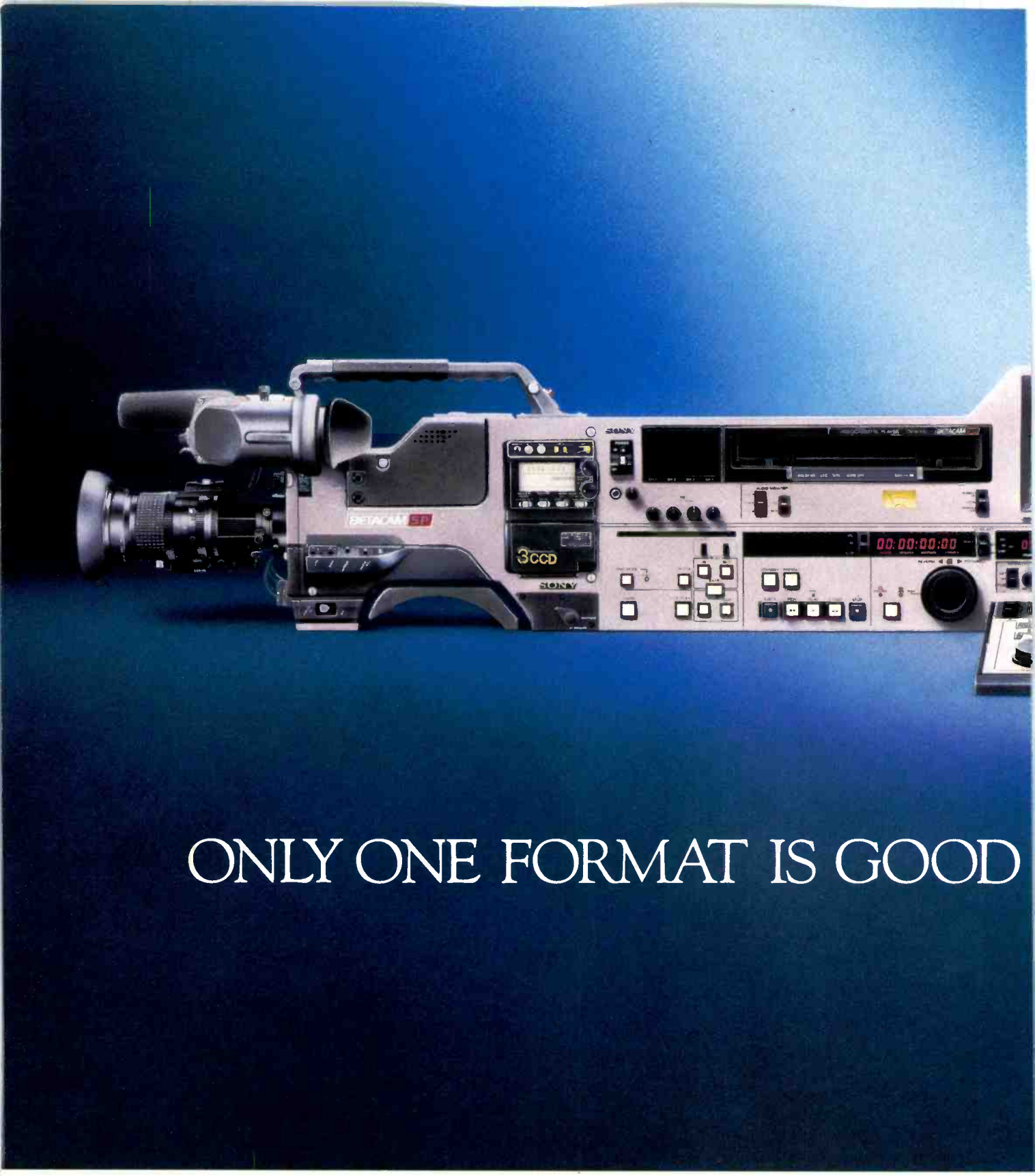

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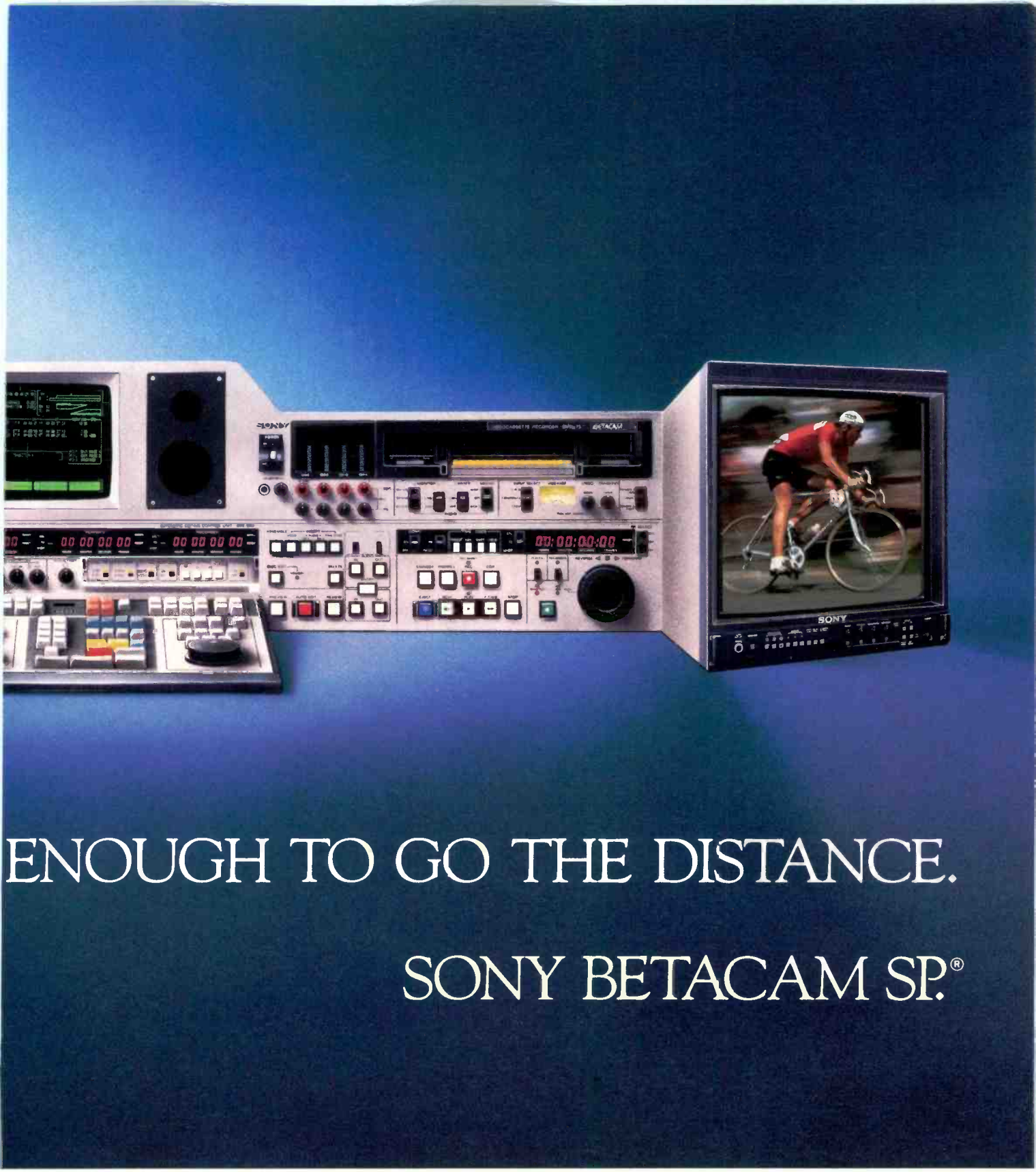

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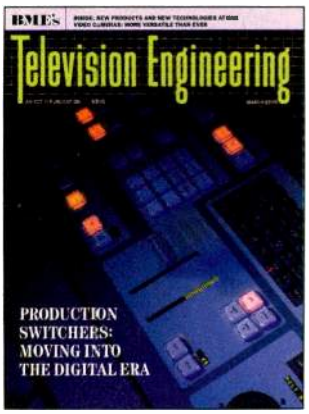
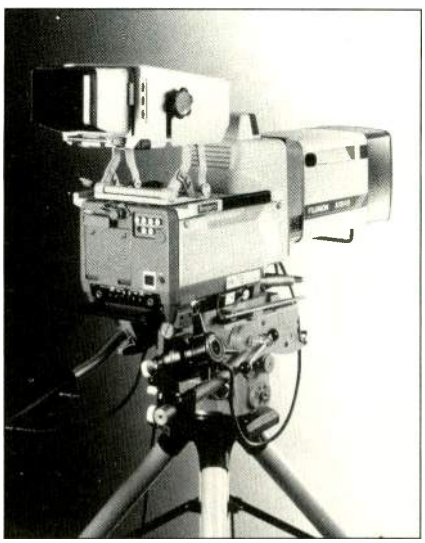


On the Cover:
Close-up of the Abekas A84 digital post-production switcher. Photo courtesy of Abekas Video Systems. Cover Story begins on page 107.

106 *Abekas Video Systems A84 4:2:2 Digital Production Switcher.*



113 *Ikegami HK-355 studio camera.*

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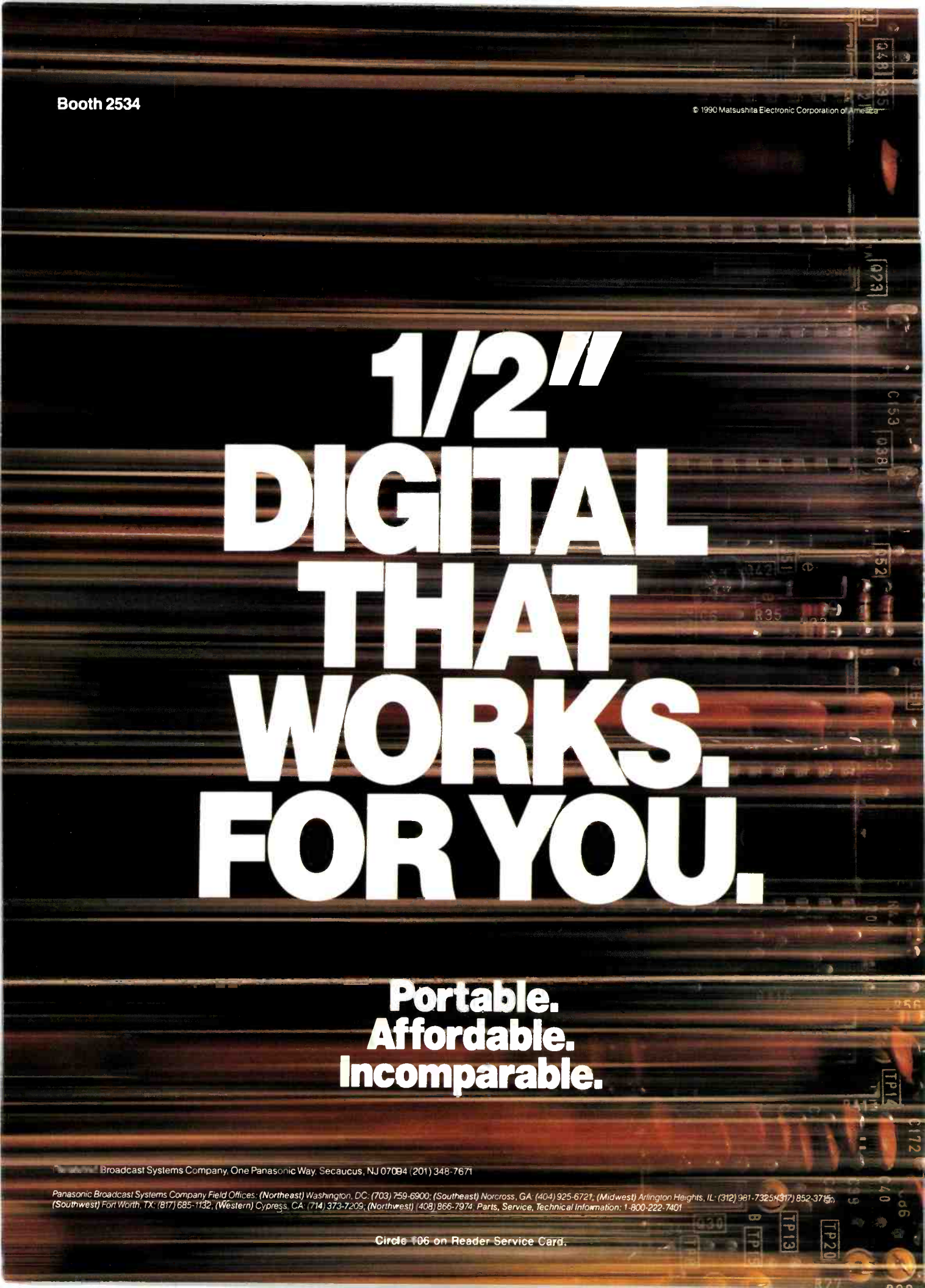
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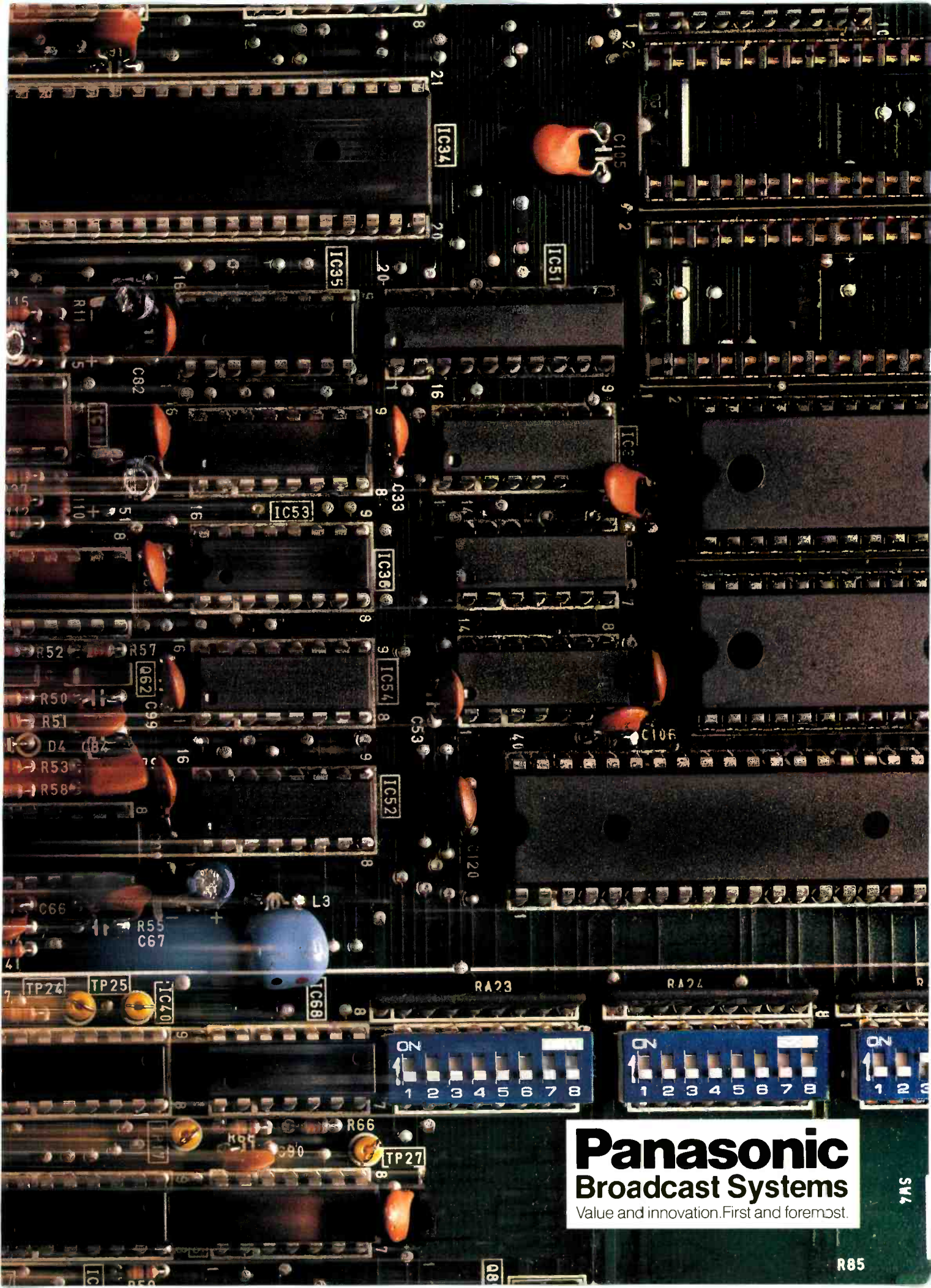
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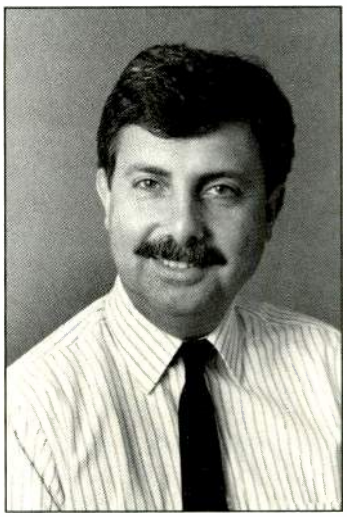
VIEWPOINT

This year's NAB will be one of the most pivotal gatherings in the history of television technology.



It may not be the most exciting NAB on record, and it probably won't set any records for equipment purchases. This year's convention may even turn out to be smaller than some recent shows, with Atlanta's far-flung hotels and fears of urban rush hours conspiring to keep some would-be attendees away. Yet this year's NAB, which opens the last day of this month, will witness a convergence of technologies and debates that promises to make it an event not to be missed. Major themes abound. Among them:

Digital recording. Component digital, for the foreseeable future, will remain a niche format, in use at only a handful of D-1-equipped high-end post houses. D-2 composite digital, emerging from a stormy introduction, is poised to make major inroads at stations and facilities, but doesn't yet seem ready to assume the mantle of Type C. Looming on the horizon is half-inch composite digital, whose manufacturers will make strong economic arguments for its deployment—arguments that will command rapt attention in today's financial climate.

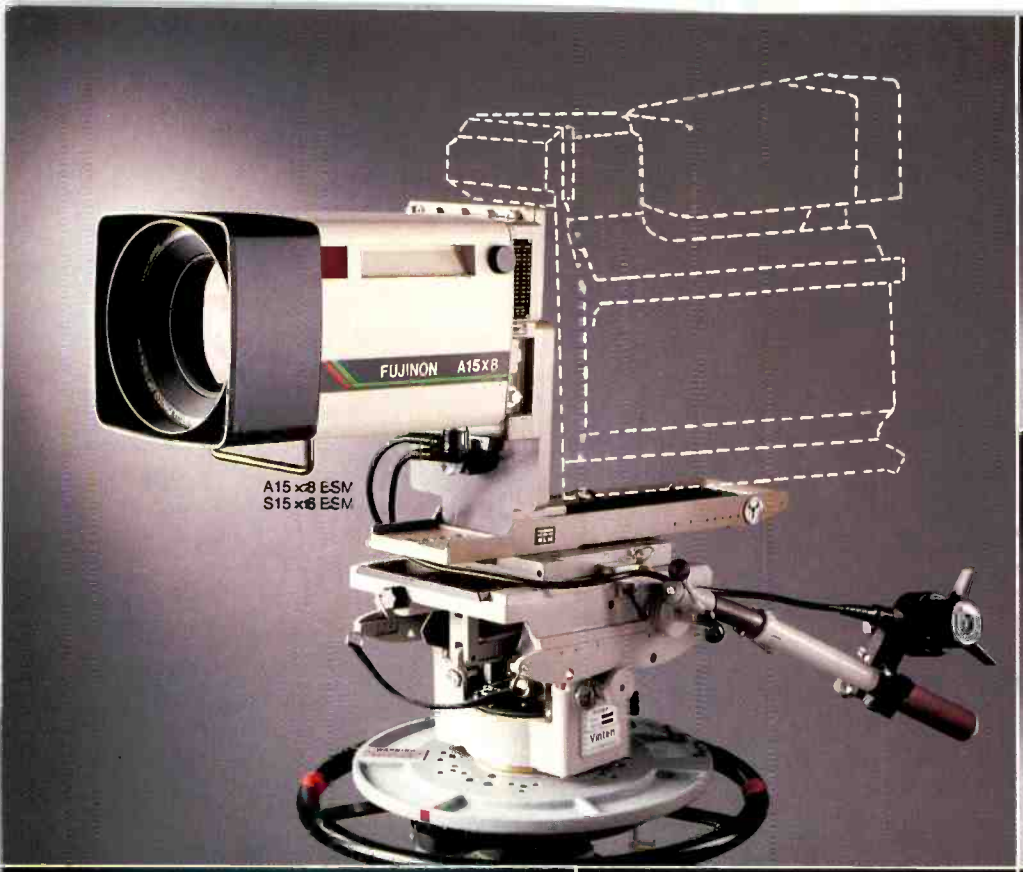
High definition. Technical and political alliances form and re-form. While adherents of 1125/60, the only existing HD production standard, continue to develop equipment for it, others are testing the technical and regulatory waters of U.S. high-def transmission in anticipation of terrestrial broadcasts after the mid-90s. A strange wall has formed between advocates of a production standard and proponents of transmission standards—a lack of communication related to the next theme.

The DBS/fiberoptics/cable-telco question. As we went to press, four media giants—NBC, Cablevision, Hughes and News Corp.—announced a high-power DBS service to start in 1993. But there's no foreseeable need for the up to 108 additional channels the billion-dollar venture proposes. Sky Cable, as it is called, appears to be a calculated strike against other industries, aiming, in turn, at MSOs who won't accept carriage of services owned by competitors, at phone companies that may one day provide terrestrial fiberoptic transmission of everything, and at whatever high-def services may emerge. This business-by-preemption philosophy brings us to the final theme:

American industrial leadership. We know of several large U.S. manufacturers of broadcast equipment that, in today's troubled TV marketplace, face declining sales. Others have productivity or debt problems. Mergers and acquisitions will continue, with overseas manufacturers increasing their market share. NAB sales activity this year will be the ultimate test for many companies, and what happens in Atlanta will decide their future and have a huge impact on the make-up of industry suppliers in the '90s.

It should be an interesting show. ■

Peter Caranicas
Editor in Chief



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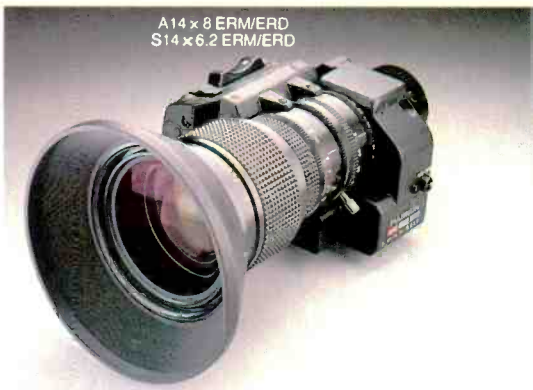

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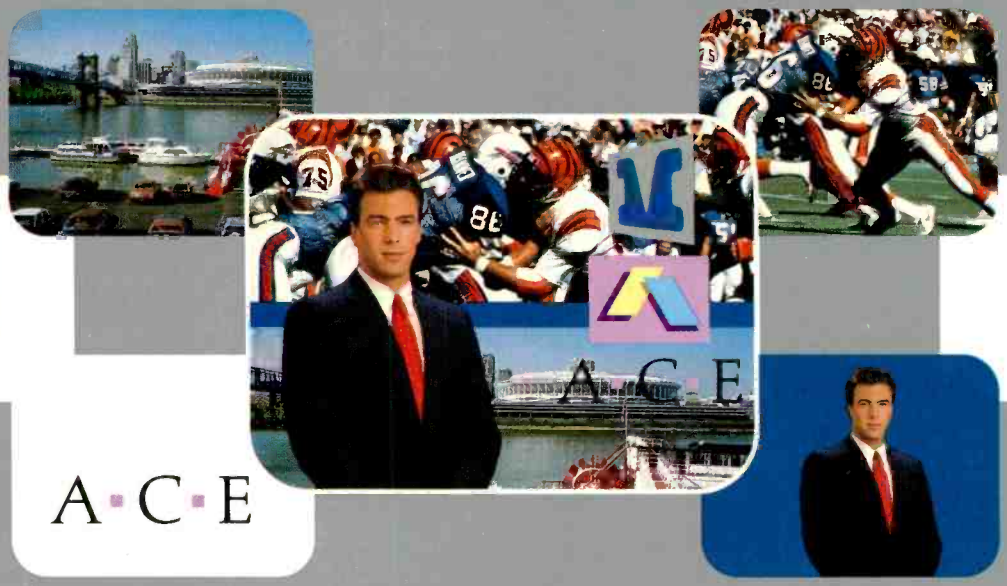

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UPDATE

Syndex Prompts Bomb Threats at KCFW-TV . . . NBC & Partners Plug Advanced TV . . . QSound Makes Musical Debut . . . National Supervisory Network "On-Line" . . . Television Engineering *Names Senior Editor*

Syndex Prompts Bomb Threats at KCFW-TV

Telephone bomb threats haunted the switchboard of KCFW-TV, an NBC affiliate in Kalispell, MT, after the station invoked syndication exclusivity rights against local cable TV company TCI of Kalispell. Exercise of those rights by KCFW had forced the cable operator to drop Spokane NBC affiliate KHQ-TV January 1, when syndex rules became effective. Charges of felony intimidation and misdemeanor obscene and vulgar communications have been brought against Kalispell resident and bomb-threat suspect Mark Lelm, age 30.

Mike Mason, general manager of TCI Cable, describes Kalispell as a "bedroom community, with close ties to the Spokane area." Mason further explains, "Spokane is where many of the town's young adults move after finishing their schooling."

According to Steve Fetveit, KCFW's general manager, his station received more than 125 phone calls protesting the loss of KHQ-TV by the cable company. Fetveit says the public does not understand the situation with the NBC programming: "I'm the local broadcaster; I have the right of exclusivity." Fetveit claims that his station has been victimized by a TCI campaign of misinformation, with TCI filling the now-blank distant channel with a crawl that blames KCFW-TV for loss of the Spokane station.

The TCI-owned cable system began in 1953, and for many years, the only stations available were those imported via microwave from Spokane. TCI's Mason says his system added KCFW as an ABC/NBC affiliate 15 years ago, while continuing to offer the Spokane stations, including NBC affiliate, KHQ-TV.

Complicating the issue is the location of Kalispell in the Rocky Mountain time zone. KCFW-TV airs the NBC Central time zone feed, while KHQ-TV broadcasts on Pacific time, resulting in a two-hour difference. According to Mason, "many people in the area are shift workers, and the broadcast times of KHQ-TV were more in tune with their lifestyle." When asked about possible delay of network programming in order to accomodate his local viewers' schedules, Fetveit said that "network delay was out of the question," but would not elaborate.

Suspect Lelm is alleged to have made several calls, including one in which he used obscene and vulgar language and made a threat to blow up the KCFW-TV transmitter. Steven Nardi, Lelm's attorney, characterized the charges as "overblown—an overreaction to a guy who was mad because his kid couldn't see *ALF*." Nardi also expects that local feelings on the issue may make it tough for the government to prosecute Lelm, who is seen in some local quarters as a "hero" standing up to the "big boys." This attitude might be reflected in the fact that the judge in the case released Lelm from jail without bail, even though a conviction on both counts carries a possible sentence of over 10 years and over $50,000 in fines.

At KCFW, the threats were taken quite seriously, however, and an edgy staff awaits the outcome of the pending trial. Chief Engineer Chris Neuhausen says the station's security has been tightened at its downtown studio site. He says he is not very concerned about the safety of his transmitter plant—it shares space with a very well-protected Air Force radio facility. ■

NBC & Partners Plug Advanced TV . . . Much Ado About Something, Part 1

NBC, Philips USA, Thomson Consumer Electronics and the David Sarnoff Research Center have formed the Advanced Television Research Consortium (ATRC), with plans to introduce widescreen, enhanced-image television by 1993. Michael J. Sherlock, president of NBC operations and technical services, announced the development at a January 25 studio press conference. All but Philips had already been joined in a seven-year-old research partnership.

After introduction of the principals in each of the partner companies, Sherlock presented a demonstration tape, which he labeled as "what we would see in the studio." The tape (of a Denver Broncos playoff game) was viewed on monitors with 16 x 9 aspect ratios. Image quality appeared to *Television Engineering* to be no better than

one would expect from a D-2 tape on a high-quality studio monitor.

Responding to technical questions about the tape and the system, Sherlock admitted that, in its existing form, the system used the standard NTSC 525-line scanning, and existing MII tape for shooting. Plans call for home receivers that will include line-doubling capability to increase scanning lines to 1050. The demo tape was "edited on slightly modified D-2 machines here in the building," according to Sherlock, who seemed reluctant to discuss technical characteristics. When questioned on the type of cameras used, Sherlock deferred to Merrill Weiss, managing director of advanced television systems, who described the photographic equipment as standard Thomson cameras modified to the 16 x 9 aspect ratio.

Although NBC provided an extensive press kit of information, the network gave no in-depth technical information in its printed material about the proposed system. The demo tape was shown on two large monitors, but there was no equipment to inspect the technical characteristics of the signal.

Attendees seemed confused as to exactly what what being introduced, but Sherlock clearly explained that the system being proposed was not HDTV, but an intermediate step which could be "on-line" by 1993. Costs of implementation for stations would be "no more than that of replacing a standard NTSC piece of equipment," Sherlock claims.

Dr. J. Peter Bingham, VP of technology for Philips Consumer Electronics Company, discussed his company's participation in the project. When questioned whether Philips, a 50 percent owner of broadcast equipment supplier BTS, would supply broadcast hardware for the new system, Dr. Bingham indicated he "expected Philips to be in any market where its experience and technical expertise could be applied profitably."

Sherlock notes that the consortium represents a marriage of industry leaders. NBC was the number-one rated broadcast network for 1989. Thomson is the largest U.S. manufacturer of televisions, with the RCA and GE brands. Philips USA is the second-largest U.S. television maker, with the Philips, Magnavox, Sylvania and Philco brands. Meanwhile, the David Sarnoff Research Center was instrumental in the development of color television. ■

Standard Thompson cameras were used to record the ATRC demo tape.

QSound Makes Musical Debut . . . Much Ado About Something, Part 2

Amid all the hoopla on Super Bowl Sunday, Coca-Cola USA brought back the "Hilltop Singers" for a reunion, this time using a new sound system, dubbed "QSound" by its creators. QSound is a computer hardware and software package that allows recording engineers to directionalize various sound sources on a recording.

According to officials of Archer Communications, Inc., the parent company of QSound Inc., the QSound system is designed to give the listener an enhanced sound experience, including the impression of sound emanating from locations unrelated to playback speakers.

Both motion-picture and record production techniques utilize "pan" pots to place sound sources in specific positions before the listener. The developers of QSound claim to have, in effect, broken the "wall" between viewers and set or screen by surrounding the listener with sound—and through use of only two speakers.

Television Engineering took an advance copy of the Coca-Cola commercial to two New Jersey television retailers and played it on top-of-the-line stereo televisions. Viewers were quite impressed by the depth and

STUDIO

Panasonic
Has Video Production Down To A System.

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Panasonic lets you hit the ground running with compact SVHS and MII camcorders. They give you less to carry on your shoulder and your budget by combining component recording technology with the efficiency and flexibility of half inch cassettes.

No matter what your specific application requirements may be, Panasonic has the right camcorder for you, including both dockable and fully integrated one-piece units. In addition, only Panasonic has SVHS camcorders available with three, two and single CCD image sensors and up to 700 lines of resolution. Panasonic lets you decide what's best for you.

Panasonic SVHS and MII camcorders don't cut any corners when it comes to recording in the field. With high performance features like on-board vertical interval and longitudinal time code, hi-fi audio, and a variety of auto adjustment functions. They're features that Panasonic brings to the field so you have less work when you're back in the studio.

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STUDIO

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Selecting the most comprehensive video production system has never been easier. The Panasonic® Professional Video Production System is designed for total systems operation in the field, studio, editing suite and for virtually any playback application.

The SVHS recording format is at the heart of Panasonic's comprehensive video production system. It provides a new level of high performance and cost effectiveness across the spectrum of video recording and playback applications. One look at the numbers tells it all. Five generations of signal integrity, 400 lines of resolution and two-hour operation on a single cassette.

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In addition, Panasonic speaks the industry's language for inter-format editing with RS-422 VCR control interface components. And video signal transcoders that allow you to integrate virtually any video signal with the Panasonic Video Production System.

Whether your editing operation requires single format or inter-format editing, Panasonic delivers the high performance and signal integrity you demand for final playback.

ideo Production A System.

you need for demanding broadcast and post-production applications. Like a luminance bandwidth of 4.5MHz, a K factor of 2% and a signal-to-noise ratio in excess of 50dB. To produce images that equal one inch VTRs with signal integrity that exceeds five generations of recording.

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Anyway you add it up, the cost/performance characterstics of the Panasonic Video Production System are revolutionary.

EDITING

PLAYBACK

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Preserve the quality of your finished production through distribution and playback. With professional playback components from Panasonic. They offer you the performance and versatility required to satisfy even the most demanding applications.

Panasonic VCRs and TBCs are perfect for closed circuit, cable and even broadcast transmission. They're ideally suited for stand-alone operation and can easily be configured for station automation.

For general viewing and large screen presentations, Panasonic has the right combination of SVHS and VHS VCRs, monitors, and video projection components to suit virtually any size audience.

If your playback application involves program distribution to a corporate network, Panasonic will carry your message. With VCR features like video sensor recording that allows you to record programming transmitted during off-peak hours. So you can save on transmission and personnel cost. And for large scale duplication and point of sale playback, Panasonic professional VHS VCRs are the industry's standard for excellence.

clarity of the sound when they listened from a point directly in front of the set. Away from the center axis, viewers did not notice much of an effect, if any.

This may be the limiting technical factor for QSound. In its own literature, the company diagrams a small "optimum" listening area. To be effective for large family groups, it is clear that this optimum area must be expanded. Also, for now, QSound's market is limited because of the low number of stereo-equipped homes, and the low number of cable TV systems able to pass stereo broadcasts. ■

National Supervisory Network "On-Line"

"Operator-on-duty" services are now available from the National Supervisory Network (NSN). With one TV and five radio stations already under its remote control, NSN has contracts pending for at least 25 additional stations.

According to President Bill Sepmeier, the company "provides a service through technology, furnishing stations with a qualified operator on duty 24 hours a day, at a cost considerably lower than an on-site operator." Company literature points out that its average service cost of $1.09 per hour is well below even minimum wage.

From its base in Colorado, the Network's trained engineers monitor station transmitter and automation operations, handle routine transmitter logging, and respond to local and national EBS alerts. Half-hourly logging allows NSN to closely monitor transmitter performance and perform trend analysis to spot potential problems. NSN engineers can take control at any time, to keep station operations within the management's operational requirements.

The benefits of NSN's service to the local station is twofold, according to Sepmeier. In his words, "finding qualified engineers is difficult; finding qualified engineers within a station's budget is more difficult. NSN provides stations with experienced, licensed broadcast technicians, on duty around the clock, at a very low cost."

One interesting feature of the NSN command center is its dedicated weather satellite system. By keeping abreast of local weather conditions around the country, the NSN engineers can prepare for weather-related problems, such as power spikes and outages caused by lightning.

Although NSN could serve as a total automation service for a station that uses satellite-delivered programming, Sepmeier believes that his service works best as a supplement to local staff. He expects that stations will use NSN to control engineering functions, while station employees handle programming and creative functions. "Stations should be programmed locally to serve their community," according to Sepmeier, "with NSN taking care of the routine operation and monitoring of the technical plant." ■

NSN Chief Engineer Lynn Osburn tests remote equipment prior to start-up.

Television Engineering Names Senior Editor

Act III Publishing has appointed John F. King senior editor of *Television Engineering*. King, who has 10 years of editorial experience in book and technical magazine publishing, joined the staff on January 22.

"John's technical background fits perfectly with the editorial direction we're taking with *Television Engineering*," says Peter Caranicas, editor of *Television Engineering*. "He'll be instrumental in the planning and execution of our goals and objectives in the months ahead."

