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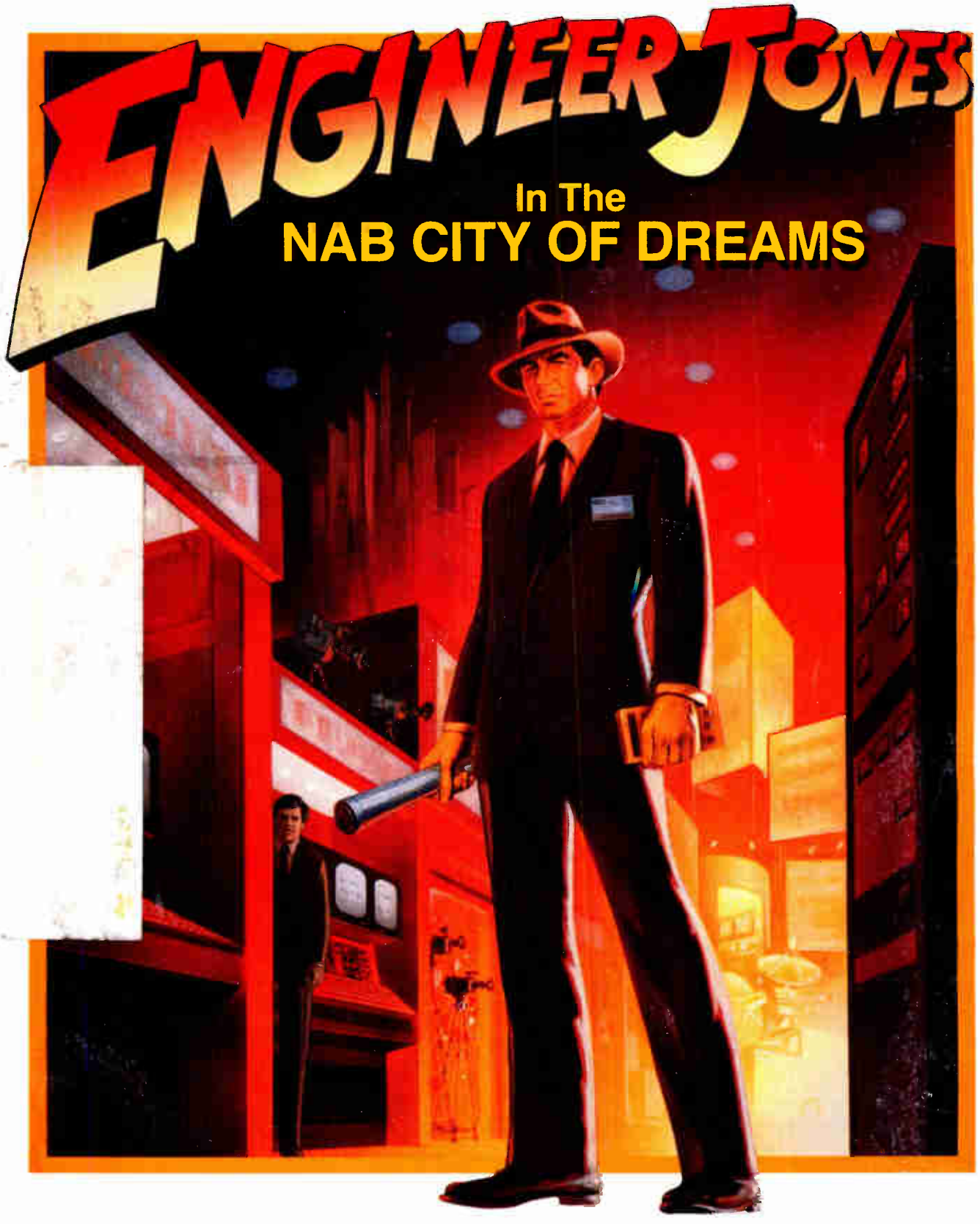

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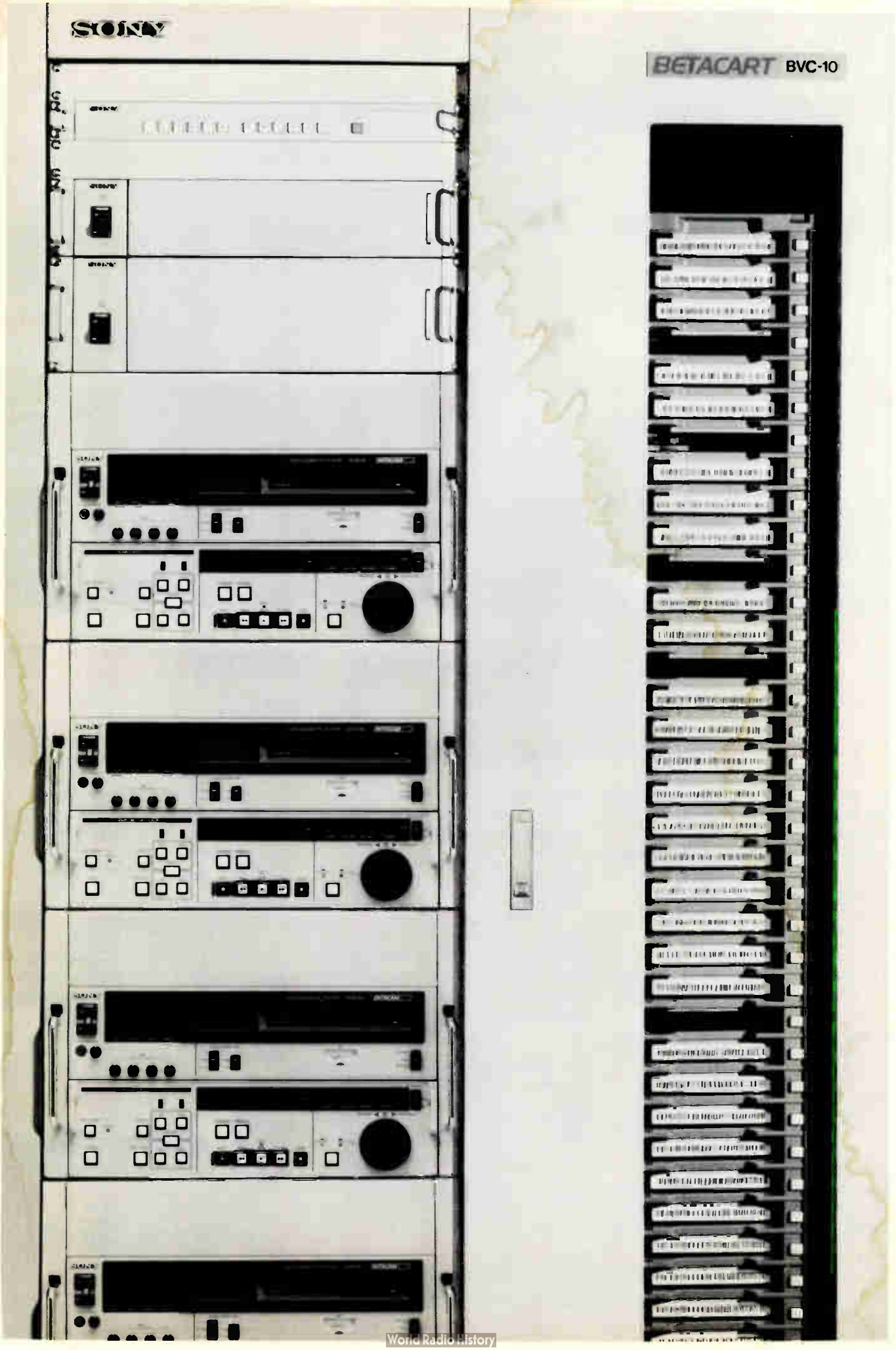

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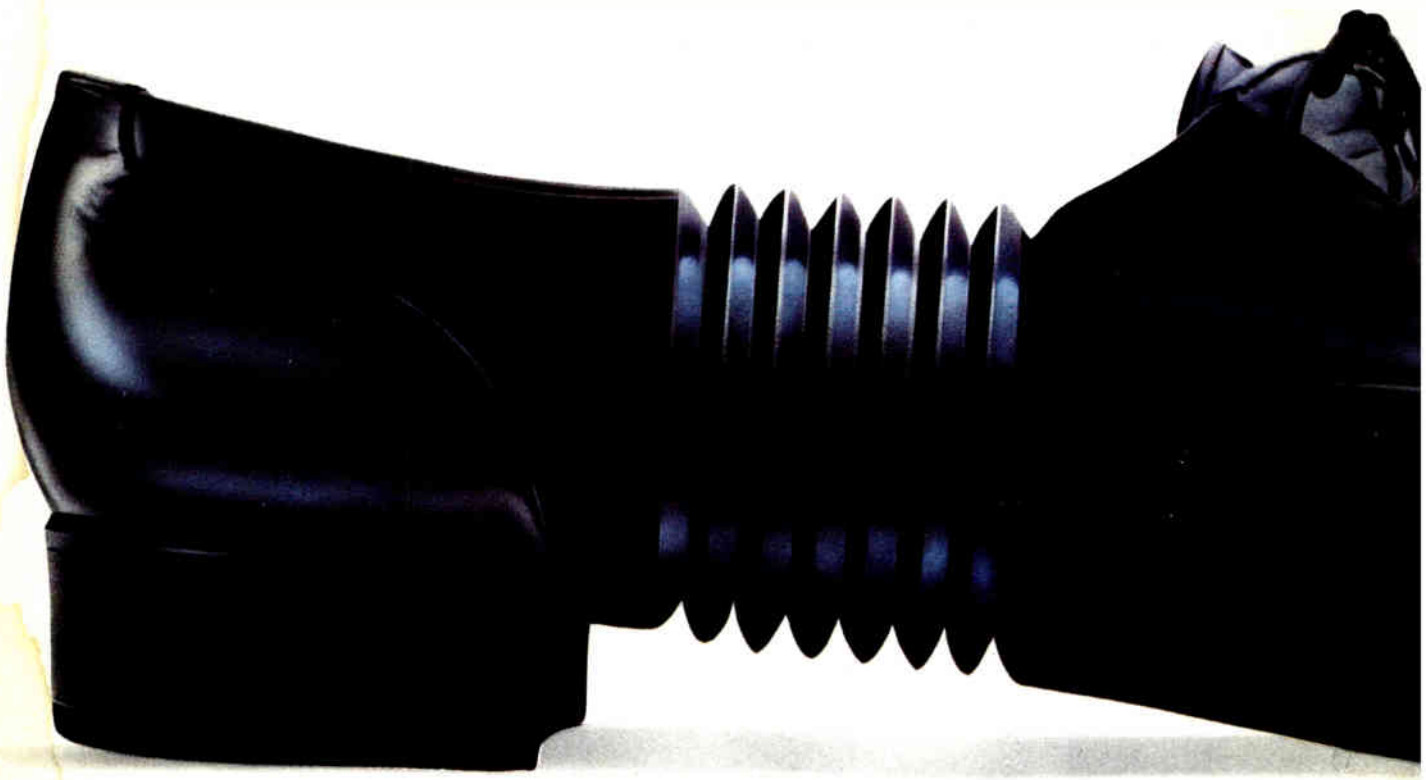

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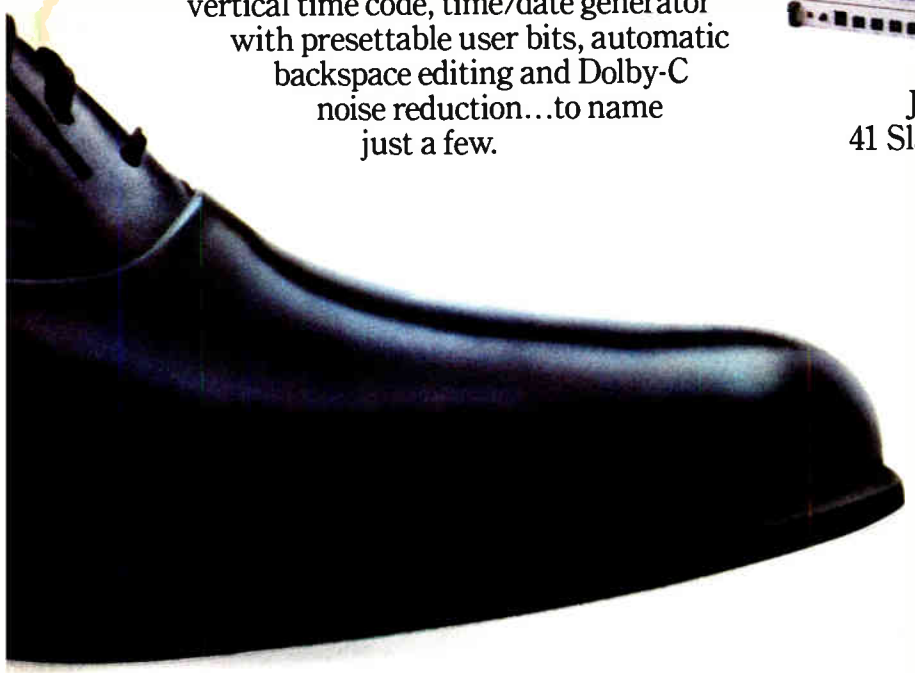

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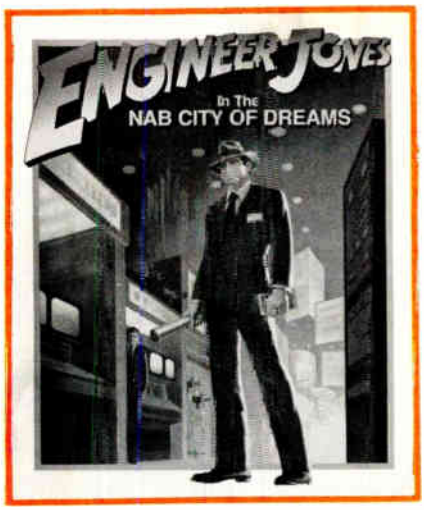

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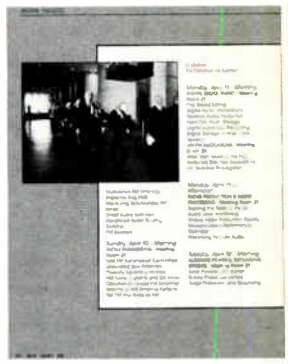
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NAB '88:

Color-Coded Guide to the Las Vegas Show

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NAB Annual Report Card

"As a broadcast industry association, the NAB receives an A+. From those who are not broadcasters, however, the NAB receives a different set of marks."

New York City's Mayor Ed Koch is fond of asking members of the press and others gathered around him, "So, how'm I doing?" Not that the NAB has asked this question, but on the eve of the Las Vegas show we thought we might provide the following "report card" on the Association's recently issued Annual Report.

Representing virtually all (940) of the country's TV stations and most (5,200) commercial radio stations, the NAB has risen to become *the* trade organization for the broadcast industry. Between lobbying activities on behalf of government deregulation, efforts to ensure the purity of the RF spectrum for broadcast use, the movement to improve the signal quality of AM and FM radio, active research and testing in areas such as HDTV, and public awareness campaigns to bring broadcast-related issues to public attention, the NAB has become a virtual institution.

Thus, as a broadcast industry association, the NAB receives an A+. For most of the 35,000 to 40,000 people expected to attend the NAB show this year, however, the NAB receives a different set of marks. Those who are not broadcasters wonder who exactly represents them.

Those in teleproduction, though forming a substantial percentage of show attendees (23 percent), are alienated by its apparent lack of interest in their concerns and have formed ITS, the International Teleproduction Society, in order to be heard in all-industry deliberations.

Manufacturers, who help to contribute 40 percent of the NAB's annual funding by paying for exhibit space, also complain that the Association is not responsive to their needs. Despite objections from many, NAB insists on moving the show from city to city rather than fixing its location in Las Vegas. Some manufacturers also question the propriety of NAB's entering the manufacturing arena with its FMX system.

Even engineers, including those in broadcasting, find that the NAB doesn't adequately represent them. Hence the formation of the SBE, which, despite its support of and by special interest groups, has become the voice of the engineering community.

In short, a mixed report card for NAB which, while striving to represent broadcasters, has apparently forgotten about some rather important members of the industry as a whole.

Robert Rivlin
Editor-in-Chief

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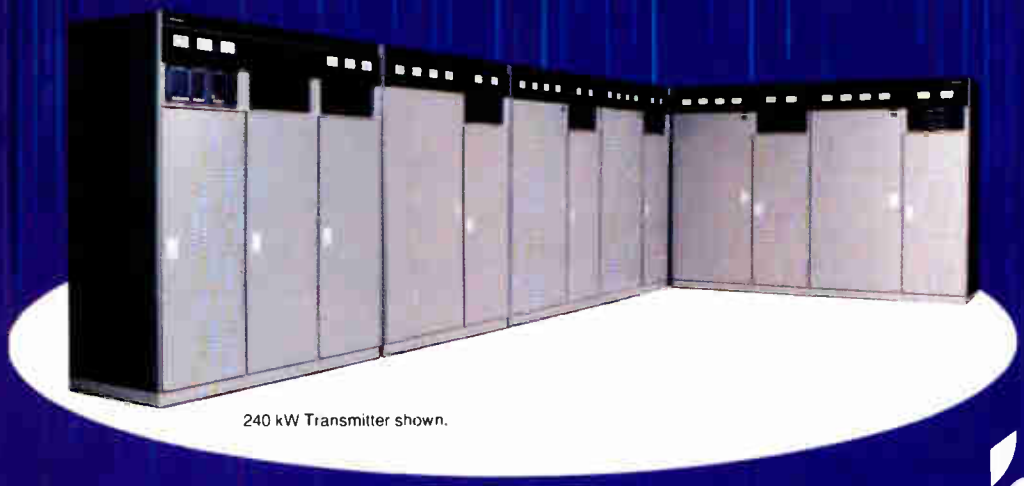

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There and Back With My Ikegami HL-79

By Ken Jobson, WTN Camerman

As a hardened cameraman of many years, I consider myself fortunate that UPITN/WTN has provided for my professional use, an Ikegami HL-79 video camera which produces quality images often under the most adverse conditions, is electronically reliable, robustly constructed and designed in such a way that it relates to the operator's body. The camera after all, is only a device which facilitates the recording of images seen by the human eye and therefore becomes an (electronic) extention of the human body.

I have very strong emotional feelings about all of 'my' electronic cameras — all Ikegami's.

Using Ikegami cameras has given me tremendous professional satisfaction and, I hope, established my reputation as a cameraman who will go to extreme lengths in order to capture 'the shot'. My Iky's have been taken from me at gunpoint, survived several car crashes, travelled in helicopters, tanks, armored cars, innumerable jeeps, fire engines, on camels, rowing boats to battleships, have been stolen, have boiled in midday sun in the Sudanese desert and chilled on the ski slopes of Lebanon, have witnessed the most appalling degrees of human inspired destruction, a fighter falling to the ground one meter in front of the camera as he was hit in the stomach by a sniper's bullet, glamorous fashion models on the catwalk, the Prince who loves playing polo, a famous parrot now alas no longer with us reknowned for his voluntary impressions of incoming shelling, hundreds of correspondent standuppers, the happiness at weddings and the sorrow of bereaved relatives, the innocent child at play and another innocent child staring into infinity from his hospital bed wondering why that phosphorous bomb exploded in his house. My Iky's have never let me down on any of these shoots. But one incident, which demonstrates the remarkable characteristics of Ikegami cameras, will remain firmly in my mind forever.

Location: Main street in Bhamdoun (pronounced without the 'B') an attractive mountain town in central Lebanon on a sunny afternoon. We had just finished taping the totally deserted street (or so we thought) and locked up shop fronts, when the distinct crackle of automatic gunfire could be heard breaking the eery silence. It took perhaps five to ten seconds for us to realize those bullets were coming at us. As my soundman and I both took independent evasive action, the Ikegami HL-79 and video recorder both fell from our shoulders onto the pavement. The Iky laying on its side (and as I realized minutes later, my finger had touched the roll button as it fell out of my hand) was now happily recording the sound of incoming bullets hitting the surrounding shop fronts. Our cries in Arabic that we were press and the gunmans order in English "Get out, get out,' were followed by another burst of gunfire. Carefully, I crawled across the pavement and uprighted the still rolling Iky, pointing it in the direction of its crew who were to be seen crouching behind a sand heap for shelter. Minutes later, thinking our ordeal was over, I bent down to press the stop button, when an M-16 bullet tore through my right neck muscle. It was only the sudden feeling of wetness down my back that made me aware that something was seriously wrong. I was hit. Once again I flung myself down behind the gravel pile, as the gunman fired at least another twenty bullets at us. The firing then ceased, and I was put into the back of a car and taken to an Israeli medical unit, who treated the wound, gave me a pain killer injection and hot coffee. Later at the American University Hospital in Beirut, doctors gave me a local anesthetic, cleaned the wound internally (very painful), x-rayed, took blood pressure, etc.

The bullet which miraculously missed my spinal cord by two millimeters has left two holes three inches apart in the back of my neck. Subsequent viewing of the video reveals twenty five recorded gun shots at us before I was hit. Plus approximately twenty shots as I lay bleeding. I was very happy not to be going home as a waybill number. And today while the memories linger; my work as it must, goes on.

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Feedback: Letters to the Editor

D-2 Debate

"D-Day in the Format Wars" (*BM/E*, January 1988, p. 63) seems to take the position that composite analog or digital NTSC video, and recorders, are unsuitable for high-quality production and post-production work. We at Ampex disagree.

While most of us can recite the list of composite NTSC's liabilities, we also recognize their continual reduction through improved equipment designs—as examples: differential gain and phase no longer plague us, and the evolution of keyers has curbed the "ragged edges" we once accepted as normal. One need only look to "Yves Faroudja: Champion of NTSC (p. 31)," in the same issue, to be reminded of composite NTSC's continuing potential for compatible, and affordable, evolution.

There is no doubt that the Type C (or Type B) analog recorder has been the weakest video performance link in the high-quality production and post-production facility. However, the digital recorder almost completely eliminates the video degradations previously expected from a VTR. Proof of digital recording transparency is seen in post-production accomplished with the widely utilized A-62 disk recorder—a composite digital recorder. The biggest performance improvement in the composite analog-to-digital format transition is obtained from the transition to digital recording—not the transition from composite to component.

Component digital recording (D-1) is not intrinsically better than composite digital recordiang (D2)—each has its place. Both the D2 recorder operated in a component environment (input encoder/output decoder) and the D-1 recorder operated in a composite environment (input decoder/output encoder) have limitations.

A well-executed D-1 recorder operating in a totally component digital- equipped and CCIR 601 interconnected environment can provide suberb 525/60, 8-bit video transparency. The spectrum of equipment necessary to produce such an environment—equal in operational capabilities to today's basically composite analog interconnected facilities—is not yet available. When available, the purchase, integration, and operation costs will be extremely high, yet such a facility will have to compete for business with conventional, composite interconnected facilities. Given this, the D-1 recorder best serves in very small CCIR 601 interconnected systems, such as can be practical in digtial graphics production environments.

The fact that most facilities utilizing professional television equipment are in business to operate at a profit cannot be escaped. There are those who claim that post-production facilities can "simply pass on D-1's costs to their clients." We believe this is a risky posture in a competitive environment, because the true cost of D-1 is that of a complete CCIR 601 component digital system—not just the D-1 recorder.

Those who quickly dismiss the price differential between D-1 and D2 product offerings miss a critical point. Recorder purchase price, recorder operating costs, and system integration costs, taken together, represent the full cost against which the respective benefits of D-1 and D2 recorders must be measured.

Not to be ignored are increasing pressures for reduced programming production costs—pressures directly threatening production and post-production profitability.

Production and post-production professionals say that composite NTSC video is quite suitable for high-quality production. They prove it by producing high-quality product with it—making money in the process. They say our analog recorders are too limiting—all that worry about mulitiple generations. Further research shows that few of them will justify the investment necessary to build CCIR 601 component systems. Ampex developed D2 to answer their needs.

As in the case of the D-1 recorder, the D2 composite digital recorder is capable of more than 20 digital input/output generations with no degradation of video or audio. The Ampex VPR-300 composite digital recorder goes even further by providing 20 generation analog input/output performance with virtually imperceptable signal degradation.

The D2 recorder is instantly system compatible—there's no need to buy a surrounding system of equipment. The D2 recorder is, in fact, cleaner in a composite environment than a suitably equipped D-1 recorder, and considerably less expensive.

The D2 recorder has half the rotary head tips, needs no erase heads, and consumes only 1/3 as much tape as the D-1 recorder—it's less expensive to operate.

Just as important, D2 lends itself to the varied motion effects and other important operational capabilities customers have come to rely on.

Professional video users need products that not only exhibit excellent and versatile performance, but also meet the economics of their businesses. For D2 supporters and detractors, there can be no substitute for first-hand experience—the Ampex VPR-300 awaits their inspection at NAB.

Peter Zakit
General Manager-
Studio Recorders
Ampex Corp.

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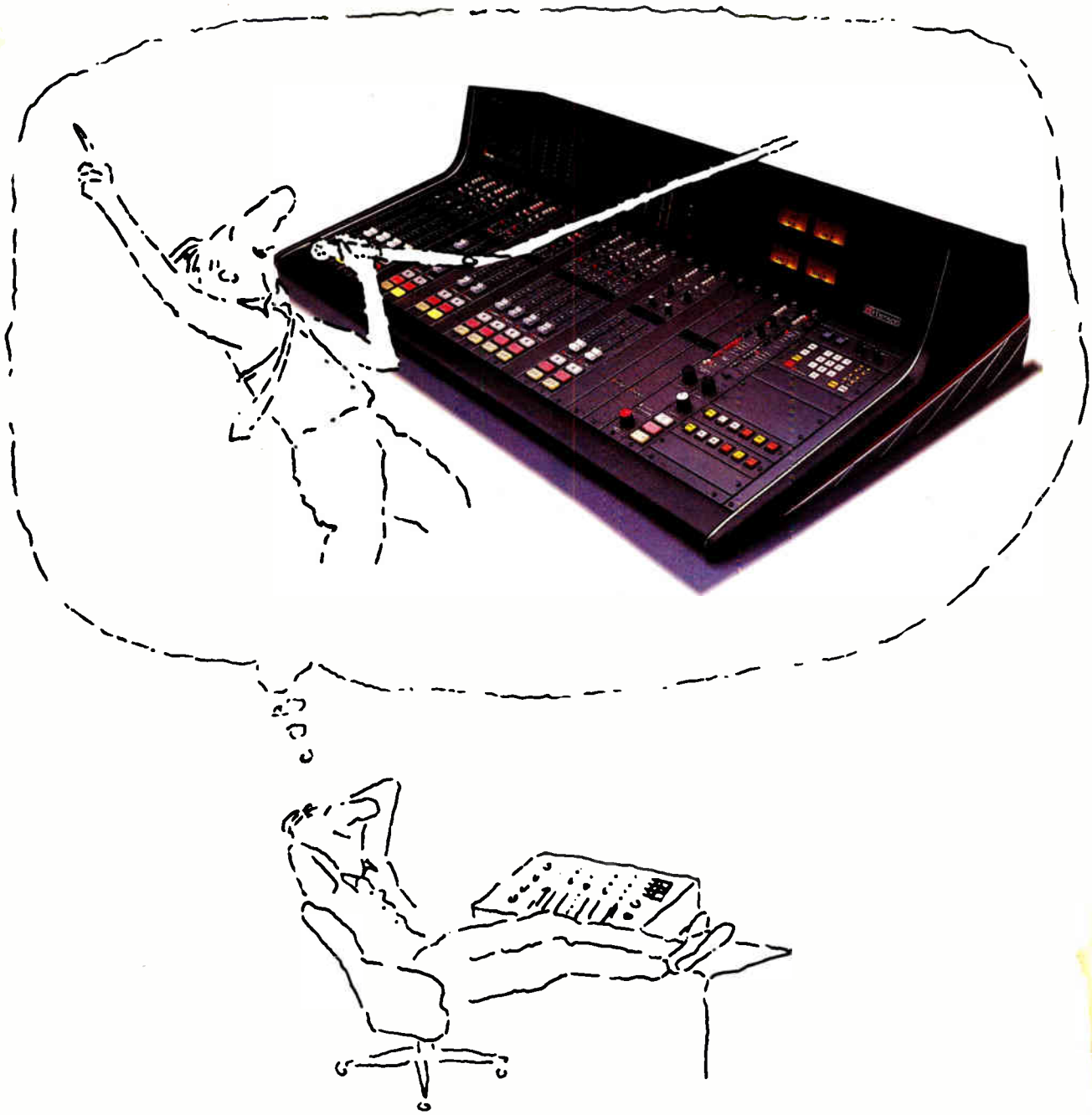

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Cox and Tribune Back Del Rey HDTV

Tribune Broadcasting and Cox Enterprises have joined forces in funding an NTSC-compatible HDTV transmission proposal from the Los Angeles-based Del Rey Group. The joint venture, announced late in February, is known as the Compatible Video Consortium.

The consortium's funding will enable further research, and eventual practical tests, of the Del Rey system, known as HD-NTSC. So far, the system has been tested only in VAX computer simulations at the Canadian Broadcasting Corp. Initial tests were in monochrome, but recent color tests have been "very promising", Del Rey founder and principal Richard J. Iredale stated.

According to Iredale, HD-NTSC is based on a subsampling technology the group calls TriScan. The technique allows the originating high-definition image to be compressed into a single 6 MHz NTSC channel for transmission. It requires no "black box" converter on the home receiver and incorporates a digital audio channel.

Iredale said that the preliminary data from the HD-NTSC tests predict both vertical and horizontal resolutions equal to that of HDTV, or about 700 lines per picture height, contrasted with about 330 lines per picture height for NTSC. Spacial resolution would be "significantly higher" than that promised by the competing ACTV system from David Sarnoff Research Center, although temporal resolution of ACTV is higher, he added.

The system would be fully compatible with current NTSC receivers and would eliminate cross luminance and cross color artifacts, although at its highest resolution it would add an artifact similar to cross luminance. This could be minimized by slightly reducing the resolution until HD-NTSC receivers are more common, Iredale said.

Bill Killen, director of financial analysis and planning for Cox Enterprises, parent company of both Cox Broadcasting and Cox Cable, commented that the consortium was formed to further research into practical solutions for HDTV transmission.

"There are a number of possible solutions for HDTV, and this is one of them," Killen said. "We find it promising and worthy of being tested."

He added, "In the current environment, we think it's important that broadcasters and cable operators think of funding HDTV research."

Happy 25th for Satellite Technology

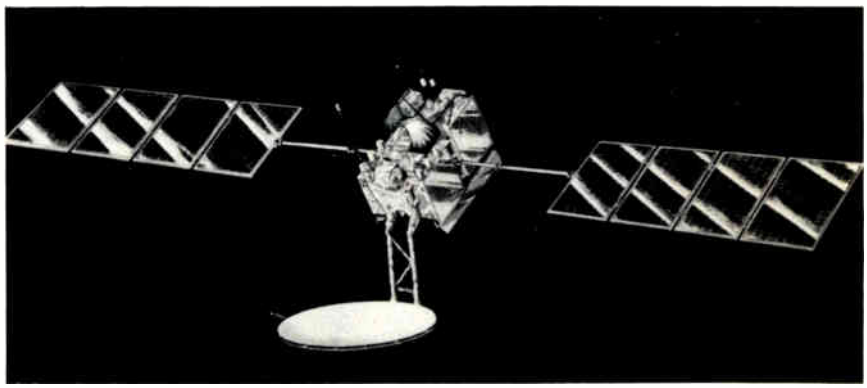
February 1, 1988 marked the twenty-fifth anniversary of the foundation of COMSAT, the outgrowth of President John Kennedy's idea for global communications. The private, Washington, DC-based company was authorized by Congress through the 1962 Communications Satellite Act with the specific mandate to develop and share satellite technology.

Its development of communications satellites has forever changed the nature of broadcasting. Those who have beeen in the iindustry for a while will still remember the days when "live via satellite" and quick-turnaround stories from overseas were meaningless concepts.

In retrospect it seems strange to have entrusted the development of such a significant technology, with national and international ramifications, to a profit-making, shareholder-owned company. But the need to provide quality and low cost led to the decision to go with a high-altitude system. This required only three satellites for the entire planet. In April 1965, the first, The Early Bird, was launched. When the system was in place, INTELSAT, a coopertive between the several nations using satellite communications was formed as a joint ownership. The organization now has 165 members and is one of the most impressive examples of international cooperation in history.

But the advancement of satellites did not end there. Even today, breakthroughs occur regularly. Most recently, Pan American Satellite, the first private company outside the Intelset consortium, announced the go-ahead on its first craft.

And the tradition of international cooperation continues: the Japanese firm, Fujisankei Communications Group (FCG), and Conus Corp. have signed a deal that will shrink the global village even further. This new agreement will make live transPacific news coverage and interactive reporting possible. As the relations between the two companies increase in importance, this service will prove vital.



COMSAT was founded a quarter century ago.

HDTV Captures the Day at Winter SMPTE

The 22nd annual SMPTE Television Conference, the society's yearly winter techical session, was spread over two days with the appropriate theme of Technology

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in Transition.

Most of the excitement came on the last day of the sessions, with the "technology in transition" that drew the most attention being the various acronyms attempting to define television systems surpassing the current NTSC system. EDTV, ACTV, HDTV, and a plethora of alphabet-soup designations attempted to outline the alternate, advanced television systems that dominated the prodceedings. The above systems were discussed by everyone from representitives of equipment companies to professors from M.I.T., including reports on the work of the Advanced Television Systems Committee.

All the speakers attempted to separate what their companies/institutions were proposing as different from the heavy crush of confusing material currently informing the industry. Arguably, the issues have, to a great extent, become more political and economical than they have technical.

Filling in for a last minute cancellation, Sony's Larry Thorpe argued for endorsing the 1125/60 standard as a production standard, allowing it to go forward unencumbered by spectrum availability or anything else beyond the parameters of production and transfer between media (as in tape to film). In addition to other "refined definition" types of systems, W.F. Schreiber of M.I.T. presented a paper on noncompatible 6 MHz high definition TV distribution systems. In his presentation, Schreber explained that removal of the constraint of backward compatibility with existing receivers would facilitate the achievement of maximum quality within one existing channel.

"Noncompatible systems of this type," he argued, "are suitable for controlled-access environments such as cable, or for dual broadcasting of NTSC on one channel and HDTV on a second channel. By using a combination of methods that maximize image quality for a given bandwidth, it appears possible to distribute television images of quality comparable to MUSE within a single 6 MHz terrestrial broadcast or cable channel."

PBS also updated attendees on its presentation of HDTV. This was an internationally broadcast demonstration in cooperation with Sony, CBS, NHK, and the CBC. The demonstration was conducted in October of last year and futher experiments will be taking place in 1988 according to Dr. Richard Green of the Public Broadcasting Service.

Also of note at the show were two working group displays. One involved monitor calibration, and the other demonstrated information from a paper entitled "Communications Between Analog Component Production Centers" given by C.J. Dalton.

This paper was an expansion of

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the need for a MAC-type system in transmission to studio with emphasis placed on maintaining a wide luminance bandwidth, with sampling and component bandwidth to a 4:1:1 standard and compression ratios of 14:9 and 56:9 for Y and Cb, Cr. The resulting analog component link equipment (ACLE) signal is accommodated within the active line time of a standard 625 sync.

In addition, some of the controversy over the bit level communication in digital video communication lines was smoothed over. Richard Taylor of Quantel delivered his position on the company's dynamic rounding technique to solve video noise problems resulitng from the signal exiting the Harry's higher bit resolution and being reduced to 8 bit for the communication within the digital production studio.

Grass Valley's Peter Symes made his position for 10-bit communication, acknowledging that 10 bits does not solve the striation problem referred to by Taylor. In addition, it was stressed, the problem occurs only in electronically generated signals—camera originated signals are not pure enough for the problem to become noticeably evident.

New Advanced Television Test Center Formed

Those who have been concerned about recent industry fragmentation over the HDTV/advanced television controversy should be reassured somewhat by the formation of an all-industry coalition group formed to study the pros and cons of the various proposed transmission systems and assess which is best for the American viewer. These results would then be provided to help the FCC's Advisory Committee on Advanced Television Systems in its policy-making role and the industry's Advanced Television Systems Committee (ATSC) in its standards-setting capacity.

The members plan to contribute up to $700,000 each, either singularly, or, in the case of the MST, INTV, and the Television Operator's Caucus (TOC), among member station owners.

The anouncement, made by the NAB, the Association of Maximum Service Telecasters (MST), and INTV is also receiving support from Capital Cities/ABC, NBC, and PBS. The group is also inviting participation by cable operators and cable industry associations. This is significant in light of the perceived face-off of terrestrial broadcasters and cable operators on the issue (see "Advanced, Enhanced, Expanded, Compatible: The Search for Higher-Definition TV", *BM/E*, November 1987, p.55).

The current founding members agree on one tenent: the new system should be designed to enhance the existing service in the U.S.

The examination will be subjective testing on quality, identifica-

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tion of potential bands, and laboratory and field testing using both small and large screens for viewing purposes.

The center is the logical evolution of NAB's Advanced Television Systems Committee and its Science and Technology Department's proposed HDTV lab. Says NAB president Edward O. Fritts, "We hope this testing facility will provide a way to help bring to the public the next generation of TV pictures."

Local Stations Solve the Satellite Traffic Jam

Now that satellites are so intrinsic to the newsgathering process, some say that dependency may be a problem. The traffic seems so large—maybe too large—and some are wondering about alternatives. The recent rush on satellite hours started with local TV stations carrying the Super Bowl, and continued through the first presidential primaries leading to a total jam-up for "Super Tuesday." Thrown into this batter is the coverage of the Winter Olympics in Calgary. This all adds up to the "heaviest [SN] traffic we've ever had," said one Conus Communications official.

It's impossible to estimate what would happen if more were available. Says Harry Mahon, GTE Spacenet manager of broadcast services, "We reach a point where we're saturated." All eight of GE Americom's SN transponders were booked.

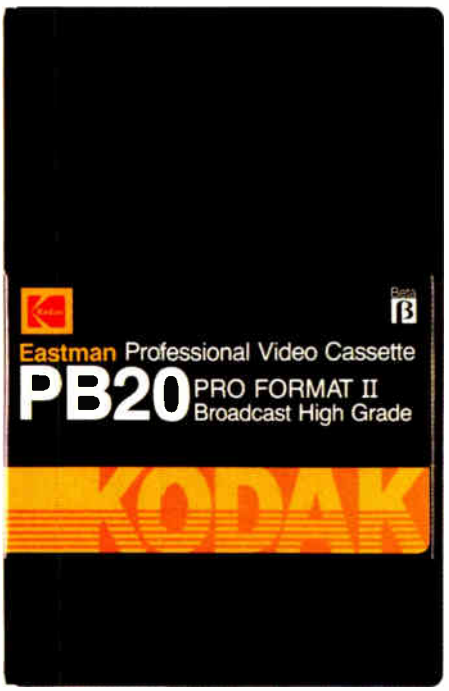
Because of this incease in use, half-transponders are on the rise. There has been resistence to the technology due to fears of lower quality and reluctance to buy new equipment. Charles Hoff, managing director of CNN's Newsbeam SN service recognizes the apprehension that half-transponders face but says, "If we want to stay in the satellite business, we'll just have to work with the limitations."

Because Conus leases four GE Satcom K-2 transponders full time, they're listed by GE as occupied. Conus says, though, that there is available time for its affiliates, even during such busy times as "Super Tuesday " or during sporting events.

The member stations in Conus' Satellite News Cooperative pooled expertise and resourses to get through the Iowa Caucuses. This allowed locally-oriented news breaks live from Des Moines or by taped reports and interviews for better coverage. For instance, the viewers of Boston's WCVB-TV were especially interested in the progress of Governor Michael Dukakis, and the network reports didn't cater to this special interest.

Conus offered a total of 198 feeds directly from Iowa, including 134 live shots ranging in length from five minutes to a half hour. The Ku-band capability also allowed shots from the Republi-

"GROWING PAINS" GOES TO HAWAII WITH



When George Spiro Dibie, Emmy-winning director of photography for "Growing Pains," recently went to Maui to shoot a special hour-long episode, he specified Eastman Pro Format II broadcast video cassettes.

"Pro Format II video cassettes lived up to our best expectations," he says. "Every subtle nuance that we captured with our CCD (charge-coupled device) cameras was faithfully recorded.

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"The image quality of the ½-inch tape, which we shot in widely varied lighting circumstances, was comparable to the 1-inch tape shot in the studio. There were no problems, even when we intercut original 1-inch tape from the studio with second-generation 1-inch dupes of the original footage shot in Hawaii.

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can headquarters.

CBS booked 200 satellite feeds for 40 U.S. and foreign Newsnet-member stations for the Iowa causus alone. "Super Tuesday" offers even more complications because local stations from 17 states have special interest in the results.

NAB Takes Steps to Save AM

Perhaps the introduction of AM stero hasn't done as much good as industry leaders had hoped. In late January, the NAB Radio Board met to consider the state of radio and to react to recent suggestions that the AM industry is wavering. The board passed a resolution that charges the Radio Executive committee to make "the actions necessary"—including spending a budgeted $500,000—to salvage the industry.

The controversial resolution was followed by exhaustive discussion as to what can be done to strengthen and support AM. The situation, as it is seen by the members of the board, was examined.

One of the first steps to be taken is suggesting the adoption of new FCC rules to eliminate interference and enchance technical quality. It is the NAB's opinion that the commission should therefore temporarily suspend new AM licensing and major changes. These opinions were expressed in reaction to the FCC's Notice of Inquiry on AM technical assignment criteria. The NAB challenged the commission on the premise that new AM stations and expansions of existing stations are good for the listening public. As the paper reads, ". . .this long-standing FCC approach. . .has been the primary cause of the technical and economic demise of the AM band." The association also urged the the commission to incorporate the NRSC's transmission standards into new FCC rules.

NAB president and CEO Edward O. Fritts.

NAB president Edward O. Fritts reinforced the call for a freeze on major changes with a personal letter to FCC chairman Dennis Patrick. It is clear from the letter that the addition of new stations under the current policies is one of the reasons for the current problems.

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Tom Garber, United States Video, Vienna, VA

Eric Weaver, You TV, Hollywood, CA

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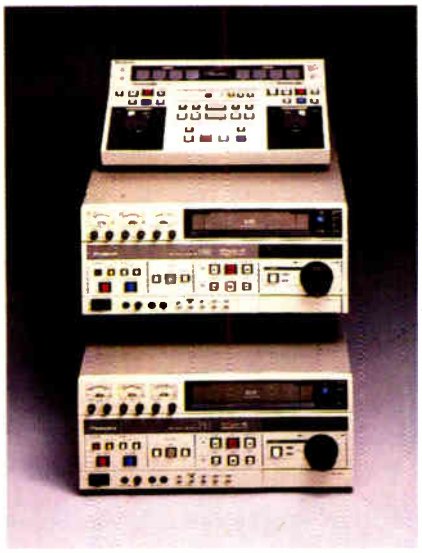

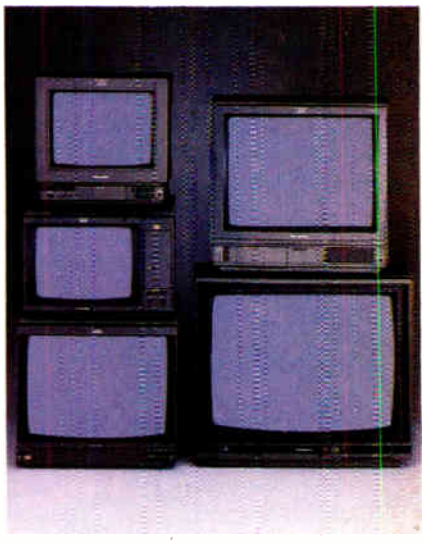

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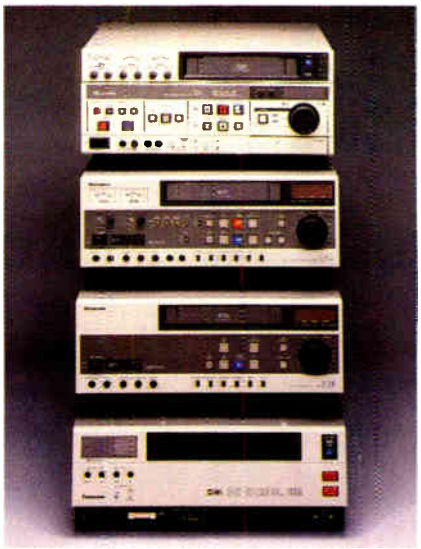

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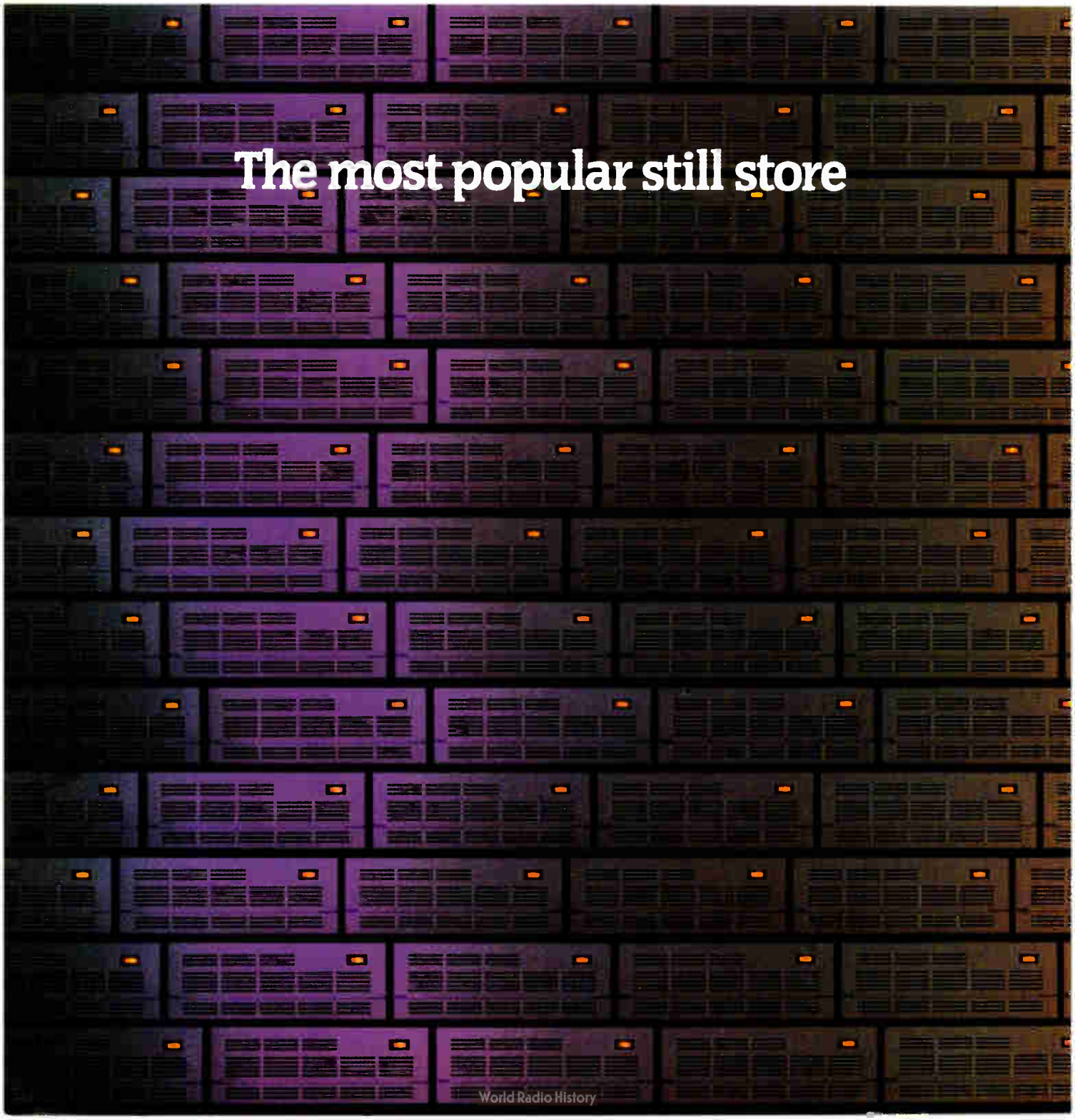
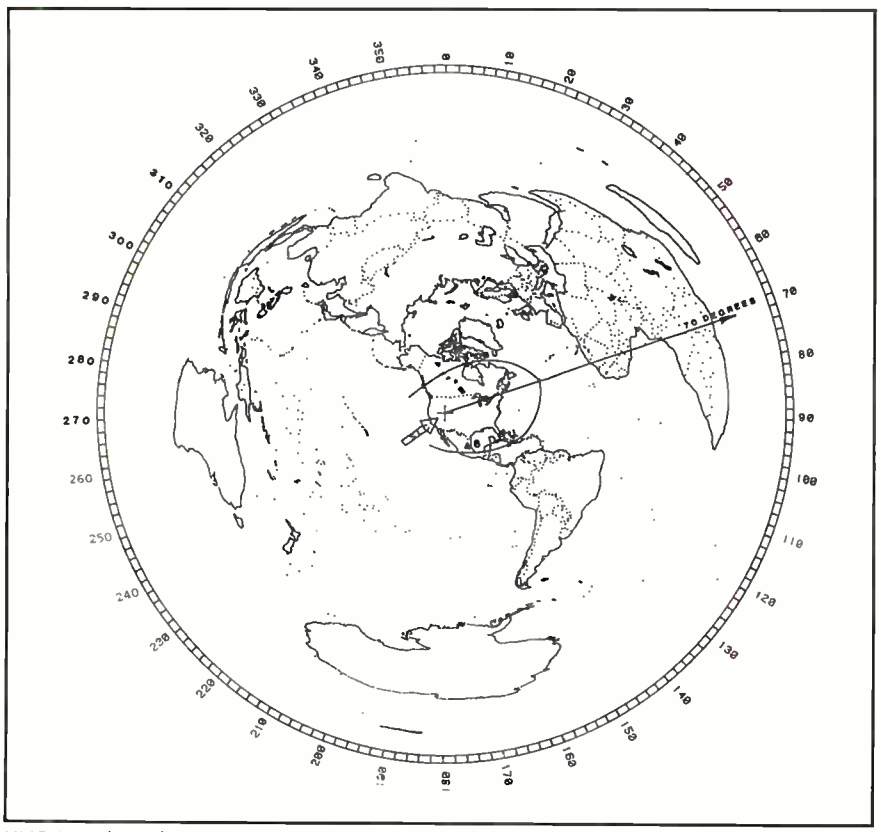


Super-Powered Commercial Shortwave

By Robert Rivlin

If you think shortwave radio is a thing of the past, or simply a way for governments and religious organizations to disseminate propaganda to distant regions, think again: the U.S. public bought over 18 million shortwave-equipped radio receivers between 1977 and 1987; the BBC estimates U.S. listenership of its transatlantic shortwave programming at 2 million (100 million worldwide); and KUSW in Salt Lake City has now become the country's second FCC-licensed shortwave radio station broadcasting commercial programming and ads (the other is WRNO, located near New Orleans).

Shortwave was invented, of course, by Gugliemo Marconi, who set up a successful transmitting operation in Cornwall, England, in the late 1890s. Unknown to Marconi at the time, shortwave's frequencies in the 3 to 30 MHz band (just above AM) not only allow it to "bend" around the terrain but bounce back and forth between the ground and the ionosphere, making it possible to literally reach around the world from a single transmitter location.



KUSW's signal pattern, oriented toward 70 degrees true of Toronto, ON.

According to Rex N. Carlson, the station's chief engineer, KUSW is using a Harris SW-100B 100,000 W transmitter, a pulse-duration type that requires no modualtion tranformer. This feeds out on an open-wire line to a TCI 516-3 log periodic antenna, supported like a curtain between two 145-foot towers. Pointed at 70 degrees true towards Ontario, Canada, the antenna provides a bandwidth of 40 degrees on each side, yielding a pie-shaped form.

This propagation method has been yielding extremely good signal quality in both Europe and Scandinavia, two of the station's primary coverage targets. "We're also experiencing a 10 percent residual signal off the backside of the antenna," Carlson notes. "So we're picking up reports of listners in areas such as Washington, DC, and California."

Limiting is provided by an Inovonics MA-2. Music playback for the adult contemporary format is through a combination of Sony CDs and Otari reel-to-reel decks while mixing is done with a Sparta console. The station also utilizes The Weather Bank to issue worldwide weather reports.

"There were some interesting challenges in setting up for shortwave," comments Coleman, who has also been instrumental in set ting up KRSP-AM/FM, Salt Lake City; KRJC-FM, Elko, NV; and

KSMK-FM, Cottonwood, AZ. "For one thing, we have to shift frequencies every two to three hours—to fine-tune the signal to changing conditions in the ionosphere, and to take advantage of openings left by programmers in other countries that are themselves shifting to fine-tune their own signals."

★ ★ ★

Congratulations are in order for Michael Rau who has been recently appointed as the new head of NAB's Science and Technology Department and elevated to the position of VP. Rau replaces Tom Keller, who has been appointed chief scientist of the NAB's newly organized Broadcast Technology Center, where he will be working on the NAB's HDTV research program.

Although much has been made of what at first appears to be a

Michael Rau, new head of the NAB's Science and Technology Department.

demotion (Keller was not named head of the lab itself, a job position still unfilled), Keller himself is pleased with the change in position. According to the NAB itself, Keller is an outstanding scientist who will make a vital contribution to the development of HDTV.

Rau, who had been the NAB's director of Spectrum Engineering and Regulatory Affairs, is also the owner of radio stations WKLV-AM and WBBC-FM in Blackstone, VA. He joined the NAB in 1981 and has been extremely active in promoting the organization's AM improvement plans.

