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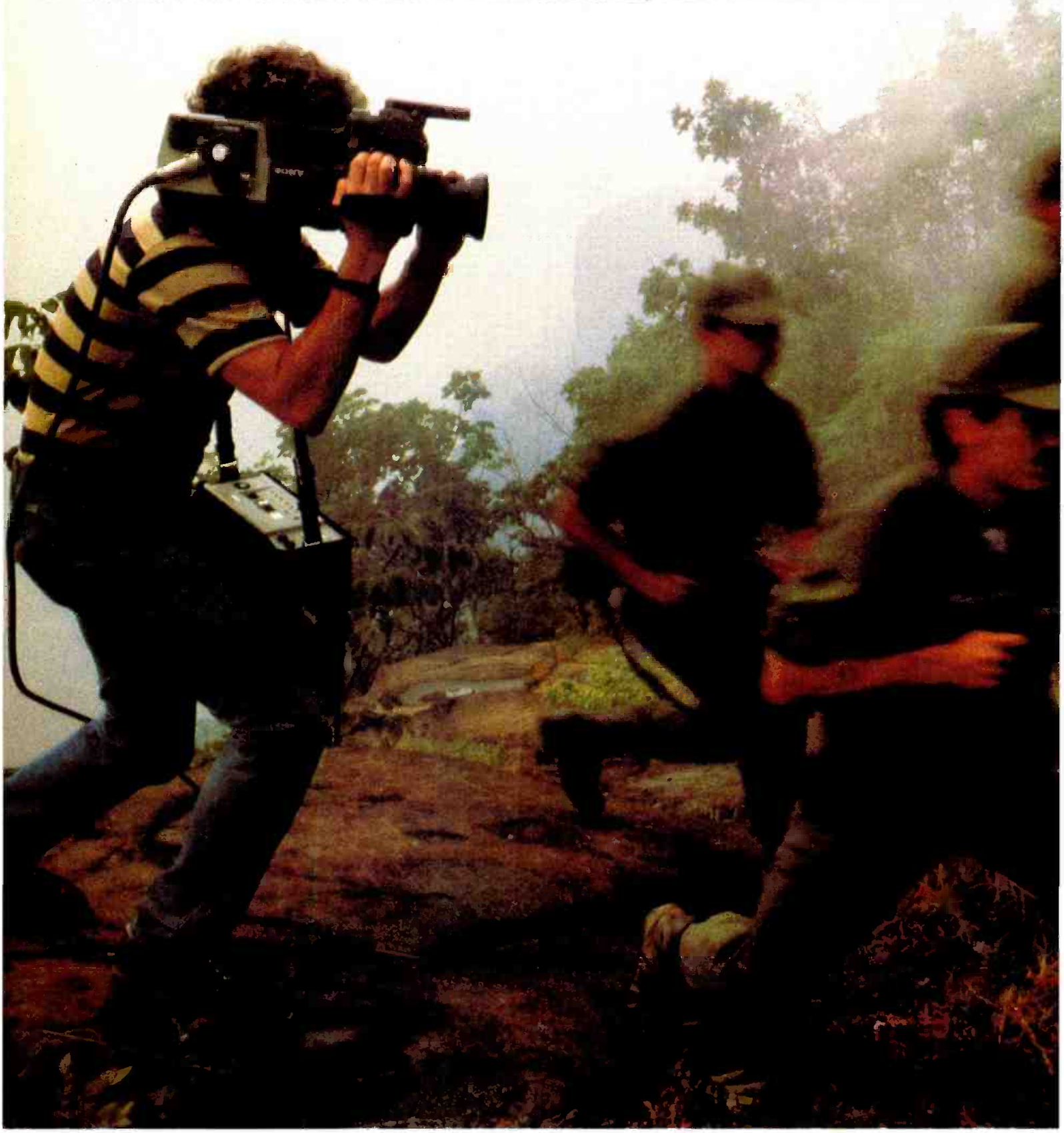

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295 Madison Ave., New York, N.Y. 10017
212-685-5320, Telex: 64-4001
Publishers of:
**BM/E—Broadcast Management/Engineering**
**BM/E's World Broadcast News**

ABP BPA BM/E BROADCAST MANAGEMENT ENGINEERING (ISSN 0005-3201) is published monthly by Broadband Information Services Inc. All notices pertaining to undeliverable mail or subscriptions should be addressed to 295 Madison Ave., New York, NY 10017. BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities in the U.S. and Canada. These facilities include AM, FM and TV broadcast stations, CATV systems, ETV stations, networks and studios, audio and video recording studios, telecine facilities, consultants, etc. Subscription prices to others $24.00 one year, $36.00 two years. Foreign $36.00 one year, $60.00 two years. Air Mail rates on request.


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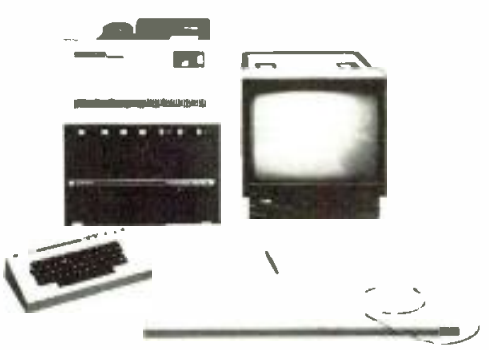

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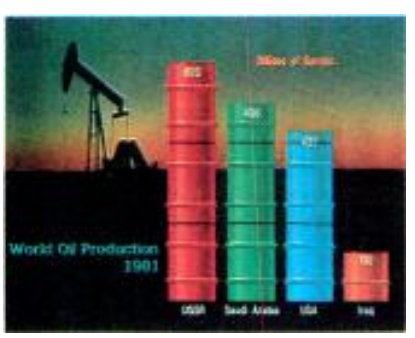


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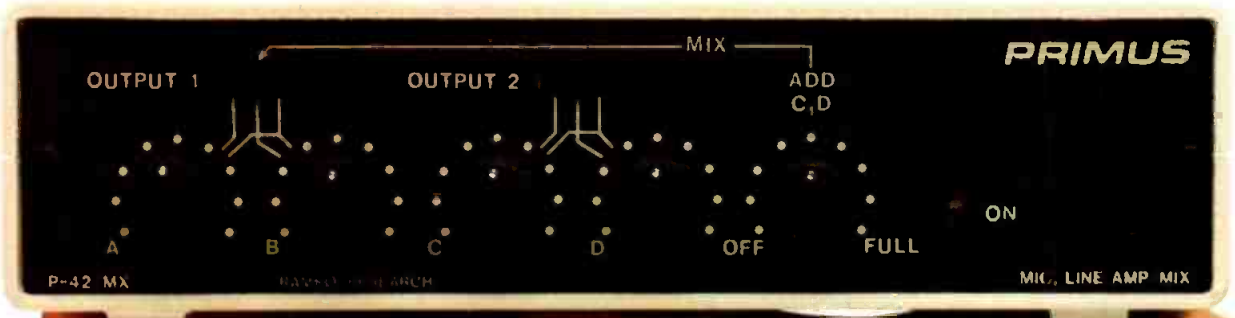


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# EDITORIAL

# Here We Go Again

IF YOU THOUGHT THE FCC'S MARKETPLACE SHUFFLE on AM stereo standards was a fiasco, please stand by. There could be a much more devastating technical standards move afoot in the form of FCC Docket 83-114. This document would in effect take apart the long-standing technical standards covering interoperability, interference control, and spectrum efficiency—and have the marketplace rule.

Broadcasters have until August 5 to comment (extended from the original May 2 deadline). And indeed they should—loudly and clearly. Disillusionment with the Commission's marketplace dogma applied to technical standards was evident at the NAB Convention not only from chief engineers but from broadcast managers. Their point: Docket 83-114 would haul up the FCC's standards-making rudder at a time when critical decisions have to be made concerning multichannel TV sound, HDTV, direct broadcast satellite standards, and digital transmission standards.

Adding his influential voice to the chorus of complaint at NAB, Joe Flaherty, vice president Engineering and Development for CBS/Broadcast Group, warned that the FCC is dodging standards-setting just when technology is moving ever more swiftly. In short, this is no time to abdicate.

Flaherty suggested that if the Commission is overloaded, industry groups might be able to narrow down standards decisions to a couple of choices and leave the final decision to the FCC. American organizations, however, when working together, are constantly looking over their shoulders in fear of the Justice Department's antitrust investigators. By contrast, Japanese and European enterprises, not having to worry about these constraints, have approved mechanisms for reaching concensus. (In Japan, the euphemism is "government guidance.")

According to statements made at the NAB, the FCC's Office of Plans and Policy is standing firm on 83-114. But one Washington insider has observed that some FCC staffers have grown uneasy about the marketplace policy. They fear that going overboard with deregulation could damage the industry. From the point of view of technical issues it appears that the industry shares these fears. The argument in 83-114 is that the time has come to remove technical regulations to encourage innovation. The Commission and the industry appear to be going in opposite directions. The FCC wants to eliminate standards in order to let new technology flourish, while broadcasters like Flaherty want the FCC active in standards *because* of flourishing technology. We urge broadcasters to maintain the momentum started at the NAB to turn the FCC around on this issue.

In accepting the NAB's 1983 Engineering Achievement Award, Joe Flaherty issued another challenge to the association that we endorse. He called upon the NAB to become the focal point for voicing broadcasters' needs and establishing an "effective relationship with standards organizations, regulatory bodies and television equipment manufacturers."

He called upon engineers to take the lead in establishing a new order in coping with new technologies. "The old order, or disorder, for establishing technical standards must be adapted to the need. There is no longer time for the endless debates which have characterized the agonized groping for standards in industry organizations, while the FCC seems to have abdicated all responsibility for directed standards."

Amen.



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## Anne Jones Leaves FCC

In a move that surprised her fellow commissioners, FCC commissioner Anne P. Jones last April made public her intention to step down from her post May 31. Jones had been in government 15 years and on the Commission four years at the time of her announcement; two years remained of her FCC term.

The Republican commissioner, known for her willingness to speak out her opinions, even when unpopular, said her resignation was prompted by a desire to return to the private sector and not by any conflict on the Commission. Her government career began in 1968 in the Securities and Exchange Commission.

At press time, another outgoing commissioner, Stephen A. Sharp, was seen as the most likely candidate to fill Jones's vacated post. It was reported, however, that Sharp plans to leave the FCC when his term expires. Sharp, also a Republican, is slated to leave the FCC June 30 along with Joseph Fogarty, as a result of Congress's reduction of the FCC from seven to five members.

## Engineers, Fritts Call for FCC Standards-Setting

Two distinguished engineers, speaking before the sixty-first annual NAB Convention, called for the FCC to resume setting technical standards. Joining them in their appeal was NAB president Edward O. Fritts. Joseph A. Flaherty, vice president, engineering and development, CBS Broadcast Group, in accepting the NAB 1983 Engineering Award, said that if broadcasters do not now work to establish a standard for high-definition television production and, later, broadcasting, it is "quite certain that the other channels to the home such as cable, videocassette recorders, and videodiscs, will develop their own HDTV standards and deliver services to the viewer which may not be broadcastable at all."

Because of the changing regulatory and standards environment, broadcasters have a new responsibility, Flaherty said. "The old order, or disorder, for establishing technical standards must be adapted to the need. There is no longer time for the endless debates which have characterized the agonizing groping for standards in industry organizations, while the FCC seems to have abdicated all responsibility for directed standards."

Dr. George H. Brown, former RCA executive vice president for patents and licensing, and luncheon speaker at the broadcast engineering conference, said standardization of equipment is a must. Referring to the proliferation of noncompatible news-gathering equipment, Brown said, "I do not see how you can do business with this situation." Brown chastised the FCC as "no help." He said, "It seems years since the debate started on standards for AM stereo and FM quad and it is far from settled. The marketplace will never settle this issue." Brown also said engineers must get their views and needs across to manufacturers so they develop the right equipment.

**NAB's Charles Keller (left) presents Engineering Achievement Award plaque to Joseph Flaherty of CBS.**

The plea for technical standards was also voiced by NAB president Edward Fritts opening day in his annual state of the industry speech. Fritts said single-system standardization is one of the foundations of the industry, along with localism and spectrum integrity. Without a technical standard, the public may wind up with neither AM stereo nor teletext, Fritts said.

Lawyers, too, are worried about the lack of technical standards. At an NAB legal workshop, Richard Schmidt, of the firm Cohn and Marks, termed marketplace setting of technical specifications a "fiasco."

Standards was the focus of an NAB panel discussion entitled "Television: A Toaster with Pictures? Or TV Without Technical Standards," a title prompted by the FCC chairman's remark that television was just another appliance. Flaherty, a panel member, pointed out that even toasters have standards—the plug, voltage, frequency, and size of bread slots.



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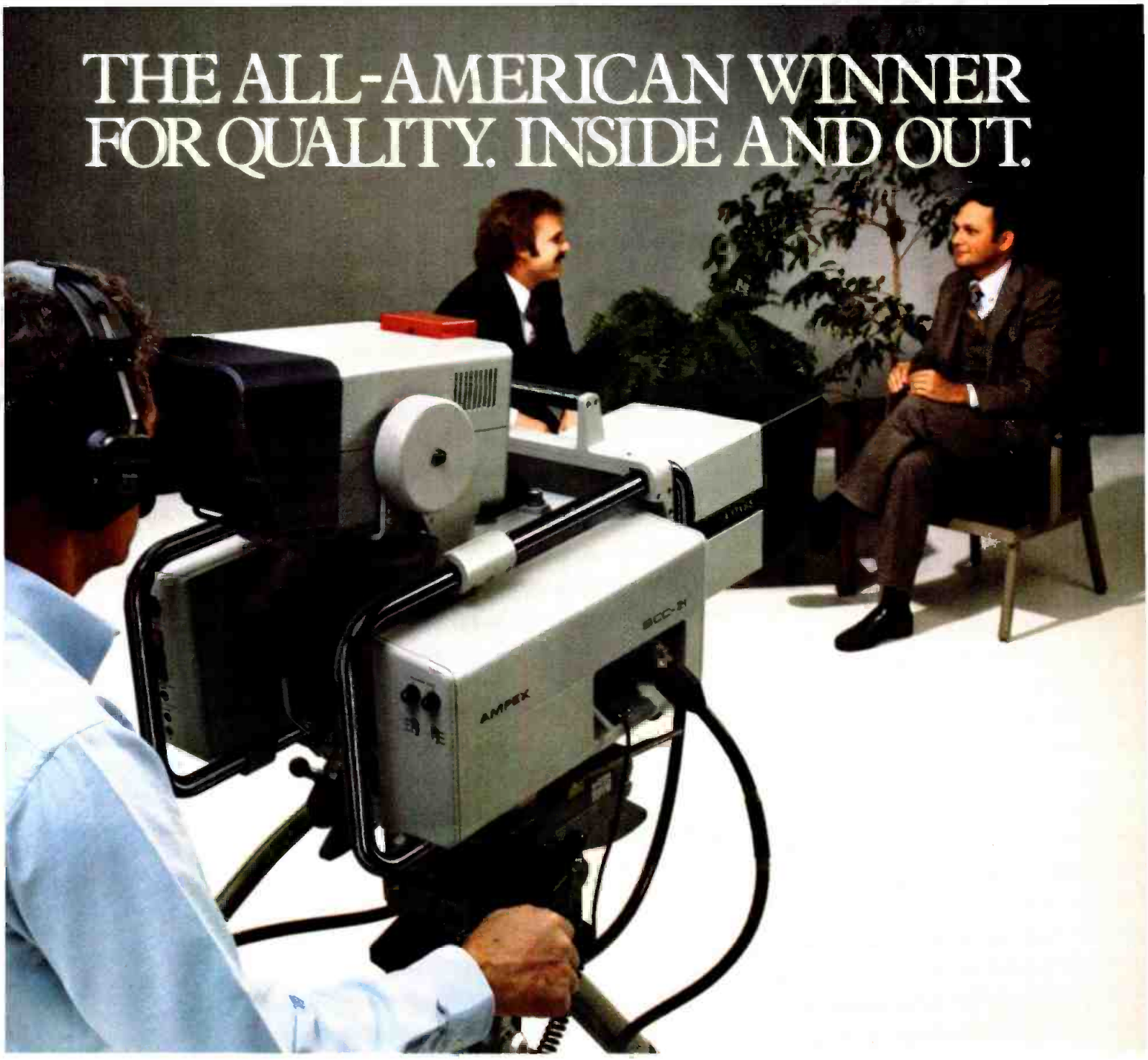


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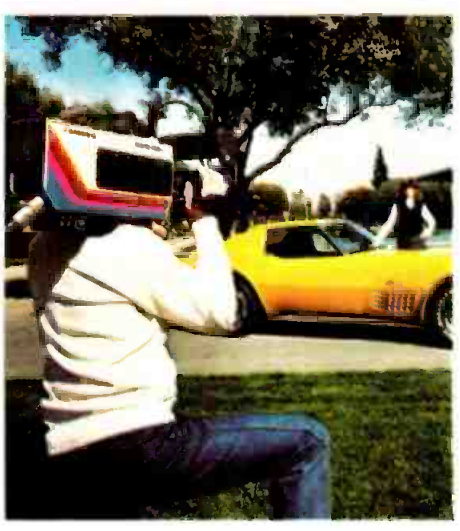

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## Viewer Dissatisfaction Up; TV News Is Exception

An NAB-commissioned study of public attitudes toward television has revealed increasing viewer dissatisfaction with the medium. At the same time, a Roper poll conducted for the NAB's Television Information Office finds viewers increasingly pleased with the quality of television news, relying on it as the most important news source by the largest margin ever.

News fared better in the NAB study than did other programming areas, with 92 percent of the 1500 respondents agreeing that TV has shown technical improvement in news and sports coverage and 86 percent finding it an important source of information. Network news viewing was up 10 percent—to 81 percent of the respondents—since the last such survey, conducted six years ago. Local news viewing, on the other hand, dropped seven percent, to 65 percent.

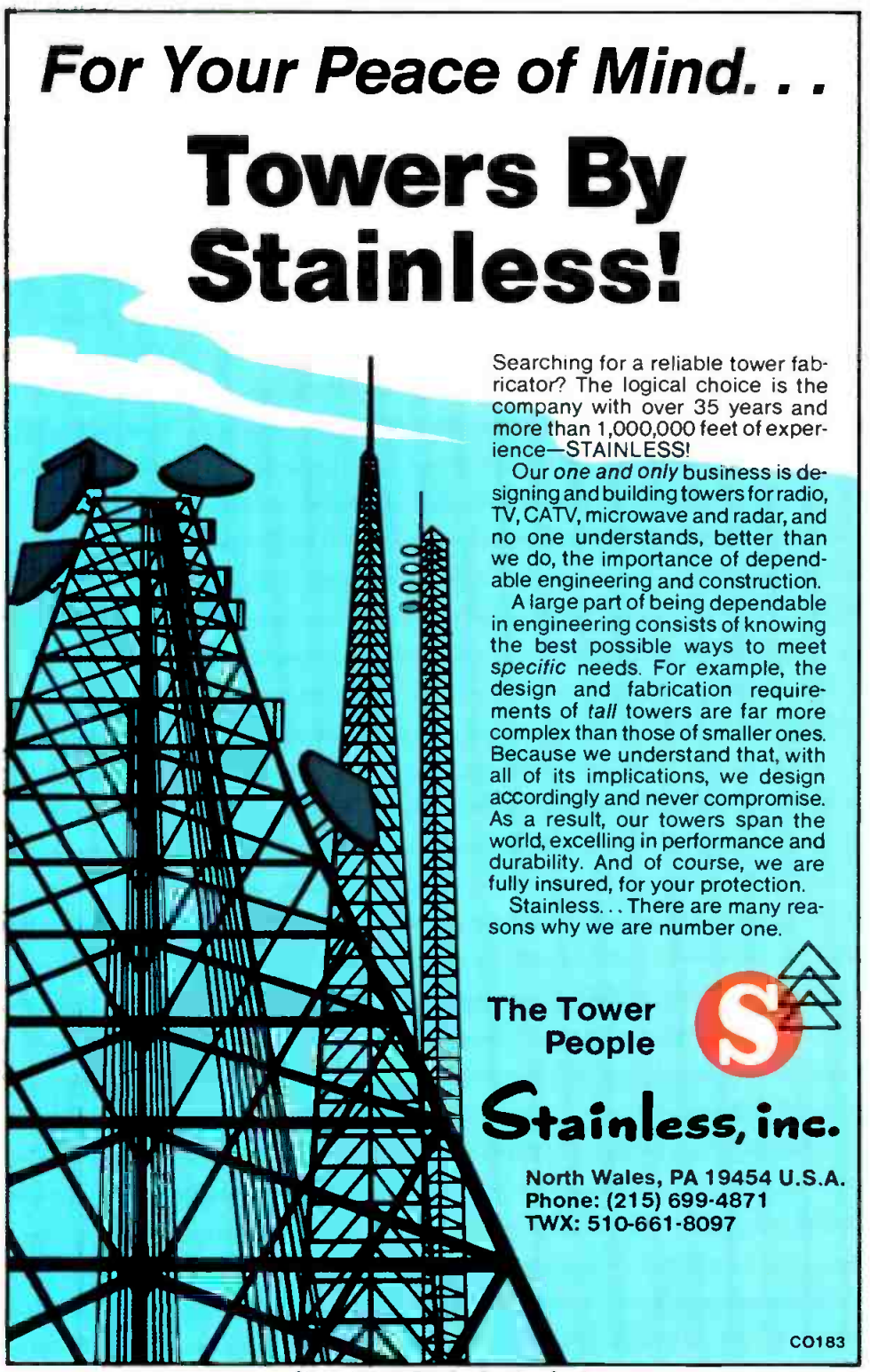
The NAB survey consisted of 500 at-home interviews conducted by KPR Associates of Scottsdale, AZ, and 1000 telephone interviews conducted by Peter Hart Associates of Washington, DC, late last year and early this year. In general, the respondents reported viewing levels similar to or slightly higher than those reported in the last survey; however, they said they were increasingly dissatisfied with programming and saw television as less important in their lives than previously.

While 38 percent said they were watching more than six years ago, half said they were watching less—up sharply from 28 percent in the last survey. Especially significant was that the changed attitudes were constant across socioeconomic lines. Viewers with cable television said the greatest benefit of cable was uncut theatrical films.

A more upbeat vision of TV was outlined in the Roper poll, which focused on attitudes toward television news. Fifty-three percent of the 2000 respondents rated television as the most believable news medium, the highest percentage since the biannual poll started in 1959. The second most believable source, according to the poll, was newspapers, with 22 percent. Over 40 percent said they relied on TV as their sole news source.

Respondents found TV a responsible journalist, according to the poll. Three-quarters rated investigative news shows "usually careful and fair," as opposed to only 18 percent that found such shows "often unfair and misleading." In addition, respondents generally expressed satisfaction with the portrayal of ethnic and occupational groups, with some exceptions: 36 percent thought the elderly were depicted too unfavorably, and 39 and 35 percent, respectively, thought doctors and lawyers were depicted too favorably.

Among those polled, the only family activity that outrated television watching was eating the main meal together.

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## Limits of Deregulation: Spectrum Management and Spectrum Fees

The love affair between the FCC and the NAB, now three years long, sparked by the Fowler Commission's liberal deregulation, showed signs of cooling at the sixty-first NAB Convention. NAB president Edward O. Fritts indicated the NAB wasn't ready to go all the way when he warned that "a headlong rush to deregulate everything will lead only to trouble." The trouble envisioned by Fritts is the violation of three premises that make up what he called the foundation of the broadcasting industry: tech-



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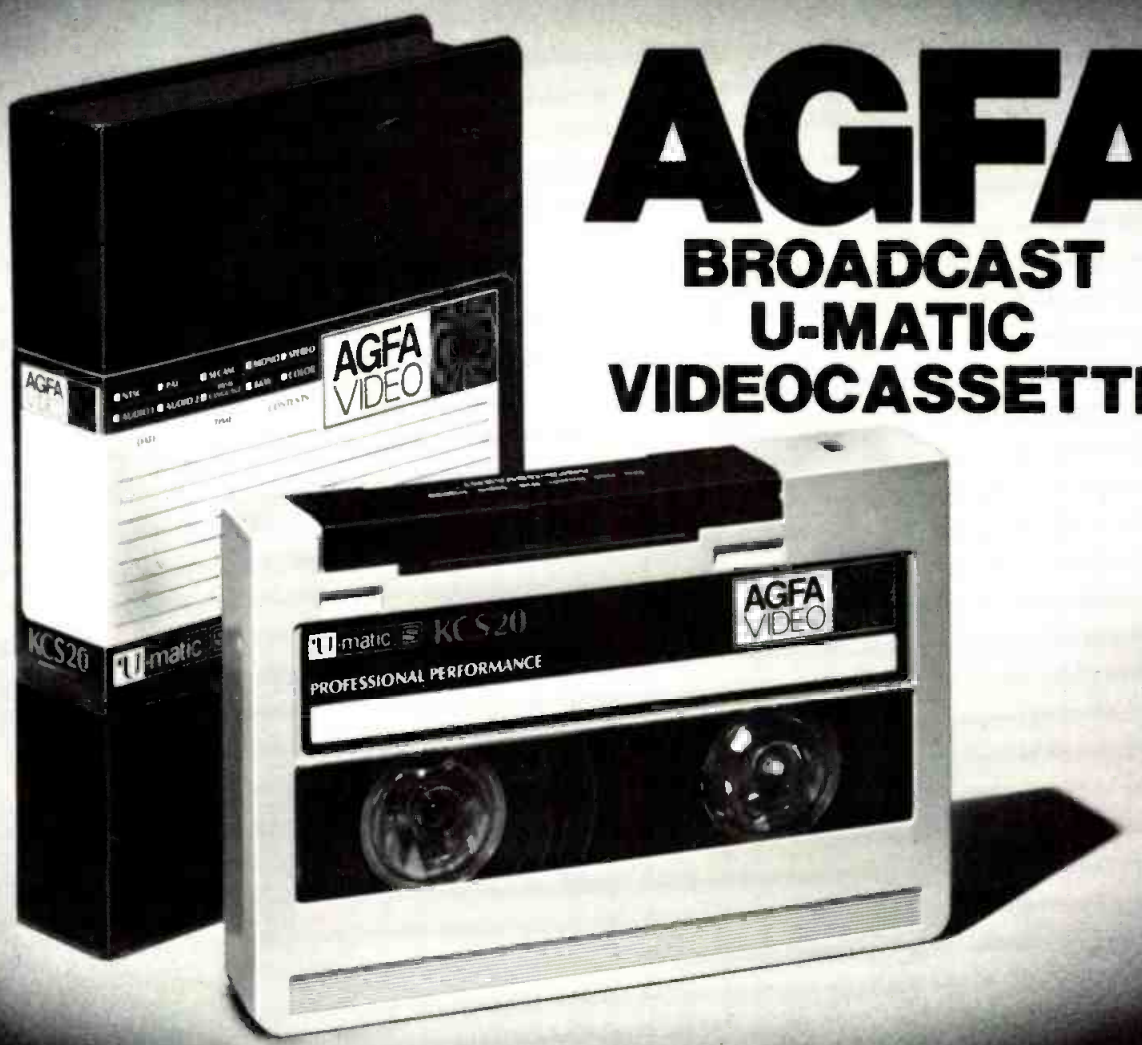


In less than twelve months since its introduction, the Agfa "Professional Performance" U-Matic Videocassette has become the industry's leader in high quality performance. Television networks, producers, engineers and performing artists now regularly specify Agfa U-Matic Cassettes because they deliver a new dimension of color brilliance and definition to their masters.

Technical superiority of Agfa U-Matic Cassettes can be measured by 3dB more video signal-to-noise, 3dB more color signal-to-noise and 2dB more RF output. Drop-out rate is exceptionally and consistently lower when compared to conventional U-Matic cassettes.

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nical standardization, localism, and spectrum integrity.

The NAB, already disturbed by the FCC's "marketplace solution" to AM stereo and teletext standards, is now concerned that localism might be threatened, particularly if cable must-carry rules are dropped. Fritts is also concerned that spectrum management is being abandoned in view of the new FM allocation plan, which could add as many as 1500 new FM stations, and the FCC call for sharing of microwave frequencies.

It became clear at various sessions at the convention that the Commission staff seems to have capitulated totally to the notion that the marketplace can be a regulator. William Hassinger, engineering assistant to Larry Harris (head of the Mass Media Bureau), indicated that this has gone so far as to place "greater reliance on licensees to avoid harmful interference." When asked if there is a recognition at the FCC that the marketplace is not the whole answer in some areas, Hassinger said that within the technical staff there is concern about undue reliance on the marketplace, particularly in terms of enforcement. But, he added, while "the technical staff is more inclined to regulate, the economists are more inclined to turn everything loose and see what happens. So there is a dynamic tension."

One hopeful sign for change at the convention came from Larry Harris himself, who admitted that much of the criticism leveled at the FCC for inattention to engineering and technical aspects was valid. "We should always be guarding against potential interference," Harris said. "If we fail in that issue, we really fail in the major mission of the Commission—efficient management of the spectrum." He cited a lack of engineers and technical expertise as his most "frustrating problem" at the bureau. Harris's remarks came during a one-on-one session with Fritts.

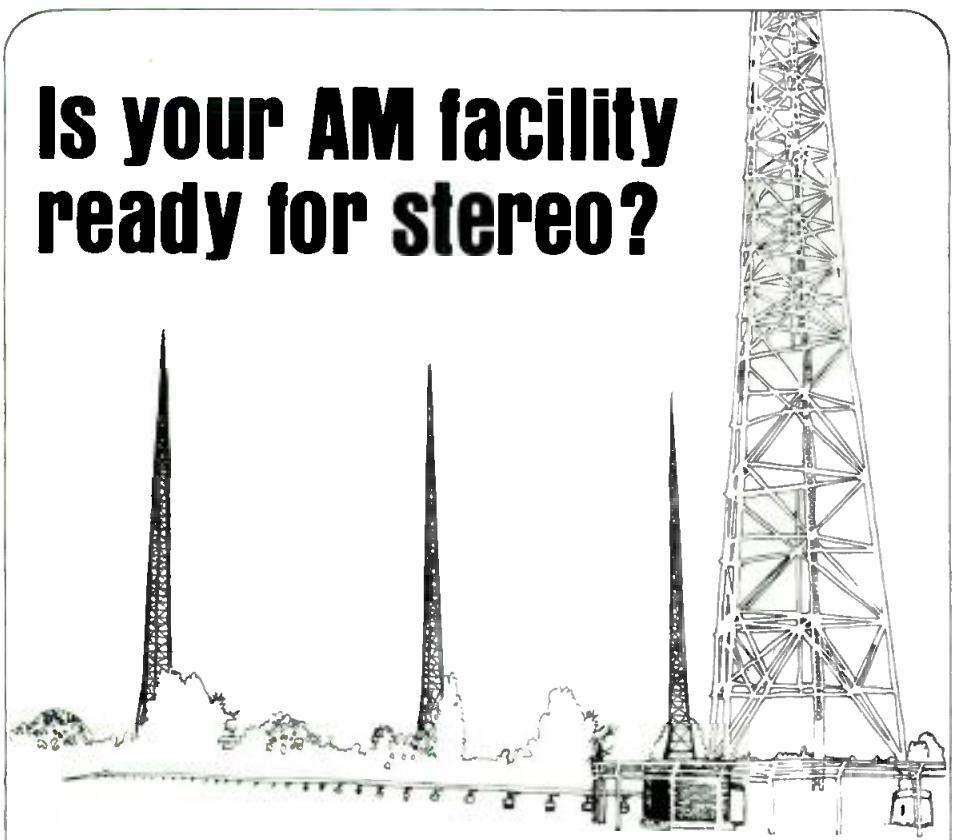
Although he praised most of the deregulatory steps taken by the FCC to simplify administration, Fritts drew the line when it came to spectrum fees as the price for further favors. Later in the convention, however, both Senator Bob Packwood and Rep. Timothy Wirth said such was the payment being demanded. Packwood and Wirth pack considerable clout since the former heads the Senate Commerce Committee and the latter the House Telecommunications Subcommittee.

## Multi-decoder May Resolve AM Stereo Fracas

The marketplace race to declare an AM stereo winner is still going strong, but it is a race that appears to have no finishing line. Bets on the odds-on favorites have been cancelled. Harris, with 50 stations on the air, and Kahn, with 30, are still front runners in about the same positions they held a year ago. Motorola has moved up, however, thanks to Delco's support and the licensing of four other equipment manufacturers to produce Motorola exciters and monitors (Broadcast Electronics, Delta, TFT and Belar). It now has six stations on the air. Magnavox, with three, is in the rear but is not fading. All of the systems seem to be working well. The frustration has been the fact that there are virtually no receivers in listeners' hands. That situation may change, however, with a proposed receiver system.

Sansui says the multi-system decoder chip receiver is the interim, if not final, solution, and it actively promoted its TU-S77AMX tuner at the recent NAB


Is your AM facility ready for stereo?



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Convention as a beginning step. Helping to sell the Sansui tuner was Harris, who offered it at a discount price of $348. Sansui says a car tuner should sell for about $250. Adding credibility to Sansui's initiative, Sony and North American Philips (Magnavox) announced at the NAB show they too would shortly introduce multi-system receiver consoles. Sansui intimated that a major semiconductor manufacturer—which it declined to name—would soon offer multi-decoder chips at an attractive price to all set makers. Answers may be revealed at this month's Consumer Electronics Show. Panelists at the NAB Convention viewed this development as helpful, although Motorola remained skeptical that one decoder could do justice to all systems. Most thought one system would emerge as the preferred standard in the long run, but that multi-system receivers would help both broadcasters and listeners decide which system is the best all-round bet.


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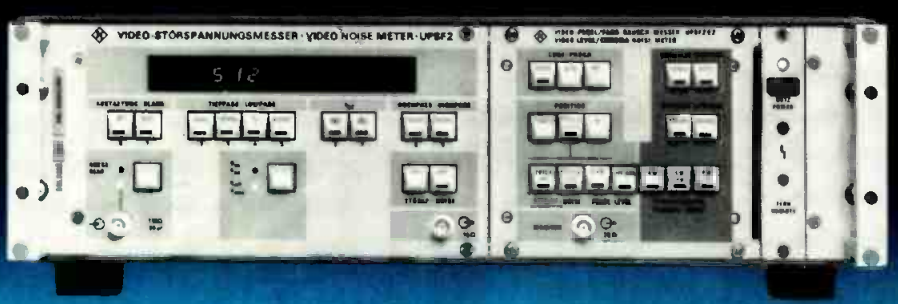
Model UPSF2



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## Oak Pulls DBS Proposal, Still Plans to Participate

Oak Industries, which has been facing financial difficulties of late, recently announced that it has withdrawn its FCC application to build a DBS satellite. The company says it still plans to participate in the DBS industry as an equipment manufacturer, programmer, and system operator. Oak, which previously had withdrawn a proposal for a quasi-DBS service on Canada's Anik-C, reportedly will defer any final decisions on its DBS plans for a few years.

Shortly after its DBS announcement, Oak also informed the public that its STV operations in Phoenix and Dallas-Ft. Worth would be terminated. Both ON-TV subsidiaries—Oak Television of Phoenix and Oak Systems of Ft. Worth—were to meet with their respective partners, the television system owners, to confirm the termination proposals. Termination dates were April 30 in Ft. Worth and May 4 in Phoenix.

Oak had previously announced plans to add a second STV channel to its ON-TV services and to begin STV operations in the Baltimore-Washington area by the end of this year.

## Ampex Cuts Employment Five Percent

Faced with stiff competition and a poor business climate, Ampex Corp. laid off 462 employees last April—five percent of its total workforce. The cuts came from all Ampex product divisions, as well as from the company's corporate support functions.

"Eighty-two was a lousy year for us," admitted a company spokesperson, who said the company's earnings were down 94 percent over the previous year, to $1.2 million. The spokesperson said that no single reason accounted for the difficulties, but that the two most important factors were intense competition and the poor economic situation worldwide.

Ampex's strategy for recovery, according to the spokesperson, will be to aggressively market its recent introductions in the video and tape areas, in addition to tightening up operations.

**Correction**

Due to an oversight, charts appearing in March's Radio Programming and Production column (pages 29 and 30) were not credited to their source. The graphic information was adapted from Arbitron Ratings Co.'s publication *Radio Today* (1982).



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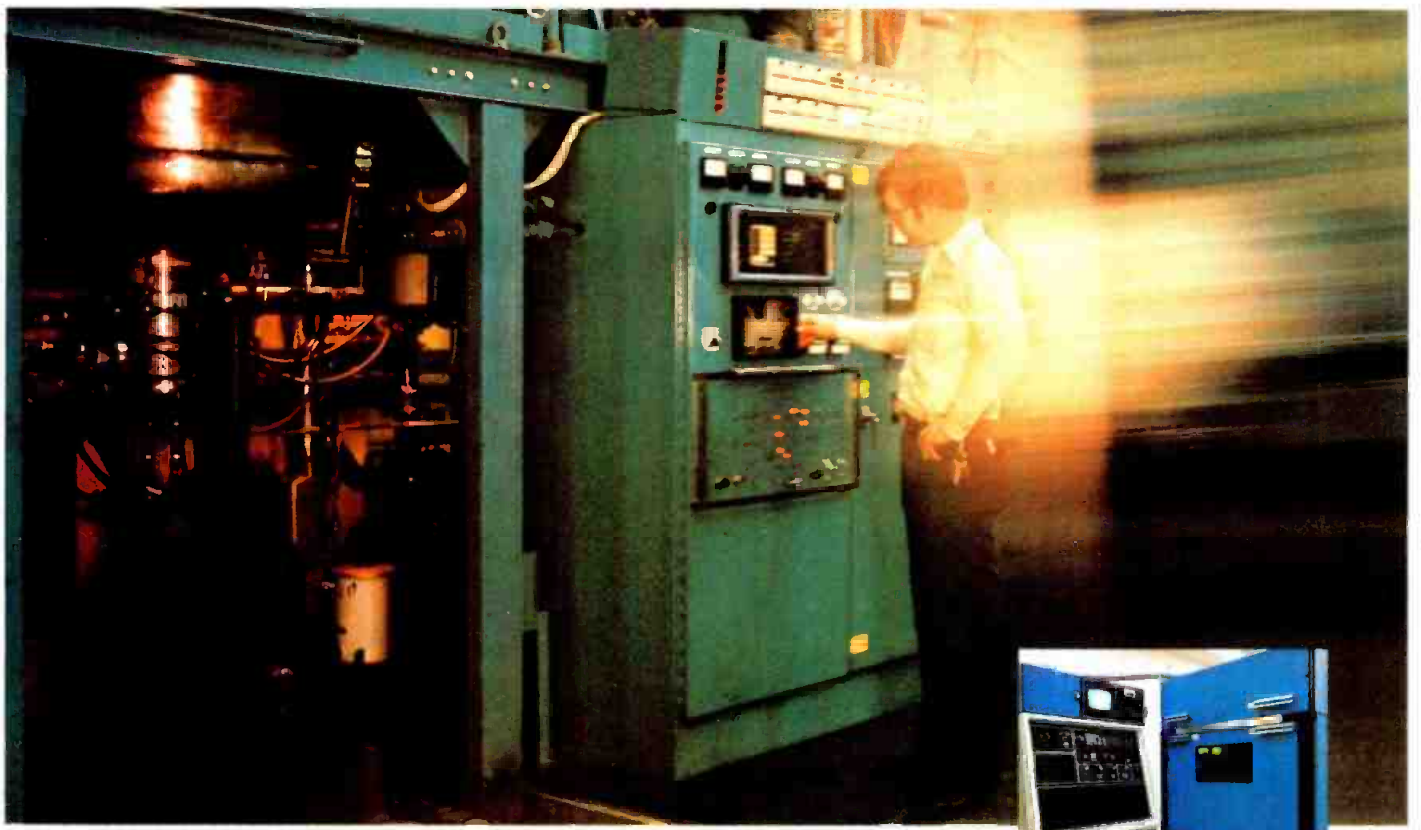

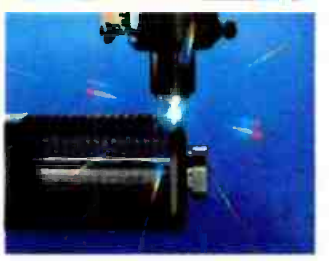

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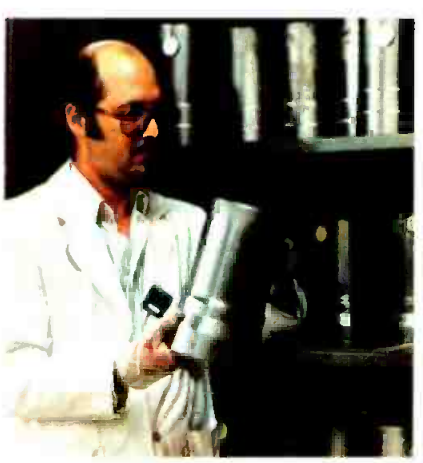

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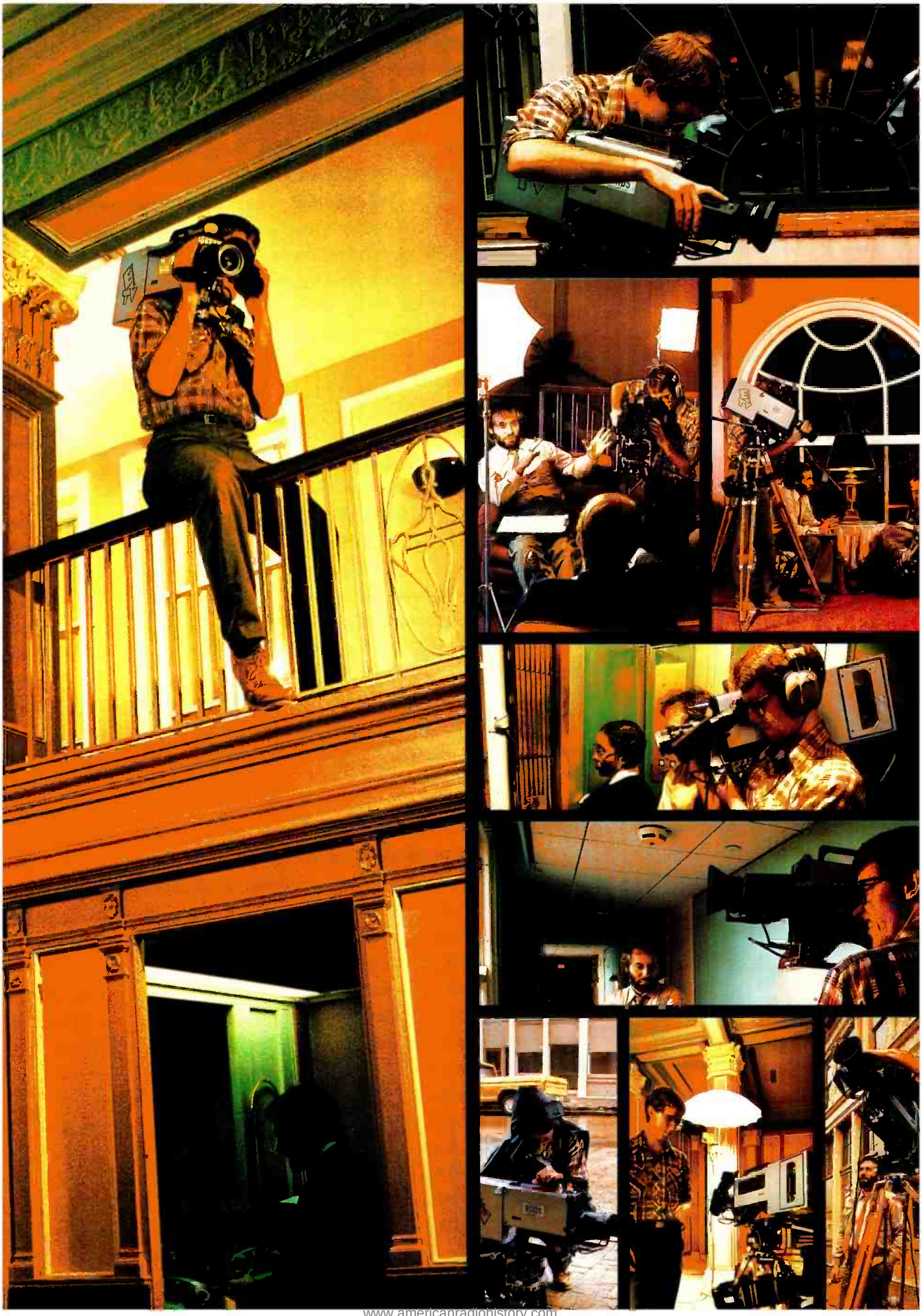

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# HAWKEYE

## ONE-MAN GANG SHOOTS 25 SET-UPS IN 12 HOURS

Mississippi ETV has a one-man equipment gang on the road shooting and recording their new documentary series "Mississippi Roads". They're able to do it because of the versatility of HAWKEYE!