King has written and edited a variety of technical material—serving as news editor for *Electronics*, assistant editor for *Personal Computing*, and technical editor for Kahn Associates, a military publisher. Most recently, King was sponsoring editor for the MacMillan/McGraw-Hill School Publishing Co. ■

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BUSINESS BRIEFS

Equipment Sales & Installations

President Bush will be taking his cues from **Q-TV's** Newsprompter One, with 20 units recently delivered to the White House Communications Agency. **ABC** is also using the Newsprompter One for its *Good Morning America* program .... **Chilesat Telecommunications** called on **Satellite Transmission Systems**, a subsidiary of **California Microwave,** to design Chilesat's digital satellite network for domestic long-distance telecommunications. The network will have an INTELSAT hub station in Santiago that can communicate directly with stations in other major Chilean cities .... Four transportable satellite trucks (each equipped with a 4.5 m antenna) from **American Communications and Television** will carry sports backhaul transmissions for clients of **IDB Broadcast**, a provider of satellite transmission service. IDB, meanwhile, has cracked the Chinese wall, having contracted with the People's Republic of China to install an INTELSAT Intermediate Data Rate telephony link between the Chinese cities of Urumqi and Yining .... **Triax Cablevision** is a new customer for **Pioneer Communications of America**; four Triax cable systems have recently upgraded their equipment with the Pioneer two-way interactive BA-6000 addressable converter ... Gary Jones, president of **Jones Productions**, Little Rock, AK, sees a strong industry move toward CCD camera technology. "The benefits and advantages of CCD technology far outweigh those of tubes," says Jones, whose company picked up four **BTS** LDK-910 studio cameras and two LDK-91 portables for an all-CCD-camera mobile unit .... **LDL Communications** of Baltimore, MD, is installing an **Alan Dick** combiner and antenna on the tower of **KMSP** of Shoreview, MN. Purchased by the **Shoreview FM Antenna Group** partnership, the system will accomodate simultaneous transmission by the Group's eight stations .... Environmental limits on ground-level RF exposure and new FCC height requirements had **KGON-FM** of Portland, OR, puzzled. **Myat** supplied them with a $9\frac{3}{16}$-inch rigid transmission line for their 603-foot tower. Signals combined at the antenna building are carried through the Myat line. ■

People On The Move

Robert P. Seidel promoted to vice president of television engineering and David Horowitz to vice president of planning at **CBS Engineering and Development** .... Anthony R. Gargano to vice president of product operations and Paul Berger to director of recording systems product management for **Sony Communications Products Company** .... Phil Lerza to acting GM of **KFRC-AM** in San Francisco .... James L. Faust to corporate vice president international for **Scientific-Atlanta** .... Glenn F. Higgins to president of **Comtech Antenna Systems** .... Madga M. Saina to graphic services manager at **Grace & Wild Studios** .... Loren A. Swenson to president and Joycelyn R. Steil to executive vice president of **Cycle Sat** .... Forrest Watson to video products technical director for **Research Technology International,** Lincolnwood, IL .... Mark Hutchison to software engineer in the Columbus, OH, office of **Pioneer's** Cable Television Engineering Department. ■

Company News

Pesa Electronica, S.A., is taking full aim at the North American market now that they have acquired part of **3M's** broadcast business. **3M** audio/video routing switchers and character generators will now be sold and serviced under the **Pesa America** umbrella. In addition, a new U.S. engineering and manufacturing center has been set up in Huntsville, AL, under the aegis of **Pesa Industries** .... The U.S. operations of **AMS Industries plc** are expanding. AMS is moving its Seattle-based subsidiary to Petaluma, CA, while keeping the Seattle office for sales support .... **Panasonic Broadcast Systems Company** posted strong fourth quarter sales in 1989 thanks to a big boost from its new MARC II-400 automated video cassette systems (MII format) .... Robert N. Wold is wearing two hats these days with his recent launch of a consulting enterprise, **The Wold Organization, Ltd.,** based in Los Angeles, and as sales & marketing representative for **Hughes Television Network** .... Meanwhile, next month **Keystone/Wold International,** the international division of Keystone Communications, Los Angeles, CA, and joint venture partner, **VISNEWS International**, begin a new two-year contract for providing satellite transmission services for the Japanese International Satellite Joint Users Organization .... In the "let's pitch in and help our neighbors" department, **The Alta Group** helped **KQED** of San Francisco raise $2 million during the station's recent earthquake-relief telethon by donating needed TV equipment: three Cygnus 5.5 time-base correctors/field synchronizers .... Following up on the 1986 consumer-market release of "Digital System 3 with Sound by Bose" **Zenith** and **Bose** are again teaming up under a new five-year contract. The firms said the contract underscores their commitment to high-end home entertainment products for the '90s. On its own, Zenith hopes its new PRO840 digital projection monitor will have a broad appeal. Exhibited at the Winter Consumer Electronics Show, the system has hybrid lenses that allow it to be used at a distance of only 4'7" from the screen. ■

Booth 2534

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ATV at NAB; School for HDTV

By Peter Caranicas

NAB just wouldn't be complete these days without a major exhibit for advanced television technology. And this month in Atlanta, true to recent tradition, the National Association of Broadcasters is sponsoring a combined Advanced Television and High Definition Television Production showcase of products.

The exhibit will take place at the Atlanta Inforum—a new facility just three blocks from the Georgia World Congress Center, where the main NAB booths will be located. The Inforum's exhibit area of 100,000 square feet will be almost completely occupied by up to 50 exhibitors, says an NAB spokesman, assuring that this exhibit will "far exceed all previous advanced television exhibits in size and scope."

According to Lynn Claudy, staff engineer of the NAB's Science and Technology Department, which is the organizer of the ATV exhibits, the Inforum showcase will be divided into three areas.

First, the "HDTV Production Exhibits" will consist of demonstrations of HDTV applications for motion-picture production, electronic opticals, TV production and post, and HDTV-to-film transfer, as well as several business and scientific applications.

A major portion of this area's exhibits will be sponsored and implemented by the 1125/60 Group, a consortium of manufacturers and producers supportive of the 1125/60 standard. Most of the products shown will be based on that standard, although the exhibit is "open to any company that wants to show production or post-production equipment," according to an 1125/60 Group spokesman. While 1125/60 is the only high-def production standard sanctioned by a standardization organization, the FCC has all but precluded a transmission version of 1125/60 from ever being terrestrially broadcast in the U.S.

This fact makes for a fascinating juxtaposition between the production exhibits and the second set of exhibits, the "ATV Transmission" area, which will feature proponent systems for terrestrial transmission of advanced TV. Zenith, the Sarnoff Center, Philips and Thomson will be on hand, among others.

Finally, in a "New TV Technologies" area there will be demonstrations of other aspects of ATV. These will include: a digital 45-megabit-per-second NTSC transmission technique over fiberoptics, now being tested in eight markets by the networks and phone companies; a half-inch digital high-def VCR to be shown by Japan's NHK; a process called "Synthevision," also from NHK, described by Claudy as a "confluence" of HDTV and NTSC; and a demonstration of over-the-air NTSC ghost canceling, jointly shown by the Broadcast Technology Association (BTA) of Japan and NAB, in which Atlanta's six terrestrial broadcasters will participate.

An NAB badge is all that's required

HDTV equipment, such as this Sony HDC-300 HD camera, will be part of a special ATV/HDTV exhibit at NAB.

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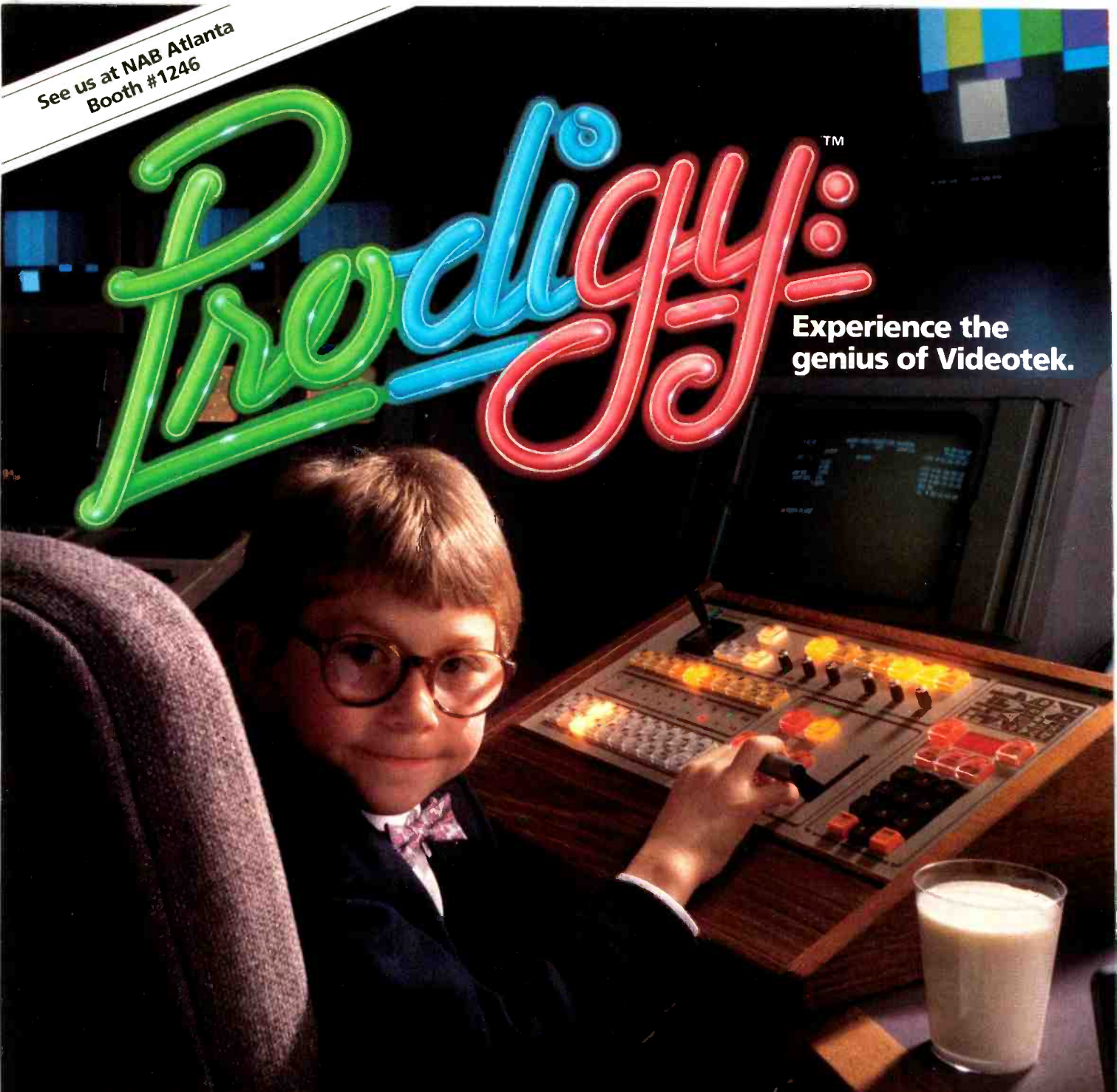

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for admission to the Atlanta Inforum, which will be open March 30 through April 2 (NAB's regular exhibits go from March 31 through April 3). Up to 30,000 attendees are expected.

SCHOOL FOR HDTV

As interest in advanced television spreads, the demand for more information is growing. Responding to this need, Captain of America, the New York-based high-definition production company, has organized an ongoing series of two-day workshops designed to educate participants about the new technology and the issues that surround it.

Called Advanced Communications Technology (ACT) Workshops, they'll be held at Captain of America's midtown Manhattan high-def production facility. Attendance is limited to 25 persons per course, and the curriculum has been tailored to three groups of participants. Group I will consist of direct end-users of high-definition products and services, including decision-makers in film, broadcast TV, cable, corporate video, advertising, publishing and medicine. Group II will be made up of members of industries that create HD-related products and services, including telecommunications, aerospace, electronics and financial institutions. Group III will be formed from the creative and technical arms of the production industry, including engineers, editors, directors, producers, camera operators, ad agency creatives, directors of photography and special-effects supervisors.

Curriculum is tailored to three groups. Group I will consist of direct end-users; Group II will be made up of members of industries; Group III will be formed from the creative and technical arms of the production industry.

The intent is to immerse each workshop participant in a high-def environment for two days. Equipment at Captain of America's 16,000-square-foot facility includes a full complement of HDTV cameras, recorders and post-production gear. Recently the company acquired a high-def graphics/paint system from Shima Seiki. While Groups I and II will witness several equipment demonstrations, Group III will receive hands-on experience with high-def hardware.

Workshop leaders will include: Hollywood producer/director Francis F. Coppola; Advanced Television Test Center program officer Ben Crutchfield; Association of Maximum Service Telecasters VP and FCC Advisory Committee on Advanced TV Service Planning Subcommittee vice chairman Gregory De Priest; CBS Engineering and Development VP Joseph Flaherty; telecommunications consultant Donald Jansky; Captain of America president and producer/director David Niles; House American Task Force on High Technology and Competitiveness chairman and HDTV Caucus cochairman Hon. Don Ritter; Captain of America information director and former CBS Production Systems analysis director Rupert Stow; University of Michigan Electrical Engineering and Public Policy Studies lecturer Wes Vivian; FCC Advisory Committee on Advanced TV Service chairman and former FCC chairman Richard Wiley; and HD Media Inc. President Dr. Robin Willcourt.

The Inforum's exhibit area of 100,000 square feet will be almost completely occupied by up to 50 exhibitors, assuring that this exhibit will "far exceed all previous ATV exhibits."
—NAB spokesman

According to Captain of America's Pat Kogan, "High-def will be part of the teaching process itself. Instructors will be videotaped in high-def as they teach. This will allow the accumulation of high-def software that will supplement the teaching of future workshops, as well as demonstrate the technology."

Although Captain of America is the parent company of 1125 Productions, a high-def facility that uses the 1125/60 standard for production, the workshops are in no way biased toward that or any other high-definition standard, according to the company. For further information, call Captain of America at 212-759-1125 (that's 1125, naturally). ■

"Instructors will be videotaped in high-def as they teach. This will allow the accumulation of high-def software which will supplement the teaching of future workshops, as well as demonstrate the technology."
—Pat Kogan, Captain of America

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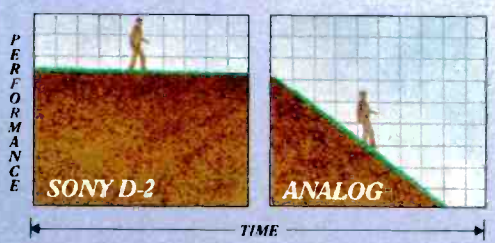

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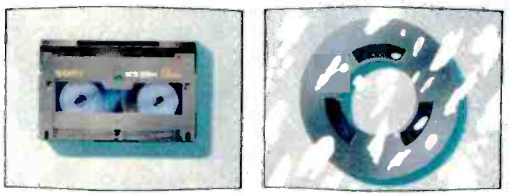
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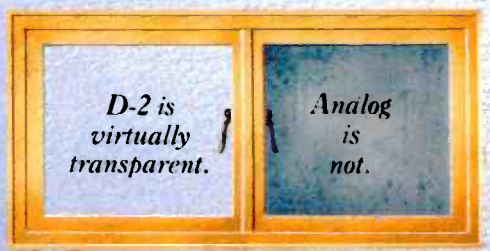

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They're "clones." Digital replications indistinguishable from the original.

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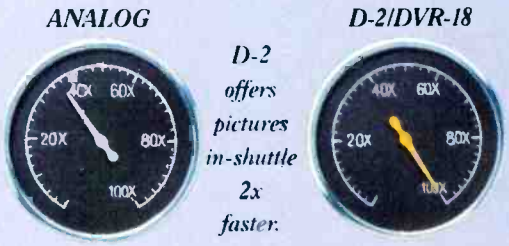

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QSound: Super Sound For The Superbowl

By Dan Daley

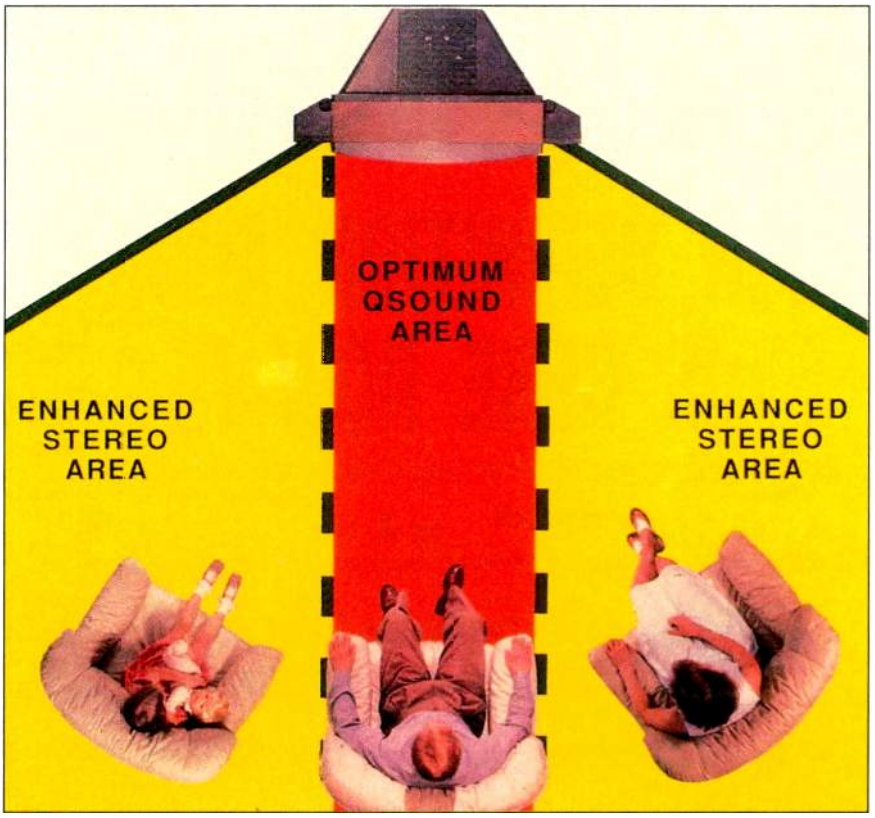
This past January 28, some viewers of Superbowl XXIV may have been thankful for copious supplies of beer in the fridge. Except perhaps for 49ers fans, the 55-10 blowout was about as tedious and predictable as a championship contest can get. Meanwhile, several weeks of prepping by CBS assured a flawless telecast, even allowing for local wind-shear effects on the Met Life blimp.

However, if you were watching—or rather, listening—closely enough, you might have heard something far more exciting than yet another Montana completion. Right after the two-minute warning break in the first half, Coke ran its Superbowl special spot, an "update" of the 20-year-old "I'd Like to Teach the World to Sing" spot. The Super spot opened with a couple of seconds of original footage, followed by new scenes shot on the same Grecian hilltop with many of the original singers. But if you were listening in stereo, the audio may have captured your full attention because the audio tracks were processed with an ingenious new system from Canada called QSound.

Part of a new generation of audio spatial manipulation systems, QSound is thus far the only available process that I've heard which can actually produce a true three-dimensional sound effect over two speakers.

QSound does not merely enhance the stereo effect; it discretely localizes multiple sound sources. One voice is heard slightly to the left at about a 25-degree elevation, a vocal group is further left and below it, another group to the right and higher, and the strings are heard as if coming from yet another area.

It's pretty spectacular stuff, and you can expect to be hearing more systems like it in the future. QSound



QSound's full effect relies on a "sweet spot" for listening, although audio is enhanced up to four feet on each side.

is the product of much experimentation by Dan Lowe and partner John Lees in Calgary, Alberta. Based on empirical results of computer-generated models of human hearing patterns, QSound is a computer software program through which audio signals are processed during the audio mix stage. Signal is sent from tape through a return channel to the software (at present being run on a IBM 386 Environment) directly to the stereo buss through to whatever mastering medium is being used.

In the case of the Coke commercial, which was QSound's public debut, music tracks were delivered to A&M Recording in Los Angeles where Shelly Yackus engineered and Dan Lowe supervised the QSound processing. (Both Yackus and studio partner/producer Jimmy Iovine—both of whom have scored numerous industry awards and recognitions—are associated with QSound, as is Todd-AO and mega-agency CAA.)

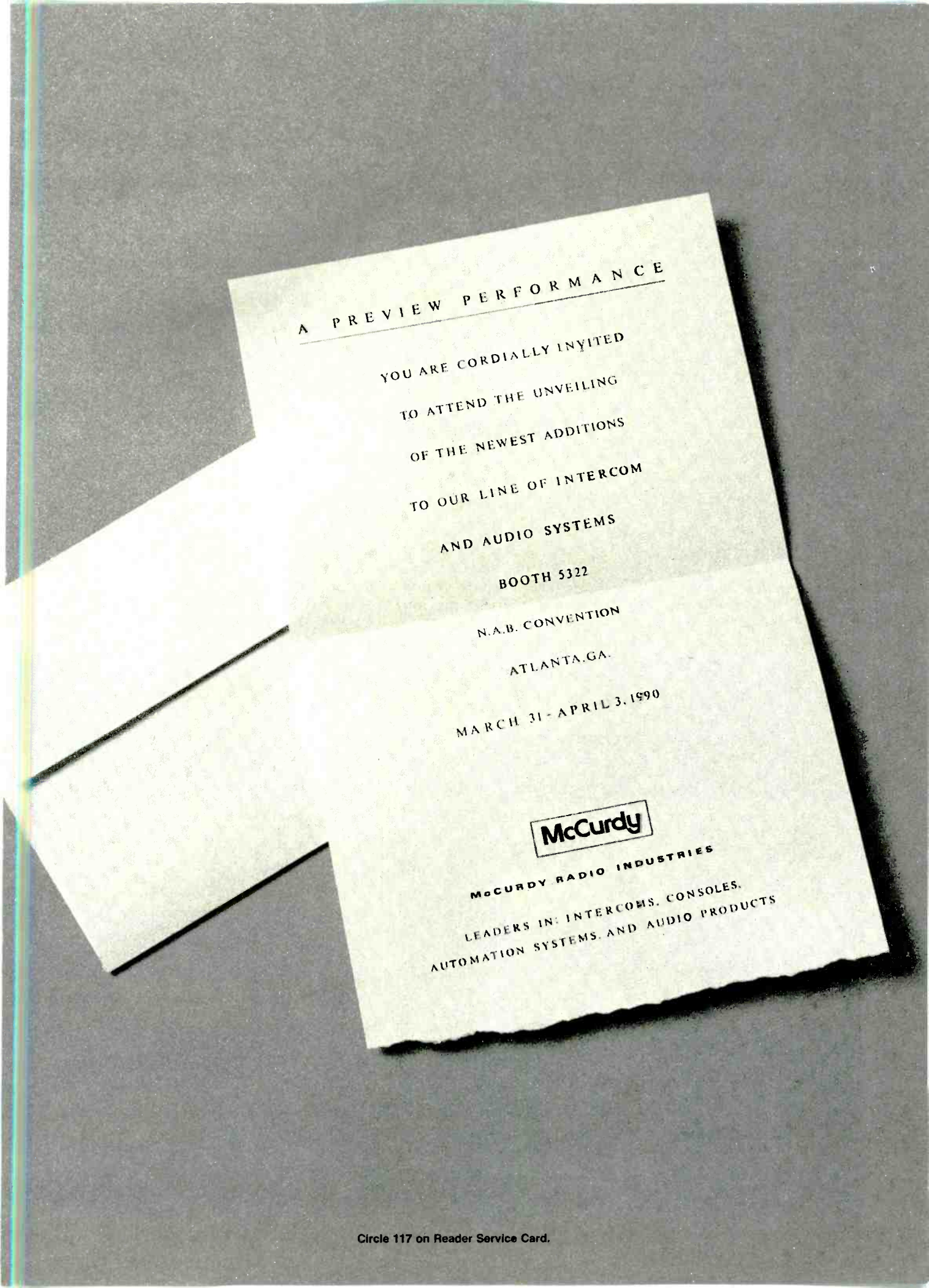
The mix, from a two-inch, 24-track master supplied by the McCann-Erikson agency, was recorded to a Sony 1630 digital two-track and then bounced down to a one-inch master

during playback for distribution to various broadcast centers during the Superbowl. Lowe says that about 36 percent of CBS's affiliates were capable of broadcasting the spot in true stereo. The remainder used either stereo synthesis or straight mono. Since QSound is mono-compatible, it will produce a clearer audio image, but not a three-dimensional one. Affiliates who were using stereo synthesis were asked to negate that effect during the Coke spot, according to Lowe.

While the manner in which QSound is applied seems fairly simple, the way it works is more complex than any other sound-enhancement system currently being broadcast. As Lowe describes it, audio input signals are sampled at 192 KHz (i.e., 4x oversampling) and after 56-bit precision computations, the samples are output at 24 or 16 bits, matching current audio industry standards. The software processes signals according to their frequencies, then the signals are computer-synched to compensate for the longer processing time needed for lengthy impulse responses. Results can be output in analog or in digital, at either the 44.1 KHz or 48 KHz rates. The system uses a remote control that has an I/O for each channel and a six-axis joystick.

Sound from the "Hilltop Singers" was processed through QSound software for the Pepsi Superbowl spot.

The bottom line is this: The encoding takes place in the studio during mixing via the processing through the software; decoding equipment is unnecessary since, as Lowe puts it, the listener's auditory system itself is the decoder. Individual listeners are the individual decoders, meaning that QSound has no hardware requirements either at the broadcast or



Circle 117 on Reader Service Card.

the reception stage.

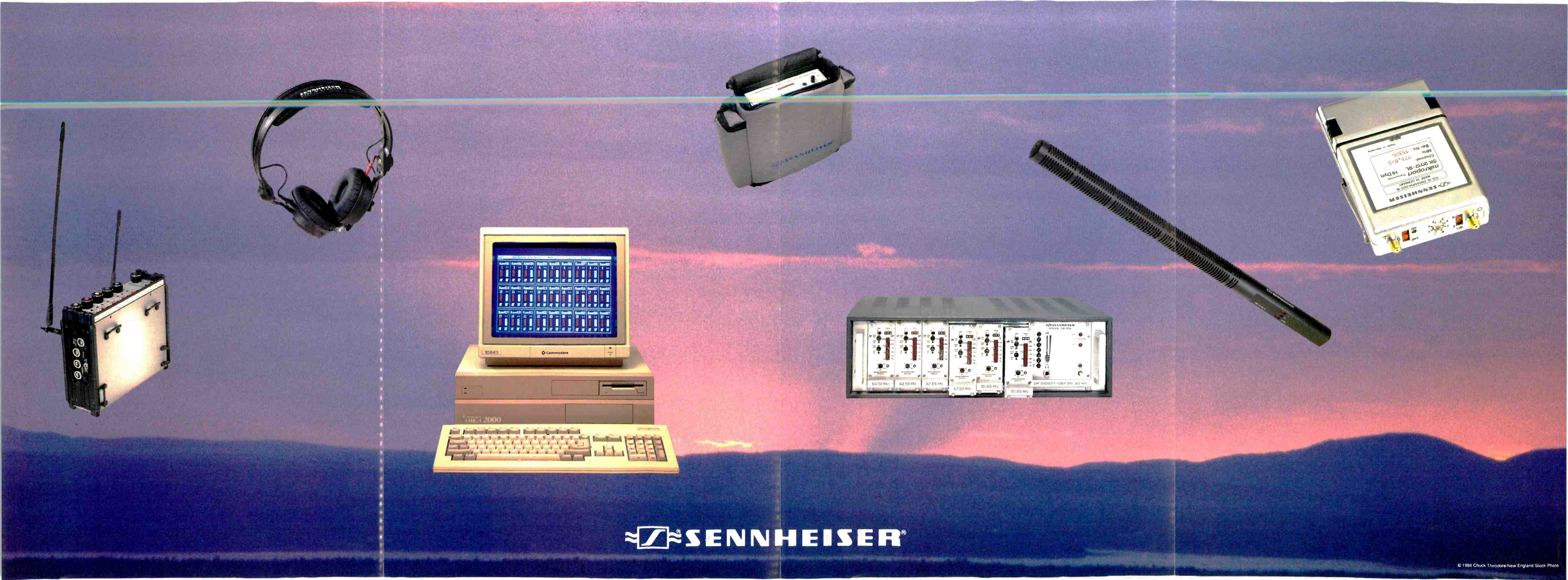
As effective as QSound was on the television spot, Lowe contends that the system was not used to its full potential, partly because in a 30-second spot, the shock of the new sound could cause viewers to miss something on the screen, which could hurt product identification. Until QSound becomes more familiar to broadcast listeners—which of course depends on further penetration of stereo television into the marketplace—this could be a problem for some spots, although a problem a lot of advertisers might welcome. It certainly gets one's attention. A stereo radio spot of the same commercial is using a more pronounced effect, according to Lowe.

The only technical drawback with QSound is its dependency on a sweet spot for listeners to perceive the full effect. In an earlier version of the technology I heard in Calgary last October, the effect dissipated considerably when the head moved to either side. QSound's sweet spot has been broadened considerably between then and last January when the Coke spot was mixed. However, the full effect is still limited to an area a couple of feet wide directly in front of the speakers. That, Lowe asserts, will be widened further by the time this article has been published. But QSound does produce an enhanced audio image up to four feet on either side of center.

QSound has no hardware requirements, either at the broadcast or the reception stage.

The fact that this technology was first applied in a broadcast setting gives more evidence of how important audio for video has grown in the last few years. And taking television audio to this level certainly shows off the promise and potential of stereo television. But more to the point, the QSound/Coke spot was a graphic demonstration of the fact that the way things get heard—broadcast and otherwise—will be changing dramatically in the very near future.

Dan Daley is a New York City-based freelance writer specializing in audio technology.



SENNHEISER®

User-friendliness is standard on the Mikroport; no special instruction or training is required, and the software automatically boots itself. Each channel shows RF level, audio level (% modulation), and diversity/squelch status; color-codes alert you to drops in RF level or increases in audio level. Using the computer's name editor, each channel is labeled with the name of the actor being miked via that channel. Close-ups of three channels can be summoned at a touch, and the Mikroport Display supports slave screens so crew members at other stations can monitor RF status as well. A truly state-of-the-art digital unit, the Mikroport Display's interface measures each channel 25 times per second.

How It's Used: The Mikroport Display gives a detailed yet easily comprehended overview of a large multichannel RF wireless system, alerting you to problems before they happen. The slave screen feature has been put to use in the Broadway hits "Phantom of the Opera" and "Starlight Express," in which a slave screen backstage enables the technical crew to quickly identify and remedy any problem, such as a broken antenna, thus assuring a flawless technical performance every night.

Even multi-event sports team coverage such as track and field is well supported by the Mikroport Computer Display. In fact, anywhere that multichannel RF problems can occur, the Mikroport Computer Display is the solution.

ENG 2003 Portable Wireless System

Originally developed by Sennheiser for a major network to use in covering the 1988 Summer Olympics in Seoul, the ENG 2003 is a full-featured, true-diversity UHF receiver for all ENG/EFP applications. Lightweight and easy to use, the ENG 2003 comes with a 12-hour rechargeable battery, charger, output cable, and a diversity antenna system built into the shoulder straps of its sturdy canvas carrying bag. The ENG 2003 is available in two transmitter/receiver configurations: the UHF 2EB for body pack/lavalier mic applications, and the UHF 2EH with a handheld microphone/transmitter.

How It's Used: The ENG 2003 is made for broadcasters who demand transmission reliability in a wireless microphone system. The diversity receiver measures the signal strength from each antenna and selects the strongest one, always providing strong, dropout-free reception. For remote work—for instance, when a talk show goes on location—the ENG 2003 is an ideal choice, a high quality RF wireless system in a small package. High-density RF environments like urban centers and airports pose no problem because the ENG 2003 is available in a wide range of frequencies.

EM 1036 Multichannel Receiver System

A rack-mountable modular receiver system, the EM 1036 features up to either three diversity or six non-diversity channels. Each rack uses six slide-in receiver cards, so a system can be quickly and easily reconfigured, even in the field. The EM 1036 features maximum intermodulation rejection, sharp input filtering, and can handle closely spaced signals without desensitization. Like all of our RF wireless products, it uses the Sennheiser "HiDyn" companding system to maximize dynamic range and minimize noise.

How It's Used: The EM 1036 really shines in television production. Used in a myriad of programming categories—from news to sports to entertainment—the EM 1036 assures a clean, interference-free signal every time.

MKH 70 P48U Condenser Microphone

The latest in Sennheiser's highly directional, transformerless microphones for which Professor F. Sennheiser received the Academy of Motion Picture Arts & Sciences *Scientific and Engineering Award*. This new supercardioid mic's symmetrical push-pull transducer virtually eliminates intermodulation distortion yet increases headroom. Not an electret element, the transducer is a true condenser element of a tuned circuit which forms a phase-sensitive demodulator in conjunction with a stable RF oscillator. A low-noise Class A amplifier follows, providing a balanced, transformerless output. The MKH 70 has an extremely low inherent noise floor and exceptionally high sensitivity. A full array of accessories are available, including a light yet rugged windscreen, a battery power supply (with a low-cut filter and a switchable 10- and 20-dB attenuator), a shock mount, a pistol grip, an AC power supply, and a microphone bracket.

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How It's Used: In high SPL environments such as sports broadcasts, the MKH 70's 10 dB pad is easily switched in to avoid overmodulation. The low-cut filter (18 dB/octave below 50 Hz) and high-boost filter (+5 dB @ 10 kHz) let you optimize the frequency response for both near-field and distance miking. In television production, the MKH 70 has already been used on some of the major networks' most highly rated prime-time shows. The MKH 70 excels in the field, be it news, sports, or any EFP project. Its directionality (sounds above 1 kHz and 60° off-axis are attenuated between 15 and 25 dB) and super-low noise floor makes it ideal for nature shoots. And it doesn't matter whether the location is the local zoo or central Africa—the MKH 70 can take the cold and withstand high humidity.

SK 2012 RF Wireless Pocket Transmitter

The SK 2012 is an extremely compact wireless transmitter with the features broadcasters need: "Hi-Dyn" companding noise reduction; eight-position input sensitivity control; strong, durable aluminum shell; very low spurious emissions; defeatible limiter/AGC; long battery life; reversible belt clip; and electret element bias. The transmitter operates on a single carrier frequency and is available in the VHF range 160 to 216 MHz or the UHF range 470 to 950 MHz.

How It's Used: The SK 2012 is light, durable, and perfect for concealed lavalier microphones. Thanks to the "Hi-Dyn" companding system, it features unsurpassed audio quality with wide dynamic range and very high signal-to-noise ratio. The SK 2012 is popular with many stations' news anchors and weathermen, who no longer need to "plug in" and "unplug" upon entering and leaving the news set, giving them wider freedom and mobility and fewer technical problems. The small, powerful transmitter is also a favorite of network on-air talent.

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Sennheiser is a leading West German electronics company established in 1945. Sennheiser develops, manufactures and markets high-quality headphones, microphones, wireless RF, infrared and active noise compensation products, as well as audio test equipment.

With these products, Sennheiser services a variety of industries, including the film, broadcast, sound reinforcement, professional audio, hearing impaired, musical instrument and consumer electronics market.

Sennheiser strives to provide application-oriented equipment and services for the professional and to supply the consumer with products of the highest quality.

Sennheiser has received numerous international patents and citations, including the distinguished Scientific and Engineering Award of the Academy of Motion Pictures Arts and Sciences.

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Flawless audio starts with listening. Sennheiser devotes a lot of time listening to broadcast professionals and learning what they want and need. Care and attention to detail went into the design and manufacture of Sennheiser's new broadcast audio-for-video line; the effort manifests itself in unsurpassed performance.

Sennheiser products will provide you the sound quality your audience demands as broadcasting enters the digital audio age. Our philosophy has always been to peer beyond the technological horizons before us and be ready for the progressing needs of audio professionals. Take a look at what we've developed and see how it can help your operation maintain its highest audio-for-video standards.