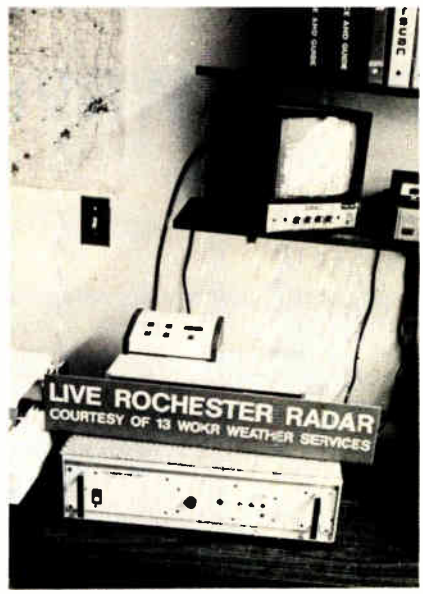
★ ★ ★

David McIntosh of Colorado Video writes: "A major snowstorm is closing in from the Canadian border, promising 40 m.p.h. winds, visibility-cutting sleet, wandering snow drifts, and downed power lines in its wake. A plant manager needs to make a quick decision to stop production for the day and send his employess home early. A radio station news director needs to have up-to-the-minute weather information for the afternoon drive slot, but the lines to the National Weather Service are tied up, busy, or maybe already downed. A utility repair fleet manager has to come up with a positioning plan for her trucks, placing them in close proximity to the areas most likely to be hardest hit.

"Normally, these people would have to wait for a television newscast to give them the visual and factual information they need, but, in Rochester, NY, through WOKR-TV, and in Beaumont, TX, through KDFM-TV, the weather-information-hungry don't have to wait for the six o'clock news.

"Through a combination of sophisticated weather forecasting systems and Colorado Video freeze-frame video transmission equipment, up-to-date, cost-effective weather video information is being made available to local businesses and services over dedicated phone lines and broadcast over VBI. Subscribers receive the same information, in still-video form, that station meteorologists view, as they view it, during the day, all day.

"WOKR in Rochester utilizes several weather-gathering systems to build up a solid information base. An Enterprise Electronics weather radar system for local data, an ESD Front-End for information via satellite, and NOAA Weather Wire and Pan AM Weathermation for back-up services are all included in the station's scheme. Each service feeds into a single workstation for interpretation and manipulation by meteorologist Bill Peterson. At this point, the information is split

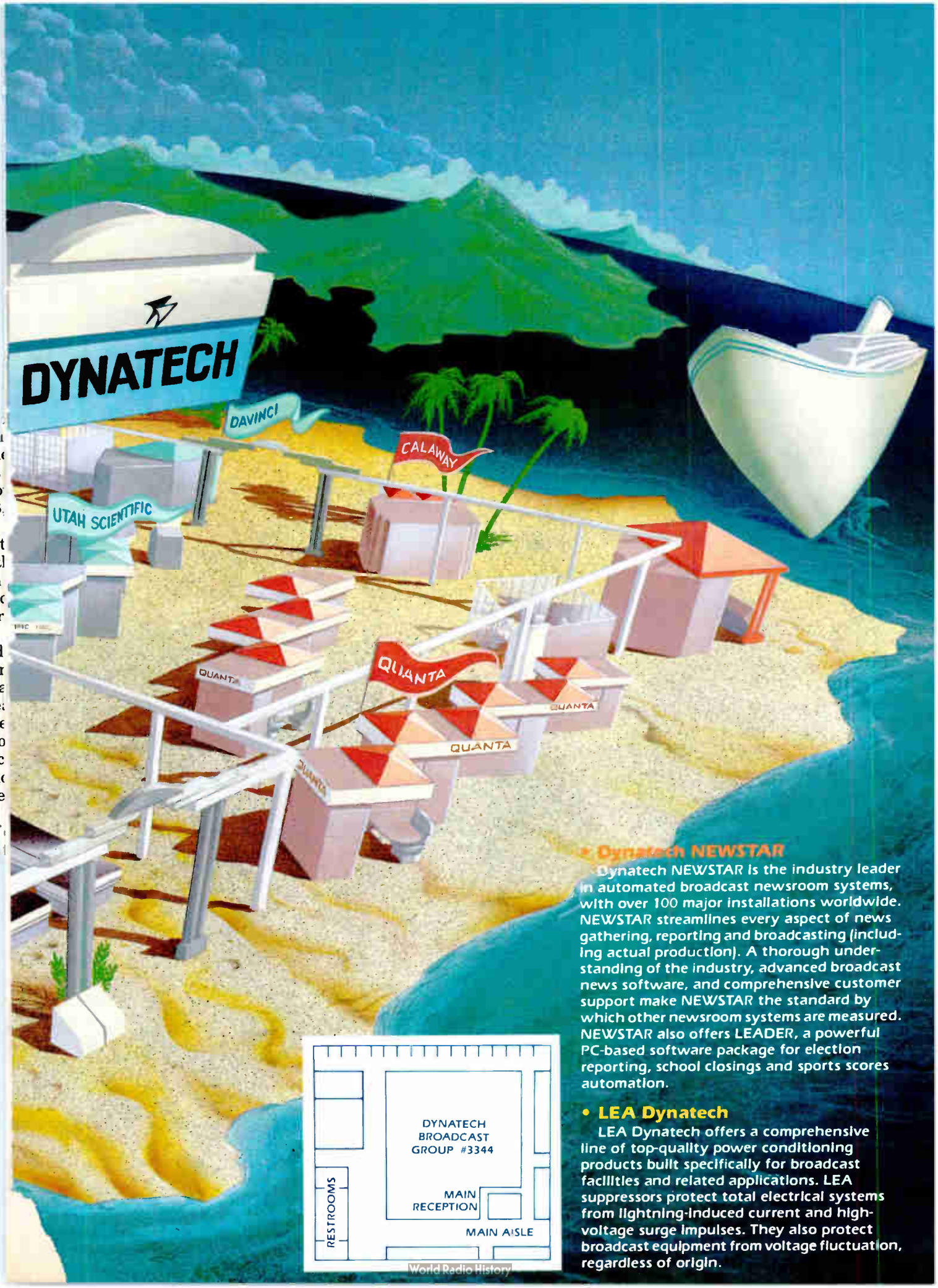


Private weather graphics station at a client's office.

to both the studio for the newscast and to the local subscribers. Colorado Video still transmission equipment gets the ball rolling at the station, and each subscriber has similar reception equipment at their end.

"At Texas station KFDM, similar services are used for information gathering and the basic interpreted still video image format is used, but a radically different method is utilized for distribution to subscribers. The data gleaned by the station's Kavouras, Collins, and Radac weather graphics systems and edited by meteorologist Greg Bostwick is sent out as part of the station's vertical blanking interval signal; a VBI receiver at a subscriber's office anywhere in KFDM's signal area lets a client in on the graphics information. There is no crossover or interference from the main channel into the VBI narrowcast service, and subscribers gain a great deal of portability since they aren't tied to phone lines. Again Colorado Video transmission/reception equipment is utilized at either end."

Discover Dynatech



• Dynatech NEWSTAR

Dynatech NEWSTAR is the industry leader in automated broadcast newsroom systems, with over 100 major installations worldwide. NEWSTAR streamlines every aspect of news gathering, reporting and broadcasting (including actual production). A thorough understanding of the industry, advanced broadcast news software, and comprehensive customer support make NEWSTAR the standard by which other newsroom systems are measured. NEWSTAR also offers LEADER, a powerful PC-based software package for election reporting, school closings and sports scores automation.

• LEA Dynatech

LEA Dynatech offers a comprehensive line of top-quality power conditioning products built specifically for broadcast facilities and related applications. LEA suppressors protect total electrical systems from lightning-induced current and high-voltage surge impulses. They also protect broadcast equipment from voltage fluctuation, regardless of origin.

Discover Dynatech

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Utah Scientific will unveil its new digital video and audio routing switchers and display the daVinci system for film-to-tape or tape-to-tape unifed color correction (green village).

Experience the ARTSTAR digital paint and animation system of ColorGraphics Systems, Inc. (blue village).

Try out the new Orion and Delta anti-aliased character generators of Quanta Corporation (mauve village).

Witness a dramatic robotics demonstration with NEWSTAR controlling an *entire television news production*—including on-air camera (peach village).

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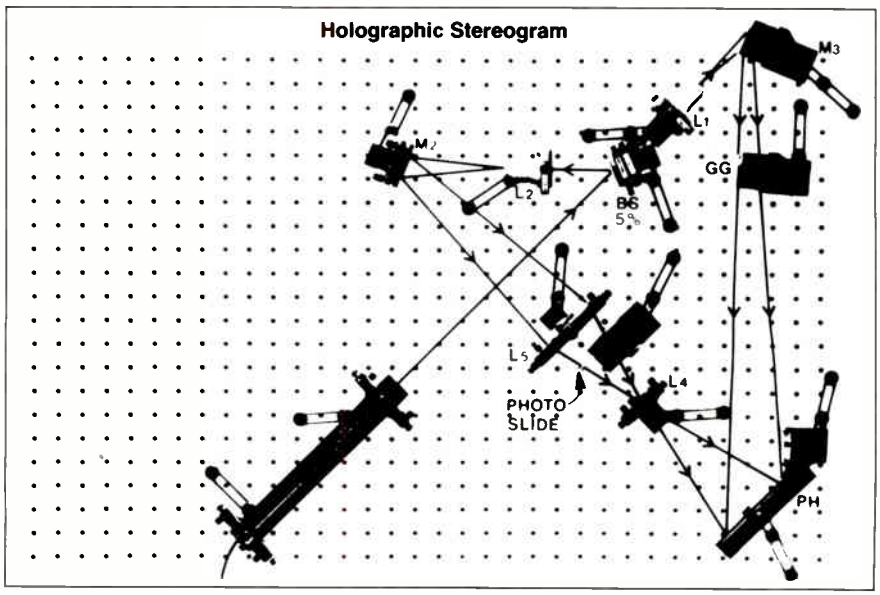
Holography May See Role in Television's Future

By Kent Alexander

It is difficult to imagine, looking
t the seemingly real, three-di-
ensional hologram reproduced
a two-dimensional surface,
at one is looking at a light wave
erference pattern: a coherent
n of light from a laser is beam-
into two, with one half trav-
directly to the recording me-
(such as a piece of
graphic film) and the other
ng off the curves and an-
a 3D object in real space
joining up again with the
split-off beam. The interfer-
avefront between the two
, representing the differ-
time that it takes the one
o bounce off the object, can
rded on the film. And, un-
right viewing conditions,
raction pattern is perceived
photographic record of the

ifficult as it is to grasp the
echniques of holography,
r, it is even more difficult
gine how they might be
the television medium.
e possibility does exist that
a technique might come to
. In fact, the very nature of a
D TV" scenario is based on seemingly incredible advances in current information transmission systems—incredible advances that will be brought about by the products of holography itself.



The making of a stereogram: Light from a laser is split (at BS) and routed through two microscopic objective lens (L1, L2). One beam is reflected off mirror M2, through lenses L5 and L4, through the slide, and onto film (PH). The other is reflected at M3, spread through ground glass (GG), and projected onto the film.

Early research

Holography was born in the late 1940s, when scientist Dennis Gabor was attempting to improve the resolution of electron microscopes so they could "see" atoms. Although he did not succeed in viewing atoms, he did produce the first hologram. The 1948 publication of his work aroused the interest of other researchers involved in optics, who, in turn, explored the new invention theoretically and provided additional insights into the nature of holography. But, like Gabor, these scientists were constrained in their investigations by unsuitable light sources and flaws in the early technique itself, which produced images that were difficult to discern.

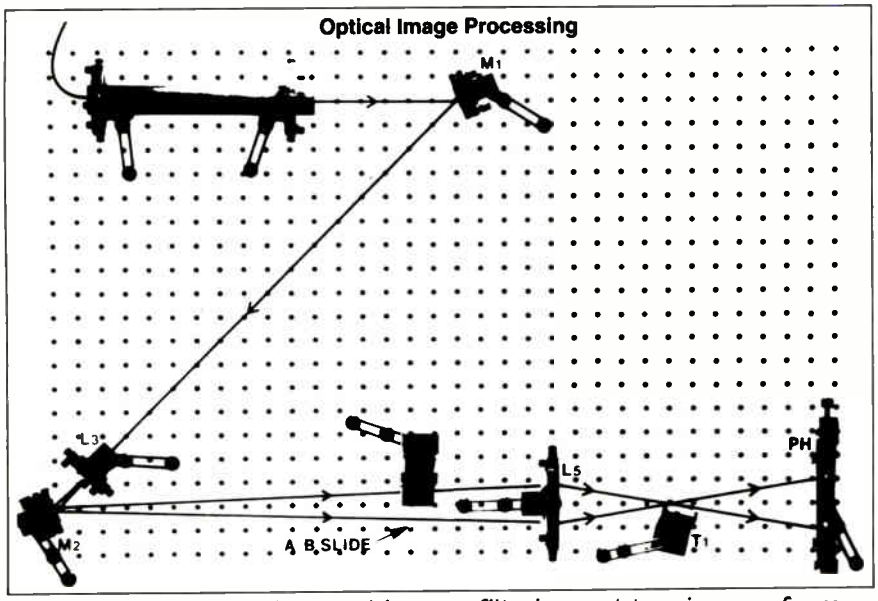
However, in 1965, electrical engineer Emmett Leith and colleagues at the University of Michigan applied holographic ideas to synthetic-aperture radar—a method for producing optical images from information obtained by radar. The marriage of these two fields yielded a practical off-axis recording technique that allowed Leith, by the end of the decade, to routinely make holograms from transparencies.

Though crude and admittedly two-dimensional, these early attempts do represent holography's first successes and heralded the beginning of optical information processing.

Three-dimensional holography, however, required the invention of the laser, which was itself part of this same innovative optic chain of events that began in the late 1940s. By 1963, after the introduction of the first helium-neon laser, Leith and contemporary Juris Upatnieks were able to produce the first 3D laser transmission holograms. At the same time, Soviet scientist Yurii Denisyuk developed the reflection hologram.

Applications

The range of practical applications for holography is extensive; however, it is probably when the technology's nonliteral, nonvisual component is brought into focus



Optical image processing: In this case, filtering out two images from a double-exposed photographic slide. Laser light is reflected off mirror M1; through concave lens L3; off mirror M2, with one beam going through the slide; through lens L5; across tall mount T1; and onto film (PH).

that we see its possible advantages to transmission technology.

Frequently computers interface with holographic information to generate hypothetical data for previsualizing product prototypes. Usually holographic stereograms (holographic "movies") are the product of this technique, generated from a series of 2D perspective views to produce a synthesized image in form of a hologram. The computer, in turn, can easily rotate the image.

Holographic optical elements (HOEs) are the simplest kind of hologram to produce. While display-type holograms are formed by recording a very complex pattern of light, HOEs are made by essentially capturing only one point of light. These optical elements direct light; they perform like specialized lenses and mirrors, often replacing conventional optics because they are less expensive, lightweight, easily individualized, and overlappable. Theoretically, as light continues to become an important medium for information transmission, HOEs will will become even more application specialized: Holographic solar concentrators are being designed right now that may someday replace current solar power collection schemes; incorporated into the exterior windows of a house, directed and intensified light from holographic optical elements could eliminate the need for daytime lighting.

Fundamentally, by directing light very specifically, information, say in a fiber optic network, can be transmitted faster, more accurately, and in a more sophisticated fashion. And, just as holography will contribute to the advancement of transmission technologies on a component level, it is not unreasonable to assume that holographic images will be sent and recieved on these more complex systems.

Holographic television

A very real technical hope for the future of holographic video is to playback 3D imagery with motion and sound distrubuted over fiber optic cable television or on videodiscs. Currently, the information contained in a single still hologram far exceeds the capability of any mass broadcast communications method. Vast reductions in the amount of information in a hologram, then, is a key goal to researchers in this field.

In 1968, Dr. Steven A. Benton of M.I.T., working at Polaroid, developed the White Light Transmission Hologram, a step in reducing the bulk of holographic information. Benton's work is based on electronic transmission, along the lines of digital video, that is interfaced with a computer. Technical hurdles must be conquered, however, before the reconstruction of holographic images from bit streams on coaxial cable becomes practical.

However, a digital-to-holograp converter, according to Bento might not be to far off. The D converter would be essentially computer peripheral device th could receive, send, and interp holographic information with computer network environm Work on a universal graphic age code, similar to ACSII characters, called NAPLF nearing completion.

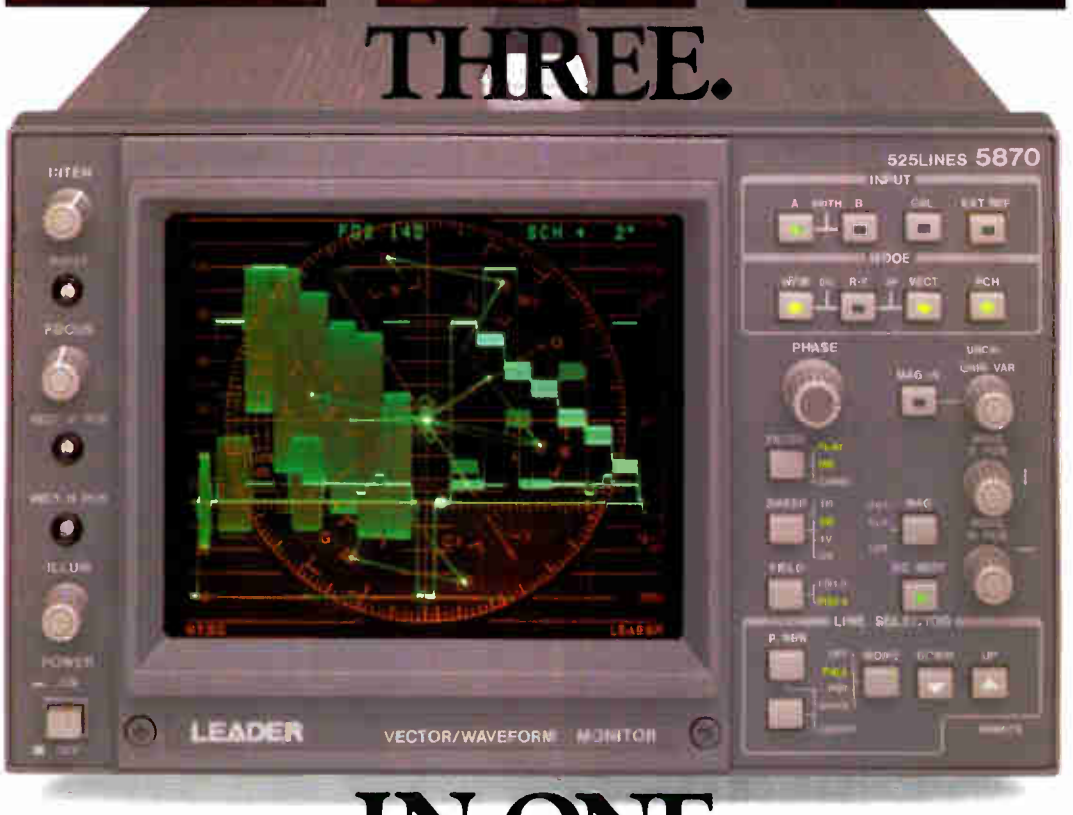
The future of holographi vision and holography itself lies in computers. More tha improvement in 3D digital eras and hard copy writ needed, however. A whol problem of bypassing stag ages for simulated picture be addressed. Work under M.I.T. by Benton and col John Lewis may reveal sor swers. (Lewis has already up digitized solid objects on that, if defined in a simple-e shape language, could be in real time.)

The phenomenal quality o tally processed sound coming laser-read CDs reveals the kin improvements to be gained fro what is essentially *signal processing*. However, *image processing*, is a much more complex endeavor due to the content of information in the pictures and the sublety of human vision sytems. Despite these challenges, however, rapid advances in both computer architecture and transmission science, advances spurred on by a number of researchers, may lead to the reality of holgraphic television in our lifetime.

About the author:
Kent Alexander is the former editor of *Holosphere*, a publication of New York City's Museum of Holography.

LEADER

THREE.



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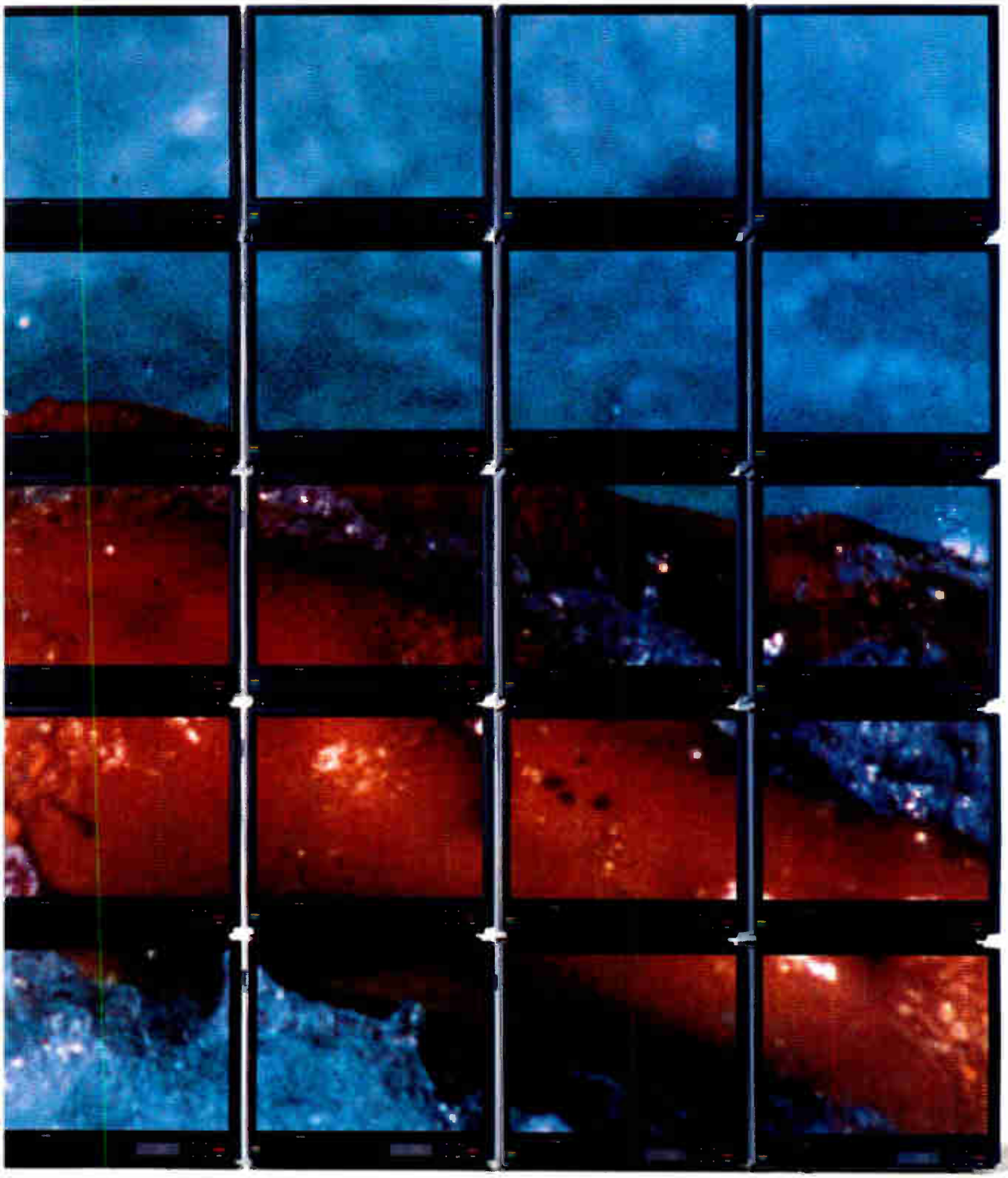

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NAB '88

Engineer Jones stood at the vaulted entrance to the Las Vegas Convention Center. Engineering blueprints for station remodeling under his arm, requests for next year's capital budget in his pocket, calculator in hand, he calmly surveyed the situation.

Before him the glittering array of exhibits seemed to stretch into the boundless distance of the imagination. From every corner of the exhibit floor people he knew, sales reps, fellow broadcasters, seemed to beckon him. How could he possibly accomplish his objective to return home having seen everything worthy of seeing and having visited all the booths, hotel suites, and engineering sessions most important to his plans...all in just four short days?

For a moment a wrinkle of doubt creased his forehead. Then he smiled. Reaching into his briefcase, he removed his copy of *BM/E* and studied its NAB guide. Listings of exhibitors arranged alphabetically...a Product Reference Guide indicating manufacturers and booth numbers...an analysis of "hot" new developments at the show...a complete listing of the Engineering Program...and all color-coded for easy reference.

Confident, his *BM/E* in hand, he strolled out onto the floor....

NAB '88
COLOR-CODED REFERENCE GUIDE

WHAT'S HOT

TV/VIDEO

Engineers, be warned: For your own protection on the NAB '88 show floor, wear future shock-proof suits. The ferment in video technology, never very well contained, will erupt this year as new developments vie for attention and dominance.

Prepare yourselves for major rumblings in digital video. The new D-2 composite format is poised to break into broadcast studios, while on the component front, more and more D-1 compatible equipment proclaims that this is *the* format for high-end post-production.

In cameras, CCD technology has advanced right up to the studio door. HDTV will make news across the convention floor, not just in the booths of VTR and camera makers. On the lower end of video recording, a host of new S-VHS equipment will include processing and post gear. The graphics and effects market will see ever-increasing integration of capabilities, along with a swarm of new election reporting packages, just in time for the presidential races.

So gather your strength before you step through those doors — this year's excitement is not for the faint of heart.

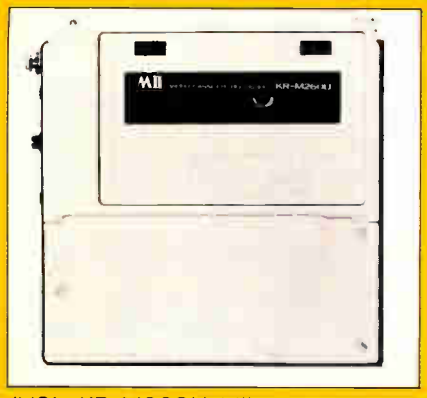
Video recording technologies

One of the most exciting developments in the video recording arena at NAB '88 will be Ampex's unveiling of its new D-2 digital composite studio VTR, the VPR-300. Ampex, of course, originally developed D-2 for use in its ACR-225 digital spot player, introduced amid great controversy a couple of SMPTEs ago. The controversy has subsided somewhat, with rival Sony Corp. throwing its support behind D-2, and the SMPTE forming a standardization committee to work out the details of the new format.

With the introduction of the VPR-300, engineers will have their first opportunity to evaluate a digital VTR designed for broadcast studio work. While the format may lack the advantages of component recording, it offers digital quality in a package that can plug right into existing studios, without the rewiring that D-1 can require. The recorder's digital video quality (with its four digital audio channels) is promised to be transparent down to the twentieth generation at least.

Nor will Ampex be alone in the

D-2 arena. Details were sketchy at press time, but Sony had announced its intention to display its own implementation of the D-2 format in the form of a composite studio recorder. Sony's introduction of the D-2 recorder, along with a full line of D-2 tape products (see Magnetic Media section of this report), serves the double purpose of lending credibility to Sony's earlier stated support of D-2 while simultaneously increas-



JVC's KR-M260U MII.

ing market confidence in the as yet untested format.

Sony, of course, will continue to display its DVR-1000 D-1 format 4:2:2 component digital VTR, gaining increasing popularity among high-end post-production and graphics users. But Sony, too, faces new competition, this time from BTS. That company's DCR-100 D-1 digital recorder, originally unveiled at last fall's SMPTE convention, will be available in two versions: one primarily for remote-control applications, the other with a full-featured control panel.

Rumor has it that at least one other major company will bring a D-1 recorder to NAB, reaching for a slice of that juicy postproduction pie.

Sony will feature the latest in its line of Betacam SP recorders, a trio of studio decks. The BVW-60 is a playback-only machine, while the BVW-65 is a studio player with Dynamic Tracking, capable of slow motion and still framing. The BVW-75 player/recorder features motion control memory for news programming and editing applications. Sony will also show a new Betacam SP player designed for Betacart operations. The BVW-95 provides heightened picture quality and wider audio options, according to the company.

Both Ampex and BTS will be featuring the Betacam SP line under their own imprimateurs. Ampex's Betacam SP studio decks, all premiered at last fall's SMPTE convention, are the CVR-70 studio recorder, the CVR-65 studio player with Automatic Scan Tracking, and the CVR-60 studio player.

From BTS, the line will include the BCB-60-N, a studio player with built-in TBC, time code reader, and selectable time code/CTC LED display; the BCB-65-N, a similar unit with Dynamic Tracking; and the BCB-70-N, an editing VCR with built-in TBC.

Panasonic will fill out its MII recorder line with some new introductions, which the company is keeping a lid on until the show. This year will also be the first NAB showing for Panasonic's full S-VHS line, including monitors, cameras, and VCRs.

In the S-VHS camp, Sharp will introduce the XA-2500S professional series S-VHS VCR with jog/shuttle dial, flying erase heads, digital special effects and hi-fi audio.

Expect new S-VHS decks from JVC, also. That company will unveil the BR-S4100 portable S-VHS recorder with docking capability, and the BR-S810U S-VHS editing recorder.

Sony's most recent addition to its U-matic line—the BVU-950 recorder/player/editor, which features the new SP technology—will be a featured item at the booth. The 950 has an optional plug-in time base corrector.

While activity in one-inch VTRs seems to have slowed, due in part to the heated interest in other formats, manufacturers remain committed to Type C. One-inch video should remain the leader for most higher-end applications for several years, at least until the price of digital component drops.

Sony will introduce a plug-in module that provides advanced audio noise reduction capability for its BVH-3000 one-inch VTR series. The BKH-3080 offers either Dolby A or Dolby SR (Spectral Recording). Of course, the BVH-3000 itself will be featured, along with Sony's entire one-inch VTR line.

Ampex, too, will highlight its one-inch VTR line, in spite of the emphasis on half-inch component and digital technologies. Engineers in the market for Type C recorders should visit the Hitachi booth, too.

Disk, solid-state recorders

NEC's unique VSR-10 solid state video recorder, introduced last year, will make another appearance at NAB. The VSR-10 uses dynamic RAM chips to record 34 seconds of video (optionally expandable to 136 seconds). Its computer memory-style architecture allows great freedom in processing and controlling the video: instant random access in record and playback, simultaneous record and playback, real-time slow motion, and endless layering with no degradation are all possible.

Asaca will introduce the ADR-5500 magneto-optical video disk recorder/player, which features

Sony's VO-9600 U-matic SP recorder/player.

large capacity, high quality, high-speed access 4:2:2 digital video recording, playback and signal processing.

A new entry into the digital disk recording field will be DSC, already well known for its digital effects systems. DSC will premier the DISC real-time digital disk

WHAT HAS 5 VTR'S, 2 ROBOTS, 3 ROTARY LIBRARIES, 1,184 CASSETTES, A COMPUTER, THE ABILITY TO PLAY 15-SECOND SPOTS BACK TO BACK CONTINUOUSLY, IS AVAILABLE NOW,

AND IS SURE TO TURN THE BROADCAST INDUSTRY UPSIDE DOWN?

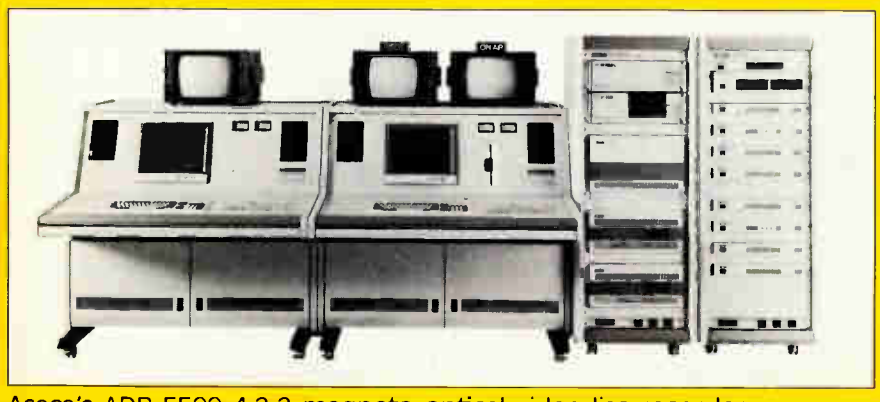
system, designed to key multiple video sources onto a background without generation loss.

Abekas's established digital disk recorders, the A62 and recently introduced A64 for 4:2:2 component recording, will be demonstrated interfaced to the company's A53-D digital special effects system.

Panasonic will feature its optical laser disk recording system, now finding its way into post-production use, notably in the CMX 6000 random-access editing system. Optical Disc Corp. will also show the latest developments in its videodisc recording system.

MERPS and spot automation

Ampex's ACR-225 D-2 composite digital spot player, shown in prototype last year, is getting closer to reality. The system, which can hold 256 cassettes online at once, will see its first deliveries by year end.



Asaca's ADR-5500 4:2:2 magneto-optical videodisc recorder.

Stop by the Sony booth for a look at a production model of the Library Management System, the company's ultra high-capacity spot playback system. The latest developments in Betacart technology will also be featured.

Odetics will show its TCS2000 television cart system with a number of new features and enhancements, including expanded input/output interface that enables the system to control and switch external recorder/players and other program sources.

The company will also premier a new, lower-cost play-only system that complements the on-line recorder unit.

Channelmatic will introduce a new ad insertion system, the Adcart 2+2, aimed primarily at cable operators. The system has full stereo audio capability, even with 3/4-inch VCRs.

Channelmatic will also unveil a new automatic videocasette changer, the Broadcaster II, which allows microprocessor-controlled random access of up to 15 videocassetes and seven-day programming of up to 100 events per day.

The LaKart Division of Lake Systems Corp. will feature a production version of the ASL automatic library system, shown controlling a Betacart system. The Mini-Kart ad insertion system will also be introduced.

Duplication systems, accessories

Future Productions will introduce monitor main control units for its established FP duplication systems. The new MMC-100 and MMC-500 are digital address signal generators that offer random access to any VCR and/or VCR group in the system, with random group cancel preset for small production and automatic sequencing with speed adjust.

Recortec will introduce an extended play VHS adapter that yields up to 150 hours in SSL mode.

New from Tentel will be a torque gauge for U-matic recorders, plus new Tentelometers for MII, Betacam, and Sony Type 7 and Type 9 VCRs.

Allsop will feature its line of cleaning accessories for video and audio player/recorders, especially its cleaning cassette for 3/4-inch U-matic VCRs.

Cameras

BTS will attempt to crack the studio market with its newest CCD camera, the LDK-900, available in both NTSC and PAL versions. Aimed at mid-range broadcast and industrial users, including outside broadcast applications, the LDK-900 takes a range of studio and field type lenses up to 50X, is triax-controllable up to 2000 meters from the CCU, and has a seven-inch viewfinder.

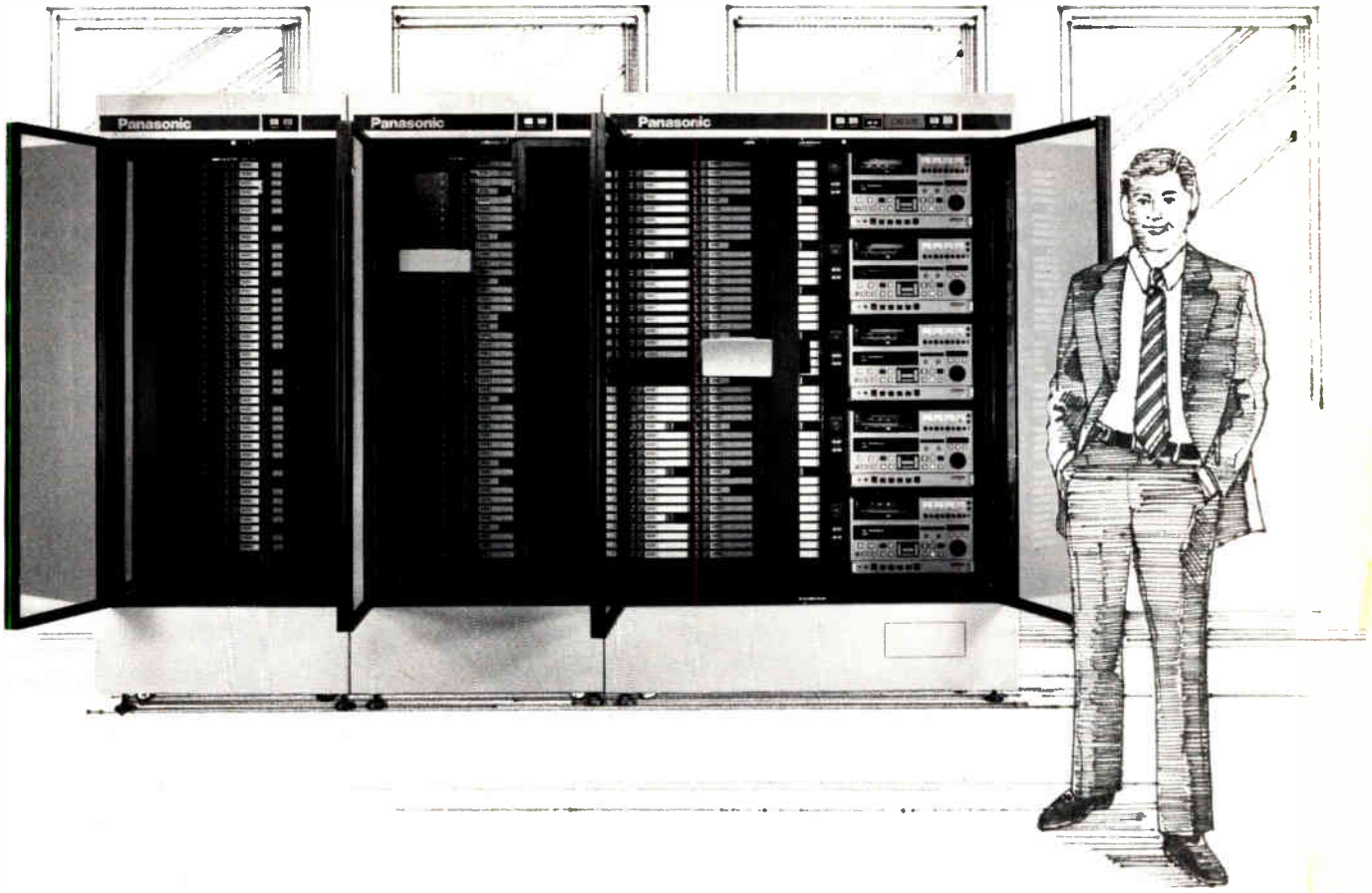
NEC, whose SP-3A is the longest-lived CCD camera in the broadcast market, will introduce a high-resolution three-chip camera for EFP applications. The EP-3 incorporates a newly developed NEC anti-smear CCD that virtually eliminates the vertical smear that plagues most other solid state pickups, the company claims. The EP-3's specs are impressive: horizontal resolution of 700 lines, sensitivity of f/5.6-2000 lux, and S/N or 62 dB. Threshold illumination is 15 lux at +18 dB gain. The camera has a variable speed electronic shutter with seven settings ranging from 1/60 to 1/1500 sec.

Sony has also reduced vertical smear in its latest three-chip CCD camera, the BVP-50. Designed for EFP as well as ENG applications, the BVP-50 also incorporates an electronic shutter and improved S/N ratio.

Ikegami's latest entry into the broadcast-quality CCD camera arena is the HL-379A, plug-compatible with the HL-95 tube ENG camera and available in standalone and camcorder configurations. The 379A features auto iris, SMPTE color bars, auto highlight compression, built-in sound monitor speaker, genlock circuitry, and dynamic detail correction. It weighs 3.1 kg (including the viewfinder) and draws 14

ANSWER:

THE MII M.A.R.C. SYSTEM CART MACHINE.



It's probably the most technologically advanced cart machine ever created. So advanced, we doubt the competition will have anything like it for a long while to come.

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W. Ikegami will also show the economical CCD-770 three-chip CCD camera for industrial applications, introduced last year.

Ampex will introduce the CVC-50 three-chip CCD camera for sports, EFP and high-quality ENG applications. First seen at last fall's SMPTE Convention, the CVC-50 features a newly designed frame interline transfer

NEC's new EP-3 EFP CCD camera.

CCD sensor and a switchable electronic shutter. It is available in a camcorder configuration or in a studio configuration.

Another CCD entry worth a look will be the FP-C1HS from Hitachi. The latest three-chip camera in the company's FP-C series, this model boasts remote control of zoom, focus, filter disk and character display.

Panasonic will feature its AK-400 three-CCD camera, designed for interface with MII recorders.

JVC will show two new CCD cameras, the KY-15U with three chips and the BY-10U, a single-chip model.

Ikegami will expand the top of its ENG/EFP tube camera line with the new HL-791, compatible with all HL-79E accessories. The 791, which can operate in standalone mode or with an on-board VCR, features full auto setup and a full range of viewfinder options. New to Ikegami's industrial line is the ITC-735, with f/1.4 prism optics and 58 dB S/N.

Hitachi will expand its Computacam line with the SK-971, an auto setup 2/3-inch tube model. The 971 offers wideband RGB over triax and AC utility power at the head. A companion unit will be the SE-110 "super encoder," designed to improve resolution in both saturated and dark portions of the picture.

Sony will enhance its BVP-350 portable production camera with the introduction of the portable CCU-350 camera control unit, which also controls the new BVP-50 CCD camera.

New from Sharp will be the XC-B20P professional broadcast Plumbicon camera, with interformat capability, automatic setup, and advanced viewfinder graphics. It also has automatic white knee highlight compression, along with white/black balancing, centering, iris, beam optimization, and auto contrast.

JVC will introduce a three-tube color camera designed especially for use with on-board MII recorders, the KY-75U.

Ikegami's new EC-1125P HDTV camera, introduced last fall, will make its NAB debut. Designed with electronic cinematography in mind, the camera uses a newly developed 1.25-inch MS pickup tube with reduced lag.

Sony will also debut a new camera in its HDVS line. Other manufacturers with HDTV lines on display will include Hitachi and BTS.

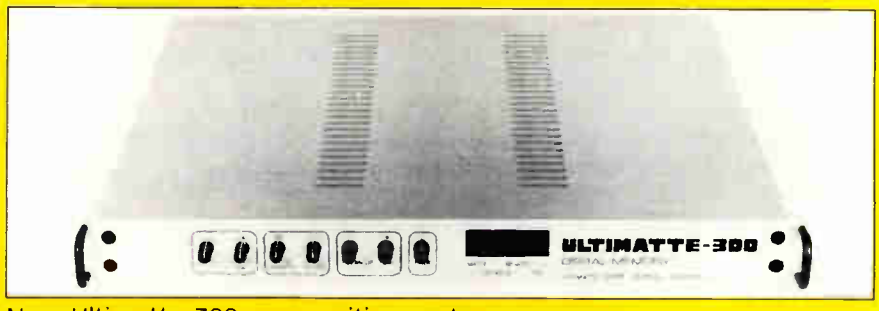
Future Productions (5830) will introduce the MCU-400 four-camera remote CCU, a five-inch-high rackmount unit that controls most broadcast and professional portable cameras, according to the manufacturer.

Lenses, chips

Fujinon will introduce four new lenses at NAB. The HR5x12SD, a high-definition zoom lens for one-inch format tubes, has a focal range of 12 to 60 mm with a constant f/1.2 maximum aperture. The user has a choice of servo or cine-type manual controls for iris, zoom and focus. For sports applications, the A34x20.5ESM boasts a maximum focal length of 1400 mm. this 2/3-inch format lens has an f/2.4 maximum aperture flat from 20.5 to 480 mm, ramping to f/3.5 at 700 mm and f/7.0 at 1400 mm. Even longer focal length is the R34x29.5ESM at 2000 mm, which has a maximum aperture of f/3.5 to 700 mm and f/5.0 at 1000 mm. The A34x10ESM is a lightweight (13.6 kg) EFP zoom for 2/3-inch format cameras.

Angenieux's new 20X8.5 microprocessor-controlled studio camera lens boasts no minimum focusing distance due to the microprocessor. F/1.3 maximum aperture is constant through the focal range. Other new lenses from Angenieux will include 40x9.5 and 40x14 field lenses, new 14x7 and 14x6 ENG lenses for half-inch format cameras, and 14x9 and 14x8 ENG lenses for 2/3-inch cameras.

Schneider will also show a microprocessor-controlled lens, the TV-85, a 35X11 mm tele/sports zoom. It operates without mechanical cams or cam followers as the 16-bit microprocessor controls the movement of the optical elements. Another new lens from Schneider will be the TV-64, a 14.5X studio zoom with built-in range extender and diascope.



New Ultimatte-300 compositing system.

Sign of the times: Amperex will introduce four new CCD imaging chips, but only one camera pickup tube. The new chips are the NXA1011 and NXA1021 for PAL

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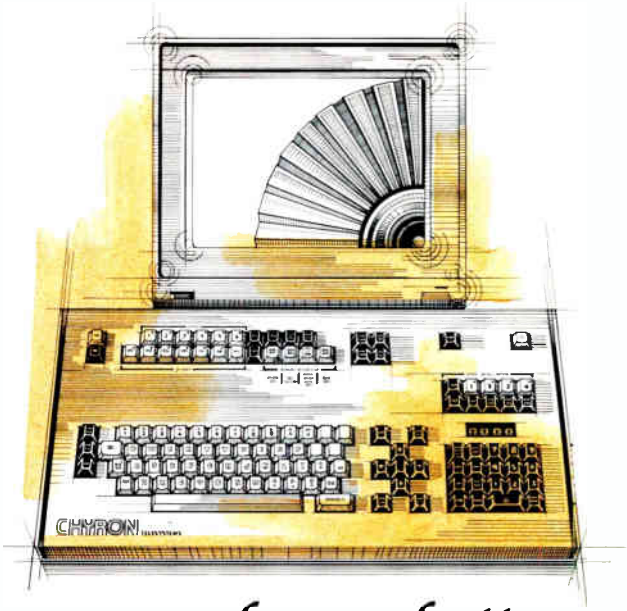

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three-chip and single-chip color cameras, respectively, and the NXA1031 and NXA1041 for NTSC. The new tube is the 89XQ high-definition Plumbicon with tetrode gun and electrostatic deflection.

3D modeling and animation

Quantel promises major enhancements and new capabilities in its entire line of digital graphics and effects products, including the Mirage, Encore, Harry, Cypher, and the ever-popular Paintbox. As usual, however, the company is keeping mum as to the exact nature of those new features.

Anyone with an interest in HDTV should be sure to check out Quantel's new Graphic Paintbox, an ultra-high resolution version of the Paintbox graphics system designed to meet the demands of not only HDTV, but also the printing industry.

BTS's emphasis in the graphics area will be the Pixelerator high-speed rendering engine for the FGS-4500 Elite 3D computer animation system.

Further strengthening BTS's position is the new satellite off-line modeling unit for the FGS-4500, providing an additional boost to performance and productivity.

Dubner's big news will be the Graphics Factory, an integrated system combining a dual-channel CG, dual-channel paint system, and dual-channel animation system in a single package. The Graphics Factory's capabilities also include 3D modeling and library/still store functions. Also new from Dubner will be the DSS-4 still store with library functions and D-2 interface capability. The unit also includes basic paint and image enhancement functions. Dubner's third new item will be the 20-KEL, essentially the company's 20-K character generator with an election reporting package capable of handling up to 1000 races.

BTS Vidifont election reporting package.

Aurora Systems will feature its established line of graphics and paint systems, ranging from the PC-based AU/75 to the AU/280, with 3D modeling capability.

Alias, another purveyor of high-end 3D systems, will feature the latest developments in its Alias/2 video animation workstation. Built around Silicon Graphics hardware, the new Alias software features natural phenomena, 601 video, and interactive metamorphosis.

Microtime has renamed its 3D graphics and animation system (formerly available from ITI) the ImagePlus. Along with the new name come significant advances in hardware and software capabilities. For example, the system now incorporates the advanced 80386 microprocessor as its CPU.

Another new 3D system based on IBM PC architecture will be the DGS 2.1 from Digital Arts. The version 2.1 software features full support for NTSC, PAL and 35 mm output, and also includes auto-trace for easy creation of logos and other objects. All animation channels may be independently controlled with respect to keyframes and velocity, and lights, polygons, and surfaces are limited only by system memory.

Cubicomp, which introduced an 80386 version of its PictureMaker 3D animation system last year, promises "significant new enhancements" in its product line for NAB '88. Cubicomp recently acquired the Vertigo Systems high-end 3D graphics system.

Pinnacle Systems, whose integrated workstation approach to graphics encompasses digital effects and still storage in addition to 3D modeling and animation and 2D paint, plans to introduce major enhancements to its existing product line, as well as several new products; details will be available at the show. In addition, the company will demonstrate the next upgrade for its SV-1000 desktop video workstation.

Quanta Corp. will display its new Artista graphics system, which provides paint, antialiased fonts, and powerful 3D modeling and animation capabilities, all for under $70,000. The company will also feature its Quantapaint 32 paint system and the Quantapaint QVP-100/200 series, which converts an IBM XT-compatible computer into a graphics/paint system.

The Mini Vas animation controller, a videotape recorder interface for single-frame recording from Lyon Lamb, has become an increasingly important link in many animation systems. This year, Lyon Lamb is showing three video animation systems designed to interface video input and output with computer graphics workstations. System 1, based on the company's ENC VI color encoder and the Mini Vas, allows frame-by-frame recording of RS-170A RGB onto a Type C or U-

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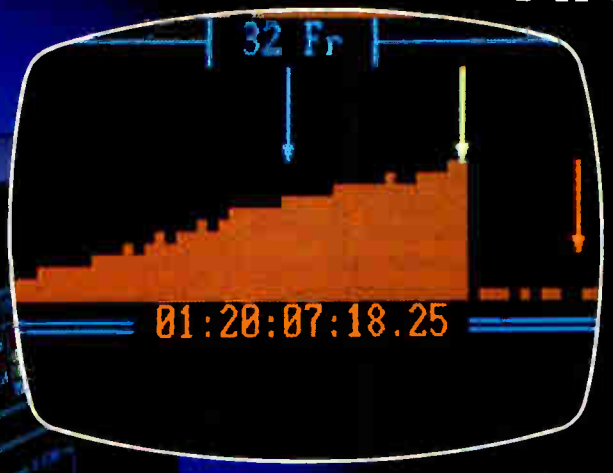

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matic VTR. System 2 adds full control of the Mini Vas from the computer graphics workstation, image capture from camera, VTR or laser disk, Ethernet communications, and PC graphics via an AT personal computer equipped with a 24-bit Targa board. System 3 includes all System 2 capabilities, plus video paint software, digitizing tablet, and 32-bit Targa board.

Art/paint systems

Ampex's AVA-3 video art system, a strong competitor in this field, will be demonstrated in a 4:2:2 component digital version that will be shown interfaced to a 4:2:2 ADO and a 4:2:2 ESS-3 still store. The complete system, which the company has dubbed the Ampex Creative Graphic Center, relies on the AVA's ability to generate a digital linear key that can be used as a direct source input to an ADO effects system.

ADO has had the digital interface option since last June; the corresponding options for AVA-3 and ESS-3 will become available during the second quarter of this year.

Another digital advance will be the introduction by ColorGraphics Systems of the ArtStar 4:2:2, a CCIR 601 component digital version of the company's established, popular ArtStar paint and animation system. The new digital ArtStar will complement the existing ArtStar 3D Plus and offer total compatibility via Ethernet, according to the company. Its digital graphics will be convertible to NTSC or PAL.

The GraphicStore paint and still store system, part of the BTS Vidifont line, will come to NAB in a new high-resolution version featuring picture capture, save and recall in 16.7 million colors, as well as picture create, capture and montage of two or more pictures in palettes of 4096 colors. The four frame buffer system also offers an antialiased airbrush for smooth blending of foreground and background pictures.

Chyron will feature its Chameleon paint system, a high-resolution, low-cost device with icon-oriented menu and full-featured capabilities.

Weather systems

The ColorGraphics LiveLine 5 weather graphics presentation system, introduced last year, will demonstrate its animation and paint capabilities for on-air presentations.

Kavouras will feature its latest color weather radar system, the RADAC 2100. The new device is fully programmable and automatically calls NWS and RRWDS radar sites nationwide at predetermined times, archiving and animating the images it collects. Also new from Kavouras will be the Triton A/P graphics and animation system, a PC-based device with high-resolution 24-bit backgrounds and a wide range of paint and animation capabilities.

Alden will feature its new Model C2000C composite weather radar display, which composites and displays up to 10 radars on a regional background.

Accu-Weather will show its latest range of weather graphics; the company now offers over 1200 graphics per day. New at this show will be the Front Door 750, an IBM PC-compatible base system for receiving, displaying, and archiving Accu-Weather satellite-delivered graphic images.

Weather Central, a subsidiary of ColorGraphics, will demonstrate a new receive-only sequence and display system.

Character generators

It's a bit misleading to describe devices such as the Chyron Scribe as "character generators," even though their main *raison d'etre* is titling and text generation. Especially with its latest enhancements, the Scribe goes far beyond basic titling. This year, Chyron promises several advances for the Scribe, including increased speed in operations and font processing. New advanced font utilities include glows, beveling, chiseling, embossing, 3D texture maping and neon effects. The unit also has new business graphics capability, camera capture, auxiliary entry packages for off-line entry and election reporting interfaces, and Iomega mass storage.

Quantel's Digital Production Centre, featuring Harry and Encore.

Chyron will participate in the NAB's HDTV Project demonstration with a high-definition version of the Scribe.

Aston Electronics, another leader in the high-end character generation market with its Aston 4 text generator, will introduce two new products: the Caption, a full-featured video production character generator with antialiasing, LogoMaster logo compose, and comprehensive background graphics; and the Spectra background color gradation generator with two-level keying.