In a recent production covering the restoration of the Natchez Eola Hotel, the HAWKEYE recording camera and that one-man equipment gang were able to cover 25 different set-ups in 12 hours under a producer's direction.

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**Illustrations show HAWKEYE in a variety of locations and configurations at the Natchez Eola Hotel.**

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Evolution of the Technological Species

**RF** . . . . . p. 109
New Trends in Radio and TV Transmission

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Technology Nudges Broadcasters Forward

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SHOW IN PRINT NAB '83

# VIDEO

## Evolution of the Technological Species

NAB attendees gather at largest equipment exhibit yet.

### FIND IT FAST


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It wasn't until the plane ride home from Las Vegas that all the pieces of the NAB show began to fit together. We'd isolated glimpses all along—"a great selling show, finally" . . . . "Have you seen the 44X zoom yet?" . . . . "No, but didn't that RGB switcher demo look good?" . . . . "Which half-inch system are you going with?" . . . . "Don't know that we will—quarter-inch looks fine to me" . . . . And so forth. But they were only isolated hints.

No longer in close proximity to Las Vegas, however, the patterns come clearer. This was not the show to end all shows. For though it took up more space than ever before (the entire Convention Center was filled), and though there were more manufacturers than ever before (over 550), and though there were 5000 more attendees this year than last (33,000 total), there were very few "oos and ahs" surrounding new product demonstrations. There was no area of technology which suddenly presented itself as the solution to a



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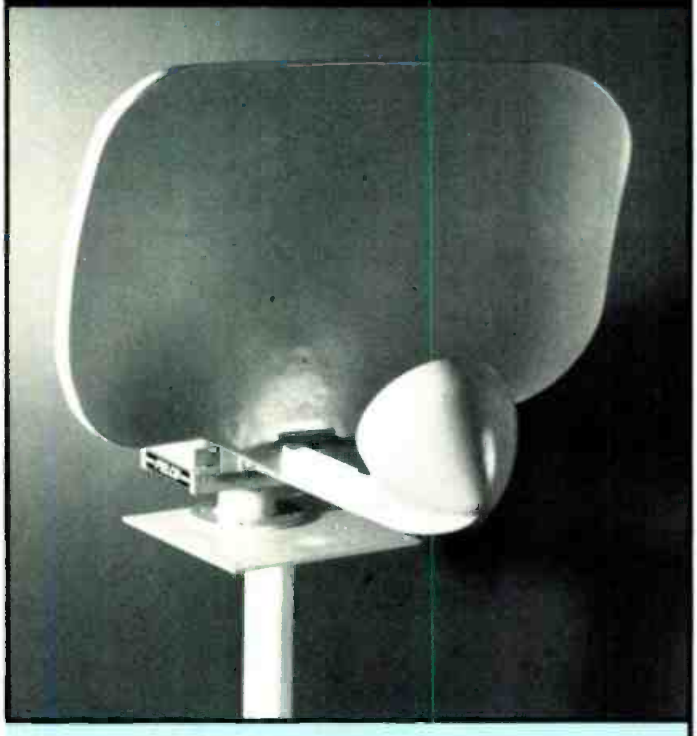

**Nurad Transmit System**

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**Lens display at Canon's booth.**

problem broadcasters had been wrestling with for years. And there was definitely the sense that manufacturers, in most cases, *had* cut back their R&D efforts in 1982 and early 1983, faced with a broadcast economy described as sluggish at best.

On the other hand, this may well have been the most important NAB show in history, a show that saw the broadcast and production facility industry *buying* for the first time in several years. Time and again one heard that large orders were being written. Or that people had narrowed their choices down to two or three manufacturers of a type of equipment they were definitely going to purchase in a month or two. The NAB was once again a place where a manufacturer might hope to generate actual orders and sales leads to account for 40 to 50 percent of his annual business—which, in the case of larger companies which spend $1 million and more for their exhibits, is a lot of business.

In short, despite announcements about several large companies in financial trouble, despite one of the worst years in the economic history of the industry, this year's NAB was like the arrival of spring itself—an industry which made it through the long winter months and has reemerged with a new sense of purpose, and with a lot of saved-up money to spend.

There were, of course, some technological developments. But in almost every case they represented evolutionary steps rather than radical changes. This year there were few surprises.

This does not mean there was nothing of significance in the way of state-of-the-art technology. Certainly among the most important was the multitude of recorder/cameras seen in at least a dozen booths around the floor. While the format wars continue, and while network big shots continue to hedge their bets, stations around the country are getting involved, making purchases despite the lack of overall standards,

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Laird 7200 Communicator graphics system.

IVC's ABR-1A editing system.

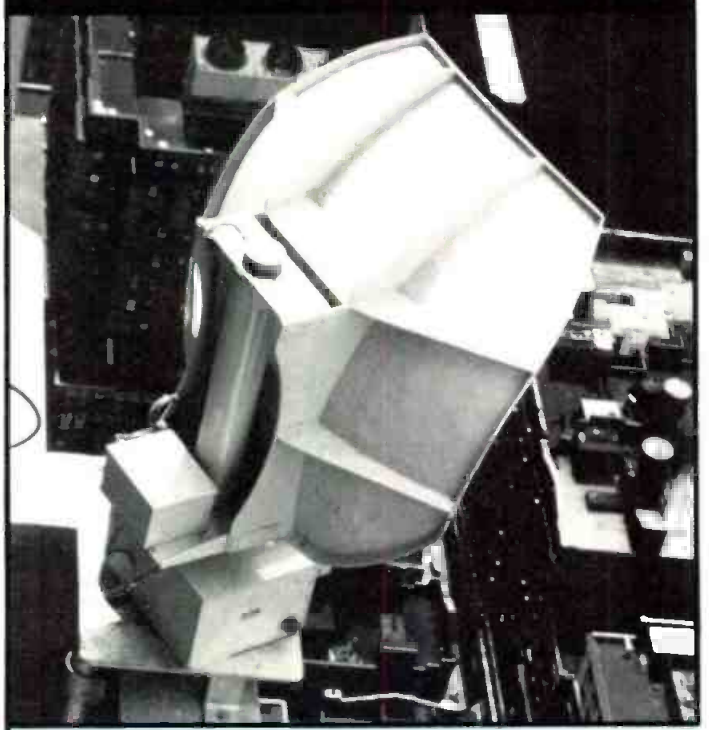
perhaps based on the assumption that since the life expectancy of an ENG camera is so short anyway, there is no harm in committing to a format which needs to last only three to four years.

And not only are the recorder/cameras themselves springing up all over, but so is a whole new generation of equipment to support them—everything from a new generation of lenses to all the new digital processing equipment designed to work with analog component signals such as the M-format's YIQ or the Betacam's Y, R-Y, B-Y. This is true not only for the various TBCs and error correctors needed while editing, but for RGB production switchers as well.

There were also some brand-new wrinkles in digital art/graphics systems, but again nothing like the first emergence of the 3D programs just a few short years ago, or the emergence of the art/paint systems a few years before that. "Software developments" was the term most often used. The same was true of post-production systems, though CMX's introduction of its brand-new editing system was perhaps the single most important highlight of the show.

But in the case of every kind of equipment there was always something worth looking at, even if only for the sure indication that next year's show would certainly see some radical changes, fueled by the funds which this year's show will make available.


# Nurad offers complete systems for dual-band video transmission



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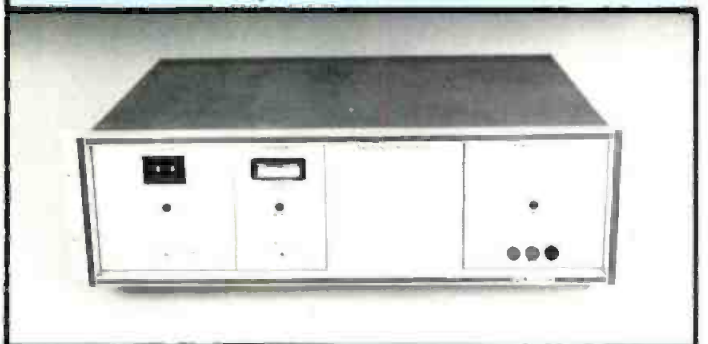
To complement the SUPERQUAD, Nurad offers a complete line of frequency agile central receivers in both single and dual bands, ICR transmitters and receivers, and remote control systems.



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# VIDEO

## CAMERAS

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KYU-310 from JVC.

Ikegami's HDTV display.

This year, some of the biggest excitement in broadcast cameras came in an area that may not directly affect broadcasters for years to come—high-definition television. **Sony** and **Ikegami** both showed 1125-line HDTV cameras and monitors, in operation and drawing large crowds. The clean, fine-grained pictures these systems were producing gave NAB visitors a taste of what the future could bring to video technology. But while Sony was very careful to describe its HDTV camera as a prototype, on display so the company could gather industry reactions and suggestions, Ikegami said it stood ready to build its HDTV camera for any interested buyer.

Back in the present, the biggest advances were seen in ⅔-inch format cameras, which are gaining more acceptance in broadcast studios as they increase in performance features and picture quality. **Ikegami** led the way here, with its new **HL-79E,** a computerized camera designed for high-quality field and studio production. The 79E is intended to coexist with the HL-79D, not to replace it, according to the company. While the new camera physically resembles its predecessor and uses some of the same circuitry, this new introduction has been completely redesigned, with features borrowed from Ikegami's EC-35 electronic cinematography camera and its high-end HK-322 auto setup studio camera.

Ikegami also brought its **ITC-730** in a new version with all Saticon tubes, a 2H detail corrector, and some circuitry changes for increased performance. The camera also has a new CCU that allows operation at distances from 100 to 300 m.

Sony's **BVP-330A** has been updated with a new precision deflection system and new dynamic focusing, in which the electron lens of the tube is moved dynamically to correct corner errors.

Introduced last year, **Harris's TC-90** ENG camera now has a new "smart package" option that provides auto centering, SMPTE and VITC with diagnostics that are printed out in the viewfinder.

Established ENG/EFP cameras at NAB included the Philips LDK-44 system, Sony's BVP series, RCA's TK-710, Thomson-CSF's MC701, and Toshiba's PK-60. Thomson says it is now manufacturing the MC701, having taken over that job from Sony.

**Philips** also had some refinements on its **LDK-47SL,** including a new Philips low-output capacitance diode gun Plumbicon with specially matched FETs.

**Hitachi,** which has offered a computerized 1¼-inch camera—the SK-110—for several years, entered the computerized ⅔-inch market with its **SK-97** "Computacam" and companion **SK-970** studio version. The SK-97, described as a mid-priced computer setup camera (the company is not giving out the price officially), has a full internal computer for auto setup functions and data files. The 12-pound package also features access to both external and internal diascopes.

At the RCA booth was the first production model of the **TKP-47,** a portable camera introduced last year at IBC and designed to fit into a system of TK-47s with precisely matched colorimetry. The TKP-47, which weighs 18 pounds and uses ⅔-inch diode gun lead oxide tubes, shares the same camera processing unit, remote control units, and setup terminal as the TK-47.

JVC made its first foray into the high-end production camera business with its **Pro-Cam** line, available with either Saticons (KY-900U) or Plumbicons (KY-950U). These lightweight (11.5 pounds with viewfinder) cameras boast S/N of 58 dB with low-output capacitance diode gun tubes, 600 lines center resolution, a new SSG circuit that conforms to RS-170A, and an f/1.4 prism optical system with built-in quartz filter.

Also at the JVC booth was the **KYU-310,** the fourth-generation successor to the KY-2700. This compact nine-pounder has added automation features, high-resolution prism optics, and upgraded Saticons.

**Sharp** rounded out its XC camera line with the **XC-900D,** a new diode gun Plumbicon camera for under $20,000. The new camera is similar to Sharp's XC-800, a Saticon model introduced last year. The 900 offers a linear matrix masking circuit for precise matching of colorimetry and built-in genlock. The company also introduced a low-cost (under $10,000) **triax system** for the XC-900D and XC-800.

Two new entries from **Panasonic** were the **WV-888** ENG/EFP camera, successor to the WV-777, and the **WV-555,** an economy model. The 888 features a dichroic prism optical system and three ⅔-inch ST-MG Saticons; S/N is listed at 57 dB and claimed resolution is 600 lines. The camera has digital auto white and auto black, a built in EIA color bar generator, built-in auto centering, and an optional remote control unit.

Studio cameras with one-inch and 1¼-inch pickup tubes showed less movement, with some refinements but no entirely new models. **Ikegami** came to the show with what it termed the final production version of its **HK-322** top-of-the-line studio camera. This automatic camera, which a spokesperson says is a refinement of previous versions, uses 1¼-inch tubes as standard but can use one-inch tubes.

The featured product at the **Philips** booth was the **LDK-6** computer-controlled camera system, also seen last year. This camera, which comes only in a triax version, features distributed intelligence with microprocessors in all main parts of the camera. Because each camera has its own computer, only one camera fails if a computer fails.

**Thomson-CSF's TTV-1525B** studio camera was displayed in a new one-piece version that replaces the two-piece A version seen last year.

RCA displayed its well-established TK-47B in a triax model that operates at cable runs of up to 11,000 feet. Harris displayed its computer-controlled TC-85, and



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Toshiba had its studio camera, the PK-41.

In CCD cameras—another area that probably won't hit broadcasters full force for some time—NEC has a new three-chip camera designed for ¾-inch and half-inch tape formats. The **SPC-3** is being aimed directly at the broadcast market with resolution of more than 500 lines. NEC says this high resolution results from its use of two CCDs for the green channel, which also reduces ghosting.

Electronic cinematography cameras kept a low profile at this year's NAB. The Ikegami EC-35 was on display at the Cinema Products booth, in the same form as last year. Panavision Electronics (formerly CEI) had a demonstration of its Panacam Reflex video camera system for film-style production.

The camera sections of integrated recorder/cameras are showing an increasing tendency toward independence, with both Sony and Ampex showing the cameras in standalone ENG/EFP versions. These developments will be covered in greater detail in the following section.

## RECORDER/CAMERAS

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The format wars, merely a skirmish last year, were raging on all fronts this year as the combatants filled in product lines and fired off press releases to mark every contract signing. While the half-inch camps seemed deadlocked, the quarter-inch troops made gains, including

Betacam gear at Thomson-CSF.

concessions regarding standards.

Significantly, Philips announced that it would adopt the Bosch quarter-inch Lineplex recording format for a new ENG recording camera which will feature ⅔-inch pickup tubes. The company promised a complete line of playback and editing equipment. Soon thereafter Bosch, Philips, and Hitachi Denshi, which has the other quarter-inch system, announced that they would fully support any working committee which might be formed by SMPTE to establish quarter-inch standards.

All this cooperation over quarter-inch standards, however, in no way diminished the competition with half-inch in the hardware introductions. **Hitachi** introduced the **SR-3** quarter-inch system, an integrated unit that has a three ⅔-inch Saticon tube camera.

The recorder portion uses Hitachi's CVC cassette for 10-minute recording time. The companion playback unit with built-in time base corrector, the **ECR-5**, interfaces with existing ¾-inch or one-inch equipment.

The **Bosch Quartercam KBF 1,** which was a hit last year in prototype, was demonstrated as a production item this year priced at $41,800. Added to the system was a studio recorder **BCF 10** and a field editor BCF 20.

Although the quarter-inch backers raised the possibility that broadcasters could leap over the half-inch systems directly to quarter-inch, the half-inch supporters would have none of this talk. On the offensive from its spaceship-like booths, **Sony** pounded home its Betacam message. The company demonstrated a new half-inch editor/recorder with built-in TBC, the **BVW-40;** a new portable playback VTR weighing 24.3 pounds, the **BVW-20;** and various adaptors to interface with other recorders and cameras. In addition, Sony unveiled a new mixed field Plumbicon version of the three-tube **BVP-3** Betacam camera to go along with the three-tube mixed field Saticon tube camera announced last fall.

On the M-format side of the battle field, **Panasonic** and RCA also introduced portable VCRs compatible with various cameras. The Panasonic **AU-200** uses a standard half-inch VHS cassette for 20 minutes of recording.

The Hawkeye **HR-3** portable from RCA performs video insert edits in the field. It weighs 15.8 pounds, without battery, has a built-in SMPTE time code generator, and can be used with cameras having component or composite video output.

Panasonic showed the **AK-100 S/K** and **AK-100PL/K** Recam kits. Both come with the AK-100 Recam camera, a genlock adaptor for compatibility with any VTR, a clip-on ac adaptor, and a carrying case.

In addition, both came out with half-inch multifunction deck systems. The Panasonic **MVP-100** M-Vision video player involves up to nine separate computer-controlled tape transports. With two built-in TBCs and a computer, the MVP-100 can be used as an automatic random-access spot inserter, TV program sequencer, multisource editor and group roll system. The RCA system, **TCR-10,** is similar but uses HR-2 studio recorders—six for the basic system, up to 10 for five hours' playing time.

There were also announcements from the other contestants in the format competition. **Ampex** introduced the **ARC-20** portable VTR, a full-featured half-inch M-format unit that weighs under 20 pounds. New too was a moderately priced ENG camera, **FPC-10,** that can be locked to an FRC-10 half-inch recorder to operate as an integrated recorder/camera. The three-tube FPC-10 comes in ⅔-inch low capacitance diode gun Plumbicon and Saticon versions.

**Ikegami** once again showed the **HM-100** half-inch VCR coupled to the side of an HL-83 camera. While Ikegami had on hand the full complement of playback and editing equipment in addition to adaptors to connect the VCR to its other ENG cameras, there were hints making the rounds that the company may be ready to go for the quarter-inch format.

Fujinon's 44X zoom.

Sony's European Betacam ally, **Thomson-CSF,** was also at NAB aggressively pushing its entries. Thomson also arrived with a three-tube Betacam camera, the **MC-613,** which uses ⅔-inch mixed field Saticon tubes.

When **Frezzolini** showed up at the SMPTE show last fall to demonstrate a way to attach a VHS recorder to a standard ENG camera, it seemed too easy to be true; in fact, it seemed frivolous. But not so. Frezzolini came to NAB to show how serious it is by showing the production version of the On-Cam Model



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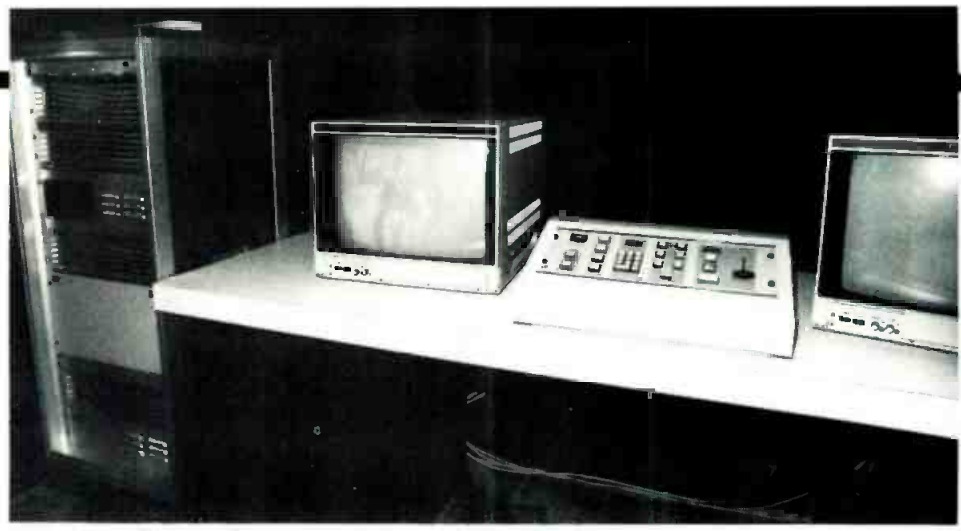
**OC-1.** The company has redesigned the unit since SMPTE primarily to make it more rugged. Using the battery brackets of the portable camera, it is possible to mount the 5 lb. 8 oz. recorder/camera battery holder and convert the two into an integrated recorder/camera. **PEP**, which also handles the On-Cam, was touting the complete camera crew and edit room package for $7000, camera not included.

**JVC** found the idea a good one for locking its HR-C3U compact VCR with its KY-1900U color camera. The module, **KA-100**, attaches the recorder to the side of the camera rather than the back.



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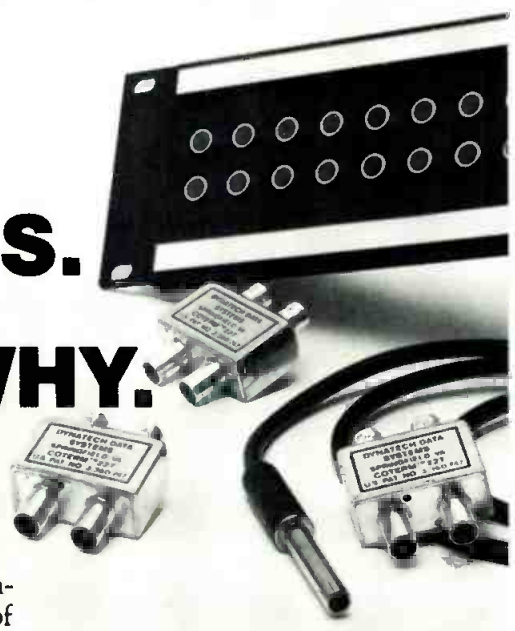

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## LENSES, ACCESSORIES, PICKUP TUBES

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This year's long lens trophy went to **Fujinon** for its **44X zoom**, available for both one-inch and 1¼-inch formats. The lens, mounted on a camera on the roof of the booth, demonstrated its capabilities on a large screen down below. As if 44X weren't a long enough zoom ratio, the lens has a built-in 2X extender. The company says the new lens is six to eight pounds lighter in weight than its 30X lens and has better ramping characteristics. The one-inch version has focal length of 13.5 to 600 mm (27 to 1200 mm with extender) and maximum aperture of f/1.8.

Fujinon also had a new ENG/EFP lens for ⅔-inch format cameras, the **A7x7RM** wide angle zoom. The very wide field angle of 64 degrees/18 minutes gives excellent depth of field; MOD is about 12 inches.

**Angenieux** also had a **new lens** for studio cameras, a 12x12.5 mm, f/1.5 model with 1.5X range extender and diascope. The company says this diffraction-limited lens is the highest-resolution lens available on the market. The lens is available now for all one-inch and 1¼-inch cameras and costs in the $25,000 to 30,000 range with all accessories.

The news at **Canon** was in the ⅔-inch category, with a new **extra-wide-angle adapter** for ENG lenses that increases maxi-



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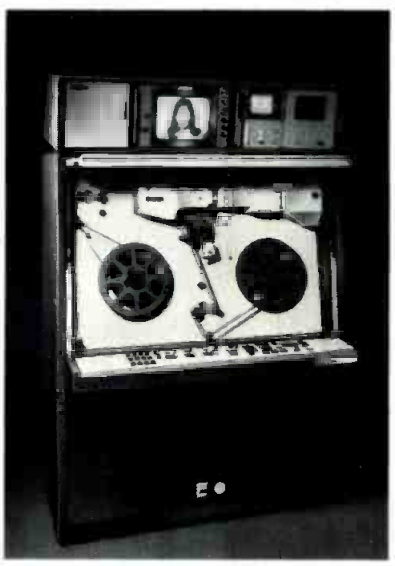

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mum focal length by 20 percent. This attachment will increase the angle of view of Canon's 18:1 lens to 62 degrees; it sells for $4600. Another new attachment was a fisheye 130-degree wide angle lens for the company's J13X handheld lens, for $750.

A newcomer to the U.S. broadcast lens business was **Tamron,** which sells still camera lenses in this country and is an OEM supplier of lenses to several of the Japanese camera makers. Tamron came to its first NAB show describing a range of ENG lenses with 10X, 12X, and 14X zoom ratios it says it is ready to supply to end users here.

**Tele-Cine** again brought the **Schneider** line of lenses, with several models boasting improvements. The **30X lens,** with a focal range of 26 to 800 mm and maximum aperture of f/1.7, was shown adapted for use on an RCA Hawkeye. The universal adaptor system allows the one-inch format lens to be used with either half-inch or ⅔-inch cameras. Schneider also had its **14X** ENG/EFP lens with additional electrical features.

Visitors to the **Century Precision** booth found a variety of new lens accessories, including a snorkel-type lens the company says will fit any video or motion picture camera up to 35 mm. The company also had new wide angle adapters for ⅔-inch video zoom lenses, new additions to its line of extenders, and new super telephoto lenses.

**Tiffen** brought five new **filter sets**—a starter set, a special effects set, a fog effects set, a contrast filter set for the "film look," and a Sofnet diffusion filter set. The company also brought the Rezinar line of high-quality resin filters.

Several new pickup tubes showed up at this year's NAB. EEV had several new entries, including a half-inch lightweight Leddicon designated **P8470,** designed for integrated camera/VTRs. The company's new **P8440** series of 1¼-inch diode gun Leddicons were being offered by RCA as an option for the TK-47B, and were installed in one of the TK-47Bs at the RCA booth. According to EEV, this tube provides higher resolution, lower beam resistance, and better lag performance than standard 1¼-inch tubes.

**Amperex** brought a recently introduced **1¼-inch Plumbicon** for the red signal, which the company says eliminates the problem of red image retention. Amperex has delivered about 250 of these tubes since January and says it has received no complaints so far.

## VTRs AND VCRs

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Not all the tape recorder news came from the front lines of the recorder/camera format wars. In fact, there was a medical bulletin of sorts proclaiming new life for ¾-inch VCRs.

Coming up with a shot in the arm were Sony, Panasonic, and JVC. In the case of **Sony,** the announcement was for an enhancement of the **BVU 800/820** Series to improve image quality. The IP feature, which can be added to any BVU-800 or BVU-820 now in use, corrects luminance and chrominance noise and delay problems in multigeneration dubs.

For **Panasonic** it was a portable ¾-inch Model **NV-9450** for ENG/EFP applications. It features video confidence heads which give on-the-spot signal monitoring during recording. Color resolution is better than 260 lines and signal-to-noise ratio is 46 dB.

**JVC** came in with three new ¾-inch videocassette decks, an editing machine, a


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As for one-inch machines, Sony introduced a new follow-on to the 2000 Type C VTR, the **BVH-2500,** featuring still-frame recording; a complete discussion will be found in the following section.

Although **Ampex** had previously introduced its principal one-inch machines, the **VPR-5, VPR-3,** and **VPR-80,** interest was still running high. In a sense the company took a risk in unveiling the Ampex-Nagra portable VPR-5 and the fast VPR-3 last fall rather than waiting for the NAB. But while the introductory splash preceded NAB, the sales ripples were coming in during the show.

Wringing more versatility out of its **TR-800** one-inch VTR, RCA demonstrated its machine in six different configurations from a simple, transportable setup to studio console arrangements. The 800 was designed to accept three optional modules to generate, read, and process time code. All three plug-in modules operate with SMPTE longitudinal or vertical interval time code.

Also going through its paces among the high-end machines was the **3M/NEC TT-8000.** Available this year is the NTC-10B digital time base corrector with a 16-line correction window and four times subcarrier sampling.

In the **A.F. Associates** booth was the **Marconi MR2B** Type C machine, which features full electrical control of the capstan motor and auto step in shuttle in both directions.

**Hitachi** continued to make strides with its **HR series** of one-inch VTRs, offering what many consider the smoothest "ride" in the industry.

Waving the Type B format banner, **Bosch** once again displayed the portable **BCN 21** designed for playback and editing. Weighing 20.1 pounds with batteries and tape, the 21 handles 20-, 30-, and 60-minute reels and is priced at $45,110.

At the **Merlin Engineering** booth was the **ME-258** ultra-wide-band video recorder, based on the Bosch BCN-51 one-inch Type B VTR. It uses the standard scanner assembly, heads, and commercially available tape.

While there were mostly familiar machines on the VTR stage, there were signs of things to come. **Sony** put on a major demonstration of what may be tomorrow's recording technology—the **digital VTR.** Like its HDTV demonstration, this was carefully labeled as strictly experimental. But the fact that it is based on component recording of a 4:2:2 13.5 MHz signal, the international digital standard, indicates that Sony has made significant progress toward a more "real world" digital recorder.

RCA, too, shows signs of life in this area. In its "closed to the press" hotel suite, RCA had a multiplexed analog component recorder built from a reworked TR-800 one-inch machine.

## TAPE, ACCESSORIES

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King DOC and chroma/noise evaluator . . . . . 295


What can you say about videotape? Rather than say anything, the manufacturers at the show chose to run demonstrations showing picture quality after multiple edit generations or simply long hours of continuous use. The message clearly was quality.

For example, **Ampex,** under the theme "Quality worth broadcasting," showed off its brand-new ¾-inch U-Matic **197** cassettes. Formulated to optimize Sony BVU machines, the 197 comes in BCA play lengths of 10, 20, 30, and 60 minutes as well as in 20-minute BCS minicassette.

Ampex also rolled out its one-inch **196** tape reels, which have a 2000-pass durability and a still frame durability of 60 minutes.

New in the 3M videotape line was the Scotch **480** one-inch, which will be available in the third quarter of this year. Capable of 2000 passes, 480 tape exceeds three hours in still frame.

3M also had its line of half-inch cassettes, **T120** VHS and **L500** Beta formats.

**Fuji,** too, came to the show with its new half-inch videocassettes: **Super High Grade H421** and Super High Grade **H321** for M-format and Beta systems, respectively. Fuji has tightened video S/N and color S/N specs so that after 100 plays there is virtually no dB loss, thanks to heavy-duty binders.

**Fuji** also introduced improved **H521** U-Matic ¾-inch cassettes. This cassette also features the firm's back-coating technology that has proved successful on one- and two-inch open reel videotape.

**Agfa-Gevaert** also added new U-Matic cassettes—a new **KCS 10** mini-cassette for portable field use and a standard **KCA 10** are now part of the existing line of packaged/labeled broadcast U-Matics, which include the KCS 20 mini, and KCA 30 and the KCA 60. Agfa also introduced a high-quality two-inch audio mastering tape, **PEM 428,** available on 12.5-inch reels for one-hour recording time at 15 ips.

Both ¾- and half-inch videocassettes were launched by **Maxell.** The ¾-inch U-Matic **KCS** is aimed at ENG and other portable video equipment. It is available in 20-minute format. The half-inch **HGX Pro** videocassette line is aimed at the recorder/camera systems.

**Maxell** also came out with the **KCA 5** ¾-inch U-Matic videocassette in bulk package duplication and post-production commercial lengths.

Among the accessories, **Christie** introduced the **MaxERASE-16** bulk video audio tape degausser, a 30-second, one-pass total erasure of all high coercivity videotape formats and sizes. **Research Technology International** had the **Videocassette Evaluator/Cleaners** for ¾-inch, Beta, and VHS formats. Chyron, too, showed its cassette cleaner and evaluator.

A brand-new tape evaluation system was introduced by **King, Model 101** videocassette dropout verifier and **Model 102** chroma/audio quality. Extensive microprocessor programming allows the units to be extremely selective of which time intervals they will sample.

## STILL STORES AND SLOW MOTION

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Wavetek CompuTrace hardcopy recorder . . . . . 308


As *BM/E* has pointed out repeatedly during the past year, the market for still store and slow motion recorder equipment, particularly the new breed of digital products, is heating up considerably. Together with a whole new range of equipment in virtually every price range, there is also keen interest at both stations and production facilities in acquiring the systems.

**FOR MORE INFORMATION ON ADS APPEARING IN THIS ISSUE, USE READER SERVICE CARD, PAGE 25.**



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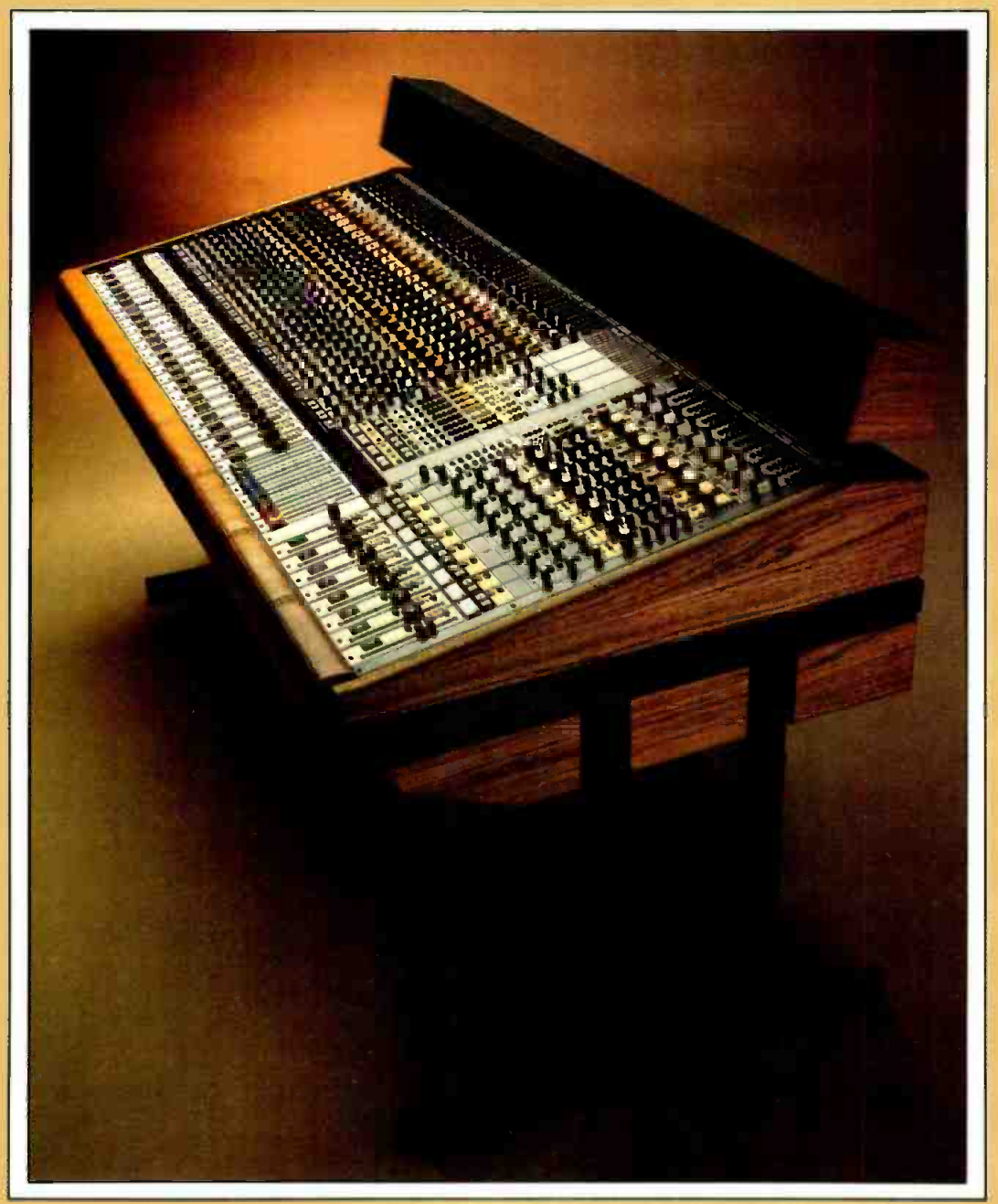

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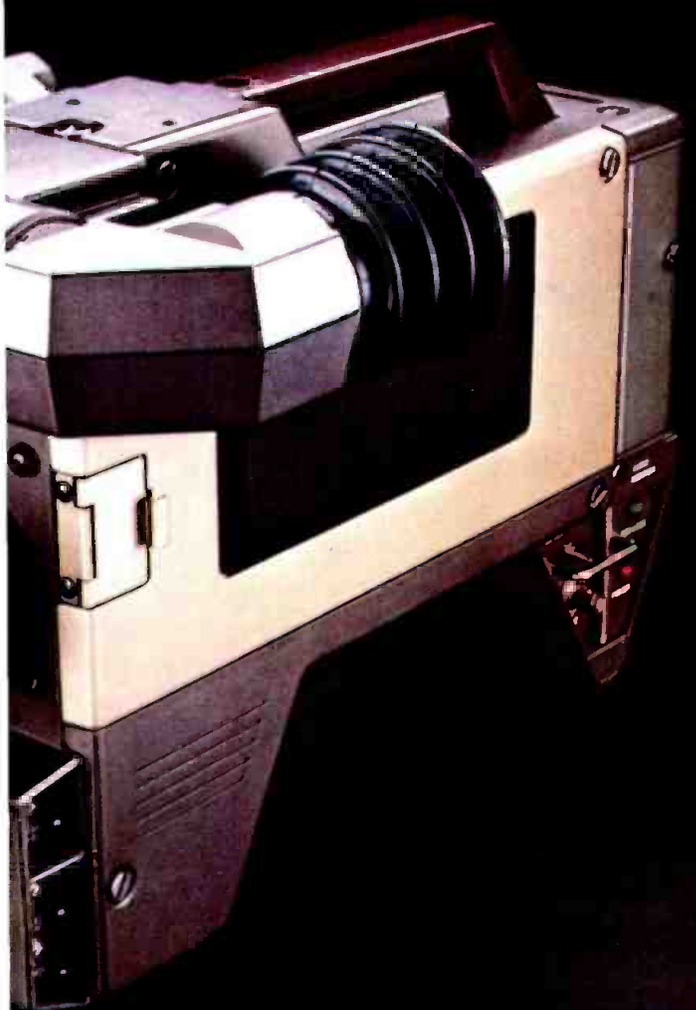

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Certainly the most dramatic, and also unexpected, new product introduction was the **ESS-3** digital still store from **Ampex,** which had been perceived as lagging behind in this product area for the past couple of years. The ESS-3 is fully compatible with the new international digital sampling standard of 13.5 MHz with a 4:2:2 ratio (the ADO, also a 13.5 system, has 4:1:1 sampling). Base price for the system is $48,800.

A brand-new competitor in the market made its first appearance at this NAB—the **VSP-42** (video slide projector) from **Abekas.** Its list of impressive features starts with the price—$29,500 for the basic system, $7000 for the extra card that transforms it into a full two-channel system with internal cross-fading between the channels. The basic unit is only seven rack inches high, including a built-in mini-Winchester disk drive for storage of 100 video frames (200 fields); an add-on 5.25-inch expansion brings the system capacity up to 300 frames. Off-line storage is accomplished on "streaming tape"—a new peripheral from the computer industry.

Another brand-new entry into the digital still store market is **Rank Cintel,** which introduced the **Slide File**—developed by the BBC and marketed exclusively by Rank for

**Abekas VSP-42 still store.**

around $72,000. Claimed to be a "production rather than a library storage system," one of its main features is component digital sampling for extremely clear images. Eighty frames are stored on an eight-inch Winchester disk for instant, on-line recall, while the system also employs a streaming tape cartridge for off-line storage.

New still store developments are also being seen, however, among manufacturers of existing systems. **Harris,** for example, proudly showed off the latest addition to its IRIS II—the incorporation of a Chyron VP-1 **character generator,** controlled through the IRIS keyboard. The DigiFont system allows on-air captions to be created along with the still, then recalled whenever it is displayed.

At **MCI/Quantel,** the news was of a **central library system** for the DLS-6000 Series still stores. The CLS tracks the location of up to 100,000 stills, stored on either DLS units or on the Paint Box. This gives the artist the ability to combine Paint Box-created images with images grabbed on the still store, then file them again for later recall. Maximum access time to any of the 100,000 images is less than five seconds, and the system works with distributed processing so that each workstation maintains autonomous control over its images.

**ADDA,** too, is actively promoting its ESP digital still store—being offered especially for those seeking enhanced graphics capability. One of its major feats is the recording of artwork that is scanned in and digitized, then manipulated and transformed into both animated and still graphics images.

Not all the news was made in digital still stores, however. There were optical laser disks at the show—the OMDR system from Panasonic, for example, shown interfaced with the Via Video System One (see the discussion in the Image Synthesis section). 3M, too, described its services for mastering optical video disks.

**Precision Echo,** too, is seriously considering product development in the optical videodisk area, and put on a series of seminars in a private hospitality suite. For the moment, however, it is concentrating on its magnetic disk recorders—both the **Frame Bank** and the more sophisticated **Image Maker.**

**Eigen** also continues to be active in the magnetic disk market.

Within magnetic recorders used for still storage and animation, however, perhaps the most innovative product was introduced by **Sony**—its brand-new **BVH-2500.** This recorder, based on the Type C one-inch format, enables the recording of 200,000 individual frames of video per one-hour reel without prerolling and advancing the tape each time—a development made possible through Dynamic Tracking technology. Frames are recalled through VITC time code addressing, permitting random access. In its animation mode, the recorder lays down one frame at a time; or it can be instructed to grab frames at preselected intervals.

**Video animation** of this sort was also in evidence at the **Lyon Lamb** booth, now considered the market leader since the AniVid system from Convergence is no longer being marketed. The Lyon Lamb system works with either a computer graphics generator or an animation stand and records frames one at a time on a VTR.

This type of approach was also demonstrated by **Forox,** a company moving into the television market for the first time.

For those requiring hard copy printouts of graphics material, **Dunn Instruments** has begun making its **computer graphics film cameras** available to the broadcast market. The basic design takes a raster image, splits it into RGB components, then photographs each as it is displayed on a CRT.

Finally, there was the **CompuTrace 1500** system from **Wavetek,** which allows extremely rapid black-and-white photographic images to be made from frozen video rasters—on either paper or film.

## IMAGE SYNTHESIS

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It seemed for a while that the number of new companies which were offering digital art and graphics systems would never end. Companies in the computer graphics field discovered what was perceived as a whole new market in broadcast and production facilities. Character generator manufacturers added graphics tablets.

The obvious leader—both in terms of sophistication and price—still appears to be **MCI/Quantel,** whose **Paint Box,** introduced just two years ago, is making rapid strides in sales. Increased sophistication has been made constantly through the addition of software, and this year was no excep-



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tion—with the addition of the ability to create frame-by-frame animation by having the system memorize the stages in an image's creation. The artist can edit out the mistakes and palette displays, then, using the Paint Box's joystick as a shuttle control, move forward and backward through the image.

Also new is the addition of a vast repertory of typehouse-quality lettering fonts—styles that are made available from two of America's leading typographical designers.