WM-1 Wireless Mixer

Designed for field and on-location applications, the WM-1 Wireless Mixer is built to meet the most stringent demands of any ENG or EFP operation. This portable mixer has five channels and operates on either internal or external DC power. Four channels are fitted with RF receivers to interface with wireless microphones; the fifth channel has a balanced input for mic or line-level audio sources. Each channel has two-band equalization, a switchable 70 Hz high-pass filter to reduce low frequency rumble, pre-fader listen, gain adjustment, an on/off switch, and an LED bar graph indicator for audio level or RF field strength; all of these controls are located on the front panel, making the WM-1 one of the most ergonomically efficient professional audio products available. The WM-1 provides a line level audio output and—for when the mixing engineer is located away from the camera or the tape recorder—an RF transmitter, which makes the WM-1 truly a wireless mixer; no more laying hundreds or even thousands of feet of cable!

How It's Used: For multi-event on-location sports and news gathering, the WM-1 brings in crisp, clear audio from every field position with mobility and versatility, and saving hours of set-up time.

HD 25 Professional Dynamic Headphone

Designed for both comfort and performance, the sealed-type HD 25 stereo headphone is the ticket for anyone who spends a lot of time wearing headphones. An adjustable split headband provides an optimum fit and the single side audio cable won't inhibit your range of movement. The HD 25's closed earcups provide 40 dB of isolation, or you can flip one driver off an ear to keep in touch with immediate surroundings. The HD 25's aluminum drivers provide extremely accurate sound reproduction. It's frequency response is a broad 30 Hz to 16 kHz–more than adequate for broadcast–and its 70 ohm nominal impedance and 124 dB maximum SPL insures loud and clear communications. The HD 25 comes with a durable steel-stranded cable terminating in a 3.5 mm stereo plug as well as a quarter-inch stereo phone plug adaptor. As with all Sennheiser headphones, it's built to last.

How It's Used: The HD 25 is the perfect headphone for field production use. "Radio on-air talent love the HD 25 because one of its muffs swings away from the ear so easily," said Klay Anderson, vice president of Performance Audio in Salt Lake, Utah, who also does special project mixing for the Corporation for Public Broadcasting. "And I think they're tremendous. I love to do live mixes on them, especially when doing digital audio. They're compact and very accurate."

Mikroport Computer Display

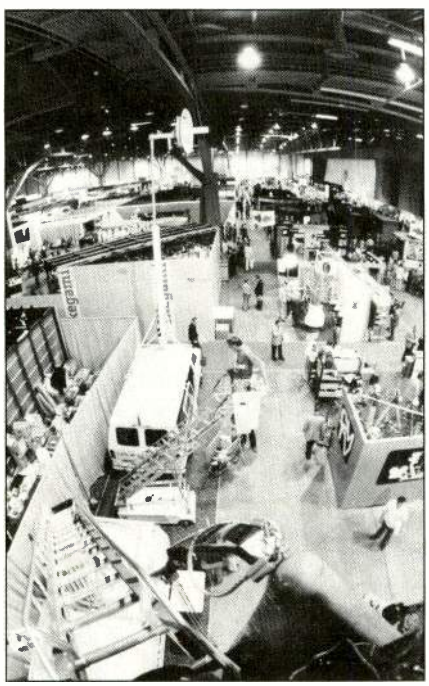
In a crowded RF environment, the Mikroport Display, interfaced with a standard Amiga® personal computer, gives you real-time status information on an array of wireless microphone channels. As many as 27 wireless channels can be monitored reliably, with color-coded bar graph data arranged on the screen in an orderly, efficient way.

NAB 1990:

THE SHOW OF SHOWS

When the National Association of Broadcasters holds its annual convention in Atlanta, March 31–April 3, the event will attract an international who's who from the worlds of broadcasting and teleproduction. This year's 50,000-plus convention-goers might include President George Bush (rumored to be planning an appearance), and will certainly encompass top brass from the three networks (ABC's Tom Murphy, CBS's Larry Tisch and NBC's Bob Wright), the FCC commissioners and a gaggle of congressmen and senators, not to mention hordes of lobbyists, bankers, attorneys and consultants involved in the broadcasting industry.

What makes all this possible, of course, is the convergence at NAB of most of the nation's TV- and radio-station general managers and engineers—plus owners, operators and engineers from well over a thousand teleproduction and post facilities nationwide—who come to the show to sample the latest in the audio and video technology that makes their business possible. Greeting this group are the booths of nearly 800 manufacturers—manned by armies of sales engineers—from around the world who consider the NAB their big opportunity to sell products and improve market share.



On the following pages, *Television Engineering* previews this year's show in three parts. Part One, "NAB Decisions: To Buy or Not to Buy," looks at NAB from the point of view of engineers who go there to buy equipment. The engineers interviewed also happen to be members of *Television Engineering*'s Editorial Advisory Board. Their insights into today's and tomorrow's technology put the vast equipment supermarket into perspective.

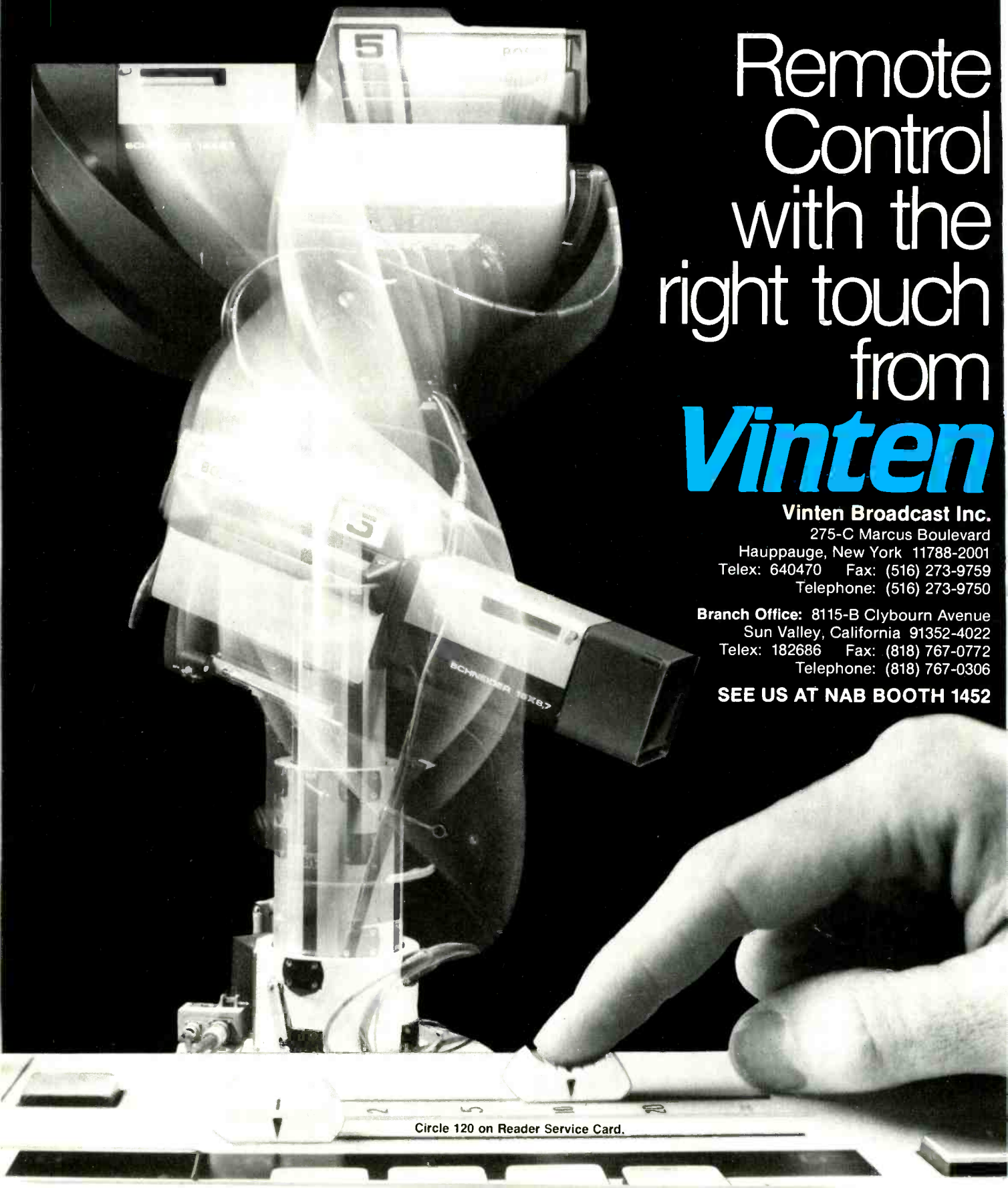
Part Two lists every exhibitor of TV-related equipment, along with descriptions of what each company will take to NAB this year. New equipment is mentioned first. Attendees can use this section for planning their booth visits. The information was compiled by Senior Editor John King following an exhaustive mail poll of each exhibitor. (Convention-goers interested in advanced and high-definition TV equipment should also visit special exhibits at the Atlanta Inforum, an arena separate from the Georgia World Congress Center, where the main exhibits will be housed.)

Part Three outlines the TV engineering and management programs, including all relevant technical sessions and panel discussions.

In its June issue, *Television Engineering* will present its post-show NAB report. There will be much to write about. This year's show promises sharp technical advances, countless debates over formats and standards, more manufacturer mergers and shakeouts, and pressures on users to make the right choice. Stay tuned.

—*Peter Caranicas*

Microswift



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NAB DECISIONS:

TO BUY OR NOT TO BUY

Members of Television Engineering*'s Editorial Advisory Board discuss the pros and cons of purchasing versus browsing at the largest broadcast-equipment market in the world.*

By Tom Soter

JIM BARTEL
CHIEF ENGINEER
POST EFFECTS/
CHICAGO

Why do you go to NAB?

Because it's the largest equipment show of the year, and an opportunity [to review] every [kind of equipment] at one time. Not only to look at the equipment, but also to see what's happening in the industry, and to get feedback from your counterparts in other parts of the country. And to see where manufacturers' thoughts are these days. And it's an opportunity for manufacturers to see what the broadcasting industry needs, and how that compares or contrasts to the needs of post-production.

Do you do a lot of buying there?

It is probably the pivotal point for our yearly purchases. The greatest percentage of purchasing occurs at NAB, or soon after.

Are you ever surprised at what you see at NAB?

It depends. A lot of times we might know what's going on. If we didn't have beta test-site relations with [manufacturers], we probably would be surprised more often.

Will you spend more or less for equipment this year?

Probably more. A lot of new technology has developed over the last few years, and we've made some major purchases. The D-1/D-2 issue has probably been prevalent in the industry. We're supportive of both formats.

Will you be looking for developments in D-1 and D-2?

Sure. A lot of the [buying] decisions are based on the needs of the post-production industry's clients. I would love to have a full D-1 edit suite, plus a D-2 edit suite and everything that's available, but the determining factor is client needs.

Is the industry expanding?

Certainly the number of post-production facilities [at NAB] has grown. I'm sure a lot of that has to do with the proliferation of low-cost video hardware, and with the increased number of people competing for the production market. Equipment manufacturers [have also grown]; look at the growth in floor space at NAB over the last few years. There's a lot more to choose from. There's also been the growth of companies that were rela-

tively small five or six years ago.

Is there optimism or pessimism in the industry?

There's optimism for the growth of the industry, but pessimism over the problem of how many times you can slice up that pie before you reach some sort of saturation point. In post-production, that's always a concern. There is more and more work available, but there is caution about the amount of new companies that are there to service that market. Their number might be growing a little bit quicker than the market is growing.

Is there more pressure to spend wisely?

Without a doubt. Post-production facilities in the '90s are going to be a lot more frugal, and much more calculated in their purchases. We have to treat everything in a more businesslike way, and ask, "If I buy this piece of hardware, when do I pay it off?" People will buy a piece of equipment because it's the best thing, but also because within three years, when its technology becomes obsolete, it will have paid for itself.

What advice would you give first-time NAB attendees?

Make sure that while you're at the show, along with everybody who's anybody in the industry, [you] take the opportunity to compare and contrast and shop and spend time doing a lot of research for purchases you're going to make in the coming year. In general, talk with people. Find out how facilities like yours in other markets do things. How are they doing? Where do they feel the technology is going? Basically, the whole idea of these conventions is for people to talk with one another.

RICHARD EDWARDS
VICE PRESIDENT/ DIRECTOR OF ENGINEERING
GUY GANNETT BROADCASTING SERVICES/MIAMI

What are you planning to buy at NAB?

Absolutely nothing.

So why go?

Usually we use it as a springboard to get the [station] group together, to have our own meetings and get some camaraderie going. We'll do that this year. We have a pretty tight schedule; we have actual meetings set up in advance for the properties and their needs. Specifically, we'll probably look at weather systems. Character generators are always a nice thing to look at. But by and large, we're in the wind-down stage of modernizing our facilities.

How will this NAB be different?

There's more of a selection in certain areas. Character generators, time base correctors, lots of switchers. Everybody's coming out with different types. But there's fewer things like transmitters and antennas, unless you're willing to take a gamble with companies that might be underfinanced.

Why is that?

Good question. It's my understanding that not an awful lot of dollars are being spent at broadcast stations. We're somewhat the exception. And with that, I guess most businesses are having a tougher time making it, with everybody cutting things closer than they used to.

Is the climate at NAB more pessimistic than it used to be?

Let me tell you something that concerns me. While we all work to get the best deals for our respective companies, I also try not to push too hard on prices because I want to make sure that a company's around down the road to support its equipment. There are lots of companies that, to get that last sale, will cut it too tight. They'll lose money on it, and they'll lose the company. I'm not nearly as hard on pushing prices as I used to be. Maybe I'm mellowing out.

Do you have advice for new attendees?

I can tell you what I do. I start in a very systematic and logical way. First day I get there, I always schedule two hours, and I start at Point A and I walk in a very fixed pattern down the aisles, and zig-zag my way back, without duplicating steps. I'll make notes if there is something of interest, not stopping at the time, but making a note where it is and then coming back later to deal with it. And if it's something of large importance, I always stop and make an appointment for after-hours time to come look at it. If you're not organized at NAB, then you just won't make it.

NEIL FELDMAN
PRESIDENT
VIDEO POST & TRANSFER/DALLAS

Are you planning to buy?

I usually have that in mind. We have a list of things we want to look at, but sometimes we find things there we hadn't been thinking about—something new—and we may buy it on the spot.

What are you looking for this year?

We'd like to see a new D-1 recorder from Sony, one that—if I could write the specs for it—would have either 4:2:2:4 or 4:4:4:4 capability, and 10 bits. Why? Because we already have a DF/X Composium; we have a Vertigo. Those are 4:4:4:4. And we would like to get the highest-quality component digital signal possible. If we can't have 4:4:4:4, we need at least 4:2:2:4, so we can track the matte channel. We'd like that machine to have some slow-motion still-frame capability.

Right now, if we do any special effects, which is really where component digital has found its way in post-production, the matte channel is forgotten, and

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that's the channel that allows us to do our layering. If we see [a matte channel], we will be very encouraged because basically we are looking at component digital devices. We're looking at enhancements to our routing system that will take care of both component and composite video. We'll be looking at composite digital switchers.

Are you spending more or less than last year?

I spent well over $1 million last year; I think we'll be [spending] less this year.

Do you expect NAB to be different this year?

There are more competitors for small-end products, but I'm not expecting any breakthrough technologies at this show. One other thing—I'm real anxious to see some low-cost optical read/write disk systems.

Are you aware of what's going to be there in advance?

No. About a week before NAB, the companies that think they have something significant will send out teasers, or perhaps announcements. Normally NAB is where people show new things. We don't know what the surprises will be.

Is the pressure to spend wisely greater now?

I don't think the the pressure is any different now than at any time before. The pressure is to be able to find the technology that will last long enough to get a return on the investment and also enhance what we're trying to do in our facility. The only difference now [at NAB] is that there is more of a consolidation among the manufacturers. I'm not particularly pleased with that because it eliminates competition and creates megacompanies that have the potential to be less responsive to day-to-day problems. For instance, I don't think Sony was very interested in D-2 until Ampex pushed the D-2 format and Sony responded.

Do you have advice for first-time NAB attendees?

It helps to know what it is you're looking for. It's a big show and it's hard to see everything. I usually spend the first day just running through everywhere and have a feel for where everyone is and see if I can pick out anything different. But the real beauty of NAB tends to be with the hidden gems. Not the people making a lot of noise, but with the new companies that may be on the floor of a show for the first time, or exhibiting in suites, where you get to see something you really hadn't expected. That's always been the case for us. Many of the devices we've ended up picking up were, in a sense, well off the beaten path.

Can you give an example?

Years ago, there was a company that was showing something they thought was an editing device that would display successive frames of video. At the time, we were intrigued by the idea of automatic scene detection on our film-to-tape transfer units. I wasn't pleased with any of the commercial devices that were available. When I happened to see this particular device, I realized that we could come up with what I call a foolproof automatic scene detector by [adapting it].

You built on what they had?

Exactly. They were just hidden somewhere [at NAB]. I probably walked past them 10 times and didn't see it. Those are the kinds of things that happen quite often at NAB. It's very exciting when that happens.

ROBERT FREY
DIRECTOR OF ENGINEERING
PACIFIC VIDEO RESOURCES/
SAN FRANCISCO

Why do you go to NAB?

Mostly to see new equipment. It's the one opportunity a year to talk to the design engineers and the people who don't make [it to] other shows about the products they're developing or have on the market.

Do you buy a lot?

No, not right at the show. You're there for three hours, after [which] your feet hurt, your eyes are glazed over, you've got about 18 business cards, and you're already having trouble remembering who was who. You're not in a good place to make an intelligent buying decision. You [find out] who to talk to for more information. It's always better to make an evaluation after NAB. The only time we place orders at NAB is when we see something we know is hot, and if we want any kind of reasonable delivery, we'd better get an order in as soon as possible.

Do you expect to buy more this year?

Probably not. The whole industry is in a down trend. Our facility is fairly complete right now. There's nothing on the market that is a real "need-to-have" kind of unit. In general, the post-production marketplace is pretty saturated. We're more interested in maintenance and capital improvement.

Will NAB be different this year?

No, about the same. But, attendance is not reflective of how many sales take place. It's a tremendously useful show, although it's never been a great show for people in the post-production field. It's a broadcaster's show.

What advice can you offer attendees?

Wear comfortable shoes. Get a lot of sleep ahead of time. If you're not very well prepared for what you need to get out of the show, you're going to end up wandering around the floor in a daze, bumping into things, and not being sure of the value of the whole thing. What I always do is prepare lists of who I want to talk to. I always have meetings with facilities from other

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parts of the country. It's the only time in the year where we can get together. I spend a lot of time organizing. Then I always leave myself time away from the floor, back at the hotel room and review what I got done, see if there's any follow-up I need to do. And [do] not feel like you have to be on the exhibit floor for eight hours.

PATRICK HOWLEY
PRESIDENT
POST PERFECT/
NEW YORK

Are you going to NAB?

I go to every NAB. We're sending about six people this year. It's the major convention where all the new toys are unveiled.

Do you buy there?

Some manufacturers make it very attractive for you to buy at NAB. Generally, if a company comes out with a new product, they won't take your order until you can physically see it. So there will be a few booths I'll hit first thing, and if I see the device and it looks like I want it, I'll sign up on the list.

How long does it usually take to get equipment you order that way?

A lot of manufacturers go to NAB with a prototype that's 90 percent done. It takes them a year to get that other 10 percent done. And then it takes a while to deliver them.

Are you spending more or less money this year?

About the same. We made a lot of purchases the year before we opened, [at] NAB in 1987. We bought millions and millions of dollars in equipment. Then in '88 we went in and spent another $3 million, because we radically increased the size of our facility. [In] '89 [we were] fine-tuning, adding extras, adding digital converters, D-2 machines, an extra machine here, an extra Betacam there. In '90, it's the same kind of thing. Fine-tuning. We're opening up a new interformat room. And we're looking at audio mixers that handle digital and analog as well as four channels of sound, because the majority of our recorders are D-2 machines, which are four-channel devices. Nobody right now is making a very user-friendly audio board which hooks up to a CMX that does full four-channel manipulation and four-channel preview. We'll also be looking at black-and-white high-resolution CCD cameras for titling; digital converters; decoders and encoders; any changes in D-1 machines; and at D-2 peripheral devices. The next time we buy some D-1 stuff will be 1991.

Besides buying, what are NAB conventions good for?

They're good for wearing out a good pair of shoes. It's a place where you can go meet people in your business; talk with manufacturers; go off to the side and grab their ear. It's the right atmosphere to sit and talk about future products. It's a very hard place to sit and play. You have to schedule your demos before hours or after hours. Because if you hope to sit down and see what the latest whizbang from Grass Valley does, 47 people will be sitting there also asking questions.

Has NAB changed during the years you've gone there?

It's too big. It gets bigger every year. I don't think a company could send one person to cover NAB. We each go with our assignments and meet once a day and compare notes. One year we sent 12 people. You go with a target. For instance, one day I will go to look at certain booths where I'll find products that I'm in the market to buy. Only after you've done that do you look at everything else.

Is there more pressure to spend wisely?

Oh, yes. Return on investment is becoming a much-used term. There's now a tendency not to buy something that would do no more than make it nicer. There's a tendency to say, "If we had this, could we make any more money?" You always want to lead the market. But we don't want to keep adding whistles and bells we can't charge for.

STANLEY KRONQUEST
CHIEF ENGINEER
HSN TELEMATION/
SEATTLE

Why do you go to NAB?

Because I'm buying a Rank-Cintel Ursa. It's the latest model Rank, and we're adding a telecine. The deal's final; they're using mine as a demo, and I want to make sure it works. That's why I'm going.

Do you buy much?

We hardly buy at NAB at all. We never really have. We buy any time we think it's the time to buy.

Then why do you go there?

I think it's habit. It's the annual grand convocation of the video and the old broadcast crowd. I don't know what the hell happens there.

Do you exchange notes with people on what they've bought?

We do all that at the International Teleproduction Society Forum. We make the ITS, not the NAB, our official gathering. We decided that would be the company's policy. And that's probably why we're lukewarm about the NAB.

Has the NAB changed?

It's gotten bigger. It's harder to do business there. It's terribly confusing.

JOSEPH MAHEDY
CHIEF ENGINEER
CHARLEX/NEW YORK

Why do you go to NAB?

To have meetings, to evaluate new technology that's coming out, to purchase, and to have a lot of fun.

Are you planning to buy?

Yes. [Charlex will] be spending more [than last year]. We'll be looking at

digital editing rooms, digital switchers, effects units, D-1 and D-2 tape machines. Basically digitally stuff. Maybe some 3-D animation. We have a lot of D-1 equipment here and we're looking to expand that.

Is NAB a place to browse or to buy?

Both. Lots of times the manufacturers are just showing items in demonstration form that are not real products yet. Sony showed a digital effects unit last year that's not purchasable yet, but it kind of shows which way Sony is going. NAB is a [means] to test the waters. [Also,] delivery is important on digital equipment now. If you have it, you can use it right away, and you can make some money up front before anybody else does.

Have things changed at NAB over the years you've attended?

It's grown. It's very difficult now to do the rounds in the few days that you have, as well as attend private showings in hotel rooms. At the end of every day, you [should] have a team meeting to discuss [what you want to see]. It's almost too large. A show the size of SMPTE is a lot more manageable.

Are you ever surprised by what you see at NAB?

No. Disappointed, yes, [when] things aren't really working as they claim [they should].

But it's useful to go?

Absolutely. This is the convention where you can see anything and everything.

Is there more pressure to spend wisely?

Absolutely. Because of the fierce competition—from little boutique houses to very large production houses—you must be able to find ways to do effects without spending millions and millions of dollars. You must cut down on your staff. You must be very versatile. And buying the right piece of equipment could be life or death to a small company. You invest half a million dollars in something and it never gets off the ground, it could be a real problem. You have to make the right decisions and sometimes they have to be made at NAB. In terms of delivery of equipment, you can gain quite a reputation if you have it a month before anybody else. [Competition at NAB for placing orders] can be very fierce.

What advice could you offer first-time attendees?

Be well prepared. For items you're interested in, call up the manufacturers at least a month before. Set up some appointments. They welcome that. Make realistic plans—where you're going to be in the morning, where in the afternoon. There are times you're going to have to wait an hour or two to see a demonstration. I'd make appointments beforehand for private demonstrations. Determine what you want to see, what you intend to buy, and then do some investigations well in advance of the show.

KENNETH D. MILLER
VICE PRESIDENT, ENGINEERING
CAPITOL VIDEO/ WASHINGTON, DC

Why do you go?

It's a chance to see a lot of equipment I don't have in my facility, and to generate new ideas on new ways of doing things. If I can keep away from the salesmen, I might find someone to talk to; usually there's an engineer or two—though not nearly as many as at SMPTE You can discuss some of the problems you're trying to solve and find new and inventive ways to do it.

Do you buy a lot?

Never. I figure that any deal they offer you on the floor is good any other time of the year until they raise prices. I go there to formulate new strategies or reenforce an old one.

What will you look at?

If Sony comes out with a serial D-1 machine and a lower-priced D-1, we'll check that out.

Will you be spending more money this year?

No, nowhere near. Last year, though, we spent over $1.5 million. We were in the midst of an expansion.

Has NAB changed in the last few years?

The essence of NAB has not changed very much, but every year it becomes a larger and larger show.

Is that good?

I'm ambivalent. I'm glad everything is there. If there's a question I have or a germ of an idea, [I can talk to someone at NAB]. But to get anything answered in depth, that's difficult because you stand in line for everything.

Are you optimistic about the industry?

Technologically, it's a runaway. There are so many new technological ways of doing things: machine controllers, switchers, routers. I'm very optimistic. What I'm not optimistic about is HDTV.

What advice would you offer a first-time attendee?

Formulate some sort of priority list about what you'd like to see, and take the first half a day to get a feel for where everybody's located, and estimate how long it's going to take to get around. Then, bright and early the next day, start knocking off the list.

Are you ever surprised at NAB?

No. The drumroll is long and tedious.

ROBERT MURCH
VICE PRESIDENT, ENGINEERING
WPIX-TV/NEW YORK

Why do you go?

First, we go to look and see what's new. We do some comparison. A lot of companies like to release what's new at NAB. Some of the presentations are good to hear and might save you some aggravation.

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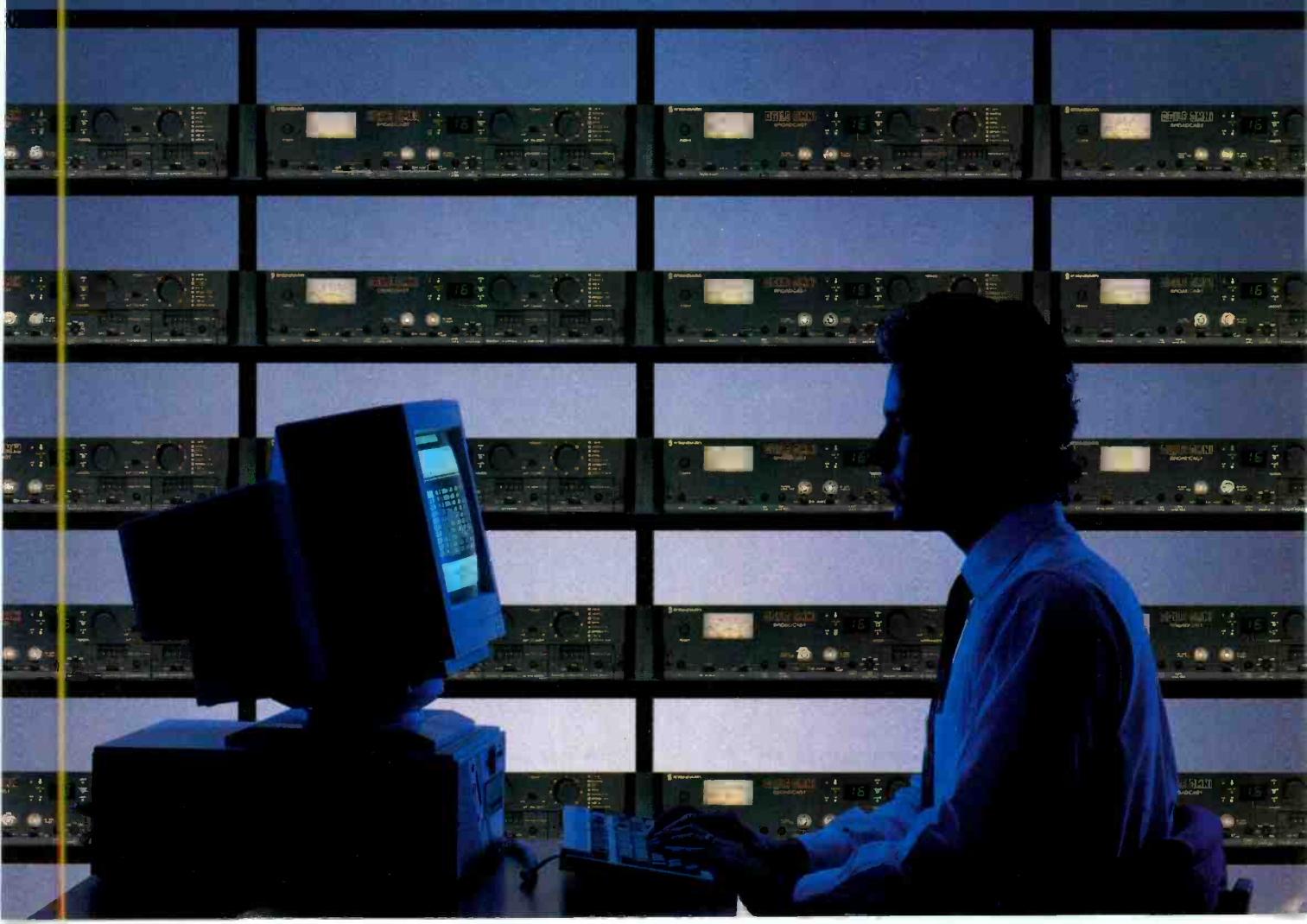


Is there a particular type of equipment you're looking at this year?

We're looking very hard at large cart machines. That's one of the top things. More ENG trucks, and probably an SNG truck as well. We are also looking at titling and graphics equipment.

Will you spend more money this year than last?

Yes, because we plan on buying a cart machine. There's a lot of money involved in that.

How do you make purchasing decisions?

There are some things that you see that you know right away are perfect—the Sony 9000 editor, for instance. You buy those things. But we rarely buy off the floor. You come back home and talk to others in your company, and then purchase it.

Are you ever surprised at what's there?

A lot of times we talk to vendors before NAB and they will privately tell us what they're going to show. Of course, that's not the same as actually seeing it. [But] that's helpful in knowing where to look. Also, I prepare little cards for our senior management, and that's helpful for them because sometimes they get overwhelmed on the floor of NAB. If they have a note that says, "Go to the Quantel Booth and see the V Series Paintbox," then they'll go to the Quantel booth.

How important is organization?

Very important. You're wasting your time if you don't go out with a plan. We plan meetings with certain key vendors. We plan certain demos ahead of time, and [which] presentations [we will attend]. We do try to leave blocks of time open because you might see someone at NAB who'll say, "Let's get together Saturday night."

Has NAB gotten too big?

It's definitely gotten bigger and harder to manage. There are a lot of little companies, and you have to watch them because sometimes those companies have gadgets that are really going to be helpful to you. I try to get a feel for the booths first. If I see something interesting at a small vendor, [I'll] come back to it. The larger vendors—Sony and Ampex—to go through those booths could take you half a day to see and understand everything. So you have to be careful to focus on what's new or what you're interested in.

What other advice could you offer to first-time NAB attendees?

Wear a comfortable pair of shoes.

WILLIAM NAPIER
DIRECTOR OF ENGINEERING/WBTV, JEFFERSON PILOT COMMUNICATIONS/ CHARLOTTE, NC

Why do you go?

You can probably get more effective business done at NAB than anyplace else, or at any other time. Over a three-day period, I can get more business conducted than I can by seeing sales representatives over 30 days. When you're working with a sales representative, no matter how knowledgeable, they always have to call the home plant, and all of those home-plant people are always working, and we may or may not be able to make a contact with them. At NAB, it's usually a case of walk across the aisle and there they're standing. At NAB, you can cut through some problems relatively quickly. By being able to look at the machine and see what it's doing, you can ask more intelligent questions. That's helpful.

Do you know what you're going to buy before you go to NAB?

I am seldom surprised. Most of what we see is a logical extrapolation of what you would expect to see. What's a surprise is if delivery is available.

Is there a delivery problem?

Yes. It's not unusual to see a product operating on the floor that you may not be able to get for another eight months—or longer. We have two goals when we go to NAB: finalizing purchases we've been working on, and seeing what might be on the horizon that we might finalize next NAB.

Are you going to be spending more or less than last year?

I think it will be comparable [to last year]. We try to flatten out our depreciation schedule, so we're constantly replacing old equipment or buying new equipment in a reasonable, ongoing fashion.

What are you looking for this NAB?

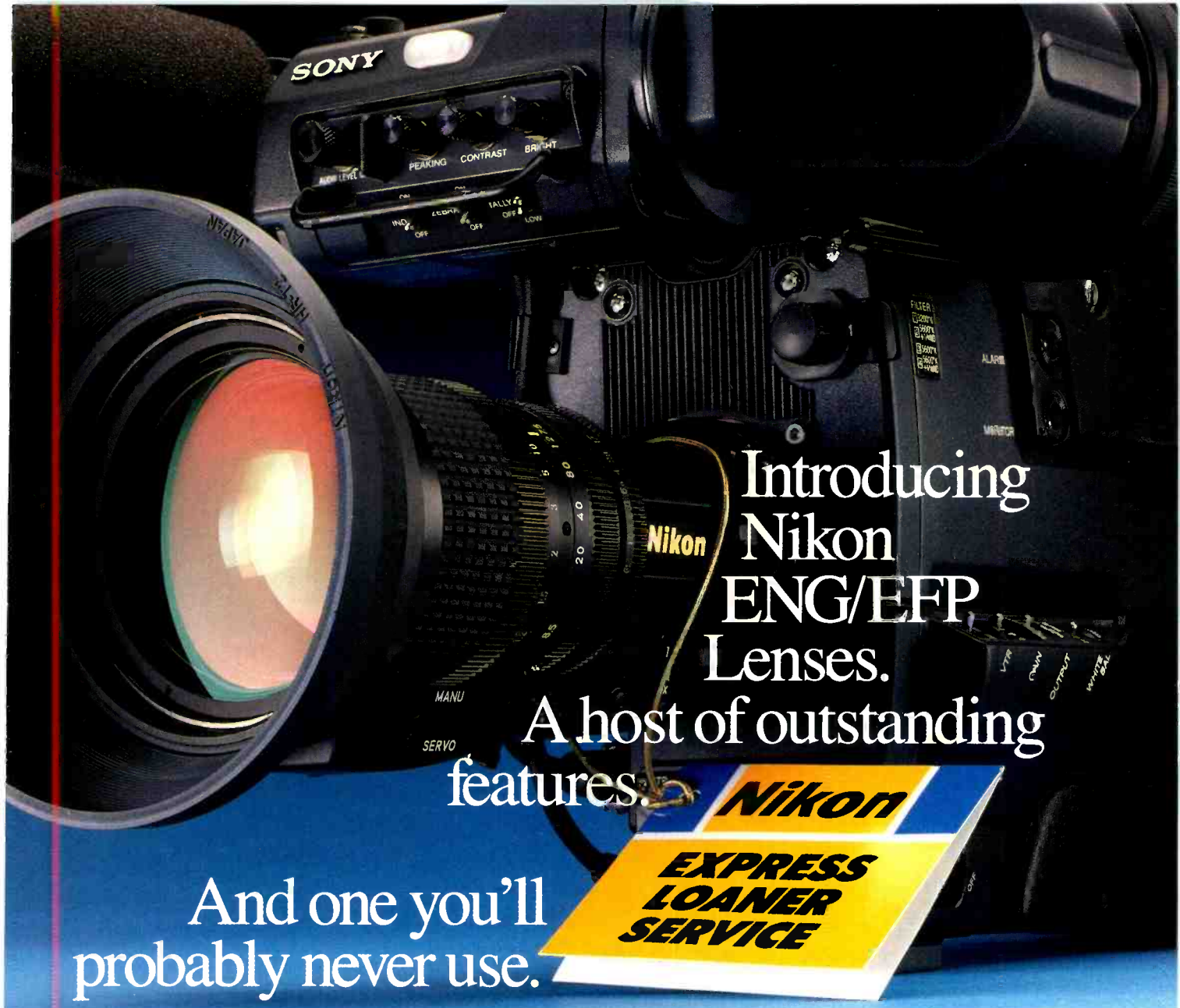
Cameras will probably be on the list: studio CCDs, and any improvement in computerized remote control systems. Also, any possible development in D-2 and Beta-SP equipment, because we will be looking at replacing some one-inch tape recorders in the upcoming years. We have completed our conversion to Beta here, so now it's time to start looking at the workhorse machines, meaning the one-inches.