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The well-established Vidifont line, now sailing under BTS colors, will have a number of new additions this year. The Vidivote election reporting package has several timely updates, including a Graphics Package containing pictures of the major candidates, party logos, and specially designed format pages for various reports. The Viditext II character generator now offers graduated backgrounds and a third-channel RS-232 interface.

A new entry in the character generation field will be Abekas. The A72 digital character generator, the company's latest venture, will be shown in single- and dual-channel configurations.

Quanta Corp. will unveil two new antialiased character generators, the Orion and the Delta I, in addition to its established CG line, which includes the Microgen Plus and QCG series.

Laird Telemedia will feature new versions of its character generator line, featuring Y/C and S-VHS compatibility.

Digital video effects

The trend toward increasing integration of effects and graphics systems will be evident at the Digital F/X booth, where the company will unveil its new DF/X 200 digital video production system. This device combines real-time 3D digital effects, high- resolution character generation, and paint tools in a single unit.

NEC will show the latest enhancements for its DVE System 10 and economical DVE System 100 digital video effects systems. New features for the System 10 will include forced monochrome, a new "tearing" move, unlimited key frames, a more powerful microprocessor, and off-line storage via a 3.5-inch microfloppy disk drive.

Abekas will show its two established digital video effects systems, the A52 and the A53-D with Warp and Key Channel. The A53-D, available in composite or component digital versions, will be shown in single- and dual-channel configurations.

Microtime will introduce a new digital video effects system offering a wide range of features and effects, with both composite and component inputs and outputs. The system will be available in NTSC, PAL B and PAL M television standards. The company's existing RP-1 3D digital video effects system, now in full production, will also be highlighted.

James Grunder will introduce a new eight-bit broadcast digital effects system from Cel Electronics, the P164.

Alta Group's Centaurus effects/still store unit.

Ultimatte will introduce its latest video compositing system, the Ultimatte-300, aimed at the nonbroadcast professional and corporate market. Features include digital memory, software control, and high-quality compositing with no loss of foreground detail.

Still stores

Rank Cintel, which has continued to expand and enhance its Slide File still store system, will show the most advance version, the Gallery 2000 image library management system, with a new interface to Basys newsroom automation systems.

Asaca/Shibasoku will show a new HDTV still store system, the ADS-6000, based on its new ADR-5500 magneto-optical videodisk recorder/player.

Alta Group will premier the Centaurus, a dual-channel digital effects and still store system combining an A/B roll video switcher, Y/C video switcher, dual infinite window TBCs, two-channel picture freeze, still storage of 140 pictures per 40 Mbyte removable disk pack, NTSC picture grab, 4x2 stereo audio mixer, and downstream keyer.

Production switchers

Expect an exciting new production switcher from Videotek: the Prodigy, a powerful, economical system aimed primarily at small post-production facilities, TV station news departments, and similar operations. According to a spokesman for the company, Prodigy uses an industry-standard multilevel effects system comparable to such switchers as the Grass Valley 100 or Ross 210. Stereo audio-follow-video system and serial editor interface are included as part of the standard package.

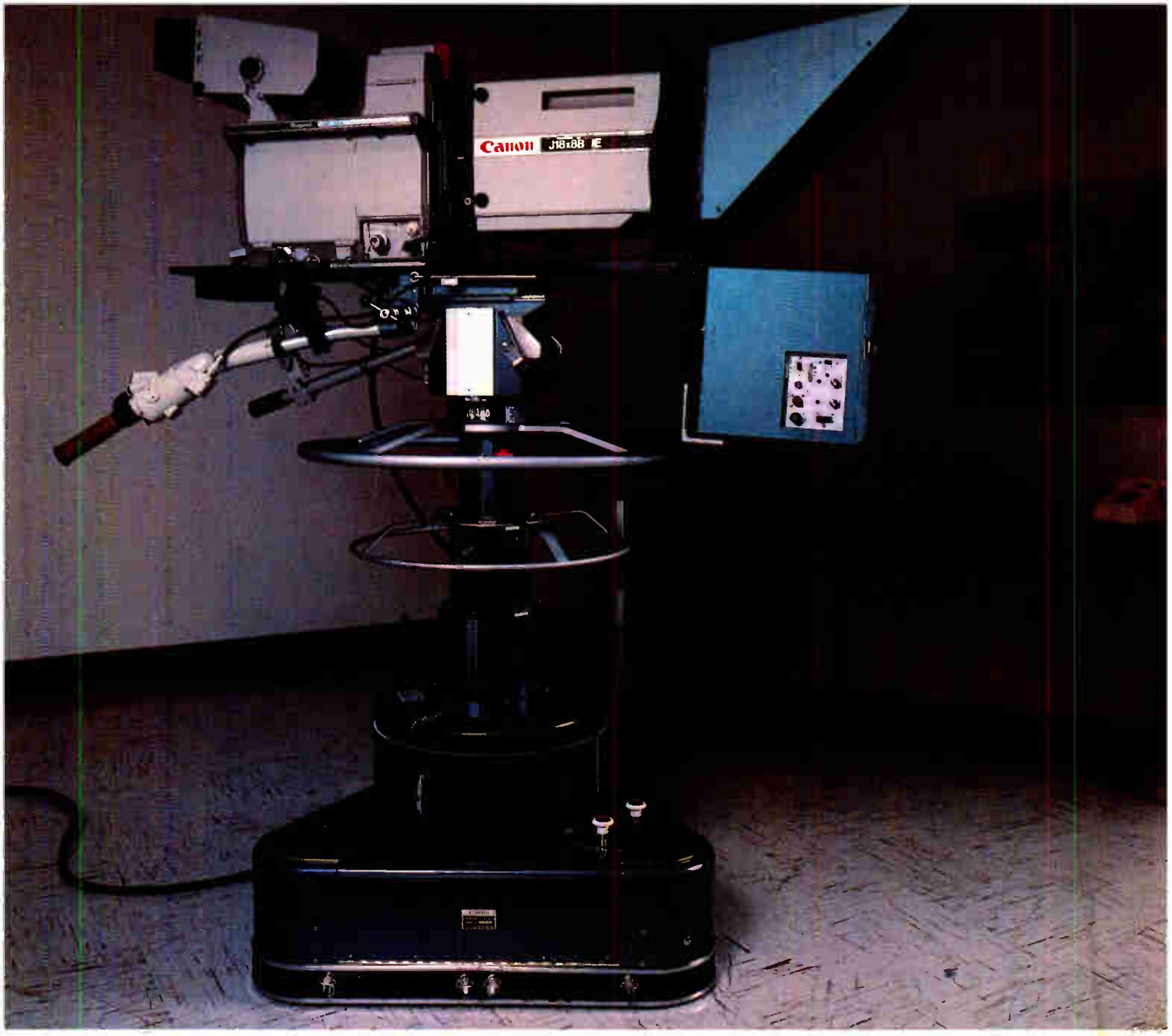
Making its NAB debut will be an 18-input version of Ampex's AVC Vista series switcher. (A ten-input version was shown last year.) The most noticable feature of the Vista is its graphics-oriented display, which helps simplify control of even complex functions.

Grass Valley Group's latest switcher will be the Master-21 master control switcher, an economical 16-input unit featuring stereo audio, keyer, clock, fade to black, transition status display, serial ports, and preroll. And don't miss the NAB debut of GVG's Kadenza integrated digital switching system, introduced at SMPTE.

Crosspoint Latch promises a host of capabilities for its new 6129AHK computerized postproduction switcher. The switcher boasts two M/Es, Auto Drive, five keying levels, programmable fader arms, and five GPI-triggerable auto ramps. Also new will be the 8200C S-VHS/ composite dual TBC and switcher package.

New from Intergroup Technologies will be the 9500 Series postproduction/remote switcher, a compact, cost-effective complement to the company's established 9600 switcher line.

Central Dynamics will also introduce a new switcher, the



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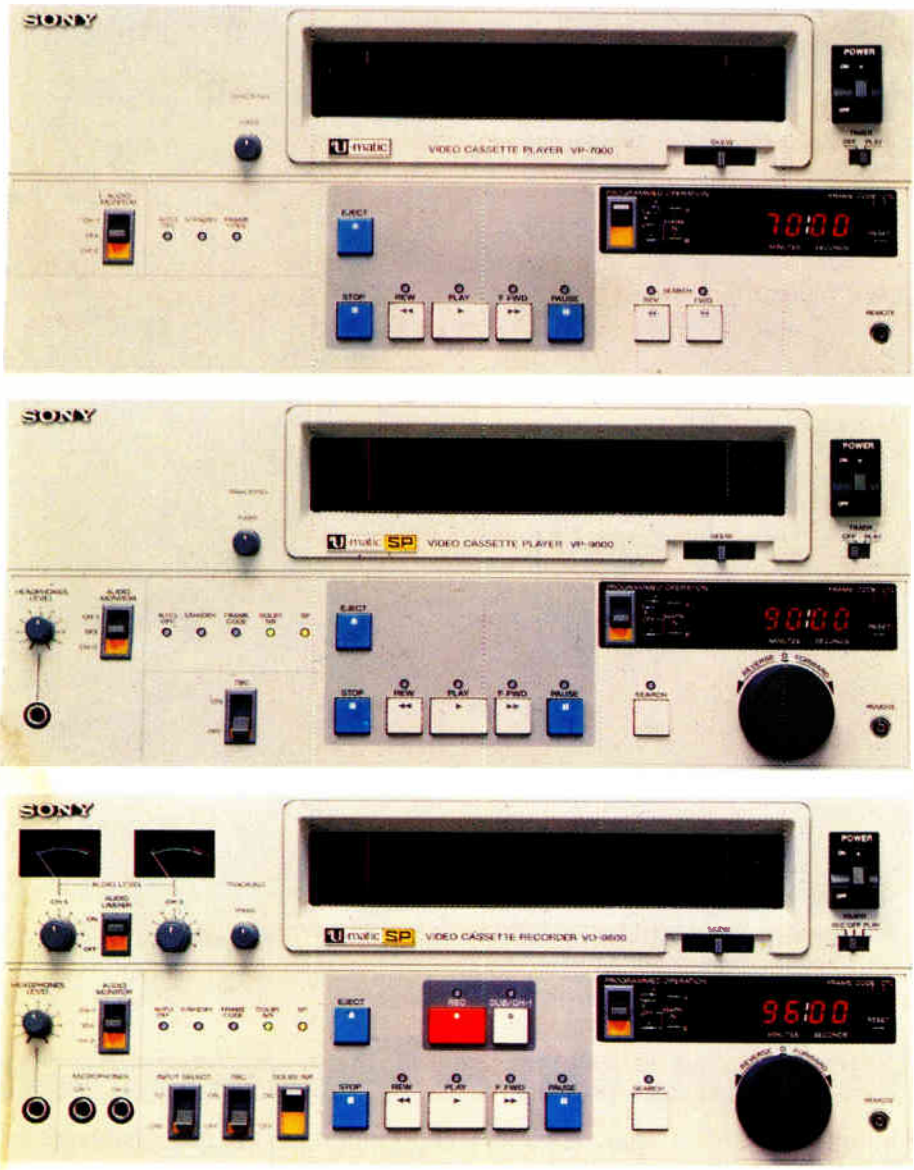

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Strata-10, described as a 10-layer, multilevel effects production switcher.

In the component arena, For-A will introduce the CVM-1000 component video mixer, a full production multi-bus switcher with three M/Es and M/E keyers, plus three downstream keyers.

Ross Video will unveil the RVS 416 production switcher, with 16 inputs and two completely independent multilevel effects systems. The 416 features dual output key buses, rotary and matrix wipes, memory, serial I/F, and encoded and RGB chromakeying.

Alta Group will show its established line of TBC-based products, including the Cygnus, an infinite window TBC/synchronizer; the Pyxis, a dual TBC/switcher; and the Pyxis-E a dual infinite window TBC/switcher with dual picture freeze and digital effects.

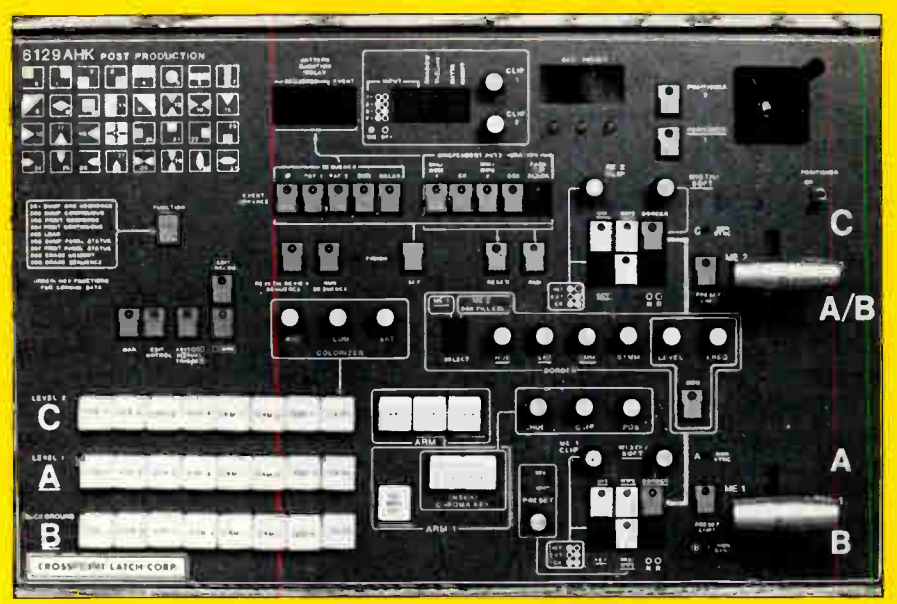
Post-production and editing

CMX will debut the Multi-Cam version of the 6000, which controls from up to four cameras, a boon to episodic television and similar productions. In addition, a new dual-head videodisc player will be offered for the 6000, and the new EFX Graphics feature will be premiered.

In CMX's standard line of editors, the 330A will boast a new, optional internal A/V switcher that does cuts and dissolves. An all-component version of the mid-range CMX 3100, utilizing a new component preview switcher, will also be unveiled.

One of the most exciting editing developments at this year's show will be the return of Montage. The company, which dropped out of the competitive field due to financial woes a couple of years ago, has reorganized and is poised for a strong comeback with a new version of its Montage Picture Processor. The new System II version includes hardware upgrades and supporting new software, plus improved worktape functions to speed up the process of building and recording workprints.

Ampex will go after the news and off-line editing markets with its new low-cost ACE 25 editor. The compact system can incorporate an optional internal audio and/or video switcher (component or composite format) into its electronics. In its standard configuration, the ACE 25 includes four VTR interfaces and controls two audio channels, three auxiliary sources, three GPIs and a 3.5-inch disk drive. Its software allows for A/B roll, slow motion edits, and full split edits, along with a 1000-line EDL, auto assembly, and basic list management.



Crosspoint Latch's 6129AHK postproduction switcher.

Editron, the Australian company that has shown its wares at the last few NABs, has announced a 15 percent average price reduction, along with several new features in its editing systems. New capabilities include 10 softkeys (each holding up to 50 keystrokes), auto assembly of cue lists, enhanced cue list operation, automatic dialog replacement with an optional 20-channel ADR card, and varispeed sync.

Paltex Editing Systems has enhanced and expanded the interfacing capability of its E series videotape editing systems with multiple serial ports. The Elan, ES/D and Esprit Plus editors will be exhibited in totally new versions for NAB '88.

Videomedia will unveil the V-Max I, II and II editors, which the company describes as a new concept in expandable high-end editing systems. The system has multimachine sync roll capability and currently controls up to 10 devices. At the low end of the Videomedia line, the company will enhance its Mickey editor with the PC-Link, which adds real-time databasing and list management via an IBM or compatible PC.

United Media will introduce an entirely new editing line, the Multi-Tasking Series. The hardware and software of these new editors have been designed to allow more than one task to be performed at one time, so that editing, list management, data input/output, and auto assembly can take place one at a time or simultaneously. In addition, the Multi-Tasking line offers up to three different EDLs in memory, up to 3000 events of EDL memory, delayed dissolvers with staggered starts of all VTRs, look-ahead cueing, auto assembly with continuous roll, sync roll and sync chase.

Grass Valley Group will feature the latest enhancements to its line of high-end multimachine computer editing systems.

EECO/Convergence will exhibit its editing system line, including the high-end EMME multimachine editor, the IVES II professional editing system, and

the ECS-195. The company will introduce a new CMX-style keyboard for the EMME, as well as S-VHS interfaces for the ECS-195. A new ESbus-compatible networking system allows sharing of VTRs and edit controllers.

BHP will feature the latest enhancements for its TouchVision touchscreen-controlled editor.

Calaway Engineering, now a division of Quanta Corp., will feature its CED series of video editing systems. The high-end CED MKII controls any mix of up to six Sony or Ampex VTRs.

James Grunder Co. will feature enhancements to its P158 "Eric" editing control system, including a low-cost triple time code reader and generator and a time code calculator.

Amtel Systems will introduce the Transform-LM edit list management system, which is designed to provide sophisticated list management capability to virtually any edit controller.

Telecines

Rank Cintel will unveil a new three-perforation film gate for its enhanced MkIIIC Digiscan 4:2:2 telecine. Rank's ADS-1 telecine, designed expressly for television station use, will feature a new generation CCD imaging device, and will be shown in a new 4:2:2 digital version.

L-W International will show the latest version of its Athena 4500 telecine.

AEG Bayly will show an unusual and useful item for high-end film-to-tape transfers, the ASWE automatic scene transition recognition unit.

Steadi-Film, known for its Steadi-Gate pin-registered gate for Rank Cintel telecines, will unveil the Manipulator, a joystick operated, servo controlled, four-axis motion control unit; the Festival Enhancement Kit, an upgrade kit for Rank Cintel Mk III's; and a high-speed replacement for the standard Rank 52 mm lens.

Newsroom computers

Dynatech NewStar will take a step closer to total newsroom automation with the premier of its new Robotics Camera Control system. According to the company, this system can control an entire newscast, including all camera moves, electronic teleprompter, automatic tape play through a Sony Betacart spot automation system, closed captioning (with the new NewStar Closed Captioning system), show timing, and camera scripting.

NewStar will also feature its NewStar APS and Discovery computerized systems for television and radio newsrooms, and will make the timely introduction of its new Leader system for election night reporting.

A new line of integrated newsroom products at the Basys booth will include the Touchstone touchscreen control systems for news directors, program directors, continuity, traffic and billing departments. Cueword is a new teleprompting system with variable fonts, and Timeslot is personnel scheduling software. Archive 1 is a fully integrated, multiuser newsroom archiving software package. Basys's most recent newsroom system software enhancement, Release 9, offers such new features as automatic display refreshing, variable split screen, and call and capture.

Video processing

Ampex, which won an Emmy for its Zeus advanced video processor, will introduce a TBC with many of the Zeus's features at a significantly lower price. The new TBC-7 extended performance time base corrector offers variable speed playback and time compression/expansion without picture bounce or blur; digital velocity compensation for improved multigeneration performance; and elimination of picture shifts caused by non-colorframed edits.

Microtime, a veteran in the processing field, will introduce several new products, including a new high-performance, full-frame memory TBC designed specifically for S-VHS and other extended bandwidth formats. Also new will be the JS-134 high-performance, four-field frame synchronizer for NTSC and PAL, plus the S-234 TBC/synchronizer with all the features of the 134 plus a built-in time base corrector.

Videotek will premier a new digital framestore/synchronizer, the VDP-8000, and a new color sync generator with SMPTE color bars and audio tone, the VSG-201.

A new company to NAB, Yamashita, will introduce the CVS-950 sync converter, which converts RGB outputs of high-resolution computer graphics (such as CAD) into NTSC or PAL standards.

BTS will have a number of new entries in the processing arena, including the XD-ST 631 4:2:2 component and composite noise reducer system; the XD-CD 7184 analog component to digital 601 encoder; the XD-DC 7184 digital 601 to analog component decoder, and the HCN-5CF 64A comb filter decoder (composite to RGB).

Grass Valley Group will introduce the ADC-120, which translates any video format to component digital RP-125 or EBU 3246-E; and the DAC-110 digital/analog translator with built-in CBG, either SMPTE or EBU. Also new will be the 7510 processing amplifier, designed to clean up incom-

New TBC-7 from Ampex.

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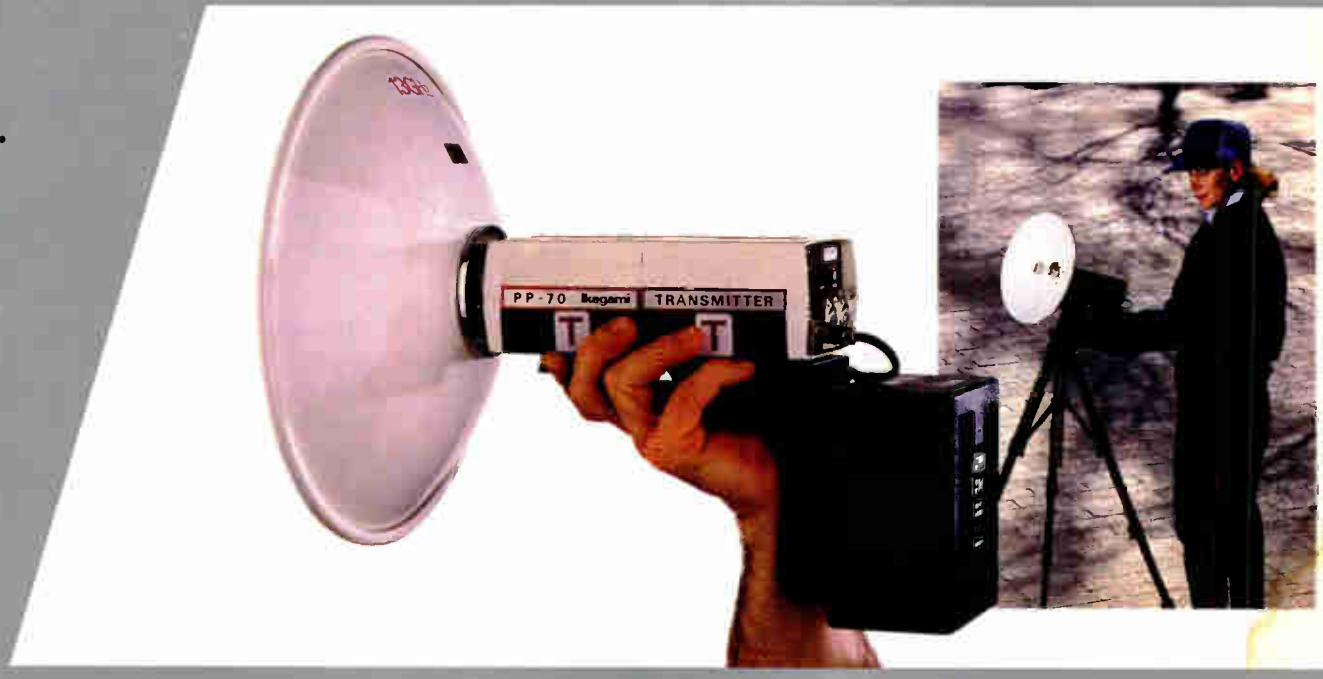

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Fortel will introduce the SuperPro, a new video processor that promises dramatic improvements in S-VHS multigeneration performance. The SuperPro is a TBC with full proc amp controls, H phase control, and two composite video outputs.

New from Lenco will be the Starflex 4500, a frame synchronizer in a modular package. Four can be installed in one rack frame,

Microtime's S-134 four-field synchronizer.

according to the company. Also new will be the PGE- 843, a combination RS-170A sync generator and NTSC encoder in one unit.

Hotronic will unveil a new frame synchronizer, the AF72, and a new slow-mo stillstore TBC, the AE81, for use with satellite broadcasts.

Microsonics will introduce a new line of comb filters for high-quality luma/chroma separation.

Nova will introduce two new products. NovaSync is a frame synchronizer with A/B inputs, auto level control and selectable default modes. Also new will be the Nova 700S S-VHS TBC.

Another time base corrector for S-VHS will be introduced by AMX Corp.

Quality Video will unveil an economical RGB to composite video converter.

Video Internation Development will introduce a four-field television standards converter, the DTC-4500.

Switching and distribution systems

Utah Scientific will introduce a new digital video routing switcher, the DVS-I, a switching system for parallel 601 digital video signals which is fully compatible with the control system of existing Utah Scientific audio/video routing switchers. Also new from Utah will be the TAS-I station automation system, a full-featured on-air automation system incorporating intelligent machine control. The RAS-I real-time switcher control system will also be introduced.

Grass Valley will unveil a new digital DA, the DDA-101. The company's extensive lines of switching and distribution systems will be on view, including the Horizon and Ten-X series.

Videotek, which also has a new entry in its production switcher line, will introduce a new 10x1 video routing switcher. The RS-103A also has three audio channels, breakaway and computer control.

Image Video will add two new items to its routing switcher line: the 9520 20x10 video routing switcher, which mounts in one rack unit, and the 9521 20x10 dual audio routing switcher, also one rack unit high.

Three new products will be featured at the Datatek booth: the D-2400 audio/video routing switcher; the D-810 10x1 audio/video switcher; and the D-802 10-output video DA.

BTS will have a new video/audio distribution switcher, the TAS/TVS 2001. Other new entries from BTS will include the BSX 350V 10x10 compact video switcher, the BSX 350A 10x10 compact audio switcher, and the BVS/BAS 350 10x1 or 20x1 video stereo audio switcher with 30 MHz bandwidth.

HEDCO, too, will have several new switching and distribution products. They will include the TWS-100 12x1 video switcher, the TWS-200 12x1 stereo audio switcher, the HSG-100 sync pulse generator, the HTG-200 audio tone generator, the HPA-100 audio power amp, and the HD-16 switcher with RS-232 serial controller.

Dynair will feature its Dynasty family of high-performance routing switchers, introduced last year and capable of passing high-resolution RGB graphic signals of up to 40 MHz bandwidth as well as NTSC.

A U.K. company new to NAB, Vortex Communications, will exhibit several new routing products at the Comrex booth. They will include the GC-5x1 RBG/component switcher with loop-through inputs, and the GC-16x16 expandable routing switcher with four levels of master/multi-slave switching.

James Grunder will introduce the new P172 16x8 video routing switcher from Cel Electronics.

J-Lab will introduce a new battery-operated video DA and a 5x1 component router.

Leitch Video will unveil a new digital equalizing distribution amp, the DAA-6001, which accepts CCIR 601 input and provides four CCIR 601 outputs.

Stop by the Television Equipment Associates booth to see the latest additions to the Matthey line of video delay lines and filters. Highlights will include the NV series, upscaled from the DV, with improved performance and infinite adjustment.

Future Productions will introduce the AVD-12S, a new audio/video distribution amp for S-VHS applications.

New from Omicron Video will be the Model 330 digital component video (601 standard) distribution amplifier.

Video test and measurement

As usual, Tektronix will have a raft of new product introductions aimed at the latest developments in video technology. The 1730HD waveform monitor provides the bandwidth necessary to test, eval-

Hi-Performance Communication

In A Compact, Maneuverable System

Midwest utilizes a heavy-duty structural system to combine a 1.8M dual offset-fed antenna with an extended body one-ton van. The result is a powerful satellite communications system that can maneuver easily in city traffic or on narrow country roads.

The Vertex 1.8M antenna has a transmit gain of 46.6 dbi and meets the 29-25 log Θ FCC 2° spacing curves. The standard RF package includes a single thread 300 watt TWT amplifier, a Ku exciter with two agile audio subcarriers, a Ku receiver and a spectrum monitor. Modular dual 200 watt phase combined amplifiers, providing fail-safe redundancy are optional, as are several baseband equipment packages.

The S-18's spacious, acoustically treated interior provides an optimum work environment. The unit has ample storage space, and there is enough room for the addition of a VTR editing system.

The S-18 is a flexible satellite communications system, ideal for uplinking news or special events, and easily adaptable for voice and data applications.

Contact Midwest for complete information.

The Midwest S-18. Performance and Flexibility. In a compact, maneuverable package.

"See us at NAB at indoor booth No. 4342 and outdoor booth No. A117"

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uate and operate HDTV equipment. The DP-100 digital video probe is a new high-speed data acquisition and digital-to-analog coverter system designed to diagnose faults in digital video equipment.

The TSG-170D digital composite test signal generator, also new from Tek, allows simultaneous output of analog and digital test signals for D-2 composite digital. Also new will be the TSG-100 test signal generator and the SPG-271 PAL sync generator.

Rohde & Schwarz will introduce two new video test devices. The ATF TV data analyzer measures signals in various standards, and has line store (freeze) with remote transmission capability. The ODF is a high-performance digitizing TV waveform monitor, shown in prototype last year.

Several new entries from Philips will include the PM 5661 waveform monitor/vectorscope; the PM 5662 waveform monitor/vectorscope with SC/H display; the PM 5665 waveform monitor with all waveform monitoring functions plus A-B capability; the PM 5667 vectorscope; and the PM 5668 vectorscope with Sc/h phase capability. Also new will be the PM 5690 TV multichannel converter and the PM 5638 component color coder.

Leader Instruments will have several new products at NAB '88, including the Model 5870 combination waveform monitor/vectorscope in a single half-rack package; the Model 5845 EFP vectorscope, a hand-held, battery-operated unit; and the Model 411 synthesized, genlockable NTSC sync/test generator.

Magni Systems will add component digital and composite digital outputs to various models in its line of test signal generators, including the 1510A and 1510S, the 1515, and the 1517. The 1527 integrated measurement package will feature a significant expansion in its signal set. The company also promises a new component digital product for studio and post-production operational use.

Grass Valley Group will have several new products in this field, including the CBM-85N SMPTE color bar generator; the CV- 95N SPG color black generator, which generates all the standard pulses plus GVG encoded SC.

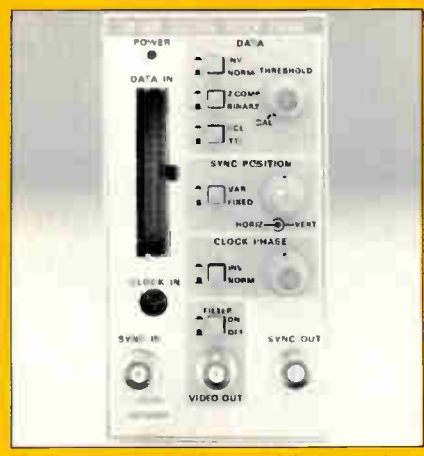
Leitch Video will unveil the MTG-2600 multi-format test signal generator.

BTS will introduce a new digital test pattern generator, the DT-TS.

QSI Systems will introduce the 408, 416, and 424 color bar generators, with eight-, 16- or 24-character identifier, respectively. Other new products from QSI will be the 3440 multiburst generator, the 2048 message crawler, the 5500 full video proc amp, and the 5300 economy video proc amp.

New from Minolta will be the TV-Color Analyzer II, designed for objective white-balance adjustment of color monitors.

Minolta will also unveil its first noncontact trustimulus spot colorimeter, the CS-100, which the company says is ideal for measuring light sources that cannot or should not be touched. Two other new chroma meters, the CL-100 and XY-1, will also be introduced.



Tek's DP-100 digital video probe.

Video Accessory Corp. will have three new introductions, a low-cost color bar generator; an RS-170A genlocking sync generator; and a clamping, high-resolution video distribution amp.

Video monitors

Conrac will introduce a new automatic setup monitor, the 6545/6550 Micromatch color monitor system. Available in 13-inch and 19-inch screen sizes, the monitor stores settings in memory, which may be transferred to other 6545 monitors using the 6550 photometer.

Automatic setup monitors will be featured also by Ikegami; the company will unveil its new 15-Series high-resolution, digitally controlled broadcast color monitors in 20-inch and 14-inch models. The monitors' digital control system controls RGB background, GB gain, contrast, brightness, chroma, hue, aperture, height, width, H and V centering, and rotation.

Barco Industries will introduce the CVM series of low-cost, microprocessor-controlled broadcast monitors, designed for excellent color temperature and raster size stability and with high-brightness, flat square CRTs. The CVM series also features remote control capability and an option slot for flexibility of configuration.

Sharp will add a new 13-inch, rackmountable professional color monitor to its video monitoring line at this NAB. The XM- 1300 offers more than 600 lines of resolution at center, with standard U.S.-controlled phosphors for accurate color reproduction and matching with other monitors. Hitachi will introduce its new CM-150/210 high-performance color monitors with added functions for broadcast operations. Also new will be a line of HDTV large-screen projectors.

Lighting, power, and grip equipment

Lee Colortran will introduce new software and other enhancements for its Prestige Series lighting control consoles. Other introductions will include color-effect, correction and diffusion materials, along with a new line of resin camera filters and polyester photographic filters.

Lowel's new ViP lighting system, to be introduced at NAB, consists of three new lights: the V-light, a broad, efficient 500 W halogen source with protective

Performance and Portability

The S-1 Flyaway — Another Midwest Innovation

It's the world's first hi-performance, truly portable Ku-band satellite uplink. Each of the 13 A.T.A. approved cases weighs less than 100 pounds, and the complete system conforms to international baggage regulations. Checked as excess baggage, the S-1 arrives when you arrive. Economically.

The system utilizes a Vertex 1.8M offset-fed antenna with a transmit gain of 46.6 dbi. This precision, aluminum surfaced reflector antenna meets the 29-25 $\log \Theta$ FCC 2° spacing curves.

Two STS phase combined power amplifiers provide fail-safe redundancy and plenty of reserve power. And an Intelsat-approved exciter with half and full transponder transmit capabilities allows you to operate on any available satellite system. The S-1 can be set up fast, on-line in less than 30 minutes. And the S-1's modular electronics make system repair or replacement in the field easy.

Video and audio control and monitoring equipment are included in the standard S-1 package. Options include a 2-way communications channel, and an international receive configuration is available. The S-1 is also easily adaptable for data transmission. Contact Midwest for complete information.

The S-1 Flyaway from Midwest

Built to perform. Packaged to go . . . anywhere.

"See us at NAB at indoor booth No. 4342 and outdoor booth No. A117"

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glass shield; the i-light, a tiny focusing light with 12 V, 100 or 55 W halogen lamp; and the Prolight, which uses various voltage lamps from 100 to 250 W and has interchangeable special-purpose reflectors, unique barndoors, five swing-away accessories, and a gel frame and brella.

Matthews will introduce several new lighting and grip items. The company's Matthflector reflective surface is now available in bulk, as well as in ready-made reflectors in a variety of sizes. In addition, the Matthpack 645 line (buy six, pay for only five) has been expanded to include seven new products.

Cinemills Corp. will introduce a new Dedolight portable video light, which comes in its own case with accessories.

Cool-Lux will unveil its "Perfect Pack" Micro-Lux camcorder light, one package that includes battery, light fixture, lamp and diffusion lens.

Alexander will introduce its new BP-1-11 camcorder battery, a direct replacement for the NP-1. Also new will be a BP-1-11 battery charger and analyzer/conditioner.

Ikegami's TM-2015R color monitor with auto setup probe.

Three new products will be introduced by Anton/Bauer: the Lifesaver microprocessor-controlled four- and eight-position chargers; the Probe programmed battery evaluator; and the Anton/Bauer Gold Mount system.

The new Pro 500 battery charger will be introduced by Pro Battery. This computer-controlled charger has four ports that operate independently and charge simultaneously.

Maxell will launch a new line of nicad rechargable batteries for the professional/industrial market, designed for use with portable cameras, VCRs and camcorders.

Pep, Inc, will display its full line of ENG batteries and chargers, including the Model UMC Universal MicroCharger.

Paco Electronics will introduce the DP-11 nicad battery pack, a direct replacement for the Sony NP-1A. The full line of nicad battery packs and chargers will be on view.

LEA Dynatech will introduce two new low-cost transient voltage surge suppressor lines for radio and LPTV stations, the PH series and the PT series.

Control Concepts Corp. will augment its Islatron line of power line filters with the Islatron Plus, a new series including 5 A and 15 A units for load requirements up to 15 A.

Camera support

TSM, Inc., a leader in the robotic control of cameras, will introduce a new software-based controller for its HS-110P and SH-105P servo pan/tilt units. The controller will have touchscreen input with clear and precise menus to maximize user confidence. The system also interfaces to a newsroom computer to allow remote setup and real-time editing of all controller functions.

Telemetrics will display the latest additions to its line of camera control and pan/tilt devices, including the 68059 dome- mounted camera pan/tilt assembly and the 68060 camera trolley assembly.

Miller will introduce five new camera support systems this year. The System 80, designed primarily for EFP, accomodates cameras with top-mount monitor, zoom lens, rear controls and prompting systems weighing up to 80 pounds. Two of the new systems, the System 20 Special for industrial/professional CCD ENG cameras and the System 40 ENG Special, are lighter-weight versions of popular, established Miller supports. Miller will also unveil two economical new systems featuring its Junior fluid head.

Sachtler's featured item will be its new Video 80 head with OB-tripod system, designed for camera/lens combinations up to approximately 200 pounds. It consists of a two-stage tripod, a dolly, and an elevation unit.

Vinten will expand its MicroSwift digital remote-control camera system with a new servo-controlled pedestal, teleprompter-based shot retrieval, and automated people tracking. The company will also unveil the Vision 5 2133system, complete with fluid pan/tilt head, tripod, spreader, and soft foam-filled equipment carrying case.

A new ENG camera brace from Bogen is designed for maximum comfort and utility. Weighing just 2.6 pounds, it is made of aircraft-grade black anodized aluminum, padded at the waist and shoulder.

Karl Heitz will add two new monopods, the 564G Mono Studex Giant with a reach up to eight feet, and the 564GL Mono Studex Giant Lux with a reach of up to 12 feet.

Cinema Products will feature its full line of camera support equipment, including the Mini-Worrall continuous-pan cable drive geared head, the Mini-Worrall Super (with Sachtler-style quick release system), the Camraprompter and Camraprompter L portable prompting systems, and the J-6 joystick zoom control. Of course, the Oscar-winning Steadicam Universal Model III will also be on view.

New from Alan Gordon will be the Argus compact dolly with Mini-Jib. Gordon will also feature the Revpod product shot turntable, the Sonic mic boom family, and a new line of acrylic special effects.

A.F. Associates will unveil floor tracking for the Radama- EPO line of camera remote control equipment.

Video Services Unlimited will exhibit a newly modified version of its Jimmy-Jib.

PROBLEM SOLVERS

How to re-create instantly -- anytime -- the exact camera adjustments that gave you perfection today.

This problem is both technical and artistic. And the best solution ever developed is the built-in floppy disk system in Hitachi's Setup Control Panel, for SK-97D and SK-970D cameras.

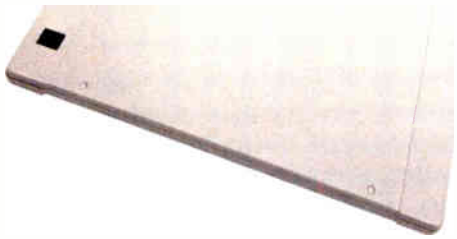
Keep this "perfect look" on file.

For example, suppose you've spent a fussy 55 minutes adjusting your cameras for absolute perfection in tight closeups, for a special on kids and pets.

But as soon as you start shooting, the on-camera narrator becomes very ill and you have to reschedule. This leaves you not feeling so well yourself. Because you know, in a day or two, you'll have to create that look again.

No problem -- with Hitachi's system. Setup and adjustment data from as many as six cameras and 32 scenes can be filed on a single floppy disk. You can automatically set up your cameras again anytime -- *exactly* the way they were. About two minutes is all it takes.

Other computerized camera systems can't do this. Only Hitachi has the software and the



built-in floppy disk drive that does it. On-board micro-computers in Hitachi's SK-970D and SK-97D cameras exchange data with the disk.

Think of the advantages. You can file and re-use camera adjustments that flatter the complexions of specific talent. You can match and keep on file the look of any continuing series.

The bottom line is -- you save time. You add to effective production time by cutting down setup time.

That's why a major network bought 47 of the first SK-970D's and SK-97D's.

Hitachi SK-97D
- Zero method auto setup
- S/N 60dB
- Real time registration compensation
- 2/3" MS LOC DG Plumbicon tubes
- Triax Capability - 10,000 feet

Call us for a demonstration. See our Zero Method automatic setup camera system with the built-in disk drive and many more Hitachi features that solve problems and save time. Call now.

SU-97D
Auto Setup Control Panel
- Built-in 3.5 inch floppy disk system
- Data Transfer between files
- Lens extender display
- Numeric keypad for file selection
- Camera number LED display

Re-create perfection anytime.

HITACHI

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See us at NAB Booth 3324

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Teleprompters

Computer Prompting Corp. will unveil a family of IBM PC- based computerized teleprompters, featuring closed captioning capability, simultaneous scroll/edit, and electronic newsroom interface. capability.

Compu = Prompt will also introduce a new PC/AT-compatible computerized teleprompter, with 16-color capability and 20 font sizes.

The new A-5000 prompter from Listec Video provides formatted prompter text from any computer that produces ASCII text files.

Telescript will introduce a prompting program for IBM and compatible microcomputers that offers instant push-button font sizes.

Videotape and accessories

No format is complete without its tape, and digital video is no exception. Sony Magnetic Products Co. will introduce 19 mm metal tape cassettes for the new D-2 format composite digital recorder. Of course, Sony will also feature its D-1 component digital master cassettes.

Agfa-Gevaert will feature a prototype of its new Afga Betacam videotape, along with a prototype Broadcast Pro U-matic tape. Maxell will introduce a new half-inch video cassette for S-VHS, claimed to deliver a horizontal resolution greater than 400 lines. An unusual item from Maxell is also a sign of the times: a compact video floppy disk designed especially for electronic still cameras.

The Ampex Magnetic Tape Division will feature a new packaging system for its line of 187 Broadcast and 197 Master Broadcast U-matic videotapes.

Broadcasters will be able to predict and (hopefully) avoid costly tape failures with RTI's new Tapechek Model D11 dropout analyzer. The compact, rackmountable unit works with virtually any format videotape recorder and can check recorded tape without erasing it. RTI will also show an improved one-inch videotape evaluator/cleaner.Garner Industries will add a new model MII 2000 specially designed for degaussing high-energy MII and Betacam SP tapes.

A new entry to this field Paltex, will introduce the Weircliffe line of degaussers for MII, Beta SP, D-1 and D-2 digital videotape, and DAT digital audio tape.

A new concept in interlocking lid-to-case design is promised by Anvil Cases. The new M.I.C.S. modular interlocking case system allows lids to double as interlocking tabletops.

M.I.C.S. case system from Anvil.

Porta-Brace will have several additions to its line of soft-shell nylon cases, including new recorder cases for half-inch broadcast VCRs, shoulder cases for Beta and MII camcorders (with new rain top feature), and camera cases for a variety of camcorders including the Sony BVW-505.

New from Kangaroo Video Products will be a recorder case and raincover for Betacam SP and Panasonic MII camcorders, a new line of portable television monitor carrying cases, a raincover for the Sony BVP-360, and a new design camera case with viewfinder support.

Nalpak will have a new line of shippable soft-bags for tripods and related video equipment.

Star Case will offer its wares in two new colors, turquoise and bordeaux, designed for positive ID. Jensen Tools will unveil its new Rota-Tough and Rota-Lux cases and shipping containers.

Furniture, accessories

Storeel will premier a compact new CD storage system in units from 160 to 640, as well as high-density storage systems for MII and VHS cassettes.

Winsted Corp. will introduce a new tape storage system for VHS, Beta and MII tape formats, along with a new series of vertical equipment cabinets.

Arben Design will introduce a new information display kiosk for interactive videodisc and other programming displays, plus a new line of flats for traditional wall and room settings.

KinTronic Labs will exhibit a new line of equipment rack cabinets matching the company's existing Phasor cabinet design. Crenlo will feature its existing line of Emcor modular equipment enclosures, workstations and furniture.

Canare Cable will introduce its new A2V1 camera remote cable, with two audio and one video line, along with new BNC connectors.

Cam-Lok will unveil its new EO400 Posi-Lok power distribution panel and its 2001 Series 4-58 pin connector for power and control.

New from Chester Cable will be a line of component video cables that meet the latest SMPTE standards.—*Eva J. Blinder*

They're here!

MAGNI

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(800) 237-5964
FAX (503) 626-6225
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Its features are that sounds good.

Sony is pleased to announce a merger. Analog recorders that combine the advanced features you need with the quality sonics you crave: the remarkable APR-5000 series.

Whether you need a recorder with a genius for post-production or one for high-quality studio mastering, there's an APR-5000 that fits.

Their 16-bit microprocessor controlled transports handle tape smartly, yet gently. And "intelligent" head assemblies make changing head formats a snap.

And when it comes to sound quality, transformerless design and 400 kHz bias enhance high-end performance. While optional "wide profile" heads help to create new lows–35Hz at 30 ips.

So, if you've been waiting for a precision analog recorder that finally breaks the sound barrier, don't wait. Contact your Sony Professional Audio representative. Or call Sony at 800-635-SONY. SONY.

Professional Audio

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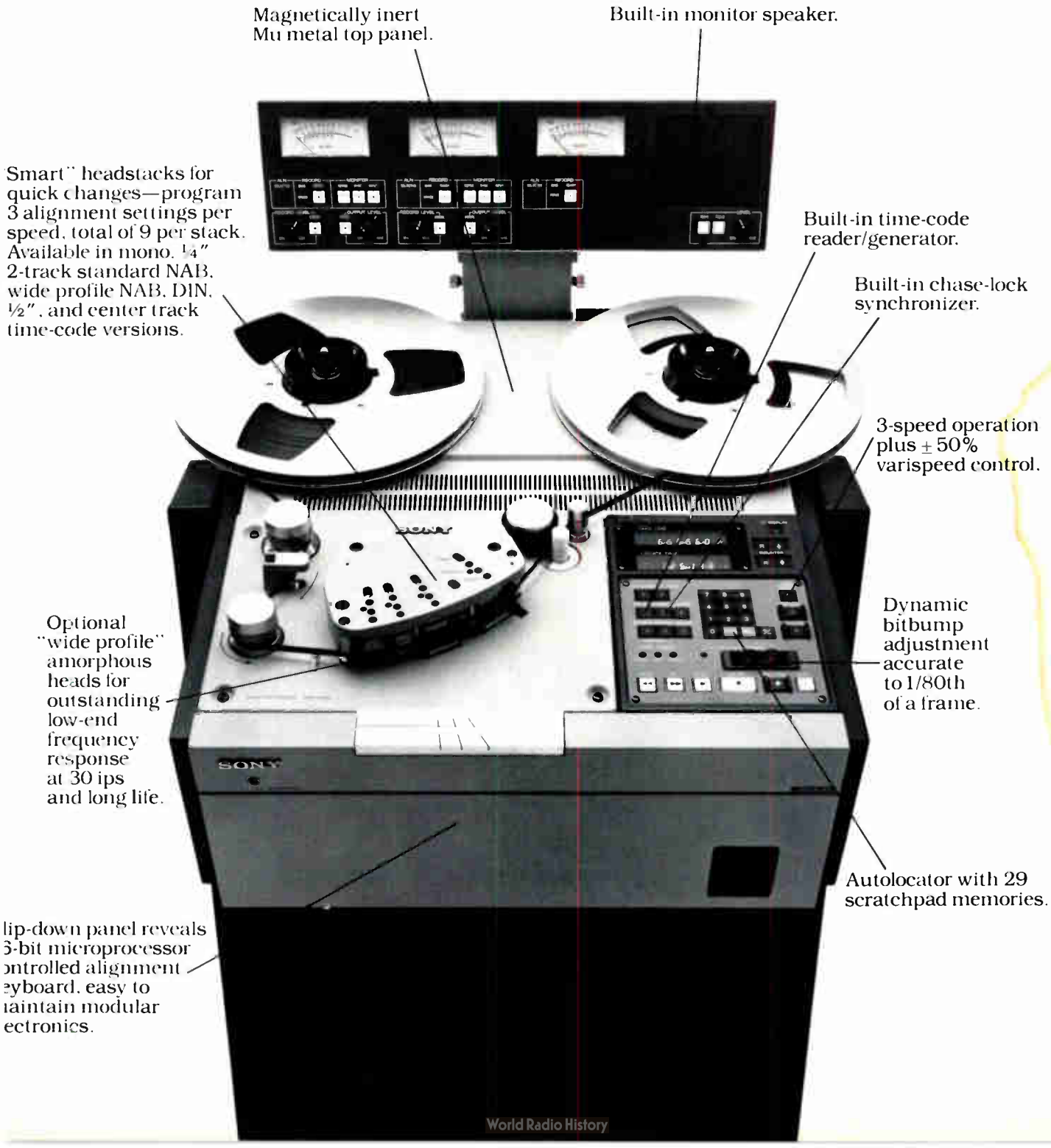

Rev into stereo-
With the remarkable new FP32 ENG Mixer.

Introducing the stereo version of our legendary FP31.

Stereo adds incredible dimension and realism to sports and news coverage. And Shure's new compact FP32 Stereo Mixer makes ENG and EFP applications easy and economical.

Consider these advantages:

- Three transformer-coupled XLR isolated inputs and stereo outputs, all switchable to low-impedance mic or line level.
- Dual mini and 1/4" stereo headphone jacks.
- Built-in slate mic and slate tone.
- Battery, phantom, and A/B power (no special power supplies needed).

Plus new stereo advantages:

- Full stereo capability with separate, detented stereo pan pots and monitoring capability.
- Full 48 volt phantom capability.

Size? Only 2 5/16" x 7 1/4" x 6", comparable to our FP31. Weight? Just 2 1/2 pounds. Price? Hundreds less than you would expect. Stereo is here to stay. So is the FP32. For complete information about our full line of field production gear, write or call: Shure Brothers Inc., 222 Hartrey Avenue, Evanston, IL 60202-3696. (312) 866-2553

The new FP42 Stereo Production Mixer — the stereo counterpart to our M267. Four channels with independent center detented pan pots and cuing. Headphone amplifier. Adjustable limiters.

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SHURE

Breaking Sound Barriers™

WHAT'S HOT

RADIO/AUDIO

It can safely be said that the computer, and its various associated technologies, has been the single most important driving force in all electronics over the last decade. In the broadcast and production industries this has manifested itself in various hardware and software innovations in both audio and video, allowing users greater control and more creative choices. The trend in audio has been visible for years, first in digital circuitry, special effects devices, and later in a variety of storage media derived from the microprocessor.

The depth of computer generated/manipulated audio has reached such proportions now that, as reported in these pages last fall, the most recent television convention (SMPTE) was dominated by audio product introductions. The upcoming NAB convention in Las Vegas should be no different. Among the many ways computer technology has come to fruition in the audio domain is the recent advent of the digital audio workstation.

The digital audio workstation has developed into many different physical forms with a wide range of capabilites and, of course, a breadth of pricing. None of them are exactly cheap, nor can it be said that you are likely to find many of these systems in local radio stations in the 100th market. Nevertheless, five years ago, nobody would have predicted that music synthesizers would find their way into radio stations.

Digital audio

And it is with a form of the music synthesizer that we can begin discussion of this category. The two most prominent companies in this realm of audio practice that will show their wares at the convention are New England Digital and Fairlight.

Fairlight is launching a new plan wherein it will offer three levels of storage and manipulation capability at three price levels, thereby allowing the user to determine the level of sophistication he needs in terms of effects and amount of storage.

New England Digital's offering, the Synclavier, also has as its basic control interface, a keyboard, but has expanded its digital storage and manipulation capabilities further towards the high end of the spectrum with its new

standalone direct-to-disk multitrack system. This is a self-contained hard disk unit offering four-, eight-, or 16-track recording with various levels of customized software depending on the job.

A newer company, more true to form in the strict sense of the digital audio workstation and with a more universally accessible control console, Digital Audio Research (DAR), has introduced the Soundstation II. Billed as a digital audio recorder and production center, the system combines multichannel digital audio recording with direct-access sound editing and tosses in a good measure of digital signal processing as well. One of the characteristics of the digital audio workstation is the configuration of the system, and it is clearly demonstrated in the layout of the Soundstation II. DAR has chosen to divide the system into two components: the control console, where all operations are effected, and the processor and storage unit, which contains the system hardware, software, and the disk drives used to store the audio data.

New England Digital's Synclavier

Another frontrunner in the digital audio workstation concept has been Waveframe Corp. with its offering, the Audioframe. The Audioframe provides the digital signal manipulation and storage expected from the workstation approach, but has already begun to offer an array of options to expand the capabilities of the unit beyond such digital features. To be unveiled at this year's NAB is the DSP (Digital Signal Processor) module that will allow the Audioframe to act as a digital 16 x 2 mixer with EQ and reverb.

Further enhancing the track storage capabilites, often a limitation in computerized systems, Fastrack will be offered for the Audioframe. This is a modular eight-track hard disk recording option for the system to be previewed in a private room in the Waveframe booth. Those serious about getting involved with the digital audio workstation approach should make a point to see the private viewing.

Consoles

As digital signal processing becomes more common and storage and manipulation hardware begins to fall in price, the clear distinction between different types of hardware become quite blurred. The evolution of the digital audio workstation promises to combine the functions of several different pieces of equipment currently in use. Will these systems replace the tape recorder and the console? Not likely, at least not for some time to come. Yet it is obvious as these systems add digital storage and signal control capabilities, they will begin to confound the simple old systems we currently accept as standard operating procedure.

A small, quiet company that has offered an advanced digital console with no audio in the top of the board at all has been Orion Research. The primary advantage of consoles such as these, beyond keeping the audio in fairly pristine condition, is the ability to offer sophisticated software for a wide variety of mixing functions, including full recall. Orion will demonstrate ReMem at the show, an upgraded software package that allows single keystroke for full recall of console setting.

Long a major player in the upper levels of console technology has been Solid State Logic. SSL has provided consoles suitable for every purpose of recording and mixing, offering various levels of performance applications in its 4000, 5000, and 6000 model consoles. New for this year, and fitting in with out theme of technology crossing clearly distinguished lines of delineation between equipment types, the company will demonstrate a new digital production center. The system is a self-contained digital audio recording, processing and editing system.