This same range of fonts also forms the basis of a brand-new addition to the MCI/**Quantel** digital products lineup, **Cypher**, which could be considered the world's most sophisticated caption generator, combines the extremely high quality of the type foundry fonts with the Mirage's ability to manipulate them. Because it is framestore-based, the composition mode allows virtually infinite page layout possibilities—including totally independent character overlap. Even more fantastic, each character can be treated independently and moved as if controlled by its own Mirage system.

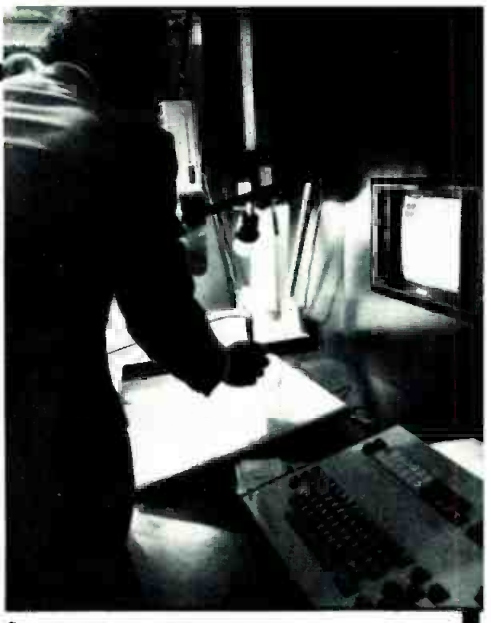
The appearance of the unit at this year's NAB, of course, is almost certainly in response to the tremendous excitement generated by the **Bosch FGS-4000** three-dimensional "character generator" which was shown publicly for the first time; deliveries of the production version will begin

**IMAGES from CGL.**

shortly. Its unique feature is that the images it generates are truly three-dimensional computer-graphics-like models, rendered only just prior to display by twin framestores; this is different from the simple front/back input images which provide 3D perspective in systems such as Mirage and ADO (more later).

This product, as exciting as it is, should not eclipse the new **Bosch FPS-1000** (less than $20,000) art system brought out at last year's SMPTE. This is a more standard digital art/paint system, which will work either as a standalone graphics generator or alongside a character generator. In this way, artwork can be combined with titles, or the character generator output given special graphics treatment.

**Chyron**, which has steadily been advancing its Model IV from a simple character generator to a full-blown art/graphics system, again showed advances this year. These were centered around the **MGM (multimode graphics module)** shown last year in prototype but now in production. This incorporates software for creation of both seven-color fonts/logos through the camera font compose system, and also artwork entered through a graphics tablet digitizer.



**Chyron's graphics system.**

Chyron was also displaying Digifex, the extremely low-cost digital manipulator which takes the character generator or graphics module output and creates simple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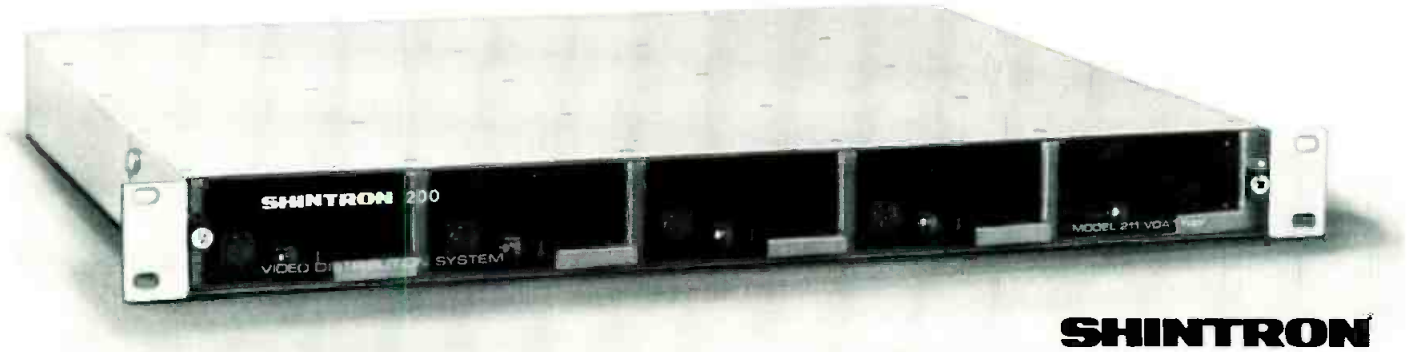


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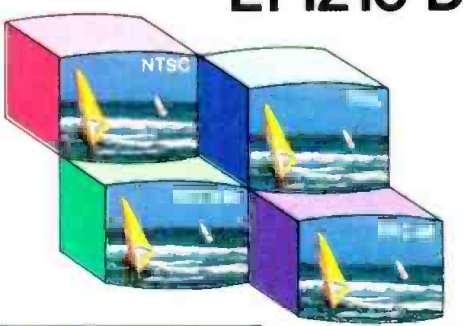

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digital effects. Also new at the Chyron booth was a camera-based **font compose system** for the RGU-2, Chyron's portable graphics system.

The **Aurora/100 digital art/paint system** is also beginning to find popularity among stations, particularly fitting since 1983 marks the tenth anniversary of the first digital art system created by Aurora president Dr. Richard Shoup at the Xerox Advanced Research Center. New in the Aurora/100 this year, a result of major software advances, is an airbrush painting mode.

Making an extremely aggressive push into the broadcast market now is **Via Video**, whose **System One** demonstrations drew considerable crowds. Plainly committed to continually advancing technology, the company showed its art/paint system in conjunction with the Panasonic **OMDR (Optical Memory Disk Recorder)**, a laser-based video disk system that permits single-time writing of 15,000 frames per disk as well as unlimited recall within 0.5 seconds. Disks can be removed and stored for archival purposes. Its uses when coupled with the System One for creating animation effects are obvious.

Certainly among the most advanced new offerings in this area are some new programs from **Computer Graphics Lab** which work in conjunction with its **IMAGES** art/paint system. Designed primarily for graphics studios and specialized applications, they nonetheless may find immediate applications in the broadcast environment. **Big Paint**, for instance, is a program that allows an artist to compose images in a 2048x2048 high-resolution format which is broken down and displayed in smaller 512x512 segments.

At **Dubner**, changes were shown in the CBG-1 character generator and CBG-2 graphics system in the way animation is handled. Previously there have been problems loading the run-length encoded data fast enough to create real-time motion effects. Now, however, an add-on **"Meg O' Mem"** drive adds up to eight megabytes of on-line RAM memory to the system, permitting 60 field-per-second playback of prerecorded images.

New weather display software was also the theme at the **Thomson-CSF** booth, where the Vidifont **Graphics V** was shown in its automatic satellite data formatting mode. Satellite pictures are automatically "straightened out" and provided with station-selected land, water, state and cloud cover colors.

As noted earlier, weather system manufacturers continue to make the kind of advances that allow their systems to be used as standalone graphics generators. The **McInnis/Skinner** Newscan, for example, offers **Graphics II**, a standalone system with

**Bosch FPS-1000.**

larger disk and RAM memory capability than the graphics offered as part of its Weatherscan weather package. High-resolution images (640x412 pixels) are created, with 256 out of 4096 colors displayable per image.

**ColorGraphics** showed several **new additions to its weather graphics system.** One is the addition of 3D perspective displays of any country in the world or any state, which can be shown tilted with a horizon line in virtually any size. New also is the addition of 20 Mbytes of hard disk storage, permitting 250 images to be brought on-line instantly. A third new addition is expanded software capability for graphics effects such as airbrushing and a character generator.

Other news in the weather graphics area was the introduction by **Technology Service Corp.** of the new **Series 2000** weather display computers. The series consists of


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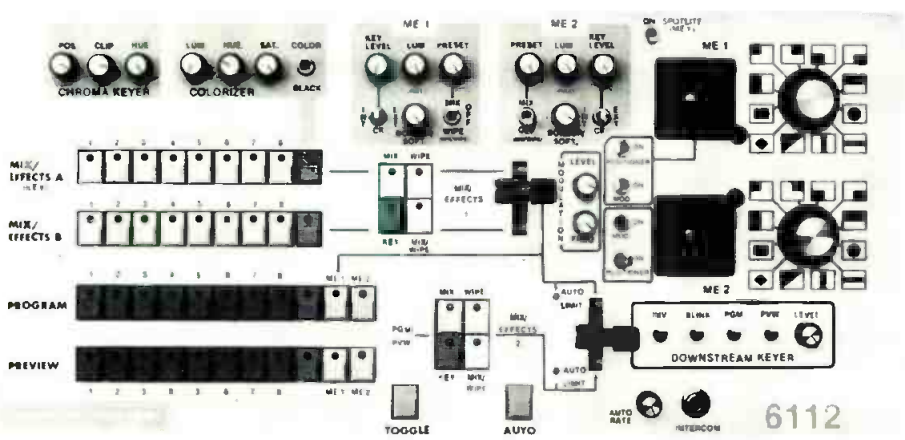


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# George Fridrich's name shows up on a lot of awards.

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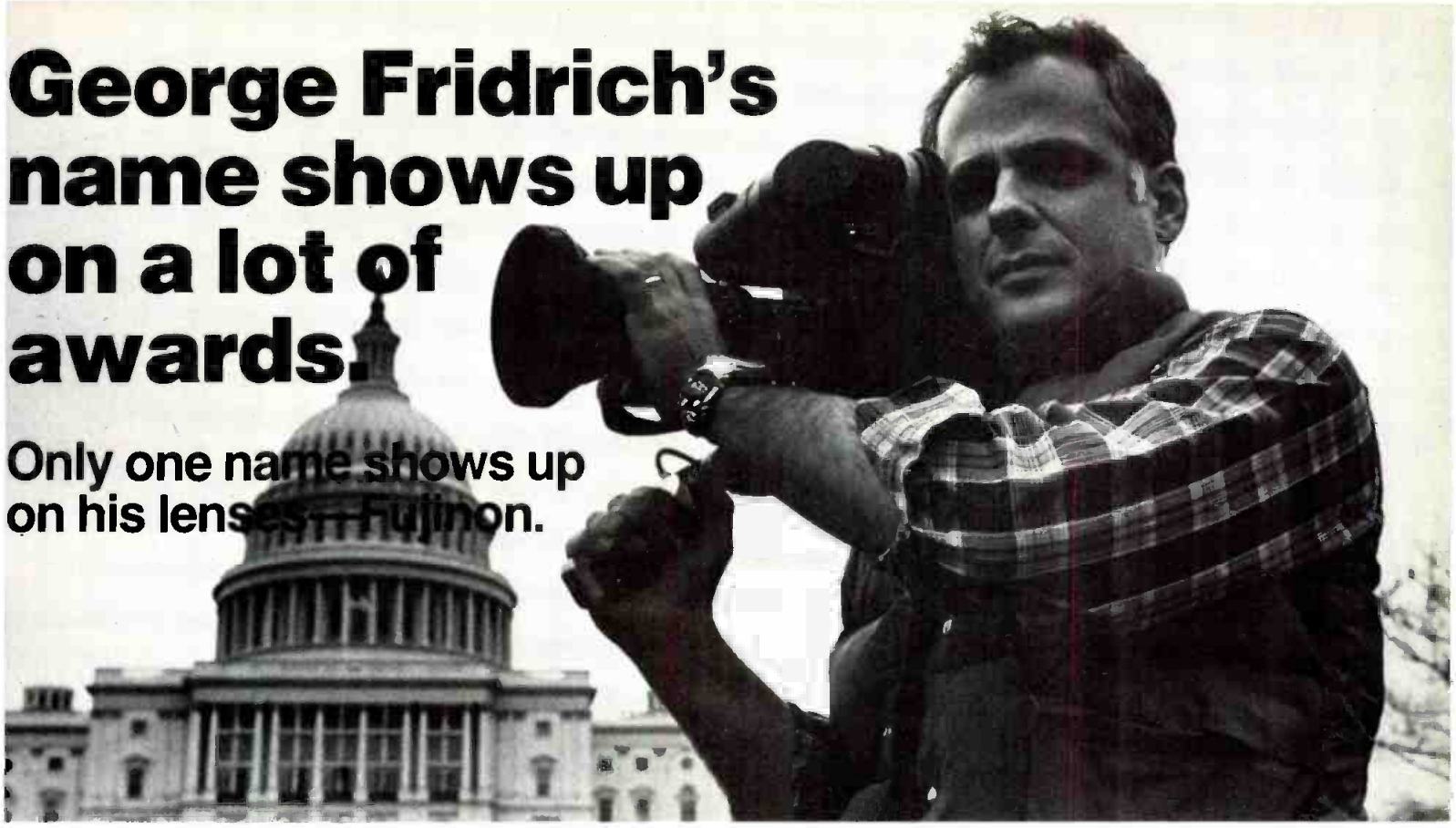

Network news cameraman George Fridrich covers the nation's Capital. Assignments also take him across the country. But wherever he goes, his work speaks with authority. The most prestigious awards confirm it.

The White House News Photographers Association named him "newsfilm photographer of the year" for 1982. (They did the same for 1981 and 1979.) And he received first place awards for spot and feature news in 1982 from the National Press Photographers Association.

Obviously, George Fridrich has his choice of lenses. For years, his choice has been Fujinon, exclusively. Here, in his words, are his reasons:

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George's basic lens is a Fujinon 14X zoom with built-in 2X extender. When he can't get in close, the lens will and because its maximum F1.7 aperture stays flatter, farther, George can still get the brighter, higher contrast picture quality he demands. His second lens is Fujinon's exclusive 3.5x6.5 wide angle zoom. With an MOD under one foot, no assignment is ever missed because of tight quarters.

Incidentally, although George didn't receive the White House News Photographers' award for 1980, Pete Hakel (WJLA, Washington) did. He won with Fujinon, too. It's not a coincidence. According to Pete, "90% of the ENG work in D.C. is Fujinon."

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three basic units: the 2100, which displays color weather radar pictures from NWS and FAA radar; the 2200, for display of satellite and other weather graphics from private companies, such as WSI and ESD; and the 2300, which displays both color radar and weather satellite/graphics pictures.

Popular as always at the show were the stylus-interactive **Telestrator** systems from **Interand**, including the Model 100 "electronic chalk board"—the system being widely used in sports production. The announcer can draw directly on the screen over the video display, either "rubber stamping" symbols or drawing new patterns.

A new company entering the broadcast market for the first time this year is **Vectrix**, which offers **software/hardware** designed to interface with Apple personal computers. The system allows a station to work with WSI weather data. For a base price around $26,000 (not including the computer), the VXB-TV also offers advanced graphics features such as 3D perspective, 512 out of 16 million colors displayable per image, RGB or encoded output, and an internal character generator.

Low-cost graphics were also in evidence at the **Video Associates Labs** booth, where the basic thrust is an NTSC **encoder** that converts Apple II graphics into TV-compatible images. A new device this year is a light pen, which works at a 60-cycles-per-second rate, making it applicable for television use.

In character generators themselves, undoubtedly the most significant advance was the introduction of **Quanta**'s new **Quantafont Select7**, a modular approach to design in which three update modules can bring the system from a inexpensive titler all the way up to the Q-8 font-loadable system (shown this year as a full production model). Features on the Q-7S include six resident fonts with eight character sizes (eight to 64 scan lines high) in each.

**Laird Telemedia** showed its new **Model 7200 Communicator** character generator, the top of its line. One of its main features is the availability of 37,768 foreground and background colors. Proportionally spaced characters from four 128-character fonts are stored in a 100-line internal memory.

Among character generator manufacturers, the line between newsroom computer systems, talent prompting, and on-air graphics is becoming thinner and thinner. This year, for instance, **Beston Electronics** (BEI) chose to devote most of its exhibit to a new **DataNews** system. It is organized around the idea Beston introduced several years ago—DataPrompter—but on a much larger scale, in which reporters write stories using word processing software, producers organize material using editing functions, and on-air talent reads the material from character generator-fed prompters.

A new system in this field, **CompuPrompt** from **Dreamdata**, is a transportable system based on an Atari 800 *color* computer. Four different colors can be displayed on the screen at once, entered and edited through full word processing software capability.

An extremely low-cost ($2300) character generator system was shown by **For-A**, its **VTW-210** "video typewriter." Dot matrix characters have a resolution of 16x20, with 32 characters per line, eight lines per page, and four-page memory standard. An integral title keyer inserts typed text into the video display. A new option for the system allows both colored characters and colored backgrounds.

3M's **D-8800** character/graphics generator was also on hand, with the camera-based font compose system introduced last year now in full production.

## SPECIAL EFFECTS, PRODUCTION SWITCHERS

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**CDL Series 80 switcher.**

In previous years, developments in production switchers have followed the general trend in other equipment: the bigger, the better. This year, however, it seems the reverse is true. The switchers and effects systems which drew the most attention were the smaller, more affordable units.

Perhaps the most interesting development was a brand-new product from **Shintron**, the **Model 390** *component* video switcher. This is just the beginning, of course, of what will undoubtedly become a whole new class of support and post-production equipment designed to meet the needs of those who are beginning to use analog component recorders.

The 390's base price is only $15,000, which provides for four inputs plus black. Each input, of course, consists of three separate RGB channels, though it will work with either RGB or YIQ inputs. Sixteen wipe patterns, full preview channel capability, and color background generator are all standard.

At least as important as the Shintron development, however, was the **Grass Valley Group** demonstration of its brand-new experimental component video switcher, **Model XCS-1**. Based on the physical layout of the GVG 1600-1L switcher, but modified to accept two additional video channels, the experimental switcher will handle any of the analog component standards now being commonly used—YIQ, Y, R-Y, B-Y, or RGB, through three separate inputs per channel; all are internally converted into the switcher's RGB processing.

Perhaps its most important feature, however, is the extremely precise chroma key capability—with a far sharper resolution and none of the ringing, edge crawl, or inability to handle thin edges found in encoded systems.

In its regular convention floor demonstration, **Grass Valley** showed several other new developments—those that are available as actual products. Among these, the most impressive is the first-time showing of the **Model 1680** as a production rather than a prototype version.

Other new developments at **Grass Valley** have been made in the **Mk II DVE effects system** (standard in the 300 Series switchers and available as an add-on in the 1600 Series). Chief among the new features is the input/output communications that allows



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the DVE to be controlled by an external computer interface and allows DVE effects to be stored on floppy disks.

Another leader in the production switcher field, **Central Dynamics**, celebrated its twenty-fifth year in the television industry with the introduction of several new products. The brand-new switcher line, **Series 80**, is available in four-, six-, and 10-bus models, each with a new kind of program processor that represents the equivalent of adding an effects M/E of the program bus.

Equally exciting at **Central Dynamics** was the company's first entry into the digital effects arena with **FlexiKey**, a low-cost digital effects generator which offers a wide range of effects, including spin, flip, rotate, zoom, compress, and various wipe effects. It was demonstrated on both the new Series 80 switchers, and also on various American Data switchers such as the 20-input version of the AD-3101. FlexiKey's advantage and lower cost comes from manipulating the key signal itself rather than the video.

At **Vital**, the news in production switchers and effects was less of brand-new products than of existing product lines that have been reengineered and repackaged. A typical example is the **250** P/N, the extremely compact, digitally controlled switcher, that is now available in a 16-input version. In another example, for situations where space is at a premium (as in mobile vans), Vital has packaged a two-M/E 114 switcher, a two-channel SqueeZoom processor, and a PSAS-2 effects memory into the space normally taken up by a three-M/E switcher system. **PSAS-2** itself has been reengineered "to take care of all the problems found in the earlier system."

Brand-new from **Bosch** this year was a line of compact production switchers incorporating microprocessor control with serial interface between the control panel and the electronics and an optional 30-event memory package (more effects can be stored with external memory on floppy disks). Three models are available: **R 51** single-level switcher with eight inputs and downstream keyer; **R 61** single-level switcher with 16 or 24 inputs and two optional keyers; and **R 102** two-level switcher with flip-flop, 16 or 24 inputs, and two keyers.

Other standalone digital effects processors were also big attention-grabbers, as has become customary at recent shows. Again, this area is being dominated by **MCI/Quantel**, whose **Mirage** was shown on the floor for the first time, a production model. Several changes have been made in the transition of the system from prototype to production model, especially the substitution of an H-P A700 computer rather than the DEC LSI-11 that was used originally. The new computer adds considerably to the processing speed.

The move toward 3D effects systems, which began only a few short years ago, has now reached an almost fevered pitch. One of the leaders here, the **Ampex ADO** system, showed significant software gains, especially in the ability to combine one to four channels of ADO effects into a single image. Since each ADO has two inputs, representing the "front" and "back" or "top" and "bottom" of an image, the new multichannel software permits a rotating three-dimensional cube to be provided with four faces of live video, each compressed and manipulated independently.

But 3D effects are no longer the sole property of large systems such as Mirage, DPE, and ADO. Now, thanks to a brand-new development from NEC, the **DVE E-Flex** can offer rotation and perspective effects when supplemented with the **EPR-400** cost-effective accessory. The new option interfaces with the standard E-Flex control program, but adds three-axis tumbles, flips, and spins which can be positioned anywhere on the screen.

E-Flex posted gains on other fronts, too. A **combiner unit** now permits two E-Flex systems to be used together for the creation of a single image through a digital mixer/keyer. The system also contains a built-in chromakeyer and provides a digital chroma key signal from a selected source.

**ADDA**'s main push these days seems to be with its **VIP** digital compression and effects system, though interest in the low-cost


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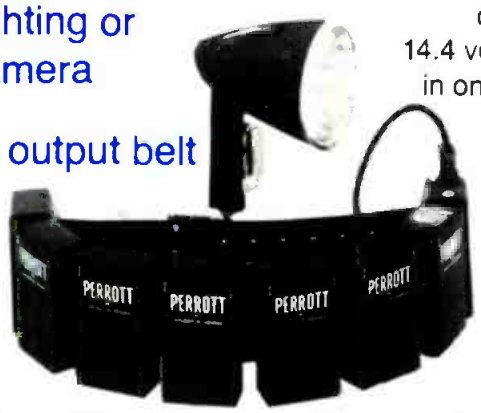


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AC-20 remains high. VIP's claim to fame is that it achieves digital compression without sacrificing bandwidth, and passes a full 5 MHz signal.

On an even smaller scale, a brand-new digital effects package is available from **Microtime**, the first time the company has ventured into this area. The **T²E-120** is unique among this class of low-cost processors (it costs only $20,000) in that it contains two completely separate T-120D TBCs in addition to the main effects processor and control panel (which can be remoted from the electronics through a 75-foot cable). This arrangement permits high-quality A/B roll transitions such as wipes, soft and hard cuts, and dissolves, with programmable times from 0.5 to 1.5 seconds.

Also coming in at the amazingly low cost of $18,700 is **Precision Echo's The Squeezer**. All it really does is compress a video frame into one of four sizes (one twenty-fifth is the smallest), then position the compressed image anywhere within the raster and provide it with a colored border in various widths. But considering that this type of effect accounts for so many of the digital video effects in everyday use, it is certainly a cost-effective addition.

Still a little unsure of its presence in the American market, **Toshiba** again showed its **DPE-II** digital picture effects system, this time in a slightly more dynamic display than had been offered last year. There is no doubt that this is a potentially powerful system. Its special features include bubble memory storage of effects, presettable program *and* previous effects, a digitally coded fader arm, curved as well as straight-line moves, along with compression and expansion moves plus flips and tumbles.

**Shintron's 390 switcher.**

Among switcher manufacturers, one of the most active recently has been **Crosspoint Latch**, which this year introduced a new top-of-the-line three-M/E switcher, **Model 6139**. The basic unit ($14,500) comes with eight inputs (including black and color background) and 12 wipe patterns per M/E, but both inputs and pattern generator can be field-expanded up to 16 inputs ($19,500) and factory-expanded to 24 inputs ($28,000).

ISI, too, unveiled a new switcher in its 900 Series, the **903**. Fully microprocessor-controlled (the processor is in the control panel), it has two M/Es (program and preview) that allow for mixing between the two by reentering M/E 1 into M/E 2. Fourteen wipe patterns are provided in the pattern generator with variable softness, border width, and border color. Also on display was the **904** with two M/Es and an integral downstream key edger that permits outline, drop shadow, and bordered keys to fade downstream of the flip/flop mixing.

At **Beaveronics**, the display concentrated on the standard product range—beginning with the 12-input **Model 712** with downstream mixer and optional downstream keyer designed for ENG/EFP van applications, the **BI-154** 12-input switcher with downstream mix/key amp, and the **BI-156** two-M/E switcher with 15 inputs, designed for studio installations.

Another popular switcher on display was the **EchoLab SE/3**, an extremely compact unit featuring three M/E amps, two border generators, a color background generator, two color matte generators, and quad splits in a package with only 1.25 inches of front panel depth.

**Ross Video** was on hand with its full line of production switchers. Its top-of-the-line product is now the **RVS-508** with 20 or 24 inputs and two complete multilevel effects M/Es. This switcher is designed to work in conjunction with the Scene Store effects presetter for 200 on-line scenes and off-line storage on cassettes.

Several new standalone effects systems were also introduced. New from **Panasonic**, for example, was the **WJ-1200** chroma key generator. Hue can be shifted


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The new modular design of the 200 Series editing systems includes keyboard, detached status display monitor, and separate rack-mountable control electronics for more elbow room and options in your editing suite configuration. Optional DD-200 Dual Disk Drive also available. Each of the four models in the 200 series is upgradeable, and can be interfaced to most editing VTR's in ½," ¾," or 1" format.

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through 360 degrees, and clip control and key delay are built in.

Also brand-new from **Graham-Patten Systems,** actually the company's first product that did not grow out of network custom design work, is the **Model 1231** downstream keyer. Keying as many as six sources simultaneously, it offers important features such as key bordering, key transitions, title masking, full preview functions, and interface to external control sources.

A new title keyer/colorizer was also introduced by **For-A, Model TKY-4600.** Title key control and color control have been expanded with new automatic transition functions including eight integral wipe patterns. The unit also incorporates a self key mode and an external key mode.

**Toshiba,** as part of its digital products display, had a **wipe pattern generator** on hand, offering variable bordering, and features such as pattern modulation, tearing, and ripple.

Finally, **Ultimatte** was on hand with another analog component system bound to have important impact as more and more stations turn to small-format recording. Shown hooked up with two M-format recorders, the Ultimatte **video matting device** was demonstrated producing virtually flawless chroma keys in second and third generation dubs.

## POST-PRODUCTION

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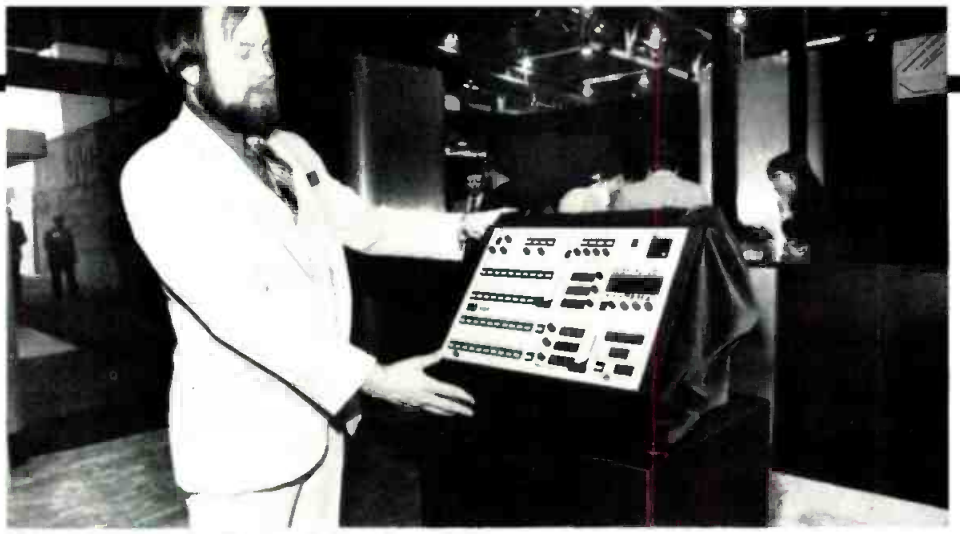
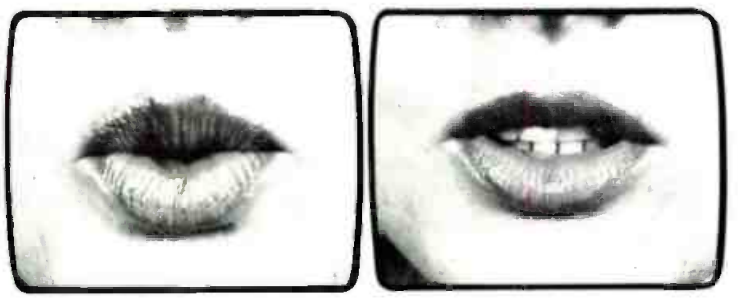


**Model 903 production switcher from ISI.**



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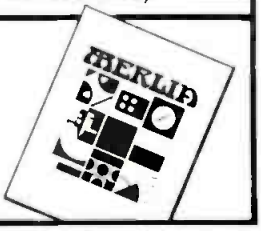


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Those looking for the latest editing system at NAB could find new entries in all size categories, from the smallest to the largest. New products were the exception, however, with most companies showing systems already familiar to NAB visitors.

The biggest news came from the biggest systems this year, with **CMX/Orrox** generating excitement with a new, two-level large-scale editing system. The first stage is the **3400**, essentially an extension of the 340X with a host of new features. The company has totally restructured the software in Pascal and slightly restructured the keyboard to provide expanded capabilities, including improved list management and expanded edit decision list. The 3400 has unlimited memory capability, and is delivered with 256K memory.

The biggest fanfare, however, was reserved for the next step up: the **3400+**. CMX says it conducted extensive "blind" interviews with editing system users around the country to determine what they wanted in a top-of-the-line editing system. The information they gathered led them to build a completely redesigned keyboard that is totally user-definable. Each of the 40 keys—less than half the 3400's 128—can be assigned any function the user desires.

In addition to the streamlined keyboard, the 3400+ offers touch screen editing—seen before in Control Video's Lightfinger and the Ampex ACE—and voice activation, never seen before in an editing system, according to CMX.

An unusual feature of both the 3400 and the 3400+ is that they will accept videodisc players as sources. Phil Arenson, president of CMX/Orrox, sees videodisc-based editing as becoming the industry standard in as little as two years from now, when the price of transferring filmed or taped program material to disc drops.

Aside from CMX, the news in large editing systems was in software, not hardware. **Datatron** trod the middle ground here, with new **"Level Six" software** for its Vanguard system that creates "firmware" changes. Among the new features are five user-definable keys, each capable of storing up to 20 individual keystrokes. Another keyboard change is the substitution of an outboard rotary knob for the Variscan shuttle slide.

Datatron is particularly proud of the new "Backtrac" function, which it says has "brought film-style editing to videotape." The function allows the operator to use a previous edited master as one of the source tapes for the next, finer edit. As the process is repeated, each successive master serves as a source for the next.

Several companies showed expanded interface capabilities for their editing systems, large and small. **Videomedia's** established **Z6000 system** now has a CMX **translator option** for edit decision list compatibility, either on disk or as a printout.

**Bosch's Mach One system** also had some **new software features,** including the ability to "talk" with Bosch routing switchers. The new software consists of one card for parallel interface machines and one for serial machines, allowing the editor to interface with any switcher with only two interface cards.

At its second NAB, **Interactive Systems Co.** of Boulder, CO, returned with its upgradable, software-based **editing system** that controls a switcher and from three to 15 VTRs. The company sold its "Superedit" software alone until last year, when it took the plunge and started selling entire systems. The compact system can directly control any VTR with RS-422 serial control, without an interface (such VTRs include the Ampex VPR-3 and Sony's BVU-800, BVH-2000, and BVW-10 Betacam recorder). The company will supply interfaces for other recorders, including M models.

Also celebrating its first birthday was **Sony's BVE-5000** editor, introduced last year. New **interface** capabilities at this show included a Grass Valley 300 E-MEM interface, a floppy disk interface, and new software for recording with MCI/Sony audio tape recorders. The 5000 controls up to eight Sony one-inch and ¾-inch VTRs (six play and two record).

**Automated Studio Technologies** brought a SMPTE time code-based **editing system for audio or video** post-production that controls up to 12 tape recorders and stores up to 999 edit events. The standard system comes with 256K RAM for real time control and a LIBRARY function that stores time code locations of sound effects, theme music, or a shot list. The system will support direct serial or parallel control of tape recorders; alternatively, it may be interfaced to the BTX Shadow synchronizer. Machine-specific "personality cards" providing varispeed, shuttle, and track assignment switching allow Shadow owners to upgrade to full electronic editing.

The only "new" mid-sized editor at NAB was **Convergence's ECS-200** Series, actually a reworking of the company's ECS-104. The 200 Series consists of four modular, upgradable editors ranging from the ECS-201 to the top-of-the-line ECS-204, essentially identical to the 104. Each model offers edit decision list management, auto assemble ability, and internal list storage (the 202, 203, and 204 store up to 866 events). The 202 is a cuts-only and sync roll editor; the 201 is cuts-only and has a 50-event memory.

Also new from **Convergence** was the **ECS-90S** "Super 90" single-source edit controller, now enhanced with two built-in SMPTE time code readers, a time code generator, an edit decision lister, a fade-to-black board, and a black generator.

As with the large editors, most other developments in mid-sized systems focused on enhancements of existing editors.

**Convergence ECS-200 Series.**

**Videomedia's Eagle.**

**United Media,** also responding to requests from customers, partially rearranged the keyboard of its **Commander II** system, which controls up to eight VTRs in its "ultimate" version, with all single-function keys grouped by function for user convenience.

**Control Video** came to the show with a significant enhancement to its Lightfinger touchscreen editing system. The upgrade consists of the **CV68K** microcomputer and floppy disk drive unit that expands edit decision list storage to 1000 events in a CMX-compatible format. The CV68K, which comes as a plug-compatible upgrade to any existing Lightfinger or Lightfinger Plus system, will allow Control Video to add more advanced features to the Lightfinger in the future.

Another new mid-sized editor at NAB was the **ABR-1A** from the newly formed Editing Products Division of **International Video Corp.** The ABR-1A uses either SMPTE,



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# 40 to 1

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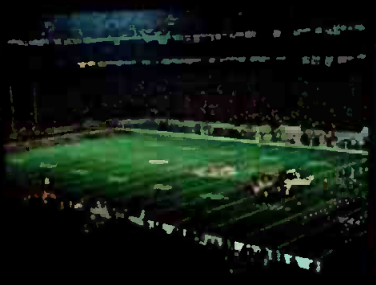

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## In the Foreground of Television Audio

Audio for video is on a lot of minds these days. Advanced video formats and transmission methods make dramatic improvement possible. Producers' concerns over the initial impact and residual value of their programmes make it desirable. EFP, new competitive arenas and increased consumer awareness make it necessary. And now, the SSL Stereo Video System makes it practical.

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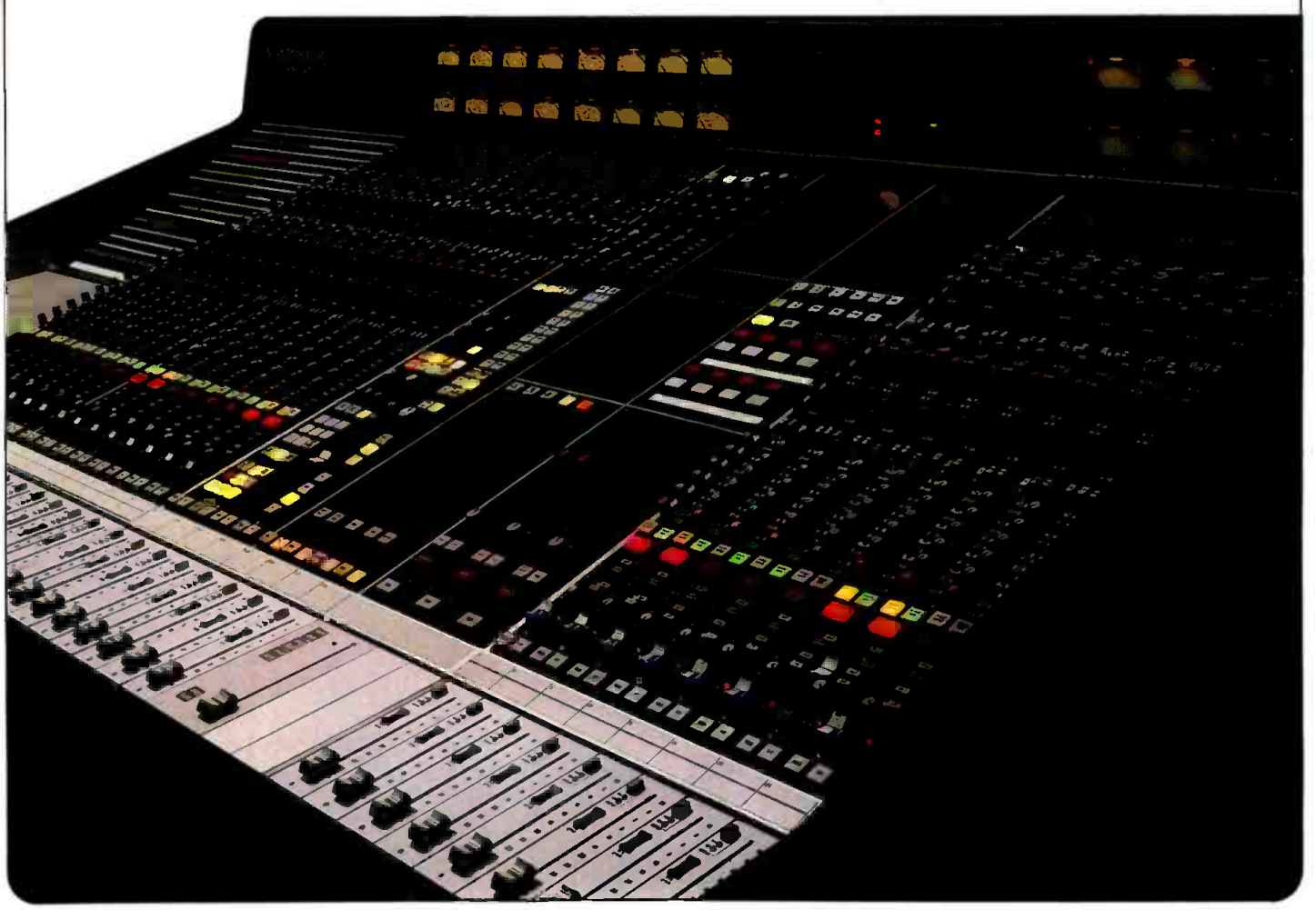
And of course, the Solid State Logic Stereo Video System provides you with the ergonomic and sonic attributes which have made our companion SL 4000 E Series the leading choice of the world's great music studios.



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## Format Flexibility

The Stereo Video System's six bus mix matrix accommodates all audio-for-video formats. Along with standard mono, stereo and multi-track operations, each input may be panned between one of three stereo mix buses. This allows the engineer to freely divide the console into dialogue, music and effects sections as each project requires.

The Dialogue, Music and Effects mixes may be recorded in mono on a 3 stripe or 4 track, or in stereo on an 8 track or the multi-track master. Composite stereo and mono mixes of all 6 buses are derived from the master mix matrix for monitoring, transmission and/or simultaneous (first generation!) layback to the stereo video recorder. Alternatively, the six buses may be used for stereo mix and mix minus feeds during live coverage.

## Comprehensive Signal Processing

Each I/O module contains an expander/gate, compressor/limiter, high and low pass filters, four band parametric equalisation, six cue/aux sends and tape electronics remotes. Master logic, push-button signal processor routing, patchfree audio subgrouping, and 8 VCA Group Masters ease complex productions, and always provide the minimum signal path.

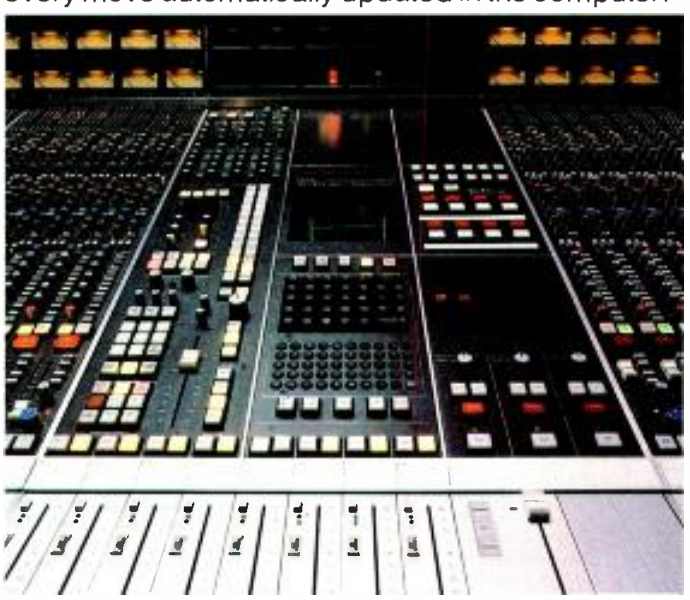
## Total Recall

Complete details of all I/O module control settings are stored on floppy disc by SSL's Total Recall System, enabling console setups to be restored within .25dB accuracy. Not only does Total Recall save time on each production, it allows greater scheduling flexibility with fewer headaches than ever before possible.

## Computer Assistance. Live And In Post.

The SSL Primary Studio Computer is instructed with simple phrases entered via dedicated command keys and an alphanumeric keyboard at the console centre. A small video display advises the engineer of all activity. Above this display, controls for the SSL Video Switcher enable the mixer to call programme, preview or computer displays to the main video monitor.

The computer accepts entries in all timecode and foot/frames standards, and provides complete cue, edit, punch-in and mix list management. In post-production, it links multiple ATRs, VTRs or film chains with the Dynamic Mixing functions, providing fast and familiar rollback and pick-up recording, with every move automatically updated in the computer!



In live production, the SSL Real Time System enables complex sequences of all channel and group fades and cuts to be pre-programmed, and then manually executed with a single set of controls.

The SSL Events Controller provides up to 16 multi-repeatable contact closures under computer control. The SSL Effects Controller adds 40 A/D ports to link the computer with external signal processors.

The Solid State Logic Stereo Video System is available in studio and Outside Broadcast versions from 16 to 56 I/O modules, with up to 112 line and microphone inputs plus four stereo effects returns. Please call or write on your letterhead for complete details and prices.

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Microloc, or control track time code to control three VCRs in an A/B roll configuration. It is available with either CMX- or Datatron-compatible decision list formats. An unusual feature of the ABR-1A is that it has separate controls for each VCR.

**Datatron,** which replaced its Tempo system with the **ST-3** (for "Super Tempo") at last fall's SMPTE show, brought to NAB a series of **new interfaces** for its editors, demonstrating them on an ST-3 system. Included are SMPTE serial protocol interfaces for devices with serial communication, including Sony's BVH-2000 and Betacam recorders and Ampex's VPR-80; interfaces for the RCA Hawkeye and TR-800 recorders; and serial switcher interfaces for the GVG 300 with DVE and Audio E-MEM.

New interfaces were also the news at **Jatex**, which brought a series of new switcher interfaces for its **VSEC-62TMX** A/B roll editing controller. The series includes serial and/or parallel interfaces for production switchers from Crosspoint Latch, GVG, and ISI; interfaces are in development for American Data, CDL, Echolab, and Vital switchers.

CMX announced that it had increased the number of models of its mid-sized editor, The Edge, from three to five, and had reduced prices up to 27 percent. Models now range from the basic two-machine, cuts-only ED 990A at $9000 to the top-of-the-line ED 1003A with three-VTR interface and full effects switcher control at $18,100. **The Edge** was also featured at the **Laumic Co.** booth in a special portable version available for **rental.**

Two companies brought all-new small editing systems to NAB this year. **Videomedia**'s new entry, the **Eagle**, is a two-level off-line editing device for U-Matic recorders. The basic Eagle I system features distributed intelligence, a 250-event memory, frame accurate editing, and a built-in sync generator, among others. Prices start at $7500. The Eagle II, at $9500, provides such Z6000-compatible options as list management, A/B roll and sync roll, and general purpose interface.