Is NAB less important than it used to be?

No. I candidly believe that it is every bit—if not more—important than before because it's the only place where you can go and do a great bit of business over four days that may serve your company very well over 10 months.

Is the business expanding?

My feeling is there are more suppliers of some of the basic equipment, and the major suppliers are feeling that competition. The business is expanding in that the manufacturers look not only to broadcasters but also to production houses and industrial operations for buyers of their wares. You'll find as much Beta equipment in industrial use as you will in the broadcast stations.



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From a broadcaster's standpoint, the number of manufacturers actually building stuff—the major equipment—hasn't expanded. You could buy a video distribution amplifier from a dozen different people, but there's really only two people you can buy a videotape recorder from. They have a whole bunch of different names on it, but it's still the same recorder. The number of little booths has gotten bigger and the number of bigger booths has gotten smaller.

Is there more pressure to spend wisely?

Yes. It used to be when you bought a videotape recorder, you did so for a TV station that had four, five or six VTRs. It's not unusual now for TV stations to have 50 or 60 VTRs. So consequently, you've got to look very carefully at the per-unit cost. [Also,] if [the buy] doesn't translate into viewers in one form or another, it would be a pretty poor business decision.

How does that differ from the past?

Fifteen years ago, an awful lot of equipment was purchased because it was new, and you could stay well ahead of the competition by doing things they couldn't do. That isn't true anymore. I'm ahead of my competitor on one thing, and he's ahead of me on another, and we just leapfrog. It just depends on what cycle you're in. This year, it's my cycle to buy new cameras. Maybe it was his year to buy a switcher.

What advice would you give a first-time NAB attendee?

Sit down for a couple of days and plan what you want to see specifically; who you want to meet with and where their booths are. Know exactly what your agenda is and start with the most important thing on your agenda and don't leave that agenda unless you stumble across something that you absolutely cannot do without. When you get done with the agenda, then you can go around and have fun looking at the toys.

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THE FORTUNATE 500

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FRED STEURER
VICE PRESIDENT, ENGINEERING
PULITZER BROADCASTING COMPANY/ ST. LOUIS

What do you go to NAB for?

Usually to see what's new and to meet one-on-one with the suppliers. Very often, they have special deals going on at the convention. Other times, it's bringing a list of problems with a certain piece of equipment and you can meet [the manufacturer] face to face and say, "Look, I'm having this kind of trouble, what are you going to do about it?" They can't get away.

Are you planning to buy this year?

We might very well. Because we're a group, we may buy together.

What are you looking at this year?

ENG, microwave, TV antennas. We have seven stations and one of them is in need of an [antenna] overhaul.

Has NAB changed over the years?

Not particularly. The problem is there's so much to do, so much to see in such a short time. You simply can't do it all. We have our engineering meeting down there [with our stations], and talk about what we're going to say, what we're going to ask when we meet with a certain vendor.

Based on what you see at NAB, is the industry expanding?

Some [manufacturers] are getting larger, and some little guys are falling away. Grass Valley has expanded their line to graphics. Sony is showing switchers, which they never had.

Is there more pressure to spend wisely?

It's gotten greater because it was tough last year. [There wasn't as much] business as hoped for. Then there's the old story that expenses keep going up, so there's a certain amount of pressure that's focused on spending: What piece of equipment will allow us to do more for less? These days we have less to spend, but the cost of the equipment keeps going up, so we have to negotiate well. [At NAB,] if you don't do the whole deal, you make contact there, and follow it up later.

What advice would you give first-time attendees?

There are two things going on: the exhibits and the seminars. You have to decide why you're going. Are you going there to see the exhibits and meet with the vendors, or are you going there to attend the seminars and the workshops to learn something? You really have to schedule. You can't just blindly walk in there and gawk.

ROY TRUMBULL
ASSISTANT CHIEF ENGINEER
KRON-TV/ SAN FRANCISCO

Why do you go?

My main [reason] is to attend the technical seminars. They're quite valuable. [One paper] on the thermal characteristics of a transmitter cooling system [was very revealing; it showed] how the sort of thing you might do instinctively was absolutely the wrong thing to do. And [the speaker] had all the numbers to back it up. That kind of thing is gold.

Do you go to buy?

In some cases, [going to NAB] will be the last step before signing on the dotted line. Usually, a typical station will have made arrangements for private presentations on the floor.

Do you know what you're going to get before you go?

There's always a surprise that requires further information. One of the problems of the show is that sometimes there will be equipment in a booth that nobody knows about. That's particularly true of the international companies. They may exhibit a broad spectrum of equipment, but they may only be familiar with a certain portion of the line. And maybe the one guy who knows what this thing is is not there.

Do you plan to spend more or less than last year?

We have a fairly stiff capital budget this year that we'll wind up spending on some pretty hefty systems.

Do you expect major changes at NAB?

There is probably a different mix of people when it's held in Atlanta than when it's held in Las Vegas. There will be some local people from the southern states. We might see some regional vendors that might put on a bigger show than they would if they had to go cross-country.

Is there more pressure to spend wisely?

Whatever you're going to buy, you'd like it to enhance your productivity. There's also the concern that what you're buying doesn't turn out to be an orphan in two years. You look at the track record of the company and the likelihood that they're going to be around. That plays into the hands of the incumbents, and makes it hard for the new guys to get started.

What advice would you offer new NAB attendees?

If you're really considering making a substantial investment in anything, by all means get a user's list from the vendor and talk to those people. You can talk to them before, or you can talk to them at NAB. Use some of the time to schmooze with people from other stations, ask them what they bought, what they're having trouble with, what's working for them, and so on. That's probably one of the big benefits of the shows; all these people do get together in one place at one time, and you can spend some of that time asking what their experience has been. If we're seriously considering a piece of equipment, I'll usually put together a list with or without the vendors' help of who has it, and then I'll talk to the users. ■

See us at NAB Booth #3134

Canon is #1.

Canon is the number one lens in every sense. Quality, application and significance.

In a recent study, we were rated the number one lens in quality by an independent, outside market research firm. When chief engineers from TV stations around the country were asked what lens has the best quality, Canon won... hands down.

Our product line is the most comprehensive in the business and includes our new J14a x internal focusing lens, the only standard square lens available. Our response to the industry's needs.

And we're number one in the imaging process. Your Canon lens is first to see that all-important scene you're shooting. Let's face it, beauty in... beauty out.

Put a Canon lens up front...
The Number One Lens.

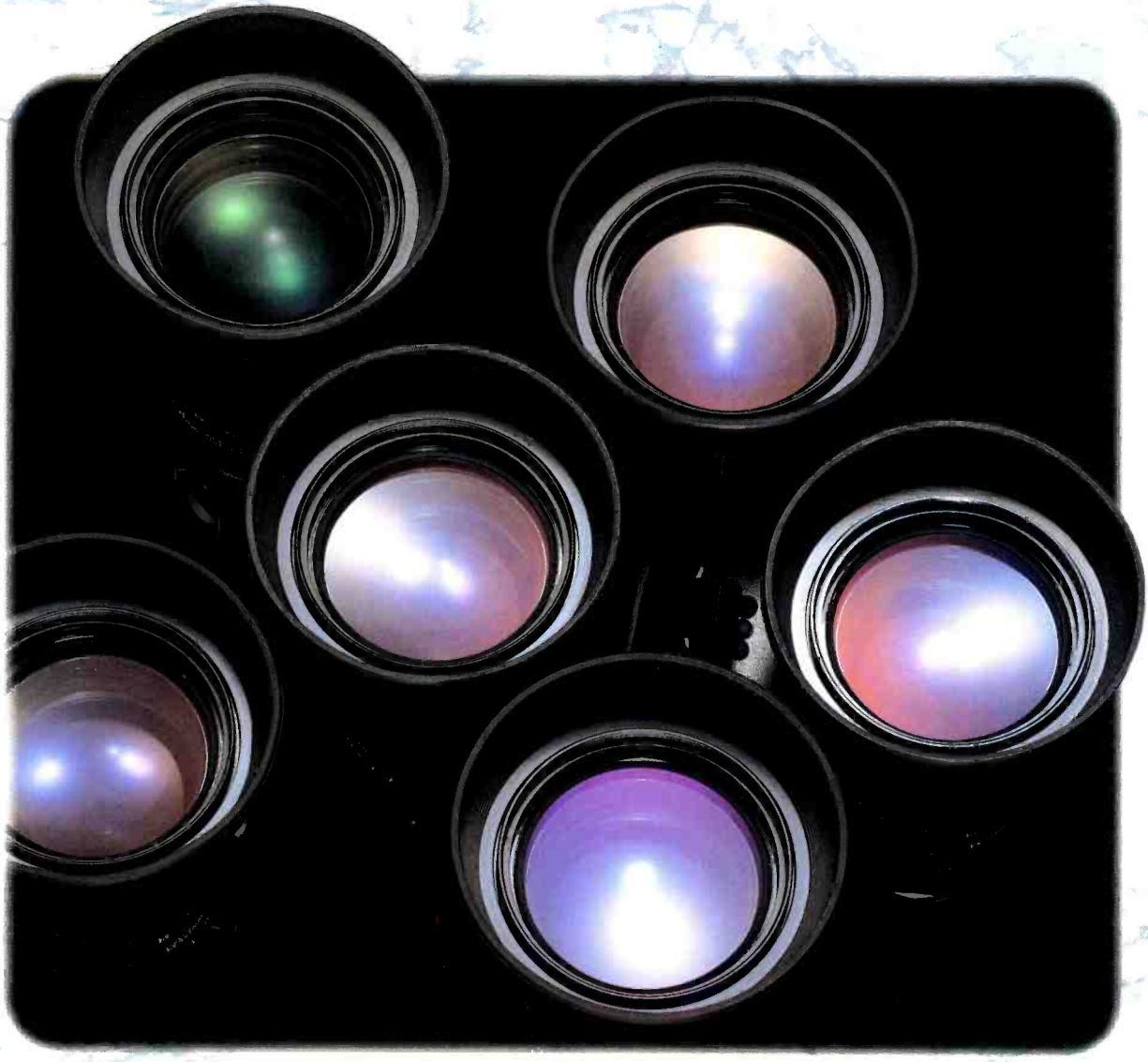
Canon
The Number One Lens

CANON U.S.A., INC. BROADCAST EQUIPMENT DIV.
NEW HEADQUARTERS
610 Palisade Avenue, Englewood Cliffs, New Jersey 07632
Telephone: (201) 816-2900
FAX: (201) 816-9702 Telex: 43717 CANON OPTICS

CANON CANADA INC.
6390 Dixie Road, Mississauga, Ontario L5T 1P7, Canada
Telephone: (416) 795-1111 FAX: (416) 795-2027 Telex: (21) 6968792

CANON EUROPA N.V. TV PRODUCTS DEPARTMENT
Bovenkerkenweg 59-61 P.O. BOX 2262 1180 EG
Amsterdam The Netherlands
Telephone: (020) 545-8905 Fax: (020) 545-8203 Telex: 18276

DEAR SIRS,...



Although I like my ENG/EFP lenses, I would like more.

My picture blurs when raindrops turn with the front element while focusing.....

My sunshade lets too much stray light enter the lens.....

It irritates me to have to reset my polarizer each time I refocus.....

It's troublesome setting up my matte-box and sunshade.....

I would really like a standard zoom lens with inner focus to solve these problems.....

INTERNAL FOCUS

IT'S ALL YOUR DREAMS COME TRUE

J14a x 8.5B IRS

THE ONLY STANDARD WITH THE INTERNAL FOCUS SYSTEM

Canon has been at the forefront of the television optics industry ever since it began. Its latest development ushers in a new era of innovative products, incorporating advances in lens quality and optical performance to match the superb imaging of the latest CCD's.

Canon's new J14a x 8.5B IRS has the long awaited INTERNAL FOCUS SYSTEM in a standard zoom lens for ENG/EFP. The J14a x 8.5B IRS is an outstanding new lens that was developed through the combination of state-of-the-art technology and feedback from industry professionals. This introduction raises quality and performance levels to new standards that even surpass the J13 x 9B IRS.

Cameramen everywhere who have long awaited this type of lens are bound to appreciate the merits of the fixed front element for everything from news gathering to studio production.

CANON CANADA INC.
6390 Dixie Road, Mississauga, Ontario L5T 1P7, Canada
Telephone: (416) 795-1111 FAX: (416) 795-2027 Telex: (21) 6968792

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Canon
The Number One Lens.

ADRIENNE ELECTRONICS
8059
New: PC-VITC/RG1 reader & generator for IBM PCs; standards converters.
Routing switchers; time code equipment; audio routing switchers; ESbus I/F for IBM PCs.

ADVANCED DESIGNS
2021
2D graphics systems; weather graphics; videotape.

ADVENT COMMUNICATIONS LTD.
1300, A208
New: Mantis portable Ku-band satellite system.
Satellite earth stations; SNG systems.

ADX SYSTEMS
7119
New: time code equipment; ATR synchronizers.
VTR synchronizers; delay systems; VTR/ATR dubbing systems.

THE AIRCRAFT MUSIC LIBRARY
6802, 6803
Music/sound efx libraries.

AKAI PROFESSIONAL
3902
Routing switchers; digital studio ATRs; audio routing switchers; cassette decks; direct-to-disk digital recorder.

AKG ACOUSTICS
6500
Digital audio workstations; headphones; microphones, accessories; reverb, special efx.

ALAMAR ELECTRONICS
2948
New: Station automation systems; switching automation equipment; master control network delay; clocks, timers.

ALCATEL ATFH
3107
New: ENG microwave.

ALDEN ELECTRONICS
5153
Weather graphics; weather radar.

ALEXANDER BATTERIES
5155, 5157
Battery chargers/analyzers.

ALLEN AVIONICS
5607, 5609, 5611
Video delay lines, filters, hum eliminators.

ALLIED BROADCAST EQUIPMENT
4430
New: AKG DSE 7000 digital audio sound editor; Gentner PeopleLink broadcast telephone system; SqueezePlay AM/FM radio/cassette with integrated skimmer; Disc commercial digital storage system.
RF cavities; RF loads, filters; dubbing center with Henry mixer; audio satellite receivers; demodulators; subcarrier equip.

ALLIED TOWER CO.
5606
Antennas, towers.

ALPHA AUDIO
6701, 6702, 6703, 6704
New: Audio hard disk recorder.
Electronic audio editors; acoustical supplies.

ALPHA IMAGE
7017, 7019
New: frame synchronizers; NTSC encoders/decoders; routing switchers.
Routing switchers; encoder/decoder.

ALPHA VIDEO & ELECTRONICS
3111
New: 1/2-inch VTRs; IFB systems.

ALTA GROUP
6030
Time base correctors; frame synchronizers; digital video effects; edit/controllers; production switchers.

ALTRONIC RESEARCH
6814, 6815
New: Omegaline Model 6775 75-kW air load, power test load system.
RF components; RF test equipment.

AMBER ELECTRO DESIGN
4900, 4901
New: audio T&M.

AMCO ENGINEERING
2009, 2011, 2013
Electronic still stores.

AMEK/TAC US OPERATIONS
3164
New: broadcast consoles.
Console automation; post-production consoles; field-portable mixers; EQ compressor/limiter.

AMERICAN STUDIO EQUIPMENT
6506
Lighting equipment; camera support equipment.

AMPEX CORP.
2200
New: VPR-200, VPR-250, and VPR-350 D-2 format composite digital studio VTRs; CCIR-601 component digital version of ADO 100; component analog ADO 100; Automatic Conflict Resolution for ACR-225 cart system.
Camcorders; ENG/EFP cameras; studio/field cameras; character generators; digital video effects; edit/controllers; electronic still stores; production switchers; time base correctors; video processors; videotape; 1/2-inch VTRs; digital VTRs; 1-inch VTRs; Cart automation/MERPS.

AMS INDUSTRIES
6338
Audio processors; console automation; broadcast consoles; delay systems; digital audio workstations; electronic audio editors; microphones, accessories; reverb, special efx.

AMTEL SYSTEMS
6008
Character generators; tape synchronizers; routing switchers; DAs; time code equipment; ATR synchronizers.

AMX
3714, 3716
Remote control systems; TBCs; production switchers.

ANDREW CORP.
1860
Antennas; ENG/EFP vehicles; MDS, SMATV systems; ENG microwave; intercity microwave; RF amps, switches; RF components; RF test equipment; satellite earth stations; SNG systems; STLs, TSLs; towers; transmission line; switching automation equipment; wire, cable; technical/engineering consultant.

ANGENIEUX CORP. OF AMERICA
6112
New: lenses.

ANIXTER BROS.
1506
Connectors, jackfields; patch panels; wire, cable; equipment racks, cabinets; Ty-Wraps; marking systems; shrink tubing.

ANRITSU AMERICA
6549, 6451
New: Digital video generator with ghost cancelling; RF test equipment.

ANTENNA TECHNOLOGY CORP.
6406
New: antennas; MDS, SMATV systems; satellite earth stations; RF loads, filters; equipment distributor; technical/engineering consultant.

ANTON/BAUER
5013, 5015, 5017
Lighting equipment.

ANVIL CASES
2110
Transportation cases.

APHEX SYSTEMS LTD.
6054
Clocks; aural exciters; audio processors.

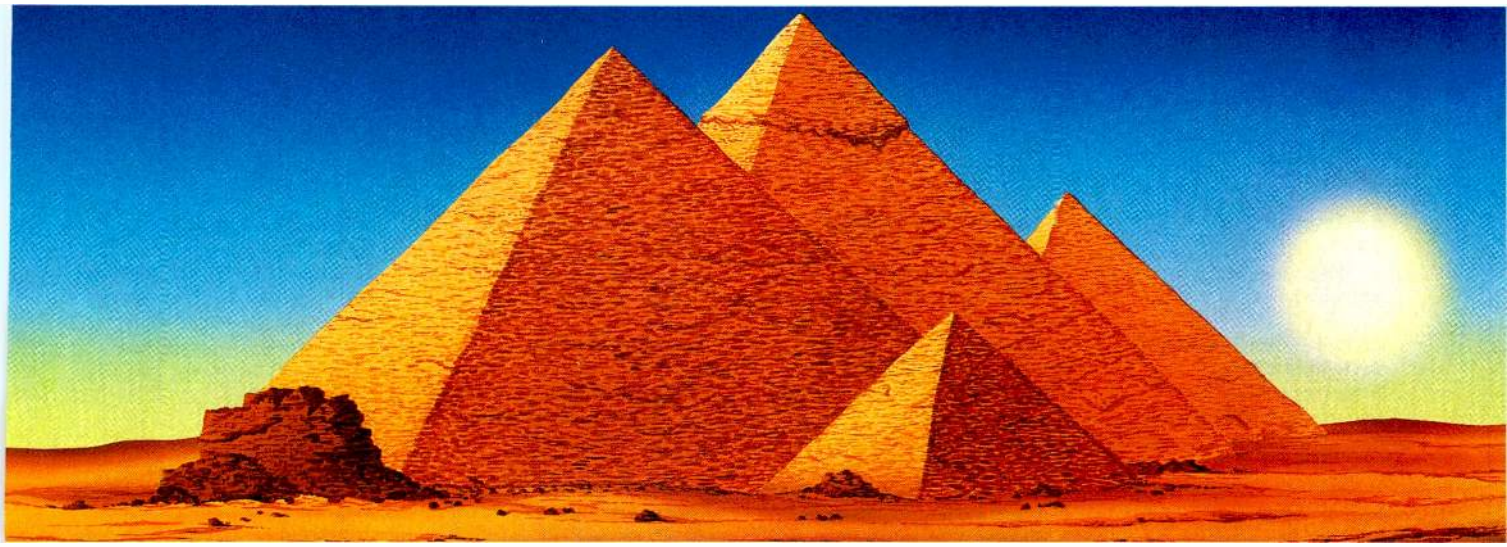
APOLLO LIGHTING
3800
Lamps; patterns; nightclub lighting; special effects.

ARBEN DESIGN
3906, 3907
Studio design & construction.

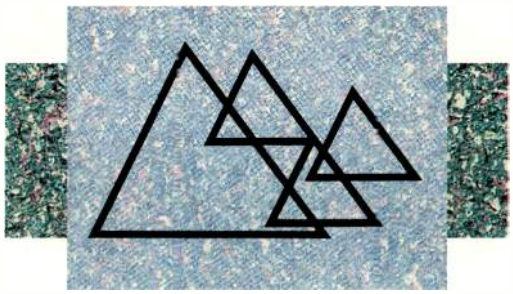
ARCOR ELECTRONIC CO.
1018
Video, camera, and audio cables; wire, cable.

TOBY ARNOLD & ASSOC.
4047
Music/sound efx libraries.

ARRAKIS SYSTEMS
4052
Field portable mixers; on-air consoles, mixers; audio routing switchers; studio furniture; tape storage systems.



LANDMARK



COINCIDENCE?

The Pyramids: symbols of man's triumph over the ordinary. Monuments to lasting technical innovation and achievement.

The **BASYS** Group: world leaders in broadcast automation systems.

A group of companies building systems and providing integrated solutions meeting the present and future needs of the industry. **BASYS** leading the news and studio automation field; **Connolly Systems,** specialists in automated transmission; **Jemani,** with a video design and production workstation; and **Signal,** a leading software house.

The **BASYS** Group. Committed to excellence. Rising way beyond the ordinary. Building the future to meet *your* aspirations.

Working together
for better broadcasting.

BASYS GROUP

Basys Incorporated, Five Odell Plaza, Greystone, NY 10701 U.S.A. Tel: 914 376 4800 Fax: 914 376 0865
Basys Group, 11/49 Station Road, Langley, Slough, Berkshire SL3 8YU U.K. Tel: 0753 583333 Fax: 0753 581559

N.A.B. Booth No. 1256

Circle 129 on Reader Service Card.

ARRIFLEX CORP.
5314
Lighting equipment; camera support equipment; lenses.

ARTI/ADVANCED REMOTE TECHNOLOGIES
Booth no. N/A
Macintosh- and IBM-based desktop video systems; edit/controllers; editor interfaces, accessories; multisource editors; time code equipment.

ASACA/SHIBASOKU CORP.
5152
New: Cart automation/MERPS.
NTSC encoders/decoders; routing switchers; video monitors; video test and measurement equipment.

ASSOCIATED COMPUTER SERVICES
9024, 9025
Graphics, weather graphics & production software for the Amiga; Amiga genlock devices.

ASSOCIATED PRODUCTION MUSIC
6438, 6340
Music, sound efx libraries.

ASTON ELECTRONICS
1106
Character generators; electronic still stores.

AT&T
2810
2D graphics systems; 3D graphics systems; fiberoptic systems; satellite earth stations; business automation equipment.

ATI/AUDIO TECHNOLOGIES
5051, 5053
New: Audio DAs; level indicators.
Amplifiers, preamplifiers; audio DAs; audio processors; audio routing switchers; broadcast consoles; level indicators; microphones, accessories; IHP to PRO interface amplifiers.

AUDI-CORD
4204
Cart decks.

AUDIO ACCESSORIES
4810
Connectors, jackfields; patchbays.

THE AUDIO BROADCAST GROUP
4039, 4041, 4045
New: digital audio workstations; studio furniture; mobile vehicle construction.
Amplifiers, preamplifiers; 2-track ATRs; audio processors; audio tape, carts; cart decks; cassette decks; compact disc equipment; broadcast consoles; DAT decks; headphones; microphones, accessories; noise reduction systems; reverb, special efx; turntables; equipment distributor; studio design & construction; studio system for AM, FM, & TV audio; mobile broadcast studio.

AUDIO DEVELOPMENTS
1942-4
New: audio DAs; field-portable mixers.
Broadcast consoles; post-production consoles; field-portable mixers.

AUDIO INTERVISUAL DESIGN
1340
Microphones, accessories.

AUDIO PRECISION
3252
New: APP-FM1 audio proof package for FM; System One dual domain test equip.
Audio T&M.

AUDIO SERVICES CORP.
9001, 9002, 9003, 9004
New: distribution amps; master control switchers; production switchers; routing switchers; video monitors; field-portable mixers; microphones, accessories.
Amplifiers, preamplifiers; audio DAs; audio processors; IFB systems; intercoms.

AUDIO-TECHNICA U.S.
4214
Microphones, accessories; wire, cable.

AUDIOPAK
4811, 4812
Audio tape, carts.

AUDITRONICS
4542
New: console automation; broadcast consoles.
Amplifiers, preamplifiers; audio DAs; IFB systems.

AURORA SYSTEMS
1834
New: 2D graphics systems.
3D graphics systems.

AUTOGRAM CORP.
4806
Console automation; broadcast consoles; post-production consoles; clocks, timers.

AUTOMATED BUSINESS CONCEPTS
3813, 3814
Radio business automation.

AVCOM OF VIRGINIA
3151
New: RF test equipment.
RF components; satellite earth stations.

AVID TECHNOLOGY
1119, 1120
Avid 1 Media Composer random-access video editor.

AVITEL
3006
New: distribution amps; standards converters; routing switchers; time code equipment; digital video DAs.

B

B & B SYSTEMS
1116
Equipment distributor; studio design & construction; technical/engineering consultant.

BAF COMMUNICATIONS CORP.
1564, A238
SNG systems.

BARCO
2944
New: Routing switchers; video monitors; compact disc equipment.
Video projectors.

BARRETT ASSOCIATES
4606
Equipment distributor; time base correctors; audio processors; audio tape, carts; cart decks; cassette decks; compact disc equipment; broadcast consoles.

BASYS
1256
Newsroom computer systems; electronic still stores; character generators; production switchers; robotic camera systems; teleprompters; machine control system; cart automation/MERPS.

BCS—THE BROADCAST STORE
9019, 9020, 9021
Broadcast equipment distributor.

BEAVERONICS
4740, 4742
New: clocks, timers.
Character generators; distribution amps; keyers; video hum-stop coils.

BEEKMAN LABS
7117
New: transmitter, power tubes.
Camera pickup tubes.

BELAR ELECTRONICS LABORATORY
4308
Modulators, demodulators; MTS equipment; remote monitoring systems; FM stereo modulation minder; TV stereo modulation minder.

BELDEN ELECTRONIC WIRE & CABLE
6007, 6009, 6011, 6013, 6015
Wire, cable; connectors, jackfields.

BENCHER
3105
New: camera support equipment.

BENCHMARK MEDIA SYSTEMS
1318, 1320, 1322
New: audio processors; faders, attenuators.
Amplifiers, preamplifiers; audio DAs.

BEXT, INC.
8104, 8106, 8108
Exciters; RF components; stereo generators; STLs, TSLs; UHF transmitters; amplifiers, preamplifiers; equipment distributor.

It's Here!

It's all digital. It's fast. It's two channel. And most importantly, it's a Chyron character and graphics system . . . and can convert your valuable "library" of fonts and logos on the *tens of thousands* of Chyron IV disks that pervade the industry.

Appropriately named for its virtually infinite capabilities and future potential, the iNFiNiT! is a dual-channel, dual user, full color, fully anti-aliased graphics system that is compatible with the Scribe family.

Standard features include: 2 full channels, 32 bits per channel, 16.7 million colors on-line, 256 levels of anti-aliasing/transparency, 2d animation, 16 fonts on-line, dual encoders, mix and effects between and within channels (wipes, dissolves, etc.), soft roll mask, continuously variable roll speeds, 80Mb Winchester, 2Mb 3.5 floppy in keyboard, 4Mb font memory, a graphical user interface and Fonts-by-Wire™.
Options include: Real-time 3D transformations, 3D animation software for solid objects, third internal mix channel, dual user software, real-time color video capture, CCIR 601 in and out, networking, Chyron IV font and logo converter, advanced font utilities (glows, neon, partial shading, etc.), Intelligent Interface™ for connection to election, sports reporting and newsroom systems, logo compose, expandable mass storage, 44Mb IOMEGA removable disc and mouse.

Chyron makes the most widely used character and graphics systems in the video industry. Bar none. Draw on the wealth of thousands of trained Chyron operators and the treasure chest of available Chyron graphics. The iNFiNiT! The new standard. It's here.

See us at NAB booth #1834

THE CHYRON SCRIBE INFINITI
A product of the Chyron Group

CHYRON
A member of The Chyron Group
The company the whole world watches.
516-845-2022

Circle 130 on Reader Service Card.

BEYER DYNAMIC
1938, 1940
Headphones; microphones, accessories.

BIO-ELECTRONICS
9009
New: distribution amps; sync and pulse generators/processors; time code equipment.
Character generators.

BOGEN PHOTO CORP.
5948, 5950
Lighting equipment.

BOGNER BROADCAST EQUIP.
2028
Antennas.

BOONTON ELECTRONICS CORP.
1437
New: RF test equipment.

BOWEN BROADCAST SERVICE
3008
VTR heads, electronics; technical/engineering consultant.

BRADLEY BROADCAST
6354
Equipment distributor.

BRETFORD MFG.
3637, 3639
Video system furniture.

BROADCAST AUDIO CORP.
4452
On-air consoles; studio monitors; audio DAs.

BROADCAST AUTOMATION
8123
New: equipment enclosures.
Cart decks; compact disc equipment; broadcast consoles; microphones, accessories; monitor speakers; radio automation systems; equipment enclosures; studio furniture; live-assist controllers; equipment distributor; studio design & construction; technical/engineering consultant.

BROADCAST ELECTRONICS
4500
Antennas; exciters; stereo generators; audio tape, carts; cart decks; broadcast consoles; turntables.

BROADCAST PRODUCTS
6454, A201

BROADCAST VIDEO SYSTEMS
5041
New: Masterkey Mk IV keyer; EN450 NTSC encoder; component/RGB transcoders; portable safe area generator.

BROADCAST YELLOW PAGES
1143
Mailing list service.

BROADCASTERS GENERAL STORE
8016, 8018, 8020, 8022
New: Audio processors.
Cart decks; cassette decks; compact disc equipment; noise reduction systems; telco interface equipment; equipment distributor.

BRUEL & KJAER
8029
New: DAT decks.
Microphones, accessories.

BRYSTON LTD.
6039, 6041
Audio amps and preamps.

BSM BROADCAST SYSTEMS
3210
Routing switchers; C310-88 Video patch pannel; MR 207 x-y with memory for existing routing switcher; audio routing switchers; C216PP audio patch panel.

BSW/BROADCAST SUPPLY WEST
4046
Equipment distributor.

BTS/BROADCAST TELEVISION SYSTEMS
5808, 0156
New: LDK 391 frame transfer CCD camcorder; BDA-2000 serial digital routing switcher; BRC-2000 routing switcher configuration editor; BBE 910 Editing System; BRC-2100 routing switcher automation controller; BRC-2200 switcher automation controller.
ENG/EFP cameras; HDTV cameras; studio/field cameras; Betacam-SP System; character generators; color correctors; distribution amps; multisource editors; 2D graphics systems; NTSC encoders/decoders; master control switchers; routing switchers; sync and pulse generators/processors; telecines.

BURK TECHNOLOGY
9022, 9023
New: remote monitoring systems.

BURLE INDUSTRIES
5024
ATR synchronizers; (Harpicons for HDTV; mixed-field Saticons); RF cavities; transmitter, power tubes.

C

CABLEWAVE SYSTEMS
4020
Antennas; ENG microwave; MTS equipment; remote monitoring systems.

CALCULATED INDUSTRIES
1455
New: time code equipment; time code calculators; clocks, timers.

CALZONE CASE CO.
2045, 2047
New: Equipment carts; cart-n-case combination.
Audio tape, carts; cart decks; transportation cases.

CAM-LOK
9017

CAMERA MART
6330
Camcorders; camera support equipment; ENG/EFP cameras; edit/controllers; keyers; time code equipment; CKM-4 multi-level keyer; CE-25/75 Edit Controller.

CAMERA PLATFORMS INTERNATIONAL
A147
New: Shotmaker camera car with video turret.

CANARE CABLE
3730, 3732
New: connectors, jackfields; wire, cable.

CANON USA-OPTICS DIV.
3134
New: Lenses; robotic camera systems.
Camera support equipment; lenses.

CARPEL VIDEO
9016
Videotape.

CASCOM
1206
Station graphics.

DWIGHT CAVENDISH CO.
3805
Videocassette duplicators.

CBSI/CUSTOM BUSINESS SYSTEMS INC.
4652
Business automation equipment.

CCA ELECTRONICS
4442
Radio transmitters.

CEL ELECTRONICS
1016
New: CEL D152B "Maurice II" touchscreen controller; MS-850, MS-851, MS-852 digital video effects systems; CEL P159 Eric Plus editing controller; CEL P167 Still Image Store; CEL P165 Tetra bi-directional standards converter; YEM CVS-910 auto scan converter.

CENTRAL DYNAMICS LTD.
2050
New: NTSC encoders/decoders.
Distribution amps; production switchers; routing switchers; audio DAs; audio routing switchers.

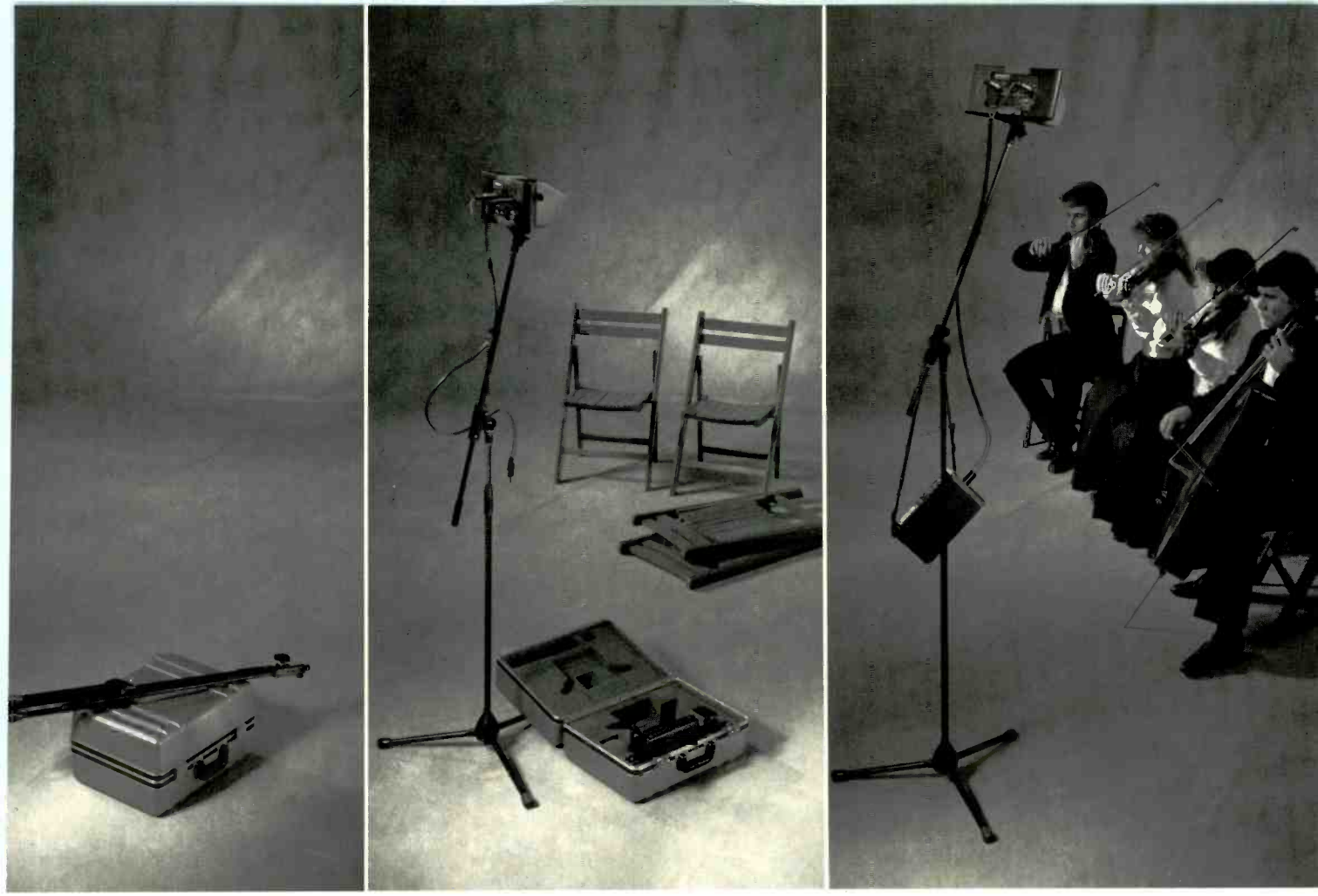
CENTRAL TOWER
6602, 6604, 6606
Towers; equipment distributor; technical/engineering consultant.