Calrec, another competitor from the UK, will have as its centerpiece a digitally assignable computer controlled console. The unit provides 128 channels, 12 stereo groups, four main stereo outputs and 24-track recording capability.

Also noteworthy in the digital console domain, if the term console still applies to these versatile contol systems, is Yamaha's DMP 7. This digital mixing processor is an eight-by-two console with digital equalization, three built-in digital special effects processors, and moving fader memory. As an

"Features and specs sold us on Auditronics 200 consoles."

Robert Lankton, Chief Engineer
WDUV/WBRD in Bradenton, Florida

"Their performance and reliability keep us sold."

"We wanted a console flexible enough to use in master control, production and news. We shopped for features and specs, but we also looked for ease-of-use and reliability. We got just what we wanted in our four Auditronics 200s."

Features

"I insisted on outboard power supplies and no monitor amps in the console for noise reasons. I was impressed with Auditronics' VCA technology, which at the time was not available elsewhere. We wanted the self-contained clock and timer. We needed the switching logic to interface between the A and B inputs, (a neat concept most other consoles don't offer). And we needed a lot of extra line inputs to support our satellite feeds. We needed a first-rate telephone interface. Auditronics beat its competitor hands-down on this. And, of course, modular design was a must for serviceability. We got it all in the Auditronics 200."

Specifications

"We go for the widest dynamic range we can get because much of our programming originates on CD. So the 200's 3dB better S/N is really important. Everything on the Auditronics 200 tests out better than the specs they publish, and you can't ask for more than that."

Ease of Operation

"I found the 200 logically laid out and very easy to train our people to use. The jocks like them and can easily understand them, which is very important to management."

Reliability

"We're just ecstatic about the Auditronics consoles. They've run 24-hours, 7-days since turn-on without a failure. What's more, they've held their specs, which I check every month to audiophile standards."

"Would I buy Auditronics again?"

"At WDUV/WBRD everybody is happy with both the Auditronics consoles and the support we've received from the company. We look forward to doing business with them again." If you'd like to know more about why Rob Lankton swears by Auditronics consoles, call 1-800-638-0977 or contact

auditronics, inc.
3750 Old Getwell Road, Memphis, TN 38118
901-362-1350

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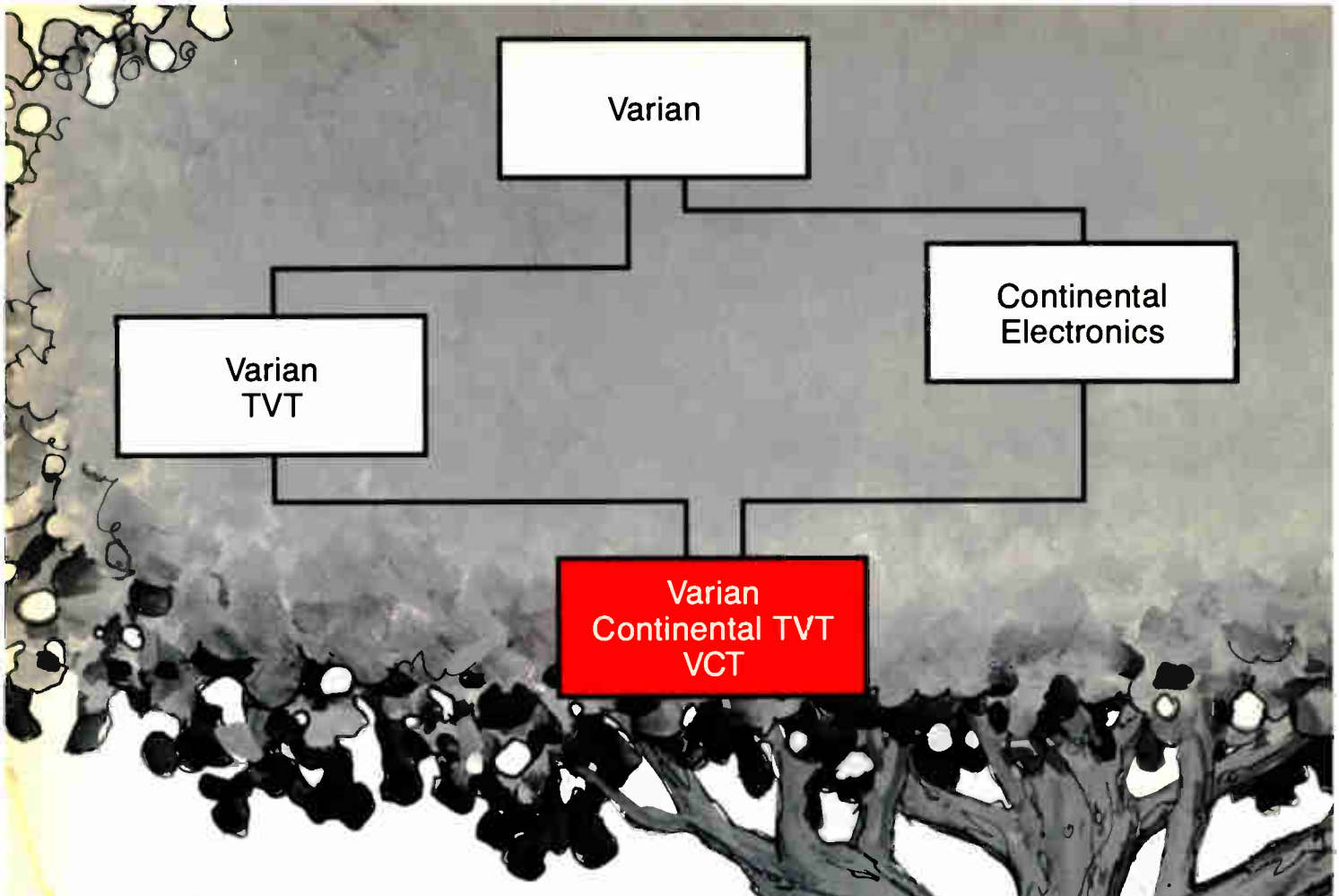
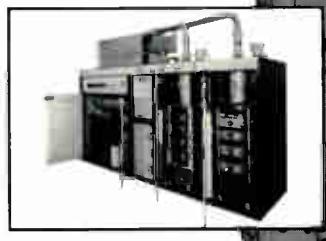


VCT - a direct line to video ancestry

Varian Continental TVT - VCT - markets and provides 24 hour a day technical support for Varian UHF-TV transmitters in the U.S. Our television heritage is strong because the VCT family tree consists of Continental's radio broadcast experience, state-of-the-art TV technology and transmitters built with quality English craftsmanship.

We're located near the Dallas-Ft. Worth International Airport. Our transmitters are specially designed for reliable, quality performance because they're purpose built for UHF-TV stations. That's VCT's commitment from its strong heritage.

For more information, contact:



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adjunct to its full range of digital products, Yamaha will introduce the FMC1, a digital format converter containing stereo capability, accepting SDIF-2, CD.DAT, or AES/EBU signal for direct digital input/output.

Turing to the more traditional and in some ways more practical console products, Harrison will unveil its new AIR-790 on-air console, its new PRO-790 edit suite production console, and the ARS-9 routing switcher. Highlighted will be a new generation of automation systems for Harrison consoles.

Wheatstone's newest offering at this year's convention will be the A-20a on-air radio console designed for smaller radio stations and news/production carousels. Expanding its control capabilities for all of its consoles, Auditronics will demonstrate the UCI-2000, an intelligent controller that can be manipulated by outboard serial equipment and that will support RS-232, SMPTE, and MIDI protocols. In addition to its wide variety of other audio products, Fostex will announce the new 1240 mixer. The 1240 is a 12-input board with two stereo outs, four aux sends, parametric EQ, PFL on each channel and a VITC reader/generator.

More in the full-blown production category, Neotek will introduce the Essence console, designed specifically for multitrack effects, ADR, Foley, and post-production assembly as well as synthesizer sampling and assembly. Allen & Heath Brenell will show both on-air mixers as well as production consoles. The Sigma series will handle the production applications and the company will introduce the Phantom Series of moderately priced boards in eight and 16-bus formats.

When systems and components advance in complexity the control and routing functions tend to increase in importance. Answering this challenge, Moseley will introduce the ARS-256, a digital quality audio routing/mixing system using an RS-232/C port for PC control interface allowing monitoring and control of the switcher through a menu-driven program. McCurdy has prepared new features for its audio distribution amplifier line. The ADA 700 is a stereo unit with individually adjustable outputs and impressive specs at an economical price. The ADS 500 is a modular distribution system. ROH, in addition to bringing its line of automation equipments, will unveil the Series 7000 audio routing switcher with summing crossbar design and control functions configured for medium to large audio routing, monitoring, and control systems.

Recording technologies

The onslaught of the microchip has not, of course, remained in the control and routing area of audio. In fact, its impact may have been felt first in the magnetic storage sector of the business and is only now crossing over into the control and solid-state storage domains. A new area of some controversy still remains in the magnetic storage product area as the fate of professional R-DAT (Rotating Digital Audio Tape) machines has been left to international politics. Many companies, however, have decided to go ahead with product offerings. This includes, importantly, many tape manufacturers supporting the product. Among them are 3M and Sony, of course, and at this NAB, Maxell will reveal its new DAT product line.

Sony and Tascam as well as Fostex have announced R-DAT machines for the professional market and they have been received better than predicted. This year's NAB will see further support of the technology as Sharp plans to unveil its SX-D100 deck, targeting the unit for recording, production, and broadcast use. Expanding the applications for R-DAT will be Concept Productions, offering its Computer Assisted Programming System in R-DAT for full random access of entire radio format libraries.

Beyond the small format digital audio tape there has been, for several years now, the larger systems most notably offered by Sony and Mitsubishi. Recent entries in the digital domain have been Studer, supporting the DASH format and Otari with its entry from the Pro Digital format. Mitsubishi, of course, offers digital editors, and digitally automated consoles to complete a digital production environment.

Studer continues to offer a wide range of products in both analog and digital configurations including a complete system of professional CD players, including the A730. Studer will continue to support its analog two-track and multichannel tape deck lines with several introductions in this area including the C270 two-channel

The Orion automated Newsmaker console.

and the C274 and C278 four-and eight-channel decks respectively.

Also assaulting the professional CD market is Shure, introducing its PDP1000 unit with auto cue, balanced line level XLR outs, and adjustable outputs from 0 dBm to +20 dBm. Also featured are 16-bit processing with oversampling and 15-stack memory.

Otari's formidable MTR-10 and 12 decks have made inroads in broadcast and production facilities as have its workhorse MX

The Audiometrics Broadcast Multiplay CD systems.

5050 units. The company's Pro Digital entry will offer options and features at this year's show that should be examined by those interested in going digital.

Bridging the audio/video gap

With digital storage and manipulation capabilites expanding very rapidly as the digital boxes rain down on the industry, control of the various units becomes a primary concern. To a great extent, this need for greater control is what has led to the advent of the digital audio workstation. Nevertheless, there are many facilities in which a variety of audio and videotape machines exist, both analog and digital, as separate systems and need a central synchronizing point. This function serves not only for syncing units together, but for controlling and editing applications as well.

As microprocessor technology finds its way into all aspects of audio and video equipment, many of the similarities begin to appear and many of the differences between the two types of equipment seem to fade. Adams Smith has been an innovator in the audio editing field and with its new products on display at the convention the boundaries once again become vague. The editor with C:Sound is a new audio-graphic sound envelope display technique that permits methods similar to video still-frame and slow motion to be used to edit audio in a precise way. This is a new option for the standard model 2600 editor. The 2600 offers edit decision list management and hard disk input/output, full keyboard and high resolution color screen display.

Timeline, too, will arrive in Las Vegas with additions for its Lynx line of editors. A new keyboard contol unit provides multi-machine control and edit function through the Lynx module. Lynx time code modules control audio, digital audio, and videotape machines for chase synch. And the new Lynx VSI modules interface audio tape transports to other manufacturers' audio or video editing computers. This kind of versatility is another by-product of the influence of computers in the audio-video equipment industry.

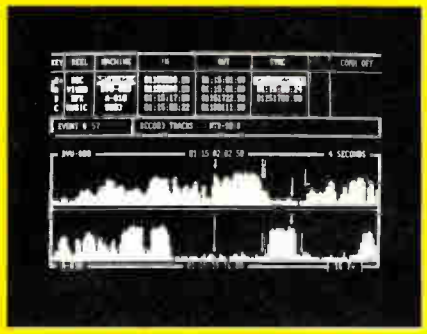
Having made a name for itself in the digital effects end of the business, AMS (Advanced Music Systems) has launched new efforts in the recording, storage, and editing portion of the industry. Further improvements to its Audiofile, a digital editor/recorder will be displayed at the show including full bandwidth scrub editing, full cut and paste editing, internal digital level control, internal panning, and up to seven hours of storage. Advances in software have allowed AMS to develop a new editor interface that allows the Audiofile to appear to video editing machines as an Ampex VPR 3 or VPR 6 transport, allowing synchronous audio follow video editing and track slipping in the digital domain.

Alpha Audio contines its endeavors in this field by offering its automated audio editing system with updates on the BOSS programmable keyboard accessory featuring soft keys and a jog knob for easier access. Well known for its many products, Evertz will offer at this year's show the emulator audio transport interface for video editors and a variety of synchronizers.

Digital efx and production

Digital signal processing has gone beyond special effects, as already mentioned, and incorporates some of those function into the broader spectrum of digital production systems. Lexicon has made its statement in this area with the Opus system. Beyond this, its famous time compression units have influenced the way audio production is carried out. And its 480L digital effects box has also had its impact. Continuing in its tradition, Lexicon will introduce, at this year's show, the LKP-1 multi-effects module and the MRC MIDI remote controller, further evidence of the microprocessor-based technologies of various disciplines joining together.

Deeper inroads into digital signal processing are evident as the lines begin to blur between re-



Adams-Smith System 2600 audio editor.

cording, effects, storage, and other types of signal manipulation. So many of the modern effects use microprocessors for storage of the signal for manipulation that, given enough capacity, they begin to cross the line into the solid-state recording medium. Certainly, tape based, and now also disk-based, systems are here

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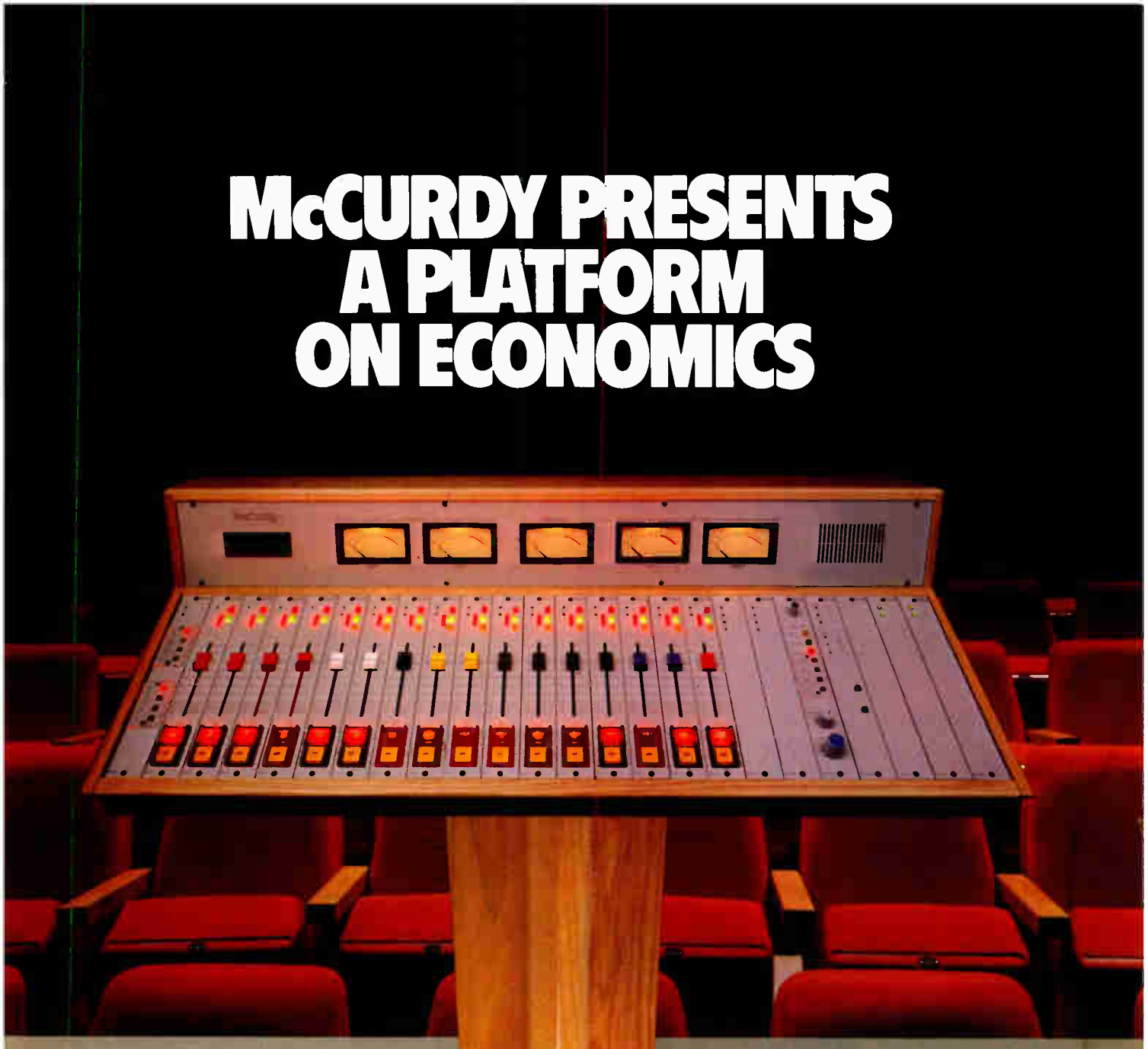

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Here is audio engineering at its finest. A desk top "drop in" package which can be tailored for any size budget and broadcast requirement.

Inexpensive by design, the Series 'S' console provides precise audio mixing, monitoring and control. The very latest in analog and digital electronics is coupled with full electronic audio switching to assure the highest quality.

• up to 26 input mixing modules • stereo program and audition buses • telephone and cue buses • solid state audio switching • full function digital logic control • universal module positioning • full travel Penny & Giles conductive plastic faders • separate VU housing section for customer provided equipment

As complete or as basic your budget allows, the Series 'S' offers McCurdy's unsurpassed audio quality and ultra-reliability. Simple economics with high-tech engineering. Another winning performance from McCurdy.

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for some time to come. Thoroughly defined pieces of equipment, however, are becoming a thing of the past as hybrid technologies and applications scramble things.

Evidence of this has been seen in the products of Eventide with its time compression equipment and its Harmonizer. Pioneering new territory in digital and signal processing this year, the company will introduce the H3000 Ultra-Harmonizer, a stereo pitch change and effects processor.

Yamaha, too, infamous for its digital effects boxes, will bring new product to the Las Vegas convention. McCurdy will introduce the ADU-11S, a compact dual-channel digital delay unit. It incorporates 16-bit linear A/D conversion technology and microprocessor control.

Microphones

As applications for the gathering of sound have changed over the years, manufacturers have sought ways to target everchanging markets. Whether driven by their own perceptions or by market demands, manufacturers, the last couple of years, have been attacking shotgun microphones with new zeal.

Audio-Technica will address this new market concentration at the upcoming trade show. The company will introduce the AT 4071 and 4073 externally polarized, transformerless line+gradient mics, featuring wideband width response, both on and off axis, in a considerably lighter instrument.

Production methods and the quality of signal commanded by the new signal processing techniques have obviously changed the marketplace and the ways in which various types of mics are used. The shotgun has shown itself to be particulary versatile in the shifting of techniques, and it is the users who have discovered the versatility of this type of unit. Also new from AT is its 4031 cardioid capacitor mike with a frequency range of 30 to 20,000 Hz and designated for both studio and field production.

Electro-Voice will be revealing new products in its N/DYM technology line of microphones, especially concentrating on the RE 45 N/D. Shure Brothers will reveal its full range of microphone and mic accessories for a variety of applications.

Beyer Dynamic will demonstrate new offerings including the M58 ENG/EFP news and sports mike, the MCE 10 hypercardioid lavalier and the MPC 40 omni acoustical boundary mike.

Orban's programmable EQ unit.

AKG's introductions at this year's NAB will include several microphone models including a new headset microphone.

In wireless microphone systems Cetec Vega will announce its new Pro 2 true diversity wireless with db x noise reduction for lavalier and handheld mics. Wireless intercoms are going to see innovations at this year's show as well.

Regarding fully installed, wired intercom systems, Ward-Beck has long been know as a major innovator in this area and will again advance the science with its MicroCom II microprocessor controlled TV plant communications system. RTS Systems will have several new products ranging from a portable single-channel station, a two-channel portable station, its 24-channel programmable matrix intercom system.

R-Columbia plans to show new base station interfaces for both wired and wireless systems and will unveil its ENG/IFB telephone with switchable tone/pulse dialing and five channel selectable wireless intercom headphones. The base station will interface FM wireless with any hard-wired system.

Full circle

One of the new technologies that has thrown a wrench into the talk about digital audio, to take the discussion full circle to our opening topic, has been the advent of Dolby's Spectral Recording modules. SR, when applied to quality analog recording and playback systems, will produce audio that is subjectively superior to the best digital systems. Studer has incorporated it into its high-end multitrack recorders for studio work in addition to bringing out its new DASH machine. In an attempt to hold off the attack that cart machines have faced in the radio operation, SR is being used in that area as well. Pacific Recorders has been one of the big proponents of using SR processors with cart machines and will show new products in this area at the NAB.

Never letting the challenge of new technology slip by, Fidelipac will once again unveil new products at this year's show. Most notable will be its Vari-Speed remote control for its CTR 100 Series of cart machines and other cart machine enhancements. Audi-Cord will show its new DL series re-designed to provide better value for an economical price.

—Tim Wetmore

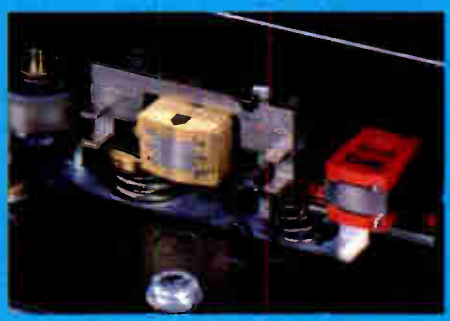
Today's tougher audio requirements demand a new choice

Telex Pro Series 6120 XLP

A new duplicator with 8X speed and tougher specs.

Improved frequency response plus less distortion and crosstalk are just a few of the technical gains achieved in the new Telex Pro Series duplicator. This means that you'll make duplicates that are **truer to the master** than with any comparable tape duplicator on the market today.

Yes, here's a system with all the advantages of the famous 6120 high speed duplicator plus enhanced specifications. Features that made the 6120 popular such as compact size, unlimited expandability, track select, audio level monitors and easy one-button operation remain distinct Telex advantages. But, by developing the 6120XLP with 8X speed, Telex gives you the advantage of improvements in many **important professional specifications** such as distortion, frequency response, speed accuracy and crosstalk. And, the new cassette transport speed allows you to duplicate directly from 15 ips open reel masters for the ultimate in quality and convenience.



New *XL LIFE* cassette head.

The Pro Series 6120 uses a newly developed, highly efficient *XL LIFE*® cassette head featuring ultra-hard physical characteristics for **extra long life** (10X normal) plus a satin smooth surface that resists excessive oxide build-up preventing the need for frequent maintenance. Its advanced engineering, precision design and painstaking manufacturing techniques contribute immensely to the Pro Series improved specs including an **unmatched frequency range** of 50 to 13KHz. For further technical details and the name of your nearest 6120 dealer, call or write Telex Communications, Inc., 9600 Aldrich Ave. So., Minneapolis, MN 55420.

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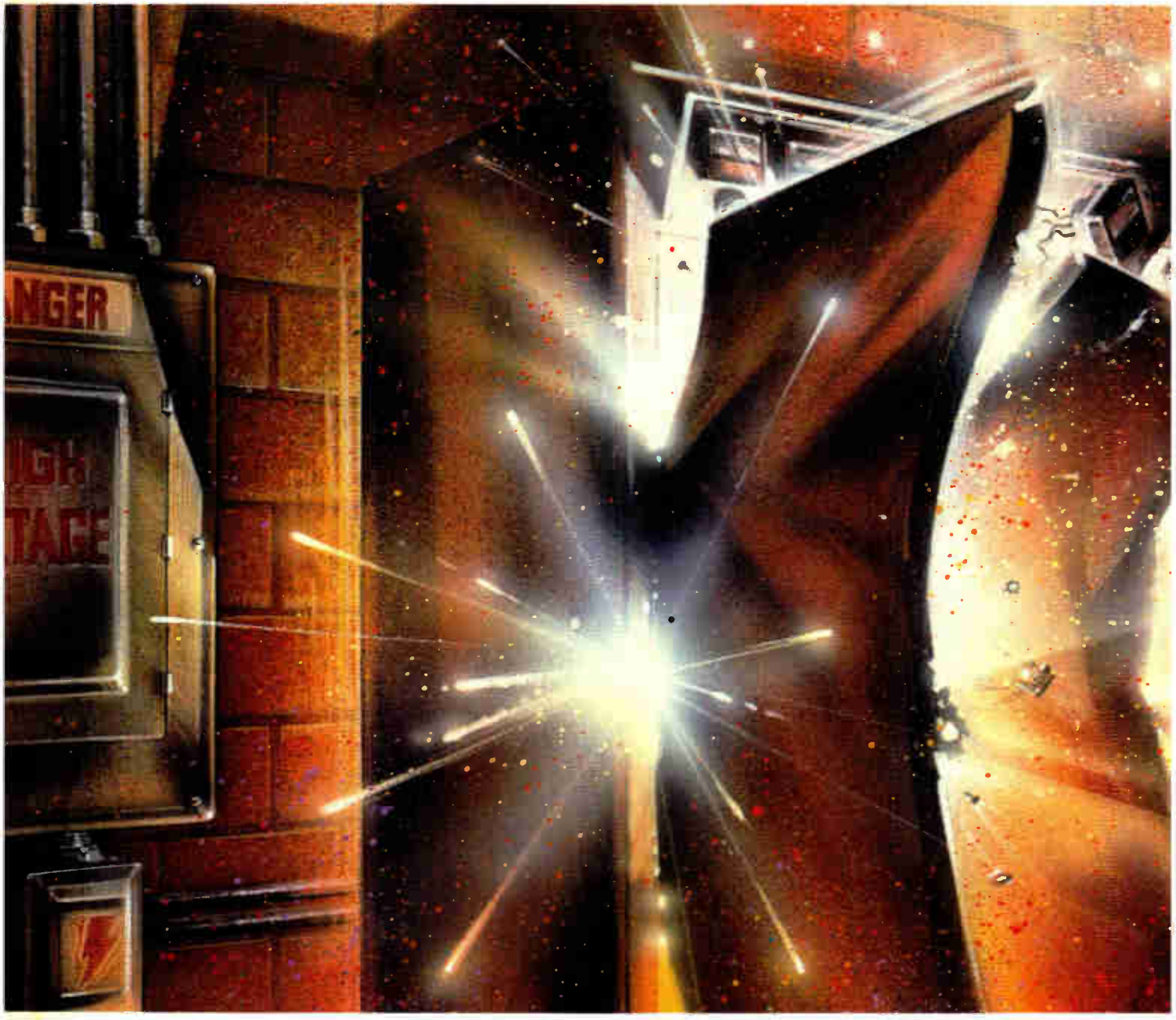

Chattanooga. January 26, 1987. WTVC's transmitter — from a Harris competitor — exploded. Doors blew away. Quarter-inch-thick sheet steel melted. And Channel 9 went off the air.

Working through the night in subzero weather, Director of Engineering and Broadcast Operations Manager Dennis Brown and his staff would bring the station to half power in 18 hours. But less power

BLEW UP, EVERYTHING EXPENSES"

F. Lewis Robertson
Vice President/General Manager,
WTVC

still meant less revenue. They needed a replacement fast . . . in 30 days rather than 30 weeks. Says Brown with a smile, "We knew if anyone could, Harris could."

The day after the accident, a Harris rep was on site. Assessing damage. Identifying needs. Rolling up the shirtsleeves to pitch in. And once Lewis Robertson gave the go-ahead, a new Harris transmitter was in place and operating just 30 days after the order. Channel 9 was back on the air at full power . . . with a picture viewers felt was better than ever!

At Harris, we understand the special pace and requirements of the broadcast industry. We've responded fast and effectively to our customers' needs for over 65 years. Supplying a full line of transmitters, antennas, control systems, and other high-quality communications products.

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Beat the traffic.

M/A-COM opens up a new lane for broadcasters with our new 18GHz microwave system.

If you've been looking for an open frequency at 7 or 13GHz, you're not alone. In many areas, they simply aren't available: there's too much traffic and not enough spectrum.

M/A-COM's new 18GHz microwave system gives you another option: a wide-open band which the FCC has assigned to broadcast. It gives you 50% better link availability (or 40% longer range) than 23GHz, and none of the congestion of the lower frequencies.

The MA-18CC is a fully-featured microwave system, designed to meet or exceed all RS-250B short-haul performance specifications. It is field tunable, and a single gunn oscillator covers a wide selection of frequencies so spare parts can be kept to a minimum.

For over 20 years M/A-COM MAC has specialized in providing microwave radio equipment to broadcasters. Every unit with our name on it is built in our own factory, so we not only control the quality, but we know how to service it.

For more information on how you can streamline your microwave needs, contact M/A-COM MAC, Inc., 5 Omni Way, Chelmsford, MA 01824, (617) 272-3100.

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M/A-COM

WHAT'S HOT

RF/TRANSMISSION

Solid-state AM and FM transmitters are now entrusted and entrenched, the klystrode transmitter has made it to the marketplace, and the frenzy over satellite newsgathering vehicles (SNVs) has subsided. There's little that's "sizzling" hot this year. But progressive improvements are inevitable, and that keeps the pot simmering if not boiling.

A new generation of AM solid-state transmitters marks this year's NAB, "reaching a new level of performance'" according to Nautel. Larcan is showing solid-state TV transmitters. There are some processing improvements. Kahn Communications says it can reduce co- and adjacent channel AM distortion and close-in fading distortion. In FM, a production version of FMX is available. There are a few other new processing products. An anti-skywave, anti-fading AM broadcast antenna will be shown.

Studio-to-transmitter links options now include fiber optics and digital microwave.

In the microwave class, improvements in portability are found.

On the satellite front, most emphasis is on making better use of what is available. This means using more sophisticated earth station receiver controllers (C- and Ku-band combos), better receivers, better voice communication links, and turning to elliptical path satellites for international connections. And SNV pioneer Hubcom will be showing a latest generation fly-away package.

Transmitters

With last year's NAB '87 being such a watershed year in transmitters—Harris announcing the DX-10 digital modulated AM transmitter, Comark showing a klystrode transmitter ready for delivery, plus Americanized Thomson high-power solid-state TV transmitters, Townsend expanding, PYE TVT selling to Varian, Acrodyne adding new power levels—what can NAB '88 possibly offer?

In truth, nothing quite as exciting as last year. But new products there are, and at least one new transmitter name: Ian Hill & Associates PTY, Ltd. Ian Hill is an Aussie company, and its Pulse Modulated AM transmitters can be seen on display at the Marcom booth,

The winner on points: LDK 90 with Frame Transfer CCDs

Our picture of two hockey players illustrates the benefits of higher resolution: the more pixels (picture elements), the sharper the picture.

We chose this example to make clear why we didn't settle for just any CCD sensors, but selected Frame Transfer CCDs.

The number of pixels in the image area is an important distinction. Frame Transfer keeps exposure and storage functions separate, providing space for more pixels: 610 per line. This ensures pin sharp pictures at all times.

The LDK 90 also provides superior dynamic resolution, because light-sensitive Frame Transfer CCDs have a shorter integration time (it takes only 1/60th of a second to expose a field); and this can be extended to ever shorter exposure times. Slow motion and freeze frame shots are always sharp and clear. These advantages are especially appreciated when covering sports events. Even a small hockey puck racing across the ice is always clearly visible.

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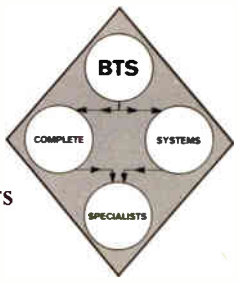

BTS Broadcast Television Systems

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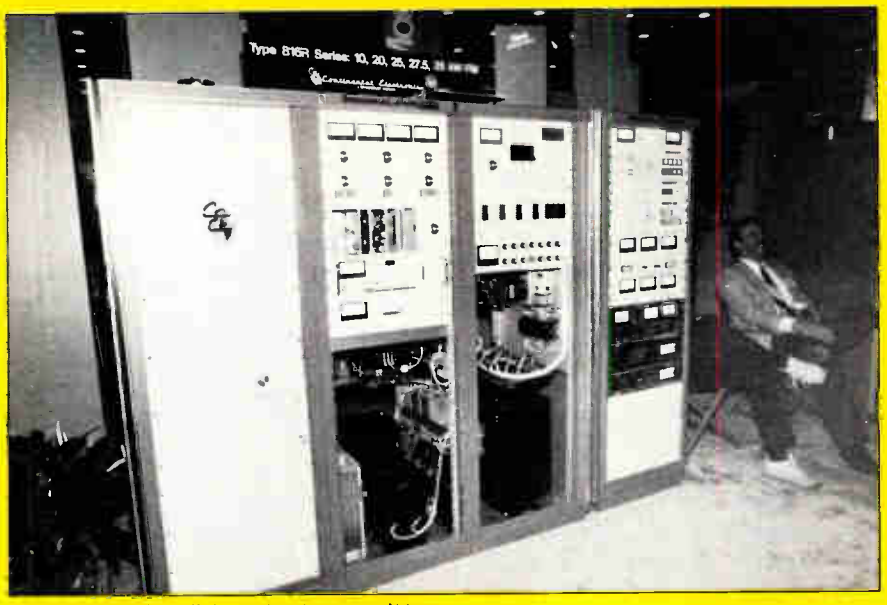
103/105.

Not a great deal of information is available on the Ian Hill "Pulse Power" series, but there are three power sizes: a 125 WAM transmitter, a 1 kW version and a 5 kW unit. Each power level offers a 20 percent reserve. Up to 160 percent modulation is possible, and the units are AM stereo compatible. Each transmitter is fully metered and VSWR protected. The pulse technique, of course, achieves high efficiency.

McMartin is staging its comeback by showing a 3.5 kW FM transmitter, the BF 3.5M, which incorporates the BFM 8000 exciter. McMartin is also reintroducing its complete SCA line including the BFM-2001 generator and the TR 11D-2 dual-channel receiver. The TBM-100E monitoring receiver will also be shown along with improved models of other McMartin products.



Continental solid-state transmitter.

QEI is showing a new, lower-power FMQ Series of FM transmitters, starting at 3.5 kW.A unique feature of the FMQ Series is that units are field upgradable to higher powers, i.e., the 3.5 kW unit can be increased to 5 kW or 10 kW.

Nautel, which has been a preeminent leader in solid-state AM transmitters, including behemoth 50 kW versions, this year will introduce a new higher-standard 10 kW unit, the Ampfet ND-10. Nautel says it offers everything customers liked about the AMPFET 10, plus a number of additional features such as 10 percent more headroom, a frequency response flat from dc to 10 kHz, less than 5 percent square wave tilt, IM distortion of less than 1 percent, a better than ever audio harmonic distortion figure, and IQM better than 35 dB.

A battery-powered FM transmitter can be found at the Elcom Bauer booth. Its low-power 100/300 watt series can be powered by a battery for use as a direct rebroadcast satellite transmitter.

A new FM transmitter will be shown by Broadcast Electronics this year. Its a 20 kW unit Model FM-20A featuring a single tube design.

TV transmitters

The role of high-power, all-solid-state TV transmitters continues to tantalize broadcasters; but are they ready yet for the price-sensitive American market? Last year, both Comark and NEC talked about practical 30 kW types. Indeed, Comark showed a 30 kilowatter VHF type on the floor, and NEC reported the sale of a UHF model to an Australian station. This year, however, both companies appear to be soft-pedaling the higher-power no-tube transmitters, essentially because of their higher cost.

Though Comark will not show its H Series debuted last year, its sister company LGT (as part of the Thomson family) will have a 10 kW solid-state VHF unit on hand. Such power levels are selling well outside of the U.S. where total operating costs are a big factor.

Filling in the breach is Larcan. It announces a TTS-22M all-solid-state VHF 22 kW transmitter using a FET semiconductor in the output modules. And Larcan emphasizes that a 6 kW VHF TV transmitter, the TTS-6M, will be operating on the floor (LDL Communications booth) to demonstrate its performance.

Whether FET power types will offer a price advantage over bipolar types will be the "hot" story. LGT and Comark suggest bipolar prices will be coming down.

In the lower power ratings, solid-state is the norm. This year ITS Corp. announces a new solid-state 100 W UHF transmitter, the ITS-220, which boasts no fans or blowers. In the MMDS/ITFS category (2500-2686 MHz), ITS is showing a new ITS-1610C transmitter, a 20 W unit. It will also have a 1658C transmitter incorporating four 100 W MMDS/ITFS transmitters in one standard size cabinet.

Elsewhere, TV transmitters on display have single-tube finals. Acrodyne lists a "new" transmitter, the FL/20KL 30 KW unit, operating in Band I. It is also showing a 60 kW UHF type, the Marconi B7548, which features the B7500 drive system with annular ring pulsing. Comark's featured new product this year is the CTT-U-120SK, a 120 kW UHF Klystrode transmitter.

Harris, NEC, and Townsend will be showing familiar models.

In the way of new tubes, EEV offers three new klystron types: a K3153 15 kW air-cooled UHF, a K3773BCD 70 kW wideband

UHF, and a K3936L24 air-cooled tube. Watco reports it will have an new TWT amplifier on hand.

Econco will be offering is rebuild service for radio and TV tubes. And if 540 SCFM cooling will do the trick, readers may be interested in a brand-new BMI motorized impeller blower from Amco Engineering which is a smaller, more efficient package than centrifugal blowers.

Some fresh help in power supply design is available. Hipotronics can offer HVDC designs intended as beam supplies. Peter Dahl can custom design TV klystron power supplies that will deliver 26,000 VDC at 6.1 amperes. For power conditioning, Current Technology has a new Power Siftor that includes an extended range filter to 100 MHz.

Remote control

Advanced Micro-Dynamics promises a new ARC-16 remote control system. It's a 16-channel unit with dial-up, speech, and subcarrier options.

Moseley will show microprocessor control of transmitter systems using a PC as the operating control terminal. Moseley will also have some new MRC-2 software updates.

CAT Systems will be on hand showing how it can build remote control features into the transmitter at the manufacturing stage.

TFT will show new RPU units in the 450 Mhz band. They offer frequency synthesized tuning, companding, and selectable responses. TFT, incidentally, will also show some new emergency broadcast system equipment.

Little new electronic gear is expected in STL equipment this year with the exception of digital microwave systems (see "Microwave" below), but Graham-Patten will be showing a new two-channel VAMP system for putting PCM audio over video systems on STL or satellite transmissions.

Fiber optics

On the other hand, a number of fiber optic systems are appearing which can perform the STL function. Rockwell International will show two systems: the Digital Muldem/Lightwave System, the DML-3X50, suitable for video and sound transmission, and a complete "metropolitan" communication lightwave system, the LTS-1565D which takes feeds from several DML-3X50s. The DML-3X50 can operate at two optical line rates: 50 Mb/s or 150 Mb/s which are compatible with DS-1 telecommunications terminals, 28 or 84 capacities respectively.

FiberPlex 3000 is described by Artel as a modular composite video/stereo audio/data transmission system for STL or ENG/EFP distribution applications. Also offered is FiberWay Ethernet/802.3 as a compatible 100 Mbps data transmission system. For high resolution radar, component color graphics, or HDTV transmission systems, Grass Valley offers FiberGraph CG203 and RGB 100 systems. Dynair Electronics is also offering a new fiber optic system for HDTV distribution.

SCA and stereo

There are far fewer brand-new SCA, MTS, or AM stereo products at NAB '88 compared to previous exhibitions since these technologies have been around for several years now. Nonetheless there are several new products.

In SCA, McMartin's re-entry has been noted above. Marti will be showing a new subcarrier generator, the SCG-10, and a demodulator, the SCD-10. The series introduces a higher level of performance and greater flexibility, according to Marti. Various pre-emphasis settings are possible, and audio companding boards can be added. Illuminated panel meters facilitate set-up and troubleshooting. The units can operate standalone or feed into a microwave. Belar promises some new SAP and PRO monitors.

Comark's klystrode-based transmitter line.

A new Radio Data System Encoder will be shown by AEG Bayly, enabling one to add digital data to an FM subcarrier. Messages are shown via LEDs. Self-test software is included. A road-traffic broadcasting encoder is an option.

A new pager, the Galaxy, is to be introduced by Micro Controls, Inc. The Galaxy automatically scans and locks to a properly identified SCA signal (57, 67, or 92 kHz). ASCII compatible displays of 52 characters are possible. Internally canned messages such as "Call your home," can be triggered by two digits following the pager number. In addition to the pager, MCI says it will also show a new

"Hands-free" continuous wireless communications

QTR-1 Portable (top view)

"Q" PLUS—convenient full-duplex wireless intercom

- Eliminates trailing cables
- Operates full-duplex or simplex (push-to-talk)
- Up to six portables per system
- Interfaces with other wireless or wired intercom systems
- Long-range communications over low-noise, high-band VHF frequencies
- Installs easily...in minutes
- Many applications...
  - Stage managers and technical directors
  - On-floor crew coordination
  - Camera/lighting operators
  - Backstage conferencing
  - Production crew and setup coordination
  - Warehousing operations, including voice recognition and response
  - Public-safety
  - Sports and racing

Rugged, dependable, and easy to operate

Up to six Cetec Vega "Q" PLUS remote beltpack wireless intercom units (portables) can communicate full-duplex through a central master station. The six portables talk continuously ("conference" style) without pushing a push-to-talk switch or without the annoying one-person-at-a-time limitations and syllable cutoffs of VOX (voice-operated) systems.

The compact Model QTR-1 portables are built to take abuse, and are housed in a welded aircraft-alloy aluminum case.

The portables are very easy to use; they have only two operating controls — a combined on/off and headset volume control, and a push-button audio control switch.

The portables operate 8-10 hours on two inexpensive 9-volt batteries.

System audio is crisp and clear, with extended frequency response, low distortion, and audio processing for low noise.

Full monitoring with master station

The Model QX-6 master station has comprehensive provisions for control and monitoring, plus a user-programmable intercom interface and auxiliary audio inputs/outputs. Interfacing is DIP-switch programmable to a wide variety of wired-intercom systems, including Clear-Com, RTS, ROH, David Clark, most "carbon mic" systems, etc.

The master station operates on 115/230 Vac, 50-60 Hz, or + 11.5 to + 24 Vdc.

For more information, contact your nearest Cetec Vega dealer or sales representative, or call **1-800-877-1771***

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Telex II: 910-587-3539
FAX: (818) 444-1342

*Toll-free number effective February 15, 1988.

Circle 150 on Reader Service Card

data subcarrier system plus a pager phone interface system.

There will be a significant new stereo generator on hand—the Inovonics' 707 FM/FMX Stereo Generator. This 705 is the final production version of the FMX system pioneered by CBS and NAB to extend coverage. It will be demonstrated "on-air."

For both TV and FM composite stereo applications, Orban will be showing a new ACC-024 Composite Isolation Transformer. Installed at the exciter, this unit improves signal-to-noise and prevents ground loops between the stereo generator and the transmitter. It presents to the stereo generator a composite output with a balanced floating load.

Regarding stereo matters, Studio Technologies has developed products that it will introduce at this year's show. The IFS integrated simulation system is a modular MTS simulator that has an optional polarity correction card, which prevents loss or degradation for mono listeners. In addition, the company will demonstrate its AN-2 simulator for recreation of the spatial stereo effect. Kintec, too, has been active in this field, with stereo products at its booth as well.

New from Delta Electronics is an AM splatter monitor. The unit features an accurate taut-band meter, front panel speaker and headphone jack, and an adjustable remote output is also available. Information from the output can be fed directly to a station's remote control equipment to notify the operator of an out-of-tolerance condition.

In the processing category there are several unusual products. Kahn Communications will be showing Power-side which allows AM stations to reduce: 1.) co- and adjacent-channel interference; 2.) antenna null distortion; and 3.) close-in selective fading distortion. Besides these monophonic reception advantages, Power-side is fully compatible with the Kahn/Hazeltine AM stereo system. C.R.L., which has a line of MTS and SCA equipment, is also introducing this year the BAP 2000, described as a broadcast audio processor, including mono preemphasis limiting.

Test equipment, components

Telemet reports three new products including a stereo broadcast demodulator with phase lock and quad outputs, a new tuneable demodulator and a PRO channel demodulator for remote van use. These will be shown in addition to sideband analyzers and envelope test sets.

New network analyzer test

RF calibration device from Boonton Electronics.

equipment will be offered by Anritsu along with micro spectrum and microwave power meters. Potomac Instruments will have some eleven instruments on hand though all appear to be familiar models.

Belar reports it will have new subcarrier monitors and AM, FM, and TV frequency monitors, though no details were available.

For RF power measurements, Coaxial Dynamics will show a new line of 4-1/16-inch and 6-1/8 inch rigid line RF directional wattmeters and plug-in elements. Bird Electronics reports a new Termaline high-power wattmeter to 10 kW. A new quiet and easily ductable air-cooled dummy load resistor called the Omegaline 6735, a 35 kW model, is being shown by Altronic Research Inc.

Antennas, towers, transmission line

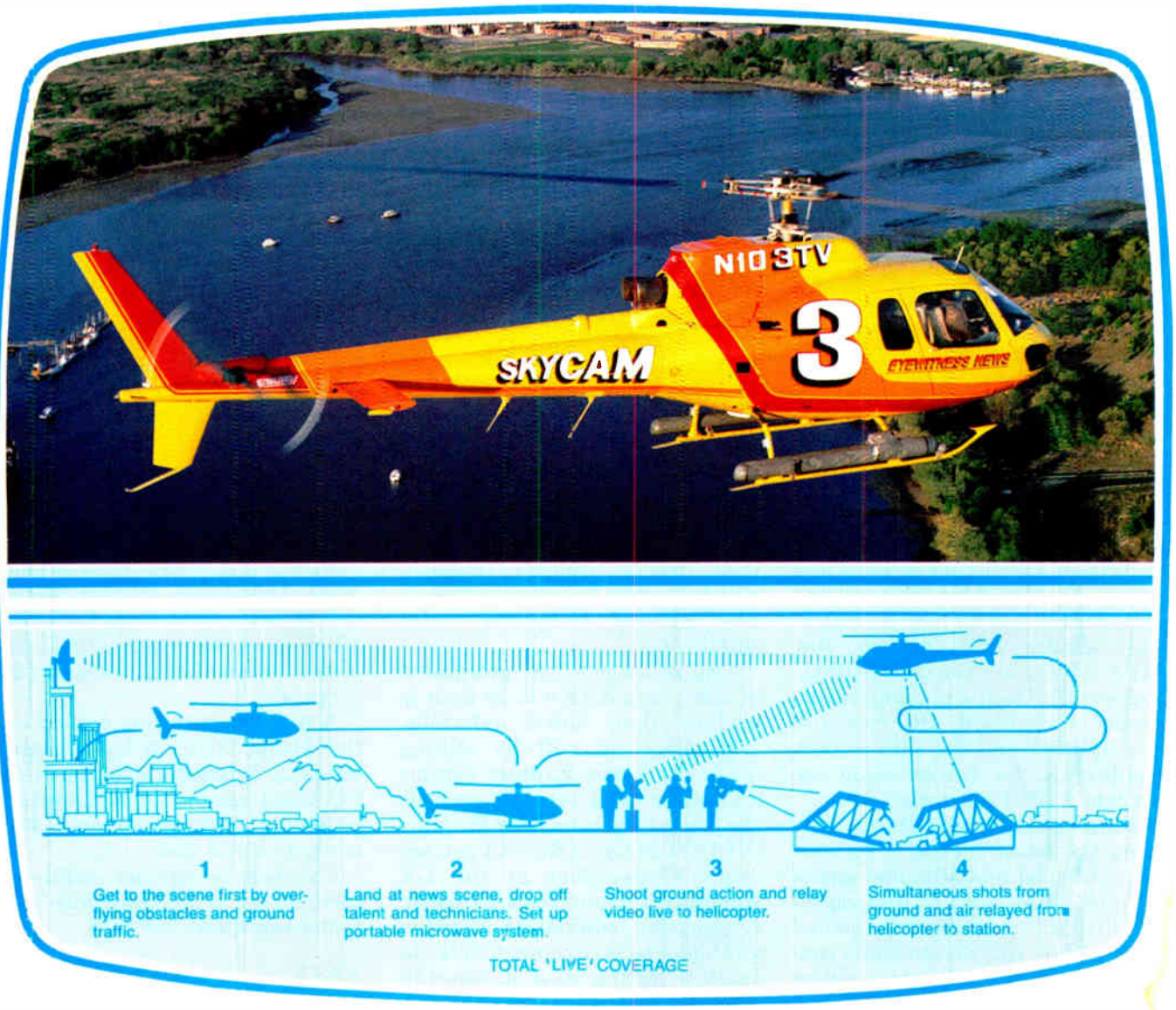
With FM panel array antennas now being "old hat," CP types for FM and TV firmly entrenched, and both circular and elliptical waveguides developed, what can be new? How about a new AM antenna concept? Pinzone Communications will display a model of its Corum Anti-Skywave/ Anti-Fading AM Broadcast Antenna. The Corum antenna is described as a low-profile structure (30 to 50 ft height) that produces a pattern nearly equal to that of a 190 degree tower 835 feet at 620 kHz). In the transmission line category, the Andrew Corp. is introducing a new 2-1/4 inch air-dielectric Heliax cable ideal for Class B 25 kW FM stations. SWR Inc. will have a new series UHF waveguide with a "R" type flange. And Shively Labs has some new Super-Power RF Filters. They are capable of handling 70 kW of input power, according to the company.

When you ask antenna tower manufacturers what new product(s) they will be showing at NAB, most have to refrain from answering. Its pretty hard to have a new product in the usual sense. But you can get the latest–information on tower construction from several, and Central Tower promises to show a display revealing details "generally only seen by the installation crew."

Rohn will be stressing its hot dip galvanizing process *after* fabrication. Some standard 90 degree joints in 10-foot sections will be shown. Express Tower Co. (EXCO) will be on hand to describe their capability in designing, manufacturing and erecting towers from 20 ft to 2000.

Kline Towers, stressing its 36 years of experience in engineering, inspection and maintenance–services, will be ready to describe all kinds of construction including those handling special type antennas.

If your tower is insured you may be extremely interested in a new Lightning Data and Information Service (LDIS) being announced by R*Scan. Using the next generation of Time-Of-Arrival (TOA) tracking technology, lightning data from regional TOA networks are merged into a single



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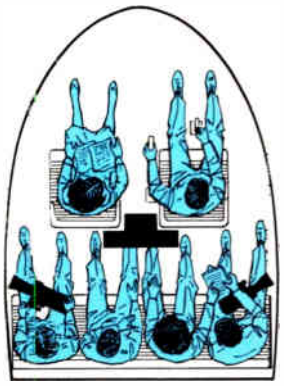

Wide body cabin

With an Aerospatiale 350 or 355 you will be first on the scene and first to send back live pictures simultaneously from the ground and air. Send a strike team into an area using a helicopter with ample room for personnel and equipment. Aerospatiale features a wide body, flat floor, no intervening posts or partitions, and three separate, lockable storage areas.

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The large cabin allows plenty of unobstructed room for close-ups of the reporter or aerial coverage. Left or right sliding doors provide the camera operator with maximum freedom of movement.

The Aerospatiale 350/355 series has earned a reputation as a "smooth, open platform for aerial photography." Low vibration and noise levels allow for "studio quality" sound reproduction. Top speeds of 145 mph and ranges up to 450 miles make Aerospatiale helicopters highly rated in a business where high ratings count.

For further information contact Ron LaFleur, Vice President, Marketing, Aerospatiale Helicopter Corporation, 2701 Forum Drive, Grand Prairie, Texas 75053-4005. (214) 641-0000 or toll free...

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database containing precise time, location, polarity, and estimated magnitude of each detected lightning ground stroke.

As usual, Lightning Eliminators will be at NAB '88 to discuss hardware and techniques for grounding and lightning strike prevention.

For proper lighting, Flash Technology says it will have a new controller with continuous monitoring and status indication, the SC-110. TRW Lighting reports it will have some new medium-power strobe lights.

Microwave

Several interesting systems are being introduced by Rockwell International, including a brand-new *digital* video system, the DVS-1000. In the DVS-1000, video is digitized and compressed, audio is digitized, the two are multiplexed and fed into a DS3 conditioner for transmission on switched DS-3 networks.

Pinzone Communications will show the latest version of its vertical interval multichannel audio system, VIMCAS. A compensation circuit corrects link errors such as line tilt. Stereo audio can be placed on existing video-only or mono microwave paths with performance and phase stability (3 degrees at 14 kHz) not normally attainable on microwave subcarriers. (VIMCAS can be used in the studio chain, to transfer stereo via video.)

Nurad will be introducing a new portable 2 GHz transmitter, the 20PT1-10. It features a 40 dBM output. Nurad will also have some new compact parabolic antennas in the 7 and 13 GHz range, known as the CP Series.

Ultra-portable is the way RF Technology refers to its new line, the FR-UPL and 200 Series. These ultra-portables have two switchable line/mic audio channels and are frequency agile. The RF-200C low-cost receiver is a companion unit to provide a total system at low cost

No details were provided, but Communication Microwave will offer some frequency-agile transmitters serving the MMDS and ITFS market.