The other new small system came from **Control Video**—the **Saber**, a spot reel editor aimed at small broadcasters, cable operators, and LPTV stations. The system consists of a CRT and the company's Intelligent Controller; the operator programs the ID numbers of the spots to be edited and gives the "edit" command, and the Saber automatically assembles the reel, checkerboarding if more than one source reel is indicated.

**EECO,** which says it is aiming its recently introduced IVES editor more toward the industrial market, brought a new multipoint search-to-cue controller, the **STC-100**, which can store and recall up to 99 cue points. The device works with the Ampex VPR-1 and VPR-2/2B VTRs to provide remote control of record, normal speed play, and full speed bidirectional shuttle.

## TIME CODE AND SYNCHRONIZING SYSTEMS

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Vertical interval time code received a boost in April as several NAB exhibitors offered new VITC equipment. Cipher Digital (the newly purchased and renamed Datametrics) brought seven new products, including its 900 Series translators, designed to allow existing longitudinal time code systems to use VITC with no duplication of hardware. Models 760 and 766 combine longitudinal and vertical interval time code; the former is a reader and the latter a generator. In the SMPTE/EBU area, **Cipher** had new **readers and generators** with character generator or LED displays.

**Gray Engineering Labs**, also in the VITC camp, announced two new products—the **VIE-224** vertical interval encoder and **VID-225** vertical interval decoder. The former converts and displays any SMPTE longitudinal edit code input to VITC output; the latter decodes and displays both longitudinal code and VITC present on a composite video signal.

Another VITC advocate at the show was **Adams-Smith,** which showed a range of VITC products in its **System 2600.** New functions include high-speed VITC reader and translator modules that allow users of any existing longitudinal time code editing system to edit with VITC, enabling them to make edit decisions in still frame or slow motion.

**Audio Kinetics'** established **Q-Lock** synchronizer showed up at the Sony booth in a demonstration of digital audio post-production with one-inch video. At the Audio Kinetics booth, the company had a redefined Q-Lock keyboard with user-definable keys; the key redefinitions are just part of a 64-item option package now available for the synchronizer.

The big announcement from BTX was the **Softouch transport controller,** a multimachine edit controller for sweetening, sound effects editing, and automatic dialog replacement. The controller, which synchronizes to all Shadow synchronizers and Cypher time code systems, has Softkeys that can learn and permanently store up to 16 production sequences simultaneously.

At the **Glentronix** booth, the featured item was the new **Scantex ADFM-204** audio follow system for editing and master control applications. The 204 is the latest addition to the AFDM-200 line. Also new were the **VRS-161** 16x1 video switcher and companion **ARS-161** 16x1 audio routing switcher with follow capabilities.

Another synchronizer at the show was **Multi-Track Magnetics' MST-100,** which the company says will control almost any VTR or ATR. The unit combines a SMPTE time code keyer and VTR controller with optional SMPTE reader and writer and VITC reader and generator.

**Skotel's PTC-100** portable time code generator/reader had a new feature—a second counter that allows time of day to be recorded in the user portion of the code while elapsed time is maintained in the regular portion.

**Cipher Digital time code.**

**Shintron** also brought two new products—the **Model 647** edit code generator, which can generate SMPTE/EBU code independently or in sync with incoming video, and the **Model 646** edit code reader/raster display, which displays the code in half-inch-high LEDs on its front panel.

ESE had a new "smart" SMPTE **time code reader,** the **ES 256**, a bidirectional, multi-speed unit with a digital error detection system that switches to a frame-counting mode when it detects a bad frame of time code, activating an internal counter that is deactivated when good time code reappears. Other new gear included the **ES-207** video distribution amplifier ($175).

The new **TCR-3500** time code reader from **For-A**, available now for $3000, has full SMPTE/EBU and user bit data reading functions and generates BCD code for hour/minute/second/frame number identification.

**Datum, Inc.** brought a variety of **time code equipment,** ranging from time code generators, reader/translators, generator/translators, and automatic tape search control units to complete timing systems.



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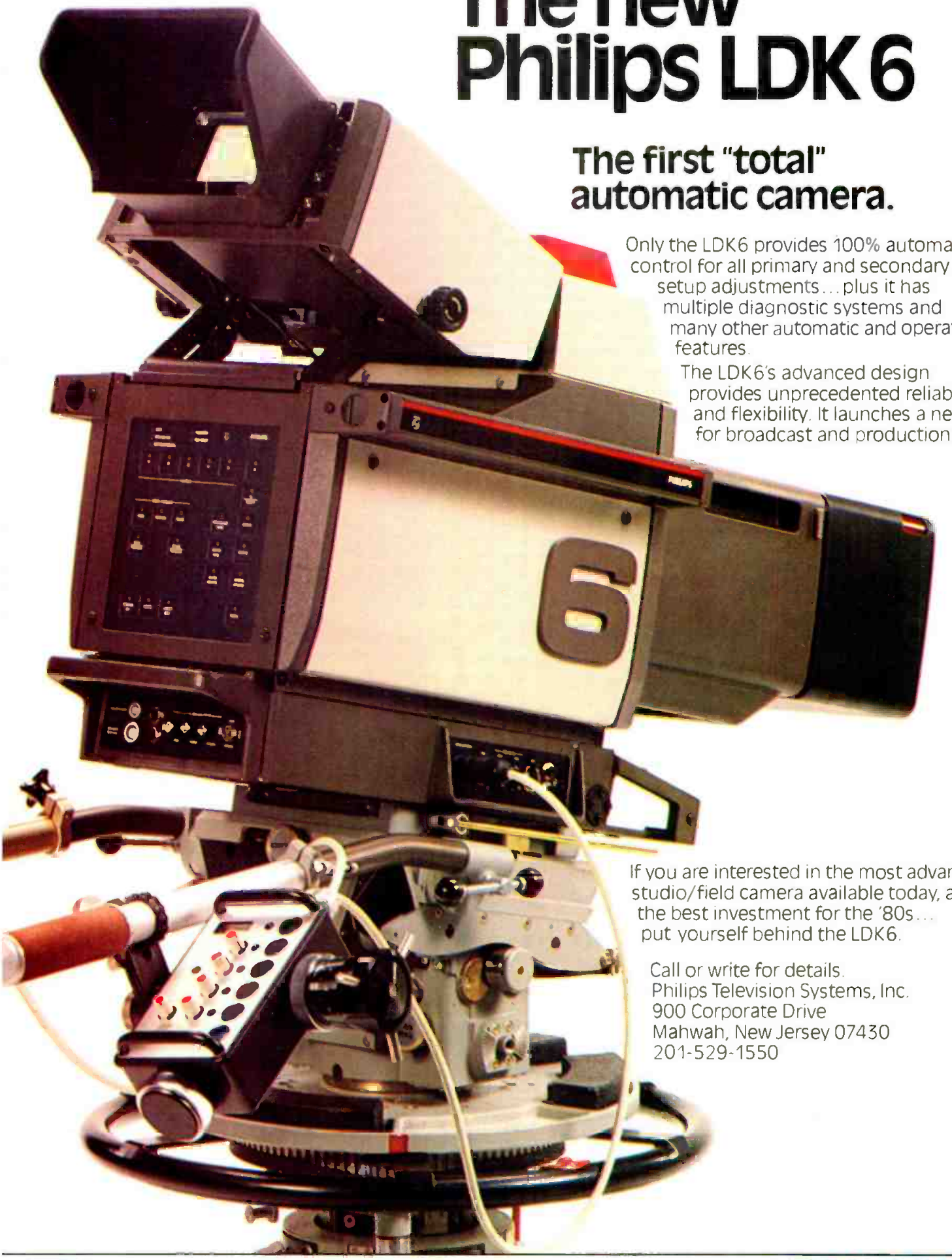


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# VIDEO

## SIGNAL PROCESSING

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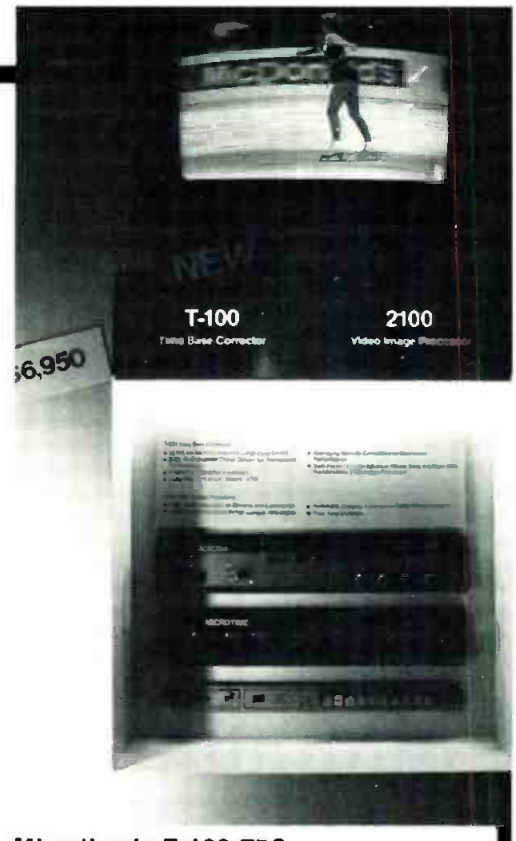
It wouldn't have been a memorable NAB without the introduction of at least one new digital signal processing wonder. This year there were at least three. led by **Tektronix**'s introduction of its **110-S.** For a company which wasn't strictly in the television products business before, Tek has suddenly become the highwater mark in frame synchronizers, considering that this unit has 10-bit 4X fsc signal processing, making it virtually transparent even with extremely noisy signals.

Designed primarily for studio situations such as satellite receive centers, where multiple passes through synchronizers may be routine, the Tek 110-S adds virtually no quantizing or other errors. The impressive specs include one percent differential gain, one-degree differential phase, 60 dB S/N, and 0.5 percent 2T K factor.

New field and frame synchronization capability were also demonstrated by ADDA as part of its **AC-20** processing system. Claimed to be the lowest-cost field and frame synchronizers on the market. the units offer 8-bit. 4X fsc sampling, and pass video beginning on line 10.

Not to be left behind in the development

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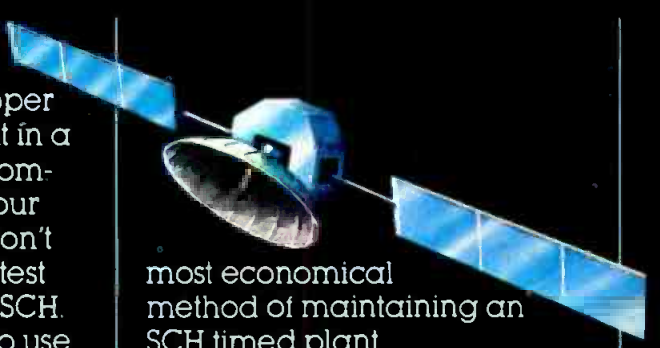

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of synchronizers designed to insure correct sch relationships when used in conjunction with A/B-roll editors. **MCI/Quantel** has added a two-framestore synchronizer to its line, designed to eliminate out-of-phase edits caused when composite signals must be combined in editing. Based on the DFS-1750, the **DFS-1752** consumes only 100 W of power and is only 1.75 rack inches high, making it "the world's smallest," according to the company.

Hot on the trail of the lion's share of the low to mid range of the market, **Microtime** has been busy developing several new product lines. The most significant is probably the new **T-100**, a TBC modeled after the popular T-120 but priced at only $6950.

Also new in this line is the **T-120D** digital TBC, again modeled on the T-120 but with the additional capability of working with the Sony BVU-820 with Dynamic Tracking to achieve slow motion and fast action.

Rounding out the new products from **Microtime**, the **S-230** is its latest-generation frame synchronizer/TBC. The infinite-window TBC accepts any half- or ¾-inch VCR, with or without capstan servo.

A brand-new exhibitor at NAB this year, **Hotronic** showed the **AD-51**, a digital TBC/frame synchronizer. Eight-bit resolution with 4X fsc sampling is offered together with "more than one frame memory" and therefore able to correct a wide range of errors.

New digital signal processing capability was also demonstrated by **Ampex** with the **TBC-80**. This dual-channel system, designed to accompany the VPR-80 Type C VTR, offers the capability of two-machine interface with any half-, ¾- or one-inch deck.

As was the case throughout the show, component coding was the theme of the latest product from **For-A**, the Model **FA-410** digital TBC that encodes analog component signals. It is able to work with half- and ¾-inch VCRs with and without sc feedback, either capstan servo or non-V-locked. The $7950 unit has a 16-line correction window, digital proc amp, and built-in DOC and sync generator.

**Fortel**, too, is off to an early lead in the design of analog component TBCs, having designed the system installed at WNEV-TV, Boston, and under contract to deliver TBC systems to RCA for the Hawkeye. This line has become a new YIQ version of Fortel's popular Y-688-32 Total Error Corrector. Like the composite version, the **C-YIQ-32** has a full 32-line window.

Also brand-new from **Fortel** was its **CC-1** color corrector, with independent control of saturation, hue, and luminance level of six independent colors; vectors are controlled through individual joysticks for highly precise control.

**Fortel** also significantly expanded its Digibloc "building block" digital processing system introduced last year with two new units. The **TBC-32**, like the FS-1 and FS-2 synchronizers, offers either 8- or 9-bit processing, depending on the operator's choice.

**Digital Video Systems** is also involved in component encoding—this time not the analog components, but the digital component sampling scheme with which the analog signal should be compatible. At the heart of the DPS processing system (which includes the **DPS-103** TBC and the **DPS-106** TBC/**framestore**) is a single-clock read/write processor which allows the chrominance and luminance to be separated, then digitized, then corrected line-by-line on a lookahead basis.

**Harris** displayed its full line of digital TBCs and synchronizers. A new **HVS-517** high-band digital TBC, designed to work with extended-performance VCRs, is dual PAL/SECAM compatible.

**Toshiba**, too, demonstrated its **VS-IV** digital synchronizer with one-line buffer memory to eliminate blur when switching to nonsynchronous sources. Specs are less than two percent differential gain, less than two degrees differential phase, and 56 dB S/N.

Another type of digital processing equipment becoming more and more popular are digital audio delay systems designed specifically to compensate for the delays introduced as video is fed through various types of digital video processors. **Fortel** introduced the **AS-1** this year. **Toshiba** showed its **AS-II**, which uses 16-bit PCM processing to provide up to 1.3 seconds of audio delay, either automatically or manually. These companies are joined by several from the audio processing field which offer similar products. **Advanced Music Systems**, for instance, showed the **A/V Sync**, which offers automatic compensations as well as digital noise reduction and other processing. **Lexicon's Model 1500** is much the same idea, and features several large LED displays to show time offset and headroom.

**MCI/Quantel**'s new offering in this area, supplementing the DAS-175 delay system introduced last year, was the **DPC-185** digital pitch corrector. This system is designed to offer 10 percent pitch correction to the audio signal being played back on a Type C VTR.

Finally, there has been considerable development recently in improving digital standards converters. Brand-new at the show, distributed in the U.S. by **A.F. Associates**, was the Applied Video Systems **AVS-6000** standards converter and video processor (34 systems are currently in use around the world).

**MCI/Quantel**, too, introduced a brand-new software package for its DSC-4002 standards converter. Dubbed **SILK** ("because of the smoothness of the images it produces") the new motion interpolation program can be installed in existing DSC standards converters.

**Oki** had a brand-new NTSC/PAL/SECAM standards converter on the floor, the **LT-1210**, priced at $65,000. Many features are standard, including sync generator, TBC, image enhancement, adjustable H and V blanking, externally adjustable set-up level, and color bar generator.

A brand-new **tri-standard converter** was also unveiled by **Video International**, a new company in the American market. The transportable unit features an extensive memory for motion interpolation, and provides TBC and frame synchronization and a test pattern generator in all three standards.

One other new digital converter is worthy of mention—the **DigiVision DRGB-343** which converts NTSC signals into a high-resolution display—at the NAB show it was shown with a 1000-line CRT. The processing can provide a maximum display of 1024x1024, and can improve the NTSC signal by more than 20 dB.

GVG's Horizon switcher.

3M Series H router.

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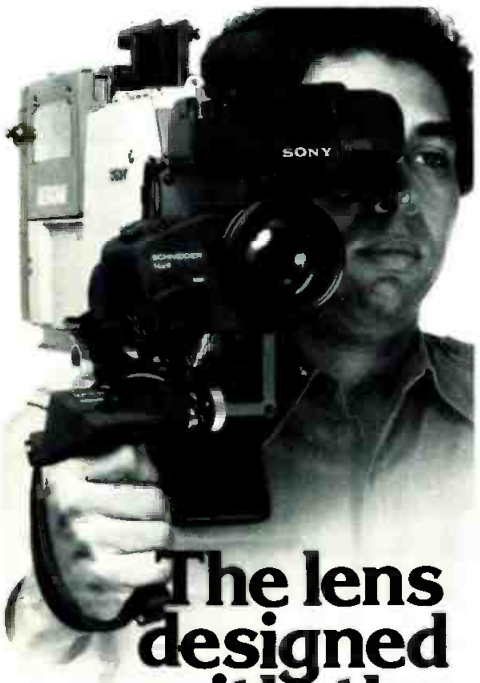

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The lens can power zoom from 9mm to 126mm. Or with the 2X built-in extender from 18 to 252mm. With the low distortion 6.3mm, to 9mm aspheric lens attachment, it can power zoom on the super wide angle shots. Schneider broadcast lenses are available throughout the United States and Canada from:
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# VIDEO

## ROUTING SWITCHERS

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Graham-Patten video distribution. . . 435

One of the real surprises at this year's show was the sudden emergence of several brand-new large-scale routing and signal distribution systems from some major manufacturers.

One of the leaders here was **American Data,** which introduced its brand-new **SDS-2** signal distribution system incorporating advanced hardware, and new software. Featuring MicroPatch, a signal control and distribution sytem and RS-2000, a high-density, four-level microprocessor-controlled switching array, the system can be expanded from a 32x32 AFV setup to 512x512.

This show also saw the introduction of a brand-new master control switcher from **American Data,** the **MC-4000.** Microprocessor-controlled, it can be configured anywhere from a relatively small system all the way up to 32 AFV inputs and eight audio-only inputs, all within eight rack units of space.

As a way of making signal distribution equipment smaller and more efficient, 3M introduced a new routing switcher. Though capable of handling a large input/output matrix, the new 3M **H Series** routing switcher is surprisingly compact in size. To achieve this, the company used computer-aided circuit manufacturing and laser trimming of circuit components.

Equally exciting was the introduction of a brand-new routing switching system from **Grass Valley,** the **Horizon.** The basis of the excitement is a newly developed 8x16 crosspoint module, which results in some 30 percent greater packaging density over comparable 10x10 systems.

With a distribution switching system philosophy that leans heavily toward complete machine control, **Bosch** came through with a major introduction. The new switching system from Bosch, the **TVS/TAS2000,** has as standard a compact 10x10 matrix, offers redundant control card capability, seven-level standard breakaway capability, SMPTE RS-422 computer control as an option, and even optional telephone touch tone control.

Appealing to a different market with an introduction of their own, HEDCO announced the new **IRS Series** of routing switchers. They are available as 48x48 audio or video systems in 17 rack units, with an additional three rack units for power supplies.

Angling for the medium to large broadcast requirements, **Image Video** made a new announcement as well. The introduction of the **9100 Series** of routing switchers displayed the ability for expansion of up to 256 inputs with an unlimited number of outputs, and any combination of video, audio, and time code matrices are available.

Created to help broadcasters with special requirements, **Di-Tech** introduced the **Model 5840-2** AFV routing switcher. The unit provides two channels of audio per input with independent control on audio 1 and audio 2.

One of the key features of the **Telemet** AV **Model 7934** routing switcher is the remote control capability. Control versatility and computer interface with programmable switching are important factors in the list of available features for this switcher.

At the show, **Datatek** offered a complete line of routing switchers and video DAS, with the **D-2000** Series taking precedence. Up to eight levels of control are possible with a variety of matrix frames. Also new was the **D-663,** a 10-output video distribution amplifier.

Displaying a routing switcher with two audio inputs for each video channel was **Videotek.** The **RS-10A** AFV switcher with video/audio latching breakaway control was shown as a standard 10x2 unit with overnight memory, vertical interval switching, and balanced/unbalanced audio inputs or outputs.

**AVL Digital** is a company with a variety of video and audio distribution amplifiers and routing switchers. The VAS-10, 10x1 audio/video switcher and the **AVS-100** 10x10 audio/video routing switcher were the center of attention. The larger AVS-100 switchers are custom-built medium to large units, capable of master control.

**Dynair** offers switching systems for standard television as well as HDTV, audio, and SMPTE/EBU time code. The **Series 1600** starts wih a 16x1 matrix supplying up to four levels of switching. The proprietary signal tip reference circuit holds composite and noncomposite signals at a selected dc reference over a wide average picture level range.

With two new offerings this year **Shintron** expanded its product line. The 200 Series audio and video distribution amplifi-



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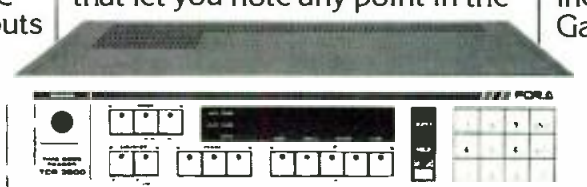

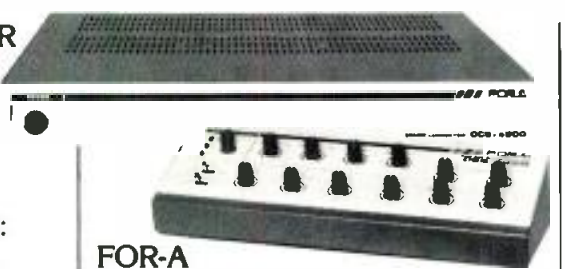

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# And that's the

*Meet the Press–NBC–11/20/47 to present*

*John Cameron Swayze–NBC–Camel News Caravan 1948 to 1956*

*Dave Garroway–Garroway at Large 1949, Today Show 1952 to 1961*

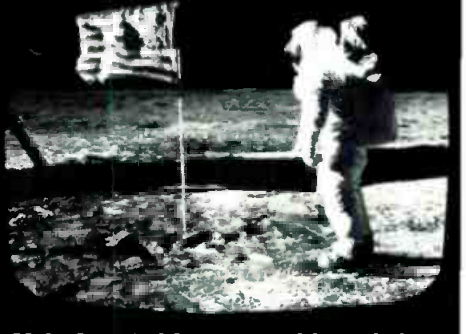
*Army vs McCarthy Hearings April 1954*

*Huntley/Brinkley Report NBC News 10/15/56 to 7/5/70*

*Kennedy-Nixon Debates–ABC–10/3/60*

*Vietnam War*

*60 Minutes News Magazine 7/24/68 to present*



*U.S. Lands Men on the Moon July 1969*

Garroway was introducing early risers to a show called *Today* and Conrac was introducing its first black and white monitor.

Swayze was anchoring network news, the McCarthy-Army hearings were being held in America's living rooms, and Conrac was introducing the first color monitor.

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# way it was.

*Senator Estes Kefauver Crime Hearings 1951*

*Edward R. Murrow–CBS–See It Now 4/20/52 to 7/5/55*

*Coronation of Queen Elizabeth June 1953*

*Walter Cronkite–CBS Evening News 1962 to 1980*

*John Kennedy Assassination 11/22/63*

*Lee Harvey Oswald Killed on Nati wide TV 11/24/63*

*Watergate 5/17/73 to 8/8/74 (Nixon Resigns)*

*Iran 11/4/79 to 1/20/81*

*Space Shuttle on a Model 6142 Conrac Monitor*

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ers come in two models, the 220 audio, and 250 video DA. The **Model 260** AFV mechanical routing switcher was also shown, providing passive switching of both video and up to two associated audio signals from 12 inputs to one output. The new **Model 336** is an all-silicon solid-state video DA for multiple fan-out, high grade distribution, fitting into a 19-inch rack.

**Graham-Patten Systems,** a company who started doing large-scale custom work for the networks, now offers several different models of **distribution amplifiers.** One of the foremost in the line is the Model 1201, with ac or dc coupling and automatic output dc null. Model 1202, also a 1x6 unit, offers differential input, switchable clamping, and optional cable equalization.

## AUTOMATION

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Lake Systems La-Kart . . . . . 444
Grumman Aerospace Starcomm studio control system . . . . . 445
Auburn Instruments MC/1 machine control . . . . . 446


The hardware and software to accomplish the real automation needs of television stations may have finally come together. That was clearly demonstrated at NAB and the crowds in the suppliers' booths indicated that broadcasters have recognized the impact of computers on the bottom line.

The newsroom has been a recent focus for automation with mixed results. Having learned from previous mistakes, companies at NAB were offering refined newsroom systems. **Data Communications Corporation,** which pioneered station automation with its BIAS programs, announced the **DCC Newsroom Management System.** The system functions as a news videotape morgue, slide/tape cross reference, contact directory, and clip file index. It also maintains a future/features file for easy access of planned activities.

Another newsroom program, **Newscan** by **McInnis-Skinner & Associates,** covers library/archive and search/retrieval tasks for story preparation. It also handles assignment scheduling, script preparation, and newscast rundown procedures. With the use of portable terminals, reporters on assignment out of town and remote bureaus can prepare and "file" copy by telephone lines.

**Basys** has a group of newsroom computer systems. Demonstrated at NAB were **News Fury,** the top-of-the-line product for daily news production; **Clip Fury,** an archival file system; **Mini Fury** and **Wire Fury,** a low-cost entry-level system; and **Cart Fury,** an automatic audio cart label printer for radio.

**Telesource,** which made its reputation controlling character generators, was another with a **newsroom management system.** Its software covers assignments, show formatting, scripting, tape indexing, and library.

**Jefferson Data Systems,** which is one of the broadcasting-based companies involved in marketing station automation, released a newsroom program at NAB as well. **News Inventory** is a library system for cataloging videotape. Material is indexed by date,


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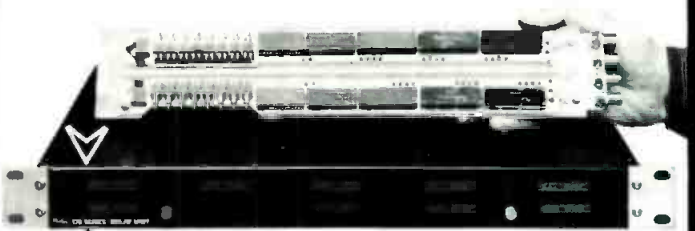

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show code, reporter, photographer, story category, newsmaker, comments, and any user-specified key words.

Another broadcaster-based computer systems company, **Cox Data Services,** came to NAB with **The One System** for station management. Using an IBM Series/1 computer with Cox programs, the One System covers traffic control, marketing information, accounting, and related activities.

Acknowledged as the **business systems** firm with the largest customer base, **Columbine Systems** also supports having a dedicated computer rather than time-sharing. On-site equipment offers the station convenience, reliability and control, according to Columbine, because the hardware is not connected to other systems through communications lines.

On the machine control side of the automation coin, **Vital Industries** made a major new addition to its **SAM** station automation system with **SANDI,** SANDI is actually a set of input/output devices which allow the user to program SAM in various ways—including an audio/video routing switcher, data communications, time code addressing, machine control, and so forth.

The **Lake Systems** booth was crowded with those wanting to get a look at **La-Kart,** Lake's automation system based not on quad carts but on Type C VTRs and/or ¾- and half-inch videocassettes. Up to 30 machines can be programmed on a 24-hour basis, with frame-accurate cuts.

**Grumman Aerospace Corporation** has entered the studio machine control market. At the show the company described **Starcomm,** a modular system for controlling all connected audio and video machines. It consists of six software modules.

In contrast to the Grumman system, the **Auburn Instruments MC/1** is simplicity itself. Designed for remote control of VTRs, film chains, and other equipment, the MC/1 operates over a two-wire connection without the need of a central computer.

## TELECINES AND FILM

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Large-scale, state-of-the-art telecines at NAB all showed important improvements and new features this year, although the basic machines remained the same. Color correction was an important element for some, and **Rank Cintel** had an extensive demonstration of its new **Amigo** scene-by-scene telecine programmer, seen in this country for the first time (the company had literature on Amigo at November's SMPTE show). The system consists of a 19-inch rack of electronics and a VDU control unit, located in the upper part of the Rank Cintel control console. Using the MK III's still frame capability, the operator adjusts color balance and other parameters on a scene-by-scene basis (Amigo will also do frame-by-frame color correction) and presses the "enter data" button. A scratch pad mode can store up to seven color balance settings for future recall.

Color correction was also among the new facilities of **Marconi's B3410** all-digital telecine, shown at the A.F. Associates booth. In addition to the Marconi Prefix scene-by-scene color corrector—which can do still frame correction, but at a slow frame

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rate—a telecine was shown tied to the Dubner color correction system, allowing full still frame functioning. Another new feature for the B3410 is Light Bias, which digs additional information out of black areas of the film.

The latest option for the **Bosch FDL-60-B2** CCD telecine is a digital grain reducer, FD5GR. Its all-digital signal processing reduces film grain and noise; it also includes automatic S/N optimization and automatic adjustment for varying film speed. It will be available this year for $25,000. The telecine now has the facility to scan nonanomorphic widescreen films and has notched film blocks for notched negatives, along with an improved film guidance system. A new film time counter automatically corrects for the film/video frame conversion.

At the L-W International booth, the two latest **Athena** telecine projectors were on display. The **4500**, seen in prototype last year, has been deliverable since last November, according to L-W's Walt Peterson, and has elicited very good response so far. It is priced at under $10,000. Its big sister, the **6000**, lists for $21,000 and is capable of handling up to 5000 feet of film (compared to the 4500's 50- to 2000-foot capacity).

At **Magnasync/Moviola,** the new **Videola V-400** Compact made its first NAB appearance. Directed particularly at broadcasters, this 16 mm telecine is designed to replace projector-type film chains and is moderately priced. The company says the V-400 offers all the features of its established V-1000, including the Flickerless Prism optical system.

**Steenbeck,** the well-known manufacturer of film editing tables, brought a new 16 mm film-to-video scanner, a small system designated **ST 1 B.** The machine features a microprocessor-controlled stop drive motor, easy handling and film threading, flexible synchronization and interlock features, variable speed, and optional remote control.

New from **Multi-Track Magnetics** was the Model 108/DCS ultra-high-speed **recorder/reproducer,** which has microprocessor electronics and is capable of speeds up to 30 times normal. A special feature is an RS232 communications bus, which allows home computers and data terminals to talk to the machine.

RCA had its full telecine line on display, with two telecine cameras in different configurations, one for broadcasting and one for teleproduction.

Nytone brought its line of flying spot scanners for slide-to-video reproduction. The three models—TSC-1, TSC-2, and TSC-3—range in price from $5500 to $9500 and have 80-slide capacity.

Visitors to the BTX booth got to see Magna-Tech Electronics' electronic interlock magnetic film recorders and reproducers, which offer interlock to videotape with SMPTE/EBU time code counter and synchronizer.

**Corporate Communications Consultants** demonstrated several new wrinkles in its telecine **color correction systems.** A new feature of both the 60XL B2 (for CCD scanners) and the XLII (for flying spot scanners) is ABC, or acquisition of balance by computer. According to the company, ABC can halve color correction time for a feature film.

**For-A** brought a low-cost color corrector designed not for telecines, but for VTR editing systems and ENG/EFP applications. Model **CCS-4200**—priced at $4500 and available from stock—permits color adjustments in two modes.

The established color correction system of Dubner Computer Systems—with over 50 units in service around the world, the company boasts—was again on display at NAB. This computerized, scene-by-scene color corrector will work with any telecine or film chain and also performs tape-to-tape color corrections.

**Eastman Kodak** had a dual focus for its NAB exhibit: the use of film in HDTV and its **Datakode** magnetic coating for film, first seen at November's SMPTE show. To promote Datakode, which Kodak feels may revolutionize film editing, the company had Cinema Products and Panavision film cameras with writing heads installed to generate time code on the film. In its HDTV promotion, Kodak claimed a resolution of 1400 lines—perhaps up to 2000 lines—for film.

At the RTI booth, products for film cleaning and inspection continued to abound. The company's **Data-Film 820** low-cost, computerized information reporting system for film inspection, editing, and programming has been redesigned with a new printer and new displays.

Sharing the RTI booth was **Lipsner-Smith,** with two new ultrasound film cleaning machines, Models **CF100** and **CF190.**

## TEST/MEASUREMENT

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Where analog meets digital and vice versa is as prevalent in test and measurement equipment as it is in other components of the television station and facility. Essentially, the T&M gear at NAB reflected the problems that engineering departments face in maintaining today's analog-cum-digital plants.

For the **Tektronix 1980 Answer** automatic video measurement set it was another year, another option. The new Option 04 software, when installed in the base system, provides the capability of automatically monitoring a baseband video signal for the standard FCC, NTC-7, and RS-170A.

Videotek test gear.

**Thomson-CSF** unveiled a new computer-aided television measurement system, called **Thomcat,** that promises automatic signal monitoring at an affordable cost. Running off an Apple II computer, the system's software package drives two modules—a programmable digital generator and a signal transfer unit.

The modular **Lenco 300-312T** video test set is designed so that each test signal generator can be mounted in any frame position in



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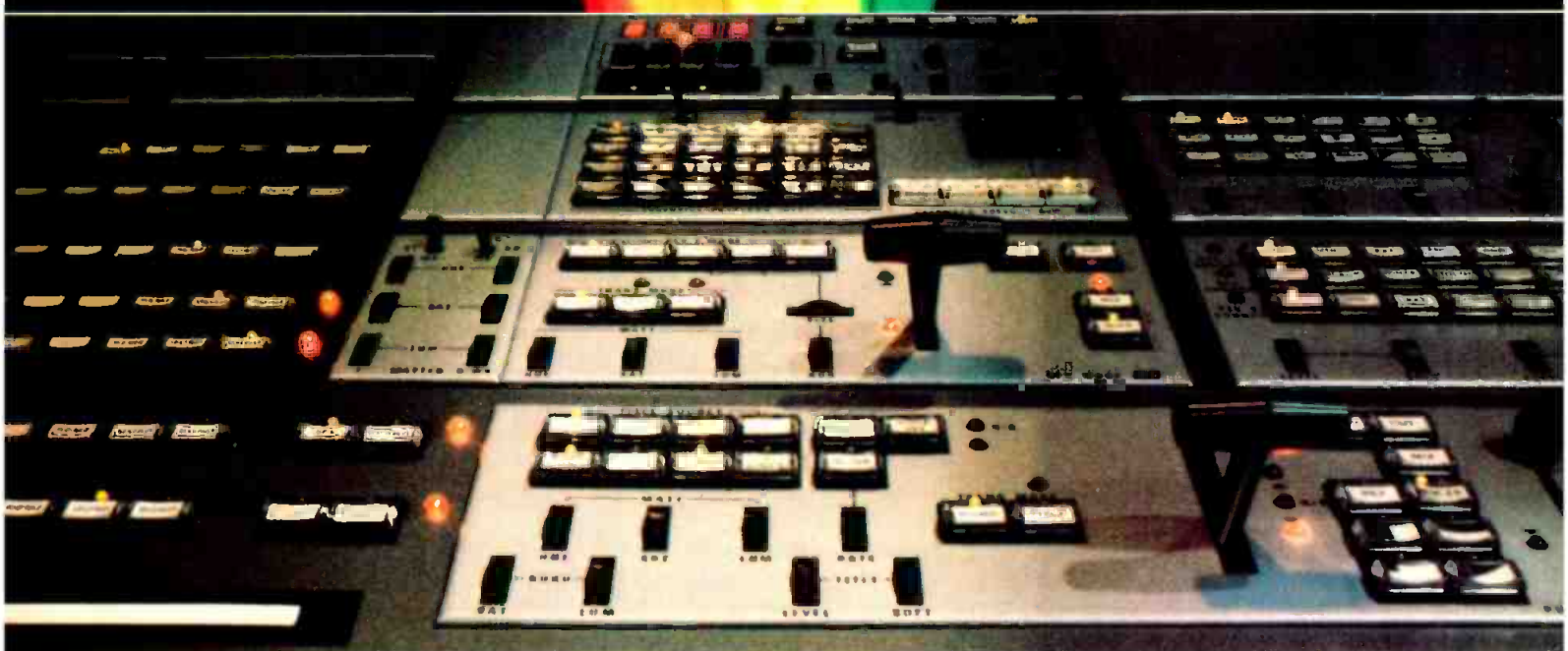

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Waveform monitors and vectorscopes are regulars at NAB. Among those on hand this year were: **Hitachi's** new **V-089** vectorscope which mounts side by side with the new **V-099** waveform monitor; **Videotek's TSM-5A** waveform monitor and **VSM-5A** vectorscope designed to mount separately or as a unit on a 19-inch rack; and **Leader Instruments' LVS-5850** vectorscope and **LBO-5860** waveform monitor are designed to mount with the **LCG-400** NTSC pattern generator.

This year **Rohde & Schwarz** came to the show with a number of new instruments. Hot off the line was the **UPSF 2** video noise meter, a microprocessor-controlled unit that operates in the 400 Hz to 10 MHz range. Also unveiled were the **LFM 2** group delay measuring set; the **DZF** TV data distortion meter for measuring the eye height of videotext signals, and the **MUF 2** TV transcope.

At **Minolta's** busy booth one of the attractions was an easy-to-use TV **color analyzer** for broadcast monitors. The unit has three three-digit displays, but to simplify monitor adjustments, deviation from white-standard/reference color values appears on three 10-LED arrays. Price is $3500.

**Porta-Pattern** demonstrated that it is ready to follow ENG/EFP crews out into the rain with a small portable waterproof test chart. It was part of a range of introductions designed to solve problems of camera alignment in uncommon shooting environments. The **All-Weather Chart** consists of back-up registration and window charts in a sealed, optically transparent case.

New in the **Leitch** booth were the **SCH-731N** NTSC sync/subcarrier phase monitor ($1590) for measurement, adjustment and continuous monitoring of the sch relationship in an NTSC encoded composite video signal and the PAL version, SCH-711P ($1690).

NTI returned to NAB with its digital color signal generator, this time accompanied by the new **DSS-11** still store to grab a frame of live video so it can be incorporated in the test signal and subsequently analyzed.

Among the new products introduced by **QSI Systems** was the Series **9000V** live video identifier and source identified color bar generators. In the color bar mode, the series allows the user to test audio and video links, and the split field ID indicates location of source. Also new at the QSI booth was the Demod 105, an off-air **demodulator.**

In addition to color monitors, Amtron showed its AG 341 safe title/safe area generator with pulse-cross, micro-rule, and blanking verifier.

Tentel Corp. had its Tentelometer tape tension gauges for VTRs, this year adding a head protrusion gauge for VHS, Beta, and U-Matic recorders.

Other instruments included the **Tektronix 1910** digital test signal generator and VITS inserter. **Television Equipment Associates** had its CRT **color monitor comparator** D6500$^{oK}$ Model MK II. In the same booth was the VG Electronics zone place generator type VGE 1032 which enables simultaneous test of frequency response in the horizontal, vertical, and temporal dimensions.

**Potomac Instruments** showed the **FIM 72** UHF field strength meter, a portable unit with a calibrated half-wave dipole antenna and a tuned voltmeter with a range of 140 dB. In Asaca's extensive line were the CB53AI TV test signal generator ($3200), TSA-7 video signal analyzer ($22,500), and 1101A1102A VTR autocheck system for both half- and ¾-inch tape ($117,000).

**Philips** came to the show with some new instruments. These included two new TV **modulators,** PM5670 and PM5671. The 5670 is the IF version, either composite or separate vision/sound output. The 5671 is the RF version. Prices are $6105 and $7115, respectively.

**McMichael** featured an **electronic clock in analog format with logo generator** for video display.

**Beaveronics** has expanded its production switcher line and is now the exclusive U.S. distributor for **Favag clocks** and timers.

## MONITORS

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Barco CM 22, CTVM3 . . . . . 465
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Like new automobiles, TV monitors appear every year in a multitude of models in an effort to satisfy and capture every segment of the market.

This year attendees looking for the **Barco Industries** monitors found the entire line at the Elector booth, since the Belgian company has split with Rohde & Schwarz. Heading the list was the **CM 22** NTSC, nine-inch, high-resolution model, an RGB, pulse cross, underscan monitor intended for both editing suites and ENG vehicles.

For master control color monitors, **Barco** introduced the **CTVM 3,** an RGB series available in either delta gun shadow mask or an in-line slot mask CRT. There are three versions—full-featured, slightly less-featured, and stripped-down.

**Conrac** also had a new master studio monitor, **Model 6200.** It features switchable comb filter chroma separator, pulse cross display and beam current feedback for color temperature stability.

A new nine-inch high-resolution color monitor, **Model TM9-9RH,** was introduced by **Ikegami.** It has 600 TV line resolution and in-line gun, self-converging shadow-mask picture tubes with American Standard Matched Phosphors.

Among the high-end, high-resolution monitors was the **Tektronix 690SR.** It has a delta gun shadowmask CRT and wide-range scan circuits.

**Sony** uncorked its full line of **monitors,** ranging from a 3.7-inch portable to a 72-inch projection system.

**Panasonic** came out with a wide range of monitors decked out to look less like consumer up-grades and more like studio equipment. New this year are the **BT-S700N** seven-inch portable, the BT-S701N desk-top version, and the BT-S702N dual-unit set of color monitors mounted on a rack.

For ENG/EFP uses, **Panasonic** brought out the **CT-300VT** 2.6-inch screen monitor. It has a built-in VHF/UHF quartz synthesizer tuner and weighs 3 5/16 pounds.

With the **TM-R9U, JVC** introduced its first mid-resolution studio monitor. Designed primarily for editing, the nine-inch monitor has underscan and internal/external sync locks, plus built-in comb filter.

**Asaca/Shibasoku** added four new color monitors—the **CMM20-11** 20-inch screen delta gun shadow mask CRT ($6995); **CMM14-11** 14-inch screen delta gun shadow mask CRT ($6800); **CMM20-7** 20-inch dot matrix in-line gun CRT ($4950); and **CMM14-7** 14-inch dot matrix in-line gun CRT ($4750).

Featured in the **Videotek** booth was a range of color monitors including a rack-mount **VM Series** in six screen sizes. Also shown was the **Studio 12A,** a 12-inch RGB/NTSC unit.

Other new monitors on view included the **Philips LDH 6200** that featured front panel pulse cross, horizontal split screen and underscan/overscan selection.

**McMichael's** entry was the 14-inch and 20-inch **MCA** 37/BQ and MCA 51/BQ RGB units with single, double, or triple standard decoders. **Electrohome** came to the show with the **ECM 1301** high-resolution 13-inch RGB monitor aimed at graphic/data display.