CENTURY 21 PROGRAMMING
4205
New: compact disc equipment; compact disc automatic systems; music/sound efx libraries; music management rotation software.

CENTURY PRECISION OPTICS
3808, 3809
Lenses.

CHANNELMATIC
6014
Distribution amps; routing switchers; audio DAs; audio routing switchers; Cart automation/MERPS; switching automation equipment; clocks, timers; commercial insertion; program playback.

CHESTER CABLE/DIV. ALCATEL
3017
Wire, cable.



There's no faster, easier or better way to record incredible stereo.

When you compare Crown's new Stereo Ambient Sampling System™ (SASS™) and a DAT recorder with traditional recording methods you'll discover there's no faster or better way to record natural, beautifully imaged stereo.

Lightweight, durable and extremely easy to set up, the SASS microphone is an exciting improvement in stereo recording. Combined with a DAT machine, it becomes a high-quality, no-compromise recording system that goes everywhere.

Crown's SASS eliminates traditional stereo recording compromises in sound quality, ease-of-use, and cost. No longer do you have to settle for weak low-end or off-axis coloration common to Midside, X–Y and near-coincident pair mics. Assembly and positioning time is also reduced significantly compared with conventional stereo micing techniques.

The SASS is available in two versions: the SASS-P, with switchable battery or phantom power and Crown's finest studio-grade PZM®

capsules; or the SASS-B, which uses the famed Bruel & Kjaer 4003 and 4006 studio mics (not supplied).

Regardless of which you choose, you'll enjoy full ambience without coloration, excellent sum to mono, and extraordinary broad frequency response. With SASS's superb imaging capabilities, every sound is audibly reproduced in its precise position resulting in a stereo experience of uncanny realism.

Readily adaptable to all common stands, the SASS includes a carrying case and accessories.

No matter what your stereo recording requirements are—from sampling to electronic news gathering to remote recording of live events—you'll find Crown's SASS family the simple choice. See your Crown representative or call toll-free for information: 1-800-535-6289.

crown®

Crown International, Inc. • P.O. Box 1000
Elkhart, Indiana 46515-1000 • 219/294-8000

Circle 131 on Reader Service Card.

CHIMERA
1015
Lighting equipment.

CHRISTIE ELECTRIC CORP.
1419, 1421
Power supplies, batteries; battery chargers, video packs.

CHYRON
1834
Character generators; digital disk recorders; digital video effects; edit/controllers; editor interfaces, accessories; multisource editors; 2D graphics systems; 3D graphics systems.

CINE 60
3129, 3131
Lighting equipment.

CINEMA PRODUCTS CORP.
2124
New: camera support equipment.

CINEMILLS CORP.
1546
Lighting equipment.

CIPHER DIGITAL
1800
New: CDI-1000 VITC reader/translator; CDI-1200 time code reader/character inserter; CDI-1400 time code generator with jam sync.
VTR synchronizers; ATR synchronizers.

CIRCUIT STUDIOS
3443
3D graphics systems

CLEAR-COM
1407, 1409, 1411, 1413
New: IFB systems; intercoms; monitor speakers.
IFB systems; intercoms; wireless intercoms.

CLIPPER PRODUCTS
6535
New: camera support equipment; audio tape, carts; cart decks; efp production support systems.

CMC TECHNOLOGY
5754, 5755
Tape erasers, degaussers; VTR heads, electronics; head and drum refurbishing.

COAXIAL DYNAMICS
6816
New: RF components, RF loads & filters, RF test equip.

COLORADO VIDEO
2933
Colorizers; field/frame stores; video noise reducers; weather radar/graphics.

COLORGRAPHICS SYSTEMS
6030
New: Mosaic 4:4:4:4 real-time digital disk recorder, digital paint and animation system; Morph the Animator automated 2D animation system; Galileo da Vinci color corrector for URSA telecine.
2D graphics systems; 3D graphics systems; weather graphics.

COLUMBINE SYSTEMS
2522
Business automation; newsroom computers.

COMARK COMMUNICATIONS
5920
New: CTT-U-30SKA 30 kW UHF transmitter; CTT-U-60SKA 60 kW UHF transmitter; CTT-U-70S 70 kW UHF transmitter.
UHF transmitters; complete line RF coaxial and waveguide transmission systems and components.

COMBAND TECHNOLOGIES
3439

COMLUX
9037, 9038
New: Model 3581/82 780 Mb/s optical terminal set; Model 3803/04 Quad 8-bit video codec.
Fiberoptic systems.

COMMUNICATIONS GRAPHICS
4113, 4115
Promotional items.

COMPREHENSIVE VIDEO SUPPLY
1660
New: Camera support equip., audio & video DAs, teleprompters, audio routing switchers, field portable mixers, mics & accessories, lighting equip, power supplies & batteries.
Character generators; color correctors; edit/controllers; multisource editors; keyers; lenses; NTSC encoders/decoders; production switchers; routing switchers; time base correctors; time code equipment; computer software/hardware; intercoms; connectors, jackfields; tools; wire, cable; music/sound efx libraries.

COMPROMPTER
6355, 6357
New: robotic camera systems; closed captioning output.
Teleprompters; newsroom computers.

COMPUTER CONCEPTS CORP.
4040

COMPUTER ENGINEERING ASSOCIATES
1102
Business automation; newsroom computers; financial services.

COMPUTER MUSIC CORP.
9006
Music search system; music library index & audition system.

COMPUTER PROMPTING CORP.
3137
Teleprompters; closed captioning systems; newsroom computers.

COMREX CORP.
5214
New: Multiline Frequency Extender using one, two or three dial telephone lines.
Broadcast consoles; IFB systems (RF); fiberoptic systems; telco interface equipment.

COMSAT WORLD SYSTEMS DIV.
3316
HDTV production equipment; video monitors; test equipment.

COMTECH ANTENNA
3002, 3004
New: Satellite earth stations.
Antennas.

COMTEK
3908, 3909
Mics, accessories; intercoms; remote monitoring systems.

COMWAVE
2904
New: remote monitoring systems.
Antennas; diplexers, multiplexers; MDS, SMATV systems; MTS equipment; stereo generators; transmission line; ITFS/MMDS transmitters.

CONCEPT PRODUCTIONS
4330
Studio automation equipment; music/sound efx libraries.

CONIFER
1334, 1336, 1338
New: QL-1015 31-channel wireless cable downconverter; 2.1 to 2.7 GHz preamplifiers; wireless cable/ITFS repeater system.
Block downconverters & antennas for MMDS & ITFS systems.

CONNECTRONICS CORP.
1922
Connectors, jackfields.

CONRAC DISPLAY PRODS.
5800
Video monitors.

CONTINENTAL ELECTRONICS/VARIAN
4316, 0204
Antennas; diplexers, multiplexers; exciters; modulators, demodulators; remote monitoring systems; RF cavities; RF components; RF loads, filters; RF test equipment; stereo generators; STLs, TSLs; towers; transmission line; transmitter, power tubes; transmitter remote control; AM & FM transmitters.

CONTROL CONCEPTS CORP.
2025
Power line protection and surge suppression.

CONVERGENCE
1734
New: edit/controllers; editor interfaces, accessories; multisource editors.

CORPORATE COMMUNICATIONS CONSULTANTS
2602
Color correctors.

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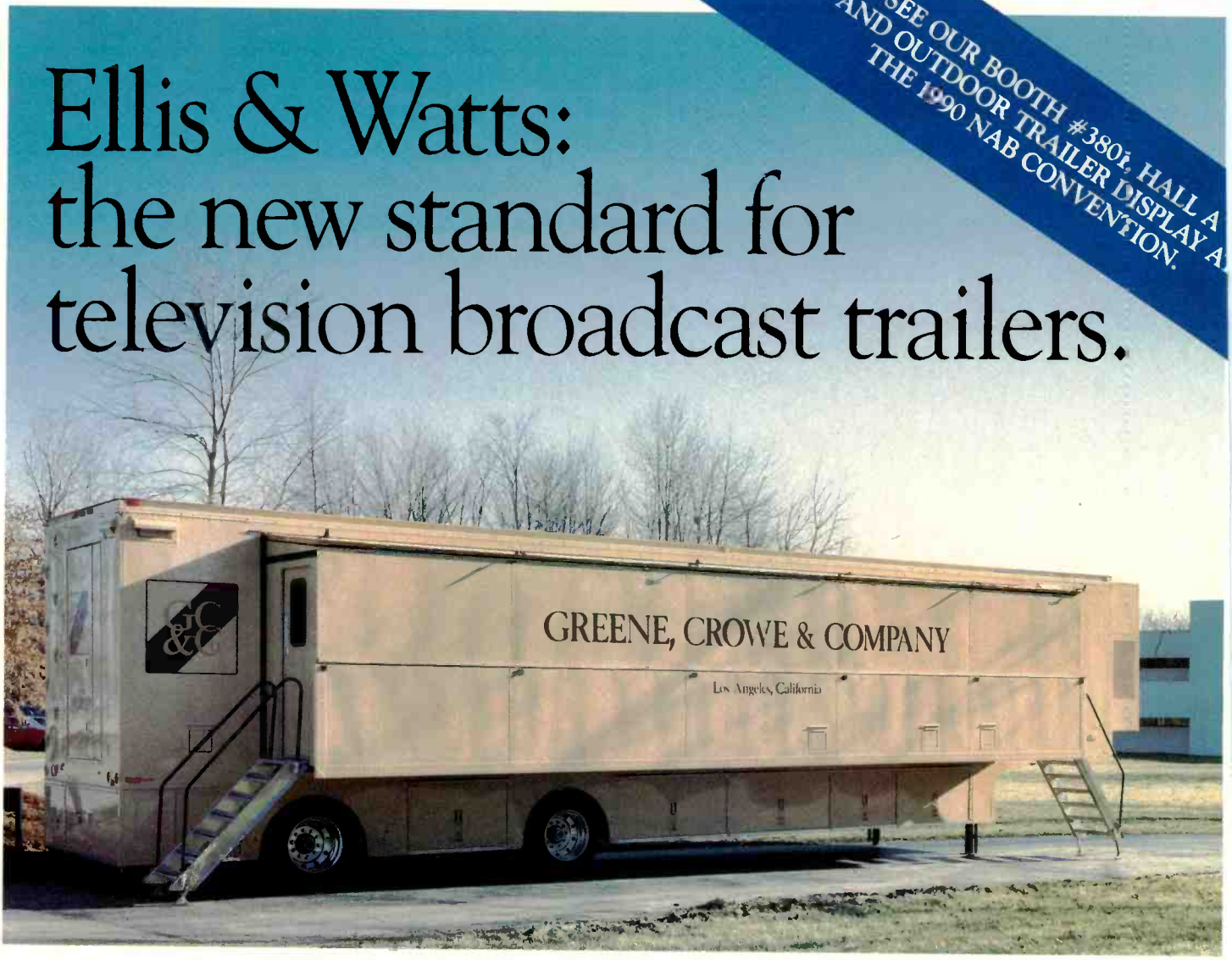
Circle 132 on Reader Service Card.

Ellis & Watts: the new standard for television broadcast trailers.

SEE OUR BOOTH #3801, HALL A AND OUTDOOR TRAILER DISPLAY AT THE 1990 NAB CONVENTION.



Ellis & Watts expanding side trailer for Greene, Crowe & Co., Burbank, CA.

Ellis & Watts sports broadcasting trailer for New Century Productions (WFMZ, Allentown, PA).

Power panel service drawer.

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Factory Sales Manager
513/752-9000

Stan Buczek
National Sales Representative
201/838-5317

Circle 133 on Reader Service Card.

CORTANA CORP.
3734
Lightning dissipation systems; radial inspection instrument.

COUNTRYMAN ASSOCIATES
2043
Microphones, accessories; Type 85 direct box.

CRL
4656
New: audio processors.
Microphones, accessories; noise reduction systems; stereo generators.

CROSSPOINT LATCH CORP.
3308
New: 6901 multifunctional rack frame system.
Production switchers; sync and pulse generators/processors; editor interfaces, accessories.

CUBICOMP
6700
3D graphics systems.

CURRENT TECHNOLOGY
9026, 9027
Digital protection for lighting equipment; power conditioning for tv transmitters; power supplies, batteries.

CYCLE SAT
3428
Automatic spot commercial and program delivery via satellite.

D

DANIELS PUBLISHING GROUP
1534
Technical & equipment reference books; catalog production, marketing support services.

DATA CENTER MANAGEMENT
5014
Election reporting systems; newsroom computers.

DATA SECURITY
7001, 7003
Tape erasers, degaussers.

DATACOUNT
8030, 8032
Business automation.

DATATEK CORP.
5652
Routing switchers; distribution amps; amplifiers, preamplifiers; audio DAs; audio routing switchers.

DATAWORLD
4456
Graphics/special effects facility; technical/engineering consultant; AM, FM, TV, LPTV, ITFS databases.

DBX PROFESSIONAL PRODUCTS DIV.
6500
Noise reduction systems; audio processors; compressor/limiters; audio DAs.

DEDOTEC
6727, 6728
Lighting equipment.

DELCOM USA
3204
New: Video projectors; video monitors; video walls.

DELTA ELECTRONICS
4518
Active whip antenna for in-field measurements; stereo noise generator; C-QUAM stereo exciter; high-power ammeters and sampling toroids; RF test equipment; high-power pulse reflectometer.

DENON AMERICA
8114

DESISTI LIGHTING/DESMAR CORP.
6100
Lighting equipment.

DeWOLFE MUSIC LIBRARY
2758
Music/sound efx libraries.

DI-TECH
2954
Routing switchers; audio routing switchers; distribution amps; audio DAs.

DIELECTRIC COMMUNICATIONS
4108
RF equipment.

DIGITAL ARTS
1464
New: DGS/386 3D graphics system.
Digital video effects; 2D graphics systems; 3D graphics systems.

DIGITAL AUDIO RESEARCH
8000, 8002, 8004, 8006, 8008
New: Optical disk recorder; Wordfit-ADR synchronization process.
Digital audio workstations.

DIGITAL DYNAMICS
7024, 7026
Digital audio workstations; ENG/EFP vehicles; mobile production units.

DIGITAL EQUIPMENT CORP.
1600

DIGITAL F/X
5308
New: digital video effects; 2D graphics systems.

DIGITAL PROCESSING SYSTEMS
3234
New: NTSC encoders/decoders; sync and pulse generators/processors; time base correctors; frame synchronizers.

DKW SYSTEMS
1115, 1117

DOLBY LABORATORIES
4443
Noise reduction systems; professional Dolby Surround decoders.

DORROUGH ELECTRONICS
5506
Audio processors; audio T&M; level indicators.

PHILIP DRAKE ELECTRONICS
3164
New: 9000 Series audio and video distribution amplifiers (European standard); PD 6801 matrix; Network 6000; PD 6930 universal interface.
DAs; stereo monitoring equipment; intercoms.

DSI COMMUNICATIONS
1512
ENG microwave; RF consultant service; studio design & construction; technical/engineering consultant.

DUGGAN MFG.
8027

DX COMMUNICATIONS
3113, 3115, A222
Satellite earth stations.

DYNAIR ELECTRONICS
5122
New: Series 3100 distribution amplifiers; fiberoptic video terminal equipment.
Distribution amps; routing switchers; audio DAs; audio routing switchers.

DYNATECH CORPORATION
6030
Please see ALTA Group, ColorGraphics, Dynatech NewStar, Quanta, Utah Scientific.

DYNATECH NEWSTAR
6030
New: NewStar System based on standard PCs and LANs.
NewStar automation system with teleprompter, CG, cart system and camera control; Statpack line of PC-based software systems.

E

EASTMAN KODAK
1905
Motion picture film services.

ECHOLAB
6716, 6717, 6718, 6719
New: Tempest 900 digital video effects.
Production switchers.

ECONCO
5756
Rebuilt power tubes.

EDITING MACHINES CORP.
1006
Random-access editors.

EEG ENTERPRISES
2838, 2840
VBI data transmission; closed captioning; data casting; teletext equipment; newsroom computers.

EEV
6310
New: High-power UHF-TV klystrode and MSDC klystron tubes.
Transmitter power tubes.

EG&G
5031, 5033, 5035
Tower lighting.

ELCOM BAUER
1036, 1037, 1135
Audio processors; radio transmitters.

ELECTRO IMPULSE
4305
RF loads, filters; RF test equipment.

ELECTRO-VOICE
4618
New: Wireless microphones.
Field-portable mixers; intercoms; microphones, accessories; monitor speakers.

ELECTRONIC GRAPHICS
1428
New: 2D and 3D graphics systems; video paint and graphics system.

ELECTRONIC SCRIPT PROMPTING
8039
Teleprompters.

ELECTRONICS RESEARCH
4013, 4015
Antennas, towers; diplexers, multiplexers.

EMCEE BROADCAST PRODUCTS
2440
Antennas; MDS, SMATV systems; modulators, demodulators; towers; UHF transmitters; VHF transmitters; edit/controllers; 1/2-inch VTRs; technical/engineering consultant; financial services.

EMCOR/CRENLO
3064
Studio furniture; equipment enclosures.

EMERGENCY ALERT RECEIVERS
6442
SCA equipment; EBS equipment.

ENERGY-ONIX
4744, 4746, 4748
AM and FM transmitters; AM NRSC filers.

ENTERPRISE ELECTRONICS
6047, 6049, 6051
New: DWSR-90CTV doppler weather radar system.

ESD
6538
New: Weather radar.
Weather graphics; weather satellite imagery & data.

ESE
6714, 6715
New: routing switchers; edit/controllers.
Character generators; distribution amps; routing switchers; time code equipment; amplifiers, preamplifiers; audio DAs; audio routing switchers; level indicators; telco interface equipment; clocks, timers.

EVENTIDE
6706, 6707, 6708
Digital audio workstations; video and audio broadcast delay; audio processors.

EVERTZ MICROSYSTEMS LTD.
6444
New: 7200, ECM 4015 LTC time code generator.
Character generators; editor interfaces, accessories; time code equipment; VTR synchronizers; ATR synchronizers; clocks, timers.

EXCALIBUR INDUSTRIES
6200
Transportation cases.

F

FAROUDJA LABS
5938, 5940, 5942, 5944
New: NTSC encoders/decoders; enhancers; transcoders; line doublers.

FERNO WASHINGTON
3117
Audio and video equipment carts.

FIBERBILT CASES
6017
Molded shipping cases.

FIDELIPAC
4624
Audio tape, carts; cart decks.

FIELD ENGINEERING
1146
Camera support equipment.

FILM HOUSE
4053
Production/postproduction facilities.

FIRSTCOM/MUSIC HOUSE
6733
Music/sound efx libraries.

FLASH TECHNOLOGY
5612
Tower lighting.

FLORICAL SYSTEMS
6730
New: edit/controllers; test equipment, timing & amplitude; cart automation/MERPS; switching automation equipment; automatic program time/run sheets.
Keyers; net tape delay.

FOCAL PRESS
1946
Books: *Art of Digital Video, Art of Digital Audio, Microphones: Technology & Technique, Loudspeakers & Headphone Handbook.*

FOR-A CORP. OF AMERICA
3522
New: HDTV cameras, color correctors.
Color correctors; digital video effects; NTSC encoders/decoders; production switchers; time base correctors; post-production consoles.

FORT WORTH TOWER
4730, 4732, 4734
Antennas, towers.

FOSTERDONE/VIDEO ENGINEERING
7105, 7107
New: color correctors; distribution amps; NTSC encoders/decoders; sync and pulse generators/processors; video processors; audio DAs.
Telecines; telecine tubes and gates; film magnetic sound follower for telecine.

FOSTEX CORP. OF AMERICA
2506
New: amplifiers, preamplifiers.
VTR synchronizers; ATR synchronizers; 2-track ATRs; 4-8 track ATRs; 16-track ATRs; digital studio ATRs; DAT decks; headphones; microphones, accessories.

FRANKLYN R. BEEMISH & CO.
6644
New: studio design & construction; technical/engineering consultant.

FREZZOLINI ELECTRONICS
2834, 2836
Battery chargers; nicad battery packs; power cases; power supplies; lighting equipment.

FUJINON
1700
2/3-inch and 1/2-inch CCD lenses for ENG/EFP and studio productions; HDTV lenses; large format studio and field lenses; CCTV and teleconferencing lens system, accessories; pan/tilt systems.

FUTURE PRODUCTIONS
3201
Camera support equipment; distribution amps; routing switchers; video processors; videotape; videotape duplication systems; videotape duplication services.

G

GARNER INDUSTRIES
2027, 2029
Tape erasers, degaussers.

GEFEN SYSTEMS/SOUND IDEAS
8038
New: DAT decks; background music playback; music/sound efx libraries.
Compact disc equipment.

GENNUM CORP.
7126
Crosspoint ICs for routing and production switchers.

GENERAL ELECTRIC LIGHTING
5500, 5502
Lighting equipment.

GENTNER ELECTRONICS CORP.
5852
New: PeopleLink multi-line telephone interfacing system; laser digital FM limiter/stereo generator; Prizm digital FM audio processor; Digital Hybrid II auto nulling digital hybrid; SPH-5 high-performance analog hybrid; SPH-5E analog hybrid with frequency extension.
Telco interface equipment; teletext equipment; transmission line; mobile production units; MDS, SMATV systems.

GEOCAM CORP.
9035
New: GeoFx 4x4 camera filters; GeoFocus follow-focus system for ENG and film lenses; 4/4.2-OB carbon-fiber matte box.

GIANT BOOM BOX INDUSTRIES
4116
Giant remote broadcasting studios.

GML
3750
New: Audio compressor/limiter.
Console automation; audio processors; faders, attenuators.

GORMAN REDLICH MFG. CO.
4902
EBS systems; NOAA weather radios.

GOTHAM AUDIO
2342
New: Spot 90 CD production system; digital DJ suite from Harmonia Mundi Acustica.
Microphones, accessories; audio processors; digital audio disk recorder.

GRAHAM-PATTEN SYSTEMS
1654
Keyers; post-production consoles; VAMP video-audio multiplexing process.

GRASS VALLEY GROUP
5830, 157B
New: DSK-102 rack-mounted control panel for DSK-101 Linear Keyer.
Video production switches; Kadenza digital video processing system; Kaleidoscope digital video effects system; video editing systems; routing switchers; master control switchers; keyers; encoders; decoders; amplifiers; Wavelink fiberoptic system.

THE GREAT AMERICAN MARKET
5300
Lighting equipment.

LYNN GREENBERG ELECTRONIC TELEPROMPTING
2035
New: Telescroll PC teleprompter workstation.
Teleprompters.

JAMES GRUNDER & ASSOC.
1212
New: CEL D152B "Maurice II" touchscreen controller; MS-850, MS-851, MS-852 digital video effects systems; CEL P159 Eric Plus editing controller; CEL P167 Still Image Store; CEL P165 Tetra bi-directional standards converter; YEM CVS-910 auto scan converter.

GTE SPACENET
1648
SNG systems; SNG voice communication service.

H

HAMLET VIDEO INTERNATIONAL
2518
New: HVI 204 Component and HVI1203B Video Scope waveform and vector measuring devices; HVI 501 Stereo Scope; HVI 2030 Audio Scope.

HALLIKAINEN & FRIENDS
4202
New: DRC200 transmitter remote control system; SAT201 satellite dish steering system.
Broadcast consoles; transmitter remote control.

HARRIS CORP., BROADCAST DIV.
4430
New: Gates Series 1 kW, 5 kW solid state MW transmitters; DX-100 digitally modulated 100 kW solid state MW transmitter; HT 1FM, HT 7FM, solid state FM transmitters; HT 1LS 1kW solid-state, low-band VHF transmitter.
UHF transmitters; VHF transmitters; FM transmitters; MW phasors; transmitter remote control; antennas; (FM and TV).

HARRIS VIDEO SYSTEMS
6700
New: digital video effects; electronic still stores; 3D graphics systems.
Character generators; color correctors.

HEDCO
3416
Distribution amps; routing switchers; sync and pulse generators/processors; amplifiers, preamplifiers; audio DAs; audio routing switchers.

KARL HEITZ, INC./GITZO
5916, 5918
New: camera support equipment.
Microphone fishpoles.

HIPOTRONICS
5912, 5914
Power conditioners; voltage regulators.

HITACHI DENSHI AMERICA
2034
New: ENG/EFP cameras.
HDTV cameras; studio/field cameras; video monitors; video projectors; 1/2-inch VTRs; digital VTRs.

H.L. DALIS
9051
Fiberoptic systems; connectors, jackfields; equipment enclosures; tools; wire, cable; equipment distributor.

HOLADAY INDUSTRIES
5049
RF test equipment; ELF power frequency meter.

HOODMAN CORP.
6628
Monitor/TV sun shades.

HORITA
9012
New: distribution amps; time code equipment.
Sync and pulse generators/processors.

HOTRONIC
2935, 2937
New: frame synchronizers; time base correctors.

HUGHEY & PHILLIPS
8107
Obstruction lighting, controls, fall protection, guyline ice protection.

I

ICA Systems Group
7006, 7008
New: cart automation/MERPS; newsroom computers.

IDB COMMUNICATIONS GROUP
3634
Satellite transmission services, domestic & international, audio/video/data; transportable earth station rental.

I.DEN VIDEOTRONICS CORP.
1016
New: time base correctors.
Standards converters.

IGM COMMUNICATIONS
4612
Studio ATRs; studio automation equipment.

IKEGAMI ELECTRONICS
6216
New: HL-53CCD, HL-55CCD, HC-200CCD, HC-230CCD, HC-240CCD camcorders; HL-791 ENG/EFP camera; HK-327, HK-355CCD studio/field cameras; TPP-1500 video projector.
Camcorders; ENG/EFP cameras; HDTV cameras; studio/field cameras; NTSC encoders/decoders; video monitors; video processors; video projectors; ENG microwave; intercity microwave.

ILC TECHNOLOGY
3048
New: lighting equipment.

IMAGE VIDEO
2910
Video routing switchers, DAs; digital production systems; audio routing switchers.

INDUSTRIAL ACOUSTICS
6818, 6819
Equipment enclosures; sound-insulating materials; studio design & construction.

INFORMATION DISPLAY SYSTEMS/SAIC
163W, A100
HDTV projectors; equipment distributor; studio design & construction; technical engineering consultant.

INNOVATIVE AUTOMATION
8113, 8115
Studio automation equipment; cart decks; audio tape; equipment distributor service.

INNOVISION OPTICS
9032, 9033
New: remote motion control; lighting equipment.
Lenses; 16-track ATRs.

INOVONICS
5601, 5603
New: stereo generators.
Audio heads, accessories; audio processors; magnetic film recording equip.

INTEGRATED ARTS
5354

INTEGRATED MEDIA SYSTEMS
1406
Digital audio workstations.

INTELVIDEO
6509, 6511
New: Pre-Coder Model IV-5, Encoder IV-6.
NTSC encoders/decoders; video delays, filters; Video Flasher.

INTERACTIVE MOTION CONTROL
1308, 1310
2D & 3D video animation stand systems.

INTERGROUP TECHNOLOGIES
2934

INTERNATIONAL MUSIC/AKAI PROFESSIONAL
3902, 3903, 3904, 3905
Digital samplers; post-production consoles; studio monitors; studio ATRs; digital ATRs; cassette decks.

INTERNATIONAL TAPETRONICS CORP.
3422
Cart decks; audio routing switchers; audio tape, carts.

INTRAPLEX
Booth no. N/A
New: DDR-1500 digital rate reducer; TDM 153FO T-1 fiberoptic transmssion system; Fly-Away transmission systems.
Digital audio transmission systems; T-1 multiplex.

ITE
5714
Camera support equipment.

ITELCO S.P.A.
1416
Radio transmitters; TV transmitters; microwave for ENG.

ITS CORP.
1622
MDS, SMATV systems; TV transmitters.

J

JAMPRO ANTENNAS
5030
New: diplexers, multiplexers.
Antennas.

JAZZ SYSTEMS/ ELECTROHOME
2850, 2852
New: routing switchers.
Digital video effects.

JBL PROFESSIONAL
2916
New: amplifiers, preamplifiers; monitor speakers.

JEFFERSON-PILOT DATA SERVICES
5014
Business automation equipment; election reporting systems; newsroom computers; switching automation equipment.

JEM-FAB CORP.
6644
Machine control patch panel; custom panel.

JENSEN TOOLS
4117
New: equipment enclosures; tools; transportation cases; wire, cable; tool kits; test equipment.

JNS ELECTRONICS
5601, 5603
New: distribution amps; routing switchers; amplifiers, preamplifiers; microphones, accessories; modulators, demodulators.
Audio DAs; audio processors; audio routing switchers; RF test equipment.

JVC PROFESSIONAL PRODUCTS
3116
New: Camcorders; ENG/EFP, HDTV and studio/field cameras; edit/controllers; editor interfaces; accessories; production switchers; time base correctors; solid state video recorders; 1/2-inch, digital and HDTV VTRs; ATR synchronizers; DAT decks; digital FIR equalizer/compressor/limiter.
DAs; multisource editors; frame synchronizers; time code equipment; video projectors.

K

K&H PRODUCTS/PORTA BRACE
6055
Transportation cases.

KAHN COMMUNICATIONS
4410
New: audio processors.
Exciters; stereo generators.

KALAMUSIC
8119
Syndicated radio programming.

KANGAROO VIDEO PRODUCTS
2945, 2947
Carrying cases.

KAVOURAS
1628
New: weather graphics; weather radar.
3D graphics systems; weather database.

KAY INDUSTRIES
4051
Power supplies and batteries; power converters.

KINGS ELECTRONICS CO.
3133, 3135
Digital video effects.

KINTRONIC LABS
6638, 6640, 6642
AM directional antenna feeder systems.

KLARK-TEKNIK ELECTRONICS
8109, 8111
New: audio processors; post-production consoles; delay systems; level indicators; microphones, accessories; monitor speakers; lighting equipment.

KLIEGL BROS.
1552
Lighting equipment.

KLINE TOWERS
8034, 8036
Towers.

KNOX VIDEO
3060
Character generators.

L

LAIRD TELEMEDIA
2350
Character generators.

LaKART CORP.
1712
LaKart station automation system; videotape compiler package for news, sports, and station break reels.

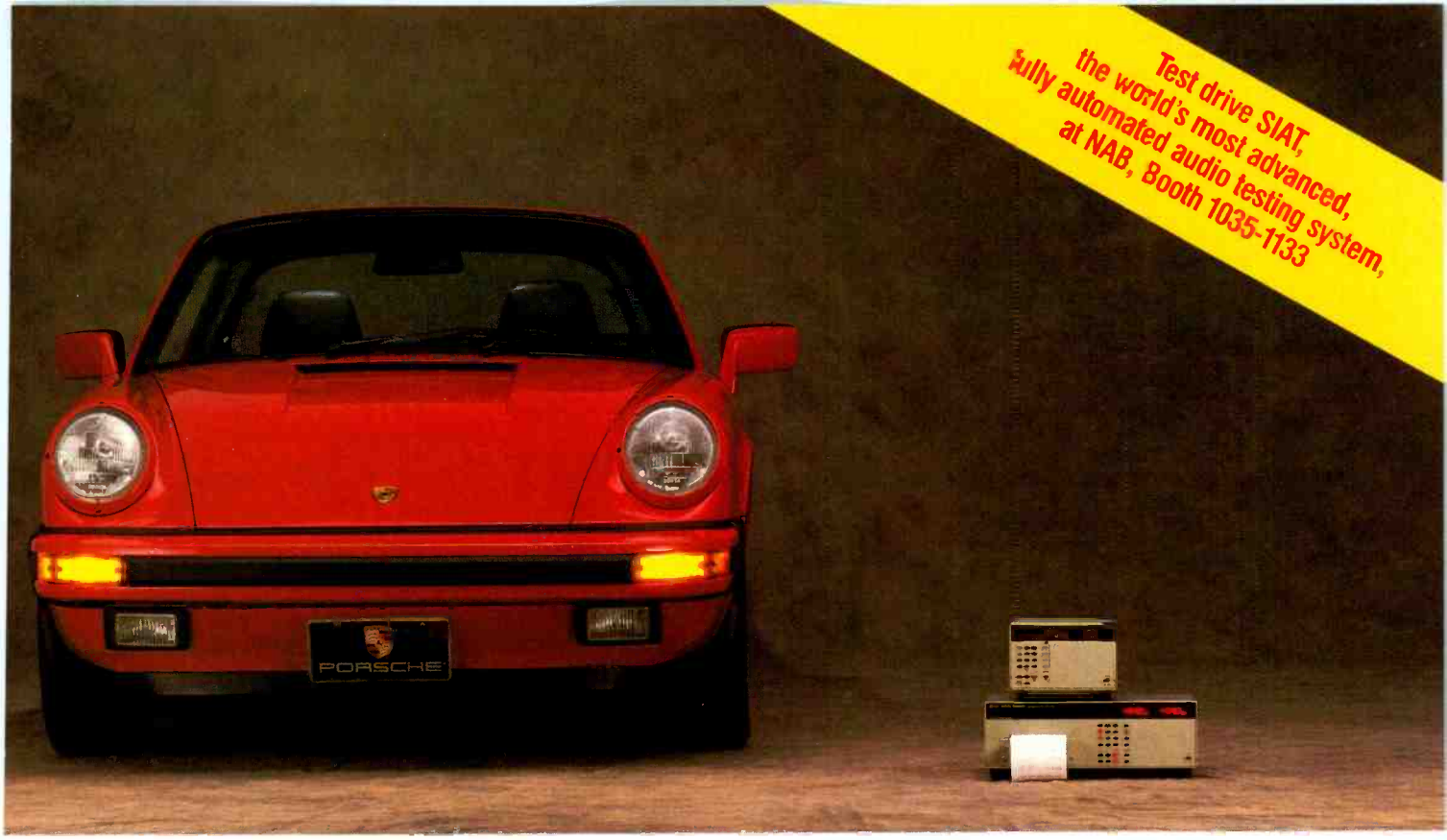
LAKE SYSTEMS CORP.
1712
New: Needs analysis for new and existing broadcast and corporate production facilities.
Facility design & construction.

LASERDUB
1044
New: High-speed laser disc to VHS cassette duplication system.

LDL COMMUNICATIONS
1634
New: RF cavities, RF components.
FM High Power Combiner; antennas; diplexers, multiplexers; exciters; stereo generators; towers; VHF transmitters; technical/engineering consultant.

LEADER INSTRUMENTS
3012, 3014, 3016, 3018
Sync and pulse generators/processors; video test equipment, including waveform monitors, VEC topscopes, pattern generators, and ENG/EFP test equipment.

LECTROSONICS
8043, 8045
Microphones, accessories; wireless microphones.



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BME

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Headquarters: Schmid Telecommunication ☐ Rieterstrasse 6 CH-8002 Zurich
Switzerland ☐ Tel: 011 41 1 206-1111 Fax: 011 41 1 201-2372

SZ Schmid Telecommunication

Circle 134 on Reader Service Card.

LEITCH VIDEO OF AMERICA
3516
New: distribution amps; electronic still stores; sync and pulse generators/processors; amplifiers, preamplifiers; clocks, timers.
Frame synchronizers; video delays, filters.

LEMO USA
2949, 2951
Video triax connectors; cable assemblies.

LENCO ELECTRONICS
2334
TBCs; video processors; video test equipment; video routing switchers; DAs; reverb, special efx; time compression systems.

LEONETTI CO.
9028, 9029, A218
Lighting equipment.

LEXICON
2452
New: Lexicon 300 Digital Effects System; OPUS/e Digital Audio Editing System; 480L Program Cartridge 1.0.
OPUS Digtial Audio Production System; Model 2400 Stereo Audio Time Compressor/Expander; time code equipment; digital video effects; sync and pulse generators; delay systems; MRC MIDI Remote Controller.

LIGHTNING ELIMINATORS & CONSULTANTS
5027
Lightning protection.

LINDSAY ANTENNA
7102
New: antennas; diplexers, multiplexers; power dividers.