Also serving MMDS and ITFS users is the Conifer Corp. Its new products will include block down converters for ITFS (the CIT Series) featuring an interdigital filter for improved RF selectivity, and dual-band MMDS (the QL-3010 series).

Satellite systems

If you are an international broadcaster finding it difficult to get transponder time in the Atlantic and Pacific regions on geostationary satellites, Comsat Intelsat Satellite Services (Comsat ISS), World Systems Division, will be happy to tell you how to use inclined (elliptical) orbit satellites.

Two other services prominent at last year's NAB will be back to explain their latest offerings. GTE Spacenet will be talking about its News Express service and other SNG services such as the Voice Communicator Package (VCP). And Cycle Sat will demonstrate Cyclecypher at the GE American Communications booth. Cyclecypher equipment allows a station to receive commercials via satellite during off-peak times in an automatic mode.

In satellite equipment, Microdyne's Automated Terminal (MAT), an automated program shifter, is of more than usual interest. Using presets, MAT automatically recalls all of the hundreds of parameters necessary to bring in the desired transponder from any of 23 satellites at the touch of a button. MAT automatically turns on the receiver, tunes up the system (slewing the dish, peaking, and setting polarization), and locks on to the program you select.

Pinzone Communications will unveil a new all-format (C and Ku bands) satellite receiver, the 9270. Preset channelization is included for 36 satellites in 16 formats.

In addition, Pinzone reports it will now offer complete turnkey satellite uplink/downlink systems in the C/Ku bands. The systems will include Comtech or Vertex antennas in various sizes; the receiver will be the Model 9270.

Other new receivers at NAB include Radiation Systems' SatCom Technologies Model 2020. It's a full-featured earth station receiver, and all options are included in the regular price.

In the audio area, Avcom is showing a satellite audio receiver (the SCS-200) fully compatible with United Video's Satellite Communication System (SCS) with tuning preselection (four different frequencies). It includes frequency-agile SCS demodulators.

New at this NAB will be a SDM 2000 Dolby-ized digital audio transmission system, and a Series 1800 low-cost audio/data receiver, both being offered by Wegener.

A new earth station controller, the Model 7670, is being introduced by Scientific Atlanta. It's a PC-based remote control system providing high-performance features at a low cost.

Comtech is another exhibitor announcing a PC-controlled antenna interface, the EC6.

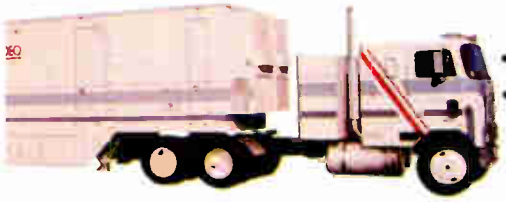
SNG

It is hard to imagine new offerings in SNG vehicles and flyaways in the face of all the activity last year, but Hubcom has managed to come up with a few new models. Among them are the SNG 230, a 16,900 pound gross vehicle weight unit featuring a walk-through body. Also new will be an SNG-100, 17,000 pound gvw short body unit. And Hubcom also reports it will show a new compact portable system, the VFP300. No details were provided.

MCL Inc., says it will have some new transportable, flyaway, and fixed satellite transmit and receive subsystems in the C and Ku bands. Power levels will range from 5 W to 3000 W.

The Will-Burt Co. reports it will have a new 30 foot telescoping mast assembly, the TMD-6-30-357/367, for those broadcasters combining ENG and SNG functions.—*James A. Lippke*

Picky, Picky, Picky.



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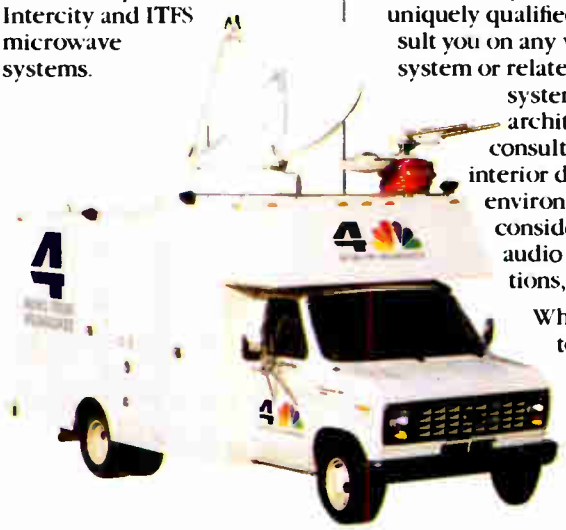

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Opto-SX™ VHF Switch-less RF Router

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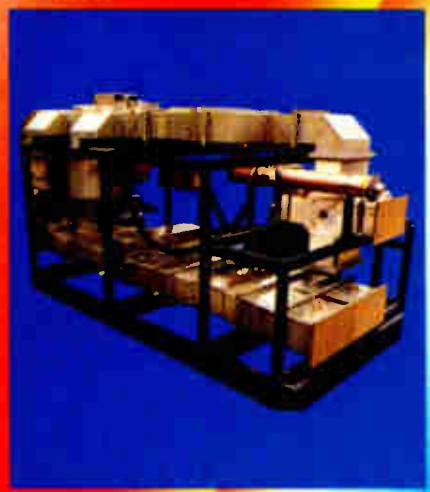

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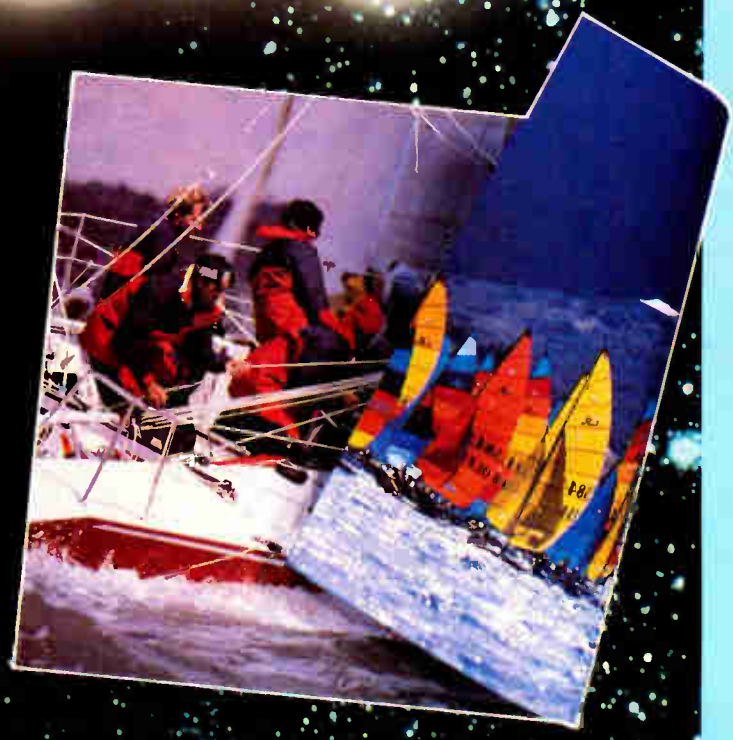

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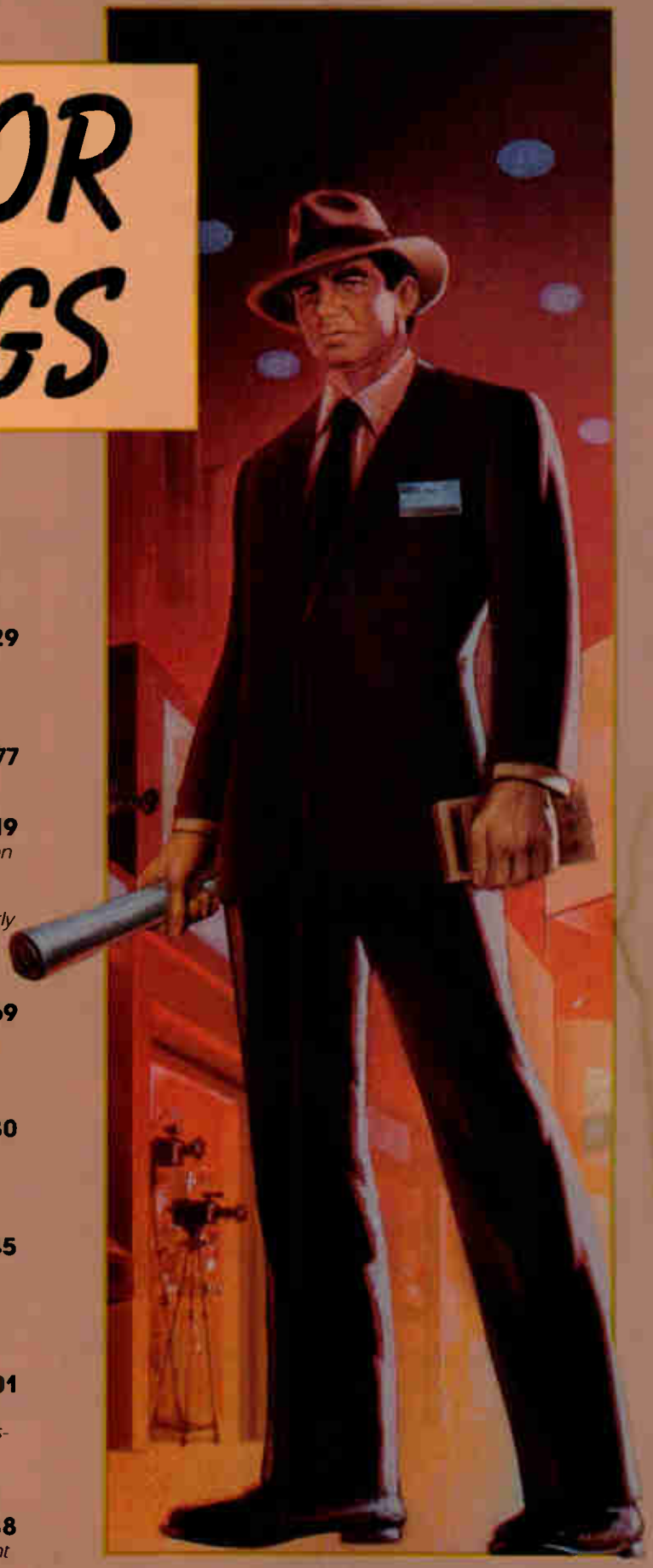

ABEKAS VIDEO SYSTEMS 1439
Electronic still stores
Character generators
Digital effects devices
Digital disc recorders
See ad on p. 30

ACCOM 5825
Video processors

ACCU-WEATHER 4151
Weather radar, graphics

ACOUSTIC SYSTEMS 5224
Portable booths
See ad on p. 180

ACRODYNE INDUSTRIES 3833
TV transmitters (Band I, Marconi)
See ad on p. 19

ADAMS-SMITH 1513
Time code equipment
ATR synchronizers
Audio for video editing systems
See ad on p. 53

ADC 3480
Audio and video patching equipment

ADELPHON 4256
Antennas, towers
Microwave for ENG

ADM TECHNOLOGY 4369
On-air consoles, mixers (BCS series, S/TV series, ST series)
Post-production consoles (VP series, Post-Pro series)

ADVANCED MICRO-DYNAMICS 5829
Weather radar, graphics (Dorprad-1, -2)

ADVANCED DESIGNS 4277
Antennas, towers

AEG BAYLY 719
Scene transition recognition
Studio ATRs
Turntables
Radio Transmitters (Formerly AEG Telefunken)

A.F. ASSOCIATES 2869
Telecines
Remote motion control
See ad on p. 99

AGFA-GEVAERT 3880
Videotape
Audio tape, carts

AKG ACOUSTICS 1245
Microphones, accessories
Audio monitoring equipment
Reverb, special efx

ALAMAR 3801
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Remote motion control systems

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ALDEN ELECTRONICS 4566
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Satellite earth stations

ALEXANDER MANUFACTURING 2205
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ALIAS RESEARCH 5221
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ALLEN & HEATH (MBI) 5016
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Post-production consoles

ALLEN AVIONICS 2705
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Hum eliminators
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ALLIED BROADCAST EQUIPMENT 557
Supplier of audio equipment

ALLIED BROADCAST SYSTEMS/SONOMAG 419
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ALLSOP 4141
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ALPHA AUDIO 2258
Automated audio editing system
Acoustic materials
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3/4-, 1/2-inch VCRs
Simple VTR editor/controller
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ALTA GROUP 5921
Time base correctors (Cygnus)
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Video routing switchers, DAs (Cygnus)

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AMBER ELECTRO DESIGN 1201
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AMCO ENGINEERING 2709
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Production switchers (Vista, AVC)
Videotape

Audio measurement system from Amber.

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Audio processors (AMS)
On-air consoles, mixers (Calrec M Series)
Microphones, accessories (Calrec Soundfield)
Digital production systems (AMS Audiofile)
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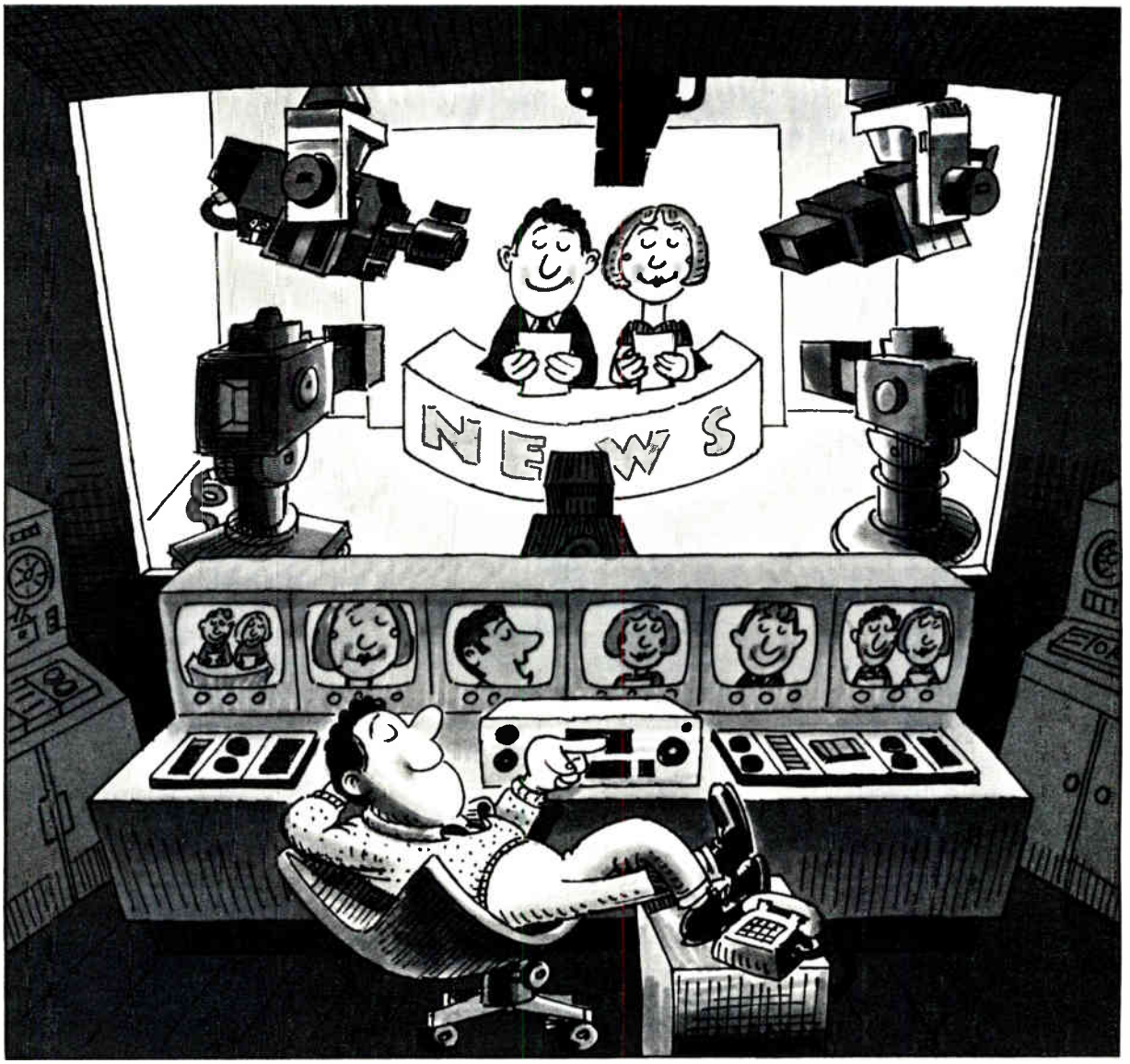
AMTEL SYSTEMS 2444/2447
Time code equipment (Evertz, Amitel)
Video edit list management systems
ATR synchronizers (Evertz)

Ampex's VPR-300 D-2 VTR.

AMX 5910/6009
Time base correctors
Production switchers
Remote control systems
See ad on p. 168

ANDREW CORPORATION 1811
Video test equipment
Switching automation
Remote motion control systems
Audio monitoring equipment
Audio test equipment
Studio automation equipment
Antennas, towers (Trasar)
MDS, SMATV systems
STLs, TSLs
Remote monitoring systems
Remote control systems
SNG systems
Satellite earth stations
Microwave for ENG
Wire, cable (Heliax)



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There's more, too. Like plug-in GPI or ESAM-II video editor interface. A host of standard audio features. And a price that is surprisingly competitive with manual broadcast consoles.

Before you buy a console, get all the facts about the most advanced, easiest-to-use audio mixing system available.

ORION RESEARCH INC. • 4650 W. 160th ST., CLEVELAND, OHIO 44135 • (216) 267-7700, TOLL FREE (EXCEPT OHIO): 1-800-82 AUDIO • FAX: (216) 267-5894

Circle 144 on Reader Service Card

ANGENIEUX 2634
Lenses

ANRITSU 5002
Video test equipment
Sync and pulse generators

ANTON/BAUER 2239
Lighting equipment
Power supplies, batteries

ANVIL CASES 1881
Transport cases

APHEX SYSTEMS 870
Audio processors

APPOLO AUDIO VISUAL 5826
Lighting equipment (Apollo, GE, BLV, Osram, etc.)
Carts and tables

ARBEN DESIGN 4563
Studio design

ARRAKIS SYSTEMS 465
On-air consoles, mixers

ARRIFLEX 2669
Lenses (Zeiss)
Lighting equipment (Arriflex HMI, Tugsten)
Camera support equipment

ARTEL 2077
Fiber optic systems (FiberPlex, FiberGraph, and FiberWay systems)

Asaca floppy disk still store.

ASACA/ SHIBASOKU 2642
Video test equipment
Electronic still stores
Digital disc recorders
IC Card audio file
See ad on p. 128

ASSOCIATED PRESS BROADCAST 2874
Programming

AUDIO ACCESSORIES 5729

AMS AudioFile digital production system.

ASSOCIATED PRODUCTION MUSIC 2216
Music libraries available on CD

ASTON ELECTRONICS 5725
Character generators (Caption, Spectra)

AT&T 3080
3D modeling, animations systems
Business automation systems (System 75XE)

ATI--AUDIO TECHNOLOGIES 359
Audio processors
On-air consoles, mixers
Audio routing switchers, DAs

AUDI-CORD 615
Cart decks (DL series)

AUDICO 1830
Videotape rewinders
Audiotape rewinders, verifiers
Jack panels
Prewired patch panels, patch cords

THE AUDIO BROADCAST GROUP 1033
Supplier of audio equipment and mobile production units

AUDIO KINETICS 259
Frame synchronizers (Q-Lock)
Simple VTR editor/controller (Eclipse)

AUDIO PRECISION 1030
Audio test equipment (System One)

AUDIO-TECHNICA 665
On-air consoles, mixers
Microphones, accessories
See ad on p. 172-173

AUDITRONICS 453
Audio processors
On-air consoles, mixers
Post-porduction consoles
Cart decks
Audio routing switchers, DAs
See ad pg. 75

AURORA SYSTEMS 2377
2D graphics systems
3D modeling, animations systems

AUTOGRAM 124
On-air consoles, mixers

AVCOM OF VIRGINIA 5331
Satellite earth stations
Video test equipment
Microwave for ENG
See ad on p. 169

B&B SYSTEMS 2473
Audio monitoring equipment (AM, IM series)
Internal headphone amp

BAF 5429,OUT
SNG systems

BARCO 2985
Video test equipment
See ad on p. 117

BARRETT ASSOCIATES 156

BASYS 3884
Business automation
Newsroom computers

BCS 6116
Used broadcast equipment

BEAVERONICS 1848
Humbucking coils
Downstream keyers
Master clock systems
ESE clocks and timers

BELAR ELECTRONICS LABORATORY 553
Audio monitoring equipment
Remote monitoring systems
MTS equipment
SCA equipment
See ad on p. 167

BENCHER 3987
Camera support equipment

BENCHMARK MEDIA SYSTEMS 4287
Audio monitoring equipment
Wire, cable

BEYER DYNAMIC 1824
Microphones, accessories (MC Series, MCE Lavalier, MCM Modular System)
Audio monitoring equipment (DT headsets)

BHP 5619
Multisource video editors (TouchVision)

BIRD ELECTRONICS 635
Remote monitoring systems (WattWatcher)
Dummy loads
Video test equipment
Attenuators

BOGEN PHOTO 4505
Camera support equipment

BOGNER BROADCAST EQUIPMENT 2666
Antennas, towers
See ad on p. 122

BOONTON ELECTRONICS 1128
Bridges and calibrators
Audio test equipment

BOWEN BROADCAST SERVICE 4507
Videotape maintenence
Infared equipment

BRADLEY BROADCAST SALES 140
Audio test equipment
Digital ATRs (SoundScape)
Telco interface equipment (Telos)
Audio monitoring equipment (Tannoy)

BROADCAST AUDIO 139
Audio processors
On-air consoles, mixers
Post-production consoles

BROADCAST ELECTRONICS 303
On-air consoles, mixers (Mix Trak 90)
Cart decks
Turntables
Studio automation equipment
Radio transmitters
Antennas, towers (Series BEI, ERI)
Remote control systems (MVDS remote control)
AM stereo equipment

BROADCAST MANAGEMENT PLUS 2166
Business automation systems

3/4-, 1/2-inch VCRs
Video processors
Telecines
Video test equipment
Electronic still stores
Character generators
Digital effects devices
2D graphics systems
3D modeling, animations systems
Simple VTR editor/controller

Broadcast Electronics Phase Trak 90 cart machine.

BROADCAST MICROWAVE SERVICES 4123
STLs, TSLs
Microwave for ENG
Power supplies, batteries

BROADCAST SUPPLY WEST (BSW) 365
Supplier of audio and transmission equipment

BRYSTON 1305
Amplifiers and preamps
See ad on p. 163

BSM SYSTEMS 1233
Video routing switchers, DAs (Modula)
Audio routing switchers, DAs (Modula)

BTS 2920
Studio Cameras
ENG/EFP Cameras
Camcorders
One-inch VTRs
3/4-, 1/2-inch VCRs
Video processors
Telecines
Video test equipment
Electronic still stores
Character generators
Digital effects devices
2D graphics systems
3D modeling, animations systems
Simple VTR editor/controller
Production switchers
Switching automation
Video routing switchers, DAs
Sync and pulse generators
Audio routing switchers, DAs
ENG/EFP vehicles
Mobile production units
See ad on p. 86

CABLEWAVE SYSTEMS 2614
Antennas, towers
Wire, cable

CALZONE CASE 1852
Transport cases

CAM-LOK 5931
Video routing switchers, DAs
Camera support equipment

CAMBRIDGE PRODUCTS 2788
Wire, cable

CAMERA MART 2366
Lenses
ENG/EFP Cameras
3/4-, 1/2-inch VCRs
Video test equipment
Sync and pulse generators
Time code equipment
Remote control systems
See ad on p. 5

CANARE CABLE, DNC 4556
Camera support equipment
Cable reels
Wire, cable (Star Quad Audio)

CANON USA 2338
Lenses
Camera support equipment
See ad on p. 55, 57

CASCOM 5127
Graphic/animation service

CAT SYSTEMS 1861
Remote monitoring systems
Remote control systems

CATEL TELECOMMUNICATIONS 1252/1350
Fiber optic systems

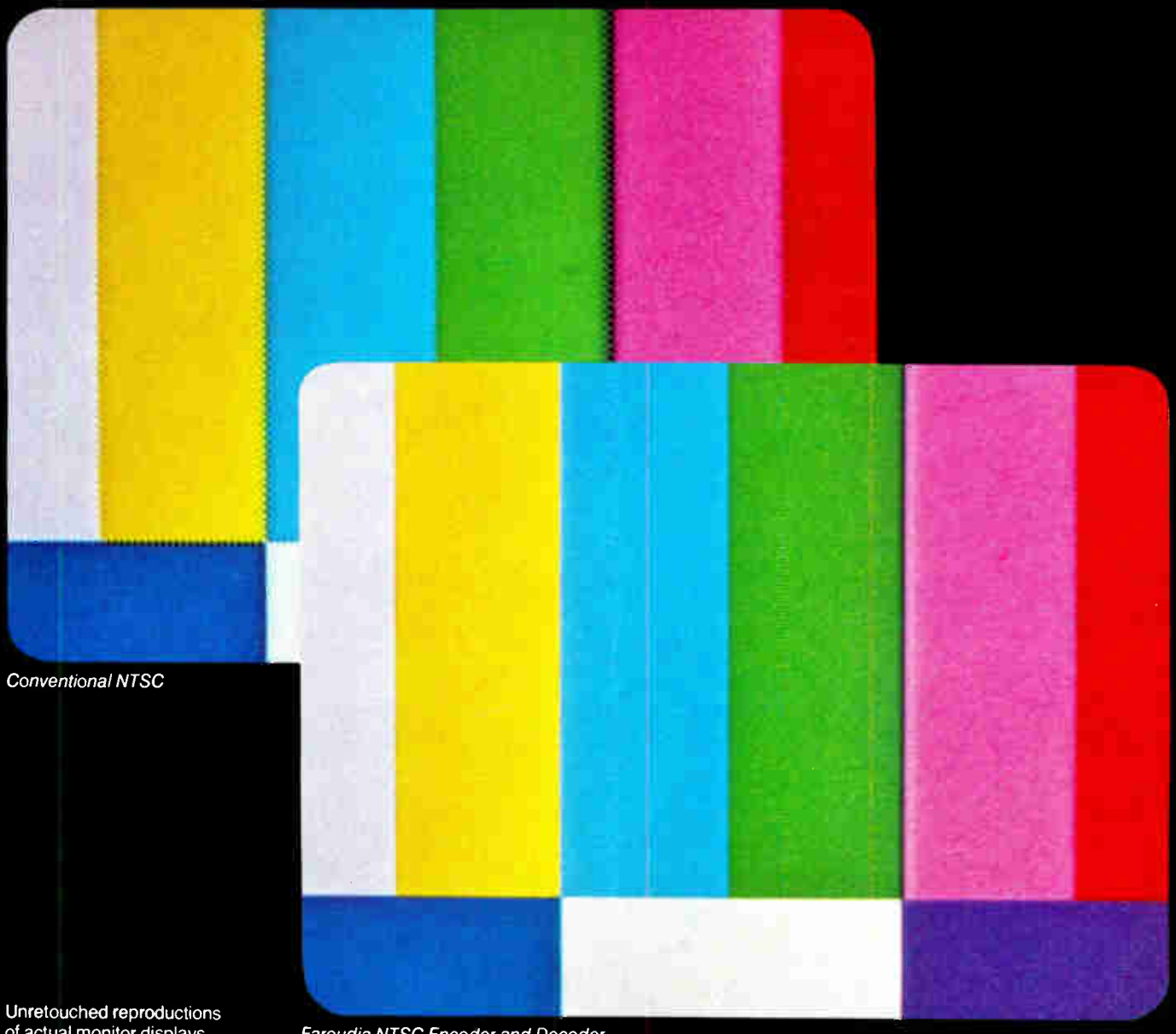
CBSI 653
Business automation systems (System)

CEL ELECTRONICS 1433
Frame synchronizers
Digital effects devices
Simple VTR editor/controller
Video routing switchers, DAs
Camera support equipment
Digital production systems

CENTRAL DYNAMICS 4249
Production switchers
Master control switchers
Video routing switchers, DAs

CENTRAL TOWER 1034
Antennas, towers (Guyed and self-supporting towers)

CENTRO 3569
ENG/EFP vehicles



Conventional NTSC

Unretouched reproductions
of actual monitor displays.

Faroudja NTSC Encoder and Decoder

IMPROVE YOUR NTSC

Faroudja Laboratories improved NTSC is fully compatible with the present system. Faroudja technology is licensed to Conrac, Fortel, Ikegami, JVC, Sony, etc...

If you want your NTSC to look like R.G.B., see us at NAB Booth 4535.

FAROUDJA Laboratories

Faroudja Laboratories Inc.
946 Benicia Avenue
Sunnyvale, California 94086
Telephone 408/245-1492
Telex 278559 MUHA UR
Fax 408/245-3363

Circle 158 on Reader Service Card

COMTECH ANTENNA 1202
Antennas, towers
Satellite earth stations

COMTEK 4524
Microphones, accessories
Intercoms

COMWAVE 4257
TV transmitters
MDS, SMATV systems
SCA equipment

Conrac Micromatch monitor.

CONCEPT PRODUCTIONS 833
Digital ATRs
Digital production systems
Studio automation equipment

CONIFER 2559
MDS, SMATV systems
Microwave for ENG
ITFS/MMDS equipment

CONNECTRONICS 270/172
On-air consoles, mixers (Seck)
On-air consoles, mixers (Seck)
Wire, cable (Mosiflex, Studiflex)
Cable connectors

CONNELLY SYSTEMS 5133
Switching automation (CATS, VTS-100)

CONRAC 3135
Video test equipment (Micromatch color monitors)

CONTINENTAL ELECTRONICS/ VARIAN 324
Radio transmitters
TV transmitters
AM stereo equipment
Microwave for ENG
Transmitting, power tubes
See ad on p. 4, 76

CONTROL CONCEPTS 4159
Surge protectors (Isiatron Plus)

CONVERGENCE 1867
See EECO/Convergence

COOL-LUX 2253
Lighting equipment
Camera support equipment

CORPORATE COMMUNICATIONS CONSULTANTS 2080
Telecine color correction and control

COUNTRYMAN ASSOCIATES 1034
Microphones, accessories (Isomax)

CROSSPOINT LATCH 2374
Time base correctors
Digital effects devices
Production switchers
Master control switchers
Sync and pulse generators

CROWN INTERNATIONAL 843
Microphones, accessories
Audio test equipment
Amplifiers

CSI MARKETING 239
Radio transmitters
Power conditioning, lighting
See ad on p. 22

CYCLE SAT 5433/2629
Data decoder/reciever

PETER W. DAHL 865
Power supplies, batteries

BILL DANIELS COMPANY 2556
Corporate services

DATACOUNT 5525
Business automation systems

DATATEK 2356
Video routing switchers, DAs
Audio routing switchers, DAs
See ad on p. 103

DATAWORLD 165
Broadcast databases

DATUM 4147
Time code equipment
Audio processors

dbx 1225
Audio processors
Audio test equipment
Compact disc equipment
Noise reduction equipment
MTS equipment

DELTA ELECTRONICS 134
Audio processors
Audio monitoring equipment

Eventide's H3000 Ultra-Harmonizer.

CUBICOMP 4310
2D graphics systems (PictureMaker)
3D modeling, animations systems (PictureMaker, Vertigo)

CURRENT TECHNOLOGY 6110
Power supplies, batteries
AM stereo equipment
See ad p. 167

DESISTI LIGHTING 2345
Lighting equipment

DeWOLF MUSIC LIBRARY 1844
Prerecorded music libraries

DI-TECH 2180
Video routing switchers, DAs
Audio routing switchers, DAs

DIELECTRIC COMMUNICATIONS 4334
Antennas, towers
See ad on p. 94-95

DIGITAL ARTS 5810
3D modeling, animations systems

DIGITAL AUDIO RESEARCH 5419/5421
Digital production systems (Soundstation II)

Fairlight MFXIII efx device.

DIGITAL CREATIONS 5929
Studio automation equipment
Video editor/audio console serial interfaces

DIGITAL SERVICES CORP. (DSC) 3556
Digital effects devices (Eclipse, Illusion)
Digital disc recorders (DISC)
See ad on p. 96

DOLBY LABORATORIES 2380
Video processors
Audio processors
Noise reduction equipment

DORROUGH ELECTRONICS 458
Audio processors
On-air consoles, mixers
Audio monitoring equipment

FUJINON'S NEW A8.5x5.5ERM — THE WIDEST ZOOM IN THE WORLD

The Fujinon advantage — deploying the 1.7X extender gives you a 9.3mm wide angle instead of 12mm.

- **With extender — 9.3mm**
- **Without extender — 5.5mm**
- **Best maximum aperture of any wide angle lens**

You told us what you wanted in an ultra wide angle zoom. The added range and flexibility of an extender without settling for a wide angle any ENG can offer. You wanted a zoom that could cope with lower light level operation.

We've delivered. Designed and manufactured with your input, Fujinon's new A8.5x5.5ERM is the widest zoom made. Instead of a conventional 2X extender, it has a 1.7X extender. When it's in position, you still get an extra-wide 9.3mm. And, at the full tele positions (1X - 47mm, 1.7X - 80mm), it gives you a half F-stop speed advantage.

In fact, the F1.7 maximum aperture remains flat from 5.5mm out to 37mm and drops only to F1.9 at the full tele position. Throughout its dual ranges, you get distortion-free zooms with all the brightness, contrast, and color accuracy that has made Fujinon famous. Naturally, the new A8.5x5.5ERM provides the high MTF and low longitudinal chromatic aberration you expect from Fujinon.

You also wanted absolute production control. To accommodate your needs, the lens accepts a full range of Fujinon studio conversion accessories including shot boxes that deliver push-button operation with accuracy to a single millimeter and zooms at the precise speed you want. It's even available with a built-in test pattern projector.

To learn more about all of Fujinon's wide angle zooms — the A3.5x6.5RM, A7x7RM, the new A8.5x5.5ERM, and the A18x8.5ERM — you'll get more information or a demonstration by calling the Fujinon location nearest you.

FUJINON INC.	10 High Point Drive, Wayne, NJ 07470	(201) 633-5600 Telex 6818115
SOUTH	2101 Midway, Suite 350, Carrollton, TX 75006	(214) 385-8902
MIDWEST	3 N. 125 Springvale, West Chicago, IL 60185	(312) 231-7888
WEST	118 Savarona Way, Carson, CA 90746	(213) 532-2861 Telex 194978

FUJINON

Circle 159 on Reader Service Card

DUBNER 2928N1
See Grass Valley Group

DWIGHT CAVENDISH 4574
Videocassette duplicating equipment

DX COMMUNICATIONS 1345
SNG systems

Fortel Super Pro 100.

DYNAIR 3730
Video routing switchers, DAs
Audio routing switchers, DAs
Fiber optic systems

DYNAMIC TECHNOLOGY 1647
Switching automation
Video routing switchers, DAs
Lighting equipment
Satellite earth stations

DYNATECH 3344
See separate listing for
Dynatech Newstar
Quanta
Colorgraphics
Utah Scientific
Lightning Elimination
See ad pp. 33-36

DYNATECH NEWSTAR 3344
Newsroom computers
See ad pg. 33-36

EASTMAN KODAK 1835
Videotape
See ad on p. 25

ECHOLAB 1866
Production switchers

ECONO BROADCAST SERVICE 771
Transmitting, power tubes

EDITRON 5327
Simple VTR editor/controller
Multisource video editors
ATR synchronizers

EECO/CONVERGENCE 1867
Simple VTR editor/controller (IVES II Pro)
Multisource video editors (EMME, ECS-195)
Time code equipment (EECONOLINE)
Interactive video products (EECODER)
See ad p. 152

EEG 2247
Vertical blanking interval digital data transmission equipment

EEV 3384
Camera pickup tubes
Transmitting, power tubes
See ad pg. 149

EG&G 2220
Tower lighting

ELCOM BAUER 631
Radio transmitters

ELCON ASSOCIATES 5828
Tape cleaners

ELECTRO CONTROLS 4184
Lighting equipment

ELECTRO IMPULSE LAB 413
RF loads

ELECTRO-VOICE 730
On-air consoles, mixers (BK Series)
Microphones, accessories
Audio monitoring equipment (Sentry monitor speakers)

EMCEE BROADCAST PRODUCTS 3053
TV transmitters
Antennas, towers
MDS, SMATV systems
Remote monitoring systems
Remote control systems
SCA equipment
Microwave TX for ITFS and MMDS

EMCOR/CRENLO 4246
Modular electronic cabinetry and computer support furniture

EMERGENCY ALERT RECEIVER 1352
SCA equipment (SCA communications)
EBS recievers

ESD 4271
Weather radar, graphics

ESE 1800
Video routing switchers, DAs
Time code equipment
Telco interface equipment

EVENTIDE 871
Audio processors
Reverb, special efx
Time compression systems (Timesqueese Jr.)

EVERTZ MICROSYSTEMS 2087
Character generators
ATR synchronizers (Chaser, Emulator 7600)
Time code equipment (VITC and LTC generators, readers, and translators)
ATR synchronizers (Chaser Emulator 7600)

EXCALIBUR 2882
Production cases

EXPRESS TOWER 2186
Antennas, towers

FAIRLIGHT INSTRUMENTS 5315
Digital effects devices
On-air consoles, mixers
Digital production systems (Series III)

FAROUDJA LABS 4535
Video processors
See ad on p. 105

FARRTRONICS 4538
Audio routing switchers, DAs
Intercoms

FIBERBILT CASES 4004
Cases

FIDELIPAC 515
Cart decks
Audio tape, carts
Tape storage systems
Studio warning lamps
See ad on p. 1

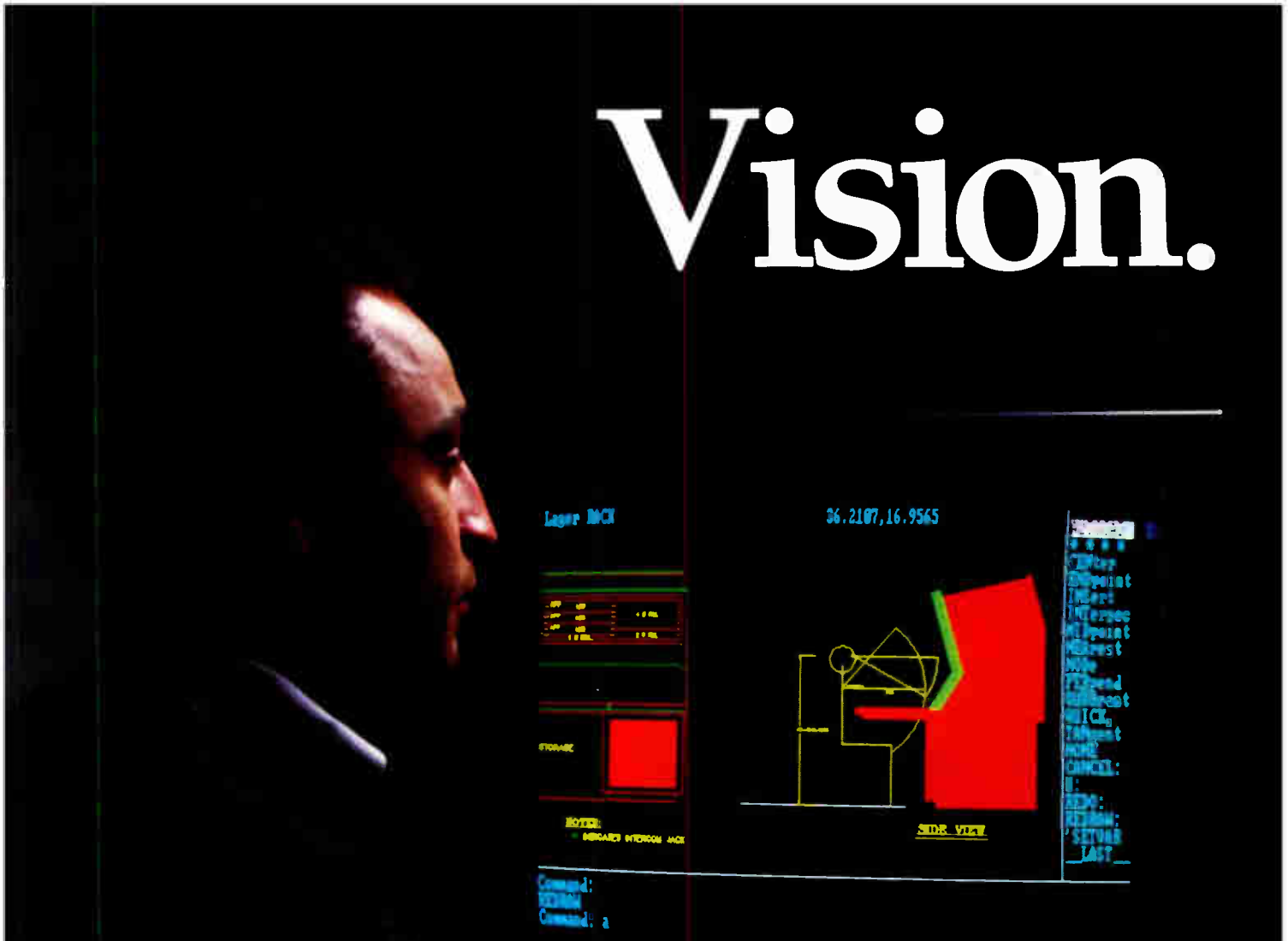
FIRST COM 5515
Prerecorded sound effects library

Ikegami's CCD-770 professional CCD camera.

FLASH TECHNOLOGY 4125
Tower lighting

FOR-A 3169
Time base correctors
Frame synchronizers
Video processors
Character generators
Digital effects devices

Vision.



Let the creative engineers at Lake Systems make the reality better than your dream.

LAKE

The Systems Company

287 Grove Street
Newton, Massachusetts 02166

Designing, Engineering and Installing Teleproduction Facilities, Worldwide.

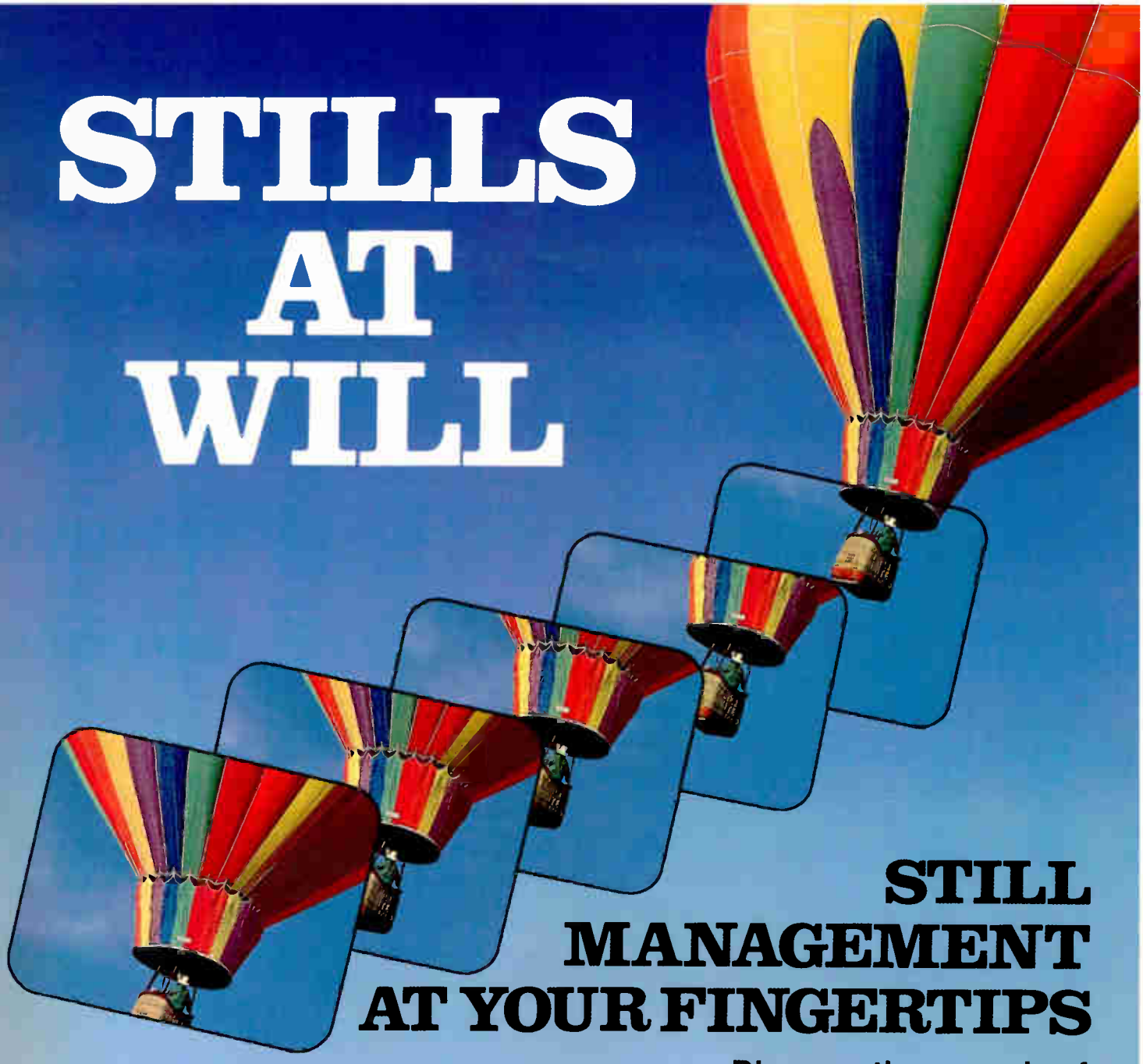
Please call us to discuss your plans.

(617) 244-6881 1-800-848-4890

Circle 160 on Reader Service Card

See us at NAB Booth 1039.

STILLS AT WILL



STILL MANAGEMENT AT YOUR FINGERTIPS

Discover the marvels of Leitch Video's new STILL FILE

Capable of storing up to 10,000 stills, retrievable in a FLASH, this flexible video still store delivers powerful still management at your fingertips. Ease of operation is ensured with a compact control panel, single key functions and on-line help. Stills can be individually compressed, repositioned and bordered. Furthermore, multiple STILL FILE systems can exchange stills over a data network, and a complete tape backup and restore system allows stills and their descriptions to be archived conveniently.

All this with Leitch high quality video specifications. For a versatile production tool that gets the picture every time – look into a STILL FILE today!

LEITCH

STILL FILE™

Leitch Video International Inc., 10 Dyas Rd., Don Mills, Ont., Canada M3B 1V5 – Tel: (800) 387-0233 Fax: (416) 445-0595 Telex: 06-986241
Leitch Video of America, Inc., 825K Greenbrier Circle, Chesapeake, VA 23320 – Tel: (804) 424-7920 or (800) 231-9673 Fax: (804) 424-0639

Circle 161 on Reader Service Card

Video routing switchers, DAs
Digital ATRs
Audio routing switchers, DAs

FORT WORTH TOWER 3066
Antennas, towers

FORTEL 3576
Time base correctors
Video processors

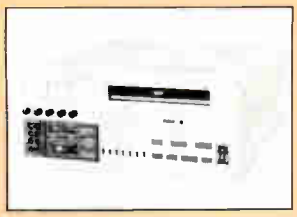
FOSTEX 4251
Character generators
Time code equipment
Audio processors
Microphones, accessories
Reverb, special efx
ATR synchronizers

FREZZOLNI ELECTRONICS 2438
Power supplies, batteries

FUJINON 4301
Lenses
See ad on p. 107

FUJI PHOTO FILM 4307
Videotape
See ad on p. 10, 11

FUTURE PRODUCTIONS 5830
Video routing switchers, DAs
Camera support equipment
Videotape duplication system
Power supplies, batteries



S-VHS deck from JVC.

G & M POWER PRODUCTS 4534
Power supplies, batteries

GARNER INDUSTRIES 4007
Videotape erasers
Audio tape erasers
Magnetic tape erasers

GE LIGHTING 1051/1150
Lighting equipment

GENERAL ELECTRIC/ COMBAND 5615
Addressable systems for MMDS/ITFS
Multichannel block downconverters

GENTNER ENGINEERING 265
Telco interface equipment
Audio routing switchers, DAs
Intercoms

GORMAN REDLICH MFRG. 1200
Remote monitoring systems

GOTHAM AUDIO 2330
Supplier of microphones and studio ATRs

GRAHAM-PATTEN SYSTEMS 4530/5433
Video routing switchers, DAs
Character generators
Post-production consoles
Subcarrier systems

GRASS VALLEY GROUP 2928
Character generators (Dubner Texta, Graphics Factory, 10K, and 20K)
Digital effects devices (Kalidoscope)
2D graphics systems (Dubner CBG)
3D modeling, animations systems (Dubner CBG)
Multisource video editors
Production switchers
Master control switchers
Switching automation
Video routing switchers, DAs (Horizon, Ten-X)
Post-production consoles
Audio routing switchers, DAs
Fiber optic systems
See ad on p. 8, 162

GRAY COMMUNICATIONS CONSULTANTS 2242/2246
ENG/EFP vehicles
SNG systems
Mobile production units
AM stereo equipment
ENG/EFP systems
See ad on p. 82-83

HARRIS VIDEO SYSTEMS 503
Time base correctors
Frame synchronizers

Leader WF monitor vector/WF display left

GRAY ENGINEERING LABS 4174
Time code equipment

THE GREAT AMERICAN MARKET 2684
Lighting equipment

GRUMMAN 3253
Business automation systems

JAMES GRUNDER ASSOCIATES 1433
Time base correctors
Digital effects devices
Simple VTR editor/controller
Video routing switchers, DAs
See ad on p. 24

GTE/SPACENET 1333
SNG and satellite services

HALLIKAINEN & FRIENDS 0308
Video test equipment
Post-production consoles
Audio monitoring equipment
Remote control systems

HARRIS BROADCAST 503
Audio processors
On-air consoles, mixers
Post-production consoles
Noise reduction
Audio test equipment
MTS equipment
Electronic still stores
Digital effects devices

HARRISON SYSTEMS 125
Audio processors
On-air consoles, mixers
Post-production consoles
Audio routing switchers, DAs
See ad on p. 17

HEDCO (SUBSIDIARY OF LEITCH VIDEO) 1820
Video test equipment
Video routing switchers, DAs
Audio monitoring equipment
Audio test equipment

KARL HEITZ 2263
Camera support equipment
Videotape
Microphones, accessories

HIPOTRONICS 4546
Power supplies, batteries
Automatic voltage regulators

HITACHI DENSHI 3324
Studio Cameras
ENG/EFP Cameras
Video test equipment
See ad on p. 67

HM ELECTRONICS 4238
Microphones, accessories

HME **4238**
Microphones, accessories
Intercoms

HOFFEND & SONS **2187**
Lighting equipment

HOLIDAY INDUSTRIES **1114**
Video test equipment
Video test equipment (Video monitor)
Microwave for ENG
See ad on p. 14-15

IMAGE VIDEO **3584**
Video routing switchers, DAs
Digital production systems
Audio routing switchers

Magni WFM560 component waveform monitor.

HOTRONIC **2571**
Time base correctors
Frame synchronizers

HOWE TECHNOLOGIES **153**
Audio processors (Phase Chaser)
On-air consoles, mixers
Post-production consoles

HUBBARD COMMUNICATIONS **1139**
SNG systems (Hubcom)
Satellite earth stations (Hubcom)

IGM COMMUNICATION **619**
Cart decks
Turntables
Studio automation equipment

IKEGAMI ELECTRONICS **2320**
Studio Cameras (HK series)
ENG/EFP Cameras (HL series)
Camcorders
Video processors
Telecines

INNOVATIVE TELEVISON EQUIPMENT **2623**
Camera support equipment

INOVONICS **770**
Audio processors
Audio monitoring equipment
Electronics upgrades for ATRs and film recorders
TV transmitters
FM/FMX stereo generators

INTERACTIVE MOTION CONTROL **4263**
Remote motion control systems

INTERGROUP TECHNOLOGIES **2359**
Production switchers
Master control switchers

ITELCO USA **3387/3487**
Radio transmitters
TV transmitters
Microwave for ENG

ITS **1113**
TV transmitters
MDS, SMATV systems

J-LAB **1019**
Remote motion control systems
Video routing switchers, DAs
Component cable extender

JAMPRO **531**
Antennas, towers
Cable, wire

JBL/UREI **4377**
Audio processors (JBL/UREI)
On-air consoles, mixers (UREI, Soundcraft)
Post-production consoles (Soundcraft)
Noise reduction equipment (UREI)
Loudspeakers
Amplifiers

New DAT cassettes from Maxell.