Included in **Lenco's** extensive line was the 14-inch RGB Model **PCM-514** Series available with a 0.3 mm or 0.4 mm dot matrix CRT. Lenco also showed a selection of monochrome video monitors, including the **PMM-900** Series ranging from nine-inch to 19-inch models. **Hitachi's** line covered nine-inch, **VM-900,** 12-inch, **VM-129,** and



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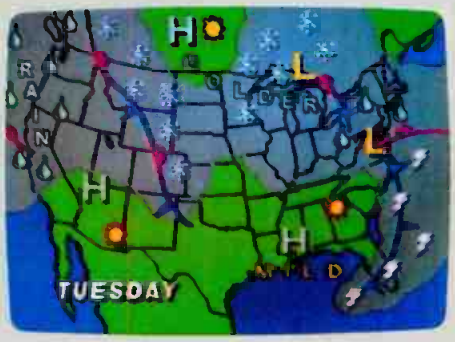


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# VIDEO

17-inch, **VM-173.**

One final product is worthy of mention here—a wide-screen projection system manufactured by Barco and displayed at the **Cinema Products** booth. The **Star-conference** is intended primarily for teleconference applications at this time, but it may have significance in the future of broadcasting as well.

# LIGHTING

**USE CARO ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


**GE Quartzline lamps** . . . . . 480
**Cinemills Daymax lamps** . . . . . 481
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**Colortran Patchman, Dimension Five** . . . 487
**Skirpan Autocue 80** . . . . . 488
**Kliegl portable dimmers, control panel** . 489
**LTM fiber optics light system** . . . . . 490
**Phoebus Ultra Quartz** . . . . . 491
**Kobold DL PAR lights** . . . . . 492
**BW 500/2000 mini softlight** . . . . . 493
**Great American Market special effects lighting** . . . . . 494


As usual at NAB, this year's show saw at least 20 manufacturers of various kinds of lighting systems vying for broadcasters' attention.

Indicative of this push, for instance, is GE, which has begun a new marketing program for video camera lamps—a whole range of small, Multi-Mirror **Quartzline** bulbs similar to the style used in Carousel projectors.

On the "high tech" bulb end, **Cinemills** drew considerable attention with its line of **Daymax** bulbs, available in either 3200 or 5600 K versions in wattages from 575 all the way up to 6000.

Getting more (light output) for less (temperature) is the eternal theme of lighting for television, and back very strongly in this area is **Cool-Light** with its lighting systems that were originally designed for medical operating room applications; they are, as their name suggests, cool. At both the Alan Gordon and Cool-Light booths, the latest in this technology was displayed: a **nine-light fay,** with three strips of three lights each, each strip individually switched. The other popular fixture is the **Mini-Cool,** designed for camera mounting.

A similar idea was demonstrated by **Perrott**: the **Mighty Lite,** weighing about one pound. The light can be either camera-mounted or hand-held, has virtually no



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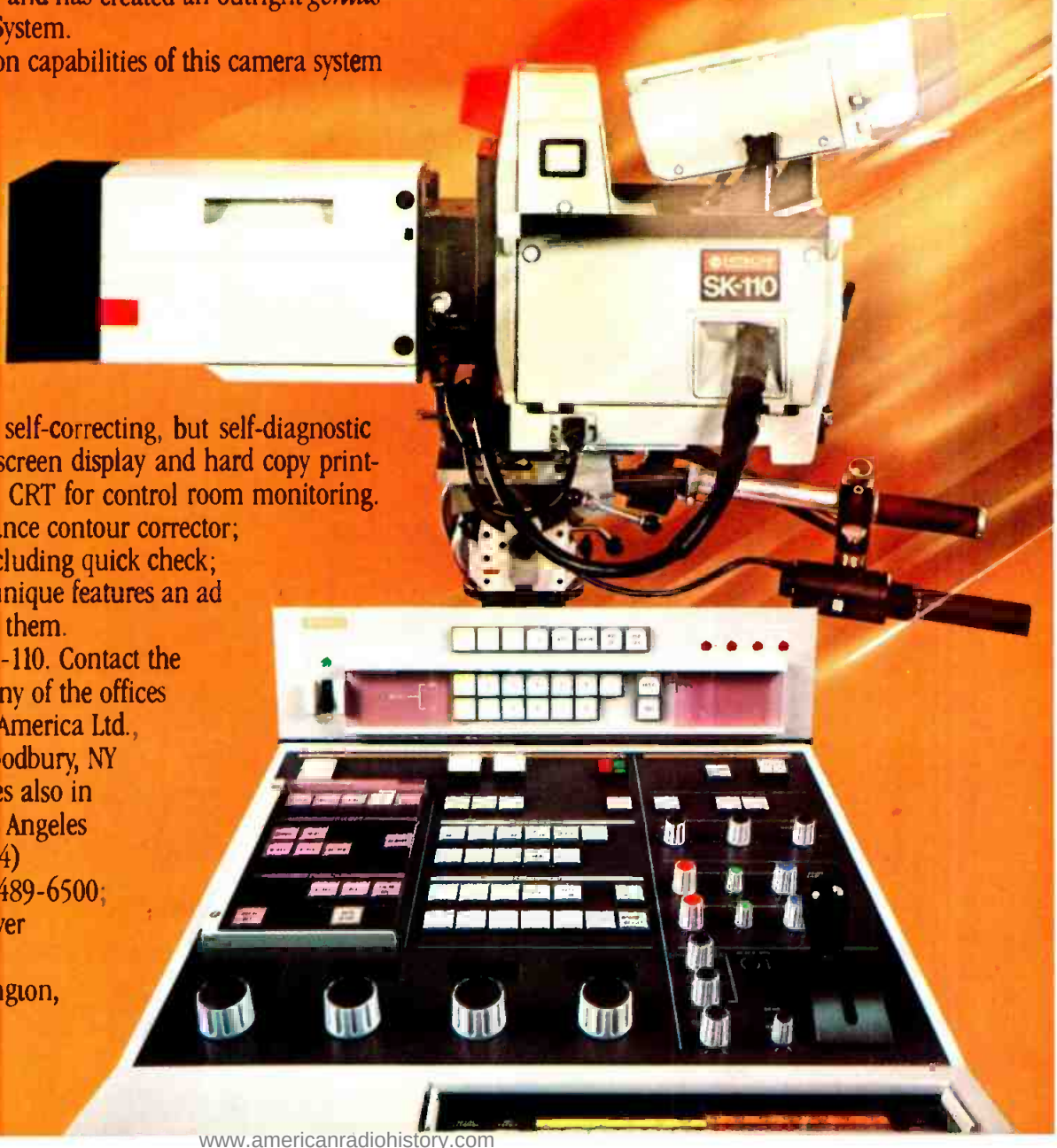


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heat, and runs for about 50 minutes on a 4 amp/hour battery. Price is $195.

Location lighting specialist **Lowel** had a new piece of lighting control equipment designed to work in conjunction with its Omni, D, Soft Light, Tota, and other fixtures. The **Frame-Up** starts out at about the size of a small lighting stand, but expands into a large frame—24x34 inches—into which can be clipped sheets of standard lighting control gels.

**Arriflex**, too, is going after the location lighting business with its line of HMI fixtures. These range all the way from the 200 W Report up through 575, 1200, 2500, and 4000 W fresnels. New this year is a 6 kW fresnel.

**Strand Century**, too, was promoting its complete lines of fixtures of HMI bulbs, the range of wattages again determined by the HMI bulb manufacturer, Osram. Strand Century has also designed a new Mark 2 ballast for these lights.

**Colortran**, too, was showing off the new line of fresnels it unveiled last year—available in 1 kW/6-inch, 2 kW/8-inch and 5 kW/10-inch versions. Colortran also introduced **Patchman**, a new lighting control system designed for location lighting applications.

But the real news at **Colortran**, located in its own special room at the center of the booth, was **Dimension Five**, a top-of-the-line computerized lighting control system. The system is entirely digitally controlled, with control of up to 999 dimmers on 255 control channels.

**Skirpan** used this NAB as an opportunity to prove itself once again a leader in lighting control, having survived a series of corporate difficulties. **Autocue 80** is its new computer-assisted lighting control system, which offers light pen operation.

**Kliegl** had several new products in the lighting control area. One of the most exciting was the SCR **portable digital dimmer pack**, available in 12-, 24-, or 48-channel configurations. Communication back to the control console is via serial data over twisted-pair wiring. Another new product in this line was a new **control panel** for the portable control system—operating up to 1000 dimmers on 12 to 48 channels.

Another interesting lighting product was the **fiber optic system** from **LTM**, which this year featured THYE MSL-250, a handful of extremely tiny fiber optic tubes which deliver approximately 1000 footcandles at eight feet—with absolutely no heat.

**FOR MORE INFORMATION ON ADS APPEARING IN THIS ISSUE, USE READER SERVICE CARD, PAGE 25.**

**Phoebus** demonstrated its **Ultra Quartz** follow-spot. Using Carousel projector-like bulbs, it delivers 53 fc at 100 feet, with a 13.9-inch minimum diameter beam.

**Kobold** featured a new series of **DL** PAR lights in 575, 1200, and twin 1200 W configurations.

**BW** had its full line of lights at the show. It featured its **500/2000 W mini softlight**, which has a rotating reflector that allows bulb replacement without having to reach in behind the fixture.

Finally, **Great American Market** put on an impressive display of its **special effects lighting** products, including Instaset set decorating materials. ColorMax is a relatively new color changing system, controlled by a computer.

## SUPPORT EQUIPMENT

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Arriflex Cinejib crane . . . . . 495
Listec Merlin, Swan head, Autocue 200, Wordbox II . . . . . 496
Q-TV VPS-500 prompter. . . . . 497
Telescript DiGiS prompter . . . . . 498
Matthews Tulip Junior, Sky Cam, Cam-Remote . . . . . 499
VideoTeleCom Barber boom . . . . . 500

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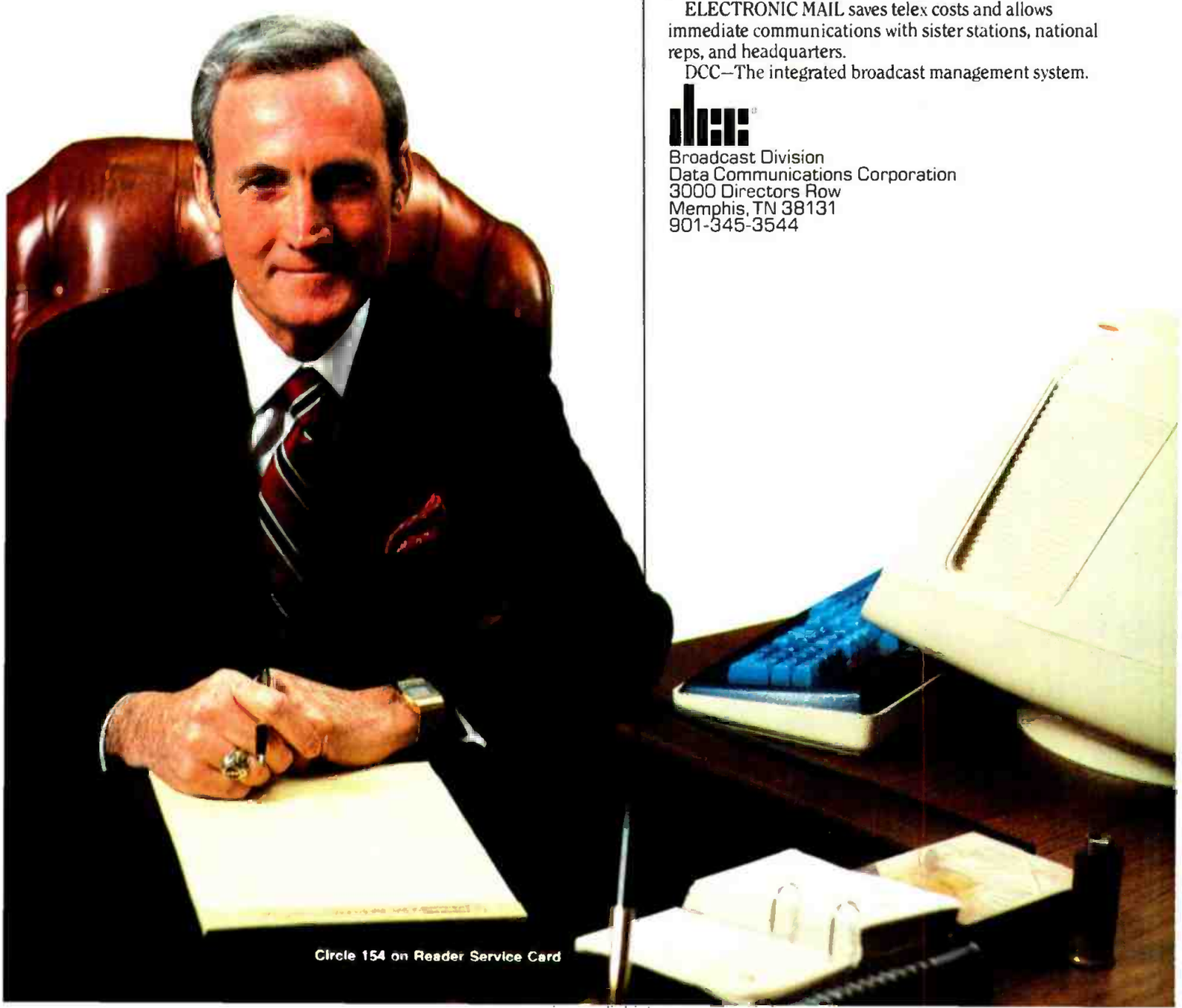

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# VIDEO

The production model of **Cinema Products' Steadicam Universal Model III,** which made its debut as a prototype at SMPTE, was being demonstrated to good response. CP also brought a prototype of a new **mini-Worral** geared cable drive head.

The featured item at the **Innovative Television Equipment** booth was the new **P1** pneumatic studio pedestal, with a camera load capacity of up to 290 pounds and an elevation range from 29.5 to 51 inches. The $8250 unit should be available in 90 days. It was shown with the new **H-100** fluid head.

Alan Gordon returned with the Elemack support line, featuring the Cricket dolly, a high-tech model that won an engineering award last year.

**O'Connor Engineering** introduced a new tripod, **Model 55,** a $125 model with internal spreader and glare-free dark finish. The extruded aluminum legs do not telescope, but function like wooden tripod legs.

A new **micro fluid head, the 3126,** was introduced by **Bogen** for extra-small cameras up to six pounds. Priced at $69.95, the head has full 360-degree pan.

The previously introduced Video 20 fluid head from **Sachtler Corp.** of America has been enhanced with a new adjustable dynamic counterbalance spring.

**QuickSet** enhanced its fluid head line with the new "Super-Hydro" head, which has a removable slide for camera balancing that doubles as a quick release.

O'Connor tripod.

Once again, **Karl Heitz** brought the **Gitzo** line of tripods, heads, and dollies. A new addition is the Model 385 **quick release** for all heads.

**Davis & Sanford** brought what it described as the first genuine, 100 percent **fluid head,** as opposed to a fluid effect head. The new model, FM-25, accommodates cameras up to 25 pounds in weight.

**READER SERVICE CARD, PAGE 25.**

Conrac's monitor display.

## POWER SUPPLIES/CASES

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Portable Energy solar chargers . . . . . 509
Frezzolini batteries and chargers . . . . . 510
Anton/Bauer Lifesaver charger . . . . . 511
Anton/Bauer Pro Pac, ac supplies . . . . . 512
Christie battery updates . . . . . 513
Cine 60 Newspak battery . . . . . 514
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Film/Video Kangaroo cases . . . . . 517
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Winsted modular corner systems . . . . . 524
Omnimount mounting systems . . . . . 525
Jensen JDK-99 tool kit . . . . . 526



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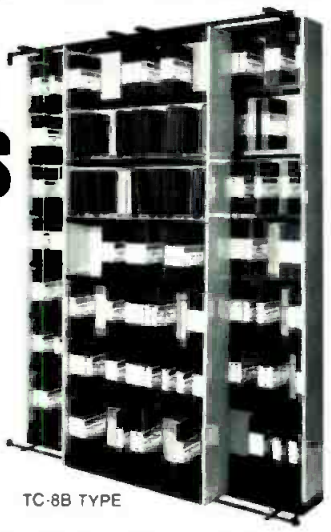

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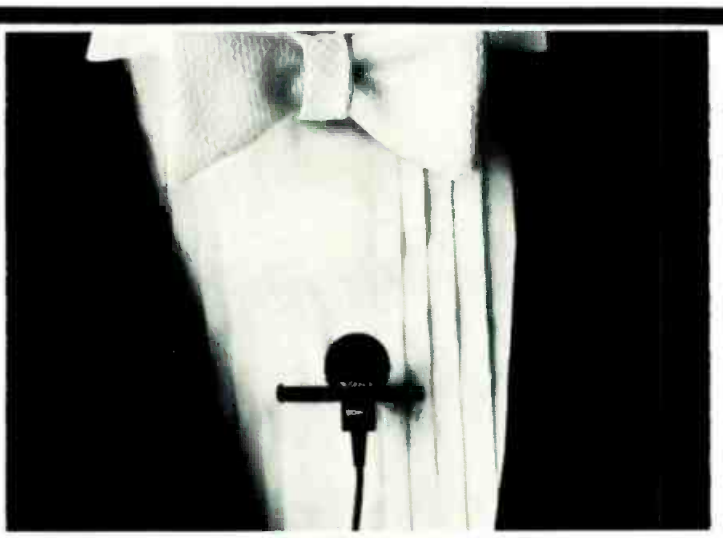

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# VIDEO

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For those who get a charge out of saving energy, **Portable Energy Products** had just the thing in Las Vegas: a line of economical **solar chargers** for on-board battery packs and belts.

Most other battery manufacturers offered more conventional, although no less useful, products. **Frezzolini** brought a raft of new items, including the RPS-2 **power supply** ($795) for simultaneous powering of two 35 W ENG cameras or VTRs or simultaneous fast-charging of two battery packs; the VC-1 **vehicle charger** ($595).

**Anton/Bauer**'s featured new product was the **Lifesaver** fast charger, which allows the user to leave a battery plugged into the charger indefinitely. It offers three charge modes and works with any battery that fits the company's Snap-On bracket. The company also brought a new replacement battery for the Sony BP 90, the **Pro Pac 90.**

**Christie** had several **new features in its battery and charger line.** Its "burping" KS and KR batteries now fit virtually all factory camera battery mounts, and every Christie battery can now be fully charged in 20 minutes on the company's ReFlex-20 burping charger.

The new item at the **Cine 60** booth was a group of on-board nicad **"Newspaks"** with capacities to 8 Ah. These camera batteries feature four separate power cell compartments.

**Perrott Engineering** introduced a new **dual battery belt** that can be used for either cameras or lights, with built-in four-hour fast charger that automatically switches to trickle charge mode.

From **Alexander Manufacturing** came new **replacement plugs** for BP 20A and BP 90 type battery packs, $6 each or $50 for a dozen.

Two companies came to this year's NAB with soft, lighweight cloth cases for cameras and other equipment. The **Film/Video Equipment Service Co.** booth was featuring the **Kangaroo** line of Cordura nylon packs, including the "Semi-Tough" case.

Soft cases were also the featured item at the **K&H Products** booth, where the Porta-Brace **"Quick-Draw"** professional camera case drew excellent response, according to the company.

Added to **Calzone Case Co.**'s line this year were **plastic molded cases** with an interlocking valance, a lightweight, moderately priced line with custom-cut foam.

**William Bal Corp.** brought the **Road Case,** a new addition to its line of molded Aero-Lan polyethlyne cases.

Anvil's exhibit emphasized the company's ability to supply current, up-to-date case designs for all broadcast equipment, including the latest Sony models.

**Fiberbilt** had **new cases for** JVC cameras and VCRs, all made of ABS plastic with recessed locks, continuous piano hinge, and aluminum frame with weathertight rubber gasket.

Thermodyne, famous for its Shok-Stop cases, offered a show special: its tool/attache case at a bargain price of $60.

**Viking Cases** of St. Petersburg, FL, showed a variety of cases, including ATA plywood models and lightweight, heavy-duty molded plastic cases for cameras, VTRs, and rack-mountable equipment.

A sturdy, collapsible (even when loaded) **video equipment carrier** was the featured item at the **Lee-Ray Industries** booth. The company also entered the teleprompter business with a lightweight (20 pounds), easy to read Tele-Scroll.

**Winsted**, well known for its consoles for VTRs, editors and other equipment, had new wrap-around **modular video systems** for corner installation in several variations.

New from **Omnimount** was the **Cable/Mount system,** designed to hang equipment from a wall. Wall mountings are connected by special nylon-coated aircraft cable which is adjustable in length.

**Jensen Tools** offered a variety of tool kits. New was the **JDK-99**, a large, molded polyethelyne tool kit with a foam-filled bottom for test equipment.


still
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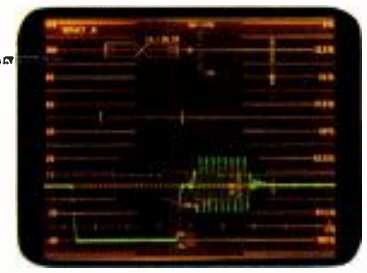

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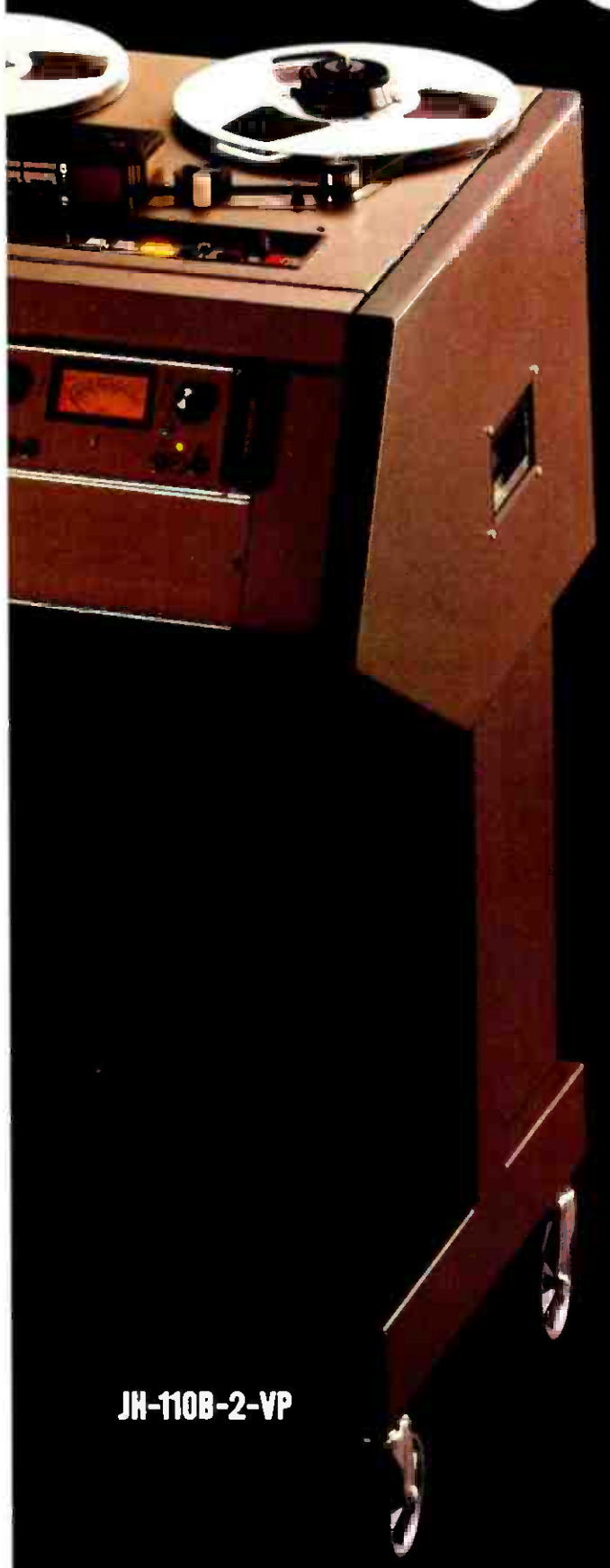


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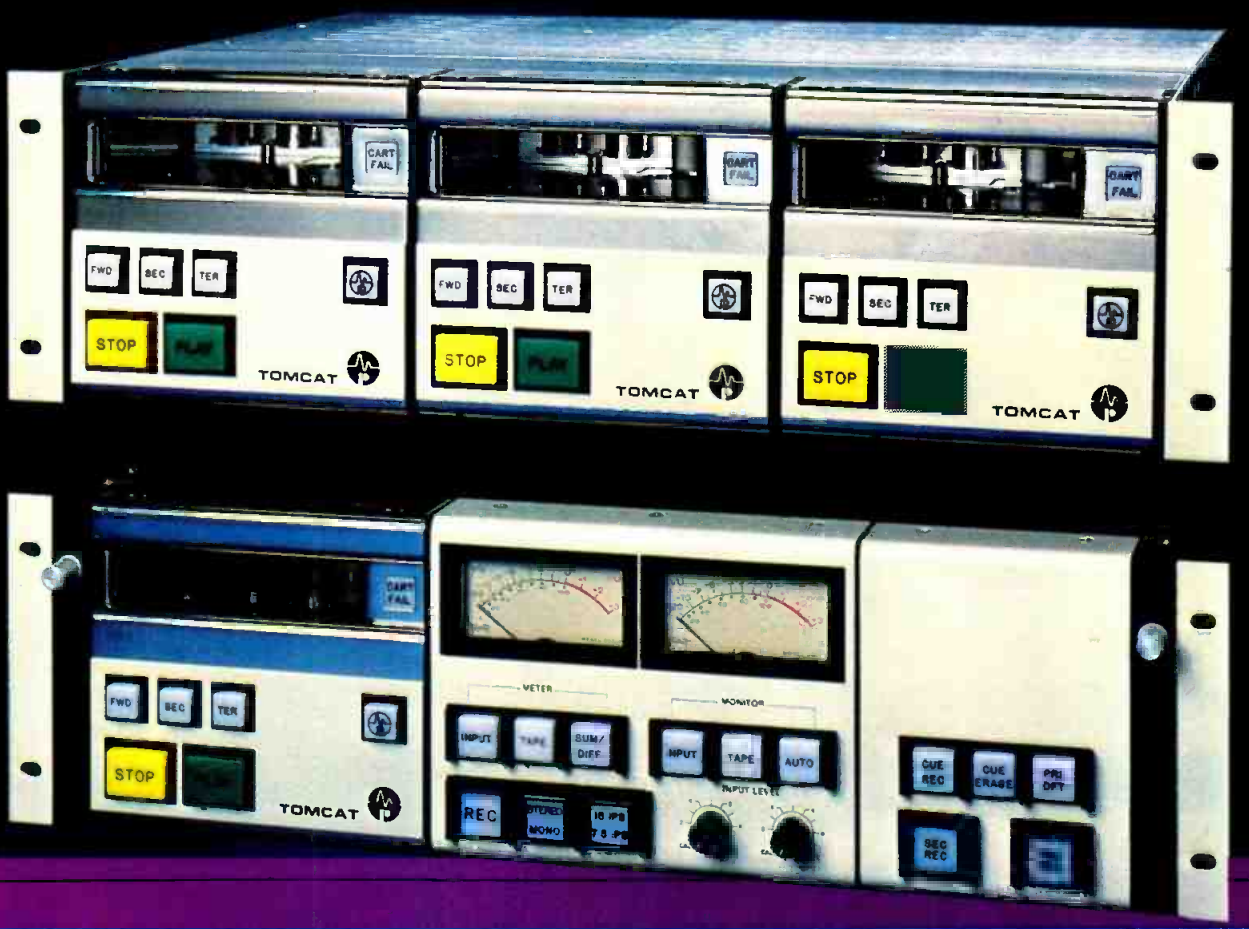


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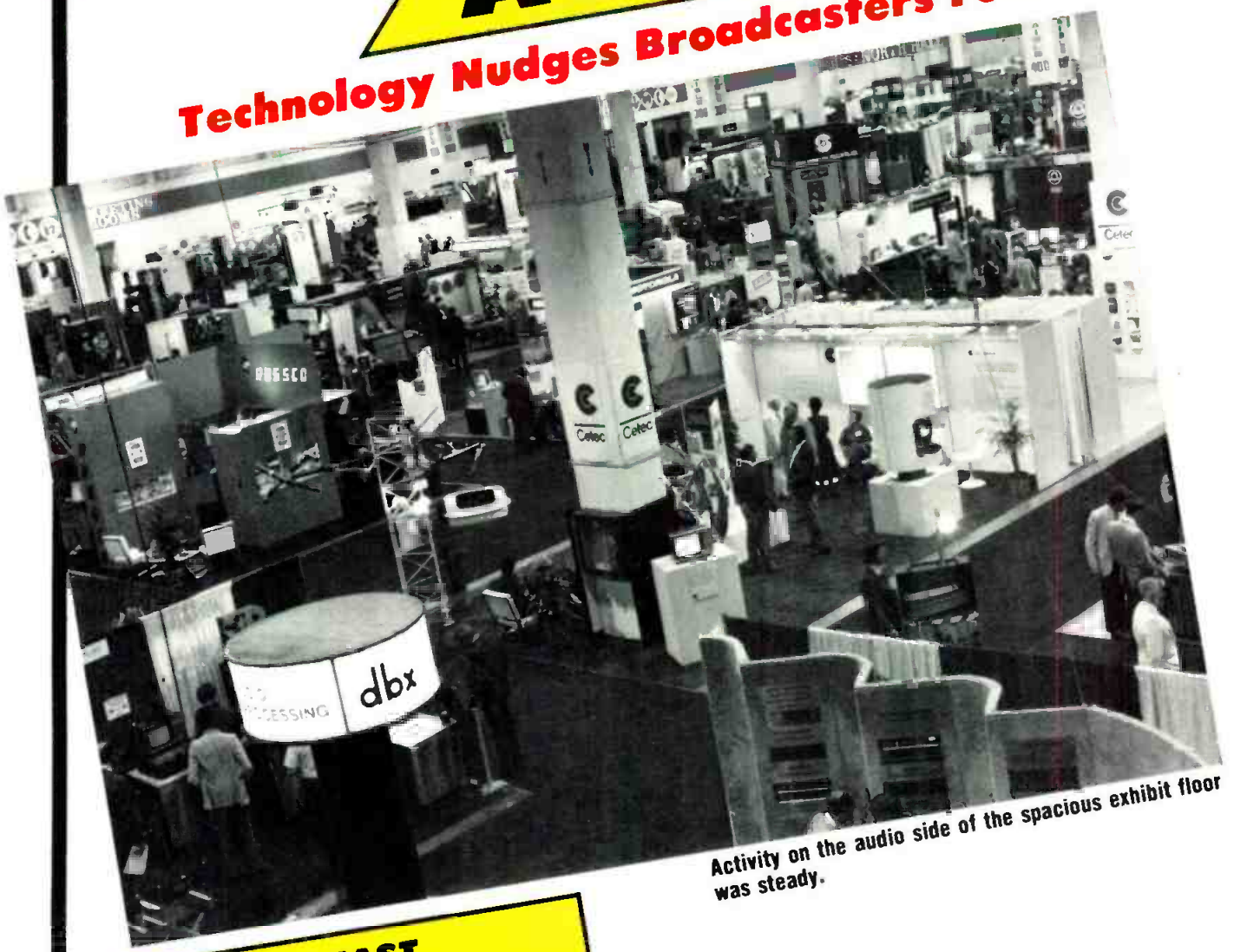
# AUDIO

## Technology Nudges Broadcasters Forward




Activity on the audio side of the spacious exhibit floor was steady.

### FIND IT FAST

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From year to year, technological developments usually come as no surprise to those in the broadcast industry. Such development is not surprising, because it arrives steadily and the broadcaster can see it coming—he only has to wait until it gets closer and comes into focus.

Thus, to no one's surprise, computers (memory storage, digital access, and digital signal manipulation) now exert an increased force on the audio wing of the broadcast business. In consoles, computers have been around for a few years. The difference is that, with improvements in microprocessor design, audio production people can now get more than simple storage of a previous mix or more than straight automation. Computers presented at this year's show actually ran the boards, according to specific programs designed to meet broadcast production and post-production needs. Input sources, signal routing destinations, EQ settings, and more can now be pro-



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**The Micro Amp series was highlighted by ATI.**

**Pacific Recorders had complete studio console systems.**

grammed into integral or outboard computers. The push is on.

Nor are these advances limited to the mixing boards. Special effects units and signal processors are showing advances reflecting industry needs. Offering the engineer more control over the processing function is an important step. The use of computers as reverb and special effects devices is now more common, with those little black, rack-mounted boxes being nothing more, or less, than computers dedicated to processing audio information.

Audio production equipment has shown significant advancement as well. Turntables have become better, microphones more versatile and smaller in size as well as higher in quality. Intercoms operate through microprocessor-controlled base stations. Even audio DAS this year demonstrated how they fit into the programmable domain of computers. And, of course, it is well understood that automation systems, by definition, are advanced computers helping some broadcasters march steadily into the future of the industry.

Then there are the ATRS and cart machines. By no means were these items left behind in the advance of product innovations. Almost all major recorder manufacturers offer some sort of microprocessor control, including memory for bias adjust and other settings. There were digital audio recorders present at the NAB, as well as the welcome addition of new digital processors for recording audio onto videotape.



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**Valley People displayed the Dynamite processor.**

**Harris displayed its brand-new Medalist.**

**Neve 51 Series of teleproduction mixers.**

Does all this mean that there will be a revolutionary shake-up this year, suddenly bringing to fruition the all-digital broadcast plant? Unlikely, but that may be what you see in the distance, that far-off speck on the horizon.

More digital control was not the only occurence in Las Vegas. For example, ATRS offered SMPTE reading and recording in abundance in 1983: a significant move toward higher audio standards for video. Some of the input from the people in the industry, from those who work with the problems and pleasures of the business every day, did not go unheeded. Manufacturers listened to the broadcasters, nowhere more evident than with new cart machines. Involving everything from more compact size (while still retaining the quality) to completely redefining a product line, this sector of the business showed its efforts in advancing technology. Retrofit enhancements for several machines were present, echoing the desire of many for improved audio.

In conjunction with this, the noise reduction department demonstrated that it was not content to stand still, offering improved modules over last year, with the promise of more to come.


isi

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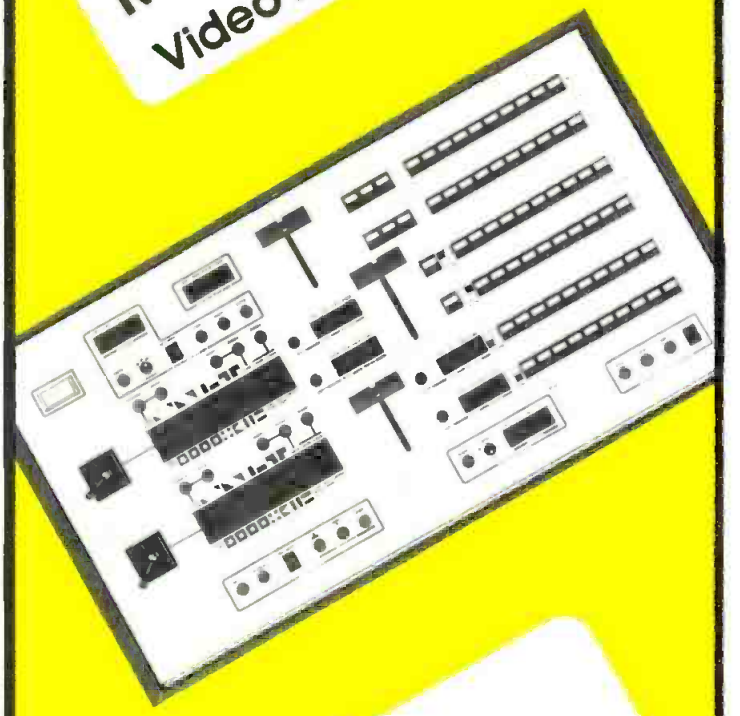

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## CONSOLES

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New companies, new models, and many new options proliferated at the 1983 NAB in the audio console arena. Some of the established companies chose to rely on their existing, quality lines, while others ventured forth with some eye-opening innovations in computer-assisted operation. Still other manufacturers improved the offerings in the ever-increasing audio/video production and post-production console category. As always, the reliable on-air consoles drew attention from attendees.

**Solid State Logic,** with its well-established place in computer-controlled consoles for audio production and video post-production, returned to the show this year with the SL 4000 E and also revealed the **6000 E** stereo video system. The 4000 E, including the on-board studio computer, goes beyond simple mixdown memory and allows computer management of audio controls throughout the production process. The 6000 E is designed for handling the stereo audio needs in video from ENG post-production to live broadcasts.

In another leap forward for audio in the video department, ADM introduced the **9000 Series** teleproduction console, with advances in audio processing and microprocessor control. The board is designed for stereo operation, including EQ. Input preselection is via an integral audio routing switcher (capable of 64 mono or 32 stereo inputs), permitting random assignment of line level sources. Alphanumeric readouts display source selection, while storage and retrieval of line and mic assignments are preserved in nonvolatile memory. The 9000 is also SMPTE bus-compatible.

Mic inputs are located on the left side of the console, and the line channels on the right, with the central keypad controller located in the middle. The system can store up to 99 setups, with 128 separate mic sources selectable from the 16 stereo inputs. ADM says the production console will be available in the fall of 1983. Versions of the company's 1600 Series II and 3283 Series II production consoles with variable inputs were also displayed.

**Auditronics** also had an impact on broadcasters interested in audio for video with its new **300 Series** production consoles. The production mixers will be available in the fall of 1983 in standard mainframe configurations of up to 32 inputs, and with two, four, or eight channel outputs. The company is targeting these consoles for the video production houses and TV stations doing audio sweetening or high-quality audio production. To this end, the 300 includes mono and/or stereo inputs, each available with or without EQ, audio-follow-video, and mix-minus capability. Complete effects, foldback, cue and monitoring, and VCA level control are standard.

Further TV sound interests were served by the presence of the **Neve Necam II** computer editing and automation system, which can store and recall up to 999 mixes with 999 programmable events and automated fader movements. Regarding the actual consoles themselves, Neve showed the new 8128 recording and mixdown console and, for TV production, the 5106. The 51 Series features 24, 36, or 48 inputs on an expandable frame, stereo and mono operation, direct output from each channel, and eight auxiliary sends.

**Studer** commanded attention from broadcasters interested in both radio and television production and post-production with its larger **900 Series** consoles. The series is based on custom engineering, including stereo mic and line balanced inputs, monitor mix modules, and options on transformer or transformerless inputs. All models have two basic input modules and include built-in pink noise and white noise. The first input modules has four-band EQ and the second is a three-band version, both with options for VU/PPM or the option of bargraph metering, and stereo equalization is available. VCA faders are automation ready, and the series of mixers provides auxiliary outputs, studio monitoring, and talkback.

**Ward-Beck** displayed one of its trend-setting television production consoles, the **L 2042A,** intended for the medium- to large-sized TV station control room requiring central coordination of all of its programming, and to handle news and program continuity. A special board at the exhibit was the 820651 custom console designed especially for ABC use at the Olympics in Serajevo and Los Angeles. The console on display had 48 inputs and an array of auxiliary outputs.

Additional **video production consoles** could be seen at the **Yamaha** booth, including the M 1516, 1524, and 1532 modular boards, with the 1532 slated for action in the mobile facilities department. The PM 2000 mixing console was displayed with various modules.

Another company with a major commitment to audio-for-TV was **Harrison.** The various modules incorporated into the **TV-3** and **TV-4** were on hand, the TV-3 being offered with any number of inputs, often with 24-track capability and subgrouping. The TV-4 television production console sells standard for $29,900 but is available with a VSI module as an option. Two new consoles from this company were the **AIR-7** for AM and FM radio stations, and the ES-7 edit suite console with AFV interface. The AIR-7 comes with VCA circuits for level control and muting, hall-effect main logic switches, two inputs per mono or stereo module, or eight stereo inputs to a remote line input module. The **ES-7,** designed for editing high-quality audio program material with video images, has AFV interfaces available for CMX, Grass Valley, Sony, and other video products.

For the first time, **Ramsa** entered the audio-for-video field with the introduction of the **WR8616** mixer with balanced input and output, start/stop remote for carts and eight-track reels, and modular construction. The console was designed for post-production video and recording use and features a three-band sweepable EQ.

**Hallikainen & Friends** displayed its **TVA Series** of audio systems, including an expandable audio mixer designed to be controlled by a video switcher.

**Datatronix** demonstrated the **API Gold**

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Series mixers with 40 inputs using gold connectors to avoid noisy contacts. The boards are specifically designed for large and complex TV post-productions with inputs expandable to 64 and outputs normally 24, expandable to 32.

MCI/Sony, well-known for the use of the JH-636 multitrack console in video production and post-production, nevertheless had perhaps the most unique equipment application exhibit geared toward the radio broadcaster. At the MCI booth a new company called Modular Perfections built an actual radio studio in which demonstrations were given of how multitrack production techniques can turn the radio station's production studio into a profit center. The studio is a duplicate of the one built at WAXY-FM in Orlando, FL, incorporating a **600 Series** MCI 18-channel board, one-inch eight-track, and quarter-inch two-channel MCI reel-to-reels. A commercial was actually made and later modified with multitrack techniques right on the site, using the 600's capability of assigning each channel of the console to any track on the reels. MCI was offering the equipment, production studio, and the modular studio assembly as a complete service to radio stations and teleproduction studios interested in audio. At the Sony booth, the compact, new MCI JH-800 console was presented with 12 inputs and four VCA groups.

**Trident** offered the **Series 70** consoles with 28 inputs, studio playback, echo return, and eight-group output. Along with the existing line of Trimix boards, the company showed the VFM consoles for custom applications, offering a variety of features and modules.

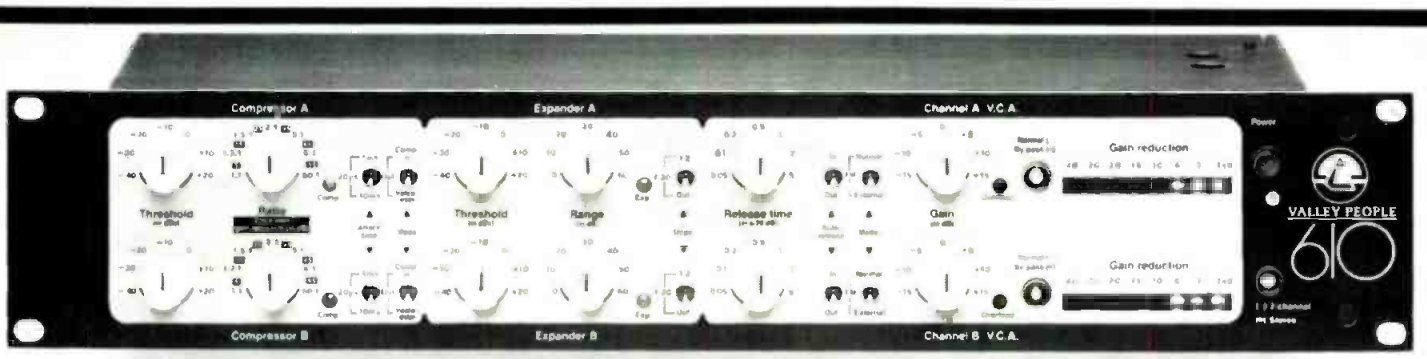
As an addition to its digitally controlled console previously introduced at the NAB, **Harris** unveiled the **Walkaway** option for its radio console, the **Micro Mac**. The option is a module containing a keypad for entry of two modes of operation: semi-automatic live assist, and fully unattended operation for up to 99 events. With the latter, the DJ can be free from the board for up to six hours; with live assist, the DJ receives help from the console during busy periods at the top of the hour.

The console can hook to a printer compatible with RS-232 ports for logging of the functions of up to 16 channels. The option also has an override for complete manual operation. Also of interest to the radio broadcaster from **Harris** was the new **Medalist**, with three inputs on each channel, mono sum output, remote stop/start switches, and a choice of P&G linear or rotary faders. The standard board is all solid-state and totally transformerless and, depending on faders, sells for $5500 to $6250.