LIPSNER-SMITH CO.
2055
Ultrasonic film cleaning equip.

LISTEC VIDEO CORP.
5042
New: A5000N prompter network.
Teleprompters.

LOGITEK ELECTRONIC SYSTEMS
4750
New: broadcast consoles.
Amplifiers, preamplifiers; audio DAs; audio routing switchers; broadcast consoles; field-portable mixers; level indicators; automated audio crossfader.

LOUIS HURTUBISE
7204
Language translation service: English submaster to French master.

LOWEL-LIGHT MFG.
6210
Lighting equipment.

LPB
4512
New: Compact disc equipment.
audio DAs; broadcast consoles.

LTM CORP. OF AMERICA
2608
Microphones, accessories; lighting equipment.

LYON LAMB V.A.S.
1540
3D modeling, animation systems and accessories.

M

M & R DATA SERVICES
8101, 8103, 8105
New: edit/controllers; editor interfaces, accessories; multisource editors; remote monitoring systems; transmitter remote control.

M/A-COM MAC
2152
New: intercity microwave; modulators, demodulators.
ENG microwave.

MACROVISION
7123
Recordable video scrambling; pay-per-view anti-taping technology.

MAGNI SYSTEMS
1026
New: video t&m; computer-to-video encoders.
Sync and pulse generators/processors; video t&m.

MAGNUM TOWERS
6712, 6713
Towers.

MANHATTAN PRODUCTION MUSIC
6618
Production music on compact disc.

MARCONI COMMUNICATIONS INC.
1825
Radio transmitters.

MARTI ELECTRONICS
4400
New: antennas; intercity microwave; STLs, TSLs.

MATCO
3641
New: MA-300 videotape duplication systems; MA-200 VTR playback systems.
Routing switchers.

MATTHEWS STUDIO EQUIPMENT
2720
Camera support equipment.

MAXELL CORP. OF AMERICA
2248
Videotape; audio tape, carts.

MAZE BROADCAST
1150
ENG microwave; intercity microwave; used equipment broker; broadcast & production equipment appraisals, liquidations, purchases.

MCCURDY RADIO INDUSTRIES
5322
New: Telephone hybrid; intercoms.
Amplifiers, preamplifiers; audio DAs; audio routing switchers; broadcast consoles; delay systems; IFB systems; intercoms; level indicators; monitor speakers; switching automation equipment; connectors, jackfields.

MCMARTIN INDUSTRIES
4429
Audio processors; on-air consoles, mixers; audio monitoring equipment; radio transmitters; exciters.

MEDIA COMPUTING
3540, 3542, 3544
New: PROtec programmable remote control.
Election reporting systems; newsroom computers; teleprompters.

MEDIA TOUCH SYSTEMS
1200
Switching automation; compact disc equipment; studio automation equipment; audio routing switchers.

MERLIN
2100
New: Telecines; solid-state video recorders; digital lip synchronizers.
One-inch VTRs; monitor speakers; cart automation/MERPS; switching automation; time zone delay; transportation cases; mobile vehicle construction.

MERLIN SNELL & WILCOX
1041, 1139
Standards converters; HDTV downconverter.

MICRO COMMUNICATIONS
2728
New: UHF super power isolator; articulated flex waveguide; UHF wg slide hangers & flange tuners; "Micro Switcher" microprocessor controller; UHF-TV dual channel combiner; coaxial transfer switches; LPTV multichannel combiner; FM super power isolator.
Antennas; diplexers, multiplexers; RF amps, switches; RF cavities; RF loads, filters; technical/engineering consultant.

MICRODYNE CORP.
1433, 1435
New: exciters; satellite video receivers.
SCPC audio systems & products; antennas; MDS, SMATV systems; satellite earth stations; satellite system design & integration.

MICRON AUDIO PRODUCTS
6729
New: MDR-150, MDR-550 miniature diversity receivers.

MICROSONICS
1439
Glass delay lines & delay modules, analog & digital.

MICROTIME
5740
New: 3D digital video effects system; frame synchronizers.
3D graphics systems; time base correctors.

MICROWAVE RADIO CORP.
2960
New: 13T01 transmitter, 13MR receiver, 7MR receiver.
Antennas; intercity microwave; STLs, TSLs.

THE PROFESSIONAL CD PLAYER FOR THE PROFESSIONAL CD PLAYER.

Like all professional CD players, the new Technics SL-P1300 is technologically advanced.

But you don't have to be a technical genius to operate it.

In fact, even if you haven't spent years in the studio, it will only take you a few minutes to figure it out.

You see, the SL-P1300 is ergonomically designed to give you greater control over playback than you've ever had before.

Perhaps that's because it's built like a recording console. Which means the disc well and all the other controls are right at your fingertips.

First, the control panel features a long stroke sliding pitch control. It's continuously variable with a range of ±8%. In addition, it lets you restore quartz lock accuracy at the touch of a button.

There's also our two-speed search dial with audible pause. Which makes finding your in point extremely easy.

Our professional CD player has other features professionals enjoy working with. Like one-touch memorization by time code, A-B repeat, and our exclusive rocker control search buttons. It's the digital equivalent of dragging your finger on the edge of a record.

A great deal of thinking also went into things like our balanced outputs (−10 dBm nominal into 600 ohms). There's even a port for a wired remote. And separate power supplies for digital and analog circuits. Given this, it's not surprising that its S/N ratio is 112 dB.

If you're a professional CD player, chances are you're ready to hear what our professional CD player can do.

Call your Technics representative. You'll find that our pro CD player isn't the only thing from Technics that's a pleasure to work with.

Technics
The science of sound

Circle 135 on Reader Service Card.

MIDWEST COMMUNICATIONS CORP.
3234, A126
New: production switchers; color correctors; routing switchers; sync and pulse generators/processors; time base correctors.
Character generators; color correctors; NTSC encoders/decoders; routing switchers; equipment distributor; studio design & construction; mobile vehicle construction.

MIDWEST COMMUNICATIONS CORP.
OUTSIDE
ENG/EFP vehicles; ENG microwave; mobile production units; satellite earth stations; mobile vehicle construction.

MILLER FLUID HEADS (USA)
6204
New: 30 Series II fluid head; 50 Series II fluid head.
Camera support equipment.

MIRALITE COMMUNICATIONS
9051
MDS, SMATV systems; satellite earth stations.

MITSUBISHI ELEC. SALES AMERICA
162W
Video monitors; video processors; video projectors.

MOBILE-CAM PRODUCTS
5352
New: Pan & tilt antenna steering; 12 V dc powered cable reels for ENG trucks mobile vehicle construction; distribution amps; audio DAs; IFB systems; ENG/EFP vehicles.

MODULATION SCIENCES
4802, 4803
New: Remote monitoring systems.
MTS equipment; RF test equipment; stereo generators.

MOLE-RICHARDSON
5600
Lighting equipment.

KEITH MONKS AUDIO
5946
Record cleaning machines; studio monitors.

MOSELEY ASSOCIATES
4336
New: MRC 1620 remote control with optional TaskMaster 20 PC control smart options; modulators, demodulators; remote monitoring systems.
Audio processors; audio routing switchers; ENG microwave; intercity microwave; modulators, demodulators; remote monitoring systems; stereo generators; STLs, TSLs; transmitter remote control; switching automation equipment; mobile vehicle construction; technical/engineering consultant.

MOTOROLA
2014
New: C-QUAM stereo receivers.
Exciters; remote modulation systems; stereo generators.

MUSCO MOBILE LIGHTING
OUTSIDE
Transportable lighting equip.

MYAT
6708
New: transmission line.
RF components.

MZB/GRAY
2500
ENG/EFP vehicles; mobile vehicle construction.

N

NADY SYSTEMS
6505
Two-way portable radios; mics, accessories; radio transmitters.

NAGRA MAGNETIC RECORDERS
2128
Audio tape recorders.

NALPAK VIDEO SALES
1401
Transportation cases; test charts; equip. carts.

NARDA MICROWAVE
5757
New: Model 8520 FM & VHF station monitor.
Remote monitoring systems; RF components; RF test equipment; transmitter remote control; FCC OST65 RF field compliance meters.

NATIONAL ASSOCIATION OF COLLEGE BROADCASTERS
1051
College radio and TV trade association.

NAUTEL
4144
Radio transmitters.

NELSON SALES CORP.L.E.
3147, 3149
Studio & ENG bulbs.

NEMAL ELECTRONICS
7203
New: Wire, cable.
Transmission line; connectors, jackfields.

NEOTEK CORP.
8116, 8118, 8120
New: post-production consoles.

NETWORK MUSIC
4220
Music/sound efx libraries.

NEUTRIK USA
6610, 6612
Editor interfaces, accessories; audio connectors & assemblies.

NEVE
4152
Console automation; broadcast consoles; post-production consoles; two-track, 32-track digital ATRs.

NEW ENGLAND DIGITAL
W161
New: PostPro SD digital recorder/editor for sound design applications; third-party Macintosh software for PostPro and Synclavier families; new optical disc sound efx libraries.
Digital audio workstations; electronic audio editors.

NIKON
6512
New: CP-8000 full color printer; lenses.
HDTV cameras; lenses; LS-3500 film scanner.

NORPAK
3915, 3916
Teletext receiver.

NOVA SYSTEMS
2922
New: NOVASyncF frame synchronizer with freeze; NOVASync2 frame synchronizer/TBC; NOVASync2F frame synchronizer/TBC with freeze; electronic still stores.
Frame synchronizers; time base correctors; electronic still stores; digital video effects; VTR synchronizers.

NPR SATELLITE SVCES.
6545
Satellite distribution services.

NURAD
2810
Antennas; ENG microwave; intercity microwave; STLs, TSLs.

NYTONE ELECTRONIC
3054, 3056, 3058
Telecines.

O

O'CONNOR ENGINEERING
5930
Camera support equipment.

ODETICS BROADCAST
5704
Cart automation/MERPS; news control terminal.

OKI/SAECO INTERNATIONAL
3806, 3807
Standards converters.

OLESEN
2618
Lighting equipment.

OMICRON VIDEO
2953, 2955
New: Video transcoder.
Distribution amps; master control switchers.

OMNIMUSIC
4343
New: Omni FX efx library; omnimusic library/professional broadcast series.

OPTICAL DISC CORP.
3415
Digital audio processor encoder for LaserDisc; Videodisc recording and playback systems.

ORBAN ASSOC.
4208
Programmable parametric equalizer.

ORION RESEARCH
3440
New: broadcast consoles.
Broadcast consoles; post-production consoles.

OSRAM CORP.
6518
Lighting equipment.

OTARI CORP.
4352
New: post-production consoles; console automation.
4-8 track ATRs; 16-track ATRs; 16-plus-track ATRs; digital studio ATRs; audio heads, accessories; audio duplicators.

P

PACIFIC RADIO ELECTRONICS
9045, 9046, 9047
Wire, cable; connectors, jackfields; tape erasers, degaussers; mics, accessories; tools; equipment distributor.

PACIFIC RECORDERS & ENGINEERING
4130
Cart decks; broadcast consoles; studio furniture; studio design & construction.

PACO ELECTRONICS U.S.A.
6726
Power supplies, batteries.

PALTEX
1734
New: editor interfaces, accessories; multisource editors.
Edit/controllers.

PANASONIC COMMUNICATIONS & SYSTEMS CO.
2534, 0203, A200
New: camera support equipment; ENG/EFP cameras; studio/field cameras; 1/2-inch VTRs; digital VTRs; DAT decks; cart automation/MERPS.
Camcorders; camera support equipment; ENG/EFP cameras; studio/field cameras; edit/controllers; time base correctors; video monitors; 1/2-inch VTRs; digital VTRs; DAT decks; cart automation/MERPS.

PANASONIC INDUSTRIAL CO./ RAMSA
2534
Camcorders; frame synchronizers; keyers; lenses; NTSC encoders/decoders; time base correctors.

PANSOPHIC SYSTEMS
3140
2D graphics systems; 3D graphics systems.

PANTHER CORP. OF AMERICA
6822
Camera support equipment; lighting equipment; remote control camera dolly system.

PATCH BAY DESIGNATION CO.
1346
Patch bay labels.

PEERLESS SALES
3821, 3822
Monitor mounting brackets; speaker mounts.

PENNY & GILES
6804, 6805
Rotary & slide attenuators.

PEP
5700
Power supplies, batteries.

PERROTT ENGINEERING LABS
2939, 2941, 2943
New: lighting equipment; power supplies, batteries; discharger/ charger series.
Lighting equipment; power conditioners; power supplies, batteries; heated equipment jackets.

PESA ELECTRONICA, S.A.
2708
Remote motion control; remote monitoring systems; transmitter remote controls; video monotors; video test equipment; character generators; intercoms; TV transmitters.

PHILIPS COMPONENTS, DISCRETE PRODS. DIV.
5512-18
New: XQ-3550 Series HDTV Plumbicon TV camera tubes; RF cavities; high-efficiency depressed collector UHF Klystrons.

PHILIPS LIGHTING
1352, 1354
Lighting equipment.

PHILIPS TEST & MEASURING INSTRUMENTS
1914
Video test equipment; RF test equipment.

PINNACLE SYSTEMS
2101
Digital video effects; 2D and 3D graphics systems; still store systems.

PINZONE COMMUNICATIONS
1558
Satellite earth stations; wire, cable.

PIVOTELLI USA
7116
New: equipment enclosures.

POTOMAC INSTRUMENTS
4406
New: Type 1900 directional antenna monitoring system.
Audio T&M; RF test equipment; transmitter remote control.

PRACTEL SALES INTERNATIONAL
9048, 9049, 9050
New: Serial machine control router.
Character generators; distribution amps; sync and pulse generators/processors; audio DAs; audio routing switchers; clocks, timers.

PRIME IMAGE
7010
New: frame synchronizers; time base correctors.
Digital video effects; production switchers.

PRO BATTERY
3125, 3127
Power supplies, batteries.

PROFESSIONAL LABEL SERVICE
1020
New: Videotape labels; videotape cases; VIDLABEL software, version 3.01; custom printing of videotape labels.

PROGRESSIVE IMAGE TECHNOLOGY
8012, 8014
TBCs; frame synchronizers; NTSC encoders/decoders; PC genlocks; character generators; digital video effects; sync and pulse code generators/processors.

Q

Q-TV
2234
Teleprompters.

QEI CORP.
4300
FM transmitters; Model 400 CAT/ LINK digital coder/decoder/multiplexer system.

QSI SYSTEMS
3034, 3036, 3038
Character generators; color bar generators with ID; safe area generators; demod tuners.

QUALITY VIDEO SUPPLY
1446
Equipment distributor.

QUANTA CORP.
6030
New: Delta-1 + CG with optional CCIR 601 interface; business graphics for Orion CG; All Channel Message System for cable and CCTV.
Character generators.

QUANTEL
1134
New: random-access editors; electronic still stores; 2D graphics systems.
Character generators; digital disk recorders; random-access editors; standards converters; solid-state video recorders; studio design & construction; mobile vehicle construction; technical/engineering consultant.

QUICKSET INTERNATIONAL
5048
New: camera support equipment.
Tripod; head; dollies.

R

R-COLUMBIA PRODUCTS
3000
New: IFB systems; intercoms.
Headphones.

RADIATION SYSTEMS
3100
Satellite earth stations; SNG systems.

RADIO SYSTEMS
4903-10
On-air consoles, mixers; digital ATRs; radio transmitters; studio furniture; equipment distributor; studio design & construction.

RAM BROADCAST SYSTEMS
6820, 6821
Routing switchers; audio routing switchers; broadcast consoles; noise reduction systems.

RAMPART CASES
7020
Shipping cases.

RANGERTONE RESEARCH
1952, 1954, 1956
One-inch VTRs; telecines.

RANK CINTEL
3156
New: color correctors; electronic still stores; telecines.

REACH ELECTRONICS
5908, 5910
SCA equipment.

REBO RESEARCH
Booth no. N/A (with Nikon 112560 Group)
HDTV accessories, support equip.

RECORTEC
2557
Tape erasers, degaussers.

REES ASSOC.
2037, 2039
Facility business planning.

REGISTER DATA SYSTEMS
2512
Business automation equipment; music & rating analysis computers.

RESEARCH TECHNOLOGY INTERNATIONAL
2049
New: tape erasers, degaussers; video t&m; videotape evaluation/cleaning equip.; tape-storage systems.

RF TECHNOLOGY
2612
New: fiberoptic systems.
Antennas; fiberoptic systems; ENG microwave; intercity microwave; STLs, TSLs.

RICHARDSON ELECTRONICS
2844
Camera pickup tubes; cathode ray tubes; RF cavities; RF components; transmitter, power tubes.

ROCKWELL INTERNATIONAL, Network Trans. Div.
1924, 1926, 1928, 1930
STLs; TSLs; fiberoptic systems.

ROH/DIV. ANCHOR AUDIO
6430, 6432, 6434
Studio monitors; audio test equipment; intercoms; audio routing switchers.

ROHDE & SCHWARZ
5408
Vidéo generator; video noise meters; broadcast station video monitoring systems; audio accessories and equipment.

ROHN
Booth no. N/A
Towers; equipment shelters.

ROSCO LABS
1808
Keyers; connectors, jackfields.

ROSCOR CORP.
6524, A255
Equipment distributor; studio design & construction; mobile vehicle construction; ENG microwave.

ROSS VIDEO
5304
New: RVS model 424 production switcher with Downstream MultiKeyer.
Production switchers.

RTS SYSTEMS
2624
New: Series 2200 wireless IFB system; Series 260 wireless intercom; MRT 327 intercom.
IFB systems; intercoms; headphones; amplifiers, preamplifiers; microphones, accessories; reference tone generator.

S

SWR Inc.
5005, 5007, 5009

SACHTLER CORP. OF AMERICA
1610
New: 575D, 1200D HMI daylights.
Camera support equipment; lighting equipment; power supplies, batteries.

SAMSON TECHNOLOGIES CORP.
6542
Console automation; broadcast consoles; microphones, accessories; UHF transmitters; VHF transmitters.

SANKEN MICROPHONES
1340
Microphones, accessories.

SAS INSTITUTE
8061
3D graphics systems.

SCALA ELECTRONICS
4224
Antennas; transmission line.

SCHAFER WORLD COMMUNICATIONS
4602
Digital ATRs; studio monitors; field portable mixers; on-air consoles, mixers; cart decks; compact disc equipment; studio automation equipment.

SCHNEIDER CORP. OF AMERICA
5616
New: video filters.
Video lenses.

SCHWEM TECHNOLOGY
3153,3155,3157
Lenses.

SCIENTIFIC ATLANTA
5730
New: 7530 broadcast-quality satellite video receiver; six-meter satellite antenna.
Exciters; remote monitoring systems; satellite earth stations.

SECK
2916
Multitrack audio consoles.

SELCO PRODUCTS
5504
VU/PPM meters, control collet knobs, accessories.

SELLMARK ELECTRONIC SERVICES LTD.
7101, 7103
New: console automation; faders, attenuators; lighting and control automation systems.
Moving faders.

SENNHEISER ELEC. CORP.
3101, 3103
New: noise reduction systems.
Headphones; microphones, accessories.

SESCOM
2015, 2017, 2019
Amplifiers, preamplifiers; audio DAs; audio processors; faders, attenuators; field-portable mixers; audio transformers.

SHIMA SEIKI
3241
2D graphics systems; 3D modeling, animation; digital video effects.

SHIVELY LABS
4030
Antennas; diplexers, multiplexers; transmission line.

SHOOK ELECTRONICS USA
A225
48-63-102 network quality production trailer with a 3-tier rear production area; 25-32 rack-ready EFP vehicle; SNG vehicles; ENG vehicles; consulting service for mobile equipment.

SHURE BROTHERS
4524
New: VP88 stereo microphone; L Series wireless systems for handheld, lavalier and body-pack applications.
Microphones, accessories; field-portable mixers; amplifiers, preamplifiers.

SIERRA VIDEO SYSTEMS
9005
New: 32-input series routing switchers.
Keyers; routing switchers; YUV/RGB format converters; RS-422 data routing switcher.

SIGMA ELECTRONICS
6300
New: distribution amps; NTSC encoders/decoders; routing switchers; video processors; audio routing switchers.
Distribution amps; NTSC encoders/decoders; routing switchers; sync and pulse generators/processors; video processors; audio DAs; audio routing switchers.

SIGNATURE MUSIC LIBRARY
7015
Music/sound efx libraries.

SIRA/COMAD
2448
New: antennas; diplexers, multiplexers.
Antennas; diplexers, multiplexers; RF components; RF loads, filters.

SISCOM
1412
New: NewsPro DP distributed processing newsroom computer.
Newsroom computers; teleprompters; software consultant.

SKOTEL CORP.
1536
New: Time code equipment.

SOLID STATE LOGIC
1321
Electronic audio editors; on-air consoles, mixers; post-production consoles; digital audio workstations.

SOLUTEC LTD.
6800
New: distribution amps.
Distribution amps; audio DAs; level indicators; commercial insert equip.

SONO-MAG CORP.
4301, 4303
Cart decks; compact disc equipment; studio automation equipment; audio routing switchers.

SONY COMMUNICATIONS PRODUCTS
5130
New: DVS-8000 Digital Video Mixer; edit/controllers; video monitors.
Camcorders; ENG/EFP cameras; production switchers; video monitors; digital VTRs.

SONY COMMUNICATIONS PRODUCTS, BROADCAST DIV.
5130
New: BVS-3200C production switcher; DME-450 digital multi-effects device; DVS-8000 Digital Video Mixer in either D-1 or D-2 format; AES/EBU audio router; video monitor with serial D-2 inputs and serial D-1 capability; DVR-2 portable D-2 VTR; Betacam SP products; BVP-70 EFP camera.

SONY COMMUNICATIONS PRODUCTS, BROADCAST DIV.

5130
New: BVP-270/370 camera; BZE-9001/02 software enhancement for BVE-9000 editing system; Digital Bit Rate Reduction product for SNG applications.
Camcorders; ENG/EFP cameras; HDTV cameras; studio/field cameras; digital video effects; edit/controllers; multi-source editors; production switchers; video monitors; 1/2-inch VTRs; digital VTRs; HDTV VTRs; 1-inch VTRs.

SONY COMMUNICATIONS PRODUCTS, PRO VIDEO DIV.
5130
New: BVE-910 edit controller.
Hi8 series 8 mm camcorders, VCRs; 3/4-inch VTRs; ENG/EFP cameras; camcorders; edit/controllers.

SONY MAGNETIC PRODUCTS CO.
5130
Videotape; audio tape, carts.

SONY PRO AUDIO DIV.
5130
New: PRO RDAT editor and player; VSP-8000 Digital Audio Mixer.
Camera support equipment; studio/field cameras; keyers.

SOUND IDEAS
5011
Production music libraries.

SOUND TECHNOLOGY
4344
Audio test equipment.

SOUNDCRAFT
2916
New: post-production consoles.
Broadcast consoles.

SOUNDMASTER USA
3720
ATR synchronizers; digital audio workstations; electronic audio editors.

SPACEWARD INC.
3634
New: electronic still stores; 3D graphics systems.

SPECTRA SYSTEMS
8042, 8044
Videodisc player; VTR editor/controllers; multisource video editors;-random-access editors; post-production consoles; electronic audio editors.

SPRAGUE MAGNETICS
5406
Editor interfaces, accessories; audio heads, accessories; heads, accessories; head recontouring services; new heads; parts.

STAINLESS INC.
5613, 5615, 5617, 5619
Antennas, towers.

STANDARD COMMUNICATIONS CORP.
3900, 3901
New: satellite earth stations.

STANTON MAGNETICS
4726
Amplifiers, preamplifiers; headphones; turntable cartridges.

STANTRON/UNIT OF ZERO CORP.
3534, 3536, 3538
Video furniture/cabinetry; broadcast consoles; studio furniture.

STAR CASE
3810, 3811, 3812
Transportation cases; equipment enclosures.

STEADI-FILM
3446
Remote motion control; telecine accessories.

STEENBECK
6408, 6410, 6412
Flatbed film editors; telecines; time code equipment.

STOREEL CORP.
2434
Tape-storage systems.

STRAND LIGHTING
3148
Dimming and control studio equipment; lighting equipment.

STREAMLINE COMMUNICATIONS
4116

STUDER REVOX AMERICA
4552
New: Digital studio ATRs; compact disc equipment; digital audio workstations; electronic audio editors.
Broadcast consoles; post-production consoles; digital studio ATRs; cassette decks; ATR synchronizers; 2-track, 4-8 track and 16-plus track ATRs; compact disc equipment; field-portable mixers; monitor speakers.

STUDIO TECHNOLOGIES
5605
New: IFB systems.
Amplifiers, preamplifiers; audio processors; stereo simulators.

SURE SHOT TELEPRODUCTIONS & TRANSMISSIONS
8112
Mobile facilities rental.

SWINTEK ENTERPRISES
6531
Intercoms; microphones, accessories; ENG/EFP vehicles; UHF transmitters; VHF transmitters.

SWITCHCRAFT
6043, 6045
Connectors, jackfields; cable assemblies.

SWR
5005, 5007, 5009
Antennas, towers; wire, cable; RF switches.

SYMBOLICS
1156
3D modeling, animation.

SYMETRIX
6342
Audio processors; digital audio workstations; noise reduction systems; audio signal processing equip.; telco interface equipment.

SYNERGISTIC BATTERIES
6450
New: power supplies, batteries.

SYSTEM ASSOCIATES
1429
Used TV equipment broker.

SYSTEMATION
6722
Studio automation equipment.

SYSTEMS WIRELESS LTD.
7113
New: equipment distributor.

T

TABER MANUFACTURING & ENGINEERING
2556
Tape erasers, degaussers.

TAMRON INDUSTRIES
3050, 3052
Lenses.

TANNOY NORTH AMERICA
6630
Monitor speakers.

TAPSCAN
3817, 3818, 3819, 3820
Ratings analysis system.

TARGET TUNING
8110
Single-frequency radio receivers; desktop & portable SCA receivers.

TAURUS COMMUNICATIONS
8049
Satellite earth stations; SNG systems; mobile facilities rental; technical/engineering consultant; Rental or lease of Ku transportable uplink vehicles.

TEAC/TASCAM PRO AUDIO DIV.
3352
New: 4-8 track ATRs; 16-track ATRs; headphones; monitor speakers.
ATR synchronizers; 2-track ATRs; cassette decks; compact disc equipment; post-production consoles; DAT decks.

TEATRONICS
2820
Lighting equipment.

TECCOM
3434

TECHNI-TOOL
2857
Tools; transportation cases.

TEKNO
1110
Lighting equipment.

TEKSKIL INDUSTRIES
3802, 3803
Teleprompters.

TEKTRONIX, TELEVISION DIV.
2016
New: TSG1001 programmable HD television generator; VM700A Option 40 automated audio measurement system; ASG-100 audio signal generator; 2721 non-interfering sweep transmitter; 2722 non-interfering sweep receiver.
Video t&m; sync and pulse generators/processors; modulators, demodulators; MTS equipment.

TELCOM RESEARCH
3046
Time code equipment.

TELEMET, A GEOTEL CO.
5114
Character generatars; distribution amps; NTSC encoders/decaders; amplifiers, preamplifiers; audio DAs; hum eliminators; modulators, demodulators; wireless security, safety, fire monitoring system.

TELEMETRICS
1449, 1451
New: camera support equipment; remote motion control; Triak Camera Controllers; robotic camera systems.

TELEPAK SAN DIEGO
3815, 3816
Camera covers, cases.

TELESCRIPT
1934, 1936
Teleprompters.

TELEVISION ENGINEERING CORP.
2240
Mobile vehicle construction.

TELEVISION EQUIPMENT ASSOC.
5501, 5503, 5505, 5507
New: video delays, filters; headphones.
Audio and video filters.

TELEX COMMUNICATIONS
2116
New: B37; wireless intercoms.
Headphones; intercoms; microphones, accessories.

TELMAK USA
1009, 1011
Camera support equipment; 2D graphics systems; 3D graphics systems; Neriki genlock for Commodor Amiga; equipment distributor.

TELOS SYSTEMS
6354
New: Link intercom-to-telephone interface; direct phone interface module.
Telco interface equipment.

TENNAPLEX SYSTEMS
A325
Automated music management system; antennas; diplexers, multiplexers; MDS, SMATV systems.

TENTEL CORP.
2033
VTR Test equipment; VTR gauges: tape tension, spindle height, head protrusion, dial torque; ATR/CART test equipment; ART tape tension gauge.

TFT
4642
New: STLs, TSLs.
Audio T&M; EBS systems; MTS equipment; RF test equipment; STLs, TSLs.

THEATRE SERVICE & SUPPLY
2903
Lighting equipment; cyclorama curtains & tracks; equipment distributor.

THEATRE VISION
3040, 3042, 3044
New: Wybron scrollers; Rigging Innovators self-climbing grid; Screenout-IR; Screenout-IRxUV; Bates plugs.
Lighting equipment; Bates plugs.

THERMODYNE INTL.
6154
Transportation cases.

THOMSON - L.G.T.
5920
UHF transmitters; VHF transmitters.

THOMSON DIGITAL IMAGE
5920
New: 3D graphics systems.
Digital video effects; electronic still stores; graphics/special effects facility.

THOMSON ELECTRON TUBES & DEVICES
6348
Transmitter, power tubes.

THOMSON TUBES ELECTRONIQUES
6348
New: TH 563 tetrode UHF tv transmitter tube; TH 2456 14-GHz klystron for satellite uplinks; TH 343 25-kW FM radio tube and cavity.

THOMSON VIDEO EQUIPMENT
5920
New: TTV 1542 CCD studio/OB camera; Proscan EDTV/HDTV camera; IMPULS component digital mixer.
Camcorders; ENG/EFP cameras; studio/field cameras; color correctors; digital video effects; NTSC encoders/decoders; standards converters; production switchers; routing switchers.

THOMSON-CSF
5290
See Comark Communications, Thomson-LGT, Thomson Video Equipment.

TIFFEN MFG. CORP.
1916, 1918, 1920
New: Star Filter series; contrast filters; black Pro-Mist.
Lens filters; technical/engineering consultant.

TIMELINE
4345
New: Lynx SSL data interface; Lynx keyboard control unit; Lynx time code module; Lynx VSI module, VSI film module.
Time code equipment; VTR synchronizers; ATR synchronizers; console automation.

TORPEY CONTROLS/KEY VIDEO
5404
New: clocks, timers.

TOSHIBA AMERICA
3322
Studio cameras; ENG/EFP cameras; digital efx systems; SNG systems; TV transmitters.

TOWNSEND
3106
New: UHF transmitters; VHF transmitters.
Diplexers, multiplexers; exciters; MTS equipment; RF loads, filters; SNG systems.

TRANSMISSION STRUCTURES
4025, 4027
Towers; tower engineering analysis; tower inspection services.

TRF PRODUCTION MUSIC
3010
Music/sound efx libraries.

TROMPETER ELECTRONICS
2854-2856
Connectors, jackfields; wire, cable; patch fields.

TRUEVISION
8051, 8053
Computer graphics hardware, software.

TTC/TELEVISION TECHNOLOGY CORP.
2006
New: FM solid state 4kW transmitter.
Antennas; UHF transmitters; VHF transmitters.

TWR LIGHTING
6539, 6541
Tower lighting.

U

U.S. TAPE & LABEL
4804, 4805
Bumper strips; window labels.

ULTIMATTE CORP.
1122
New: Ultimatte System-6 keyer with screen correction and computer interface.
Keyers; Ultimatte memory head.

UNION CONNECTOR CO.
3259, 3560, 3562
New: Modular power distribution system for studio or location work; equipment enclosures.
Connectors, jackfields; lighting equipment; wire, cable.

UNITED AD LABEL CO.
1348, 1350
Labels & labeling software.

UNITED MEDIA
2826
New: UMI 500 and UMI 600 multi-tasking keyboard videotape editors.
Character generators; digital video effects; editor interfaces, accessories; multisource editors; random-access editors; time base correctors; time code equipment.

UREI
2916
New: amplifiers, preamplifiers.
Monitor speakers; amplifiers, preamplifiers.

USHIO AMERICA
9041, 9042
Halogen bulbs.

UTAH SCIENTIFIC
6030
New: AVS-2 Audio/HDTV video routing system; TAS-1C time code control automation system; PVS Series 2 video production switchers.
Routing switchers; switching automation equipment; distribution amps; audio routing switchers; audio DAs.

UTILITY TOWER CO.
4717
Towers.

V

VALENTINO MUSIC & SOUND EFFECTS
5400, 5402
New: music/sound efx libraries.

VALLEY INTERNATIONAL
6710, 6711
New: audio processors.
Amplifiers, preamplifiers; audio processors; noise reduction systems; audio level matching device.

VALMONT INDUSTRIES
6626
Towers.

VARIAN ASSOCIATES
5100
New: VA936H,V Series & VA936X,W Series RF amps, switches.
High-power TWT and Klystron amps for satellite communications; MSDC Klystron, Klystrode.

VARIAN TVT
Booth no. N/A
UHF transmitters; VHF transmitters; installation, customer training and spares services.

VEAM, DIV. LITTON SYSTEMS
6547
Fiberoptic mic snake multipin connectors; connectors, jackfields.

VECTOR TECHNOLOGY
1364
Radio transmitters.

VEGA
4618
New: Wireless microphones. Intercoms.

VGV
5522
New: Production switchers. Distribution amps.

VIDEO ACCESSORY CORP.
1330
Routing switchers; DAs; sync and pulse code generators/processors.

VIDEO ASSOCIATES LABS
1910
New: NTSC encoders/decoders. NTSC encoders/decoders.

VIDEO BROKERS
1056
Equipment distributor.

VIDEO COMMUNICATIONS/ VCI
1412
Business automation equipment.

VIDEO DESIGN PRO
1356, 1358
Studio documentation & design automation software; touch & cable design & documentation interface.

VIDEO INTERNATIONAL DEVELOPMENT CORP.
3020, 3022
DTC 3604 4-field digital TV standards converter.

VIDEOLAB PARA TECHNOLOGIES
1005, 1007
VTR heads, electronics; time code equipment.

VIDEO LOGIC CORP.
7120
New: time code equipment; computer software/video interface; newsroom computers; videotape logging equipment.

VIDEO MAGNETICS
1445
VTR heads, electronics.

VIDEO TECHNICS
7115
New: Pixelator CG-II PC-based character generator; Pixelator PC-based electronic still storage system; Pixelator PC-based 2-D and 3-D graphics systems; graphics/special effects facility; Targa service bureau. Keyers.

VIDEOMEDIA
1434
New: edit/controllers; editor interfaces, accessories; multisource editors; remote motion control. Edit/controllers; editor interfaces, accessories; multisource editors; random-access editors; V-LAN universal control network.

VIDEOTEK
1246
New: AVM-13sv video monitor; VNG-1 video T&M device.
Distribution amps; frame synchronizers; keyers; production switchers; routing switchers; sync and pulse generators/processors; video monitors; video t&m; audio DAs; level indicators; monitor speakers; modulators, demodulators.

VIKING CASES
5855
Transportation cases.

VINTEN BROADCAST
1452
New: Osprey two-stage pneumatic camera pedestal; EXY and H robotic pedestals.
Studio and EFP camera mountings; lightweight mountings; camera support equipment.

VISTEK ELECTRONICS
1010
New: V4310 frame synchronizers; V4130 series keyers; V4132 NTSC encoders/decoders; Vector V4401 standards converters; Vision V6001 production switchers; V4301 time base correctors; 4:2:2 601/656 digital video codecs.
Video monitors; standards converters; matrix amps; MAC codecs.

VORTEX COMMUNICATIONS
5214
Distribution amps; PAL/SECAM encoders/decoders; standards converters; routing switchers; time code equipment; amplifiers, preamplifiers; audio DAs; audio routing switchers; clocks, timers.

W

WARD-BECK SYSTEMS LTD.
5002

WARREN PUBLISHING
Lobby
Broadcast Equipment Survey: information on equipment in use at TV stations; electronic data from television & cable factbook.

WAVEFRAME CORP.
164W
New: AUD7 electronic audio editor.
Digital audio workstations.

WAVEFRONT TECHNOLOGIES
3642
3D modeling, animation.

WEATHER NETWORK
1100
Weather graphics; weather radar; electronic still stores; 2D graphics systems; 3D graphics systems; NTSC encoders/decoders; remote weather stations.