JEFFERSON PILOT DATA SERVICES **1821**
Business automation systems

JENSON TOOLS **4016**
Broadcast tool kits

JOHNSON ELECTRONICS **1300**
SCA equipment

JVC **2656**
Studio Cameras
ENG/EFP Cameras
3/4-, 1/2-inch VCRs (CR, BR, KR series)
Simple VTR editor/controller
Video test equipment
Duplicators
See ad on p. 6-7

K&H PRODUCTS **3374**
Soft nylon cases

KAHN COMMUNICATIONS **739**
Audio processors
Telco interface equipment
Remote pickup, RENG equipment
AM stereo equipment

KALAMUSIC **5625**
Prerecorded music libraries

KANGAROO VIDEO PRODUCTS **2214**
Camera support equipment
Recorder, camera, and monitor covers

KAVOURAS **4520/4523**
3D modeling, animations systems
Weather radar, graphics

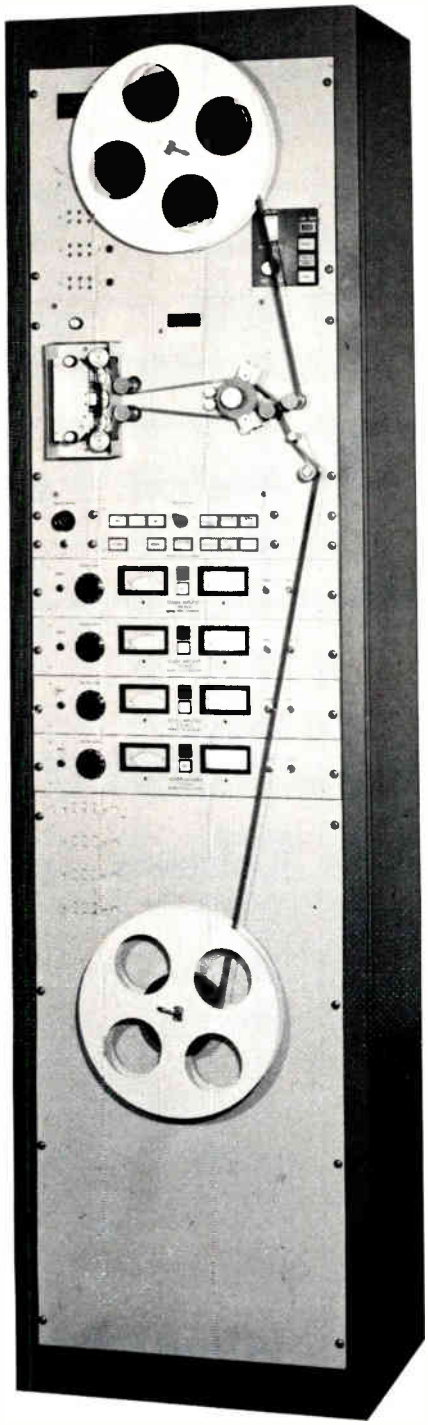
KAY INDUSTRIES **728**
Power supplies, batteries
Power converters

KINEMETRICS/ TRUETIME **4015**
Time code equipment

KING ELECTRONICS **4010**
Wire, cable
Connectors and patches

KINTEK **1611**
Audio processors
Audio monitoring equipment
Audio test equipment

KINTRONIC LABS **1040**



MAGNA-TECH

THE SOUND HEARD AROUND THE WORLD

Magnetic Film Recorders and Reproducers for Television and Film Sound Post-Production

HIGH SPEED

Telecine Magnetic Followers
Video Tape-Film Interlock
Electronic Looping
Dubbing Systems
16 and 35mm Electronic Projectors
Total Facility Engineering

WORLDWIDE SALES OFFICES

Paris
Hi-Fidelity Services
4 Rue Semard
75009 Paris, France

Sydney
Magna-Techtronics (Aust.)
PO Box 150
Crows Nest NSW 2064
Australia — Telex 24655

Johannesburg
Magna-Tech Satty Ltd.
Private Bag #5
Melville 2109
South Africa
Tel: 011-726-4266

Rome
Studio Sound System S.N.C.
Via Teano 305
00171 Roma Italy
Tel: 257-9458

Brussels
A.R.C.
Rue de Boisde Linthout 45
1200 Brussels Belgium

Hong Kong
Paul Yang and Associates
901 Star House
3 Salisbury Road
Kowloon, Hong Kong

Bombay
Capt. P.K. Vishwanath
234/4 Rama Baug,
Deodhar Road
Bombay 400 019, India

Willstatt West Germany
Zenon GMBH
Carl-Benc Str. 6
Willstatt 7601
Tel: 07852/7025
Telex: 753537

London
Branch & Appleby
Stonefield Way
Ruislip
Middlesex HA40YL
England

Kuala Lumpur
Kinematronika Sdn. Bhd.
2852, Jalan Selangor/
Persekutan,
Federal Hill
Kuala Lumpur, Malaysia

Caracas
Cine Materiales srl
Apartado Postal 61.098
Caracas 106 Venezuela

MAGNA-TECH ELECTRONIC CO., INC.

630 Ninth Avenue, New York, N.Y. 10036

Telephone (212) 586-7240 Telex 126191 Cables "Magtech"

Circle 162 on Reader Service Card

AM directional antenna feeder systems

KLIEGL BROS. 3720
Lighting equipment

KLINE IRON & STEEL 5908
Antennas, towers

KNOX VIDEO PRODUCTS 2551
Character generators

L-W ATHENA 4005
Telecines

LAIRD TELEMEDIA 3962
Video processors
Telecines
Character generators
Video routing switchers, DAs

LAKE SYSTEMS 1039
Video and audio systems designer
MERPS systems (LaKart)
See ad on p. 109

LANDY ASSOCIATES 2677
Video and audio equipment distributor

LDL COMMUNICATIONS 2175
Radio transmitters (Larcan)
TV transmitters (Larcan)
Antennas, towers

LEADER INSTRUMENTS 3472/3275
Video test equipment
Sync and pulse generators
Audio test equipment
AM stereo equipment
See ad p. 39

LEADER-BRAC INDUSTRIES 6121
Tape splicer/dispensers

LEE COLOR-TRAN 3580
Lighting equipment
Camera support equipment

LEITCH VIDEO 2169
Frame synchronizers
Video processors
Video test equipment
Electronic still stores
Video routing switchers, DAs
Sync and pulse generators
Audio routing switchers, DAs
See ad on p. 110

LEMO 4022
Video, audio, and general equipment connectors

LENCO 3956
Time base correctors
Video processors
Video test equipment
Video routing switchers, DAs (Starflex)
Sync and pulse generators
Audio routing switchers, DAs

LEXICON 1209
Audio processors (Lexicon)
Digital production systems (Opus)
Reverb, special efx (480L)
Time compression systems

LOGITEK 825
On-air consoles, mixers
Post-production consoles
Audio routing switchers, DAs

LOWEL-LIGHT 2569/2471
Lighting equipment

LPB 639
On-air consoles, mixers (Citation, Signature III series)
Audio routing switchers, DAs
Radio transmitters (AM series)

LTM 4135
Lighting equipment
Camera support equipment
Microphones, accessories

LUXOR 5812/5816
A/V tables, stands, storage cabinets

McCurdy's stereo audio test set.

LIGHTNING ELIMINATORS AND CONSULTANTS 1025
Consulting and hardware for lightning strike prevention

LIPSNER-SMITH 2466
Ultrasonic film cleaner

LISTEC VIDEO 4314
Character generators
Teleprompters

LYON LAMB VIDEO ANIMATION SYSTEMS 2251
3D modeling, animation systems and accessories

3M BROADCASTING 2305
Switching automation
Video routing switchers, DAs (H series)
Character generators
2D graphics systems (Silver)
3D graphics systems/animation (Spectre)
Sync and pulse generators
See ad pg. 40-41

3M MAGNETIC MEDIA 2305
Videotape
Audio tape, carts
See ad pg. 150-151

M/A-COM 3633
Microwave for ENG
See ad p. 84

MAGNI SYSTEMS 5105
Video processors
Video test equipment
See ad on p. 69

MAGNUM TOWERS 714
Antennas, towers

MARCOM 103
Radio transmitters (Ian Hill & Assoc. Pulse Power AM)
Marcom modulation monitors

MARCONI INSTRUMENTS 2518
Video test equipment

MARTI ELECTRONICS 525
Audio processors
Mics, accessories
Audio monitoring
Remote pickup, RENG (Marti)
STLs, TSLs (Marti)
Remote control systems (AMD)
SCA equipment (Marti)

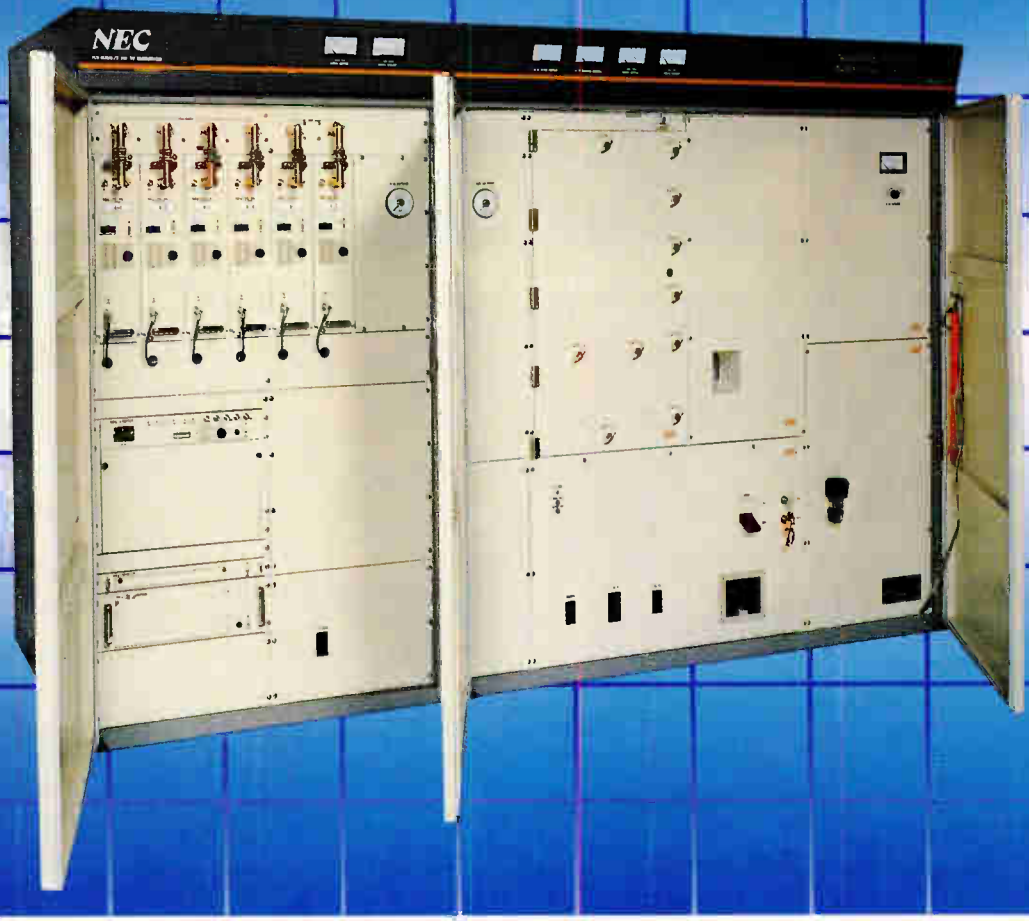
MATCO 4487
Production switchers
Studio Cameras (Tape duplicators)
Business automation systems

MATTHEWS STUDIO EQUIPMENT 4374
Lighting equipment
Camera support equipment

MAXELL 2383
Videotape
Audio tape, carts

MAZE BROADCAST 5818
Used broadcast equipment

The new standard of dependability: VHF TV transmitters from NEC.



35kW high-band and 30kW low-band models meet your needs for the next decade.

High power transmitters are a major investment. You have to work with them, maintain them, and profit from them over the years. Our PCN-1400 Series transmitters reward your investment. Because they give you over a decade's worth of daily dependability, easy maintainability and superior performance.

SINGLE-UNIT, HIGH-PERFORMANCE EXCITER.

Our hybrid IC technology slashes component count by 30%—thereby boosting reliability, making it possible to build all modules into a single unit. Design refinements include sophisticated circuits to correct linearity, and stereo capability without modification.

HIGH-POWER TRANSISTOR PA.

The solid state PA uses high-power, high-gain transistors newly developed by NEC. The aural section is 100% solid state. There's only one tetrode in the final video amp.

The PCN-1400 Series gives you a wide choice of models from 500W to 35kW, high or low channels. And all models up to 10kW are 100% solid state.

30 YEARS EXPERIENCE, 1,600 INSTALLATIONS.

NEC has installed over 1,600 transmitters in 30 years. We back our customers with 24-hour service. So take the risk out of your next investment. Call NEC and find out about the new standard of dependability in TV transmitters.

NEC America, Inc.
Broadcast Equipment Division,
1255 Michael Drive, Wood Dale, Illinois 60191,
Tel:312-860-7600. Fax:312-860-2978. Twix:910-222-5991.

C&C
Computers and Communications

NEC

Circle 129 on Reader Service Card

McCURDY RADIO INDUSTRIES 1849
Audio processors
On-air consoles, mixers (S series)
Audio test equipment
Intercoms
Audio routing switchers, DAs
See ad on p. 79

MCL OUTSIDE
SNG systems
Satellite earth stations

McMARTIN INDUSTRIES 512
Audio processors
On-air consoles, mixers
Audio monitoring equipment
Radio transmitters
Exciters

MEDIA COMPUTING 4275
Editing software
Boadcast-related software

MEDIA GENERAL 3251
Prerecorded music libraries

MERLIN ENGINEERING WORKS 4338
Switching automation (IO Driver)

MICRO COMMUNICATIONS 4166
Antennas, towers
MDS, SMATV systems
MTS equipment
Duplexers
Switchless combiners
W/G transmission line

MICRO CONTROLS 102
STLs, TSLs
Remote control systems

MICRODYNE 1016
Antennas, towers
SNG systems (Quick Link)
Satellite earth stations

MICRON AUDIO PRODUCTS 2262
Microphones, accessories

Ramsa WR-T802B console from Panasonic.

Radio transmitters

MICROSONICS 4262
Comb filters

MICROTIME 2638
Time base correctors
Frame synchronizers
Digital effects devices
3D modeling, animations systems

MICROWAVE RADIO 2935
Antennas, towers (ProStar)
Microwave for ENG

MILLER FLUID HEADS 2364
Camera support equipment

MINOLTA 2573
Video test equipment (Chroma meters)

MITSUBISI PRO AUDIO 4009
On-air consoles, mixers (Westar)
Post-production consoles
Studio ATRs (X series)
Digital ATRs
+Cart decks

MODULITE/ BARDWELL 2789
Lighting equipment

MOLE-RICHARDSON 4107
Lighting equipment

MONTAGE GROUP 1009
Multisource VTR editor/controller

MOSELEY ASSOCIATES 2315
Audio routing switchers, DAs
STLs, TSLs
Remote control systems
SCA equipment

MOTOROLA 117
Audio monitoring equipment
AM stereo equipment (C-QUAM)

NADY SYSTEMS 4009
Microphones, accessories

Quanta's Artista 3D modeling and animation system.

MIDWEST COMMUNICATIONS 4342
ENG/EFP vehicles
SNG systems
Mobile production units
Fiber optic systems (Vertex/STS)
Microwave for ENG (Ikegami)
See ad on p. 61, 63, 65

MOBILE-CAM 6021
Intercoms
ENG/EFP vehicles

MODULATION SCIENCES 4544
Audio processors
MTS equipment
AM stereo equipment
SCA equipment

NAGRA MAGNETIC RECORDERS 2714
Field ATRs

NALPACK VIDEO SALES 4526
Video test equipment
Camera support equipment
Soft bags for tripods and related equipment

THE FIRST INTELLIGENT BROADCAST COLOR MONITOR

BARCO INDUSTRIES' new CVS professional broadcast monitor is microprocessor-based to make it intelligent in operation and easy to use.

It has both a digital and an analog bus for maximum flexibility. Plus four "open" slots that let you plug in today's options and those yet to come. As new features do come along, you'll be able to add them through software - no hardware changes !

All CVS functions are controlled from the front of the monitor or from a remote keyboard. An optional master remote permits control of a series of monitors.

WE PUT THE FUTURE IN THE PICTURE.

BARCO INDUSTRIES

You can also store, and automatically call up, either calibrated presets or your own preferred presets.

Like our best master control monitors, the CVS has Automatic Kinescope Biasing (AKB) to maintain color and black level stability.

The CVS also generates more internal test patterns than any other monitor. They include white field, cross hatch and color bars.

The CVS is available in both 14 inch and 20 inch versions, and provides outstanding picture quality in any TV standard.

For complete specifications, contact your local BARCO INDUSTRIES Dealer or BARCO INDUSTRIES. 170 Knowles Drive. Suite 212. Los Gatos. CA 95030. Phone : (408) 370-3721.

BARCO INDUSTRIES is a member of the ACEC-group.

Circle 164 on Reader Service Card

IMS 7729

NARDA MICROWAVE 1428
Video test equipment
Audio test equipment
Microwave for ENG

NAUTEL 765
Radio transmitters

NEC AMERICA 2747
ENG/EFP Cameras
Camcorders
Digital effects devices
Digital solid-state recorders
TV transmitters
See ad on p. 115, 143

NEOTEK 5530
On-air consoles, mixers
Post-production consoles

NEW ENGLAND DIGITAL 5227
Digital production systems (Synclavier)

NORTRONICS 2618
Audio tape heads

NOVA SYSTEMS 2210
Time base correctors
Frame synchronizers (NovaSync)
See ad on p. 113

LAES 2674
Camera support equipment

ODETICS 5813
MERPS decks (TCS 2000 TV cart system)

OKI 2988
Standards converters

OLESEN 2647
Lighting equipment

OMNIMUSIC 118
CD libraries

OMNICRON VIDEO 8170
Master control switchers
Video routing switchers, DAs

OPTICAL DISC CORP. 5321
Video test equipment
Videodisc mastering systems

ORBAN ASSOCIATES 725
Audio processors (Optimod)
C8 (Optimod)

ORION RESEARCH 1641
Video routing switchers, (AFV/8+8)

Shure FP32 stereo audio mixer.

NURAD 4101
TV transmitters
Antennas, towers
Microwave for ENG

NYTONE ELECTRONIC 2442
Slide scanner

O'CONNOR ENGINEERING
DAs
On-air consoles, mixers
Audio routing switchers, DAs
See ad on p. 100

ORION RESEARCH 1641
On-air consoles, mixers (Newsmaker)
Post-production consoles

OSRAM 6107
Lighting equipment

OTARI 312
Studio ATRs
Field ATRs
Digital ATRs
Cart decks
ATR synchronizers

PACIFIC RECORDERS AND ENGINEERING 339
On-air consoles, mixers (BMX, AMX, ABX, Newsmixers, Stereomixer)
Post-production consoles (AMX, ABX)
Cart decks (Tomcat, Micromax)
Audio routing switchers, DAs
Custom design

PACO ELECTRONICS 1452
Power supplies, batteries

PALTEX EDITING SYSTEMS 2301
Multisource video editors
DAT degaussers

PANASONIC INDUSTRIAL 2938
Studio Cameras
ENG/EFP Cameras
Camcorders
3/4-, 1/2-inch VCRs
MERPS decks
Video test equipment
Simple VTR editor/controller
On-air consoles, mixers (Ramsa)
Post-production consoles (Ramsa)
Microphones, accessories (Ramsa)
Audio monitoring equipment (Ramsa)
See ad on p. 28-29, 47, 49

PEERLESS SALES 4553
Speaker mounting bracket

PENNY & GILES 1020
Rotary & slide attenuators

PEP 2701
Simple VTR editor/controller
Lighting equipment
Edit interfaces
Power supplies, batteries

PERROTT ENGINEERING LABS 2230
Power supplies, batteries

Sony's VO-7630 U-matic deck.

PESA AMERICA 3280
Video test equipment
Character generators
Video routing switchers, DAs
Sync and pulse generators
Intercoms
Audio routing switchers, DAs
TV transmitters
Mobile production units

PHILIPS 3177
Video test equipment (PM series)
Sync and pulse generators

PHOTOGRAPHIC EQUIPMENT SERVICES 6113
Camera support equipment
Photographic equipment

PINNACLE SYSTEMS 6027
Electronic still stores
Digital effects devices
2D graphics systems
3D modeling, animations systems

PINZONE COMMUNICATIONS 1119
Satellite earth stations
Audio/VBI encoders
Antennas, towers (Antiskywave antenna)
Microwave for ENG

Discover the power, convenience and economy of the Video Slide.

Sony announces the means to a perfect presentation.

All it took was a combination of the power and convenience of video with the economies of slides.

That's how Sony invented the ProMavica™ Still Image System.

It easily captures, stores and retrieves still images, instantly, whether you are using the ProMavica camera, your favorite computer software or even a video camera.

The secret is the Mavipak™ diskette, a slide-sized floppy which holds up to 50 images (and audio too!) and unlike slides is reusable time after time.

Then play the still image on any color TV, monitor or video projector using a ProMavica deck or portable recorder player.

It's easy, fast, sensational and affordable.

It's part of a growing line of Still Image products from Sony that gives you all of this and even lets you print the image anywhere in the world–at the touch of a button.

So call Sony Still Image Systems on 1-800-222-0878 for full information about the ProMavica solution.

And stop searching.

ProMavica™

EVERYTHING COMES TOGETHER WITH PROMAVICA

SONY®

Circle 165 on Reader Service Card

Tek's 1730 HDTV waveform monitor.

POLAROID 4576
Electronic still stores
Video to still image devices

PORTA-PATTERN 2877
Video test equipment

POTOMAC INTRUMENTS 1108
Audio test equipment
Remote control systems
Frequency synthesizer
Field strength meters
Modulation and power controllers

PRO BATTERY 5724
Power supplies, batteries

Q-TV 4117
Teleprompters

QEI 247
Radio transmitters
Remote monitoring systems
Remote control systems

QSI SYSTEMS 2462
Video processors
Sync and pulse generators
Teleprompters

QUALITY VIDEO SUPPLY 4387
Production switchers (Neumark)
A33 (Production Assessories)
See ad on p. 176

QUANTA 3344
Character generators
2D graphics systems
3D modeling, animations systems

QUANTEL 3638
Video processors (Harry)
Electronic still stores (Library systems)
Character generators (Cypher)
Digital effects devices (Encore and Mirage)
Digital disc recorders (Harry)
2D graphics systems (Paintbox)
Camera support equipment

RADIATION SYSTEMS 1500/1552
SNG systems
Satellite earth stations

RADIO SYSTEMS 159
Studio furniture
On-air consoles, mixers

RAKS 5631
Videotape
Audio tape, carts

RAM BROADCAST SYSTEMS 170
On-air consoles, mixers
Audio monitoring equipment
Audio test equipment
Noise reduction equipment

RANK CINTEL 2334
Telecines
Electronic still stores
See ad on p. 174

R-COLUMBIA PRODUCTS 2267
Microphones, accessories
Intercoms
Telco interface equipment
See ad on p. 163

REGISTER DATA SYSTEMS 659
Business automation systems

RESEARCH TECHNOLOGY INTERNATIONAL 2466
Video test equipment
Dropout counters
Tape storage systems (Tek Media/RTI)

RETEX INTERNATIONAL 116
Studio and broadcast furniture

RF TECHNOLOGY 4243
Microphones, accessories
Antennas, towers
STLs, TSLs
Microwave for ENG
LNAs, Power amps

RICHARDSON ELECTRONICS 2561
Camera pickup tubes
Microwave for ENG
Transmitting, power tubes
RF transistors
Solid state amps

Telepak's new T-Cam camcorder case.

3D modeling, animations systems (Cypher)
Digital library system
Intercoms (Link-79 O Talkback system)

QUICKSET INTERNATIONAL 4120

RECORTEC 5430
VHS adaptors

REES ASSOCIATES 4240
Architectural consultants
Cathode ray tubes
Vacuum capacitors

ROCKWELL INTERNATIONAL 2451
Video codecs
STLs, TSLs
Fiber optic systems

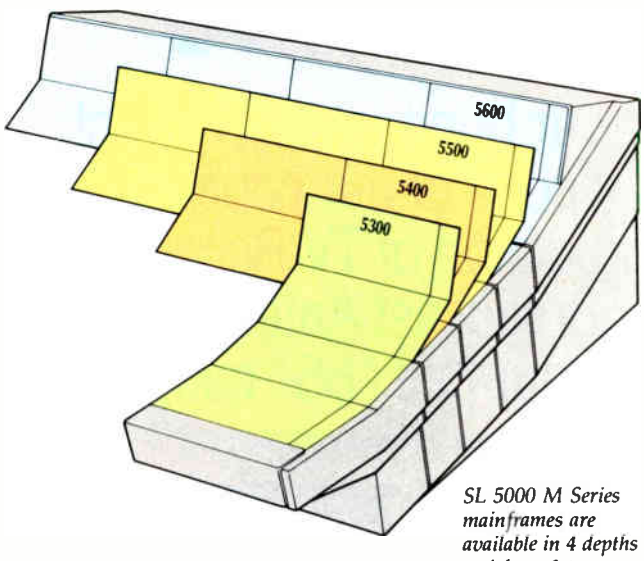
The SL 5000 M Series

The World's Most Advanced Stereo Broadcast Consoles

The SL 5000 M Series is designed to meet the demands of today's broadcasters – offering a new level of operational and creative flexibility in a practical format.

Built from a wide range of audio and control cassettes housed in a variety of mainframe sizes, the SL 5000 M Series offers all the advantages of customised functions and layouts, even for the smallest consoles. Larger organisations will also benefit from common operating procedures, parts stock and maintenance routines.

The SL 5000 M Series is designed for a wide diversity of applications – live radio, continuity, outside broadcasts, film and video post. It will satisfy your requirements for many years to come.



SL 5000 M Series mainframes are available in 4 depths and from 8 to 72 channels wide, allowing consoles of almost any size and capacity.

HTV – Bristol △

Film Australia – New South Wales ▽

Whether you are looking for an eight input on-air console, or a 72 input multitrack desk, call us now and join the growing number of broadcasters equipped for the 1990s.

Solid State Logic

Oxford • Paris • Milan • New York • Los Angeles

Begbroke, Oxford, England OX5 1RU • (08675) 4353
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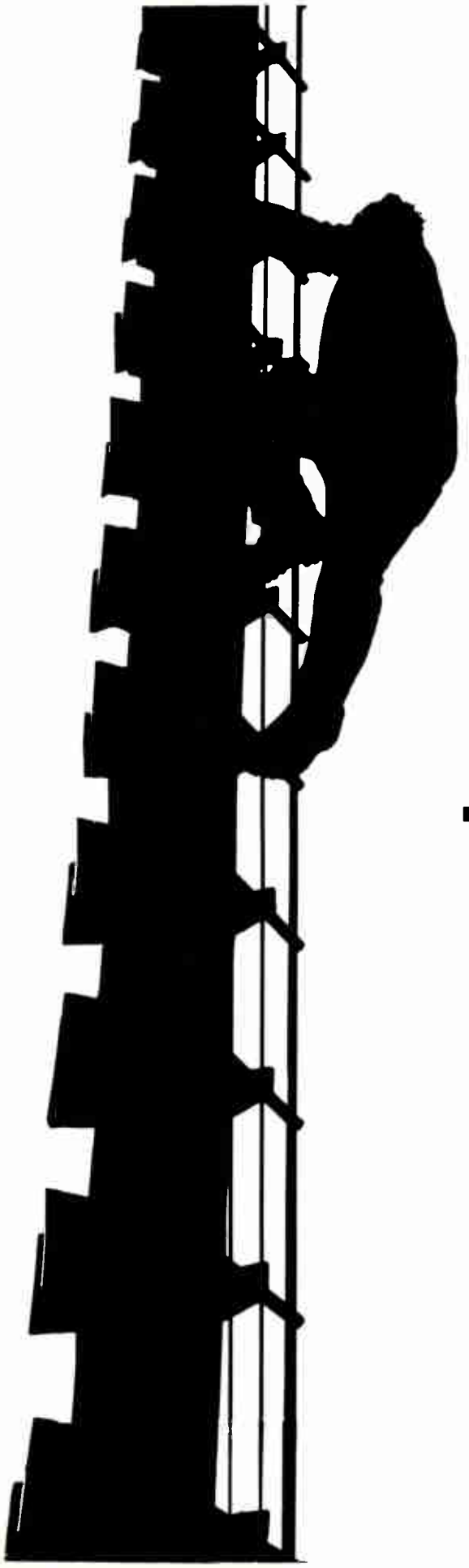
Via Cesare Cantu' 1, 20092 Cinisello Balsamo, Milan • (2) 612 62 81
320 West 46th Street, New York, NY 10036 • (212) 315-1111
6255 Sunset Boulevard • Los Angeles, California 90028 • (213) 463-4444



Attention: TV Broadcasters!

Do you know how much your antenna is degrading your picture?

BS*

The TV Antenna without BS*

Visit our booth at NAB to get a copy of our paper "Degradation of TV Reception by Broadcast Antennas" and your free "BS" badge.

Visit us at Booth #2666

BOGNER®

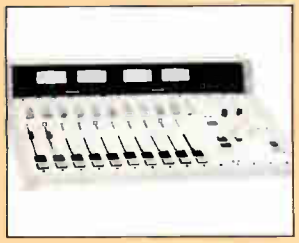
Broadcast Equipment Corp.

603 Cantiague Rock Road, Westbury, NY 11590
Tel: (516) 997-7800 • Fax: (516) 997-7721

Circle 166 on Reader Service Card

*Beam Steering

ROH DIVISION OF ANCHOR AUDIO 2235
Audio monitoring equipment
Studio automation equipment
Intercoms
Telco interface equipment
Audio routing switchers, DAs



Wheatstone A-20a on-air console.

ROHDE & SCHWARZ 2706
Video test equipment
Remote monitoring systems
Teletext equipment

ROHN 4013
Antennas, towers
Laminated fiberglass and concrete equipment shelters
Obstruction lighting equipment

ROSCO LABS 2547
Lighting equipment

ROSCOR 3141
SNG systems (Starfleet) 2084
See ad on p. 93

ROSS VIDEO 3377
Production switchers

RPG DIFFUSOR SYSTEMS 1125
Acoustical materials

R*SCAN 5007
Weather radar, graphics

RTS SYSTEMS 4330
Intercoms
Audio routing switchers, DAs

RUPERT NEVE 2348
Post-production consoles (V series)

SACHTLER 3147
Camera support equipment (Video 80)

SAIRD TECHNOLOGY 2479
MTS equipment

SAKI MAGNETICS 671
Replacement video and audio heads

SAMSON TECHNOLOGIES 4274
Microphones, accessories (Lavalier and Instrument Systems)

SANTEN MICROPHONES 6120
Microphones, accessories

SCHAFER WORLD COMMUNICATIONS 539
Digital production systems

SCHMID TELECOM 1046
Video routing switchers, DAs

SCHNEIDER 4110
Lenses

SCHWEM TECHNOLOGY 4584
Lenses (Gyrozoom)

SCIENTIFIC ATLANTA 2343
Antennas, towers
Satellite earth stations

SELCO/SIFAM 863
Audio test equipment
Fiber optic systems

SENNHEISER 152
Microphones, accessories

SESCOM 2206
Audio processors
On-air consoles, mixers
Post-production consoles
Microphones, accessories
Audio monitoring equipment
Audio test equipment

SHARP ELECTRONICS 4316
Studio Cameras
ENG/EFP Cameras
Camcorders
3/4-, 1/2-inch VCRs
Video test equipment (TV monitors/receivers)
Digital ATRs

SHIVELY LABS 109
Antennas, towers
Super power RF filters
See ad on p. 173

SHOOK ELECTRONICS USA OUTSIDE
ENG/EFP vehicles

SHURE BROTHERS 203
Audio processors
On-air consoles, mixers
Microphones, accessories
Audio monitoring equipment
Compact disc equipment
Telco interface equipment
Audio routing switchers, DAs
Phono cartridges
See ad on p. 72

SIGMA ELECTRONICS 2075
Video test equipment
Video routing switchers, DAs
Sync and pulse generators

SINGER PRODUCTS 715
Radio transmitters

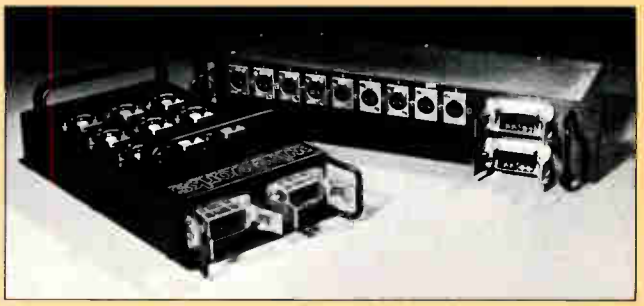
SKOTEL 4149
Time code equipment

SOLID STATE LOGIC 1409
Audio processors (01 Digital Production Centre)
On-air consoles, mixers
Post-production consoles (5000 M series, 6000 E series)
Microphones, accessories
Digital ATRs
Digital production systems
Compact disc equipment (G series)
Studio automation equipment (G series)
ATR synchronizers
See ad on p. 121

SOLUTEC 4541
A33 (SOL-6800 A broadcasting system)
Audio monitoring equipment
Audio routing switchers, DAs

SONY COMMUNICATIONS PRODUCTS 2902
Studio Cameras
ENG/EFP Cameras
Camcorders
One-inch VTRs
3/4-, 1/2-inch VCRs
Simple VTR editor/controller
Multisource video editors
Video routing switchers, DAs
Videotape
Time code equipment
HDTV production systems
On-air consoles, mixers
Post-production consoles
Microphones, accessories
Studio ATRs
Field ATRs
Digital ATRs
Digital production systems
Compact disc equipment
Disc mastering system
See ad on p. 2-3, 26, 58, 70-71, 119, 126-127

SONY MAGNETIC PRODUCTS 2902 SS
Videotape
Audio tape, carts
See ad on p. 133



Wireworks' nine-channel splitters.

INTERNATIONAL 5010
Electronic audio editors

STAINLESS 2553
Antennas, towers

STANDARD COMMUNICATIONS 1048
Audio processors
MDS, SMATV systems (Agile)
Satellite earth stations (Agile)

STANTON MAGNETICS 849
Headphones, accessories

STANTRON 1804
Tape storage systems

STAR CASE 2487
Star flight cases

STEADI-FILM 5113
Telecines (Stead-gate)

STEENBECK 2480
Telecines

STOREEL 2653
Compact disc equipment
Tape storage systems

STRAIGHTWIRE AUDIO 352
Compact disc equipment

STRAND LIGHTING 2351
Lighting equipment

STRATA MARKETING 1419
Broadcast-related software

STUDER REVOX 545
On-air consoles, mixers
Post-production consoles
Audio monitoring equipment
Studio ATRs
Field ATRs
Digital ATRs
Digital production system
Compact disc equipment
ATR synchronizers
See ad pg. C II

STUDIO TECHNOLOGIES 1633
Audio processors (ISS Integrated simulator system
On-air consoles, mixers (Mic-PreEminence)
MTS equipment

SWINTEK ENTERPRISES 1302
Intercoms

SWITCHCRAFT 130
Microphones, accessories

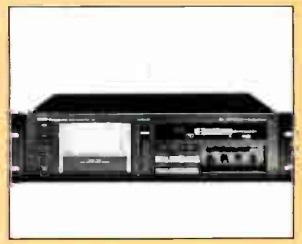
SWR 4001
Antennas, towers
Wire, cable
RF switches

SYLVANIA/GTE 2606
Lighting equipment (Sylvania Brite Arc and Beam)

SYMETRIX 672
Audio processors
Telco interface equipment
Noise reduction equipment

SYSTEM ASSOCIATES 4154
Used equipment

SYSTEMATION 1151
Digital ATRs
Digital production systems



Yamaha C300 pro cassette deck.

Studio automation equipment
Telco interface equipment

TABER MANUFACTURING AND ENGINEERING 2718
Tape erasers

TAMRON INDUSTRIES 3380
Video processors (Fotovix Pro--genlock)
Auto slide feeder and editor (Fotovix)

TEATRONICS 4514
Lighting equipment

TECHOV INDUSTRIES LTD 2484
Simple VTR editor/controller
Video routing switchers, DAs
Sync and pulse generators
Audio routing switchers, DAs

TEKTRONIX 3320
Frame synchronizers
Video test equipment
Audio monitoring equipment
Audio test equipment

TELEMET 3722
Video test equipment
Video routing switchers, DAs
Audio monitoring equipment
Audio routing switchers, DAs
Fiber optic systems
MTS equipment

TELEMETRICS 4177
Video routing switchers, DAs
Triax base stations
Remote pickup, RENG equipment
Remote control systems

TELESCRIPT 4138
PC-based teleprompter

TELEVISION ENGINEERING 1856
ENG/EFP vehicles

TELEVISION TECHNOLOGY 1801
Radio transmitters
TV transmitters

TELEVISON EQUIPMENT ASSOCIATES 2601
Passive video delays
Filters
Microphones, accessories

TELEX COMMUNICATIONS 4113
Microphones, accessories
Audio monitoring equipment
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Telco interface equipment
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TV transmitters (Hy Gain)
Antennas, towers (Hy Gain)
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THOMSON-CSF 2920E
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THOMSON-LGT 3333
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TV transmitters
Antennas, towers
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Satellite earth stations
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Transmitting, power tubes

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TIMES SQUARE LIGHTING(SLD) 2472

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UNITED MEDIA 4363
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Multisource video editors
Tape synchronizers
Time code equipment

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VALLEY INTERNATIONAL 104
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WOLF COACH 4327
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WORLD TOWER 1301
Antennas, towers

WORLD TOWER COMPANY 1301
Antennas, towers

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YAMAHA MUSIC 5213
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Audio monitoring equipment (Club series)
Digital ATRs
Digital production systems
Reverb, special efx

YAMASHITA ENGINEERING 5913
Computer sync converters
See ad on p. 177

Only So
one-inch a

There is only one still-frame one-inch recorder, and it's a Sony. There is only one Super Motion one-inch recorder and, it too, is a Sony. There are just two versions of a one-inch VTR with digital audio, and they're both Sony.

We believe that when you need a VTR, you should have the widest variety of state-of-the-art models to choose from.

It's a continuing commitment that's reflected in the new workhorse of the industry, the Sony BVH-3000. Features like air-threading, plug-in

ny takes mile.

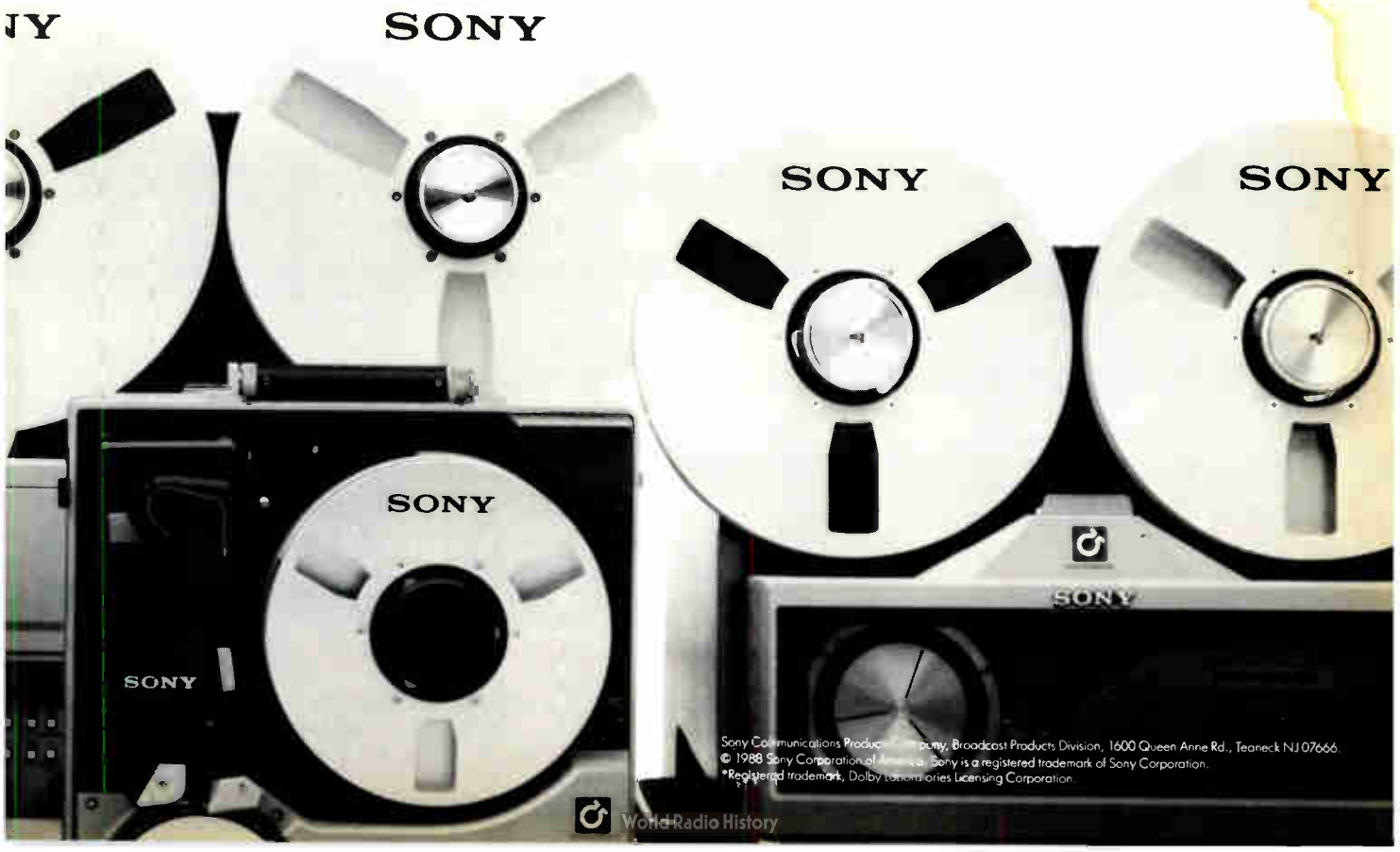
TBC processors and optional Dolby* SR noise reduction make it the most advanced, user-friendly machine ever.

So, whether you need a rugged field portable, a three-hour recording version, even a VTR with digital audio, Sony delivers.

Contact your Sony Broadcast representative for details on the complete line of Sony one-inch VTRs. Or call us at 800-635-SONY.

SONY

Broadcast Products



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DIGITAL RECORDING ON REWRITABLE MO DISK

Supreme quality and fast access capability

ASACA announces new video systems which employ rewritable magneto-optical disks providing very high-density recording media with extremely fast access and digital video quality: the ADR-5000 and 5500 video disk recorders, ADS-5000 still store/audio file and ADS-6000 HDTV still store systems. ASACA's four new video systems are powerful recording/reproduction tools for editing, transmitting and image processing.

MAGNETO-OPTICAL VIDEO DISK RECORDERS

ASACA ADR-5000/5500

MO magneto optical disk | 4fsc composite digital | 4:2:2 component digital

- Digital recording with 4×fsc composite coding in the ADR-5000 and 4:2:2 component coding in the ADR-5500.
- Ten minutes recording of moving pictures plus sound (16-bit PCM) may be repeatedly erased, recorded, and reproduced with the standard system composition.
- High-speed random-access enables you to reproduce the recorded events while they are being edited.
- A digital interface is provided as optional with the ADR-5500 to facilitate the composition of image processing system to process digital picture data.
- Slo-mo in forward and reverse, still and up to 20 times normal speed search in forward and reverse.
- Perfect device for the transmission of news, commercials, and for the production of animation and computer graphics.

STILL STORE/AUDIO FILE SYSTEM

ASACA ADS-5000

MO magneto optical disk | 4fsc composite digital

- Digital recording with 4×fsc composite coding.
- For commercials—has large capacity with 2250 stills on a single disk drive unit (assumes 2 fields video per still with 15 seconds of 16-bit PCM sound).
- Multi-tasking and real-time data processing capabilities allow registration, editing and transmission work to be simultaneously achieved from four different terminals.
- Filing of sound only, stills only, or stills plus sound.
- Suitable for libraries/editing/transmission of all still-picture programs.

HDTV STILL STORE

ASACA ADS-6000

MO magneto optical disk | HDTV high definition television

- RGB component coding system.
- Up to 1200 frames of HDTV still pictures can be recorded.
- Access time is less than one second.
- High-speed capability makes it ideal as a master file/editing/transmission system for HDTV still-pictures.
- A VME bus is provided as a standard interface to facilitate the composition of the image processing system to process digital picture data. This makes the ADS-6000 a versatile industrial tool for computer graphics, printing, medicine and many other applications.

ADS-5000 with registration and editing terminals.

ASACA®

ASACA/SHIBASOKU CORP. OF AMERICA 12509 Beatrice St., Los Angeles, Ca. 90066, U.S.A. Tel (213)827-7144
ASACA CORPORATION P.O.Box 6010 Shinjuku NS Building., Shinjuku-ku, Tokyo 163, Japan Tel (03)349-1515
ASACA SHIBASOKU EUROPE LTO. 284 Aberdeen Ave., Slough, Berkshire SL1 4HG, England Tel 0753-820228

Circle 191 on Reader Service Card

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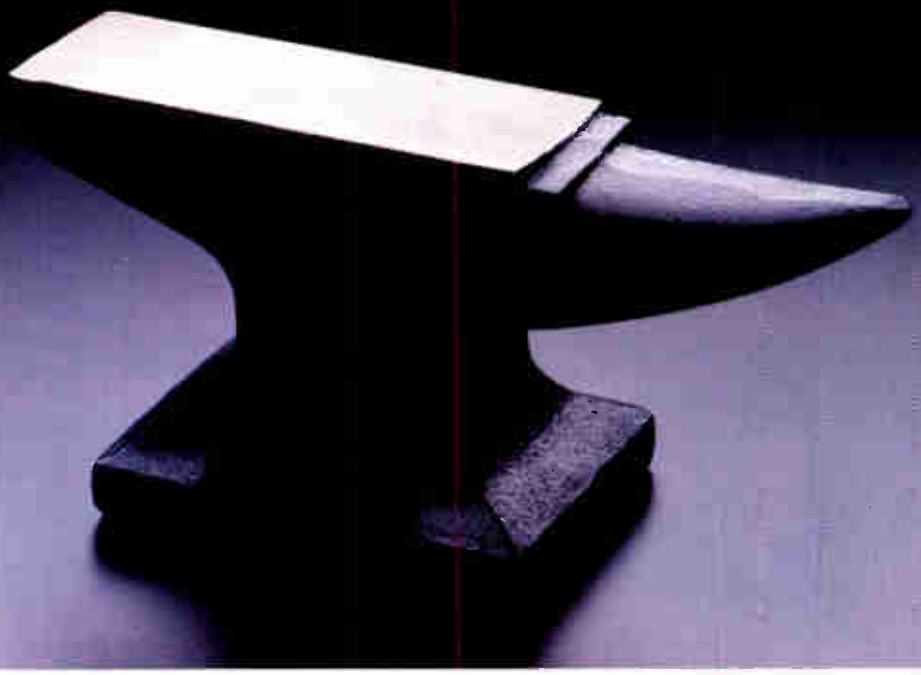
Strong as Sony.



The tougher U-matic tapes from the inventors of tough tape.

Sony BRS and the extraordinary Sony XBR have given U-matic® users an even tougher class of videocassette. And they've responded by making them Sony's best-selling U-matics, ever.

Both are produced in the U.S. with a dramatically improved Vivax™ formulation. And both have Sony's anti-static shell and Carbonmirror™ back coating for an amazing level of durability, runability and, especially, fewer dropouts.

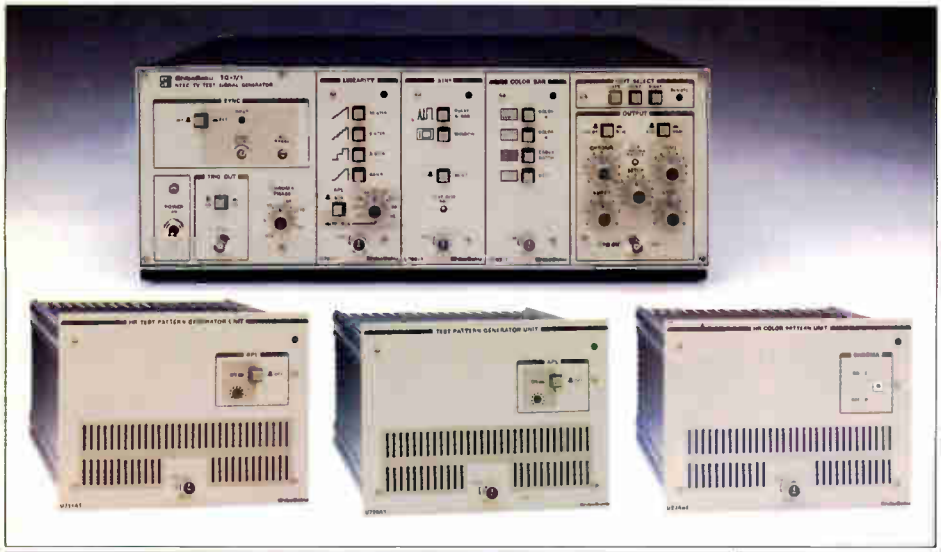
Thanks to Sony's advances in manufacturing and quality control, Sony XBR provides the finest U-matic performance achievable.

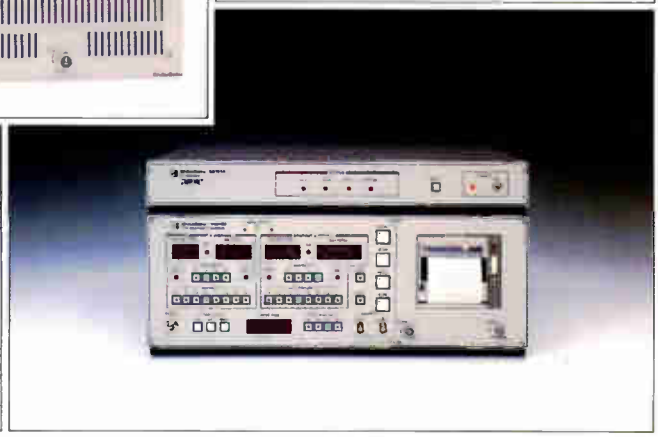
You can count on "strong as steel" performance with both Sony XBR & BRS...edit after edit after edit.

That's why they're the only U-matics you can treat like a Sony.

SONY.
THE ONE AND ONLY.

ShibaSoku®





Shibasoku Tests the Television Systems of the World and Provides the Ultimate in Monitors for True Picture Assessment

As a manufacturer of high quality test and measuring instruments, Shibasoku has provided "state of the art" products for more than 30 years.

Products include Color Monitors, HDTV Instruments, VTR Test System, Television Dignal Generators, and superb Audio Test Equipment,with performance beyond belief.

Shibasoku provides both the broadcast station and the Manufacturer of Audio and Video devices with the very best in measurement technology including LSI/IC Test Systems.

Contact SHIBASOKU COMPANY or its affiliated company either in America , or in Europe for further informatiion on any of the following products: And at NAB '88, visit OUR Booth#2642, Las Vegas Convention Center.

HDTV
- * TG91C6 HDTV Test Signal Generator
- * CM65A6 HDTV 26 inch Monitor
- * TM01A6 HDTV Still Store
- * TP18B6 HDTV TFZP Generator

Broadcast Monitors
- * 11 SERIES Grade 1 shadow mask delta gun
- * 7 SERIES Grade 1 in line dot
- * Auto setup 14 & 20 inches
- * Professional 14,15 & 21 inches

Test Instruments
- * TG-7 Modular Test Signal Generator & Modules
- * TG55BX Component Test Signal Generator
- * TG-8 Multi-output Test Signal Generator
- * TG56A Test Signal Generator
- * 205 Video Sweep Generator
- * VH01BZ Tape Dropout Counter
- * 725B Audio Distortion Analyzer

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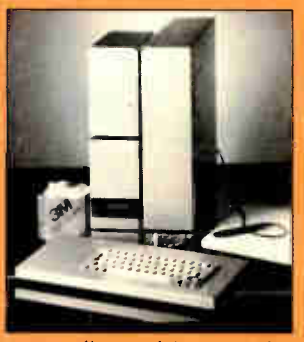

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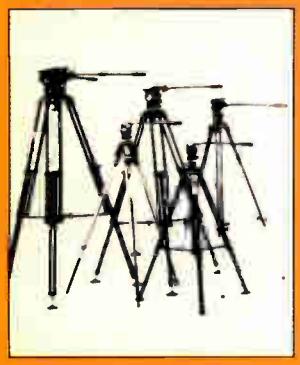

The camera tripod line from Miller Fluid Heads.

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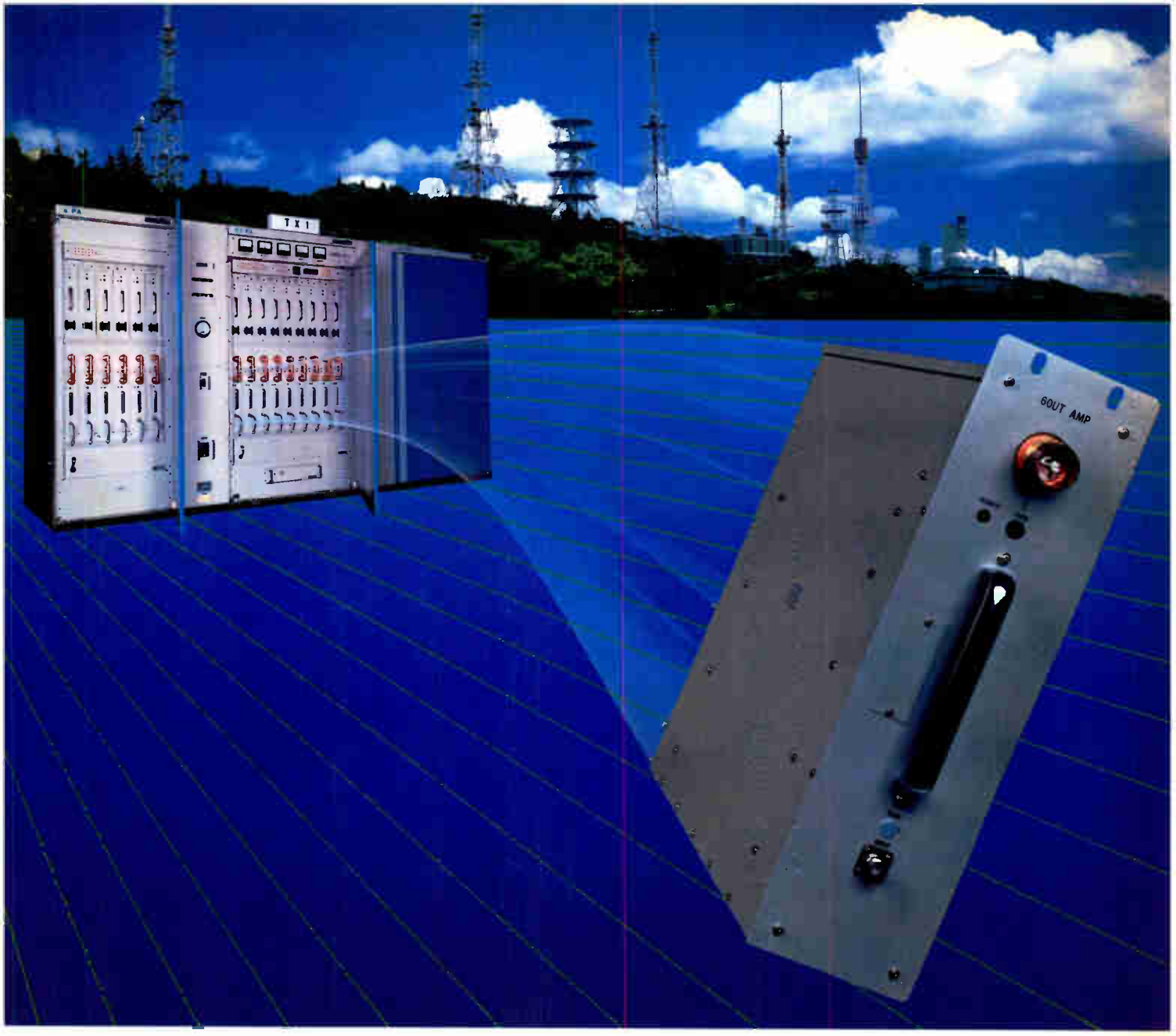

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Circle 170 on Reader Service Card

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REX50 Multi-effects digital processor from Yamaha.