**McCurdy** centered its console display around several radio studio configurations of ITC carts, McCurdy phone hybrids, and the company's many radio consoles. Continuing its tradition, McCurdy is moving further into console customizing as in the **SS8720,** eight-track TV production board, and the **SS8816** on-air or radio production board. All of the consoles come with standard linear faders and a wide range of custom options which can be set up for the user's needs.

**Pacific Recorders** displayed the versatility of its **BMX** variable-input mainframe console line by designing the exhibit into a great many studio setups for everything from on-air to news to talk studio systems. The BMX-14 was the heart of the on-air news system, while the BMX-22 was displayed in the larger radio studio configuration. In a new Talk Studio system from Pacific Recorders, the BMX-26 served as the core of the studio as designed for KSL in Salt Lake, incorporating the CMOS remote-control and mix-minus bus capabilities so important for a talk station console.

**Tascam** featured the **M16** and **M50** mixing consoles. The M16 is the top of the line designed for music recording and mixing with monitoring capability for the control room and studio. The M50 is a professional audio production board suitable for remixing to stereo or mono, for overdubbing, or to record the basic tracks.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movies have gotten longer,
cars have gotten shorter,
film has gotten faster,
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And it's physically better because it's smaller. The whole unit is only one-third rack width (5⅝"). The enclosure is made of ¼-inch milled or cast aluminum, for stability. And the panel inserts are made of Lexan®.

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Attendees looking for a new stereo on-air console were able to find it from an unlikely source. Previously known as a high-quality recording studio and video production mixer company, **Soundcraft Electronics** introduced the **SAC-1,** incorporating talkback modules, up to six cart remote switching modules, news, phone, and tape control modules as well.

Showing the entire line of rotary mixers, **Broadcast Electronics** appealed to almost all radio on-air needs. Stereo and mono models of the 10-mixer console featuring FET bus selection with 20 inputs were featured with plug-in modular electronics. The **150 and 250 Series** were also shown in stereo and mono, from eight-mix down to five-mix boards, with separate monitor, headphone, and cue channels.

On-air radio consoles from the **Citation** and **Signature** Series were exhibited by LPB. The top-of-the-line Citation comes in both rotary and slide fader styles and with variable number of inputs. The Model C-10SL is a 10-mixer dual stereo board with linear faders with optional VU meter and digital clock.

Another new introduction in on-air consoles came from **Broadcast Audio** with the **System R.** It is a stereo broadcast console with Penny & Giles rotary faders and external control module and redundant power supply options.

The featured console at the **Howe Audio** booth was the **7500** stereo mixer with a newly designed Lexan surface, digital logic control, and remote stop/start controls, selling for $9100. A brand-new option is the availability of Daven attenuators.

**Autogram** showed a new **modular on-air console** made to interface with a computer automation system. The console features a maximum of 64 stereo inputs with three stereo bus outputs, one mono program, two cue amplifiers, and two headphone amplifier outputs.

Even though it is revamping most of its entire line of broadcast products with the Primus Series, **Ramko** is offering some products in its console line. Using its old reliable dc control of audio attenuation, the **DC38** consoles feature five-, eight-, and 10-mixer versions with rotary faders, four inputs per mixer, patch panel gain select inputs, built-in talkback, and plug-in electronics.

**Micro-Trak,** which displayed both the **Sport III and IV** for ENG/EFP, also showed its new **Telefile** for radio news telephone, tape, and voice mixing. The plug-in battery offers 20 hours of operation.

Studer brought the 269, a popular unit in location broadcast applications, while Neve offered the newer 542 range with six or eight channels. Ward-Beck's small consoles, the R1000 and R1200, are both radio consoles for stations whose on-air demand doesn't require the company's more complex mixers.

**Audio Developments,** a British company, concentrated its engineering efforts on small mixers with handles, featuring the **ADO 62.** This mixer has eight inputs, two outputs, and an auxiliary out.

Other small mixers included the portable line from **Satt Electronics,** the **Sam 42 and 82.** The 42 is a four-channel mixer with an aluminum case and linear faders. The Sam 82 is an eight-channel unit with two main outputs and two auxiliary outs.

**Broadcast Technology** offered the **MM2121** mix-minus console for $7500. It has 10 inputs, pot controls for gain, solo selection, and an elaborate intercom matrix. Also new from BTI was the PI 2320 program interrupt system operating as a director's communication mixer for field use.

Auditronics displayed its popular on-air boards with the unique EQ cards for each on-air personality. Set up at the show was the Model 212 in an actual studio-style operation.

**Logitek** had a selection of consoles on hand, including everything from its **Audio-rack** six-channel rack-mounted mixer to the larger CAS-11S with up to 28 inputs.

**Arrakis** showed its products in the small radio console department, featuring two eight-channel mixers in the **2500 Series,** with linear or rotary faders.

**UREI,** with the 1620 music mixer and the 1650 and 1680 consoles, broadened its offerings at this year's show. The **mixers** are offered in either rotary or linear fader styles in six- or eight-mixer configurations with built-in cueing loudspeaker.

**Gotham Audio** demonstrated the **EMT 10.08.2** modular mixing console with solo, cue, and reverb buses, Penny & Giles faders, and stepped EQ, with capability of expanding to 30 inputs.

From **Graham-Patten Systems, Model 612** was a 12-input, dual-channel output microcomputer-driven mixer. The design of this mixer makes it suitable for post-production audio work.

**Radio Systems** displayed its line of consoles called **Audio-Metrics** with clock and timer as standard features. Cue logic is user-programmable for cueing in place, cue on detent, or auto cue.

## ATRs

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Studer A810 SMPTE reel-to-reel . . . . . 580
Otari MTR-12, MK III-2 Series reel-to-reel, Mark III/8 . . . . . 581
Ampex A800 SMPTE reel-to-reel . . . . . 582
MCI/Sony JH 110B-3-LB layback recorder . . . . . 583
Soundcraft SCM 760 reel-to-reel . . . . . 584
Nagra T-Audio SMPTE reel-to-reel . . . . 585
Gotham Audio Telefunken M-21, 15-A reel-to-reel . . . . . 586
Tascam Models 52, 58 reel-to-reel . . . 587


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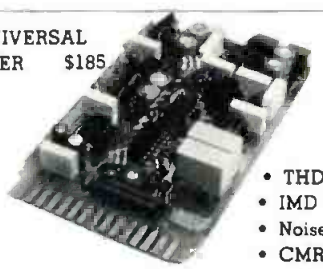

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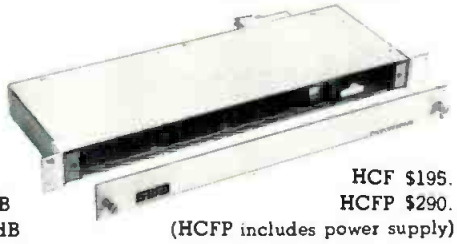

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# Studer Re-States the Art

With the new A810, Studer makes a quantum leap forward in audio recorder technology. Quite simply, it re-states the art of analog audio recording.

By combining traditional Swiss craftsmanship with the latest microprocessor control systems, Studer has engineered an audio recorder with unprecedented capabilities. All transport functions are totally microprocessor controlled, and all *four* tape speeds (3.75 to 30 ips) are front-panel selectable. The digital readout gives real time indication (+ or − in hrs, min, and sec) at all speeds, including vari-speed. A zero locate and one autolocate position are always at hand.

That's only the beginning. The A810 also provides three "soft keys" which may be user programmed for a variety of operating features. It's your choice. Three more locate positions. Start locate. Pause. Fader start. Tape dump. Remote ready. Time code enable. You can program your A810 for one specialized application, then re-program it later for another use.

There's more. Electronic alignment of audio parameters (bias, level, EQ) is accomplished via digital pad networks. (Trimpots have been eliminated.) After programming alignments into the A810's memory, you simply push a button to re-align when switching tape formulations.

The A810 also introduces a new generation of audio electronics, with your choice of either transformerless or transformer-balanced in/out cards. Both offer advanced phase compensation circuits for unprecedented phase linearity. The new transport control servo system responds quickly, runs cool, and offers four spooling speeds

Everything so far is standard. As an option, the A810 offers time-coincident SMPTE code on a center track between stereo audio channels. Separate time code heads ensure audio/code crosstalk rejection of better than 90 dB, while an internal digital delay automatically compensates for the time offset at all speeds. Code and audio always come out together, just like on your 4-track. Except you only pay for ¼" tape.

If you'd like computer control of all these functions, simply order the optional serial interface. It's compatible with RS232, RS422, and RS422-modified busses.

More features, standard and optional, are available. We suggest you contact your Studer representative for details Granted, we've packed a lot into one small package, but ultimately you'll find that the Studer A810 is the most versatile, most practical, most *useable* audio recorder you can buy.

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  Can be switched in or out of the PRO PLUS system, to accommodate all requirements.
- **Measurably the highest signal-to-noise ratio and widest dynamic range.**
  Quiet as a wire. 101 dB (108 dB, A-weighted) with DYNEX II. Even with DYNEX II switched out, the ULNR (ultralow-noise receiver) has an 85-dB SNR (92 dB, A-weighted). So good you may have difficulty measuring it, but you can definitely hear the difference.
- **"Infinite gain" receiver technology for highest performance.**
  Developed for the demanding aerospace telemetry industry, "infinite gain" provides improved performance in the critical threshold region, superior accommodation of multipath conditions, better signal-to-noise ratio, and constant receiver audio level output.
- **Lowest distortion.**
  0.25% maximum, 0.15% typical.
- **Professional audio circuits.**
  Output is adjustable from +20 dBm to -60 dBm in four ranges. Also featured are selectable phasing, user-calibratable metering, and 0.2-watt independent headphone amplifier.
- **Diversity or single-channel models.**
  The R-42 provides true dual-receiver diversity, and the R-41 nondiversity receiver has all of the other features of the R-42.
- **High-performance helical-filter front end.**
  Plus all of the other standard features expected in Cetec Vega's professional wireless equipment, famous for quality and reliability.

**PRO PLUS** wireless microphone systems achieve the highest performance possible with today's advanced technology. Write or call for further information and location of your nearest dealer: Cetec Vega. P.O. Box 5348. El Monte, CA 91734. (213) 442-0782. TWX: 910-587-3539.

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Tandberg TD-20A logger . . . . . 588
Dictaphone Veritrac SL logger . . . . . 589
Ramko Primus, Phasemaster cart decks . . . . . 592
3M/ITC Delta cart decks . . . . . 593
Broadcast Electronics Series 2100, 3000, 5000 carts . . . . . 594
Pacific Recorders TomCat carts, Maxtrax . . . . . 595
Audi-Cord Series S, A cart decks . . . . . 596
Fidelipac tape eraser, Master Cart II . . 597
Capitol Magnetics AA-3-based prototype . . . . . 598
Broadcast Supply Procart . . . . . 599
Nortronics PF-208 tape eraser, replacement heads . . . . . 600

As the radio broadcasters increase their efforts in multitrack production techniques and the TV people strive for improved audio, interest in reel-to-reel tape decks has increased.

**Studer,** for example, showed the production model of a machine whose time has arrived: the **A810.** This machine had the engineers crowded around during the show as a result of the SMPTE time code head and its facility for complete microprocessor control. Since the bias adjust is stored in the central microprocessor, the setting is retained even if the machine is shut down and the amp cards are changed. The basic machine is a two-track, quarter-inch deck which allows reprogramming of pushbutton functions for special applications, and features a choice of two or four speeds, remote-control selection, and fader start activation.

All audio parameters are programmable, including bias, level, EQ, and time constants. And, as a natural result of the engineering of the center line SMPTE head, there was a great deal of interest from the television broadcasters' side.

With innovations of its own to display, **Otari** showed the **MTR-12** in both quarter-inch and half-inch, two-track versions based on the same engineering parameters as the MTR-10, but with a reel size capacity increased to 12.5 inches. So far broadcasters seem interested in it as a production mastering deck.

The large, multitrack MTR-90 recording deck was also displayed with a CB-113 auto locator. A full range of new equipment was displayed as the **Mark III/8** and **MK III-2** Series. These are progressions from the MX5050 decks, offering quarter-inch two-track and eight-track capabilities.

Long a force in the multitrack recording business and the teleproduction industry, **Ampex** exhibited some of its existing line of reel-to-reels as well as some new wrinkles.

As a way of hitting the audio/video production and post-production markets, Ampex has designed the **A800,** which is available in mono and stereo, two- and four-track versions, with what it calls the Intertrack SMPTE time code function. Ampex believes this is the best way to record SMPTE time code onto the audio tape for synchronizing with the video portion of a production. Another feature is the ability to execute hands-on reel editing, with an open head stack offering accessibility to the heads for marking and cueing.

At the MCI/Sony booth, variety and innovation were the order of the day. Of course, the MCI JH-110B recorders were there with both quarter-inch and half-inch versions featuring transformerless, all-dc transport. The decks from the standard line were displayed in many styles from two-track to eight-track. One of the highlights, however, was the **JH-110B-3-LB.** This unwieldy model number designates a brand-new one-inch C-format audio layback system designed specifically to meet the needs of the audio-for-video business. It has a different head configuration than the other 110, two-track machines, with the record head serving as the SMPTE head. The primary advantage is a 6 dB increase in S/N over a VTR


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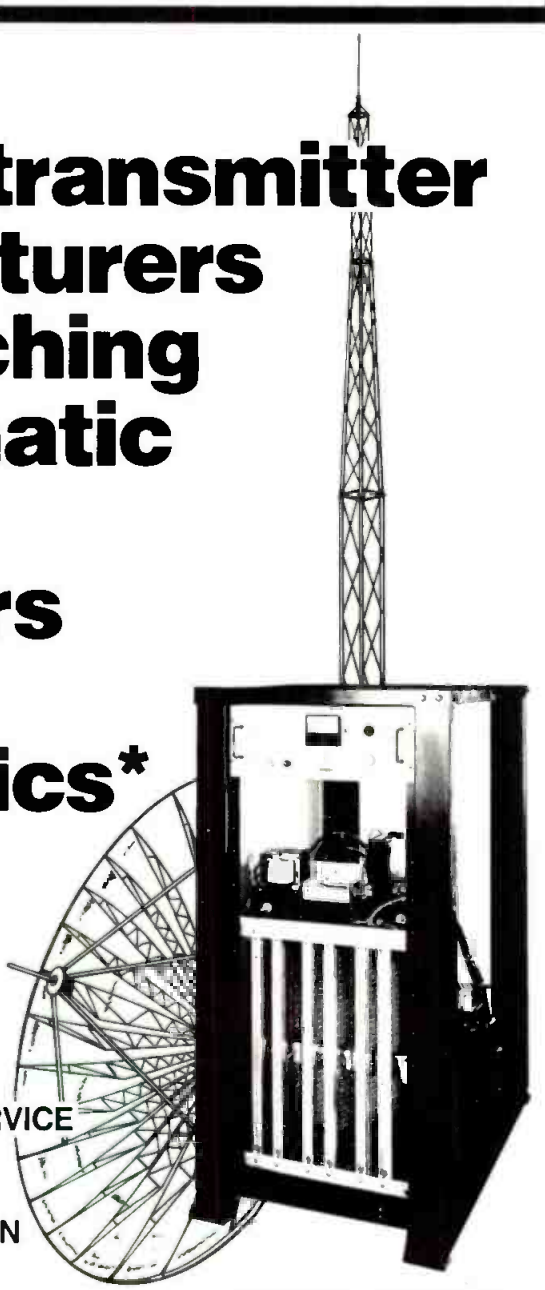

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and a substantially improved wow and flutter figure. The machine is available now and sells for $9250 without the cabinet.

**Soundcraft** made its presence known with its established line of multitrack machines. The **SCM 760 Series** of two-inch 16- and 24-track decks were displayed. The SCM 381-8 one-inch, eight-track recorder drew some interest, as it did last year. The machine is intended to give multitrack studio quality for broadcasters both in the studio and on location, due to its compact size.

Another competitor in the SMPTE encoding force for audio recorders is **Nagra.** Last year, the company introduced the **T-Audio** transportable studio recorder, and this year revealed the SMPTE capability option. Since the company has a long history in location film and television sound recording, this seemed a logical step. Other important features of the deck are the interhead tape tension sensor, removable control unit, and a choice between four possible speeds.

**Gotham Audio** displayed the brand-new reel-to-reels from **Telefunken,** the **M-15A** and **M-21.** The 15A comes in mono or stereo. The M-21 is a microprocessor-controlled deck with brushless dc capstan motor, variable speed, and is 19-inch rack-mountable.

A company that broadcasters have been familiar with for a long time is **Tascam**'s Teac Production Products, which produces several recording devices. The **Model 58** is a half-inch reel-to-reel eight-track machine used for audio production and post-production, while the **Model 52,** quarter-inch, two-track deck is used for production.

**Tandberg,** meanwhile, has moved from the consumer industry more toward the broadcasting sector of electronics, and displayed the **TD-20A** logging recorder. The deck sells for $1995. The company's reel-to-reels in two- and four-track versions were displayed, as were different cassette models, notably the 910, which will be available this year.

**Dictaphone** reinforced its individual place in the broadcast industry by displaying the new **Veritrac SL** voice communication recording system. The system can begin with one reel-to-reel machine and can be expanded to meet user needs, with three different recording/pass designs available. The machines offer a capacity of up to 24 hours per pass.

In spite of multitrack audio techniques and recording studio equipment, the foundation of radio station broadcasting is still the audio cartridge machine. Two developments involving the revamping of entire lines of cart machines included Ramko and ITC/3M.

In a dramatic restructuring of its complete line of broadcast products, **Ramko** introduced the **Primus Series** which includes, among many other products, a new line of cart machines. There are four new machines, two stereo, and two mono, with upgraded motors and electronics offering three cue tones with digital sensing, solid-state bargraph meters, and dynamic noise reduction. The flagship of the line, however, is still the **Phasemaster** with a S/N of −65 dB and wow & flutter of 0.08 percent.

ITC introduced its **Delta Series** of slim, table or rack-mount carts. Included in the series are the Delta One single deck reproducer in mono or stereo, and the Delta Four recording amplifier. The Delta Two is a wide deck reproducer in mono or stereo, while the Three is a triple deck reproducer which also comes in mono or stereo. The standard line was not forgotten, with the display centered around the Series 99B, which incorporates ELSA, a system for correcting phase shift errors. The Series 99s are driven by a brushless dc servo motor. Scotchcart broadcast cartridges were demonstrated at the 3M booth featuring tape guides, playback head shield, and no pressure pads.

**Broadcast Electronics** again showed its complete cart line, including the most popular **Series 3000** consisting of five separate models. The 3400 is a rack-mount unit handling A, B, and C size carts, while the 3100 and 3200 are compact, slim line models. The 3100 takes A size, and the 3200 both A and B size carts. The 3200 RP/DL is a delay unit used for listener call-ins. **Series 2100** carts were set up in a sound demonstration at the show in monitor/playback configuration. Rounding out the product line was the top-of-the-line **5300B** plug-in triple deck with companion amplifier.

The **TomCat** recorder/reproducer decks took a prominent position in the **Pacific Recorders** booth, demonstrating the Maxtrax wide-track fixed azimuth heads. In conjunction with these machines was the **Maxtrax** conversion kit for ITC reproducers. The Maxtrax format features 7.5 or 15 ips and fast forward control.

**Audi-Cord** showed two lines of cart machines, the S and the A Series. The **S Series** includes four models of playback decks. Model S26, at the top of the line, is a stereo playback unit with three cue tones and a timer. The **A Series** offers over 15 models of record and playback units.

Exhibitors showing cartridge- and tape-related products were also on hand. **Fidelipac** demonstrated its brand-new **Model 400 magnetic tape eraser** with a magnetic rating of over 2000 gauss, selling for $99.50. Fidelipac also showed its tape cartridge products, headed by the **Master Cart II** with Hot Tape, new front corner post design, one-piece reel, and positive reel brake.

**Capitol Magnetics** unveiled a prototype of a cartridge which is based on the **AA-3,** but shows improved phase stability and guide path, in addition to new tape which provides a much-improved high end. Also offered was the Audiopak AA-3 containing the Q17 HOLN ferric oxide tape and a new plastic shell.

**Procart** was shown by **Broadcast Supply West,** a cart said to exceed NAB type AA standards.

In recorder care equipment and tape machine accessories, **Nortronics** led the show with its huge catalog of **replacement heads** for cart machines, reel-to-reels, duplicators, and specialized audio machines. A new unit for Nortronics was the **PF-208** head degausser with 1000 gauss magnetic strength and a high-flux coil core. The PF-208 will degauss from half-inch to two-inch tape and sells for $5340.

## MODULATION DENSITY PROCESSING

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Dorrough Electronics 610 processor . . . 607
Orban Optimod-TV . . . . . 608
Aphex Compellor . . . . . 609
Harris AGC Tri-band MSP Series . . . . . 610
Valley People Dyna-mite . . . . . 611
Processing Plus IMP-3 . . . . . 612
CRL Audio SPP-800 . . . . . 613
Symetrix Model CL-150 . . . . . 614
Modular Audio Products Model 7102 . . 615
Audio + Design Scamp S27 . . . . . 616


If there are any radical advances in this processing category, they weren't in evidence at the NAB show, despite some new product introductions and some expansion and enhancement of already existing equipment lines.

In this regard, **Dorrough Electronics** introduced four new models of audio processors, in addition to showing the **Model 610** Discriminate Audio Processor for both FM and AM. The 610 is a tri-band unit using a frequency discriminate digital control signal for gain reduction, executing independently in the three channels. Also on hand was the DAP 310. Among the new models were the TV Model 710, the FM 810 selling for $3900, and the cable 910.

A stalwart in the modulation business, **Orban** showed up with a wide range of equipment, including its latest, the **Optimod-TV Model 8182A.** This unit is an enhanced version of the 8180A and is a stereo processor incorporating two advancements: a loudness controller using technology licensed from CBS Technology Center and a Hilbert Transform Clipper which reduces audible processor-induced clipping distortion. Features of the 8182A which carry over from previous units are multiband compression, intelligent gating, high-frequency limiting, 15 kHz lowpass filters, and band-limited overshoot control. Another new device from Orban is the Optimod-FM 8100A/ST, which is an upgraded version of the 8100 and will be available in the fall of 1983. The Optimod-AM Model



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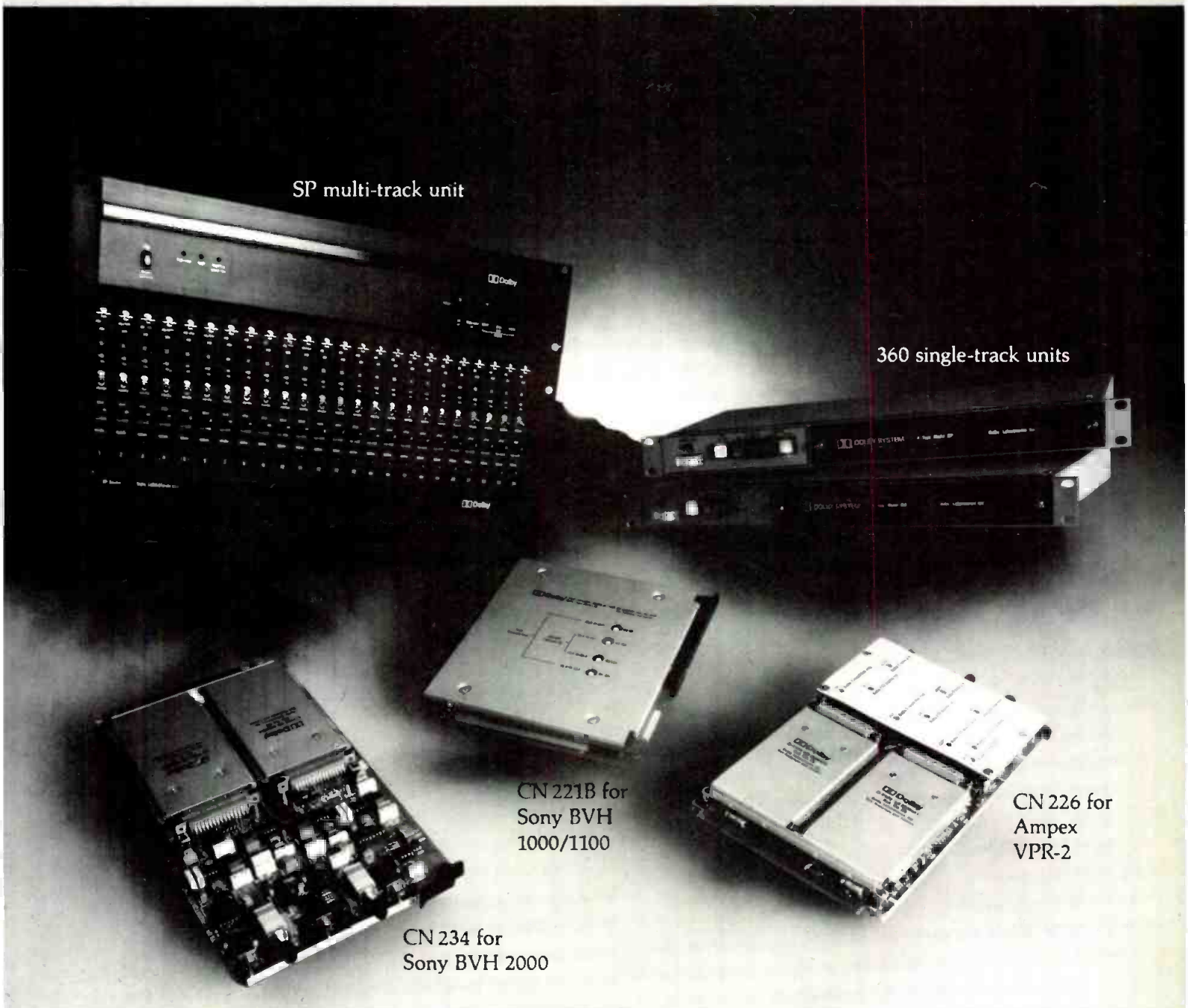
# DOLBY® NOISE REDUCTION FOR THE 1980'S

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9100A was also displayed in both mono and stereo with its six-band limiter.

A brand-new compressor/limiter/leveler was introduced this year by **Aphex.** Called the **Compellor,** the unit provides complete dynamics control, inaudible compression, and increased loudness. The quality of the audio in this unit is a result of using the Aphex 1537A VCA chip which is controlled by two partially interdependent side chains. Also on display was the Aphex II Aural Exciter, which controls the amount of drive to the side chain and has an effect which is level-dependent.

A line of processors that have been on the market for some time and which have made their impact come from **Harris.** The value of the Harris processors, claims the company, is that processor adjustment controls are easy to get to, allowing the customer to optimize his own signal, rather than being locked into the factory settings. The **MSP-90 tri-band** AGC is a true automatic gain amplifier, in addition to being a compressor.

In a different type of modulation processing, the **Valley People** showed the **Dyna-mite** units, which have uses as limiters, expanders, de-essers, and keying and effects devices. Operating in up to 18 specific modes, the units have front panel switches for different operations. In the limit/out/expand switch, limit equates to gain reduction caused by signals above threshold.

With some new approaches to processing, a new company appeared at this year's show. **Processing Plus** debuted its **IMP-3,** designed by radio engineers specifically for AM processing and featuring a program-dependent compression ratio while maintaining high average modulation.

Crowding its booth full of processing boxes, **CRL Audio** displayed 10 different processors, most of which also come in mono and stereo versions, making for several more models. The **SPP-800** stereo preparation processor automatically corrects for errors in program levels and tonal balance, enhancing transient musical qualities.

The **Model CL-150** compressor/limiter, which was exhibited by **Symetrix,** offers the exceptional variable compression ratio of from 1.4:1 to infinity:1, as well as a variable threshold from −40 dBm to +10 dBm.

Demonstrating a compressor/limiter containing two VCA units controlled by a single dc source was **Modular Audio Products. Model 7102** comes with an integral power supply and barrier type terminal strips and offers unbalanced bridging input, unbalanced output with transformer optional, and input/threshold control.

Offering a full complement of processing equipment again this year was **Audio + Design.** In addition to limiter and compressor units, voice and instrument enhancement devices, and sweep equalizers, the company offered its new **Scamp S27** crossover/four-band processor module.

## NOISE REDUCTION

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Dolby CN 234 module, SP Series . . 617
MicMix Dynafex . . . . . 618
Straight Wire Audio High Com . . . . 619
dbx 321 Series . . . . . 620
Philips Television Systems LDM 3001 . . . . . 621
Symetrix Model 511 . . . . . 622


A category that attracted everyone's attention because of audio interest was noise reduction. **Dolby** reinforced its position in television audio with the **CN 234** module for Sony BVH-2000 VTRs. The unit offers two channels of Dolby A noise reduction and plugs directly into the BVH in place of its AU-27 audio board. This module will be available in July 1983, selling for $2100. The **SP Series** multitrack noise reduction unit was also on hand in its rack-mount design, incorporating standard Dolby Number 22 modules that offer front-panel "uncal" control, permitting rapid resetting of the Dolby level.

With its alternative approach to noise reduction, **MicMix** showed **Dynafex.** This system offers signal-to-noise gains up to 30 dB using a sliding filter with the bandpass automatically adjusted to minimize noise.

**Straight Wire Audio** assembled its whole demonstration around the **High Com** noise reduction system as played through an ITC cart with an SWA retrofit amp card installed. The High Com is a patented Telefunken system licensed in this country by SWA, which claims an attack time of 300 μs for the system.

**dbx** showed its **321 Series** of noise reduction equipment, designed especially for satellite and cable use. The system is now in use in the National Public Radio network.

Brand-new in the noise reduction department is the **LDM 3001** digital unit from **Philips Television Systems.** The design, originally developed by the BBC research department, is fully automatic in operation, adapting to the incoming signal by assessing picture content and movement.

The **Symetrix Model 511** noise reduction system, as displayed at the NAB, offers up to 30 dB improvement in S/N when inserted in the signal path following a reel-to-reel, cart machine, or VTR. No previous encoding of the recorded signal is necessary, and the unit can, according to the manufacturer, clean up reverb and echo devices, as well as a wide variety of other audio equipment.

FOR MORE INFORMATION ON ADS APPEARING IN THIS ISSUE, USE READER SERVICE CARD, PAGE 25.

## EFFECTS PROCESSING

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Auditronics programmable EQ . . . . . 623
dbx programmable EQ Model 610 autographic equalizer . . . . . 624
ATI EmphaSizer . . . . . 625
Ursa Major 8X32 digital reverb . . . . . 626
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Eventide TimeSqueeze, digital processors, SP 2016 signal processor . . . . . 630
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One of the areas of broadcasting that seems to be expanding daily is the use of electronic effects and audio manipulation during production or post-production.

One of the newest applications of computer technology coming to the industry was a brand-new parametric equalizer from a well-known audio console manufacturer. **Auditronics** unveiled the **PPEQ-1,** programmable parametric equalizer, a unit designed for production use in film or audio-for-video, and in disc mastering. It includes up to four mono or stereo tracking, three-band EQ units, each with variable Q, variable frequency, and variable boost/cut.

Other computerized EQ units were offered by **dbx.** The **Model 610 Autographic equalizer,** which sells for $1900, is a device into which the user can program the equalization curve for different DJs and different rooms. The 905 parametric equalizer was also on hand.

A special type of equalizer comes from ATI. Called the **EmphaSizer,** the unit is an audio processor for disc jockeys, providing four bands of EQ, compressor/limiter functions, and additional voice gate control for on-air signal processing.

Another type of signal manipulation that is increasingly more common is reverberation, with many quality units making their way into the broadcaster's rack. **Ursa Major** is a small company which devotes itself to reverb and special effects. The **8X32** digital reverberator offers a fast diffusion plate reverb, a second plate reverb with slower build-up and longer decay values.

**Sony** expanded the capabilities of its digital reverb, the **DRE-2000,** which uses 16-bit digital quantization. Greater programming capacity and additional acoustic parameters are among the new features amounting to wider stereo width of reverb, higher echo density, and smoother decay.

Two units of particular interest in this



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field were shown by **Advanced Music Systems.** The **RMX 16** is a standalone digital reverb with an 18 kHz bandwidth, microprocessor-controlled functions, and a 90 dB dynamic range. Alongside the other equipment, the DMX 15-80 SB, a broadcast digital delay unit with nine programmable memories and an optional pitch changer, was also displayed.

Contributing to the ever-increasing list of effects units was **MicMix,** which brought the **XL-515** reverb system. Part of The Master Room, as the series is called, the unit provides continuously variable decay control. Encompassing three operation modes in full stereo, the XL-515 synthesizes the reverberation characteristics of a plate, a live chamber, and a concert hall. All functions are front panel-selectable.

Well known for its digital products, including the **TimeSqueeze, Eventide** demonstrated the **SP 2016 signal processor,** selling for about $9000. It is a delay and reverb unit incorporating software-controllable custom ROM modules and with IEEE computer-controlled interface. The 2016 features stereo in and out independent of bandwidth.

Digital effects models from **Lexicon** are all primarily computers dedicated to audio processing. The **Super Prime Time Model 97** provides programmable audio reverb and delay, as well as other effects.

## MICROPHONES, PRODUCTION EQUIPMENT

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


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**Shure SM63 omnidirectional mic . . . . . 643**
**Crown International PZM 2.5 mic . . . . 633**
**HM Electronics System 85 wireless mic 634**
**Sony PB-37, BTA-27 wireless accessories . . . . . 635**
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**Beyer Dynamic MCE5 omnidirectional mic . . . . . 637**
**Cetec Vega Model 82 wireless mic . . . 638**
**Countryman Associates Isomax mics . . . 639**
**Audio-Technica Model AT835 . . . . . 640**
**Bruel & Kjaer 4000 Series mics . . . . . 641**
**Gotham/Neumann KMR81i shotgun mic . 642**
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**R-Columbia Teleheadphone . . . . . 645**
**Russco turntables RTQ-7 direct drive . . 646**
**VSC Corp. TDM-8200 stereo slave. . . . 647**


More sensitive, yet more rugged, continues to be the story for mics. At NAB there was a mic for all reasons.

**Electro-Voice** introduced the **RE34** cardioid, condenser mic designed especially


# MAIN CONTROL

# MRC-1

- SMART TERMINALS AT CONTROL AND REMOTE SITES
- SIMULTANEOUS DISPLAY OF 32 STATUS INPUTS
- KEYBOARD CALIBRATION OF TELEMETRY

Since its introduction in 1978, the MRC-1 has become the leading microprocessor based remote control system in the broadcast industry. The compact modular design delivers proven reliability and outstanding versatility, allowing up to 64 command outputs, 32 status, and 32 telemetry inputs, at each of up to nine remote terminals.

User-tailored system set-up of the MRC-1 assures each broadcaster of filling his exact command, status, and telemetry requirements. Telemetry channels may be keyboard calibrated for linear, indirect power or direct power scaling. Upper and lower telemetry limits may be set with automatic muting if desired. All status inputs from any site can be displayed simultaneously on a set of 32 LEDs at the control terminal. Command line outputs may be assigned to function as the raise or lower output of any specified telemetry channel. In short, the broadcaster customizes his system to his plant.

- MULTIPLE REMOTE SITE CAPABILITY
- EACH SITE EXPANDABLE TO:
  - 64 COMMAND LINES
  - 32 STATUS CHANNELS
  - 32 TELEMETRY CHANNELS

To further enhance the flexibility and convenience of the MRC-1 several options are available. The multiple direct command option provides 10 pre-selected command functions for quick control of key parameters at any site. In case of an extended shutdown, the Moseley Memory option stores data for up to ten years. Optionally available automatic loggers print a record of status and telemetry operations at time intervals selected by the user. The CRT option duplicates all the functions of the control terminal and displays all 32 channels of status and telemetry data at one time from any site.

With over 500 units in the field, the MRC-1 has proven itself to be the preferred remote control system for radio, television, earth satellite stations, and a multitude of supervisory control requirements.

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for heavy use. It operates with either a 9 V alkaline battery or phantom power supply. Frequency response is 40 Hz to 15 kHz in normal use. The handle, made of graphite-reinforced plastic, is designed for easy grip even in cold weather. Line level output is switchable to mic level output. Price is $400.

**Shure** demonstrated the new **SM63** omnidirectional dynamic ENG mic in addition to its complete line of mics and elements. The SM63 is specifically designed for outdoor use and close mic situations.

For indoor use, **Crown International** introduced the **PZM 2.5 mic** designed to improve directional pickup. The new low-profile, minimum-visibility microphone combines a pressure capsule with a nearly invisible corner boundary to capture sounds approaching from its front while rejecting sounds from behind. It plugs into a 14 to 48 V phantom power supply, and includes a transformer-balanced, low-impedance output and a permanently attached 15-foot cable. Price is $399.

Wireless mics also drew a lot of attention. From its extensive line, **HM Electronics** featured the **System 85** hand-held wireless system. System 85 operates on high-band VHF frequencies between 150 and 240 MHz. It uses a Shure SM85 cardioid condenser element. Frequency response is 50 Hz to 15 kHz +/-3 dB. The TX852 hand-held transmitter is exceptionally small and operates on a 9 V alkaline battery. With battery it weighs 12 ounces.

**Sony** Professional Audio Products added to its line of UHF wireless mics to expand their ENG/EFP capabilities. The **PB-37** portable base unit holds the WRR37 diversity receiver which can pull out of the rack-mounting and be taken into the field. There are three receiver systems, two of which are frequency-selectable. One channel diversity system can operate with two nondiversity systems.

Sony also announced the **BTA-27** portable tuner attachment kit for hooking to Betacam camera mounts. It holds the WRR-27 UHF portable tuner so a wireless mic can be used for field work where the range of the camera's built-in microphone is inadequate.

The **Telex WHM-400** was designed especially for vocal entertainment applications. It's a dynamic, cardioid pattern unit with a frequency response of 50 Hz to 15 kHz ±2 dB. Signal dropouts caused by on-stage movement of the microphone transmitter are eliminated by a patented dual antenna diversity system. The receiver can also operate in the conventional manner with a single antenna.

Mics of course are also getting smaller. With a diameter of only 7 mm and a total length of just 23 mm, the **Beyer Dynamic MCE5** omnidirectional electret condenser line is one of the smallest of its kind. Frequency response is 20 Hz to 20 kHz. To operate in a wireless mode, the MCE5.9 clip-on can be interfaced with Swintek, HME, and Cetec Vega wireless transmitters.

The new wireless at **Cetec Vega** was the **Model 82,** a condenser mic that incorporates the Shure SM85 element. Used with Cetec Vega wireless receivers, the FM system operates on any crystal-controlled frequency between 150 and 216 MHz. Frequency range is 40 Hz to 15 kHz.

**Countryman Associates** showed its line of directional lavalier mics, **Isomax Pro-C, Pro-H, and Pro-B,** cardioid, hypercardioid, and bidirectional (figure eight) respectively. Frequency response is 50 Hz to 20 kHz. Actually, the Isomax provides high and low frequency contour switches to adjust the characteristics to suit the user.

The **Model AT835** electret condenser line mic from **Audio-Technica** has a unidirectional polar pattern ideal for the narrow acceptance angle desirable for long-distance sound pickup. Frequency response is 40 Hz to 20 kHz. This line features the A-T "back plate" electret construction with a four-micrometer-thick gold-vaporized diaphragm deposited on the back plate rather than the moving element.

Among the studio mics were those at the **Bruel & Kjaer** booth. Adapted from the firm's instrumentation line, the **4000 Series** has a frequency response from 15 Hz to 20 kHz ±0.5 dB.


# Sound quality.

## 200 Series On-Air Broadcast Control Console

The Auditronics 200 Series represents the culmination of latest technology applied for broadcast use. Standard features include Penny & Giles linear VCA controlling faders for reliability and precise tracking accuracy even on stereo channels, noiseless hall effect/CMOS on/off switching, local power regulation on every module to prevent mass failure, built-in Control Room Monitoring controls, a comprehensive logic system and headphone amplifier with local equalization. Available in 4 mainframe sizes for up to 24 mono or stereo inputs, a full line of accessories is provided for custom tailoring to individual requirements.

**Voice Controller Accessory:** A mono or stereo compressor/limiter/noise gate utilizing the VCA circuitry built into the 200 Series.

The 200 Series, the logical choice for on-air operations from music programming to newsrooms.

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- ☐ Equalizers
- ☐ Telephone Interface
- ☐ Remote Controls
- ☐ Redundant Powering
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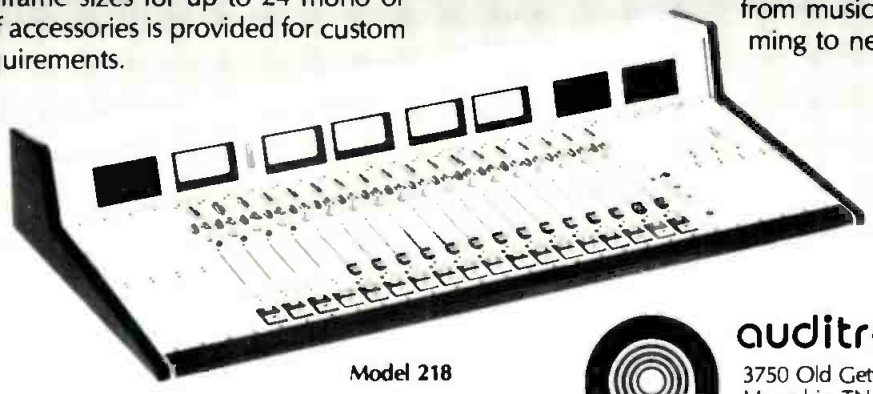

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Seen at the **Gotham** booth was the new **Neumann KMR81i** condenser shotgun mic. The nine-inch 81i has a super-cardioid pattern and a frequency range of 40 Hz to 18 kHz. The microphone capsule is located inside an interference tube which is acoustically open but has high acoustic impedance.

New from **Swintek** was the six-frequency RF switching diversity RF system designed for use with wireless mics. The Model **RFSD** switches RF instead of audio, thereby virtually eliminating transients. The unit can be purchased as an internal option for Swintek Mk 1L, 2L and Q/AC receivers.

Headphones were also in evidence. **R-Columbia,** for example, pushed its new **Teleheadphone,** plug-compatible with standard telephone handsets with built-in IC amplifier. Model 52/TM single-ear is $99.75; Model 52/TMM double ear is $145.

Racal broadcast and intercom headsets were seen in the Television Equipment Associates booth. The Astrolite Electret for broadcast use features a mic with frequency range of 50 Hz to 15 kHz. The double phone Astrolite costs $240. Beyer Dynamic also had its line of single and double phone units, including the DT109 headphone/microphone combinations.

New turntables turned up as well. **Russco Electronics** debuted its **first direct drive RTQ-7,** featuring a magnetic induction braking system that disengages automatically after bringing the platter to a stop. Delivery will start in the fall and price is expected to be under $1000.

Broadcast Electronics introduced improvements to its Model 12C QRK turntable. Newly designed motor isolation mounts and a statically balanced motor/counterweight assembly help to reduce rumble.

A sign of the times, **VSC Corporation** added the new **TDM-8200** stereo slave for audio time compression. It is designed to operate in conjunction with the TDM-8000 audio time compressor. Together, the units enable stereo audio signals to be sped up and yet maintain proper audio pitch.