WEATHER SERVICES INT'L
3024

WEGENER COMMUNICATIONS
6530
New: Addressable satellite receiver.
Modulators, demodulators; satellite earth stations; STLs, TSLs.

WEIRCLIFFE
1734
Tape erasers, degaussers.

WHEATSTONE CORP.
4010, 4012, 4014, 4016
New: broadcast consoles; intercoms.
Audio DAs; audio processors; audio routing switchers; broadcast consoles; intercoms.

WHIRLWIND
5052, 5054, 5056
Power supplies, batteries; wire, cable; connectors, jackfields.

THE WILL-BURT CO.
6807, 6807
Antennas, towers.

WINSTED CORP.
5748
New: studio furniture; equipment enclosures.
Tape-storage systems.

WIREWORKS CORP.
4800, 4801
Wire, cable; cable assemblies.

WOLD COMMUNICATIONS
2957, 2959
Satellite time brokers, uplink/downlink services.

WOLF COACH
2928
New: SNG systems.
ENG/EFP vehicles; ENG microwave; mobile production units; mobile vehicle construction.

WORLD TOWER CO.
5023, 5025
Antennas, towers.

Y

YAMAHA CORP. OF AMERICA
1440
Audio processors; field portable mixers; on-air consoles, mixers; post-production consoles; mics, accessories; studio monitors; reverb, special efx.

YAMASHITA ENGINEERING MANUFACTURE
1312, 1314, 1316
Standards converters; NTSC encoders/decoders; sync and pulse code generators/processors.

Z

ZAXCOM VIDEO
6543
New: LMS1500 Cart automation/MERPS.
Routing switchers; TBC Control Systems.

ZONAL LTD.
6812, 6813
Audio tape, carts; magnetic sound recording film.

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NAB 1990: THE SESSIONS

From antennas to RBOCs, there's a discussion of just about every topic of interest to the engineering community

ENGINEERING TECHNICAL SESSIONS

Friday, March 30
9:00–11:30 a.m.
- FM Systems Engineering I

9:00 a.m.–12:05 p.m.
- TV Automation

Presentations on how automation in TV facilities is developing for cameras, libraries and the newsroom.

1:30–4:35 p.m.
- Digital Audio Systems
- Graphics and Animation

The future of computer graphics for broadcasters. The engineer's role in implementing a new look, including technical, production and management considerations.

Saturday, March 31
9:00–10:45 a.m.
- AM Antenna Workshop
- RF Radiation Workshop

10:50 a.m.–12:35 p.m.
- TV Test and Measurement Workshop
- Contract Engineers Workshop

1:30–4:10 p.m.
- Safety, Interference and Environmental Concerns

1:30–5:00 p.m.
- TV Engineering

Sunday, April 1
9:00 a.m.–12:05 p.m.
- Radio Engineering
- UHF Transmission Systems

Changes in UHF technology.

Presentations include field performance of a multiple-stage depressed collector transmitter and a channel 69 filter system.

9:00 a.m.–12:55 p.m.
- Advanced Television I

Reports and presentations from several ATV terrestrial transmission proponents.

1:30–5:00 p.m.
- New Broadcast Technology

1:30–5:05 p.m.
- Advanced Television II

More reports and presentations from several ATV terrestrial transmission proponents. Plus a progress report on the test facilities of the Advanced Television Test Center.

Monday, April 2
9:00–11:15 a.m.
- TV Audio

9:00–11:35 a.m.
- AM Systems Engineering

11:15 a.m.–12:05 p.m.
- NTSC Ghost Cancelling Systems

Technological efforts to reduce ghosting in NTSC transmission have advanced in recent years. This session will examine the nature of multipath distribution in television transmission, and discuss techniques for avoiding, reducing and cancelling ghosts.

1:15–2:45 p.m.
- FCC Q&A Forum

Members of the U.S. Senate and House of Representatives discuss legislation affecting over-the-air broadcasters. FCC commissioners and senior staff answer questions on FCC policy issues.

1:30–5:00 p.m.
- Computers and Communications for Broadcast Engineers
- TV Production and Post-Production

2:45–5:25 p.m.
- Broadcast Auxiliary & Satellite Systems

Tuesday, April 3
9:00–11:00 a.m.
- FM Systems Engineering II

9:00–11:30 a.m.
- Professional Development

TELEVISION MANAGEMENT SESSIONS

Saturday, March 31
FINANCIAL OUTLOOK
9:00–10:15 a.m.

- International Television: New Frontier/Old World Markets

Major U.S. and international broadcasters, program producers, syndicators and advertisers will examine developments in the international television arena—especially in Europe in '92

10:30–11:45 a.m.

- Tax Management for the Broadcaster

Speakers analyze tax topics such as advertising deductibility, asset versus stock sale, Section 89 update, and the use of 401K plans.

2:45–4:00 p.m.

- Banking on Television: Domestic Investment Opportunities in Broadcasting
- Current Developments in Audience Research

Advertising, economic, financial and broadcast experts debate the television business outlook.

MINI-SEMINAR FOR INTERNATIONAL RADIO AND TELEVISION BROADCASTERS
2:45–3:45 p.m.

I—From Dialogue to Decisions: Building Relations with Government Regulators

II—Advertising: Who's Buying Commercial TV and Radio in Europe?

4:00–4:45 p.m.

III—Defining Your Image: Programming, Marketing and Promotions

5:00–5:45 p.m.

IV—Capitalizing on New Technological Advances

Sunday, April 1
BROADCASTERS AND GOVERNMENT
9:15–10:30 a.m.

- Disaster! Is Your Station Prepared?
- Government Relations
- Advanced Television: Tuning in to the Future!

Leaders from the FCC, the blue-ribbon task force and NAB discuss the latest technological and regulatory developments.

10:45 a.m.–12:00 noon

- Meet the RBOCs: Who Are They and What Are They Up To?

1:15–2:30 p.m.

- DBS: Fact or Fiction?
- Government Relations
- Building Bridges With Your Cable Operators

A panel for broadcasters interested in joint ventures with cable in such areas as joint program production, promotion or programming. The findings of a study surveying MSO executives and cable operators, jointly funded by NAB and NAPTE and endorsed by NCTA, will be discussed.

2:45–4:15 p.m.

- Government Relations
- TVB: Growing the Business in a Decade of Competition
- LPTV: It's Here and There and Just About Everywhere!

Monday, April 2
TELEVISION PERSPECTIVES
8:00–9:30 a.m.

- Share-Ins:
  —Syndex/Cable Relations
  —Personnel
  —News

A Share-In is an open exchange—a sharing of ideas among all broadcasters from all markets. This is an experiment in programming. There are only group discussion leaders, no panelists, and participants set the length of the session. The Personnel Share-In will discuss EEO issues, AIDS and drug testing, recruiting, legal concerns on firing, etc. At the News Share-In, general managers will discuss newsroom policies, libel and ethics issues, talent contracts, promotions, and other topics.

1:45–3:00 p.m.

- General Session: Sports on Television—A New Ballgame for Broadcasters

Paul Bortz, Bortz and Co., presents the findings of a study commissioned by the NAB which identifies key economic and distribution issues (local and national distribution) that affect professional and college sports programming on broadcast and cable television.

3:15–4:00 p.m.

- General Session: Telco Perspective Vs. Cable

Broadcasters are faced with a changing marketplace and an increasing number of services vying for viewers' attention. With the proposed entry of telco into the video services area, the television marketplace may confront even stiffer competition. In this session, executives from leading cable, telco and broadcast firms present their perspectives.

4:30–5:00 p.m.

- 100+ Broadcasters' Roundtable

Tuesday, April 3
INDUSTRY LEADERSHIP
9:30–10:30 a.m.

- Industry Address: FCC Chairman Al Sikes

10:45 a.m.–12:15 p.m.

- Addresses by Network CEOs: Thomas S. Murphy, Capital Cities/ABC, Inc.; Lawrence A. Tisch, CBS Inc.; Robert Wright, National Broadcasting Co.

LEGISLATIVE SESSIONS

Sunday, April 1
9:15–10:30 a.m.

- Broadcasters, Cable and Telcos—Is the Future on the Line?

With cable facing reregulation by Congress, the telephone industry is maneuvering to have restrictions lifted, so it can compete with broadcasters and cable in the video marketplace. Whatever the outcome of this political debate, it will affect broadcasters' bottom lines. Join key members of Congress as they address the prospective legislative actions relating to these important issues.

10:45 a.m.–12:00 p.m.

- Political Hardball—Campaign Advertising and You

Campaign reform is one of the hottest topics in Washington, and included in that discussion is lowest-unit-rate legislation. Members of Congress will discuss this legislation, which has a direct impact on broadcasters' wallets.

2:45–4:00 p.m.

- The Future of Beer and Wine Advertising—A Sobering Concern

The NCAA has restricted the amount and type of beer messages that can be viewed during their college basketball tournament. A number of interest groups have identified alcohol-advertising restrictions as their top priority. Congressional initiatives which propose to control the content of beer and wine ads, and possibly curtail the tax deductibility for those ads, are expected. This panel of key members of Congress discusses the issues. ■

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Chroma Noise Reducer—produces dazzling colors and greatly cuts noise.
Amorphous Video Head—Raises video S/N ratio and reduces signal degradation during dubbing.
Serial Remote Control—the RS-422 serial protocol enables convenient connection to the Hitachi VL-EC10 Editing Controller.
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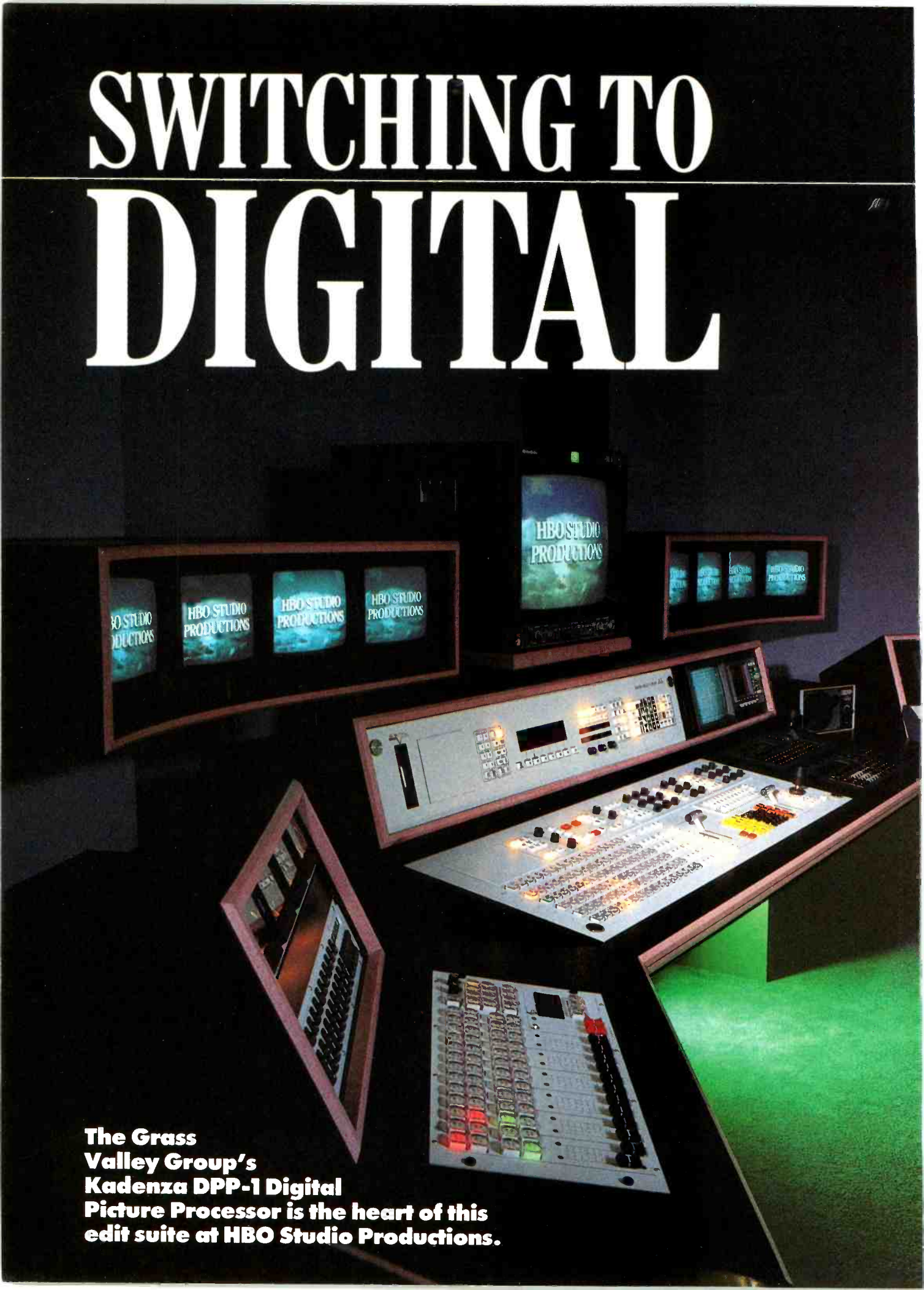
SWITCHING TO DIGITAL



The Grass Valley Group's Kadenza DPP-1 Digital Picture Processor is the heart of this edit suite at HBO Studio Productions.

PHOTOGRAPHY BY NANCY PALUBNIAK

As the digital studio becomes a reality, manufacturers are bringing it all together with the first generation of digital production switchers.

The development of digital video technology that marked the 1980s shifted into high gear with the advent, late in the decade, of digital production switchers. This new generation of machines promises to bring together the diverse pieces of the digital puzzle, linking the digital islands that until recently were characteristic of digital production and post.

In addition to merely preserving the signal in digital form, they use the advantages inherent in digital signal processing to provide advanced special effects, keying and layering capabilities, as well as sophisticated and often revolutionary user interfaces.

Considerable difference of opinion exists among manufacturers as to what the "digital switcher" should look like, technically and functionally. The split is most clearly illustrated by two devices of vastly dissimilar design: Abekas Video Systems' A84 digital switcher, in many ways a direct descendent of the classic, large analog production switcher; and Grass Valley Group's Kadenza, with a hybrid architecture that draws heavily on the company's Kaleidoscope digital video effects device. Interestingly, many of the devices' differences stem from their manufacturers' approach to the same problem: how to do layering in a digital environment.

A digital production switcher can manipulate several layers at once, so that the user can view their combined effect and make any desired adjustments before recording. The savings lies both in "saving generations" and in saving time in an endeavor where, literally, time is money.

KADENZA: Freedom For Engineers

Skip Yourd, product marketing manager for Kaleidoscope and Kadenza at Grass Valley Group, notes, "We have a similar approach [to Abekas] in that we are able to have several layers [in the system] at one time. The user can design an effect with all layers and see how they fit together. A lot of people that were doing layering with the [Abekas] A64 or [Quantel] Harry Suite found that one of the drawbacks was working with just one layer at a time. We give them the ability to go several layers at a time."

A Kadenza system consists of up to five Kaleidoscope channels and switcher channels, in any combination, all accessed from a single control panel. A total of up to four control panels and eight switcher/Kaleidoscope channels may be linked together in a ring, in which each control panel can access any combination of five channels at one time.

A base-level system, consisting of a control panel and two switcher panels, lists for $185,000. GVG has delivered roughly 18 Kadenza systems, half of them in this country, since the device's fall 1988 introduction.

With Grass Valley's long track re-

By Eva J. Blinder

SWITCHING TO DIGITAL

cord in "traditional" production switchers, the Kadenza would seem to represent a radical departure. Yourd says, "We were looking at the general trends in the digital environment, and we noted the success of devices like [Quantel's] Harry and Kaleidoscope. We felt that the architecture of the Kaleidoscope lent itself more toward layering [than that of traditional switchers].

"Frequently we get a question like, 'How many M/Es is this equivalent to?' That's where users are coming from. They're trying to compare it to something they're familiar with." The answer depends on the application, he adds. "In some areas, it's less than one M/E; in others it's equal to three or four [GVG] 300s put together. There are many, many matte generators on each layer with the Kadenza. If you're doing things that require many matte generators, you can do it with one layer on the Kadenza, rather than tying up a whole 300. But if you need lots of different inputs, each layer only takes one video and one key signal."

The Kadenza "really works best if you've got an environment where you're going to do D-1 recording and layering," Yourd asserts. "If you're trying to replace a 300 with it, it's not the right device." Although the Kadenza is a 4:2:2 device internally (plus a full-bandwidth key channel, making it effectively 4:2:2:4), it is designed to work effectively in the hybrid environments found in most production facilities. Grass Valley will supply transcoders as needed by the user.

An early user of Kadenza was Limelite Video in Miami, which took delivery of its unit around Thanksgiving of 1988. Limelite's chief engineer, Marcos Obadia, confirms the steep learning curve, but is pleased enough with the Kadenza's performance to have ordered a second one for the new facility Limelite is installing in New York City.

"The first thing [we had to get used to] was making the Kadenza fit the old edit pattern," Obadia recalls. "It was a question of retraining the operators and the clients. Instead of M/Es, you have layers." In addition to the required retraining, Limelite required some software adjustments on the original box to make it fit better into the operation. Throughout the "getting-to-know-you" process, he says, GVG was extremely helpful.

This edit suite at The Post Group is home to an Abekas Video Systems A84 D-1 production switcher, operating in the 4:2:2 digital environment.

"Harry is now capable of doing more of its own thing and leaving the simple editing to Kadenza," Obadia adds. Jobs requiring extensive rotoscoping or matte work generally go to the Harry suite, while real-time previewing and compositing is done on the Kadenza. In addition, the Kadenza's compositing capabilities have freed up the 3D graphics suites to an extent; instead of rendering an entire multi-element graphic in the 3D computer, time- and money-intensive operation, the individual elements are rendered and composited in the Kadenza. This has the added advantage of allowing the client to modify the elements individually, Obadia says.

A84: Operating In Pure 4:2:2

The Abekas A84, in contrast, is a "much more traditional-looking switcher," in the words of Product Manager Andy Sheldon. The A84 can composite eight layers simultaneously, as opposed to the Kadenza's five, but both devices still fall short of the many layers possible with a GVG 300 or equivalent switcher.

Two A84s have been installed in the U.S., both in the Los Angeles market, and the company is set to make additional deliveries "around NAB time." In addition, six of the

$295,000 switchers have been installed in London. The company is about to install one in Paris and one in Germany, and will shortly install two in Japan.

A major difference between the A84 and the Kadenza is that the A84 is designed to operate in a pure 4:2:2 environment and accepts only CCIR 601 inputs. "We did that for a specific reason," Sheldon says. "We're well known for producing very high-quality, affordable digital devices. This product was designed for the very demanding D-1 marketplace." A good deal of equipment is already available with D-1 outputs, he adds. Abekas makes a component analog-to-D-1 converter for $4900 that allows the A84 to interface with component analog gear, if desired.

Sheldon also says the A84 was designed for ease of use and flexibility. "We use it as an effects machine in the same way you would in a conventional environment," he says.

The menus are displayed graphically on a pair of electroluminescent panels on the A84 control panel. Incorporating the displays, similar in concept to the displays on digital VTRs, allowed Abekas to design menus that changed with the current application, were attractive to the eye and easy for the user to follow.

Abekas took advantage of the strengths of 601 to design into the A84 several unusual techniques aimed at overcoming some inherent problems in digital keying architecture. One of these is ASPIK, which stands for Adaptive Sub-Pixel Intelligent Keying. If the boundary of a signal falls between two pixels, under normal circumstances this will result in a stairstep effect familiar to any engineer who's worked with digital video. ASPIK overcomes this by looking at the two affected pixels and interpolating between them at a resolution of one-sixteenth of a pixel, effectively giving the operator the exact position.

Another special technique is upsampling, or oversampling, of the key signal to avoid the ringing effect that results when high-frequency key signals are multiplied with high-frequency video signals.

The A84 provides extensive real-time, digital-domain color adjustments, including luminance gain, chroma gain, gamma correction, black level and saturation changes, and can add an overall color tint to simulate the film-toning process. Each of the eight layers has two keyers, and the second can be used to color or correct selectively an individual element of a scene.

Phil Mendelson, chief engineer and director of technical operations at The Post Group, says he has found the A84 to be "very flexible and configurable because we have a good deal of 601 routing around it." The Post Group uses the A84 in a digital suite with Abekas A60 and A64 digital disk recorders and has integrated the switcher with an Ampex ADO 3000 digital video effects device and ESS-5 still store via digital interface. The ESS-5 has internal 4:2:2 architecture and provides multiformat I/O, with CCIR 601 as an option.

"Instead of laying Paintbox stills off to tape, we can lay the stills off to the still store and bring them into the switcher almost at the same time." For compositing in the component digital domain, "the results are incomparable," he adds.

VISION 5001: Developed By BBC

Vistek Electronics Ltd., a manufacturer in Buckinghamshire, England, is manufacturing and marketing what is in fact a D-1 switcher, called the Vision 5001 digital video mixer. The product is licensed from the BBC, which developed it originally for its own internal use. Vistek introduced the mixer at Montreux last fall, took it to SMPTE, and will show it at NAB this month.

So far, one U.S. customer has purchased a Vision 5001, although Vistek is declining to name the buyer until after delivery (scheduled for NAB time). The basic unit sells for a sur-

THE BIG SWITCH

In addition to the pioneering products from Grass Valley Group, Abekas Video Systems, Vistek Electronics Ltd. and VGV described in this article, several other companies are manufacturing and marketing digital production switchers as of this writing. One of them, French manufacturer Thomson Video Systems, may show a 525-line version of a $100,000 product it has shown in PAL countries.

Sony, which entered the production switcher market last year, will use NAB to demonstrate a preproduction model of a digital switcher, the DVS-8000. While the company declined to give details about the switcher prior to the show, those who attended last year's NAB may recall that Sony showed a prototype of a 2.5 M/E, 24-input composite digital switcher with integral digital effects. A company spokesman indicated that Sony anticipates introducing switchers for both the 4:2:2 and the 4fsc digital environments, but could not say if this would happen at NAB.

Production switcher manufacturers who have yet to commit to a digital product are, nevertheless, watching the market carefully. Utah Scientific, which is entering the production switcher market this month with a composite analog switcher, "will provide an upgrade path for future digital standards," according to Dave Spindle, the company's former VP of marketing.

Spokespersons for Ampex and A.C.E. stated that their companies were doing research and development in the area of digital switchers, but had no product announcements planned for the near future. CDL and Ross Video also indicated no near-term plans to build a digital switcher. Steve Carelli of Crosspoint Latch says his company will be working on a digital switcher in the near future.

—*E.J.B.*

prising $60,000. Designed to operate in the manner of a conventional analog switcher, the unit features a compact control panel with trackball control, one M/E, 16 wipe patterns and four matte shapes, color field and border generators, and parallel digital interfaces conforming to CCIR 656.

While all internal signal processing is in CCIR 601 4:2:2 digital, the Vision 5001 will optionally accept component analog inputs and outputs. An optional chromakeyer features shadow enhancement, transparency portrayal, high-quality antialiasing and variable subtractive foreground and key color suppression.

D2500: Digital In An Analog World

Although most product introductions in this very new field have been D-1, one company, VGV of Gainesville, FL, introduced a D-2 format switcher at last year's NAB. The switcher, designated the D2500, has a base price of $55,000, which can rise to over $100,000 with all options. The company has delivered four so far, two in the U.S. and two in Japan; a fifth was scheduled to ship to Japan on March 1.

The D2500 has a number of unique wrinkles, including a "phantom analog" option that allows the operator to define any primary input as either digital or analog, so that the switcher may be used in either domain. In addition, two "Paintbox-type" color background generators allow the creation of very complex, gradient-type backgrounds.

The unit is a mid-sized machine with 10 to 20 inputs and five to 10 external key inputs. Even though it operates in the composite world, it is designed to allow maximum flexibility for multilayer work. For example, three of the video levels have what VGV's president, Norman White, describes as "infinitely transitionable priority"; in other words, the user can take three planes of video and slice each through any other. "We've done things in this [digital] switcher that you could never do in an analog switcher," White says.

Users of D-2 tape machines can gain a great deal of quality by keeping the signal in the digital domain as long as possible, White says. "When you're editing, layering or creating effects, you're doing multiple generations in D-2, but the things you're laying in are coming in prime directly from the switcher or DVE. You can stay within the digital domain

throughout the editing loop, even in a hybrid studio, with no quality loss. With an analog switcher, even with D-2 tape machines, parameters like frequency response, diff phase and diff gain are additive. If the switcher adds one degree of diff phase, for three passes you'll have three degrees of diff phase. The analog switcher has become the weak link."

D2500s are installed at The Post Group in Los Angeles and at Video Post-Production in Merriam, KS. Dan Stark, chief engineer at Video Post-Production and a big proponent of the D-2 format, says his facility installed the VGV switcher about three months ago when they commissioned a D-2 room (in addition to two analog multiformat rooms that are already in service).

"The VGV switcher is a production switcher in all senses of the word," Stark says, adding that his facility originally acquired its D-2 recorders (two Ampex VPR-300s and a Sony DVR-10) for archiving the output of its digital disk recorders, and then conceived the idea of an all-D-2 suite. "Once D-2 is put into an all-digital environment, it opens up a whole new realm of quality that can be pulled off in the production," he says. "In our market, we have two stations that have purchased D-2 cart machines. A client can do all his post-production in the digital environment and we can send digital dubs to the stations."

At The Post Group, chief engineer Mendelson is equally impressed with the quality and flexibility of the D2500, which is being used in Post's recently-constructed D-2 suite. "We're discovering that it will do more than we had originally anticipated using it for," he comments. "We're doing a lot of show assemblies with it, with the intention of maintaining the digital domain throughout the production of an episodic. I believe it will have more possibilities in the area of multi-layering and compositing in the composite digital domain. It's very powerful and very clean as a multi-layer effects switcher, as well as a basic D-2 signal path."

The phantom analog option of the switcher has helped in some areas where D-2 peripherals are not yet available, according to Mendelson. "We do not have composite digital titling capabilities," he says. "The beauty of the architecture of the VGV is the phantom analog chassis, which allows you to accept a number of analog inputs and integrate them into your transports without even thinking. It's a very clever implementation." ■

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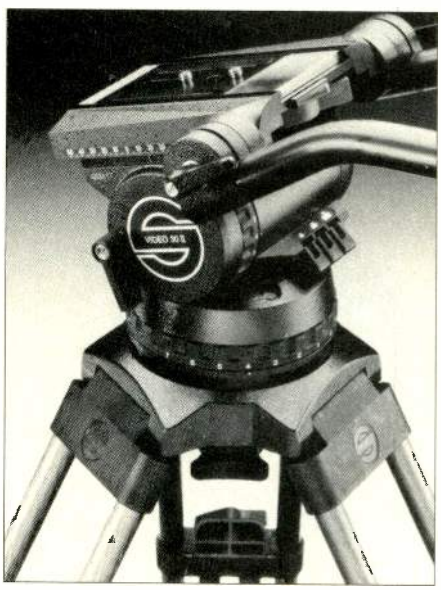

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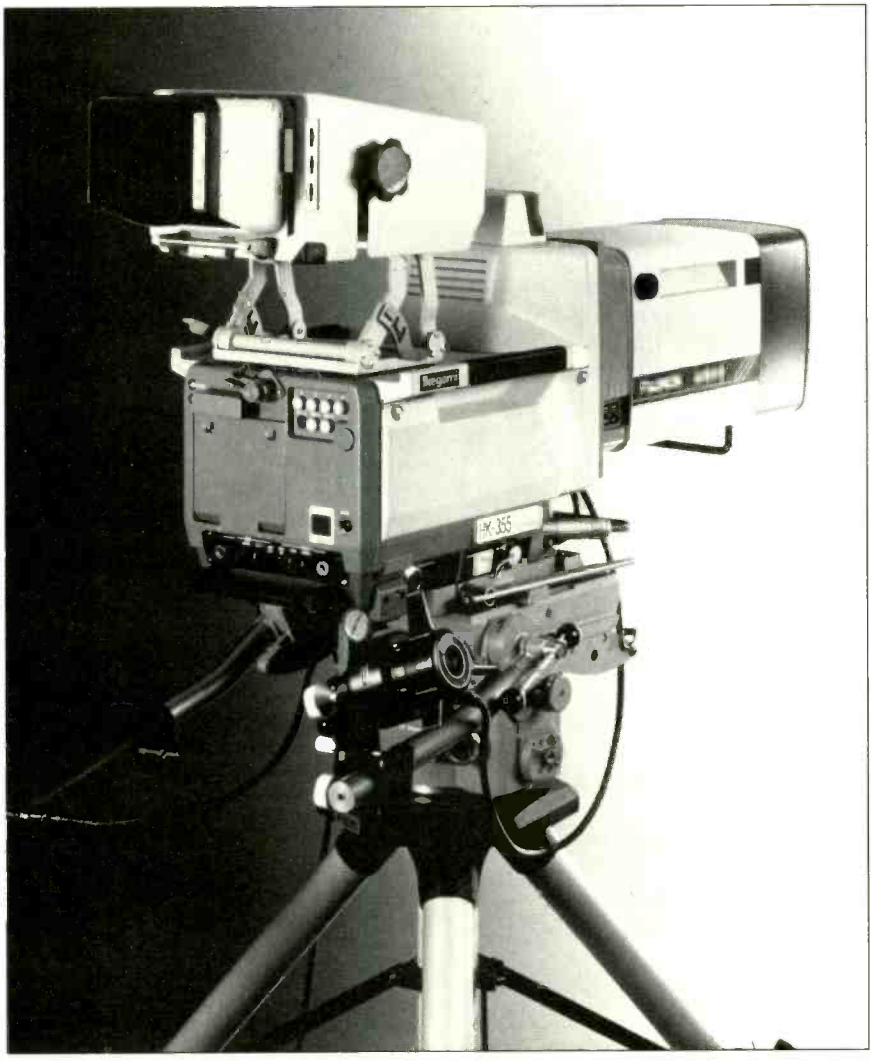
CAMERA ANGLES

Advances like chips and small-format docking recorders have made video cameras more versatile than ever. But they've also given buyers so many choices that camera shopping is more difficult than ever.

By William A. Owens

There are camera operators who recall their first experience with a color camera as working with an RCA-TK41—all 280 pounds of it. It was, they say, sort of like trying to push an aircraft carrier around the studio. Today, who could believe that the fluid camera work of NBC's color production *Peter Pan* was done with those electronic dinosaurs, complete with turret-mounted, non-zoom lenses? It was. And of course, the old joke went, "Where do you load the videotape?" What a difference a couple of decades makes.

In a year that saw the networks using 8 mm camcorders in Beijing's Tiananmen Square, where do we begin talking about new camera technology? With more broadcasters turning to camcorders and to small videotape formats, and with even "home"-type VHS becoming "acceptable" for broadcast, what kind of cameras can we define as being appropriate for broadcast use?



CCD technology in a studio package. Ikegami HK-355 is a full-featured studio camera using 2/3-inch FIT chips.

CAMERA ANGLES

Television started as a live medium, with almost all production confined to specially equipped studios. The studio camera was a big box mounted on a supporting pedestal, equipped with wheels. Studio cameras from the mid-60s—such as the RCA TK42, Norelco PC70, or GE PE250—cost $70,000 to $90,000, depending on configuration.

Broadcast-quality Ampex one-piece CVR-300 color camera/Beta SP Recorder weighs only 15 pounds.

Most high-end production is still done in studios, or using remote trucks equipped with studio-type cameras. The difference is that yesterday's IOs and Plumbicons have given way to "chips." Today's Sony BVP-370, Ikegami HK-355, Hitachi SK-F700 and BTS LDK-910 CCD studio cameras cost $60,000 to $100,000, depending on configuration. This is a tribute to the manufacturers, who have created and implemented technology far superior to that of 1966, while keeping pricing very close to levels established over 24 years ago.

These CCD cameras have brought to the studio clean, sharp images, increased sensitivity, and minimal smear through new-generation FIT chip technology. Considering the quality and capability of the new cameras, the pricing is really quite a bargain. And there's a lot less weight. But there is another trend in the industry that runs against the tendency to downsize equipment as much as possible. Even with the more widespread use of smaller cameras, pure studio-type cameras remain in demand because many engineers believe that the bulk serves to protect the camera's electronic "guts" from the rigors of production work.

With a full schedule of both in-house and outside clients' production work, WCVB-TV in Boston is an example of this kind of thinking. According to Director of Engineering Ross Kaufman, the station requires "a solidly built camera designed for the studio environment." With several Ikegami HK-312 and HK-322 cameras, Kaufman believes that "ENG-type cameras are more flimsy in their studio configuration, and would not hold up over a long period of time in heavy studio use." In addition, Kaufman noted that the high-quality lenses manufactured for studio cameras make the total imaging package far superior to ENG types for the station's production requirements.

ROBOTS TAKE CONTROL

As with any other aspect of television engineering, each position has its proponents and opponents. There are facilities that do not chose to spend the dollars required for the new generation of studio cameras. Many have found a viable alternative in the broadcast cameras created for field use, which are equipped with accessories for studio operation. More network programs—*The Golden Girls*, for example—are shot using Betacams, recording isolated video tracks for later on-line editing.

And many ENG-type cameras are finding themselves configured for studio use. For example, NBC uses robot-controlled Ikegami HK-323P portable cameras in its *Nightly News* studio, and cablecaster QVC Network recently equipped its new main studio with six Hitachi SK-F3A ENG-type cameras, also robot-controlled.

Both of these applications reflect changes in production techniques, as well as in hardware. Dockable cameras such as the Ampex CVC-70, Sony BVP-70, Hitachi SK-F3A and Panasonic AK-450 provide studio-quality performance at a lower price point, while permitting a variety of production capabilities. Cameras can be locked via time code for multi-camera production with isolated recording, or used film-style for single-camera shooting.

Perhaps a more ominous application, at least for station production technicians, is the introduction of robotic camera systems. NBC's news studio in New York, and the newsroom at the network's Chicago O&O, WMAQ-TV, are both using robots. Also using robots are the HSN and QVC shopping networks.

While it might appear that cost considerations were a factor in NBC's decision to buy the robots, the reason is less apparent for the shopping networks, both of which are based in low-wage areas far from major production centers. According to a network source who did not want to be identified, the decision to use robotic cameras at one of those networks was prompted more by a lack of production technicians skilled in live broadcasting than by saved costs. The source faulted educational institutions for emphasizing film-style production techniques while ignoring live broadcasting in their courses.

FACTS OF LIFE

Television engineers do not live in a vacuum. While we would like, of course, to be able to always use the highest quality, state-of-the-art technology, the economic facts of life usually don't permit this. As station budgets get tighter, there's less available cash for top-of-the-line camera equipment. Therefore, alternatives must be considered. There are possibilities today that didn't exist just a few short years ago, in terms of both technical capability and cost.

"Stations need a solidly built camera, designed for the studio environment."
—Ross Kaufman, director of engineering, WCVB-TV, Boston

With today's economic environment keeping a lid on capital expenditures, many facilities are finding the lower-cost alternatives to traditional "broadcast" products acceptable. Over the past few years, there has been a blurring of the distinction between low-end "broadcast" and high-end "industrial" or "professional" camera lines. Essentially ENG products, cameras from industrial categories can be equipped with a wide range of support gear and transformed into quite functional studio cameras at moderate prices.

The manufacturers have responded to this need in the marketplace with cameras like Ikegami's HC-240, Hitachi's FP-CK2 and FP-Z31, and Sony's DXC-M7—all in the $10,000 to $16,000 price range. Available at a moderate price class and in flexible configurations, these cameras are finding more acceptance in the broadcast community—and not just among small-market broadcasters seeking lower-cost equipment. Home Shopping Network has purchased Sony DXC-M7 cameras for several of its owned-and-operated stations as well.

One station taking this route was WTZA-TV in Kingston, NY, with a total of nine Hitachi FP-Z31 cameras. According to Michael Shovan, assistant chief engineer, the main benefit is "the ability to interchange cameras throughout the facility." The station fields three news crews, uses three cameras in its studio, and assigns three cameras to its remote production truck. In Shovan's words, "operations and maintenance are simplified by the use of a common camera, and stocking spare parts is less expensive." Echoing WCVB's Kaufman, Shovan agrees that "the lightweight cameras make smooth studio moves more difficult."