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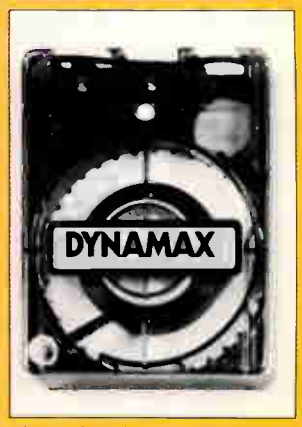

The Fidelipac Dynamax broadcast cart cassette.

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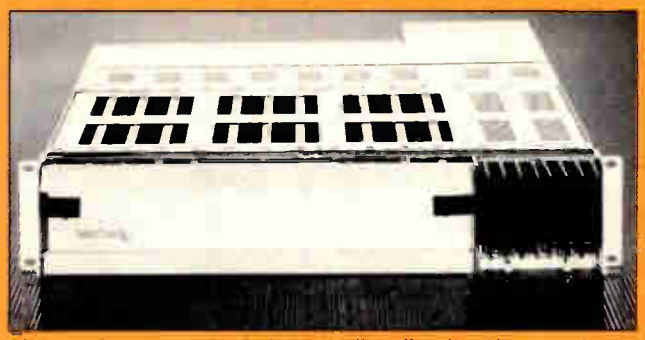

The ADS-800, McCurdy's audio distribution system.

TELCO INTERFACE EQUIPMENT

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FIDELIPAC 515
3M MAGNETIC MEDIA 2305
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AUDIO ROUTING SWITCHERS, DAS

ATI-AUDIO TECHNOLOGIES 359
AUDITRONICS 453
BSM SYSTEMS (Modula)..... 1233
BTS 2920
CHANNELMATIC 1339
DATATEK 2356
DI-TECH 2180
DYNAIR 3730
FARRTRONICS 4538
FOR-A 3169

Announcing EP-3: The first CCD camera designed for field production

Tube cameras used to be the favorite for electronic field production. Now there's a new star in the field: the EP-3 from NEC.

This sharp new CCD camera offers 700-line horizontal resolution and 62dB S/N ratio. So it goes head-to-head with tubes in picture quality. And when it comes to freezing fast action, the EP-3 gives you far greater clarity than tube cameras. Because it has a 7-speed electronic shutter, with a top speed of 1/1500 second.

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Make your own scorecard. You'll see that the EP-3 is the first CCD camera that challenges tubes in field production and comes out the overall winner. To find out how our latest CCD camera can meet your EFP goals, call NEC today.

NEC America, Inc.
Broadcast Equipment Division,
1255 Michael Drive, Wood Dale, Illinois 60191.
Tel: 312-860-7600. Fax: 312-860-2978.
Twix: 910-222-5991.

Circle 167 on Reader Service Card

NEC

GENTNER ENGINEERING 265
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ATR SYNCHRONIZERS

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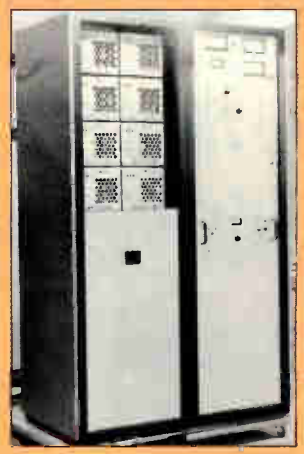
EVERTZ MICROSYSTEMS (Chaser, Emulator 7600) 2087
FOSTEX 4251
OTARI 312
SOLID STATE LOGIC (Synchroniser)..... 1409
STUDER REVOX 545

OTHER AUDIO EQUIPMENT

ACOUSTIC SYSTEMS (Portable booths)..... 5224
ADAMS-SMITH (Audio for video editing systems). 1513
ADM TECHNOLOGY (RM 1168 IFB/mix minus) .. 4369
ALLIED BROADCAST EQUIPMENT (Supplier of audio equipment)..... 557
ALPHA AUDIO (Automated audio editing system) . 2258
ANVIL CASES (cases) .. 1881
ASACA/SHIBASOKU (IC Card audio file) 2642
ASSOCIATED PRODUCTION MUSIC (Music libraries available on CD)..... 2216
AUDICO (Tape rewinders, verifiers)..... 1830
AUDIO ACCESSORIES (Prewired patch panels, patch cords)..... 5729
BRYSTON (100W, 50W, 200W amp) 1305
CANARE CABLE, DNC (Cable reels)..... 4556
CENTURY 21 (Prerecorded libraries) 819
CHRISTIE ELECTRIC (Tape eraser & degausser)... 2217
CIPHER DIGITAL (Audio editors)..... 3368
CMX (editors)..... 3556
COMMUNICATIONS GRAPHICS (Promo items)855
COMPREHENSIVE VIDEO SUPPLY (Care maintenence, storage)..... 3174
CROWN INTERNATIONAL (Amplifiers)..... 843
DeWOLF MUSIC LIBRARY (Prerecorded music libraries) 1844
DIGITAL CREATIONS (Video editor/audio console serial interfaces)..... 5929
EMCOR/CRENLO (Modular electronic cabinetry)... 4246
FIRST COM (Prerecorded sound effects library).. 5515



Ampfet ND-10 10 kW AM transmitter from Nautel.

GARNER INDUSTRIES (Audio tape erasers)..... 4007
GOTHAM AUDIO (Supplier of microphones and studio ATRs)..... 2330
INOVONICS (Electronics upgrades for ATRs and film recorders)..... 770
JBL/UREI (Loudspeakers, JBL Bi-Radial, UREI Time-Align) C24 (UREI Amplifiers) . 4377
KALAMUSIC (Prerecorded music libraries)..... 5625
LAKE SYSTEMS (Audio and video systems designer)1039
LANDY ASSOCIATES (Audio and video equipment distributor)..... 2677
LEADER-BRAC INDUSTRIES (Tape splicer/dispenser) 6121
LEMO (Connectors)... 4022
LUXOR (A/V tables, stands, storage cabinets). 5812/5816
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SOUNDMASTER INTERNATIONAL (Electronic audio editors)..... 5010
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RADIO TRANSMITTERS

BROADCAST ELECTRONICS 303
CONTINENTAL ELECTRONICS/VARIAN . 324
CSI MARKETING 239
ELCOM BAUER 631
ITELCO USA 3387/3487
LDL COMMUNICATIONS (Larcan)..... 2175
LPB (AM series)..... 639
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NAUTEL (Ampfet series) 765
QEI 247
SINGER PRODUCTS ... 715
TELEVISION TECHNOLOGY 1801
TELEX COMMUNICATIONS . 4113
THOMSON-LGT 3333
VECTOR TECHNOLOGY 1509

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ACRODYNE INDUSTRIES (Band I, Marconi)..... 3833
COMARK COMMUNICATIONS 3333
COMWAVE 4257
CONTINENTAL ELECTRONICS/VARITAN 324
EMCEE BROADCAST PRODUCTS 3053
ITELCO USA 3387/3487
ITS 1113
LDL COMMUNICATIONS (Larcan)..... 2175
NEC AMERICA 2747
NURAD 4101
PESA AMERICA 3280
TELEVISION TECHNOLOGY 1801
TELEX COMMUNICATIONS (Hy Gain) 4113
THOMSON-LGT 3333
TOWNSEND 4356
WATCO 5006

ANTENNAS, TOWERS

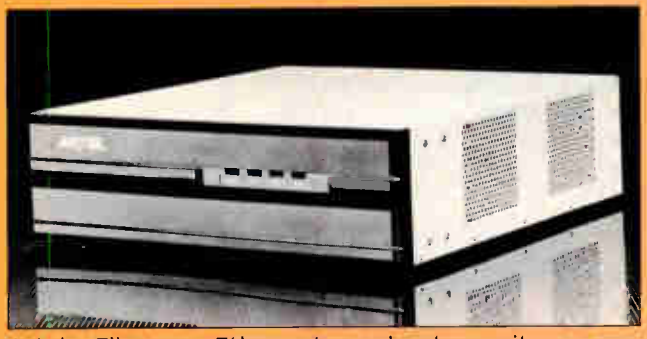
ADELPHON 4256
ADVANCED DESIGNS 4277
ANDREW CORPORATION (Trasar)..... 1811
BOGNER BROADCAST EQUIPMENT 2666
BROADCAST ELECTRONICS (Series BEI, ERI) 303
CABLEWAVE SYSTEMS 2614
CENTRAL TOWER 1034
COMTECH ANTENNA 1202
DIALECTRIC COMMUNICATIONS 4334
EMCEE BROADCAST PRODUCTS 3053
EXPRESS TOWER ..... N/A
FORT WORTH TOWER 3066
JAMPRO 531
KLINE IRON & STEEL . 5908
LDL COMMUNICATIONS . 2175
MAGNUM TOWERS ... 714
MICRO COMMUNICATIONS . 4166

MICRODYNE 1016
MICROWAVE RADIO (ProStar) 2935
NUPAD 4101
PINZONE COMMUNICATIONS (Antiskywave antenna) 1119
RF TECHNOLOGY 4243
ROHN 4013
SCIENTIFIC ATLANTA . 2343
SHIVELY LABS 109
STAINLESS 2553
SWR 4001

ROCKWELL INTERNATIONAL 2451
TFT 1109
WEGENER COMMUNICATIONS 1133

REMOTE MONITORING SYSTEMS

ANDREW CORPORATION 1811
BELAR ELECTRONICS LABORATORY 553
BIRD ELECTRONICS



Artel's Fiberway Ethernet accelerator unit.

TELEX COMMUNICATIONS (Hy Gain) 4113
TENNAPLEX SYSTEMS 1814
THE WILL-BURT COMPANY 3688
THOMSON-LGT 3333
UTILITY TOWER 733
VALMONT INDUSTRIES 5833
WORLD TOWER 1301

MDS, SMATV SYSTEMS

ANDREW CORPORATION 1811
COMWAVE 4257
CONIFER 2559
EMCEE BROADCAST PRODUCTS 3053
GENERAL ELECTRIC/COMBAND 5615
ITS 1113
MICRO COMMUNICATIONS . 4166
STANDARD COMMUNICATIONS (Agile) 1048

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ANDREW CORPORATION 1811
BROADCAST MICROWAVE SERVICES 4123
MARTI ELECTRONICS .. 525
MICRO CONTROLS 102
MOSELEY ASSOCIATES .. 7
RF TECHNOLOGY 4243
(WattWatcher) 635
CAT SYSTEMS 1861
EMCEE BROADCAST PRODUCTS 3053
GORMAN REDLICH MFRG. 1200
OEI 247
ROHDE & SCHWARZ . 2706
TFT 1109

REMOTE CONTROL SYSTEMS

AMX 5910/6009
ANDREW CORPORATION 1811
CAMERA MART 2366
CAT SYSTEMS 1861
EMCEE BROADCAST PRODUCTS 3053
HALLIKAINEN & FRIENDS 0308
MARTI ELECTRONICS .. 525
MICRO CONTROLS 102
MOSELEY ASSOCIATES POTOMAC INTRUMENTS 1108
OEI 247
TELEMETRICS 4177
TFT 1109
THOMSON-LGT 3333

MTS EQUIPMENT

BELAR ELECTRONICS LABORATORY 553
CIRCUIT RESEARCH LABS 133
dbx 1225
MICRO COMMUNICATIONS . 4166
MODULATION SCIENCES 4544
SAIRD TECHNOLOGY 2479
STUDIO TECHNOLOGIES 1633
TFT 1109

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BROADCAST ELECTRONICS 303
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KAHN COMMUNICATIONS .. 739
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MOTOROLA (C-Quam) 117
MODULATION SCIENCES 4544

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COMWAVE 4257
CIRCUIT RESEARCH LABS 133
EMCEE BROADCAST PRODUCTS 3053
EMERGENCY ALERT RECEIVER 1352
JOHNSON ELECTRONICS 1300
MARTI ELECTRONICS .. 525
MODULATION SCIENCES 4544
MOSELEY ASSOCIATES .. 7
TFT 1109
THOMSON-LGT 3333

TELETEXT EQUIPMENT

ROHDE & SCHWARZ . 2706

ENG/EFP VEHICLES

ALPHA VIDEO AND ELECTRONICS 2980
BTS 2920
CENTRO 3569
GRAY COMMUNICATIONS CONSULTANTS . 2242/2246
MIDWEST COMMUNICATIONS 4342
MOBILE-CAM 6021
SHOOK ELECTRONICS USA ..... Outside
TELEVISION ENGINEERING 1856
WOLF COACH 4327

SNG SYSTEMS

ANDREW CORPORATION 1811
BAF 5429,OUT
CENTRO 3569
COMREX 753
DX COMMUNICATIONS . 1345
GRAY COMMUNICATIONS CONSULTANTS . 2242/2246
HUBBARD COMMUNICATIONS (Hubcom) 1139
MCL ..... OUTSIDE
MICRODYNE (Quick Link) 1016
MIDWEST COMMUNICATIONS 4342
RADIATION SYSTEMS 1500/1552
ROSCOR (Starfleet) 3141
TOSHIBA 4320

MOBILE PRODUCTION UNITS

BTS 2920
CENTRO 3569
GRAY COMMUNICATIONS CONSULTANTS . 2242/2246
MIDWEST COMMUNICATIONS 4342
PESA AMERICA 3280
WOLF COACH 4327

FIBER OPTIC SYSTEMS

ARTEL (FiberPlex, FiberGraph, and FiberWay) 2077

Hipotronics' automatic voltage regulator.

CATEL TELECOMMUNICATIONS 1252/1350
DYNAIR 3730
GRASS VALLEY GROUP 2928
MIDWEST COMMUNICATIONS (Vertex/STS) 4342
ROCKWELL INTERNATIONAL 2451
SELCO/SIFAM 863
TELEMET 3722

SATELLITE EARTH STATIONS

ALDEN ELECTRONICS 4566
ANDREW CORPORATION 1811
AVCOM OF VIRGINIA 5331
COMTECH ANTENNA 1202
DYNAMIC TECHNOLOGY 1647
HUBBARD COMMUNICATIONS (Hubcom) 1139
MCL ..... OUTSIDE
MICRODYNE 1016
RADIATION SYSTEMS 1500/1552
SCIENTIFIC ATLANTA . 2343
STANDARD COMMUNICATIONS (Agile) 1048
THOMSON-LGT 3333
WEGENER COMMUNICATIONS 1133

AN-2 stereo simulator/RCU-1 recognition control unit from Studio Technologies.

TAPE STORAGE SYSTEMS

STANTRON 1804

BUSINESS AUTOMATION SYSTEMS

AT&T (System 75XE) .. 3080
BASYS 3884
CBSI 653
COLUMBINE SYSTEMS 3274
DATACOUNT 5525
GRUMMAN 3253
JEFFERSON PILOT DATA SERVICES 1821
MATCO 4487
REGISTER DATA SYSTEMS 659
COMPUTER CONCEPTS 759

NEWSROOM COMPUTERS

BASYS 3884
COLUMBINE SYSTEMS 3274
DYNATECH NEWSTAR

MICROWAVE FOR ENG

ADELPHON 4256
ANDREW CORPORATION 1811
BROADCAST MICROWAVE SERVICES 4123
CONIFER 2559
CONTINENTAL ELECTRONICS/VARITAN 324
IKEGAMI ELECTRONICS 2320
ITELCO USA 3387/3487
M/A-COM 3633
MICROWAVE RADIO . 2935
MIDWEST COMMUNICATIONS (Ikegami) 4342
NARDA MICROWAVE 1428
NURAD 4101
PINZONE COMMUNICATIONS 1119
RF TECHNOLOGY 4243
RICHARDSON ELECTRONICS 2561

POWER SUPPLIES, BATTERIES

ALEXANDER MANUFACTURING (Powerstar) ... 2205
BROADCAST MICROWAVE SERVICES 4123
CHRISTIE ELECTRIC ... 2217
COMPREHENSIVE VIDEO SUPPLY 3174
CURRENT TECHNOLOGY 6110
FREZZOLNI ELECTRONICS 2438
FUTURE PRODUCTIONS 5830
G & M POWER PRODUCTS 4534
HIPOTRONICS 4546
KAY INDUSTRIES 728
PACO ELECTRONICS . 1452
PEP 2701
PERROTT ENGINEERING LABS 2230
PRO BATTERY 5724
THOMSON-LGT 3333

WIRE, CABLE

ANDREW CORPORATION (Heliax) 1811
BENCHMARK MEDIA SYSTEMS 4287
CABLEWAVE SYSTEMS 2614
CAMBRIDGE PRODUCTS 2788
CANARE CABLE, DNC (Star Quad Audio) 4556
COMPREHENSIVE VIDEO SUPPLY 3174
CONNECTRONICS (Mosiflex, Studiflex) 270/172
KING ELECTRONICS .. 4010
SWR 4001
WIREWORKS 1810
CHESTER CABLE/ALCATEL 4261

TRANSMITTING, POWER TUBES

CONTINENTAL ELECTRONICS/VARITAN 324
ECONO BROADCAST SERVICE 771
EEV 3384
RICHARDSON ELECTRONICS 2561
THOMSON ELECTRON TUBES 1219
THOMSON-LGT 3333
VARIAN ASSOCIATES . 3725
VECTOR TECHNOLOGY 1509
WATCO 5006

OTHER RF EQUIPMENT

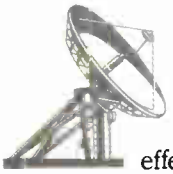
ALLIED BROADCAST SYSTEMS/SONO-MAG (Equipment supplier) ... 419
ALTRONIC RESEARCH (Omegaline dummy load resistors) 1250
AMCO ENGINEERING (BMI Motorized impeller blower) 2709
ASSOCIATED PRESS BROADCAST (Programming service) 2874
WILLIAM BAL CORP. (Shipping cases) 2611
BEAVERONICS (ESE clocks and timers) 1848
BIRD ELECTRONICS (Thruline, Termaline RF wattmeters, Tenuline attenuators) 635
BOWEN BROADCAST SERVICE (Infared equipment) 4507
BROADCAST MANAGEMENT PLUS (Custom management software) 2166
BROADCAST SUPPLY WEST (BSW) (Supplier of audio and transmission equipment) 365
COAXIAL DYNAMICS (Rigidline RF directional wattmeters) 1112
COMSAT (Satellite services) 2387
CONNECTRONICS (Utilux cable connectors) .. 270/172
CURRENT TECHNOLOGY (Power conditioning) .. 6110
CYCLE SAT (Cyclecypher date decoder/reciever) 5433/2629
DATAWORLD (Broadcast databases) 165
EEG (Vertical blanking interval digital data transmission equipment) 2247
EG&G (Tower lighting) 2220
ELECTRO IMPULSE LAB (RF loads) 413
EMERGENCY ALERT RECEIVER (EBS receivers) 1352
EXCALIBUR (Production cases) 2882
FIBERBILT CASES (Cases) 4004
FIDELIPAC (Studio warning lamps) 515
FLASH TECHNOLOGY (Tower lighting) 4125
GENERAL ELECTRIC/COMBAND (Multichannel block downconverters) 5615
GRAHAM-PATTEN SYSTEMS (Subcarrier systems) 4530/5433
GTE/SPACENET (SNG and satellite services) 1333
HIPOTRONICS (Automatic voltage regulators) 4546
INOVONICS (FM/FMX stereo generators) 770
JAMPRO (Transmission line--rigid and flex) 531
KAY INDUSTRIES (Power converters) 728
KING ELECTRONICS (Connectors and patches) .. 4010
KINTRONIC LABS (AM directional antenna feeder systems) 1040

TE-3 microphone cable tester from Wireworks.

KSRP REWARDS YOUR FORESIGHT

KLYSTRON SERVICE REPLACEMENT PROGRAM

VARIAN MICROWAVE EQUIPMENT DIVISION



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Circle 172 on Reader Service Card

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K3573BCD	40-55 kW	470-860 MHz	43% to 46%
K3672BCD	55-60 kW	470-810 MHz	44% to 48%
K3572BCD	40-55 kW	470-810 MHz	43% to 46%
K3271BCD	15-30 kW	470-860 MHz	42% to 47%
K3270BCD	5-15 kW	470-860 MHz	42% to 47%
STANDARD SERIES			
Low Band			
K3276HBCD	40-55 kW	470-596 MHz	38% to 43%
K3382BCD	40-55 kW	470-590 MHz	38% to 42%
K3217HBCD	30-45 kW	470-590 MHz	40% to 42%
K3230BCD	10-30 kW	470-596 MHz	40% to 42%
K376L	10-30 kW	470-610 MHz	34% to 40%
K370/W series	5-10 kW	470-606 MHz	29% to 35%
Mid Band			
K3277HBCD	40-55 kW	590-710 MHz	38% to 43%
K3383BCD	40-55 kW	590-702 MHz	38% to 42%
K3218HBCD	30-45 kW	590-702 MHz	40% to 42%
K3231BCD	10-30 kW	590-704 MHz	40% to 42%
K377L	10-30 kW	590-720 MHz	38% to 45%
K371/W series	5-10 kW	606-742 MHz	32% to 35%
High Band			
K3278HBCD	40-55 kW	702-860 MHz	38% to 43%
K3384BCD	40-55 kW	702-860 MHz	38% to 42%
K3219HBCD	30-45 kW	702-860 MHz	40% to 42%
K372/W series	5-10 kW	740-860 MHz	32% to 35%

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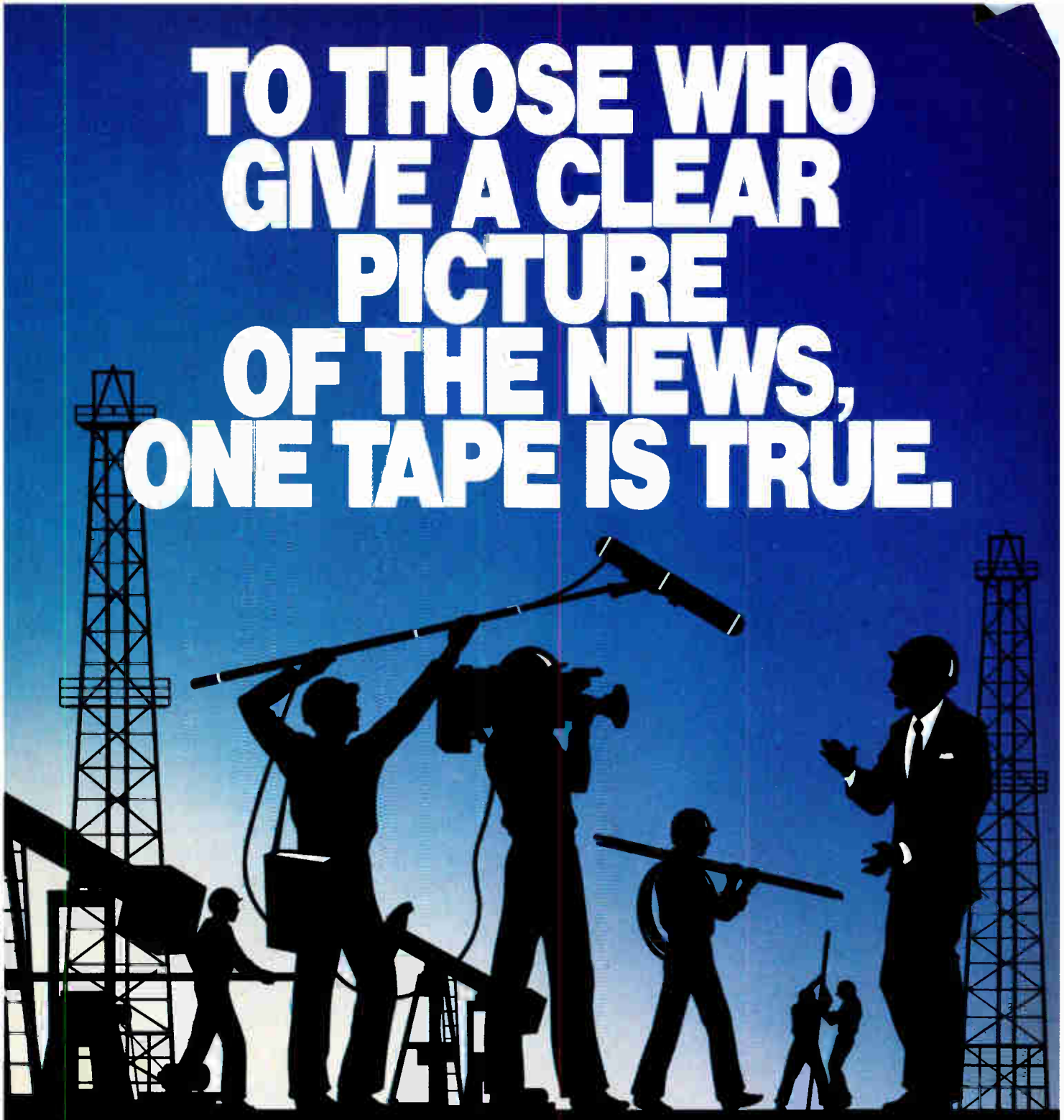
One Tape for a True Picture.

If digging for oil is the story, digging for news will take you there. And the tape you take is the 3M ¾" MBR™ Videocassette–created to exceed even our widely acclaimed MBU Videocassette. Designed with our exclusive Anti-Stat™ System–to reduce its static charge and help prevent the dust buildup that causes dropouts. To give you a true picture.

TO THOSE WHO GIVE A CLEAR PICTURE OF THE NEWS, ONE TAPE IS TRUE.



One Tape Stands True.

We see our job as being the same as yours–to give a clear picture of the news. And that's been our job since we invented videotape 30 years ago.

That's why we stand by you–with the largest support force in the field.

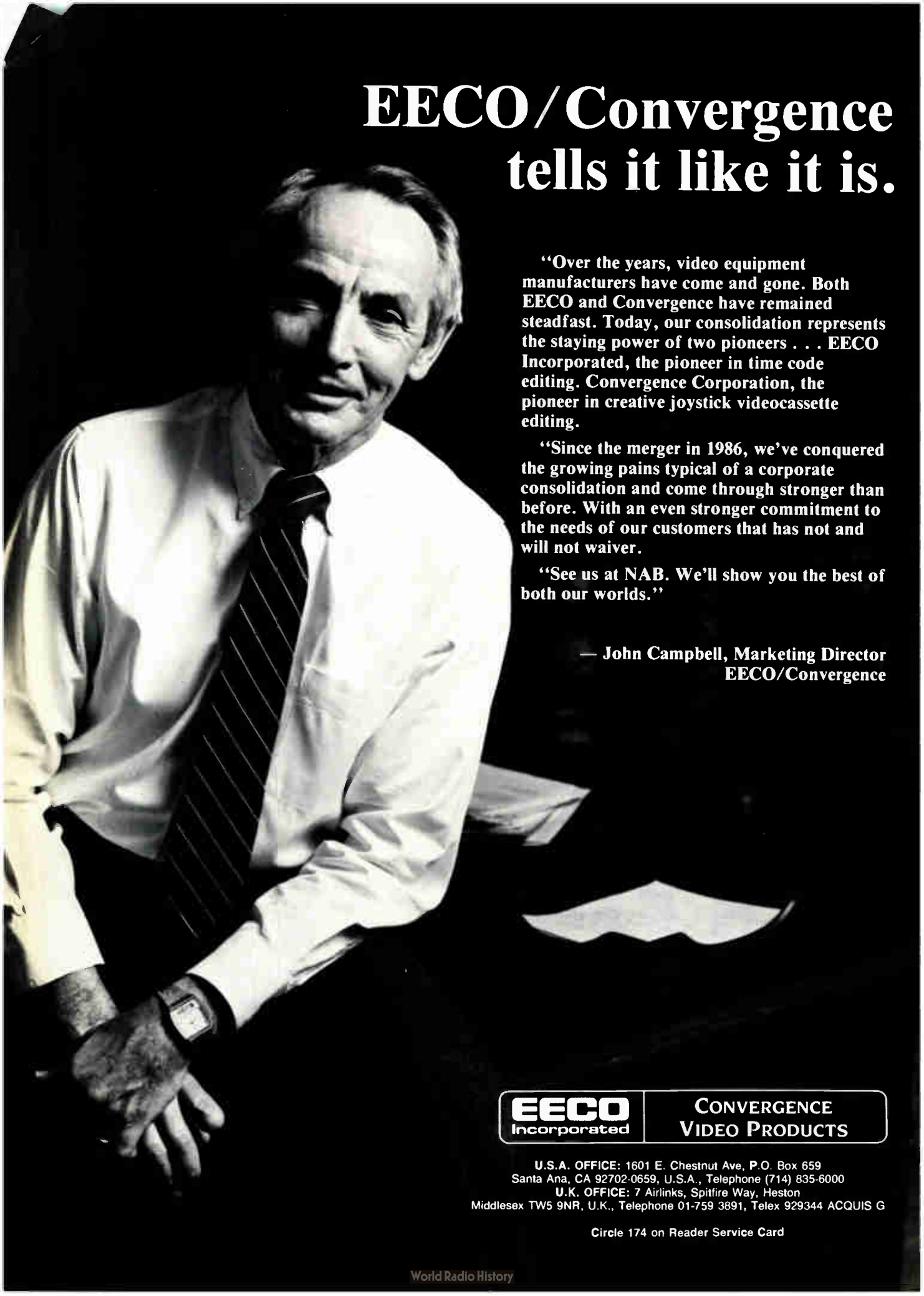
And we stand behind you–with some of the most advanced research in the industry.

All to keep our standing–as number one in the world of the pro.

NUMBER ONE IN THE WORLD OF THE PRO

3M

Worldwide Sponsor
1988 Olympic Games



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"Over the years, video equipment manufacturers have come and gone. Both EECO and Convergence have remained steadfast. Today, our consolidation represents the staying power of two pioneers . . . EECO Incorporated, the pioneer in time code editing. Convergence Corporation, the pioneer in creative joystick videocassette editing.

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ENGINEERING PROGRAM HIGHLIGHTS

RADIO SESSIONS

Friday, April 8—Morning
AM IMPROVEMENT I—Meeting Room 21
FCC Technical Standards
NRSC Field Tests
RF Emission Limits
AM Spectrum Splatter Monitor

Friday, April 8—Afternoon
AM IMPROVEMENT II—Meeting Room 21
Low Profile AM Antennas
Toroid Impedance Matching Transformers
AM Noise Blanker
Electrical Interference Panel

Saturday, April 9—Morning
RADIO NEW TECHNOLOGY—Meeting Room 21
FM Multipath Problems

Multistation FM Antennas
Implementing FMX
Measuring Synchronous AM Noise
Smart Audio Switchers
Advanced Audio Routing Switcher
FM Boosters

Sunday, April 10—Morning
RADIO ENGINEERING—Meeting Room 21
NAB FM Transmission Committee
Grounded Guy Antennas
Diversity Transmit Antennas
AM Tower Currents and DA Arrays
Circularly Polarized FM Antennas
Stability of AM Antenna Patterns
Tall FM Structures as AM Radiators
FM Distortion Reduction

Monday, April 11—Morning
DIGITAL RADIO STUDIO—Meeting Room 21
Disc-Based Editing
Digital Audio Workstations
Tapeless Audio Production
Hard Disk Audio Storage
Digital Audio Disc Recording
Digital Storage of Music and Speech
AM-FM ALLOCATIONS—Meeting Room 23
Allocation Issues at the FCC
Reduced Distance Separations
MF Skywave Propagation

Monday, April 11—Afternoon
RADIO PRODUCTION & AUDIO PROCESSING—Meeting Room 21
Tracking the State of the Art
Audio Level Monitoring
Mobile Radio Production Facility
Microprocessor Performance Optimizer
Processing Remote Audio

Tuesday, April 12—Morning
ALTERNATE POWER & GROUNDING SYSTEMS—Meeting Room 21
Solar-Powered FM Station
Rotary Phase Converters
Surge Protection and Grounding

Facility Ground System
Power Conditioning
Uninterruptible Power Supplies

TELEVISION SESSIONS

Friday, April 8—Morning

TV AUTOMATION SYSTEMS—Meeting Room 23
ESbus Status Report
Machine Control Network
Automated News Videotape Playback
Robotic TV Cameras
Newsroom Computers
Video Library Management Systems

GRAPHICS & ANIMATION—Meeting Room 18
Weather & News Graphics Survey
Election Computer Systems
Future of Graphics & Effects
CBS Centralized Graphics Facility
Broadcast Computer Animation

Friday, April 8—Afternoon

TELEVISION AUDIO & STEREO—Meeting Room 23
Multichannel Audio Recording
Stereo TV Transmission
BTSC Stereo Separation
Surround Sound
Stereo Broadcast Origination
Audio Time Delay Errors
PCM Field Audio Recording

TV STUDIO PRODUCTION & FACILITIES—Meeting Room 18
1988 Summer Olympics
Zoom Lenses
News Set Design
Production Requirements
News Captioning
Communications
Broadcast Postproduction
Vertical Interval Time Code

Saturday, April 9—Morning

TELEVISION NEW TECHNOLOGY—Meeting Room 23
NTSC Noise Reduction
Digital Amplitude Modulator-Transmitter
Solid-State Video Recording
Intelligent Monitors
Video Measurements
CCD Imaging

TELEVISION POSTPRODUCTION—Meeting Room 18
Editing Episodic Television
CBS Audio Post Facility
LaserVision Off-line Editing
Editing Film for Television
Postproduction in Miami
Postproduction at Pacific Video

Sunday, April 10—Morning

TELEVISION ENGINEERING—Meeting Room 18
Solid State Transmitters
Analog Component VTRs
Teletext on Election Night
Digital Facility Design
High-Power Testing of RF Components

ENG Camcorders
Digital Component-Level Diagnostics
HDTV PRODUCTION I—Meeting Room 20
SMPTE Working Group Status Report
HDTV at Summer Olympics
CBS HDTV Movie
Production Aspects of HDTV
HDTV Plumbicons
HDTV Theater (12:30 - 2:00 p.m.)

Sunday, April 10—Afternoon
HDTV PRODUCTION II—Meeting Room 20
Subjective Assessment of HDTV
Film-to-HDTV Tape Transfer
HDTV-to-NTSC Converter

Monday, April 11—Morning
ADVANCED TV TRANSMISSION SYSTEMS—Meeting Room 18
ATSC Transmission Status Report
ACTV
Compatible HDTV
HD-NTSC
Extended Definition TV
MUSE

Monday, April 11—Afternoon
UHF TRANSMISSION SYSTEMS—Meeting Room 23
Multiple Depressed Collector Klystrons
Updating Older UHF Transmitters
Circularly Polarized Antennas
Klystrode Transmitters
Developing Antenna Patterns
Solid State Transmitters
Tall Towers

Tuesday, April 12—Morning
FCC ADVANCED TELEVISION SERVICE COMMITTEE—Meeting Room 23

COMBINED RADIO/TV SESSIONS

Sunday, April 10—Afternoon
STUDIO CONSTRUCTION & ACOUSTICS—Meeting Room 21
Project Management Techniques
CAD Drawing Standards
Acoustical Troubleshooting
Trends in TV Studio Design
Designing an AM/FM Facility
BROADCAST AUXILIARY—Meeting Room 18
Wireless Mic Frequency Compatibility
ENG Microwave Antenna Polarization
40 GHz Microwave
New-Generation RPU
Frequency Coordination Panel
PERSONAL COMPUTERS FOR BROADCAST ENGINEERS—Meeting Room 18
Panel Discussion

Monday, April 11—Morning
ENVIRONMENTAL CONCERNS OF

BROADCASTERS—Meeting Room 23
RF Radiation Ammeter
Working With AM Antennas
Taming Lightning
Local PCB Cleanup
Tower Lighting Requirements

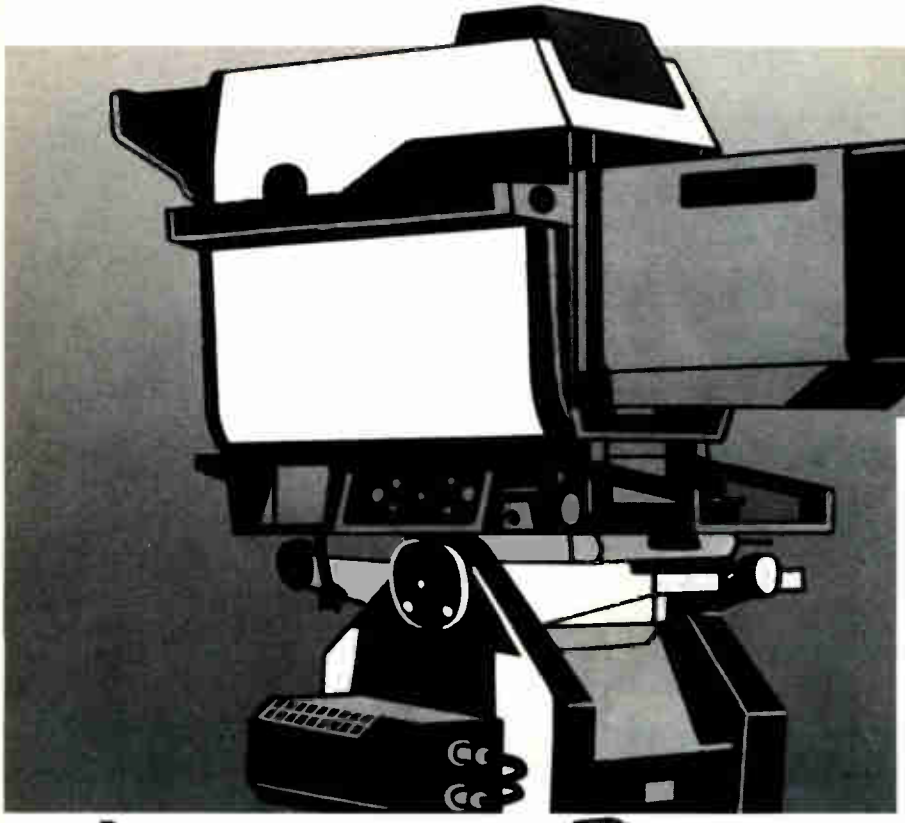
Monday, April 11—Afternoon
RADIO & TELEVISION SATELLITE SYSTEMS—Meeting Room 18
Mobile Satellite Communications
Ku-band Receive Facilities
Field Testing Earth Station Antennas
Designing SNG Vehicles
Low-Cost Satellite Systems for Radio
Equipment Miniaturization
Setting Up Satellite Equipment

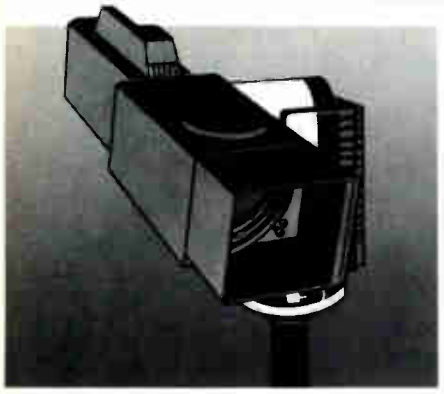
Tuesday, April 12—Morning
FIBER OPTICS & DIGITAL TRANSMISSION—Meeting Room 18
Optical Fiber Transmission Systems
Broadcast-Quality TV Digital Network
Optical Fiber Interface Equipment
FCC ENGINEERS' FORUM—Meeting Room 18
Panel Discussion

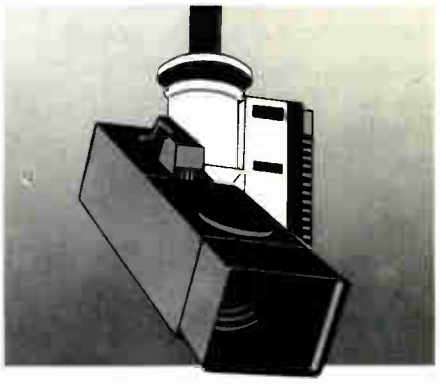
SUNDAY EVENING ENGINEERING WORKSHOPS

RF Radiation Regulation Compliance Workshop
Contract Engineers' Workshop
Studio Acoustics Workshop
AM Antenna Systems Workshop

When MicroSwift's in is automatically







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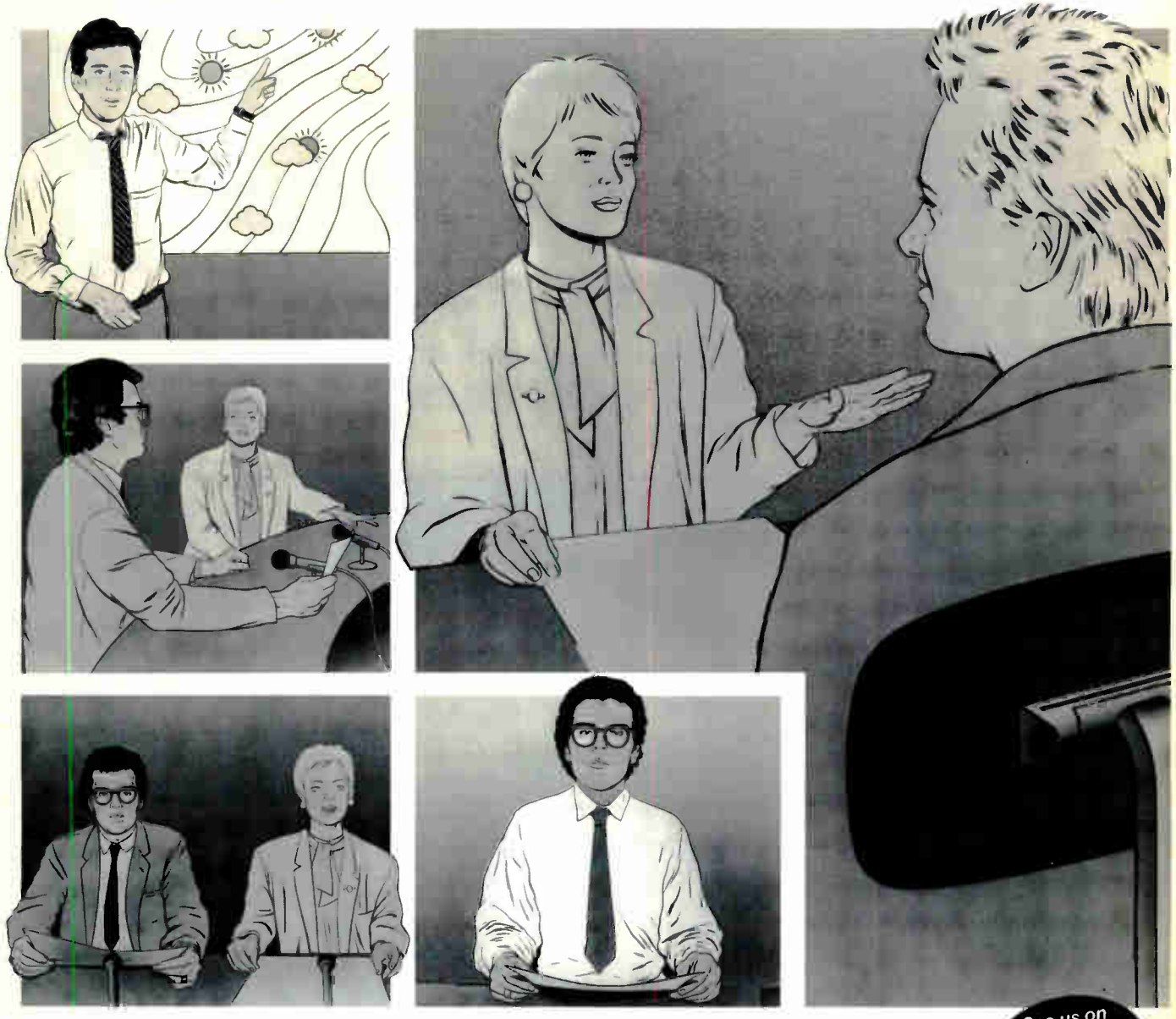

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A Live Aloha for VTE

By William Winston

November's Pro Bowl put VTE's mobile truck to the test, from live digital effects to an ocean crossing.

ESPN's decision to have VTE's mobile production facility shipped from Hollywood to the island of Maui to televise its coverage of the NFL Pro Bowl speaks loudly about the unit's capabilities. On the road since last November, the mobile production facility is outfitted with over $3.5 million worth of the latest broadcast equipment chosen specifically for shooting live sports events, rock concerts, and on-location TV commercials. For VTE, the Pro Bowl was the first opportunity to put all of its equipment to use for a single live production.

Despite its impressive capabilities, however, the truck is not amphibious. Special precautions had to be taken for the potentially hazardous ocean voyage.

"You take a risk any time you ship a 50,000-pound vehicle 2700 miles," said Frank Coll, VTE's vice president of engineering. "We were concerned that the salt air and water might penetrate through the air conditioning units, so we covered the units with plastic bags and placed five-pound bags of silica gel inside the equipment racks to prevent moisture from accumulating." The careful packaging proved worthwhile.

On the road to Hawaii? VTE's mobile production facility rode the waves to help produce the Pro Bowl.

"When the truck arrived in Honolulu four and a half days later, the only problem we encountered was a layer of salt coating the front of the unit like a salt pretzel."

The VTE truck is equipped with an array of Sony equipment, including six BVP-360 cameras, five BVP-350 cameras, a Super Motion system, four BVH-3000 one-inch VTRs, a BVU-950 U-matic SP recorder, BVW-15 Betacam player, BVW-505 Betacam SP camcorder, five BVM-1910 monitors, 50 nine-inch black and white monitors and 10 eight-inch color monitors. The microphone lineup includes six Sony ECM-672 and two C-76 shotguns which were mounted on the cameras.

VTE's crew uses BVP-360 cameras to shoot "Inside the NFL," produced at the same time as the Pro Bowl.

Extensive cabling

The 60-person crew began setting up equipment at Honolulu's Aloha Stadium the Wednesday before the game. Once the truck was parked inside the tunnel near the north end zone, the first job was installing the cable. "The cable runs to the field were easy—less than 300 feet of cable was required," said Coll. "The runs to the announcer's booth required close to 1000 feet of cable."

One crucial aspect of the event coverage centered around a 30-foot production trailer that VTE shared with ESPN. VTE used the rear of the trailer to set up a position for the Super Motion tape operator and video operator. The Sony Super Motion system, used for the first time by ABC-TV during the 1984 Olympics, consists of the BVP-3000 camera, the Super Motion VTR, and processing equipment to shoot and record events at 90 frames per second. When the picture is played back, it can be slowed down to a rate at which there is no perceivable blur. The Super Motion camera was located in a low end zone position, outfitted with a Canon 45:1 lens and used to play back critical plays. "When a player was trying to catch the ball before it went out of bounds, we had excellent still frames showing the player's foot before it actually touched the ground and exactly at the second he caught the ball."

A total of 13 cameras were used for the live production. All the BVP-360s and two of the hand-held BVP-350s were hard-wired for triaxial control from the truck. The BVP-360s, outfitted with Canon 40:1 and 50:1 lenses, were located at different points on the field: in the high end zone on the north end of the field, at mid-field, at both 20-yard lines, and in the low end zone at the south end of the field. Of the BVP-350 hand-held cameras, two were on triax and controllable at the truck and another two were used in an RF configuration on the sidelines.

"We didn't have to use any color correction on those BVP-350 cameras," said Coll. "That's an entire piece of equipment we didn't need. The 350s were a perfect match for the 360s. In order to genlock the cameras with all the other equipment on the truck, we ran each RF camera through a Tektronix 110 frame synchronizer."

The operation of the BVP-360 cameras was particularly impressive, according to Coll. The two videographers hired to do the show were not familiar with the operation of the cameras, but quickly learned how to use them to the greatest advantage. "Both operators were especially pleased with the auto setups in terms of registration and geometrical connection," Coll commented. "Another advantage was the ability to use the CCU unit to go into the digital registration mode and correct all areas zone-by-zone. "We were surprised to see that the cameras did not drift at all," he added. "The day before the game, the camera operators did the critical video setups, and they didn't have to do much the next day except make minor adjustments.

Shifting shadows

One of the toughest challenges faced by the camera operators was dealing with the contrasting dark and bright areas of the stadium caused by the alternating shadows and sunlight.

When the game started at 3:00 p.m., and for the better part of the first half, the sidelines were obscured by shadows. The shadows grew worse as the game progressed.

"One thing that helped was the triaxial connection," Coll said. "Another was the auto iris. At first the operators tried to manually iris the cameras and ride the iris levels. As the game picked up and the action got faster and quicker, this became difficult."

The light changes also made heavy demands on the cameras. "When the artificial light started to take over, we were required to change the white/black balance on all the cameras," he continued. "The 360 can do that very easily, even automatically. This feature took a big burden off the operators. They could do the correc-

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tions rapidly during a commercial break and when play resumed, the cameras were fairly well matched."

Switcher effects

The VTE vehicle relied heavily on its production switcher capabilities. For example, the Grass Valley 1680-24K with E-Mem III allowed the technical director to store prerecorded effects and recall them with the push of a button.

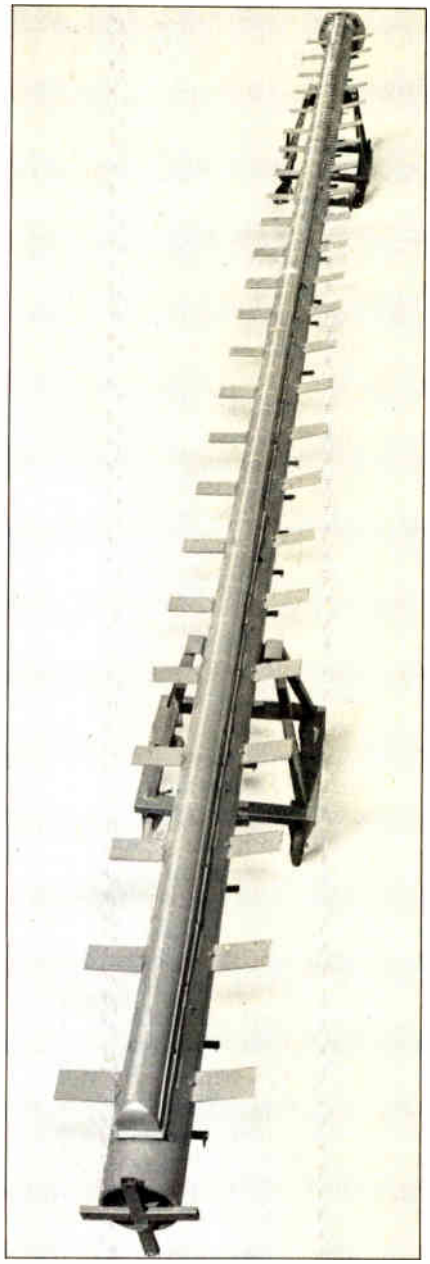
"This capability was very important in a game like this, where we had to do several complicated effects one after the other," Cobb added. The crew also used an Abekas A-53D for three-dimensional digital effects. For graphics, the crew used a Chyron 4200 EXP and an Abekas A42 still store to prerecord several head shots with graphics before the game.

VTE used the BVW-505 Betacam SP camcorder to record footage of surfers, sailboats and sunsets on the island prior to the event, and to segue into commercials during the game. In addition, interviews with players were prerecorded on the golf course, on the beach and during practice sessions for playback during the game. ESPN previewed the prerecorded footage on two BVW-15s and the playback units were also used to edit the material onto one-inch. The BVU-950 was used to play back ESPN's prerecorded game highlights.

"We were pleased with the overall performance of the truck," said Coll. "It was constructed for flexibility and ease of use which, along with its technical capabilities, allowed us to accomodate ESPN's needs. It's not very often you can do a game of this magnitude with one vehicle. Normally, it would require at least two trucks. We look forward to a future filled with more of these events." **BM/E**

About the author:
William Winston is a freelance writer who writes frequently about the television industry.

TV Signal Degradation: Is Your Antenna the Culprit?



Not even FCC type-accepted antennas are seldom suspected as causing problems. But poor designs can mean significant ERP losses.

By Richard D. Bogner

If you as a TV broadcaster were told that, because of your antenna, your actual ERP at chrominance and audio might be 10 dB or more below the value you are licensed for (and you paid for), and your station may not be capable of HDTV or even stereo and SAP due to reduced effective bandwidth, what should you do? What should the FCC do? This is the question many engineers, especially at UHF stations, may soon be forced to consider.