## ROUTING SWITCHERS AND DAs

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES

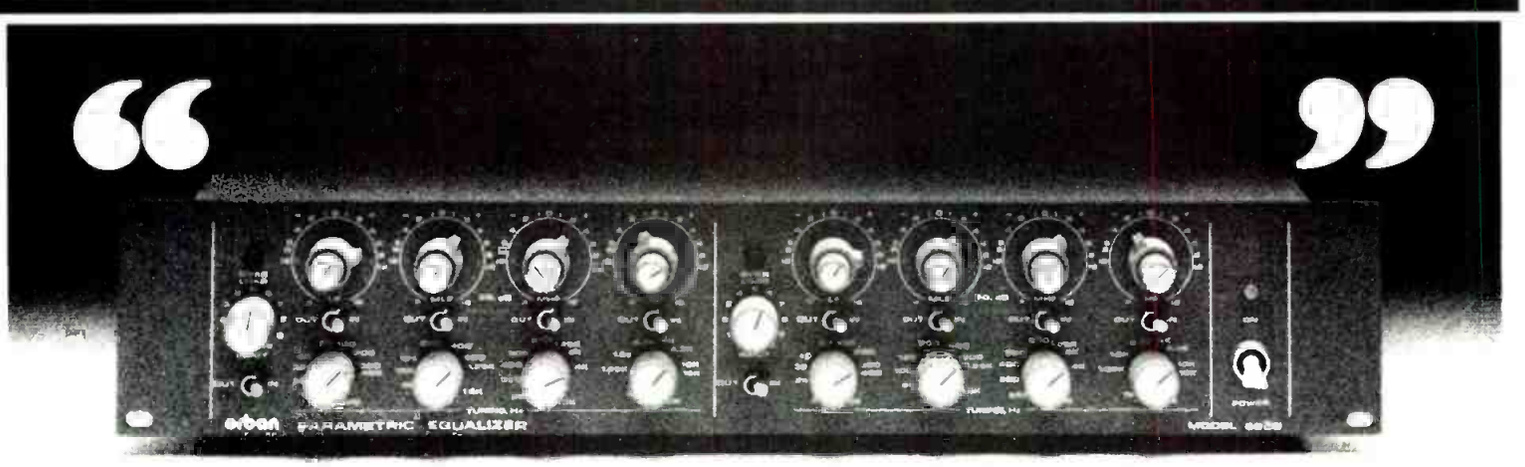
CMD, Inc. Smart Switcher . . . . . 648
Ramko ARA-1612 audio router/amplifier . . . . . 649
Datatronix Model 8318 DA. . . . . 650
AVL Digital ADA-41 DA. . . . . 651
ATI-Audio Technologies DA 10000. . 652
Modular Audio Products MAP 4824 DA . . . . . 653
Logitek DAGC-60 amp . . . . . 654
Micro-Trak 7216 DA . . . . . 655

Audio routers and DAs are being subjected to tougher demands and more complex procedures in the broadcast plant. In response to this, several manufacturers have come up with more sophisticated units, some of them computerized.

A new company appearing at the NAB for the first time, **CMD, Inc.,** displayed a unit it calls **"The Smart Switcher."** The system consists of an Apple II personal computer and a proprietary CMD system that will sum as well as distribute high-quality audio signals. Real-time switching of presets stored on disc will be available later in the year with optional time code/preset software also available.

As one of its top products in the newly announced Primus line, **Ramko** introduced the **ARA-1612** audio router/amplifier incorporating new CMOS and op-amp technology. The 1612 is a pushbutton unit with a standard capacity to route 16 inputs to any of 12 outputs simultaneously or individually. To satisfy the needs of larger production studios as well as radio and television stations with a heavy program load, units can be stacked to provide up to 45 inputs and thousands of outputs, with no source loading and degradation in signal quality.

A rack-mounted modular distribution system for broadcasters in need of an expandable system with interchangeable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The Orban 622B Parametric Equalizer has achieved near-legendary status in the broadcast industry for good reason. It is the most flexible, musically-useful equalizer on the market today. And, it offers the broadcaster unlimited versatility in production room sweetening as well as the capability to be used on the program line to tailor the sound of the station.

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amplifiers comes from **Datatronix.** The **Model 8318** is a high-density redundant-powered DA with load and power status indicators. The unit will handle up to 16 channels, 128 splits in two rack units including power. Standard models are the 318 booster amplifiers and two 300PS power supplies, with the 300PR also available.

Designed as an economical way of distributing program material, **AVL Digital** has released the **ADA-41**. Each unit contains two separate amplifiers with three output splits from each section. The balanced bridging inputs can be used to provide three outputs per amplifier, or the inputs may be paralleled for up to six splits from a single input. The cases are designed in such a way to allow up to three units to be mounted in a 19-inch rack.

**ATI-Audio Technologies Inc.** introduced a brand-new series of DAS to meet the heavy audio routing demands of radio and TV stations while still maintaining flexibility. The **DA 10000** modular distribution amplifiers consist of 10 1x6 DA modules in 5.25 inches of rack space. For user flexibility, five interchangeable types of modules are offered, all with active balanced or transformer outputs, with metering and compressor options.

Geared toward the smaller-capacity DAS, **Modular Audio Products** has introduced the **MAP 4824.** The unit is specifically intended as a distribution amplifier for broadcasters needing no more than an eight-output split. The 4824 has a balanced bridging input and a low-impedance input for summing applications.

Another new rack-mounted modular system which supplies a unique collection of modules in a 5.25-inch rack frame was introduced by **Logitek.** As a modular distribution system, the **DAGC-60** combines AGC, VCA, and distribution and monitoring capability, with up to 10 amplifier modules providing 60 isolated outputs per frame.

**Micro-Trak** maintained its high profile by redesigning its **7216** audio DA along with the introduction of other new products. Full transformer isolation and +8 dBm out nominal are standard specifications for this 2x6 distribution amplifier.

## INTERCOMS

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Ward-Beck MicroCOM . . . . . 657
RTS Systems 802 Master Station. . . . . 658
ROH Series 300 . . . . . 659
United Media CDX talkback system . . . 660
Farrtronics 525, 175 . . . . . 661
Clear-Com DLC wireless intercom. . . . . 662
HME 150E wireless intercom . . . . . 663
Cetec Vega Model C-466 Quad Case . . 664
Nady Model PRC-3 duplex system . . . . 665


The word coming in over the intercoms at NAB was "smart." Microprocessors have continued to advance into intercom applications, creating smart systems.

The leader in this movement has been **Ward-Beck** with its **MicroCOM** microprocessor communications system. About 25 systems have been sold since its introduction a few years ago. While the large number of work stations and the elaborate controls possible with this system have dazzled users, the ease of installing and reconfiguring the system should also be recognized. Instead of the multi-conductor cable needed to hook up many intercom systems, it takes only one two-conductor cable to connect the central controllers and the master remote turrets. In addition, communication paths can be reconfigured on-site easily.

The microprocessor also plays a role in the **RTS 802 Master Station** network. It provides 22 independent signal paths operating in up to six separate modes. A completely self-contained system, the 802 features momentary/latching action buttons, individual channel listen level controls and stereo headset source assignment. The 802 uses a Z-80 microprocessor to control the selection and execution of the operational functions and circuitry.

Another highly flexible intercom system was on view at the ROH booth. The **Series 300** performs in any combination of intercom, interphone, IFB/PGM interrupt, page/talkback, two-way radio, telephone, and "all call" configurations. It's available in eight-, 16-, 24-, or 32-channel versions.

**United Media** had its first entry into the intercom field at the show. The **CDX talkback system** is microcomputer-controlled, permitting a customer-defined fixed configuration to be loaded automatically, and allows the user to alter the facilities at an outstation from a central location.

The **Farrtronics** intercom consists of the **Model 525** intercom stations, and the **Model 175** intercom stations along with removable rack-mounted program cards. The 525 has four basic station configurations—two 24-pushbutton versions, a 48 pushbutton package, and a 72-pushbutton unit.

There was news, too, in wireless intercoms. For example, **Clear-Com** unveiled a major system, its **DLC (digital logic control) Series** production intercom, designed to offer full duplex and simplex PL and point-to-point communications over up to 18 channels. Eight channels are controlled through the built-in assignment matrix, and the system also provides for visual identification of call signals.

HME feels the future of the intercom industry lies in hardwired systems, and showed its newly developed system for the first time. For the present, it is still heavily promoting its **150E RF series.**

New to the **Cetec Vega** wireless line was the **Model C-466 Quad Case.** It houses four complete Model 77/66 portable systems including batteries. It measures 7x9¾x11 inches and weighs less than 22 pounds.

Telex had its Audiocom closed-circuit headset system. **Nady** arrived with a new **Model PRC-3** duplex system. Swintek had the Mark 200 with its belt pack duplex transceiver.

R-Columbia had the Model 52/TM Teleheadphone, a headphone that plugs directly into any telephone headset.

Headphones were also on hand at Beyer Dynamic, including the DT 102 single muff. Racal headsets were displayed at the Television Equipment Asssociates booth.

## AUTOMATION

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Harris Autotron Star . . . . . 666
Register Data System RDS 5000, RDS 8000 . . . . . 667
Cetec Centaur . . . . . 668
The Management SuperLog . . . . . 669
Harris System 9000. . . . . 670
Broadcast Electronics Control 16x, Sat 16 . . . . . 671
Cetec 7000GLS, System 7000 VIC. . . . 672
Computer Concepts Total Station Automation . . . . . 673


The computer is leading a varied life in radio. On the one hand, a number of companies have set up systems using standard minicomputers and peripherals to automate various radio station procedures such as accounting, billing, and the like. On the other hand, microcomputers have been put to work in program control systems at the heart of the station's operations.

Both of these roles were represented at NAB, and it was clear from booth traffic that radio broadcasters were interested. Part of the reason for the growing interest is that the automated systems have made their way into enough stations to provide experience.

How is this translated into automated systems? Essentially the computer is easier to use because it is easier to work the software—or to use computerese, the software is user-friendly. That's half the battle. The other half is in cost effectiveness—does the system contribute to the station's bottom line? These two factors—ease of use and cost effectiveness—are finally coming together. Thus, the growing interest.

The **Harris Autotron Star** is billed as "Radio's minicomputer in-house business system." The computer is the Honeywell Information System DPS-6 and the in-house



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**You can produce eleven C-60 cassette tapes in less than two minutes!**

## EASY AUTOMATED OPERATION

The 6120 practically runs itself. The system features automatic end-of-tape stop and auto recue on the reel master, and a choice of manual or auto rewind on the cassette master, providing virtually uninterrupted operation. Changes in equalization are made automatically when you change speeds on the reel master, thereby reducing setup time and avoiding errors.

## EXPANDABLE

The modular, building block concept lets you buy just what you need today and expand the system to meet your growing needs tomorrow. Modules simply plug together. There's no need to add people or space as the system grows, because the 6120 is so compact that even a full system can be operated by one person.

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refers to having the machine in the station rather than using a larger, shared computer connected by telco lines. Aside from the usual payroll, accounts payable and general ledger programs, Harris offers as options a word processing system, Background Music Accounting System and Music Library System (MLS).

The pitch at **Register Data Systems** is "computerized broadcast business systems custom designed by and for broadcasters." Offering a complete library of business programs, RDS has two systems. **RDS 5000** has 192K random-access memory, 10 Mbyte Winchester hard disk drive expandable to 30 Mbytes, two terminals, one 2K, 180 character-per-second printer. **RDS 8000** is the same as above, except a 40-megabyte Winchester drive is substituted.

**Cetec,** which has been marketing the MAPS system for some time, introduced a system for small- and medium-market radio stations, called **Centaur.** Offering many of the same features as MAPS, Centaur costs $21,900. It uses the IBM System/23 Datamaster computer. MAPS programs available include a scheduler, co-op invoicing, a "business on the books" report, a "skim avails" report, and a flexible log format.

A key element of the station systems that separate them from standard business automation is traffic. All of the systems suppliers have tackled it. The Custom Business Systems traffic reports, for example, include program log, one-day spot report, detailed avails, time sold report, and a host of other features.

**The Management** introduced what it calls **SuperLog** for radio and TV stations. SuperLog safely allows 2000 schedules (sales orders) and over 1500 client records for each station. Multiple schedules may be billed to any client.

Research is another task that computers can really dig into if fed the right data. Station Research Systems demonstrated an elaborate system for analyzing ratings, market research, music research, and music inventory. The company also offers BreakOut software to turn the research figures into jazzy computer graphics

Station Business Systems showed off its BAT 1700 traffic and accounts receivable and accounting systems. Cado Systems Corporation and Phoenix Systems also had business systems for stations.

The other arm of radio station computers is in program control. **Harris** has been in this field for some time, starting with the System 90. At the NAB show the company had the **9000** program control series. The 9000 is composed of three distinct systems, each a progressive increase in programming capability. The 9001 is a basic program control system which can be used for any automation requirement. It uses a single video terminal and has a 1999-event memory expandable up to 9999 events.

Another pioneer in program control is **Broadcast Electronics.** The **Control 16x** has a 300-event memory expandable to 10,000 with the addition of RAM boards. It is also possible to "program" two special events and insert them where and when desired. Also important, the microcomputer monitors the status of each system source one event ahead of the event on the air so that the station knows if the next event is ready to play. BE also demonstrated **Sat-16.**

**Cetec Broadcast Group** wryly introduced the **7000GLS,** which stands for "Great Little System." At under $20,000, the GLS is a cut-down version of the more-powerful System 7000 for the small station that does not have the volume to justify a full-featured system. It provides up to seven days' unattended "walk-away time" via a 1000 event memory.

The GLS can be upgraded to a full **System 7000.** A new wrinkle on the 7000 is the Voice Information Control, a monitor that uses voice alarms to warn station personnel of system failure, including transmitter problems.

Inevitably, the management systems and the programming systems would have to meet. And that is what **Total Station Automation,** touted at the Broadcast Electronics and Computer Concepts booths, does. TSA links the Control 16 described above with the Broadcast System developed by **Computer Concepts.** Essentially, the program

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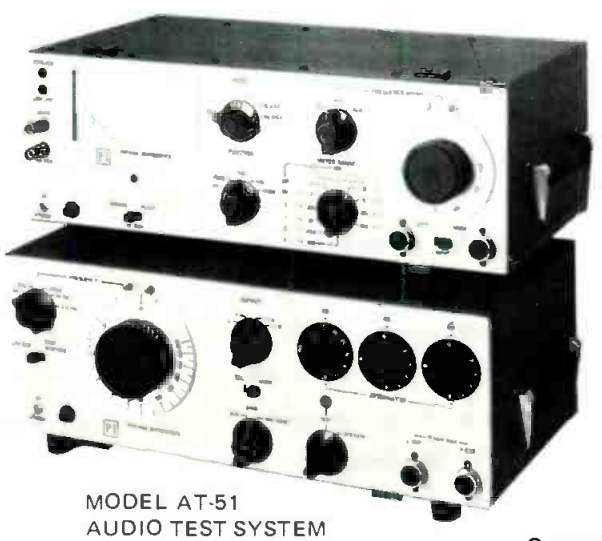

- Harmonic Distortion
- Intermodulation Distortion
- Volts
- dB
- Signal + Noise / Noise Ratio
- Wow and Flutter
- Stereo Phasing
- Differential Gain in Stereo Channels

MODEL AT-51
AUDIO TEST SYSTEM

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log generated on the Broadcast System can be transferred directly to the Control 16.

## TEST AND MEASUREMENT

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


**Tektronix TM 5000 Series, SG 5010, AA 5001, MI 5010** . . . . . 674
**Sound Technology 1510A** . . . . . 675
**Amber 3501** . . . . . 676
**Potomac AT-51, MPC-11** . . . . . 677
**UREI 813B** . . . . . 678
**JBL 4430** . . . . . 679


Programmable. Multipurpose. These were the words heard frequently in the booths of the audio test gear exhibitors. Another phrase which has migrated from computerland was "user-friendly." What this all means is that radio station engineers are seeking more and more sophisticated measurement devices designed to improve productivity.

High up on the sophistication scale was the **Tektronix TM 5000** line, featuring plug-in modules, **SG 5010** programmable oscillator, and **AA 5001** programmable distortion analyzer. These units are designed for multipurpose testing. For example, end-to-end testing of broadcast networks or satellite communication links may require only the oscillator at the origination point and analyzers at the various receiving locations. In addition, a Tek **MI 5010** Multifunction Interface unit may be added, and with plug-in cards provide audio signaling routing, logic interface to a remotely controllable device being tested, or a d-to-a converter for control of amplifiers.

Multipurpose and user-friendly also describe the **1510A** tape recorder/audio test instrument introduced by **Sound Technology.** Priced at $6000, the 1510A tests any professional audio equipment—tape recorders, film machine, mixing board, reference turntable, and so on.

**Amber Electro Design** highlighted **Model 3501** distortion and noise measuring system, a portable unit that features THD to below 0.0008 percent. The 3501 has automatic nulling and automatic set level for ease of use and costs $2100 plus options.

**Potomac Instruments** brought its extensive line to the show, including the **AT-51** audio test system, which includes the AA-51 analyzer and AG-51 generator. Potomac introduced the **MPC-11** modulation and power controller to monitor and adjust transmitter modulation and power.

**Marconi Instruments** featured the modulation meter 2305 with a frequency range of 500 kHz to 2 GHz and has a modulation accuracy of ±0.5 percent and full GPIB programmability. Applications include calibration of signal generators.

Once again **Belar** drew attention to its low-distortion AM and FM frequency response and modulation monitors. This year the company added a new AM stereo monitor.

Seen at the **Comex** booth was the Real World Technologies UniVUer, a means of displaying with graticule markings a two-channel bar graph on a video monitor simulating an audio VU meter.

From **Eventide** there was the aPX252 real-time spectrum analyzer for the Apple II and Apple II Plus computers. Among the many applications is the ability to control automatically analyzer preamp gain to maintain maximum dynamic range.

Speakers could be seen at the show too. **UREI** brought its new **813B** time-align monitor, which features a redesigned horn for improved acoustical impedance matching and smooth out-of-band response. Price is $1946.

**JBL**'s **Model 4430**, priced at $1176, also featured a unique horn, which the company calls Bi-Radial. It is designed to give constant horizontal and vertical coverage.

**Electro-Voice** showed its Sentry 505 monitor, which features the SuperDome tweeter, capable of handling 25 W of input power. The cabinet is designed for wall mounting, so that the drivers are angled at 60 degrees or 30 degrees from vertical.


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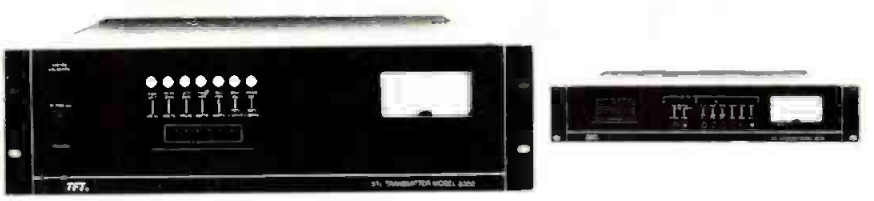

THE 8300

TFT's new Broadcast Quality Aural Studio Transmitter Link and Intercity Relay System brings a new generation of superior STL technology to broadcasting. Specifically designed for the major market's congested RF signal environment, the TFT 8300 provides more features at a lower price than *any* competitive product.

*For further information on the 8300, call TFT—the leader in broadcast product design and manufacture.*

**Features**
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- Saw filter for excellent adjacent protection
- Front Panel Programmable—
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# The Comark "S" Series

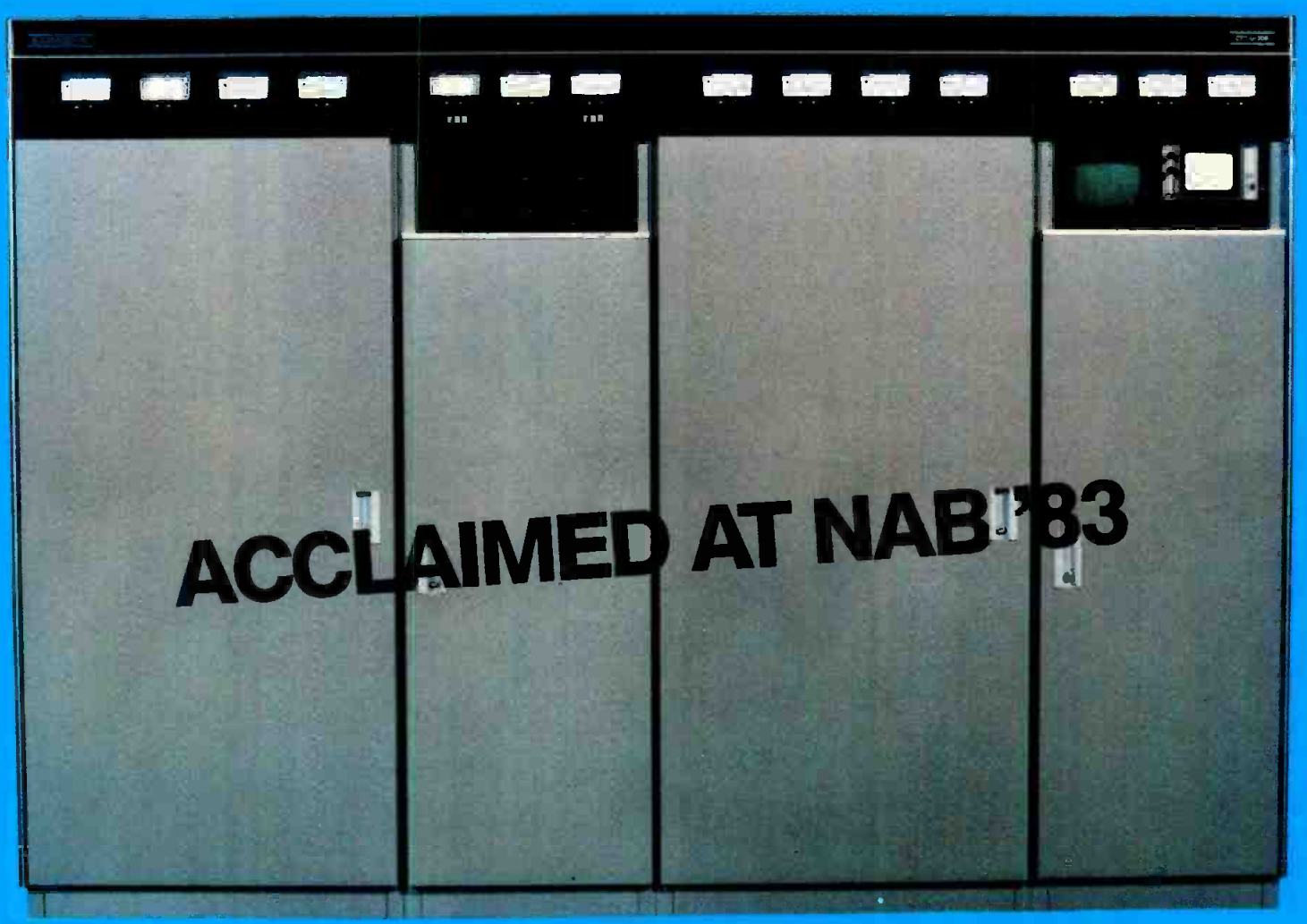
# We just made every other UHF transmitter obsolete.

Broadcast engineers and managers agree. Without a doubt, Comark's new "S" Series UHF television transmitters—from 10kW through 220kW—represent a world class product. Integrating high efficiency, reliability and low cost, each model incorporates state-of-the-art technology to achieve a unique combination of unparalleled features:

- Broadband (no tuning), high power, field proven, exciter system featuring dual channel (redundant) operation as well as Comark's CM-100S Broadcast Modulator with IF S.A.W. filter.
- External cavity, full-band, klystron power amplifiers, combining highest efficiency and compact size.
- Space efficient, mechanical and electrical layouts, fully engineered for maximum EMI/RFI isolation and overall operator convenience.
- Fiber optic telemetry for all floating high voltage metering functions, incorporated into a complete latched fault and status display system.
- Clean, fully isolated, high voltage compartments, with double-filtered air cooling and front access. (No exposed high voltage in klystron areas.)

All Comark "S" Series models are available with advanced system options, including beam current pulsers, motorized RF switching systems, E.D. and ICPM correction systems, and the services of Comark's 24-hour field operations group.

Contact Comark's Sales Office for detailed specifications and further information.




10kW/30kW/55kW
model shown

COMARK

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Colmar, PA 18915
(215) 822-0777
Telex: 846075

International Headquarters
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Southwick, MA 01077
(413) 569-5939

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# RF

# New Trends In Radio and Television Transmitting

Magnavox hoped to excite interest in its AM stereo MX exciter in the "marketplace" competition.

## FIND IT FAST

TELEVISION TRANSMISSION . . . . . p. 110
WAVEGUIDES, TV ANTENNAS . . . . . p. 112
RADIO TRANSMISSION . . . . . p. 114
REMOTE CONTROL AND STL . . . . . p. 117
SCA . . . . . p. 120
AM STEREO . . . . . p. 120
OTHER TRANSMISSION DEVELOPMENTS . . p. 122
ENG MICROWAVE . . . . . p. 122

At this year's show, developments in transmission systems were more apparent than ever. Developments in power tubes for the UHF band, for instance, have led to some brand-new products and a number of refinements in recently introduced products. At the beginning of the transmitter chain is the need for high-efficiency klystrons. Such companies as EEV, Philips and Varian (Eimac) have been leading the way.

This year the spotlight fell on two new tubes: the Klystrode from Varian (a tube combining klystron and tetrode features) and a high-power 45 to 55 kW klystron, the latest addition to EEV's line of wideband klystrons.

Taking advantage of all the recent advances in UHF technology was Comark, which introduced a new broadband, ultra-high-efficiency UHF transmitter in a very compact size, the CTT-U-30S. The Comark transmitter includes a new 20 W vision and sound



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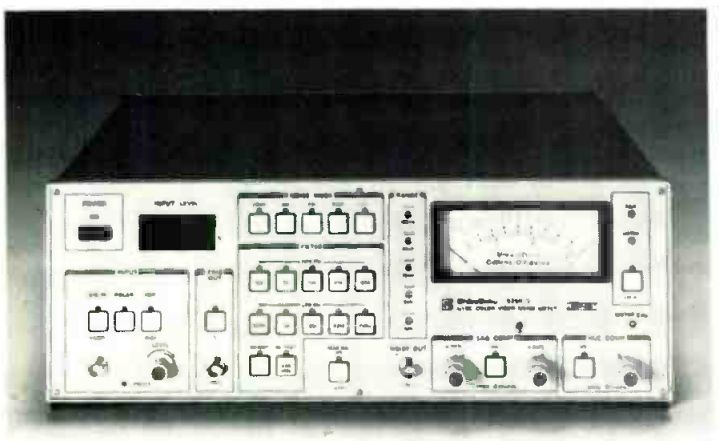
# THE TRUE MEASURE OF PERFORMANCE



## ASACA/SHIBASOKU 925R Color Video Noise Meter

The versatile 925R accurately measures both luminance and chrominance noise generated from TV transmission equipment, TV cameras, VTR's, videotape and videodisks. Connected to a general purpose interface bus (IEEE-488), it gives you complete receive/transmit capabilities. You can receive measurement start, mode and filter selection commands and transmit measurement data through the bus. You can expand the 925R into a fully automated system by using a desk-top computer with the SHIBASOKU TG-7 TV Test Signal Generator, U705 Noise Test Unit and 531 Interface Unit.

- **Tests equipment under actual operating conditions.**
- **Separates AM/PM chrominance noise and measures each.**
- **Features HP/LP filters and weighting network for frequency analysis.**
- **Provides V/H sag compensation, hue compensation, and VTR head balance.**
- **Logs digital data; may be used as a digital video level meter.**
- **Available in NTSC; PAL B, M, N; and SECAM systems.**

Measure your performance with the best. **ASACA/SHIBASOKU 925R.** The world standard in color video noise measurement.

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exciter system. A surprise was the appearance of a brand-new American transmitter manufacturer, Information Transmission Systems from Canonsburg, PA. A high-quality exciter/modulator for UHF klystron transmitters was ITS's lead product. Another new name for most NABers was Itelco—the well-known Italian transmitter manufacturer making its first foray into the U.S. market.

Last year circular waveguides made their appearance as a more efficient way than rectangular waveguides to deliver high power up tall towers (Micro Communications Inc. was the advocate). This year, Andrew Corp. came out in the circular camp but Comark challenged with a square waveguide design which it said was better than either circular or rectangular types. At the termination of the transmission line was a new UHF antenna. Harris unveiled at NAB the Wavestar—it's the only slotted waveguide antenna available in UHF, said Harris. The Shively exhibit featured Italian-made SIRA antennas for UHF and VHF.

A more detailed description of these new products and others at the 1983 NAB follows, grouped in the categories of tubes, transmitters, transmission lines, plus test loads and towers.

## TELEVISION TRANSMISSION

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Varian (Eimac) Klystrode . . . . . 690
EEV high-power klystrons. . . . . 691
RCA Cermolox tube . . . . . 692
Thomson-CSF power tubes . . . . . 693
Calvert Electronics tubes . . . . . 694
Comark CTT-U-30S UHF transmitter . . . . . 695
ITS exciter/modulator,
MDS transmitter, ITFS transmitter. . . . . 696
Thomson-LGT EVHF-S LPTV transmitters . . . . . 697
Townsend MDS/ITFS transmitter . . . . . 698
TTC LPTV transmitters . . . . . 699
Acrodyne 83U01 upconverter, UHF/VHF drivers . . . 700
Philips LDM 1742 UHF transmitter . . . . . 701
RCA TTG-35H VHF transmitter . . . . . 702


By combining features of both klystrons and tetrode into one tube, **Eimac** engineers have come up with a tube more efficient than either a klystron or a conventional tetrode. Called a **Klystrode,** the power consumption is low enough to make UHF aural systems (the first application) no more expensive than VHF. At an operating frequency of 775 MHz and an RF drive power of 160 W, the new tube delivers 20 kW of FM sound. This represents a power gain of 21 dB and a conversion efficiency of 58 percent.

EEV's new wideband klystrons, the **K3272** (vapor-cooled) and **K3272 W** (water-cooled) can produce output powers in the range of 45 kW to 55 kW. Frequency coverage is from 470 MHz to 806 MHz. The magnetics of the earlier wideband klystrons can be used, offering a very compact circuit assembly—the new system can replace lower power tubes in older transmitters.



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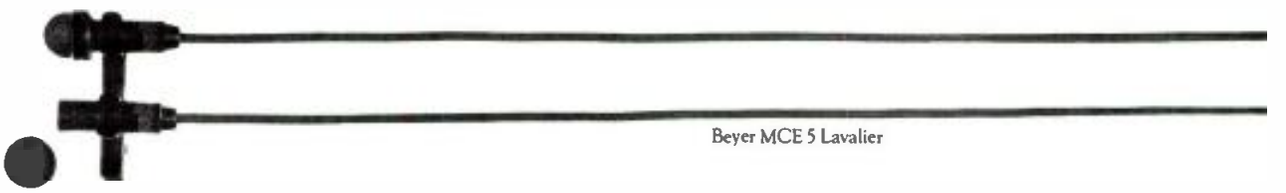
# Why Beyer mics represent a viable alternative to the usual choices in Broadcast.

Beyer MCM Condenser System



Beyer MCE 5 Lavalier

Beyer M 260

## Now there's another high-tech German condenser system.

Until recently, film and broadcast engineers thought only Sennheiser and Neumann made high-quality condenser microphone systems. Now the Beyer MCM Series offers the same German excellence in design and construction, the same kinds of accessories (windscreens, pistol grips, shock mounts) and facilities for 12V and 48V "phantom" powering.

And since the MCM Series studio condenser mic is part of a system which combines power modules and different mic capsules (long shotgun, short shotgun, unidirectional, omni-directional and figure eight), you get more microphone potential for dollar output.

Like all Beyer microphones, the MCM Series is a truly professional instrument system suited to the widest range of applications in Broadcast/Film and Video post-production.

## With lavalier mics, small is not enough.

Electret condenser lavalier mics like SONY's ECM-50 have proven useful for on-camera miking situations because of their reduced size. And while many of these mics offer good performance in a compact size, the Beyer MCE5 also provides extended frequency response (20 to 20,000 Hz) and durability in an even smaller format (diameter: 7 mm / length: 23 mm).

To optimize its compatibility with a variety of broadcast and film applications, the tiny black MCE5 is available in different configurations for powering interface and includes a system with accessories like windscreens, expansion mounts etc.

At Beyer Dynamic's ultra-modern manufacturing facility in West Germany, we hand-build virtually all of our microphones in the most evolved state of fine German engineering.

## There's more than one way to bring out the warmth in an announcer's voice.

Broadcast engineers choose the E-V RE20 for many vocal announcing situations because of its wide frequency response (45-18,000 Hz)* and smooth sound. Beyer Dynamic's M 260 also provides the extended frequency response (50-18,000 Hz) and warmth required for critical vocal applications with one distinct advantage: its reduced size. Its compact and efficient ribbon element captures the warmth traditionally provided by this type of mic. And because it is considerably smaller than a mic with a large moving-coil diaphragm, the M 260 provides a natural, balanced sound image in a portable format that won't obscure copy or take up valuable space in the studio.

The Beyer M 260 has its own custom-designed ribbon element to optimize the mic's performance based on its Broadcast applications.

The Dynamic Decision

beyerdynamic

*Extracted from competitive promotional literature or advertising.
*Documentation supporting specific comparative claims available upon request.

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Other tube news at NAB included the showing of new **Cermolox tetrodes** by **RCA Electro Optics** for UHF LPTV applications (the C93411 tube and Y1400D coaxial amplifier cavity) and a series of tubes by **Thomson-CSF** suited for these same new applications. Tube distributor **Calvert Electronics** also emphasized tubes for LPTV and TV translators, namely Eimac types.

**Comark**'s new **CTT-U-30S** (S Series) was a 30 kW UHF transmitter featuring broadband design, ultra-high-efficiency operation and compact size. Incorporated was a new but field-proven 20 W exciter system (combining vision and sound).

Comark's TV exciter is described as a component approach, and it can upgrade older transmitters. The unit is broadband (no tuning) and uses a parallel signal path for redundancy. Identical ultralinear vision and sound components permit emergency multiplexing.

A key feature of the new UHF **exciter/modulator** from **Information Transmission Systems** is full modularity. It is packaged as a control panel and four slide-out trays—modulator, upconverter, 3 W visual amplifier, and 3 W aural amplifier.

Two other new products from **Information Transmission Systems** (whose principals were former RCA engineers) include a 10 W solid-state MDS **transmitter** and a 10 W ITFS **transmitter.**

There were more low-power transmitter developments than high ones as manufacturers looked forward to expanded MDS and LPTV markets. **Thomson-LGT** showed a new line of extremely compact color units, the **EVHF-S Series,** in 10 W and 100 W sizes. These small units keep the same modulator as used in the well-known 1 kW line. The units feature synthesized phase-lock loop tuning and meet all NTSC standards. There is also a UHF series, the EUHF-S.

**Townsend,** which introduced a 10 W solid-state MDS/ITFS **transmitter** last year, this year had a new 100 W unit. Another new product from Townsend was an inexpensive emergency standby TV exciter.

EMCEE, which showed most of its new line in this category at the 1982 NAB, this year added a second-year warranty to its product line. (It also claimed a substantial sale—21 LPTV transmitters to The Genesis Corp., Columbia SC.)

**Television Technology Corp.** stressed LPTV at its booth, claiming to be number one in the field by virtue of the number of translators sold last year. Although no new products were offered, TTC did offer a special package called the Emergency Transmitter for use when disaster strikes. The 100 W emergency unit is priced at $24,000.

There was something new at **Acrodyne**—a new broadband upconverter, the **83UO1,** rated at 2 W, introduced as part of its entire transmitter/translator line. The modularized unit has a synthesized local oscillator. Frequency is switch-selectable. Acrodyne also introduced two new 10 kW series, the **TT-3510** VHF and the **TT35OU.** In the UHF series, a single 1 kW tube drives the final 10 kW assembly. If the latter fails, the 1 kW stage goes on the air.

UHF was the news at **Philips Television Systems.** Featured was a 25 kW transmitter, the **LDM 1742,** which uses the latest high-efficiency Philips/Valvo tube, the annular beam control (ABC) Klystron type YK 1233 operating in the "Super Pulser" mode. Because of the reduced visual beam power, the overall efficiency of the transmitter, with cooling, is over 30 percent.

News from **RCA** was that it will market TTC's LPTV equipment and that a high-band single-ended 35 kW VHF transmitter, the **TTG-35H,** has been added to the G line.

Although Larcan introduced no new TV transmitters this year, the Canadian company did report penetration into the U.S. market. Some half-dozen systems are now in this country.

## WAVEGUIDES, TV ANTENNAS

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Andrew Corp. UHF waveguides . . . . 703
Comark square waveguide, rigid coax . . . . . 704
Dielectric multiplexer . . . . . 705
Harris Wavestar UHF antenna, CP VHF antennas . . . . . 706
RCA H Panel antenna . . . . . 707
Andrew Corp. LPTV antenna . . . . . 708
Bogner antennas . . . . . 709
EG&G SS-125 strobe light . . . . . 710


Last year, the champion of circular waveguides for UHF use was Microcommunications, Inc. This year **Andrew Corp.** introduced a new line of high- performance circular **waveguides** for UHF-TV. Low attenuation, high power handling capability, and extremely low signal distortion are the major features. Needless to say, windloading of circulars is low. Sizes offered by Andrew include 13.5-, 15-, and 17.5-inch diameters covering channels 14-69. Andrew reports high power mode and axial ratio filters eliminate ghosting, unwanted reflections, and picture smear. An exclusive 90-degree bend permits a continuous run of circular waveguide from the transmitter to the antenna. Both Microcommunications and Andrew report two signals can be sent down a single transmission line and properly separated for feed to two different antennas.

To eliminate the possibility of what it calls "cross-pole" problems—and particularly trapped orthogonal signals—**Comark** introduced a **symetrical (square) waveguide** system. Square systems, however, offer more windloading. Although cross-pole or trapped modes are theoretically possible, Andrew stressed at its booth that its design and careful construction overcame such problems. It also pointed out that circular waveguide can withstand higher internal air pressures because square or rectangular waveguides deform. **Andrew** also introduced a new 6⅛-inch **rigid coaxial transmission line.** The inner conductor design compensates for differential expansion, eliminating mechanical movement and wear.

**Dielectric Communications** showed a custom nine-channel **multiplexer,** but no new transmission lines.

Claiming it to be the only slotted waveguide UHF antenna now available, **Harris Corp.** introduced the **Wavestar** at the 1983 NAB. The cardioid directional pattern antenna, utilizing waveguide technology, has no center conductor, slot couplers, bullets, or insulators as do coaxial types. Thus reliability of the Wavestar is greater, says Harris.

**Harris** also introduced two new **circularly polarized low-band VHF-TV antennas.** The TAV-5L is a five-bay type offering excellent performance and low windload. Each bay has three crossed-vee dipoles mounted at 120-degree intervals. Antenna accepts 60 kW power levels. The TAV-5LE is a direct replacement for the six-bay batwing horizontally polarized antenna—the "E" stands for extended radiation center—placing it within two meters of existing batwings.

**RCA** introduced a new **H Panel** antenna for 54-88 MHz band service (last year a 174-216 MHz line was announced). The new antenna enhances the THP family of antennas designed for square tower applications, although it can be mounted on triangular towers with a custom frame. H Panel antennas have a wide impedance bandwidth and are suited for multiplexing several channels.

A new LPTV **antenna** offering exceptional performance and reliability was introduced by **Andrew Corp.** Construction is welded aluminum that is highly weather-resistant.

**Bogner** offered a large selection of antennas but no new units were shown except for **a unit for 800 MHz mobile radio applications.**

Strobe lights may be getting smaller. It was only a prototype, but a new model from **EG&G** suggested strobe lights for towers might come down in size. The new **SS-125** is only 40 percent the size of older units and current drain is 30 percent less.

**The new Eimac Klystrode.**

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# Something really new at NAB

## *ANDREW debuts six products*

Andrew Corporation has long been an industry leader and innovator of antennas and transmission lines for telecommunications. The company's reputation rests on extensive research and development, and quality assurance for peak performance and customer satisfaction.

**ESC-200 Earth Station Controller**
Using advanced microprocessor technology, the ESC-200's fail-safe design minimizes operator training and reduces possible errors. Coupled with Andrew's high performance two-speed motor drive system, ESC-200 accurately positions the antenna at any given satellite coordinates, in the range of travel, within sixty seconds. Forty such positions can be preprogrammed and 200 events can be executed automatically. It also controls uplink and downlink ground communications equipment and monitors the on-line system.

**9.3 Metre Earth Station Antenna**
New size from Andrew. For television broadcasters and other system operators who demand uncompromised antenna performance and flexibility. Andrew's exclusive Gregorian dual reflector system plus extremely accurate reflector panels produce a unique performance combination. Exceptional gain and closely controlled patterns—2° compliance at 4 and 6 $GH_z$—without sacrificing efficiency.

**Long Life Broadcast Transmission Line—6⅛" Diameter**
Another premium product from Andrew. Exclusive inner conductor design eliminates mechanical movement and wear caused by differential expansion. The inner conductor is supported by state-of-the-art Teflon* disc insulators. Another feature: heavy duty EIA welded flanges.

**UHF-TV Circular Waveguides**
Three new sizes of high power circular waveguide (13.5, 15 and 17.5 inch) employ the latest design techniques for unequalled performance. New high power mode and axial ratio filters greatly reduce ghosting, unwanted reflections and picture smear. Also an exclusive 90° bend allows a continuous run of circular waveguide from the transmitter to the antenna.

**New LPTV Transmitting Antenna**
Andrew's years of manufacturing experience in UHF-TV broadcasting antennas has led to the first truly affordable high performance LPTV antenna. Low-windload. Lightweight and easy to erect. Field selection of azimuth patterns allows interference problems to be dealt with directly. Available for under $5,000.

**High Performance Receive-Only 3 Metre Earth Station**
The traditional quality and performance of an Andrew earth station antenna with a size and price ideal for LPTV, small community and private user applications. Segmented all-metal reflector for low shipping cost, easy installation and dependable service. Assembly can be completed in a matter of hours.

Other Andrew Products on display at NAB '83: High power TRASAR™ UHF-TV transmitting and standby antennas • HELIAX® coaxial cables and elliptical waveguides • 4.5 metre mobile earth station antennas. Contact your Andrew Sales Engineer for more information. Andrew Corporation, 10500 West 153rd Street, Orland Park, IL 60462. Telephone (312) 349-3300. Telex: 25-3897.

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# RADIO TRANSMISSION

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Continental's 802A FM exciter . . . . . 711
QEI 695 FM exciter . . . . . 712
NEC HPA-4536B FM exciter. . . . . 713
Singer FM30F FM Exciter . . . . . 714
Power Pak SMX-40 stereo exciter. . . . 715
Itelco exciters, transmitters. . . . . 716
Thomson-CSF EVHF
100 FM transmitter . . . . . 766
Broadcast Electronics FM transmitters. . 717
McMartin BF-400 FM transmitter . . . . 718
QEI 695T5KW FM transmitter. . . . . 719
Singer FM line, HFS AM transmitter . . 720
TTC Wilkinson transmitters . . . . . 721
Continental Electronics FM transmitters . . 722
LPB travelers' information system . . . . 723
Bosch FM information system . . . . . 724
Cetec JSP FM antenna . . . . . 725
Polar Research antenna rotator . . . . . 726
Bird RF load resistor, RF calorimeter . . 727
Hipotronics high-power measuring . . . . 728
Gentner Engineering telephone hybrid. . 729
Studer telephone audio system. . . . . 730
Marcom Rood line extender. . . . . 731
Tandberg TES equipment. . . . . 732
Micro-Trak Telefile II telephone mixer. . . 733


The latest in AM stereo or new SCA generators to capitalize on the recent FCC rules authorizing multichannel SCA would be what one might have expected to find at this year's NAB. Indeed, such products were there, as were some new transmitter designs—AM and FM—but the surprise was the number of new FM exciters. There hasn't been much excitement in exciters since Broadcast Electronics introduced the high-performance FX-30 several years back.