In the ENG/EFP area, the move to camera-recorder combinations has taken place at both ends of the spectrum. At the high end, BTS, Hitachi, Panasonic, Ikegami, Ampex and Sony all offer a variety of dockable cameras, with some companies also offering one-piece camcorders as well. The one-piece units represent an opportunity to "step up" to high-quality half-inch at a moderate cost. The Ampex CVR-200 one-piece, for example, costs just under $30,000, depending on configuration.

Here too, there is a low price point available, with JVC, Sony, Ikegami and Panasonic offering dockable cameras for less than $10,000. These cameras can be purchased with a complete range of accessories, and many facilities are finding them useful for a wide range of applications, including ENG, EFP and studio production. As reported in *BME* last September, many stations are buying low-end cameras and docking them with S-VHS-format video recorders for a budget ENG package.

While there are some technical limitations to small-format equipment, this has not stopped stations from jumping in. This is especially true in smaller markets, or in the case of a station creating a news operation from scratch. The low cost of entry allows the broadcaster to purchase much more capability for the dollars than would be possible with more "upline" equipment. One station that created a news department based on S-VHS equipment was KOFY-TV, San Francisco. According to Chuck Snyder, the station's news director, "the normal viewer sees no difference between this and other formats." In Snyder's words, "the bottom line is that the newscast is sold out, and ev-

BUYING THE RIGHT CAMERA: SOME GUIDELINES

Clearly, the day of the behemoth TV camera is over. Even those designed today specifically as studio cameras are lightweights compared to their ancestors. The camera buyer now has a selection of high-quality products at prices to fit any budget, and the ability to customize cameras through a wide range of available accessory options. While it's still a matter of getting what you pay for, your money buys more and the choices are greater than ever before. The question, therefore, is: What camera is best for a particuliar application? While there are no set answers, here are some guidelines for arriving at the right solution.

First, evaluate your needs, determine how your new camera will be used, and by whom. Make sure that the users will understand the technology, and that the performance characteristics of the camera will meet their requirements.

Second, evaluate your budget, know what you can spend, and what you need to get for your dollars.

Third, check out the possibilities throughly, either on the NAB floor, or via a demo at your facility. Pick the brains of the manufacturers and dealers' sales reps. They know their products better than anyone, and can help you through the maze of technical specifications and options.

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eryone says it looks good."

COMING HOME

One technical development that can no longer be ignored by camera users and buyers is the advent of home video. There were days when the "engineering" types looked down their noses at anything other than two-inch quad, and "portable" cameras were "portable" if your cameraman was Hulk Hogan. Those days are long gone, and images made by many of today's home-type cameras actually look better than those produced by some of yesterday's broadcast cameras. Many broadcasters today are regularly airing material shot with consumer camcorders, particularly in the news area.

WNEP-TV in Scranton, PA, is one station where "home"-type tapes air regularly. According to News Assignment Manager Don Jacobs, the station's Newswatcher Network, a group of stringers spread over 22 counties, provides 20 to 24 usable news clips per month. "We find that 80 percent of the material we receive is properly shot, and transfers easily to station equipment for editing," Jacobs told us, adding that "while the station has high technical standards, viewers understand that tapes shot by their Newswatcher neighbors are more important for content than for technical quality."

Paul Stueber, assistant news director of WCIX-TV in Miami, says, "We realize that the quality may not be as high, that some engineers may shake

"The normal viewer sees no difference between this [S-VHS] and other formats."
—Chuck Snyder, news director, KOFY-TV, San Francisco

"Operations and maintenance are simplified by the use of a common camera [for studio and field production], and stocking spare parts would be less expensive."
—Michael Shovan, assistant chief engineer, WTZA-TV, Kingston, NY

their heads, but if you've got the footage of the disabled 747 landing on the expressway, we'll air it." In the competitive Miami market, Stueber gives first consideration to the newsworthiness of a tape, then to its quality. "News audiences are more forgiving on technical quality than viewers of an entertainment program," Stueber points out.

But local stations are not the only ones using "home" camcorders. After Chinese officials tried to shut down coverage of the student rebellion last May, the American networks resorted to 8 mm camcorders, shooting covertly, to get the story on tape.

The manufacturers are likely to pursue this path. At least one of them, Sony, believes that there is a broadcast future for 8 mm tape. Sony has brought out a docking 8 mm recorder to mate with its DXC-325 camera, as well as a feed deck to drop into existing U-matic and Betacam format editing systems.

Can others be far behind? If they are, they may find themselves playing catch-up. ■

Big news; small format. Sony DXC-325 color camera with dockable EVV-9000 8 mm recording deck provides production punch on a budget.

New Products

Television Engineering's *expanded coverage of the latest developments in new broadcast equipment.*

SONY Video HI8 EVO-9700 Desktop Editor

Slated for availability in July, Sony's EVO-9700 is a one-piece Video Hi8 dual recorder/player designed for desktop editing needs. The EVO-9700 provides over 400 TV resolution lines, eight mm time code, stereo PCM and mono AFM sound. The unit also incorporates a digital chroma noise reducer, as well as technology to reduce tape jitter and skew error correction. Editing capability for the EVO-9700 includes assemble (quick edit/program edit), video and audio insert, and preview/review. The unit provides a slow/freeze edit feature, audio level control, a level meter and a mixer. Titles and characters can be added through the supplied KI-720 title keyboard. Also included are a wired remote and an editing controller (RM-E9700).

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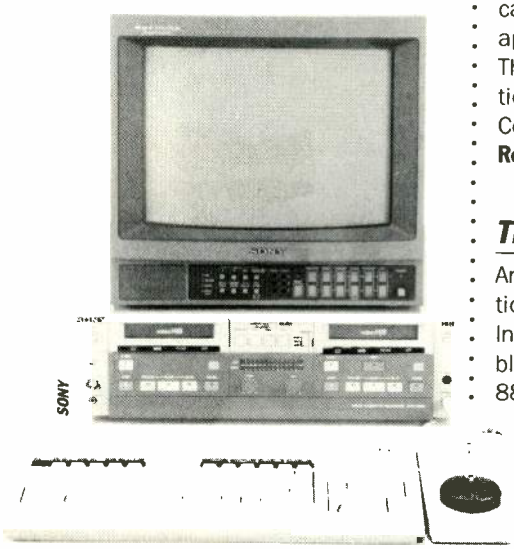


HARRIS Optical Disk Drive Option for Vws Workstation

In order to offer users the capacity of optical storage combined with the flexibility of erasable media, Harris Video Systems is now offering an erasable optical disk drive for the HarrisVws workstation. The drive, which can store images on- or off-line, uses removable 5¼-inch disk cartridges. Each cartridge can store approximately 750 4:2:2 images. The drive can be installed as an option to either the HarrisVws System Control or Disk Expansion Unit.

Reader Service #201

TFT EBS System Upgrade

Anticipating a proposed FCC regulation for shorter attention signals, TFT, Inc., now offers a shorter programmable tone-duration setting in its Model 886 and 887 EBS systems. The system features tone-duration settings of six, 12 and 24 seconds, and detection times of two, four or eight seconds.

Reader Service #202

ELECTRONIC GRAPHICS Pastiche Graphics System

Pastiche, Electronics Graphics' high-end graphics system, is designed for artists and graphic designers in the television post-production and broadcast market. An integrated system of hardware, software and firmware, Pastiche features 2D Paint/Animation with real-time rotation and corner-pinning of cut-outs. Its 32-bit graphics engine provides features such as real-time overlays, fast rotations and distortions, and high-speed brushes. The system includes an A3 tablet with pressure-sensitive pen, a monitor for viewing graphics, and a text terminal for help and system messages. Options for Pastiche include a 3D Modeling/Animation package and a new effects/mapping/animation package. Price range: $86,900 to $133,000.

Reader Service #203

MCI Articulate Flex Waveguide

Micro Communications Inc.'s Articulate Flex Waveguide is designed to solve misalignment problems and reduce stress in waveguide runs due to differential expansion. The waveguide allows for single-axis movement in one plane, while providing support in the other two planes. MCI's design permits the weight of the system to be transferred through the flexible portion of the waveguide without compression or distortion.

The characteristic impedance is self-compensating, resulting in very low VSWR. The unit can be configured for flexible movement in either the E or H plane axis. Various articulated sections are available to custom-fit desired configurations.
Reader Service #204

FLUKE Color-Pattern Generator Option

John Fluke Mfg. Co. is now offering an option for the PM 5514V, PM 5515 and PM 5518 color-pattern generators that gives them the capability to test Super-VHS VCRs. The PM 9553 Y/C option provides the separate luminance and chrominance signals used in Super-VHS video recorders and monitors. The option can be installed at time of purchase or retrofitted to existing pattern generators. List price: $600.
Reader Service #205


FLUKE

JENSEN TOOLS 601B440 and 820B035 Platform Trucks

Jensen Tools Inc. is now offering two sizes of platform trucks for transporting heavy equipment. Model 601B440 has a 19- by 29¼-foot pressed steel platform and will carry up to 400 lbs. of equipment. Model 820B035 has a 23- by 35-foot platform, and features a 600 lb. capacity. Prices: Model 601B440: $89; Model 820B035: $149.
Reader Service #208

NIKON TV-Nikkor S15x8.5B and TV-Nikkor S13x9B ENG Lenses

Designed for ½-inch CCD cameras, these ENG zoom lenses are made of Nikon's ED (extra-low dispersion) glass with anti-reflection.

Zoom ratio for the S15x8.5B: 15x; for S13x9B: 13x.
Reader Service #209

ABEKAS A60 Digital Disk Recorder Upgrade

Abekas Video Systems has upgraded its A60 Digital Disk Recorder by adding a software driver for the Sony Exabyte 8 mm tape drive. The Exabyte drive is used as an off-line storage device, and stores up to 50 seconds of computer animation or 1500 digital images generated on a single tape. The unit also transfers computer animations.
Reader Service #206

BLUE FEATHER 14-inch Teleprompter

Compatible with Blue Feather's PC-based teleprompting software and suitable for most small cameras and tripods.

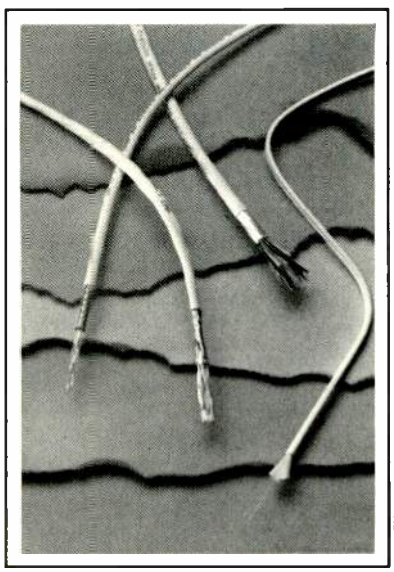
Weighs 25 pounds and features high-resolution black-and-white monitor and mounting brackets.
Reader Service #207

WAVETEK 5000/6000 Sweep Recovery System

The model 5000 microprocessor-controlled sweep transmitter and the model 6000 sweep analyzer make up Wavetek's new Sweep Recovery System. The bench- or rack-mountable transmitter sends out sweeps of specified level, width and rates at specified repetition intervals. The portable, battery-operated analyzer includes stackers that provide storage; up to seven different reference traces; and a normalizer that factors out consistent signature errors.
Reader Service #210

BELDEN Flamarrest Jacketing Compound

A new jacketing compound, Flamarrest, is available from Belden Wire and Cable for over 30 of its coaxial, multi-paired, multi-conductor and fiberoptic cables. Flamarrest is a low-smoke, flame-retardant compound that Belden says is five times more flexible than traditional fluorocopolymer jackets. Cables jacketed in Flamarrest lie flat and weigh less than the spiraling plenum cables. The UL- and NEC-approved Flamarest compound also protects the cable's shielding material from knuckling and radial cracking.
Reader Service #211


BELDEN

VINTEN Automotion Pedestal

Designed to carry Microswift camera heads around remote-controlled studio areas. Based on the Fulmar pedestal.

Incorporates the facility for both

VINTEN

elevation and X-Y movement on the studio floor. Uses magnetic sensors to follow adhesive tape floor markings. Multiple and crossing tracks can be laid and repositioned as required.

Reader Service #212

SSE TECHNOLOGIES 16-watt ASAT-1214 Transceiver

SSE Technologies has added a 16-watt, all-solid-state Ku-band transceiver to its ASAT-1214 family of earth terminal equipment. The unit features a complete power supply, LNB amplifier, and a broadband terminal that operates between 14 and 14.5 GHz. In addition, the transceiver is compatible with North American, Intelsat, Eutelsat and Aussat standards.

Reader Service #213

TARGET TTD-200 Power Amp

The TTD-200 Studio Amp from Target Technology incorporates two separate, independent 40 W (8 ohm) amps, each with its own voltage control gain cell. The level of each amp may be controlled remotely, eliminating the need for console installation. The Studio Amp can be bridged for 90 W mono operation or operated as a 40 W stereo amp.

Reader Service #214

QUANTEL Paintbox Option

The Presenter is an option for Quantel's Paintbox V series. It is designed to provide a compact and cost-effective means of sequencing and presenting network-quality Paintbox V Series graphics for digital broadcast applications. A control panel allows picture sequences to be built up from the V-Series' internal 185Mb picture store and from peripheral storage devices, such as a 1.2Gb Winchester drive or magneto-optical removable storage drive. Changes are possible right up to output, and multi-layered graphics can be built up on air. Output of both over-the-shoulder "floating" graphics and full-frame pictures are possible through the V-series integral linear key channel.

Reader Service #215

NOVA 710S TBC Upgrade

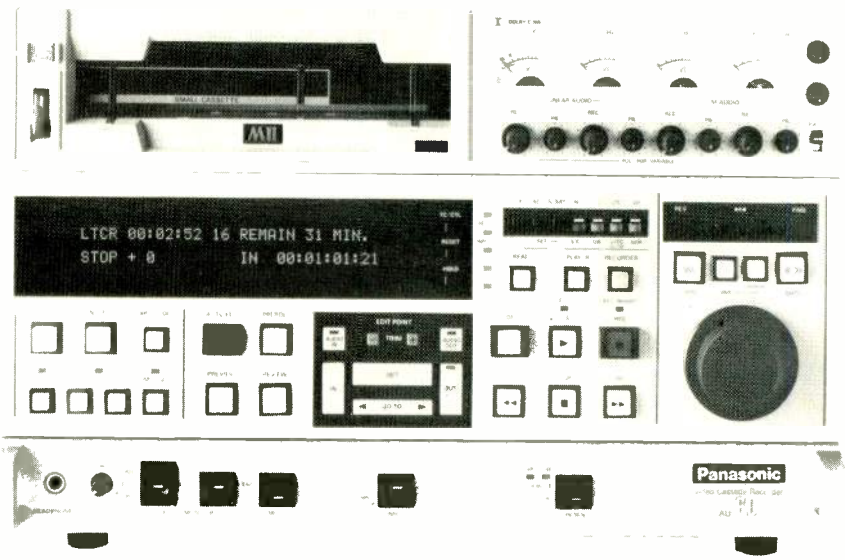
Nova has announced the addition of a Digital Drop-Out Compensator (DOC) to its 710S wide-band timebase corrector. The DOC is designed to fill in missing video from tape which has drop-outs. The DOC circuit relies on an RF reference feed from the VCR, a signal which alerts the TBC when a drop-out occurs. When one is sensed, the TBC inserts good video from its memory to replace the drop-out.

Reader Service #216

PANASONIC AU-60 MII VTR

Demonstrated at last year's SMPTE exhibit, the Panasonic AU-60 studio VTR is designed for business and institutional users who require a full-featured MII editing VTR at a lower cost. The AU-60 VTR features a built-in eight-bit TBC (providing a 47 dB signal-to-noise ratio), color framing, a built-in SMPTE/EBU time-code generator/reader, a 32-character fluorescent display, four-audio-channel recording and playback, CF/SCH display LED, editing functions, audio split editing, and REC Inhibit display LED List price: below $20,000.

Reader Service #217



PANASONIC

Inter BEE '90

26th International Broadcast Equipment Exhibition

November 7～9, 1990
Nippon Convention Center, Makuhari

SEE the latest Hi-tech developments in Asia's largest broadcasting equipment and professional audio equipment show ever.

Last year the Inter BEE '89 exhibition attracted nearly 25,000 visitors with almost 300 exhibitors participating from 20 countries such as USA, Canada, UK, W. Germany, France, Switzerland, Denmark, Japan etc. This year's Inter BEE '90 promises to be even bigger and better.

Due to this overwhelming success, this year's event will be held at the spacious new multi-function Nippon Convention Center (Makuhari Messe) in Chiba Prefecture.

A comprehensive range of products will be displayed in the large Convention Hall with all exhibitions on the one level. Centered between Narita International Airport and Tokyo, making it the most convenient position giving easy access to international travellers – only 30 minutes from either direction.
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Inter BEE '90

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Tokyo Chamber of Commerce and Industry Bldg.,
3-2-2, Marunouchi, Chiyoda-ku, Tokyo 100, Japan

Circle 149 on Reader Service Card.

ANDREW ALPine LPTV Antenna Series

Includes over a dozen standard patterns, ranging from omnidirectional through several cardioids to peanut.

Aluminum modules ease installation and provide high weather resistance and low-weight loading on the support structure. Full-length radome segments for environmental protection. Feed systems incorporate Andrew HELIAX cable.

Reader Service #218

ATLAS/SOUNDOLIER Gooseneck Accessories

Offer functional interface and color-coordinated appearance between microphones and associated desk and floor stands.

Available in six-, 13- and 19-inch lengths, with termination of ⅝ inches and 27 male and female threads to accommodate all U.S.-standard microphones and stands. I.D. is .338 inches.

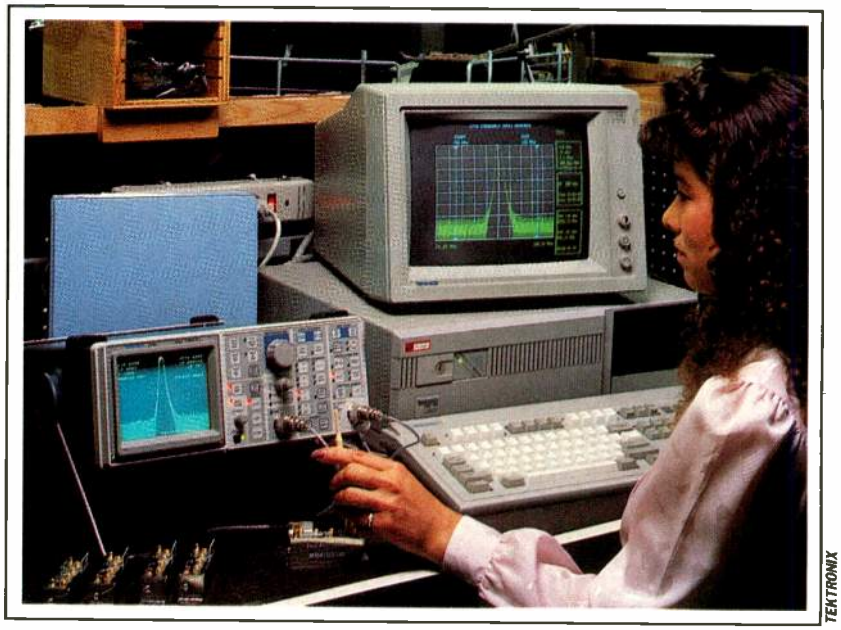
Reader Service #219

BERK-TEK Tek-Pak Cable Packaging

Tek-Pak is a cardboard-box package designed to enhance the storage and handling of electronic cable. Advantages over traditional spools and reels include: easier handling, smooth pay-out with no kinks or snarls, more efficient use of inventory space, and no need for reel-handling equipment. Available for CMP, FPLP and CL2P plenum cables.

Reader Service #220

TEK-PAK


TEKTRONIX

TEK Options for 2710 Spectrum Analyzer

Tektronix has introduced several new options and accessories for its 2710 VHF/UHF Spectrum Analyzer:

Option 03, the GPIB Interface, allows automated testing, waveform acquisition and direct plotting without the need for a controller. List price: $600.

Option 04, the Internal Tracking Generator, allows coverage to 1.8 GHz and greater than 100 dB dynamic range, and uses microprocessor-controlled frequency adjustment for correlating with the 2710's window, compensating for delays. List price: $2950.

Option 07, the 2710's 2704 Inverter and 2705 Battery Pack, forms a single unit and allows operation where AC power is unavailable. The option provides a minimum of one hour of operating time. When used as a stand-alone unit, it provides 125 watts of continuous AC power for portable measurements in the field. List prices: 2704: $995; 2705: $295.

Other options for the 2710 include a 300 Hz-resolution bandwidth filter; a .00000005 Hz-accuracy built-in frequency counter; a video monitor mode; additional resolution bandwidth filters; a Centronics interface; and two rackmount configurations.

Reader Service #221

ACCU-WEATHER UltraGraphix Weather Graphics

Accu-Weather, Inc., is offering its UltraGraphix high-resolution weather graphics via subscription in a ready-to-air format. UltraGraphix can be accessed on ColorGraphics' LiveLine IV and V computer systems, as well as on the Macintosh-based Accu-Weather UltraGraphix 240 Weather Graphics System. The new graphics include hourly national and sectorized satellite graphics—in both standard and 4D map projections; Radar-Plus, which combines hourly radar and surface observations for precipitation coverage; current and forecast national maps; jetstream maps; tem-

perature band maps; custom local maps; and feature graphics. Price: $3 per image, volume discount.
Reader Service #222

MATROX Illuminator 16/MC Video Graphics Board

Matrox Electronic Systems has debuted the Illuminator 16/MC videographics board, a single-slot, two-board set designed for MicroChannel-based, PS/2 systems. The board captures images in real time, digitizes NTSC or analog RGB to five bits/color, displays 32,768 colors, and runs DOS-based Targa software. The board also provides the following design features: flicker-free, non-interlaced output; high-resolution display modes; full-screen PAL support; single-screen VGA support; extensive overlay capabilities; and real-time special video effects. List price: $1795; 2-Mb version: $2695.
Reader Service #223

JVC

JVC BR-S811U S-VHS Editing Recorder

JVC's BR-S811U S-VHS editing recorder, part of its "Professional S" video system, is geared for high video performance through circuits such as a chroma enhancer and improved crosstalk cancellation circuitry. Improved tape transport is also a goal of the new system, through its tape-stabilizing drum head and new impedance roller. Other features include two rotary erase heads, a blanking switcher, a framing servo and stable horizontal phase lock, composite and separate Y/C inputs and outputs, Y/C comb-filter decoding, and Y/C 629 and 358 signal-transmission modes. Audio features include a frequency response of 20 Hz to 20 kHz, a dynamic range of more than 90 dB, and unmeasurable wow and flutter. The stereo track has Dolby B noise reduction. List price: $6100.
Reader Service #224

HEWLETT PACKARD HP 54504A Oscilloscope

Digitizing oscilloscope has two channels and features a 200-megasample-per-second (MSa/s) digitizing rate, 400 MHz repetitive bandwidth, glitch triggering, and dual eight-bit analog-to-digital (A/D) converters. Ratio of sample rate to bandwidth is 4:0. List price: $6,450.
Reader Service #225

WINSTED Cabinet Frame

Quick-assembly frame features positive locking pins on each end of the tie bars and locking bolts for permanently securing components in place.
Reader Service #226

PSC Universal Mic Power Supply

Professional Sound Corporation is delivering its portable universal microphone power supply, designed to power both 12V "T" (AB) and 48V Phantom microphones. Features include a nine-volt battery; a three-way switchable pad for 0dB, -10dB and -20dB; a three-way switchable "Hi-Pass" (low-cut) filter; and a "T" power phase switch.
Reader Service #227

ZAXCOM ZX400 Control System

Zaxcom's ZX400, a four-TBC/D-2 control system mounts on edit consoles to control TBCs or D-2 VTRs. Features include EDL storage, GVG E-MEM storage, optional aux. control panel, and freeze control. Additional features include 99 tape and two timing memories per TBC, TBC transition (a real-time dissolve between memories), auto color framing, and memory search by reel number. The unit can be expanded to the Zaxcom MTBC1500 Multiple TBC/D-2 control system.
Reader Service #228

INTELVIDEO IV-6 Color Encoder

Intelvideo's Model IV-6 Advanced NTSC Color Encoder uses all-digital comb filters to reduce or eliminate chroma crawl, cross-luminance, cross-chrominance and other NTSC artifacts. Other features of the IV-6 include variable vertical enhancement/deenhancement circuits, which permit overfiltering of vertical details to reduce interline flicker; all-digital color modulation with digital feedback for modulator balance; and optional D-2 output. List price: $3990.
Reader Service #229

CALCOMP DrawingCard Graphic Display System

Calcomp Inc. has introduced the DrawingCard two-page graphic display system for Macintosh applications. The system consists of a high-resolution graphics card, a 21-inch, high-contrast monitor and a flat-screen monitor (color or gray scale). There are three systems in the DrawingCard family: GrayVision, a supporting 256 shades of gray scale version; ChromaVision, an eight-bit color model supporting 256 colors; and ChromaVision Plus, which supports 24-bit, photo-realistic applications. Each system is compatible with Apple's QuickDraw graphics standards, including a 32-bit QuickDraw. Features include a resolution of 1152 × 870 pixels and a 21-inch monitor. List prices: $3195 for GrayVision; $6395 for ChromaVision; $8595 for ChromaVision Plus. (Prices include graphic card, 21-inch color or gray-scale monitor, video cable, and user manual.)
Reader Service #230

QUANTA CE75 Edit Controller

Quanta's CE 75, an A/B roll edit controller, handles three VTRs and can be expanded to control eight VTRs. Included with the CE 75 are a video switcher, a built-in 3.5-inch disk drive, CMX RT-11 disk compatibility in both the 3.5- and eight-inch formats, a preview switcher and four optional programmable GPIs. List price: $7500.
Reader Service #231

SINTEC MD-2 Stepper Motor Controller

The Sintec MD-2 stepper motor driver package is designed for stand-alone operation for robotic arms, X-Y tables, telescopes, conveyors and other automatic production equipment. The package features a basic language and development microcontroller with prewritten software subroutines. Matched dual stepper motors and cables are included. List price: $745; $459.95 without the microcontroller.
Reader Service #232

PRIME IMAGE TBC and Synchronizer Upgrade

A noise-reduction feature is now available at no extra cost for Prime Image's HR600+ and 7.5 mHz Time-Base Correctors and Synchronizers. Operated from a front-panel control knob, the 0 to 20dB variable noise reduction can be activated in all product modes, including transcoding modes, without impairing the high-resolution properties (over 600 lines) of the HR600+ and 7.5 mHz products.

Reader Service #233

MICROWAVE FILTER Sideboard Suppression Filters

Microwave Filter Company has introduced a series of low-power television channel sideband suppression notch filters, designed to meet FCC suppression standards. Filters are available for any sideband carrier in VHF channels 2–13 or UHF channels 14–69. Notch loss is 20 dB minimum with low loss and low VSWR in channel. Double notch filters are also available for suppressing both lower sidebands in a single, wider notch.

Reader Service #234

LEADER INSTRUMENTS Model 408 Test Generator

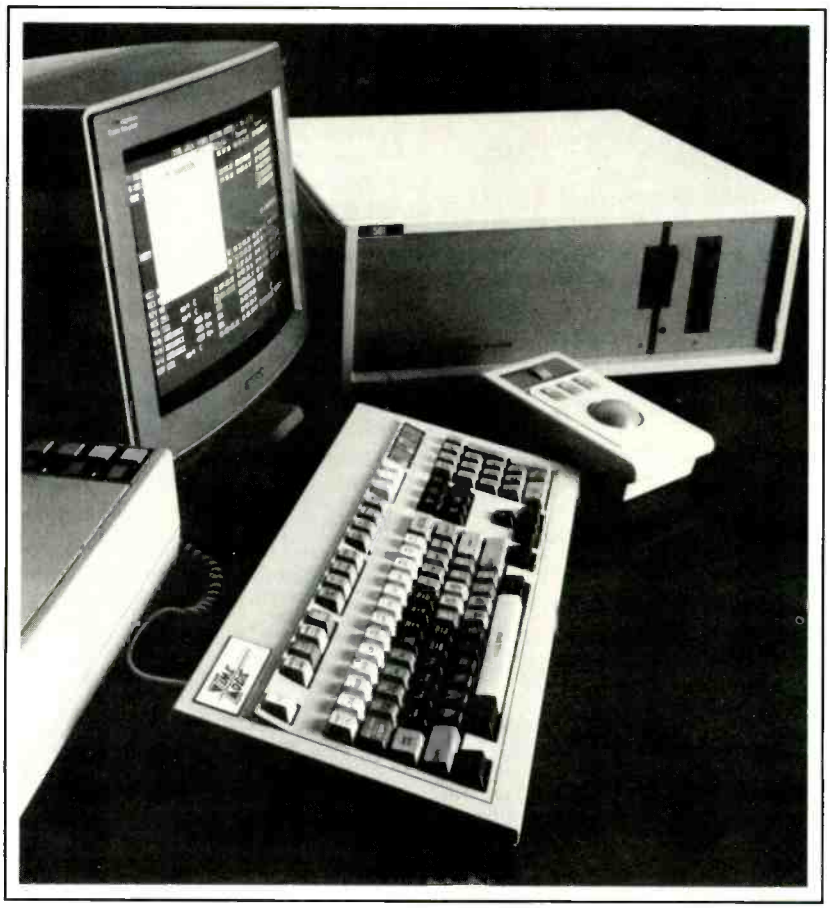
Leader Instruments' Model 408 is a genlockable NTSC Video Test Signal Generator that provides over 80 test patterns in composite, S-VHS, RGB, and Y, R-Y, B-Y output formats, with RF channel coverage of all broadcast and cable channels. Channel frequencies and video signal-level specifications are set up through menus on the LCD data control panel. Memory will hold 100 sets of video-level specifications and channel frequencies. Available test patterns include multiburst, video sweep, SMPTE color bars, modulated and unmodulated staircase, raster, convergence and crosshatch. List price: $3395.

Reader Service #235

DIGITAL AUDIO RESEARCH Soundstation II

DAR is now offering an erasable optical disk subsystem for its Soundstation hard disk-based editing system. Called Soundstation II, this stand-alone unit can be plugged into Soundstation's processing and storage unit. It allows playback and edit of mono or stereo segments directly from an optical disk through normal Soundstation commands. The subsystem uses removable 650 MB, 5¼-inch magneto optical disk cartridges; each cartridge stores approximately two hours of audio. Several drives can be used on-line in one system. Price: About $5294.

Reader Service #236



TIME LOGIC TLI-4400 Tape-Editing System

Time Logic has introduced the TLI-4400 Video Tape Editing System, which features dual-standard NTSC/PAL operation, a complete list-management system, 15 ports, 32 GPI Relays, a battery-backed EDL memory, and a high-reliability, industrial-quality computer. Other features include over 100 functions in edit-list management (including cleaning and traceback), switcher effects, edit transitions, four-channel audio, and variable-speed motion control (with trackball jog panel). VTR and switcher interfaces are included with the system.

Reader Service #237

RTI TapeChek 400 Series Videotape Cleaner/Inspector

Research Technology International has debuted the TapeChek 400 Series, a professional videotape cleaner, inspector and rewinder. The unit features a tape information display system that shows the tape length, and number and location of physical defects. The unit also cleans, polishes, inspects, finds damages, and automatically grades the videotapes' quality. Flexible purchase and lease plans are available.

Reader Service #238

VIDEOTEK RGB-1 Chroma Keyer

For use with Prodigy or other RGB chroma keying switchers.

Features adjustable sensitivity, proximity LED to indicate how close the settings match the background color, and a remote-control panel. Thirty-foot control cable provided. List price: $995.

Reader Service #239

ANTEX ELECTRONICS Series 2/Model SX-10 Digital Audio Board

The model SX-10 Digital Audio Board from Antex Electronics features two-channel stereo, "CD-quality" audio recording and playback for IBM PCs and compatibles. The unit fits into expansion slots of any IBM-AT, PS-2 Model 30, or any compatible 286/386 computer. The SX-10 allows users to receive both analog and digital audio signals from many sources, including natural voice, CDs, DAT players and other digital devices. Applications include audio mastering/recording in television and AM/FM broadcasting, multimedia presentations, interactive video and business communications. List price: $1995.

Reader Service #240

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How to Place A Classified Ad In Television Engineering

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___Training & Instruction
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Bring in the Engineers—At All Hours, Every Day

By Tony Hayman

Question: Which is worse? Having an engineer standing around not working, or having an equipment failure with no one around to fix it?

Utilizing engineering time is one of the hardest problems facing TV stations and audio and video post-production houses. In my 25 years of experience, I've found that more companies err on the side of having too few engineers. Moreover, these technicians often work during shifts when clients are present and no major work can be done.

Fortunately, much of the new equipment is very reliable. But it's also complicated, and when things do go wrong, several hours may be needed to find and correct the problem. It is often possible to limp along with a broken machine because its out-of-order feature is not being currently used. In many places, there always seems to be one problem that needs to be fixed, but unless it becomes a major stumbling block, no one ever gets enough time to concentrate on it.

Economically speaking, it doesn't make sense not to maintain equipment at its peak. The loss of income resulting from down time, lost commercials, or lowered good will can be enormous.

At a post house or studio, every time something breaks down, everyone gets upset. Clients exaggerate the amount of down time by a factor of at least two, and this can lead to a bad reputation. If the problem is serious, clients—not to mention thousands of dollars—can be lost.

Most facilities seem to bring in the engineers during off hours only when there's a major emergency, or when new equipment needs to be installed. It doesn't make sense to them to have enough engineers to be covered 24 hours a day, seven days a week.

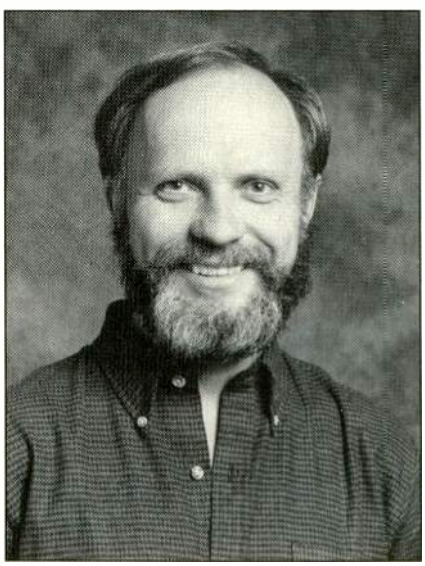
Twenty years ago, when I was working in England, we worked a shift similar to the one I'm about to suggest. It allowed the greatest amount of coverage with the smallest amount of manpower. In broad terms, it could work like this:

All engineers could work on a rotating 10-hour shift (11 hours including lunch). No one would work more than three consecutive days. The crossover day would be Sunday, when there's the least amount of work in the plant.

Engineering Team One would work Monday and Tuesday, while Team Two is off. Wednesday and Thursday, Team Two works while Team One is off. Friday and Saturday are like Monday and Tuesday, with One working and Two off. Sunday, both teams can do preventive work.

The next Monday and Tuesday, Team Two starts the week and works the same schedule as Team One the week before. The third week is like the first, with the same routine beginning again.

This system gives you engineering availability 10 hours a day, seven days a week, from two teams. By using four teams, it would be possible to cover almost 24 hours a day. The number of people per team depends on the size and needs of the facility. Since the role of the chief engineer is a management position, that person would not be affected by the schedule and would be able to evaluate each member of the staff.



Of course, the engineering schedule will always differ with each establishment. Still, it's not a nine-to-five job. If preventive maintenance procedures are followed, the number of problems arising during busy times will dramatically decrease—and ultimately, the number of engineering personnel who need to be on hand for crisis problems can be reduced. ■

Hayman is VP of Laser Edit East, a New York City post-production facility.

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This switcher handles standard bandwidth like it's going out of style.

TVS/TAS-3000 Distribution Switcher

The new TVS/TAS-3000 video/audio distribution switcher from BTS handles standard bandwidth switching in stride. But the fact is, standard bandwidth may not be the standard much longer. And that's why the TVS/TAS-3000 is not your standard switcher.

With the advent of wide bandwidth video, you'll need a switcher that can handle the new higher bandwidth signals. The 3000 will. It provides a video bandwidth of more than 50 MHz, measured with a full-amplitude sine wave or video signal. Which makes it upwardly compatible with HDTV or computer graphics—no matter what the standard.

The TVS/TAS-3000 also delivers the cleanest signal and expands to accommodate any matrix size to meet your specific needs.

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