The situation leading to questions like these has been developing over a long period of time. Soon after TV began, the FCC carefully set standards for the transmitter output characteristics, but saw no need to type-accept broadcast antennas, which were at the time generally of the low-gain parallel-fed VHF variety supplied by a few large, reputable companies and overseen by a meticulous and knowledgeable consultancy. However, much has gradually changed since that time. UHF stations have proliferated, using high-gain antennas supplied generally by price-com-

petitive and less technically rigorous vendors, and specified or reviewed by consultants or others often more concerned with things like price or delivery or weight than with more subtle and little understood characteristics.

This has resulted in an apparently unnoticed erosion of TV broadcast antenna performance. Antenna designs are being offered today that introduce significant loss of picture quality and degradation of other characteristics at the very time the industry can least afford it, especially in view of technical innovations such as stereo, SAP, and HDTV.

Beam downtilt variations

The basic cause of the ERP and effective bandwidth loss is the significant variation that occurs in the beam downtilt over the TV channel in certain antenna designs. This beam movement can be as much as 0.8 degrees or more in a beam often 2 degrees or less in total width, which as stated can result in an ERP reduction of 10 dB (down to 10 percent of the licensed ERP value), or more in some parts of the coverage area illuminated by the main antenna beam. The variation can be even greater in the side-lobe region of the antenna beam, reaching reductions as much as 20 dB (down to 1 percent of the licensed ERP value).

Virtually every antenna design introduces this problem to some extent, because there is always some change in the vertical plane radiation pattern at different frequences over a TV channel. Considering only this latter characteristic, transmitting antennas can be divided into roughly four categories: (a) those with large variation of downtilt of main beam and side lobes in 6 MHz; (b) those with moderate variation of downtilt of main beam and side lobes in 6 MHz; (c) those with small or no variation of downtilt of main beam but moderate to large variation in side lobes in 6 MHz; and (d) those with small or no variation in main beam or side lobes in 6 MHz. Obviously the last category is most desirable in reducing to a minimum the degradation of received signal over the TV channel.

In the early years of television broadcasting, most antennas used were in category c, with some in the best category, d. However, because the antennas then were of low-gain with consequent wide vertical plane beams, the side-lobe region extended at most to a mile or two from the tower; therefore the variations of pattern in the side-lobe region affected very few receive sites. These VHF antenna designs include batwing and panel types, most of which were in effect center fed. Center-fed antennas generally do not exhibit much variation of main beam downtilt with frequency, but they can have small change in gain and beamwidth, and small, or large, change in side lobes over a TV channel.

High-gain VHF

With the introduction of higher-gained VHF antennas and UHF antennas, center feeding was at first generally maintained (with notable exceptions such as the UHF side-fire helix). As time passed, the need for higher power, higher gain, and directive horizontal patterns grew, primarily in UHF, leading to the introduction of bottom-fed coaxial slot arrays, which are in catagory b. (Panel-type antennas such as "zig-zag" and "panel-slot" can be bottom or panel fed, since they employ branch feeding.)

Recently, bottom-fed waveguide slot arrays were introduced. This design can be in the worst category, a, which is the major of several compelling reasons it was rejected years earlier in favor of the coaxial slot array.

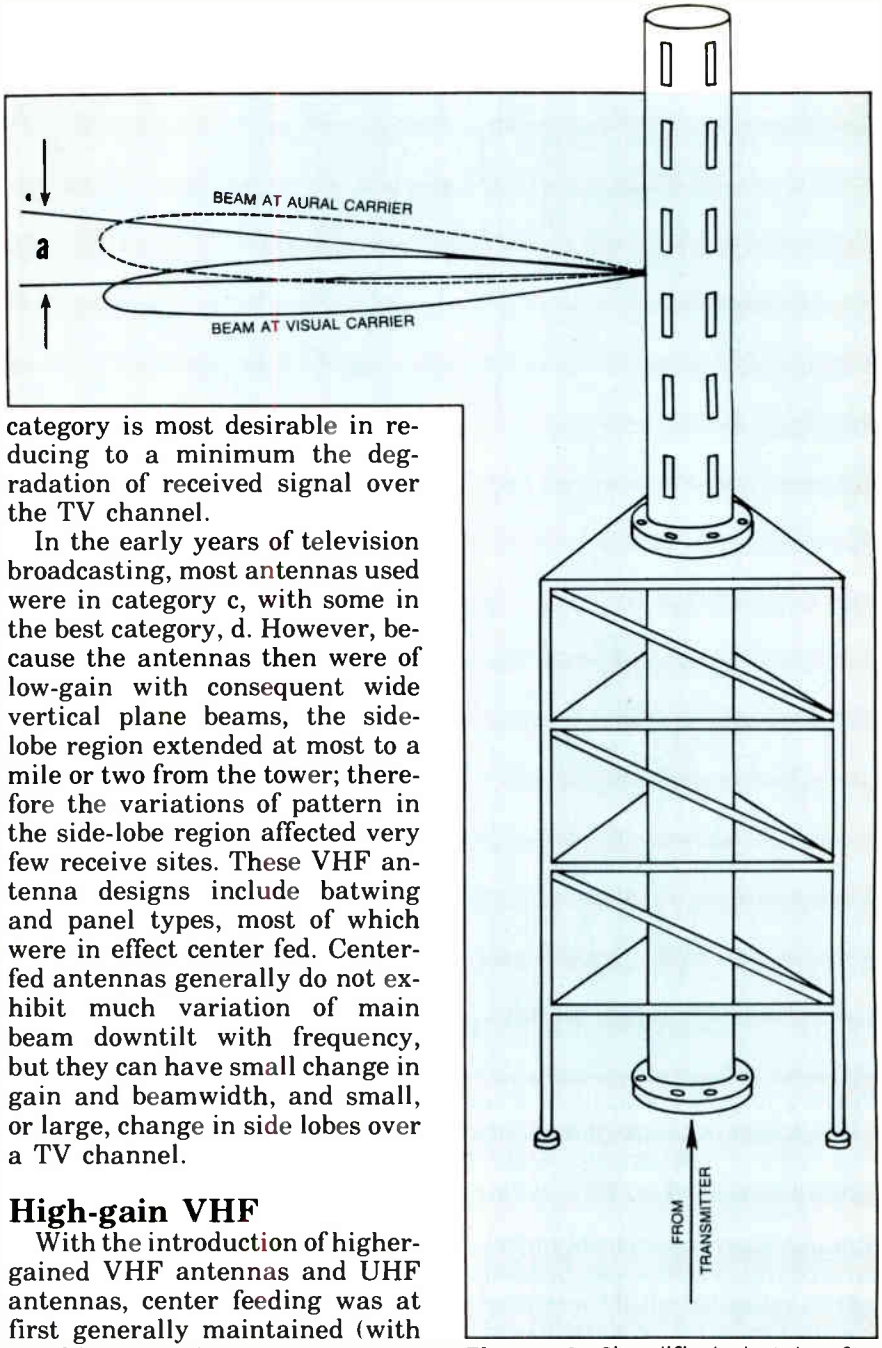


Figure 1: Simplified sketch of a bottom fed slot array showing the variation of beam downtilt over a TV channel.

Thus it can be seen that there has been a gradual but significant movement toward use of antenna designs in categories that can cause large reductions in picture quality in parts of the coverage area.

The reason that there is a lot of "beam steering" (change of beam tilt at different frequencies within a 6 MHz channel) of bottom-fed slot arrays, and why waveguide

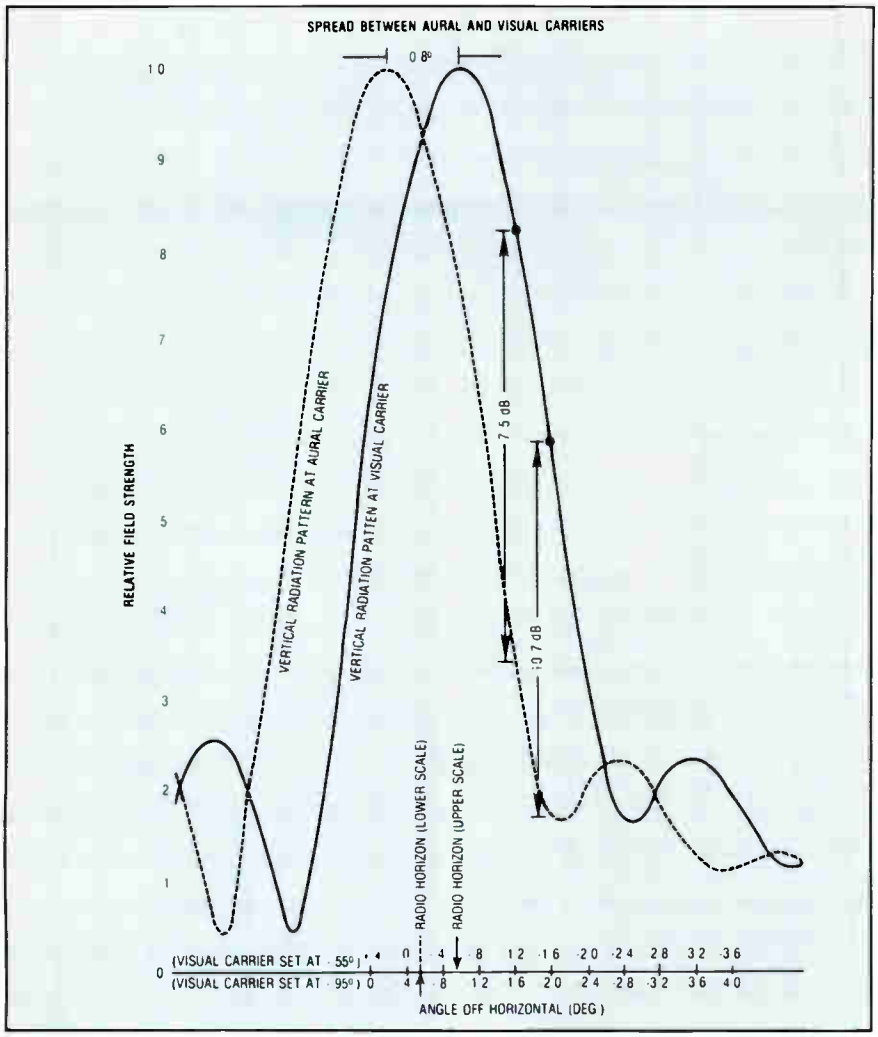


Figure 2: Typical vertical-plane radiation pattern for antenna with gain ≅ 30, showing change of angular position of beam between visual and aural carrier frequencies. (Data shown is for bottom fed circular waveguide slot array, with λg/λo = 1.4)

antennas steer considerably more than coaxial systems, can be seen from an examination of the nature of beam formation in antennas of this type. These antennas consist of slots cut in the wall of a coaxial or waveguide transmission line, in series, along the length of the line.

Each slot is excited, or induced to radiate, a small portion of the energy passing it, by a probe or by other means. The antenna, really a radiating transmission line, is merely the last section of the line running from the transmitter and up the tower. In a simple example, if the slots are spaced a constant distance S apart along the axis of the transmission line, (See Figure 1), the radiated beam departs by an angle a from being normal to this axis, where $a = \arcsin(\lambda/S\text{-}1)$. When $S = \lambda$, $a = 0$ degrees, i.e. the beam is 90 degrees from the (vertical) antenna axis. λ is the wavelength in the transmission line, which for the coaxial line case is called λ_o, which is equal to c (the velocity of light) divided by f, the radio frequency (i.e. $\lambda_o = c/f$).

However, in the waveguide case, the wavelength in the slotted transmission line is $\lambda_g = \lambda_o(1\text{-}(\lambda_o/K)^2)^{1/2}$, making λ_g always larger than λ_o if K is finite. K is a constant, the value of which depends on the type of waveguide cross-section, the waveguide dimensions, and the propagating mode. In general, K is proportional to the cross sectional dimensions; e.g. in round waveguide of inside radius r propagating the TM01 mode needed for omnidirectional radiation, $K = 2.613r$.

ERP reduction

Based on the above, and the practical waveguide sizes in actual use to maintain reasonably small values of weight and cross section area to wind, the variation of beam tilt over the frequency range from the visual carrier to the aural carrier is simple to calculate. This value, plus knowledge of the vertical plane radiation pattern, which is primarily dependent on antenna length and null fill chosen, allows rapid determination of the ERP reduction over the channel and consequent loss of effective bandwidth. Figure 2 is a plot of the vertical plane radiation pattern of a typical UHF broadcast antenna with a medium gain value of around 30 (14.8 dB) and standard null fill. The pattern is shown in two positions, displaced by 0.8 degrees, the approximate value predicted from the data given above for round waveguide. Two sets of coordinates are shown; one for an assumed condition in which the pattern peak at the visual carrier frequency is placed at -0.55 degrees (the radio horizon at 1400 feet above average terrain), and the other for an assumption that the pattern peak at the mid-frequency between the visual and aural carriers is placed at the radio horizon.

This represents the full practical range, since beyond it on either side is the loss of peak ERP. For any assumed design beam tilt in this range, the maximum loss of ERP due to beam steering is the same, but the location in the coverage area changes, as does the average loss in the area within the B grade contour. (For bottom-fed coaxial antennas, the variation in beam tilt is about half the amount shown for waveguide, or above 0.4 degrees).

Figure 3 is calculated from Figure 2 for a tower 1400 feet above terrain, and shows the total variation in ERP over the channel, versus distance from the tower for both assumptions mentioned

above. The maxium variation is about 11 dB! This results in ERP values at certain ranges only about 8 percent of the predicted (and licensed) value (this, of course, is in addition to the visual -aural ratio set at the transmitter; e.g. if the aural is set at the usual -10 dB, this 11 dB beam tilt variation will result in an aural level being -21 dB, and a chrominance subcarrier almost 10 dB below the design value.)

Note that the more usual practice of setting the specified downtilt at the visual carrier, an approach that puts the full maximum ERP at the radio horizon, causes a larger variation at color and audio over a large range than does the approach of setting the specified tilt at midband. The latter method, however, introduces some loss of peak ERP at the radio horizon, which is the largest range of interest and can least afford the reduction. (Bottom-fed coaxial designs will exhibit about half these waveguide values, dropping to about 6 dB maximum instead of 11 dB; but the curves are otherwise similar.)

Line-of-sight Measurements

A large number of line-of-sight measurements at ranges of one to twenty miles from many UHF full-service TV stations were made, checking the ratio of visual to aural carrier levels compared to the value set at the transmitter output. Stations using center-fed slot antennas, and bottom-fed coaxial and waveguide slot antennas, were included. Reductions of audio level up to 11.5 dB in the main beam region, and over 13 dB in the side-lobe region, were recorded. (Some of the antennas had the specified downtilt set at the visual carrier, others at midband.) All of the measurements confirmed the calculated results very closely.

Figure 4 shows the typical loss of received signal due only to beam steering in a beam-fed waveguide transmitting antenna over one TV channel. The transmitter output is assumed to be constant at 0 dB, and the lower

"received signal" curve is the response characteristic entering a TV receiver at a range typically 6 to 12 miles from the transmitter.

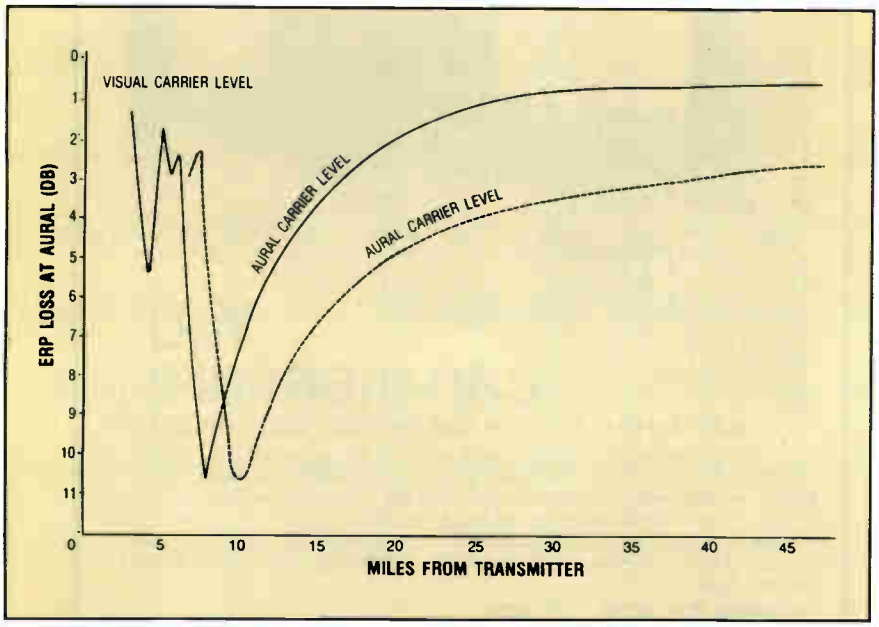


Figure 3: Typical loss of antenna gain at the aural carrier, compared to the visual carrier gain, due only to change of the vertical-plane angular position of the antenna beam over one TV channel (1400-feet AAT ASSUMED).

It is important to note that not only are the resulting color subcarrier and audio carrier levels extremely low, causing weak color and very low sound levels as well as severe stereo and SAP problems, but the full 6 MHz is not being used for video data. This results in considerable loss of sharpness.

At the present time, serious consideration is being given to high-definition television and other extended uses of the TV channel. Various methods are being analyzed, some of which include the use of only the present 6 MHz band, while others make use of additional spectrum. Laboratories are busy experimenting, and broadcasters are lobbying to maintain and even expand spectrum allocation for TV. It is probable that the engineers now struggling to squeeze more out of 6 MHz are aware that they may really only have available possibly less than 5 MHz in many cases

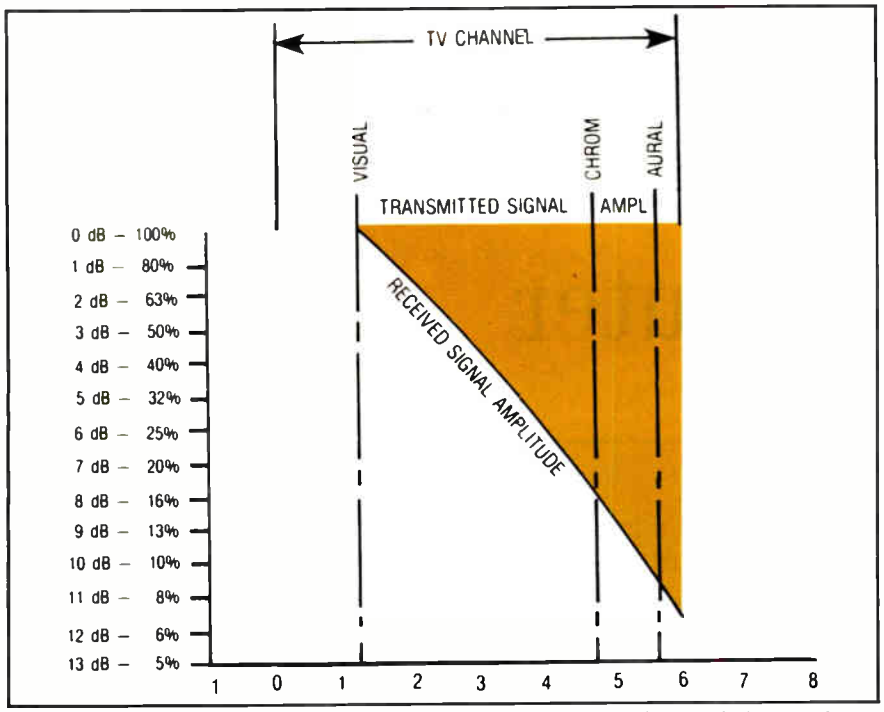


Figure 4: Typical loss of received signal over a TV channel due only to change of vertical-plane angular position of the antenna beam. (Black area represents loss of effective bandwidth. Transmitter output is assumed constant over the channel band.)

and locations? It is probable that those who want spectrum for other TV uses would appreciate knowing that the broadcasters now claiming need for more bandwith are wasting part of what they now have?

It is obviously essential to both the FCC and the TV broadcast industry to seriously consider this situation as soon as possible, and then move to eliminate the use of antennas that introduce more than a very small ERP variation over the channel, in any part of a station's coverage area. Many stations will awaken to this situation only after they try to use stereo or SAP or other bandwidth extension technique, or a new HDTV system, or after other services walk away with their spectrum.

BM/E

About the Author:
Richard Bogner is chairman and technical director of Bogner Equipment Corp.

FM Channel Studies on Your Personal Computer

By Ronald F. Balonis

When the FCC decided to increase the availability of FM broadcast assignments by changing the allocation rules, it did a lot more than just make new station allocations. It also provided the keys to unlock many of the "old" station allocations from their mileage-separation prisons.

The new minimum separation distances allow the movement, if there's slack and if there's a site, of a station's transmitter to a "better FM" location (one closer to the population center, for example, or a higher one, or perhaps one with a little less multipath). And, for some extremely fortunate stations, it allows upgrading to a higher power and class.

Because of the rule changes, the FCC found 689 channel allotments. By the same rule changes, however, especially that of allowing Class A on Class B/C channels, there are many more allocations yet to be found merely by looking for them and then getting them allocated to a community.

FM allocation study

In most radio markets, some of the main topics of discussion are the effects of the rule changes on FM allocations. The only way to be sure about new allocations and their potential impact on current channels is to have an FM Channel Study done. to search, using a database service such as Dataworld's (the FCC FM database), with a proposed transmitter location. And seldom is a single study enough to assuage all possible concerns over proposed new allocations.

Input File

```
* MOUNTAINTOP, PA CHANNEL 246 97.1MHZ *
BRIDGETON       NJ 299B  392542  751400
MILLVILLE       NJ 247B  392354  750218
TRENTON         NJ 248B  401405  744602
ALBANY          NY 299B  423900  734524
AMSTERDAM       NY 249A  425624  741106
ARLINGTON       NY 245A  414000  735600
BIG FLATS       NY 249A  421000  765800
ITHACA          NY 247B  422754  762223
NEW YORK        NY 246B  404454  735910
PORT JERVIS     NY 244A  412224  744349
SYRACUSE        NY 300B  430306  760900
UTICA           NY 245B  430846  751040
COUDERSPORT     PA 244A  414612  780118
DANVILLE        PA 244A  405916  763251
GETTYSBRG       PA 299B  401800  771400
HARRISBURG      PA 247B  402044  765209
JERSEY SHORE    PA 249A  411314  771639
LANCASTER       PA 245B  400252  762725
MONTROSE        PA 243B  415116  755150
PHILADELPHIA    PA 243B  400230  751424
RIDGEBURY       PA 245A  415500  764000
ST MARY'S       PA 248B  412542  783342
STATE COLLEGE   PA 244A  404730  775200
TOBYHANNA       PA 300A  411100  752500
TUNKHANNOCK     PA 299A  413218  755700
```

Figure 1: A demonstration file showing the format for CH###.IN, the program's input file.

With the help of your PC, however, there is a way to get a little more out of an FM Channel Study. The program, FMSITE.BAS, gives multiple answers to what-if FM channel allocation questions. It doesn't do away with the necessity for official FM Channel Studies; but for every proposal you have, it allows you to do what-if questioning for other nearby locations. Given the basic data from an FM Channel Study—stations, classes, and transmitter coordinates—and a new set of location coordinates, this program recalculates the FM Channel Study for new locations.

About the program

The program is a processor that takes a file as input (FM Channel

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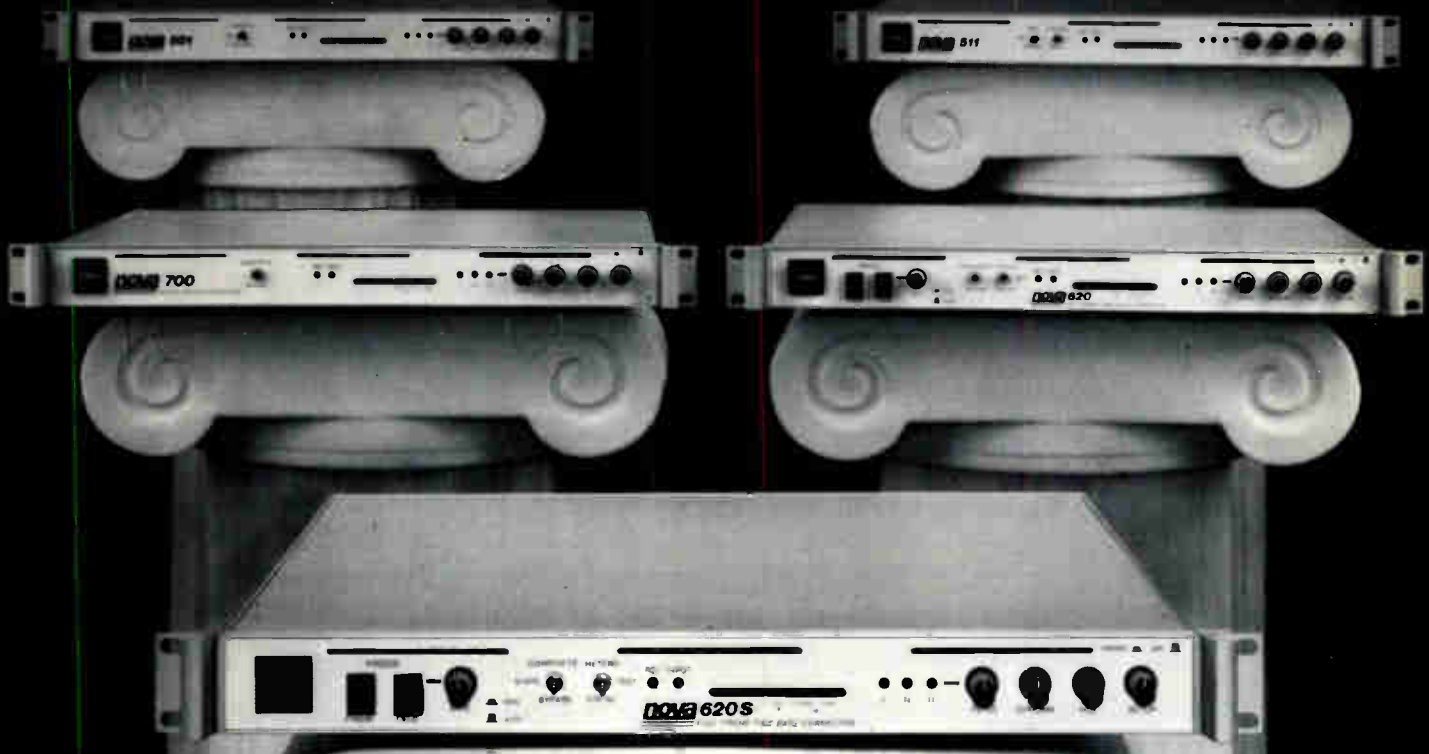

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Study Data) and creates an output file (the recalculated Channel Study). The program runs on IBM-compatible computers with GWBASIC, MS-DOS, and one drive. A printer is nice, but not essential.

The most difficult and most important part of the program is making an input file out of the channel study data. You can use MS-DOS's EDLIN, or any other word processing software that creates ASCII files. The demo file illustrates the required file format.

"FMSITE.BAS"

```
 0   'PMSITE.BAS   CALCULATE A FM CHANNEL
 5   '       BY RONALD P. BALONIS  6/24/86
10 RESTORE:RD=45/ATN(1):PSPEC$=""
20 '
45 '-THE CLASS-CLASS FM DISTANCE TABLE-
50 DATA "A ","B1","B ","C2","C1","C "
51 '    RELATION    0   1   2   3  53/4
52 DATA "A ","A ", 105, 64, 27, 27,  8
53 DATA "A ","B1", 138, 88, 48, 48, 16
54 DATA "A ","B ", 163,105, 69, 69, 16
55 DATA "A ","C2", 163,105, 55, 55, 16
56 DATA "A ","C1", 196,129, 74, 74, 32
57 DATA "A ","C ", 222,169,105,105, 32
58 DATA "B1","B1", 175,114, 50, 50, 24
59 DATA "B1","B ", 211,145, 71, 71, 24
60 DATA "B1","C2", 200,134, 56, 56, 24
61 DATA "B1","C1", 233,161, 77, 77, 40
62 DATA "B1","C ", 259,193,105,105, 40
63 DATA "B ","B ", 241,169, 74, 74, 24
64 DATA "B ","C2", 241,169, 74, 74, 24
65 DATA "B ","C1", 270,195, 79, 79, 40
66 DATA "B ","C ", 274,217,105,105, 40
67 DATA "C2","C2", 190,130, 58, 58, 24
68 DATA "C2","C1", 224,158, 79, 79, 40
69 DATA "C2","C ", 249,188,105,105, 40
70 DATA "C1","C1", 245,177, 82, 82, 48
71 DATA "C1","C ", 270,209,105,105, 48
72 DATA "C ","C ", 290,241,105,105, 48
80 '
90 TLE$="*** CALCULATE A FM CHANNEL ***
95 '
100 CLS:PRINT TAB(5) TLE$:PRINT:L=0
105 PRINT"CHANNEL NUMBER    <###CL> ";
110 INPUT CHAN$:CHAN=VAL(CHAN$)
115 IF CHAN=0 THEN STOP
120 IF CHAN<200 OR CHAN>300 THEN 0:'--CHAN NO GOOD
125  CLASS$=MID$(CHAN$+" ",4,2):CX$=" "
130  FOR I=1 TO 6
135   READ CLASS$(I):CX$=CX$+CLASS$(I)
140   IF CLASS$=CLASS$(I) THEN II=I
145  NEXT I:IF II=0 THEN 0"'--CLASS NO GOOD!
150 '------LOAD CLASS-CLASS LIMIT TABLE
155 FOR I=1 TO 6:'-LOAD IT LINE BY LINE
160  READ A$,B$
165  IF CLASS$(I)=A$ THEN 180
170   IF CLASS$(I)=B$ THEN 180
172    FOR II=0 TO 4
174     READ A$
176    NEXT II:GOTO 160:'---GET ANOTHER
178 '---READ A LINE FROM DISTANCE TABLE
180  FOR J=0 TO 4
185   READ LIM(I,J)
190  NEXT J
195 NEXT I
200 '--------GET THE FM SITE CORDINATES
205 PRINT"FM SITE: LAT  <DDMMSS>     ";
```

Figure 2: FMSITE.BAS, a frequency allocation search program.

The first line of the file is a comment line and the program skips it. Each line of the file is one channel study data. You can use MS-DOS's EDLIN, or any other word processing software that creates ASCII files. The demo file illustrates the required file format. The first line of the file is a comment line and the program skips it. Each line of the file is one channel record, and the program looks for the data at fixed locations in the line.

Note that the demo input file,

```
210  INPUT L:L1=L:GOSUB 8000: D1=D:L=0
215 PRINT"          LONG <DDMMSS>     ";
220  INPUT L:L2=L:GOSUB 8000: D2=D
225 PRINT
230 LINE INPUT"SITE: ";SITE$
240 '
250 CHAN$=MID$(CHAN$,1,3)
290 '
300 '------NOW CALCULATE THE FM CHANNEL
305 OPEN FSPEC$+"CH"+CHAN$+".IN"  FOR INPUT AS 1
310 OPEN FSPEC$+"CH"+CHAN$+".OUT" FOR OUTPUT AS 2
312 PRINT:PRINT "**** CALCULATING ****"
315  LINE INPUT#1,REC$:'----THROW AWAY HEADER
317  PRINT#2,TLE$:PRINT#2,""
320  PRINT#2,"CHAN=";CHAN$+CLASS$;
325  PRINT#2,"   FM SITE: ";L1;"  ";L2;
330  PRINT#2,"    ";SITE$:PRINT#2,""
340  PRINT#2," --- CITY ---    ST CH ";
345  PRINT#2,"CL   LAT     LONG     BRG";
350  PRINT#2," LIMIT ACTUAL SLACK"
355  PRINT#2,TAB(49)"------ KM -------"
360  REC$="":LINE INPUT#1,REC$
370  L=VAL(MID$(REC$,26,6)):GOSUB 8000
375  D3=D:L=0
380  L=VAL(MID$(REC$,33,7)):GOSUB 8000
385  D4=D:L=0
390 GOSUB 5000:'-GET DISTANCE & BEARING
395 '
400 CX=ABS(CHAN-VAL(MID$(REC$,20,3)))
410 IF CX=53 OR CX=54 THEN CX=4
415  CY$=MID$(REC$,23,2):IF CX>4 THEN 450
420  CY=INSTR(CX$,CY$)/2:LIM=LIM(CY,CX)
430 PRINT#2,REC$;
435 PRINT#2,USING"  ###.#  ###";BRG;LIM;
440 PRINT#2,USING"  ###.#  ###.#";DIST;DIST-LIM
450 IF EOF(1) THEN 460 ELSE 360
460 CLOSE 1:CLOSE 2: RUN 0:'--WHEN DONE RESTART
500 '
5000 '----DIST & BRG BY FCC 73.208-----
5100 D6=ABS(D3-D1):D7=ABS(D4-D2):D=(D1+D3)/2
5200 IF D<25 OR D>50 THEN CLOSE 1:CLOSE 2:RUN 0
5300  D=D/RD:BRG=90
5400  LA=D6*(111.13209#-.56605*COS(2*D)+.0012*COS(4*D))
5500  LB=D7*(111.41513#*COS(D)-.09455*COS(3*D)+.00012*COS(5*D))
6000 '
6020  DIST=SQR(LA*LA+LB*LB)
7010  IF LA>0 THEN BRG=ATN(LB/LA)*RD
7020   IF D1>D3 AND D2>D4 THEN BRG=180-BRG
7030    IF D1>D3 AND D2<=D4 THEN BRG=180+BRG
7040     IF D1<=D3 AND D2<=D4 THEN BRG=360-BRG
7050      RETURN
7060 '---CONVERT DDMMSS TO DD.DDDD
8000 IF L=0 THEN CLOSE 1:CLOSE 2:RUN 0
8015  GOSUB 8020:L=D
8020   D=INT(L/100):D=D+(L-D*100)/60:RETURN
8025 '--------END OF PROGRAM----------
```

CH246.IN, is based on old data for Mountaintop, PA (see Figure 1).

The program itself (Figure 2) is based on a distance and bearing subroutine (lines 5000-8025) and on the FM separation table 73.208 of the rules. FMSITE.BAS takes its input from CH###.IN, compares the station's class to the data table to get limits, and calculates the new distances based on the new location. Then, it computes the separation, limit, actual, and clear distances and writes them to an output file. In the program, the FM mileage separation table, 73.207, is in lines 50 to 72 as Data Statement. Lines 100 to 145 sign the program on the computer and prompt for the channel and class, entered as ###XX. The program error checks for a valid channel number (200 to 300) and a valid class (A/B1/B/C2/C1/C); an error of either causes it to restart. To quit, at the Channel-Class prompt, just press Enter. The program contains no intelligence, if you don't have the input data for the channel as a file (CH###.IN) on disk, you'll get an irritating 'file not found' error.

Lines 150 to 195 construct a mileage separation table for the class you've entered. Lines 160 and 170 steer only the needed separation distances into the limit table for use in the separation calculations.

Following that, the program prompts for the coordinates (latitude and longitude—DDMMSS) for the new location. Then, for a site label (FM Site:). If the channel data input file exists, the program displays "**** CALCULATING ****", and, in a minute of two, providing there were no syntax errors in the input file, the initial screen shows. To quit the program, just hit Enter. Type "SYSTEM" to get to MS-DOS, and then use operating system commands to see or print the results of the 'new' FM Channel Study in the program's output file (CH###.OUT).

The key to using this program to make multiple channel studies from one study is the data input file. Although it is possible to write a program that would take its input data from the keyboard and display its output on a screen or printer, it would be a much bigger and a more complicated program. For a calculating-on-data program, this input/output file technique is very powerful.

As with most all what-if utility computer programs, there are some qualifications of use to observe and recognize. This one is not intended to replace FM Channel Studies done using the FCC FM database. Nor does it eliminate the need for a consultant.

About the author:
Balonis is Chief Engineer of WILK-AM, Wilkes-Barre, PA.

Auxiliary Service Licensing

By Harry Cole, FCC Counsel

One little-noted area where the FCC's deregulation program has had a significant impact on engineering involves the auxiliary services. Those of you familiar with the old days may recall the complexities of obtaining, and maintaining, licenses for your STL, RPUs, etc.

Several years ago, the Commission overhauled its approach to auxiliary licensing. The most striking break from the past involved a blanket, automatic, temporary authorization for any broadcaster to use any auxiliary frequency, without prior FCC approval, for up to 720 hours per frequency annually. In other words, if you happened to have access to somebody else's remote pick-up unit and you wanted to go out and do some remotes from a local event (or an advertiser's place of business), you did not need to go to the Commission and get licensed for such use. You could just go out and do it (for up to 720 hours per year) as long as you first notified the local frequency coordination committee and any licensee assigned the frequency you intended to use, and as long as you recognized that you would have to terminate your operation if it was causing interference to a regularly-authorized station.

This approach represented a real risk in many areas where available auxiliary frequencies are scarce, or even nonexistent. After all, the notion of users just coming in and jumping on a frequency, even if only temporarily, is clearly fraught with potential dangers for everyone involved. It also places increasing importance on the efforts of local voluntary frequency coordination committees, which probably had not counted on becoming, in effect, baby FCCs.

As it turned out, the experiment seems to have worked. While the temporary authorization rule has had to be suspended from time to time, those suspensions have been directed to specific events in specific places where dramatically increased auxiliary frequency use can be predicted and where advanced coordination is clearly necessary to minimize harmful interference. (For example, the rule was suspended for the U.S. visits of Pope John Paul II and Mikhael Gorbachev and for the 1984 political conventions; most recently it was suspended in the San Diego area for Super Bowl XXII.) As a result, the suspensions have been extremely brief and localized. Meanwhile, the vast majority of auxiliary users, both permanent and temporary, appear to be living quite comfortably together.

Mobile frequency privatization

Bolstered by the apparent success of the "privatization" of at least a portion of its frequency management responsibilities, the Commission proposed, in late 1986, that this concept might be expanded somewhat. The FCC contemplated issuing to broadcast (and cable) entities blanket authority for mobile or portable operation on any frequency in bands that they are permitted to use, rather than licensing such entities for specific frequencies. The idea was to permit mobile or portable operations to be commenced locally without any further FCC involvement. The Commission would, instead, maintain only "administrative information" about portable/mobile stations, such as the licensee's name, address, and call sign. In other words, the FCC was contemplating pretty much getting itself out of the mobile auxiliary licensing business.

"The notion of users just coming in and jumping on a frequency, even temporarily, is clearly fraught with potential dangers for everyone involved."

The trouble was, though, that the Commission's concept depended almost totally on the existence of a highly developed local frequency coordination mechanism. And, as at least one commenter pointed out, the quality of local coordination varies widely from place to place. Further, local coordinators tend to be volunteers who lack the time and resources necessary to maintain databases with up-to-the-minute accuracy, and who may likely be reluctant to resolve frequency disputes, particularly on short notice.

Finally, the FCC recognized that all of the negative factors now only get worse with increased spectrum sharing. Because of these considerations, at the very end of 1987, the Commission concluded—correctly, we think—that any blanket authorization scheme would still require substantial time and attention by the Commission itself. Since that would defeat the whole purpose of the scheme in the first place, the Commission decided to put the idea back up on the shelf, at least until it can be shown that the local frequency coordination system has developed enough to permit the Commission to turn the reins over to that system. For the time being, then, broadcasters will have to make do with do with just the 720-hour temporary auxiliary authorization.

The concept of a broader blanket authorization has not been scrapped entirely, though. In fact, even while it was closing down its 1986 inquiry, the FCC was suggesting that it was just a good idea whose time had not quite come. The Commission openly invited the broadcast industry—which had gener-

ally supported the notion of a blanket authorization—to come back whenever it can demonstrate a "viable plan for frequency coordination." Obviously, once somebody can show the Commission that coordination can be accomplished, in virtually all places and all situations, fairly and efficiently at the local level, it is reasonable to assume that the commission will jump at the chance to transfer its responsibilities to the private sector.

Note of caution

Before everyone starts to salivate at the joyous prospect of an unregulated auxiliary world, where only the hens, and not the farmer or the fox, are in charge of the henhouse, a note of caution may be sounded. Before such a world will be a good idea, there really will have to be a well-established coordination system virtually everywhere. Those who are active in the system will have to be prepared to devote considerably more time and attention to it than is probably now the case: records will have to be maintained and made available for use on a current basis, and mechanisms will have to be developed for the prompt resolution of disputes (which will probably increase in number.) This increased responsibility may, very understandably, be less than attractive to those dedicated souls who already served as coordinators on a volunteer basis.

And from the point of view of the noncoordinators, there is likely to be an increasing concern about fairness. The more influential a coordinator may become in the operation of stations with which he or she is not affiliated, the greater will be the danger that policies may be established or disputes resolved in ways that favor the coordinator's employer, or station, or other private interests. In other words, as the stakes get higher, the individual(s) serving as arbiter may be expected to become much more judge-like than is probably the case now. It is not clear, however, whether such an expectation can be realized—or whether absolute fairness (as well as the appearance of fairness) can be achieved—in a purely voluntary system.

The answer might be to elevate frequency coordination to a profession of sorts, with coordinators taking a full-time, rather than a spare-time, role. But that approach is not itself trouble-free. Who, after all, would pay the coordinators? What standards, if any, would be applied to their decisions? How would those standards be devised, and by whom? And, perhaps most importantly, what remedies would be available to an auxiliary operator who feels that the coordination system has treated him or her unfairly? Would such an aggrieved user be able to sue in local or federal court? If so, who would be sued, and what standards would be applied by the court in resolving the suit?

In the warm glow of the general notion of a blanket authorization, it is easy to overlook these questions (and others like them), primarily because the existing regulatory system does not pose them. With the Commission calling the shots, we know who the

regulators are, how they are supposed to regulate, the standards governing their regulation, and the avenues available to us in the event that we believe that they have regulated improperly. All of those systems are well-established aspects of the present adminstrative legal system. By contrast, none of those systems has been fully developed with respect to a private, industry-wide, industry-sponsored and industry-administered system. And this says nothing about the potential anti-trust implications of such a private system.

The bottom line on all this is that, while the Commission and the industry may be willing, if not enthusiastic, to privatize the regulation of certain uses of the auxiliary frequencies, the Commission has correctly asked a number of important questions and, in the absence of answers, has wisely backed off its tentative plan, at least for the time being.

RF (Raw Facts)

■ The new address of the Commission's Long Beach, CA, office is: Cerritos Corporate Tower, 18000 Studebaker Road, Room 660, Cerritos, CA 90701. The new telephone number is (213) 462-4451. The Commission says it has relocated the office to "Los Angeles," although we have thought from the address that it had been relocated to "Cerritos."

■ The FCC has clarified one aspect of its 1984 deregulation of metering requirements. As a result of the 1984 amendments to Section 73.58 (b) of the FCC's rules, it apparently was not clear to some whether a station's ammeter could be installed with a jack and plug arrangement to permit removal of the ammeter from the antenna circuit in case of, say, lightning. The Commission has now reamended its rules to make it clear that it approves of the use of a suitable jack and plug arrangement.

"In the warm glow of the general notion of the blanket authorization, it is easy to overlook these questions, primarily because the existing regulatory system does not pose them."

■ If you're heavily into technical data, you should be aware that the FCC's broadcast databases are available on magnetic tape or computer diskettes, as well as microfiche. You can order all, or certain discreet segments, of most databases. You can also obtain a "Standing Order" subscription, which gets you automatic mailings of updated FCC information on a continual basis. To get the scoop on your options, delivery schedules, prices, etc., call: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, or International Transcription Service, 2100 M Street, N.W., Washington, DC 20036; (201) 857-3800. **BM/E**

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Business Briefs

Dan Rosen, of **Editel/NY**, has just recently been elected president of the New York chapter of the **International Teleproduction Society**. The announcement was made at the organization's annual meeting, presided over by outgoing president Bob Henderson of Windsor Video. ITS also selected its board of directors: Marilynn Bend (VCA Teletronics), Neil Baudhuin (VideoWorks), Gerald Citron (Intercontinental Televideo), Nick D'Antona (Manhattan Transfer/Video), Kathy DeMerit (Audio Plus Video International), Jane Everett (Video Dub), Imero Fiorentino (Imero Fiorentino Associates), Judy Glassman (HBO Studio Productions), Walter Hamilton (Lee Rothberg Productions), Bob Henderson (Windsor Video), Patrick Howley (Post Perfect), Billy Kelly (National Video Center), Barry Kneper (Unitel Video), Steve Lampert (Nexus Productions), Dan Rosen (Editel/NY), Mark Polyocan (Tape House Editorial), and Howard Schwartz (Howard Schwartz Recording).

Basys, Inc., has logged several precent sales of newsroom computer systems. Five **Fox Television** stations have purchased systems: WNYW-TV in New York (who have just installed a second Betacart system as well); WTTG-TV in Washington, DC; KRIV-TV, Houston, TX; and existing systems at KTTV-TV in Los Angeles and WFLD-TV in Chicago will be upgraded and expanded. All five systems will be linked to share system information and archives via standard phone lines and 2400-baud modems. Each location has a system foundation based on the DEC MicroVAX II, with individual device communications handled on Ethernet-based Basys CCUs...WWOR-TV, Secaucus, NJ, the **MCA Broadcasting** flagship, has installed a 32-terminal Basys system...And **KHOU-TV**, another Houston station, has incorporated a Basys package its newsroom.

Ampex Corp. has announced the formation of **two new divisions** that will focus on digital video processing systems and high-performance magnetic recorders. According to president and CEO Max Mitchell, the Ampex Video Systems Division, the Ampex Recording Systems Division, and a new Marketing, Sales, and Service Division unify three previous departments: A/V systems, data systems, and the related domestic and international sales teams. Recording Systems will be headed up by VP Mark Sanders; Video Systems, by VP George Merrick; and Donald F. Bogue will assume responsibility for the new sales and service arm.

Studer Revox, as well, has reorganized its management structure to meet the demands of an expanding market. Chris Ware has been named manager of Studer Direct Sales and will oversee any nondealer sales of Studer and Revox products. Executive VP Bill Muggler will head up overall administrative measures. Other changes involve a general expansion and the appointment of West coast sales and service personnel.

On the shirttails of an announcements that its net earnings were up 20 percent from this same quarter last year comes the news from **Harris Corp.** that it is forming new business units for technical support and software services. The two newly-created wholly-owned subsidiaries, Harris Technical Services Corp. (HTSC) and Harris Data Services Corp. (HDSC), will provide support for electronic components and software, respectively. Both HTSC and HDSC are part of the Harris Government Systems Sector...Other second quarter reports reveal **Scientific-Atlanta's** net income is up 35 percent from the second quarter of last year, with total earnings for the quarter logged in at a record $7.9 million.

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Company _____

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Circle the Numbers Below of Products or Ads for Which You Want More Information.

100	101	102	103	104	105	106	107	108	109	110	111	112	113
114	115	116	117	118	119	120	121	122	123	124	125	126	127
128	129	130	131	132	133	134	135	136	137	138	139	140	141
142	143	144	145	146	147	148	149	150	151	152	153	154	155
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254	255	256	257	258	259	260	261	262	263	264	265	266	267
268	269	270	271	272	273	274	275	276	277	278	279	280	281
282	283	284	285	286	287	288	289	290	291	292	293	294	295
296	297	298	299	300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319	320	321	322	323

URGENT ACTION REQUIRED!!!

I have an immediate interest in the following items.

I wish to start receiving/continue to receive BM/E Magazine free
☐ Yes ☐ No

Place
Postage
Here

BME
BROADCAST MANAGEMENT/ENGINEERING

Reader Service Management Department
P.O. Box 5164
Pittsfield, MA 01203-5164

Place
Postage
Here

BME
BROADCAST MANAGEMENT/ENGINEERING

Attn: Subscription Dept.
P.O. Box 6056
Duluth, MN 55806

Place
Postage
Here

BME
BROADCAST MANAGEMENT/ENGINEERING

Reader Service Management Department
P.O. Box 5164
Pittsfield, MA 01203-5164

BM/E RAPID RESPONSE CARD

BROADCAST MANAGEMENT/ENGINEERING

MARCH 1988

To validate this card, please provide all requested information.

A. Do you have responsibility for the purchase of equipment?
1. ☐ Yes 2. ☐ No

B. What is your purchasing authority?
1. ☐ Evaluate 2. ☐ Recommend 3. ☐ Specify

C. Purpose of this inquiry:
1. ☐ Current Project 2. ☐ Planned Project 3. ☐ General Information

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Signature _____ Date _____

Phone Number ( ) _____

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URGENT ACTION REQUIRED!!!

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☐ Yes ☐ No

BM/E COMPLIMENTARY SUBSCRIPTION QUALIFICATION CARD

BROADCAST MANAGEMENT/ENGINEERING

1. I would like to receive (continue receiving) BM/E (BROADCAST MANAGEMENT/ENGINEERING): YES ☐ NO ☐

2. Please check the type of facility or operation that best describes your primary business classification (check only one).
☐ TV Stations
☐ AM Stations
☐ FM Stations
☐ Corporate/Institutional Facilities
☐ CATV Facility
☐ Recording Studio
☐ Independent Teleproduction Facility
☐ Microwave, Relay Stations or Satellite Company
☐ Government
☐ Consultant
☐ Dealer, Distributor or Manufacturers

3. Which of the following best describes your TITLE (Please check only one).
☐ Technical and Engineering Management
☐ Engineering Staff
☐ Company and Station Management
☐ Production and Programming
☐ Others Allied to the Field (specify) _____

Name _____ Title _____

Station or Firm _____

Address _____ City _____ State _____ Zip _____

Signature _____ Date _____

3-88

BM/E RAPID RESPONSE CARD

BROADCAST MANAGEMENT/ENGINEERING

MARCH 1988

To validate this card, please provide all requested information.

A. Do you have responsibility for the purchase of equipment?
1. ☐ Yes 2. ☐ No

B. What is your purchasing authority?
1. ☐ Evaluate 2. ☐ Recommend 3. ☐ Specify

C. Purpose of this inquiry:
1. ☐ Current Project 2. ☐ Planned Project 3. ☐ General Information

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Signature _____ Date _____

Phone Number ( ) _____

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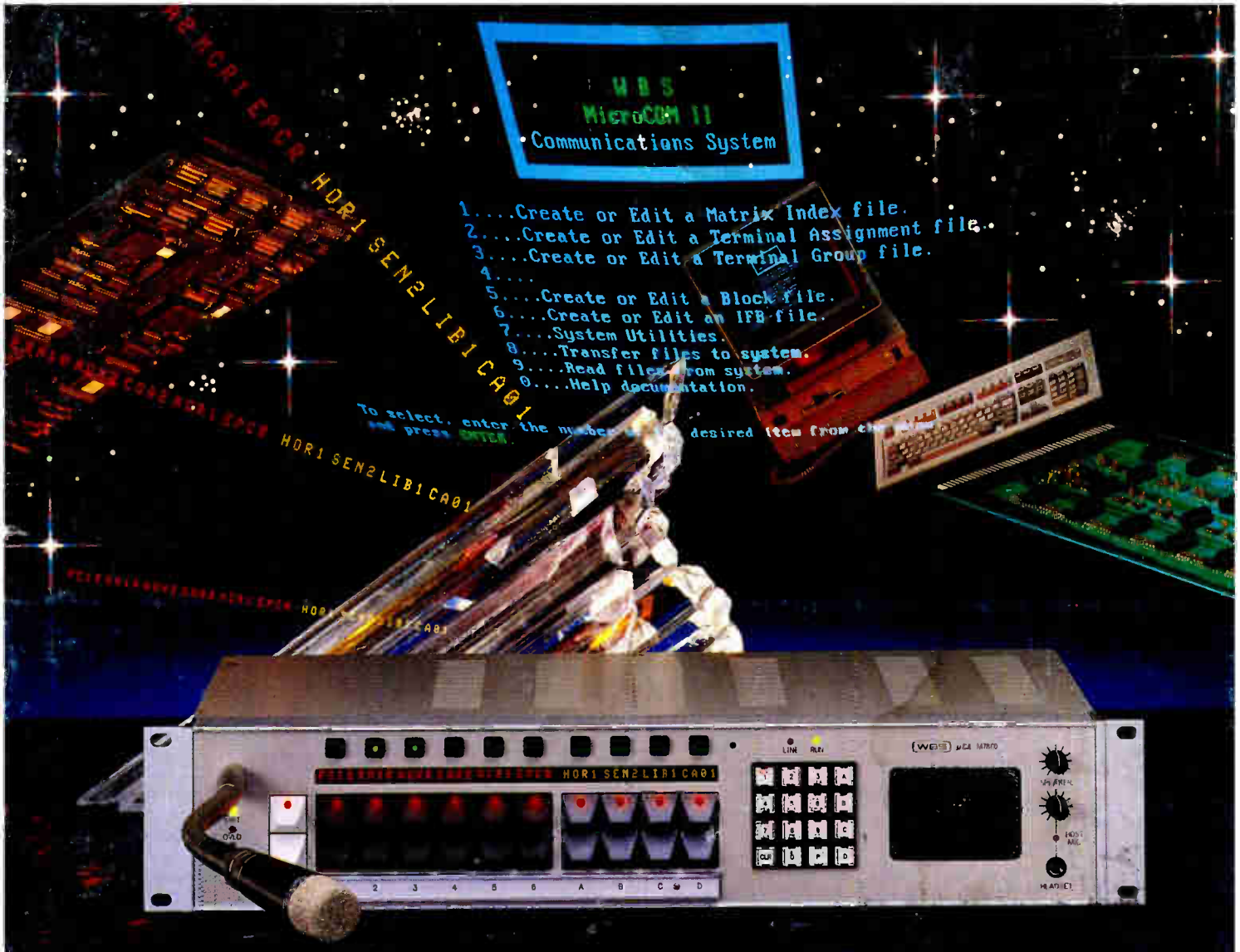

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