This year it was **Continental Electronics'** turn, and the company rose to the occasion by announcing the **802A.** Its modulation performance (direct carrier) exceeds that of any other on the market, said Continental. "Performance approaches the measurement capabilities of the most advanced test equipment," it boasted.

What Continental didn't know when it made that claim was that QEI Corp. was also at work designing an exciter "of unparalleled transparency," with characteristics "reduced to a point that they become difficult to measure." The 802A requires no tuning adjustments other than the selection of the operating frequency—which is generated by a digitally programmed, dual-speed, phase-locked frequency synthesis system.

**QEI Corp.**'s new exciter, the **695,** boasted the lowest distortion of all—less than 0.025 percent, independent of temperature. Said QEI, "we have put considerable design effort in achieving a linearity far beyond that which has been possible to date in FM exciters." It too used a synthesized PLL frequency generator.

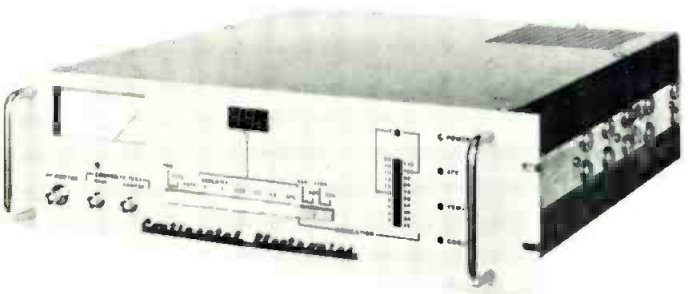
**NEC** showed a new FM exciter capable of high performance and intended as a replacement unit for older exciters. It claims low harmonic and intermodulation distortion and an FM S/N of 75 dB typical, unweighted.

Yet another new exciter was the **Model FM30F** introduced by **Singer Broadcast Products.** While it has good-looking specifications in terms of distortion and S/N, the numbers did not match those set forth by others. But then the price set by Singer was several thousands lower. The Singer unit offers a distinct choice when cost/performance analyses are made.

A new 40 W output stereo exciter, the **SMX-40,** was introduced by **Power Pak Systems Inc.** The unit is fully frequency synthesized and includes extensive status indication and protection. Its price is a modest $2995.

Still other new exciters (new at least to most Americans) were on display at the Itelco booth, the Thomson-CSF booth, and the Audio-Video Communications System booth. **Itelco** is an Italian manufacturer well known in Europe. Its **exciters** were the ESINT-05 and the ESINT-20, which were 5 W and 20 W output units. **Thomson** showed


# Introducing the ultimate FM Exciter!



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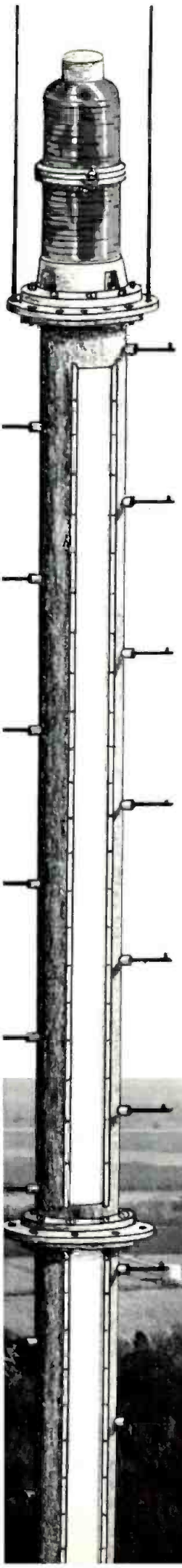

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a new super-compact FM transmitter, the **EVHF 100** (FM). It boasted 100 W of output. The AVC exciter was the Canadian-made Bayly Engineering Ltd. unit. Performance specs of these units are all very respectable but not as impressive as those claimed by BE, Continental, QEI, and NEC.

There was a surprising number of new transmitters at NAB '83. **Broadcast Electronics** showed three new **FM models:** a 1.5 kW unit, a 3.5 kW unit and a 5 kW unit. All use but a single tube. The FM-1.5A is quite unusual and reflects new design concepts. It has a patented folded half-wave output cavity, which means no plate blocking capacitor or sliding contacts. The IPA is broadband and the transmitter has a digital control system. (The exciter is the ultra-linear FX-30.)

The 3.5 kW and 5 kW transmitters from BE also feature the new folded half-wave output cavity, a broadband input matching network, digital control systems and automatic power control.

**McMartin** had one new transmitter, the **BF-400.** Height of the unit was only 51 inches and weight was 325 pounds.

**QEI,** which introduced several new low-power (1 kW and 3.5 KW) FM units last year, announced at this NAB a new 5 kW FM unit, the **695T5KW.** It uses a single output tube in a grounded grid configuration for stable operation. An automatic transmission system is built in, as is also an automatic modulation control. The new 695 exciter described earlier is, of course, used.

**Singer Broadcast** introduced a brand-new line of **FM transmitters** with 1, 3, and 5 kW ratings. These units use the new exciter already mentioned. Although the RF stage of earlier CCA transmitter models is used, a new solid-state controller has been designed.

Speaking of reworked transmitters, **Television Technology Corp.** has done a face-lifting job on the **Wilkinson** line of AM and FM transmitters it purchased over a year ago. The insides of the units were redesigned, also.

**Continental** showed additions to its line of **FM transmitters,** the 27.5 and 55 kW. The latter has two 816r-4 27.5 kW units combined in a 90-degree hybrid.

No new transmitters were introduced by CSI, Elcom-Bauer, or Harris, although all the companies displayed large lines. Nautel from Nova Scotia and Bangor, Maine, which impressed visitors last year with a series of solid-state AM transmitters, particularly the AMPFET 10 kW solid-state unit, was back again. All sizes are now in production and installed and operating, said Nautel.

Something new for NAB were **travelers' information** radios. **LPB** showed a low-power transmitter operating at 530 kHz or 1610 kHz. Its range is about 1.5 kilometers. This is the system used at the Los Angeles International Airport to provide information on parking, flight schedules and the like. At a special meeting room at NAB, the Blaupunkt Car Radio Div. of Robert **Bosch** demonstrated an automatic radio **information system for FM.** Selected FM stations can broadcast a signal that can be picked up on special receivers.

There was one new antenna for FM—**Cetec Antennas** showed the **JSP** Spiral panel circularly polarized type. The new type requires only half as many cables; a solid copper element was shown, as well as a round rod-type element.

A novel **antenna rotational control** system was shown for VHF and UHF antenna arrays. The control—operating on an inner ring and an outer ring—permits antennas to be moved for reduced interference to the antenna pattern from the mounting structure. The system was developed by **Polar Research, Inc.,** Thief-River Falls, MN. In the same booth were ac line surge suppressors from Eagle Hill Electronics. These units protect loads from energy surges caused by load switching or lightning.

There were several exhibits at NAB 1983 showing transmitter-related products—sometimes the product was new, sometimes it was a new exhibitor. In the former category was the 25 kW air-cooled air-dielectric high-power RF **load resistor** from **Bird Electronic Corp.,** the Model 8572. This is the first of a new series of compact dry, air-cooled units. The outer conductor has a very low VSWR over a wide range of frequencies.


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Also new from Bird was a new digital wide-range RF **calorimeter,** which has a range of 50 W to 1000 W. With the furnished K factor, measurement uncertainty is down to 1.5 percent.

A new exhibitor with a wide range of **high-voltage measuring equipment** was **Hipotronics.** In addition to cable fault meters, were insulation testers, corona testers, and voltage meters, plus the Peschel variable transformer which adjusts to almost any voltage, current or KVA rating.

Broadcasters always on the lookout for new and better ways of avoiding troublesome telephone interconnections were able to see a few new wrinkles at this year's NAB. A new company with solutions was **Gentner Engineering. The electric hybrid system** SPH-4 offered "computer-designed equalization before and after the telephone mix" for good hybrid performance and high telephone quality.

Gentner's hybrid was competing with those offered by Studer and Symetrix, both of whom have had systems on the market. **Studer** showed a new **telephone audio system** for radio talk show hosts based on its telephone hybrid. Because the system eliminates the need for a "mix minus" bus audio feed, stations with less sophisticated consoles may now use a hybrid.

Telephone line extenders were shown by Comrex, Tandberg, and **Marcom,** with the latter exhibiting the Dutch **C.N. Rood line.** Marcom was also showing a telephone bridging switcher being developed for 1984 use at the Olympics. Although Comrex had no brand-new equipment, it effectively demonstrated in its booth the benefits of a five-band compandor system used by the Boston NPR station along with two-line extenders. The noise reduction circuitry works with almost any line, Comrex said. **Tandberg's TES equipment** was new to the U.S. It uses compression/expansion technology to improve S/N and expand phone line response to 6100 Hz.

Although most **Micro-Trak** products are described in other sections, the **Telefile II,** as a small battery-powered portable mixer, can be included here. It connects directly to the telephone line mixing in either live voice or tape or both. (The unit has logic built in to avoid tape start wow.)

**Front drawer accessibility to Broadcast Electronics new FM-1.5A transmitter.**

## REMOTE CONTROL AND STL

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES


Pye TVT remote control . . . . . 734
CAT Systems remote control . . . . . 735
Hallikainen and Friends DRC-190 remote control . . . . . 736
Symetrix DCS-16 remote control . . . 737
TFT System 8350 remote control . . . 738
Delta RCS-IV remote control . . . . . 739
Moseley MRC-2 remote control . . . 740
Potomac RC-16 Plus remote control . . . . . 741
TFT Model 8300 STL . . . . . 742
Power Pak Systems STL . . . . . 743
Micro Controls PTS-10C/ULX-2001 STL . . . . . 744
Marti STL-10 . . . . . 745


**FOR MORE INFORMATION ON ADS APPEARING IN THIS ISSUE, USE READER SERVICE CARD, PAGE 25.**

**Cetec Antenna's circularly polarized FM antenna.**

The breakout of new FM exciters at this year's NAB was almost matched in numbers by new or modified remote control systems and studio-to-transmitter links on display.

Color graphics systems have made their way into remote control. In the Philips Television Systems booth the new **Pye TVT remote control** and telemetry equipment Type 1984 was shown, which enables up to 99 remote and unattended transmission sites to be monitored and controlled from a central point. A bright color graphics display depicted the transmission system under control.

**CAT Systems** was back with its systems that include voice synthesizers as well as microprocessor control and video color graphic displays. CAT systems are adaptable to any **RF control** situation. Broadcast transmitter computerized remote control and satellite uplink computer control were typical applications demonstrated.

A new low-cost system, the **DRC-190** digital remote control, was shown by **Hallikainen and Friends.** For $2995 one can purchase a 10-channel system (expandable to 100). The system can be operated manually or used with standard computer peripherals to monitor, display and print all relevant readings, including phase, relative amplitude calculated ratios, and deviations. Out-of-limit parameters can trigger a program to make adjustments. In conjunction with a modulation controller, the DRC-190 can meet FCC ATS requirements.

**Symetrix** introduced the DCS-16 remote control system, a microprocessor-based system with features otherwise available only in more expensive systems. Applications include not only transmitter control and status monitoring but ENG microwave antenna switching, VTR control, and so forth.

**TFT, Inc.** introduced a new TFT **System 8350** providing 24-channel control and status monitoring system.

Many of the remote control systems on exhibit were latest models or generations of well-known lines. **Delta Electronics' RCS-IV** includes new operating features such as no operator intervention to get continuous monitored parameters on a CRT screen and readings presented in the familiar log format for instant recognition.

**Moseley Associates** showed the **MRC-2** microprocessor remote controller. Although introduced last year, the system is continually shown in new applications because of the building-block approach of its design. Featured at NAB was total automatic control.

**Potomac Instruments** displayed the **RC-16 Plus** introduced earlier as a fully flexible microprocessor system. The unit is expandable to 64 channels, and can plug into an auto logger or CRT display as options.

In STLs, TFT came out with a new system designed specifically for operating in a heavy RF signal environment. The TFT **Model 8300**



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has a number of features designed to cope in areas thick with signals in the 942-950 MHz band. A front panel selectable bandwidth switch permits obtaining the best selectivity when adjacent channels are busy.

**Power Pak Systems** offers an STL system priced at $3995 but with features found only in higher-priced systems. These include wideband composite and two narrow band (one with preemphasis), a synthesized frequency carrier, and good performance in the presence of external RF environments.

Two new STL units introduced last year, but now in production, are the **Micro Controls PTS-10C** wideband transmitter/**ULX-2001** Uniphase Link/Exciter, and the **Marti STL-10.** Micro Controls says good discriminating circuits eliminate hiss in the absence of a signal. Moseley featured the PCL 606 system, designed with ultra-low noise and distortion and featuring excellent frequency selectivity and stability.

A new AM stereo STL link, the PRS-10CD and PTS-10CD, was shown by Micro Controls. The receiver has separate L and R channels. It is compatible with all AM stereo systems. A third channel is available for a remote control system.

**READER SERVICE CARD, PAGE 25.**


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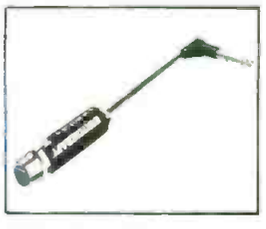

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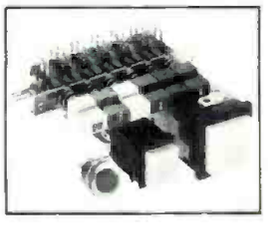

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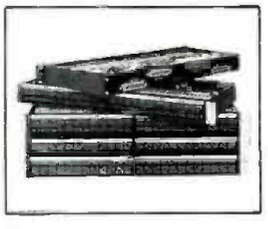

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## SCA

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


McMartin Super S SCA system . . . . . 746
Modulation Sciences Sidekick SCA . . . . 747
Emergency Alert decoders . . . . . 748


Several exhibitors were ready with equipment for broadcasters who want to take advantage of the recent FCC ruling allowing more than one FM subcarrier for SCA.

**McMartin** demonstrated what it called the **Super S** system, designed to make maximum use of the subchannel band. In one demo, McMartin showed a 67 kHz subchannel split into voice and data (a new data receiver was also shown). In another demonstration, three additional subcarriers were introduced, in addition to 67 kHz. (If 67 kHz is dropped, six subchannels could be used.) This FM/SCA pioneer manufacturer also showed an SCA enhancer which compressed and expanded the SCA signal to improve S/N by as much as 22 dB. On exhibit was a new portable TVR-2 receiver and a TX-200D FM/SCA signal analyzer.

Although not offering a multiband mode, **Modulation Sciences** presented the **Sidekick** SCA as a systems-engineered SCA generator that successfully reduces crosstalk. The result: highest-quality FM and SCA. The secret to high performance, says Modulation Sciences, is the integration of three elements into one system: the subcarrier generator, an audio processor and transmitter tuning aid.

Although it had no equipment on display, **Emergency Alert Receiver, Inc.** said it was at work on a decoder chip that would bring in the new subchannels.

## AM STEREO

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Motorola AM stereo . . . . . 749
Magnavox AM stereo . . . . . 750
CRL SMP-900 AM stereo processor . . . 751
Harris AM stereo . . . . . 752
Sansui multi-system tuner . . . . . 753
Kahn AM stereo . . . . . 754
TFT AM load management system . . . . 755


Those 89-odd stations which were transmitting AM stereo at the time of the NAB 1983 show needed exciters and monitors. AM exciters were in evidence at the exhibits of Continental, Harris, Kahn, Magnavox and Motorola. And such equipment was either on display or promised at four other booths: Belar, Broadcast Electronics, Delta and TFT. These latter four are



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new licensees expected to build exciters and monitors for the Motorola system.

The entrance of these manufacturers into equipment building is cited by Motorola as strong evidence of the superiority of its system. Further evidence of **Motorola** progress was the exhibit of a **decoder chip** for its system, the MC 13020 P. Although being distributed on a sample-only basis at present, production is supposed to begin this month. The chip is priced at $2.33 in 100-999 quantities. Samples have been ordered by over 50 receiver manufacturers, says Motorola, including Delco, which has recommended the Motorola system to its GM car divisions for 1984 models.

**Magnavox** exhibited in its booth a PMX exciter and a 1 kW Continental transmitter, and processors built by Circuit Research Labs and Belar. Live signals were received from KMJJ-AM, a 10 kW station in North Las Vegas. Although Magnavox is actively promoting its systems to broadcasters beyond the three it now has on the air, a spokesman for N.A.P. Consumer Electronic Corp., Magnavox's parent, announced on the eve of the NAB show that it supported the notion of receivers capable of receiving all four systems. Magnavox sees all four systems competing in the marketplace for some time to come.

What was shown specifically at the **Circuit Research Labs** exhibit was the **SMP-900** AM stereo processor, a unit that improves AM stereo/monaural compatibility. At the Continental Electronics booth a full system was shown.

**Harris** was promoting both exciters and monitors and receivers. The slow start in getting monitors into production is now over, says Harris, and it's ready to ship at the rate of 15 to 20 per month. The ability of its linear system to accept full audio processing without distortion, as recently demonstrated in Canada, was heavily promoted. But so was the sale of Sansui's automatic AM stereo/FM tuner, the TU-S77AMX.

Harris was taking purchase orders for the tuner which can receive the broadcast signals of any of the four AM stereo systems. The **Sansui tuners** use PLL synchronous detection which rejects interference, improves the S/N ratio and provides low distortion, according to the company.

A tuner for the Kahn system was shown by **Kahn Communications** for sale at $135. A lease arrangement to lease or purchase its STR-77 transmission system was offered on a plan as low as $312 a month.

Mentioned elsewhere in this report is an AM stereo STL system available from Micro Controls. Yet another by-product coming out of the move into AM stereo is an AM radio load management system that was shown by TFT. This system, compatible with AM stereo, can be offered by broadcasters to electric utilities that wish to control loads in consumers' homes such as air conditioning, hot water heating, and the like.

## OTHER TRANSMISSION DEVELOPMENTS

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


Artel video/audio fiber optics . . . . . 756
Grass Valley Wavelink . . . . . 757
McMichael fiber optics . . . . . 758
AT&T Digital TV Lightwave System . 759

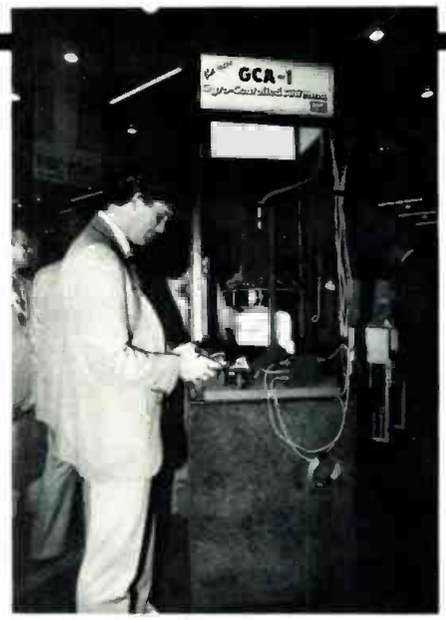

Fiber optics inroads into TV continued to manifest themselves at the 1983 NAB as new cost-beneficial applications appear. **Artel Communications**, for example, introduced a low-cost **video/audio plug-in, a transmission module** for its SL-2000 fiber optic system. By combining audio and video on a single card, fiber optics become economical for shorter distances. Maximum distance for the new T/R-2020 module set is one kilometer, compared to 7 km as the maximum distance for the SL-2000. BIW Cable Systems indicated that a careful analysis of camera cable costs frequently indicated fiber optic cable as economically practical (except for very short distances) as well as offering superior performance and being light in weight.

The **Grass Valley Group** actively promoted **Wavelink** fiber optics as "an evolutionary milestone." Fiber optics can now compete with microwave, says GVG. A new product from GVG was Dual Channel Audio, an option for the Wavelink 3291 transmission system. The Wavelink systems uses FM transmission (eliminating intermodulation distortion associated with AM), and Avalanche Photodiodes (higher conversion efficiency than possible with PIN diodes). S/N specifications are better than the 58 dB for video and better than 65 dB for audio of a 2 km fiber. Diffential phase and gain is very low.

A new exhibitor of fiber optic systems was **McMichael** from the U.K. The 4000 series was offered as a **fiber optic link** developed for video applications.

**AT&T** showed a **Digital TV Lightwave System** that will carry both picture and sound during the 1984 Olympics. Analog signals are converted to PCM, multiplexed into a serial bit stream and fed to a standard FT3C optical line.

**Nurad's new line of microwave transmitters.**




**Broadcast Microwave's new gyro-controlled airborne ENG system.**

## ENG MICROWAVE

**USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES**


BMS GCA-1 gyro-controlled antenna, omni antenna . . . . . 760
M/A-COM SkyPod II, omni antenna, central receive antennas, portable microwave transmitters. . . . 761
Nurad microwave transmitters/receivers, Silhouette antenna . . . . . 762
NEC TVL-800-7E ENG microwave link . . . . . 763
Ikegami portable microwave link . . . . . 764
Harris 7FB intercity link . . . . . 765


More head-on competition in the microwave ENG industry gave NAB visitors a wide choice of gear, but the extra models made decision-making no easy job. For example, at the RTNDA convention last fall, **Broadcast Microwave Services (BMS)** showed a new gyro-controlled antenna system **GCA-1** to compete with Nurad's airborne ENG/EJ systems (CopterPod and MiniPod) and M/A-COM's SkyPod. But as NAB rolled around, M/A-COM had advanced to the SkyPod II.

The GCA-1 is designed to assure stable pointing of the airborne high-gain antenna array. Once initial directivity is achieved through a simple thumb wheel adjustment, the antenna points to the receive site independent of aircraft maneuvering. Readjustment to an alternate receive site is made with the use of a directional bearing gauge. BMS antenna specs include 16 dBi gain, unlimited rotation, a slew rate of 60 degrees per second and tilt of 55 degrees maximum. Beam width has an elevation of 30 degrees and an azimuth of 17 degrees.



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used in conjunction with a low noise amplifier, the system performs like a quad horn at a fraction of the cost. With 14 dB of gain in two quadrants and 10 dB in two, the range is 50 miles. The only drawback of an omni is its susceptibility to unwanted signals. BMS says to try it first and pay only if it will do the job for you.

BMS showed a full line of transmit antennas. Very interesting was a truck-mounted parabolic dish transmitter that included a detachable, 16 dB yagi/transmitter module. The detachable module could be removed and hand-carried to a rooftop, for example.

M/A-COM's **SkyPod II's** claim to fame is range, flexibility and ease of use. The range is over 200 miles under line-of-sight conditions. A new exclusive slaved gyro steering approach features no drift whatsoever. The antenna will automatically track a preselected heading without regard to helicopter direction.

While M/A-COM has always provided central receive antenna systems including SkyScan, SuperScan, and MiniScan, two additions are a DA-626/DA-626DM disc-array featuring one-third the windloading of conventional antennas, and the **OmniPole,** which is similar to the BMS unit previously described. (OmniPole's gain is specified at 13 dBi ± 1.5 dBi, but a 16 dBi directional is an option.) Also new for central systems is M/A-COM's Super 2MR self-contained receiver featuring full frequency agility across the 2 and 2.5 GHz bands. The Super 2MR is intended not only for ENG use, but is suited for network programming and intercity repeater applications.

Two other new M/A-COM products were a new MB-1 **multiband portable receiver** working in the 2/2.5, 7, and 13 GHz bands, and the MLV-7I **International Portable system** for emergency link restoration, multihop capability and remote control (through 1000 feet of coax).

**Nurad**'s antenna systems and airborne equipment—always state-of-the-art—have been on the scene since ENG/EJ's beginning in 1973. This year, however, Nurad showed itself to be a force in **transmitters and receivers** as well, including central receivers, STL/ICR transmitters and receivers, and portable transmitters and receivers. Many receivers include new Nurad GaAsFET preamplifiers in the 2/2.5 and 7 GHz bands. It also offered ITFS/MDS systems including transmitters, receivers, power amplifiers and antennas. Added to the antenna line is the **Silhouette,** a low-profile and lightweight offset-fed parabolic with low sidebands. Nurad's digital remote control system has been expanded to control and monitor its full line of antenna systems—the new model number is MC4.

While several new transmitter/receivers were introduced last year by Nurad, its line is now quite complete. These include, in the AR2-Series, 2, 2.5, and 7 GHz bands. Each receiver has a digital synthesizer for frequency agility plus offset channels. Good adjacent channel selectivity is provided by a narrow band 10 MHz SAW filter.

The new NEC **TVL-800-7E** ENG microwave link promises to become a contender by virtue of its size, weight, power and noise characteristics. New CMOS and FET devices are said to be responsible for good performance in a small package. Transmitters (1 W) and receivers weigh but 4.4 pounds each. More than 10 switchable channels are offered in the 7 GHz band. Two audio channels are standard.

The **Ikegami portable video/audio microwave transmitting/receiving system,** the ML-83/79, for attachment to cameras, was first shown last year. The company reports the system is now in production. A tripod mounting system is an option to camera mounting. Up to seven different channels can be used for multicamera situations. Range is about one mile from the base-station antenna.

The new inter-city microwave equipment from **Harris,** the **7FB** baseband television relay system, is described as solid-state and high-performance. A thin film LNA and an image rejection mixer combine to achieve an exceptionally low receiver noise figure of 7 dB. The receiver includes a clamper which stops picture bounce, reduces low-frequency noise, and eliminates hum.


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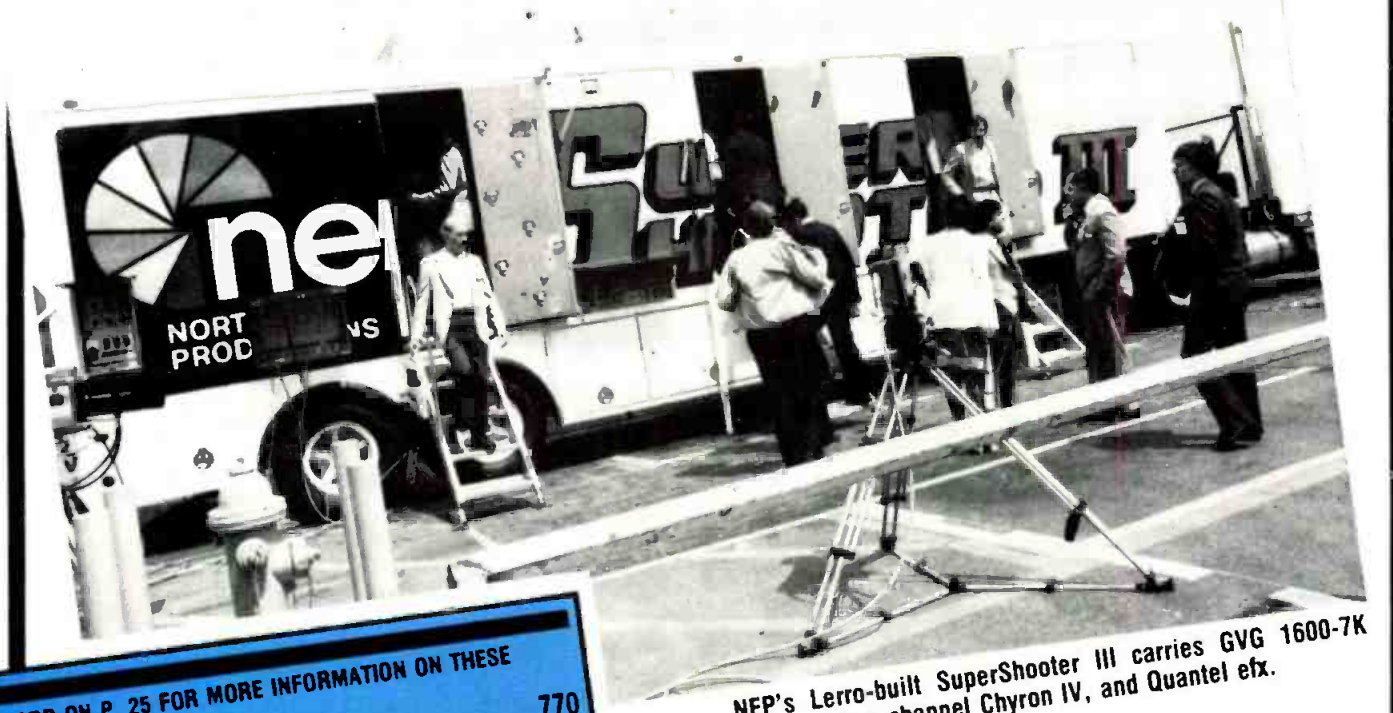
# MOBILE VANS

## Mobile Vans Taking a Ride With Industry Success




NEP's Lerro-built SuperShooter III carries GVG 1600-7K switcher, two-channel Chyron IV, and Quantel efx.

USE CARD ON P. 25 FOR MORE INFORMATION ON THESE COMPANIES

Centro 40-foot trailer, C-1000 EFP van . . . . . 770
A.F. Associates/NBC Van-Go trailer . . . . . 771
RCA/Quality Video trailer . . . . . 772
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MZB MZB-14 truck . . . . . 777
Philips/Mile Hi cable truck . . . . . 778
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TV Engineering 17-foot, 19-foot trucks . . . . . 780
E-N-G Corp. Suburban, Econoline . . . . . 781
Wolf Coach B-102 box, V-118 van . . . . . 782
Film/Video dual-truck system . . . . . 783
Bell Helicopters JetRanger, LongRanger . . . . . 784
MBB Helicopters BK 117 . . . . . 785

Visitors to the NAB have come to expect nothing less than the best in production vehicles, and they were not disappointed this year. The range of trucks on the floor and on the lot—from no-nonsense ENG vans to elaborate trailers—offered something for every broadcast need.

As usual, the giant trailers were thronged with attendees—and with good reason, for this year's crop was especially impressive. No one could miss, for example, the gleaming white **40-footer** in the **Centro** booth with its bright graphics. Centro built this beauty for Denver TV independent KWGN for an undisclosed price, rumored to be quite favorable to the station. Designed by KWGN director of engineering Ron Peters, with assistance from assistant chief engineer Gary



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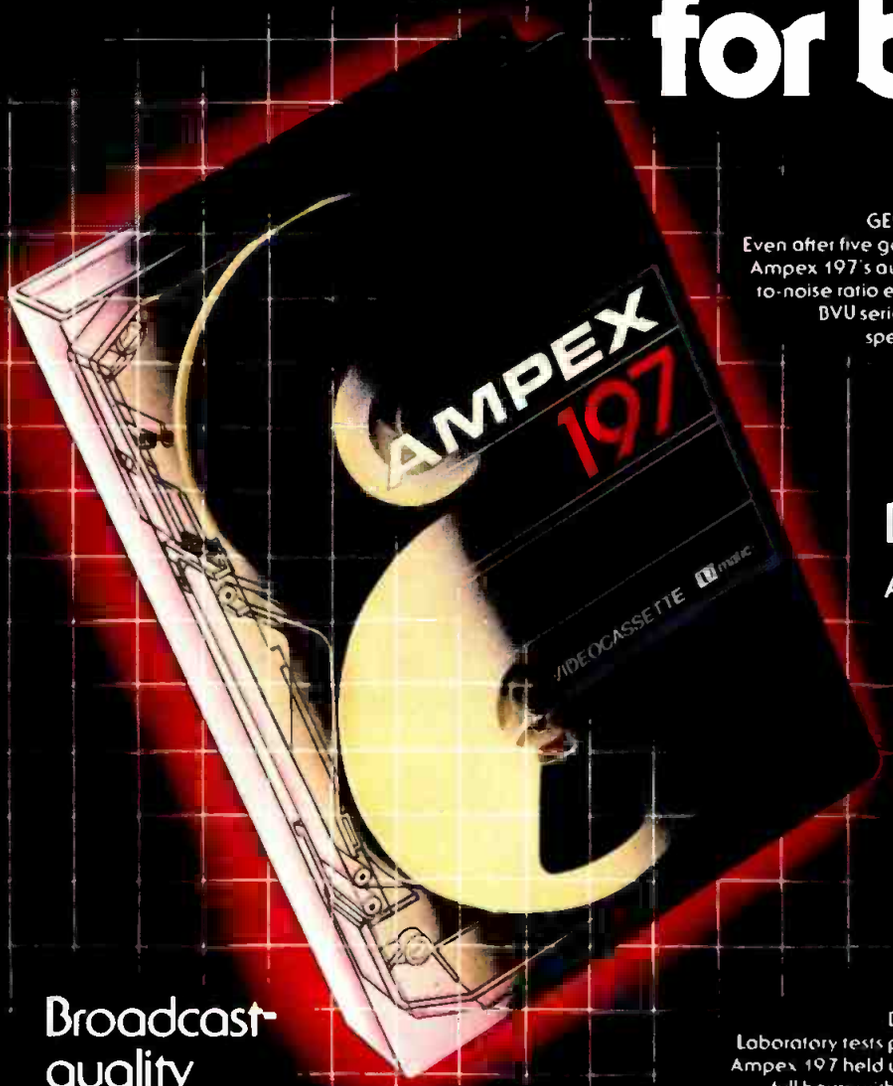
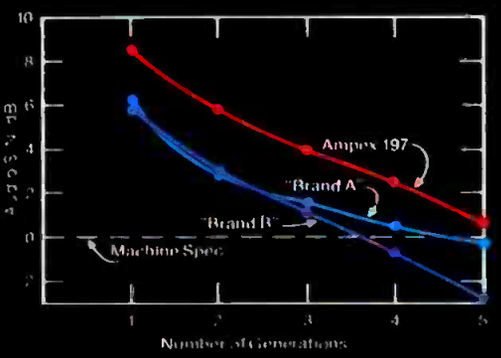
# Ampex 197: designed especially for broadcast.




AUDIO MULTIPLE GENERATIONS
Even after five generations, Ampex 197's audio signal-to-noise ratio exceeds the BVU series machine specifications.




## Broadcast-quality sound.

Ampex 197 offers superior signal-to-noise and low distortion characteristics. This means crisper, cleaner audio performance under heavy editing conditions and multiple generation dubbing. Plus excellent stereo fidelity when used for music recording.

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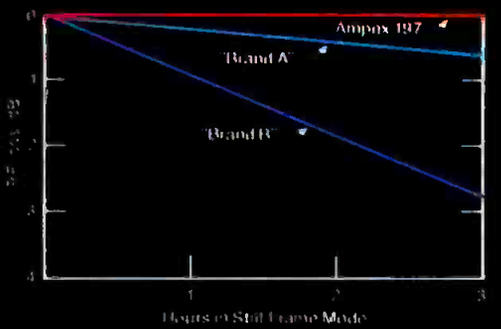


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In blind field testing, Ampex 197 got the highest marks from broadcast professionals for picture quality, stability, and durability.

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**AFA/NBC Van-Go.**

Lahm, the truck will replace the station's older trailer (which has reached a "certain age") and compete for network production jobs in the Rocky Mountain area.

An unusual feature of the KWGN trailer is a separate split-feed area, equipped with a small Broadcast Video Systems switcher and Yamaha audio board. This area is located adjacent to the video and camera control compartment, which contains the electronics for the four Ikegami HK-357A computer-controlled hard cameras and two HL-79DAL hand-helds, all triax-equipped. An additional two cameras can be added if needed. Next to the video and camera section, in the rear of the truck, is the Chryon compartment, which contains the truck's two Ampex VPR-80s and Sony BVU-820, all with slow-mo.

Rounding out Centro's NAB exhibit was a smaller, production-type truck built for Cox Cable of New Orleans. This compact vehicle, built to **Centro's C-1000** design on a Ford truck chassis, carries Sony ¾-inch VCRs and RM-440 automatic editing control unit, a small ISI switcher, Quanta Microgen character generator, eight-input Yamaha audio board, Technics cassette deck, and RTS intercom.

Centro, however, had no patent on dazzling trucks at Las Vegas. Just a short walk outside in the parking lot was **Van-Go,** the massive NBC Sports truck constructed by **A.F. Associates** to network specifications. For sheer magnitude, it would be hard to beat this truck: 48 feet long with a 24-foot pullout side that adds five feet to the truck's width; 12 miles of cable throughout the trailer; 16 tons of air conditioning (eight in the front and eight in the back); a 45x20 ADM custom IFB system; and a 32-channel ADM audio board so big it had to be installed through the roof. AFA guesses that Van-Go may be one of—if not *the*—biggest mobile video vans in the world, and the claim is not difficult to believe.

The truck, which had been in service for about six months at the time of the show, took time off its busy schedule to put in an NAB appearance. It has seven RCA TK-780 triax-equipped cameras and one TK-76; total camera capability is 10. In the videotape area, three Sony BVH-2000s are presently installed, with provision for a fourth; the truck can also handle four external VTRs. The truck had left its Quantel DLS-6030 still library at home for NAB, but still carried its two-channel Chryon IV, four ADDA VW-2 frame synchronizers, and Convergence ECS-104 editor and CP-110 switcher. The editing capability allows NBC to produce sports promos on board the truck. The main switcher, in the production area, is a three-M/E GVG 1600-7N custom-built in 1975 for a previous NBC truck. It is joined by a two-channel Quantel DPE-5000+ with effects library system and Shot Box. Color monitoring is by Conrac.

Tucked in among the satellite dishes behind the Convention Center was another full-size trailer, a 45-footer built by RCA for **Quality Video,** a Las Vegas production house, in a Gerstenslager box. On the road since last October, the QV truck carries six RCA TK-47BT triax-equipped computer set-up cameras and two Ikegami HL-79DALs, also with triax. The production area features

**TV Engineering Econoline.**

a 24-input Grass Valley 300-3A switcher, plus Mark II two-channel digital DVE and a GVG 400 routing switcher. Capability is expanded further with a two-channel Chryon IV, ADDA ESP-150 digital still store, and ADDA VW-2 frame synchronizer. Videotape capabilities include four RCA-built TR-800 one-inch VTRs with slow-mo controllers, super search editors, iso control panels, and AFV switchers; a TH-50A one-inch portable VTR; a Sony ¾-inch VCR; and a master time code system.

The truck's audio section is fully capable of both sports and show assignments, with a 32-input Yamaha PM-2000 audio board and Tapco 16-input submixer, Technics RS10A02 two-channel ATR, Telex cart machines, Technics cassette machine, and two Lexicon digital audio effects units.

Another NAB visitor was SuperShooter III, the 40-foot trailer engineered and assembled by **Lerro Electrical Corp.** for **North East Productions** (NEP). As of NAB, this well-designed truck had logged 42 remote productions since its first job in October, the Miami-NY Jets football game. Lerro built the $1,800,000 facility in just seven

**Roscor/Clarion trailer.**

weeks, accomplishing that feat by working "24 hours a day," according to a spokesperson.

Just forward of the tape compartment one encounters the engineering position, with electronics for the nine Hitachi cameras: six SK-96s and three SK-91s, all with triax.

The next compartment is the audio area, where the truck's extensive audio capabilities center around a 32-input by eight-output Yamaha PM-2000 console. Other audio equipment includes an Otari reel-to-reel ATR, two Broadcast Electronics cart machines, a Tascam cassette recorder, UREI limiters, dbx 160X compresser/limiters, an eight-channel RTS intercom, and full patching.

While **Roscor Corp.'s** booth was located in the farthest back corner of the Convention Center, the location couldn't have been the better—the booth faced one of the glass doors to the outside, with the trailer Roscor built for **Clarion Remote Television** just a step beyond. Bearing Roscor's trademark pewter finish, the Clarion truck was due for delivery to its Chicago home just after the show.

It is designed for either sports or show production; in its show configuration, it has a separate room for the assistant producers. Three-quarter-inch off-line work copies can be produced right in the truck, according to Roscor, and the truck's full time code capabilities (from Adams-Smith) include VITC on the Ampex VPR-2B VTRs—all of which have automatic scan tracking, TBC-2B TBCs, and Dolby NR. Videotape facilities are further enhanced with a Sony BVU-110 U-Matic and a variety of other ¾-inch, Betamax, and VHS recorders. Of course, the truck has full RTS intercom and IFB facilities. Cameras in the Clarion truck are all Ikegami, with five computer-controlled HK-357ATs and two HL-79Ds, all with triax base stations.

Roscor's display wasn't limited to the big truck, however. Inside the hall it showed a good-sized (over 20 feet in length) straight truck, custom-built from the frame up with a fiberglass-reinforced plywood body that the company says is highly rust-resistant. Designed for EFP work, the truck is capable of supporting three cameras.

Rounding out the trailer category at NAB was an all-audio unit being shown by MCI/Sony. Southwest Pro Audio, an MCI dealer in Austin, built the 42-foot trailer for **Reelsound Recording,** a local audio production house. The truck is built in the elegant, comfortable style audio people seem

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to favor, with a hand-made wooden floor and other attractive details. The front of the truck contains a small isolation booth for overdubbing and announce work, and the walls in the production area have cloth-covered, angled panels to reduce undesirable sound waves. In between those panels nestles the 36-channel MCI 6H-600 audio board, interfaced with four JH-100 ATRS.

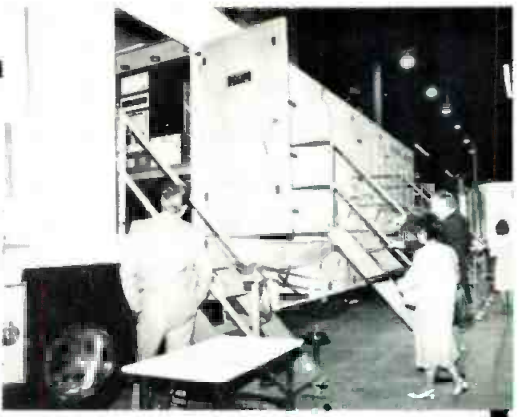
**Midwest Corp.,** which specializes in more standardized, "off-the-shelf" trucks, showed three models in its large, crowded NAB exhibit. The largest truck on display was its **M-30,** a 27-foot unit that sells for $1.25 million fully equipped. This truck features composite body construction: polystyrene walls with fiberglass on one side and plywood on the other, and has computer flooring for easy maintenance. The video area, in the rear, has three Hitachi HR-200E one-inch VTRS, two slow-mo controllers, two Sony ¾-inch VCRS, two DVS TBC/frame synchronizers, Quantel DPE-5000 digital effects, a 3M 40x20 routing switcher, 3M character generator, and full terminal gear.

Midwest's display also included an **M-20** production truck built for Cox Cablevision. New features on the M-20 include ceiling height raised to six feet, a custom power distribution center, oiled oak trim, and four-camera capability, with three Hitachi FP-22s installed. The M-20, stereo-capable and with dual 4 kW generators, goes for $208,000. The company's smallest truck, also on display, is the **M-1,** a one-camera ENG truck.

Another good-sized, standardized teleproduction truck was shown by **MZB & Associates.** The **MZB-14,** available with or without equipment, was displayed in a fully equipped $350,000 version that contained two Ikegami HL-79DAL cameras, an Ampex VPR-80 one-inch VTR, small ADC switcher, QuantaFont titler, and eight-input Tascam audio board.

Out in the satellite area, **Philips** was showing a truck built for **Mile Hi Cablevision** of Denver, with coach work by Wolf Coach. Designed for local origination and commercial production, the truck has a 16-foot box containing three Philips LDK-44 camera systems, a 10-input CDL production switcher, three Sony ¾-inch VCRS, and a Sony RM-440 VTR controller.

The theme at the **Shook** booth—high quality at low cost—was the same as last year, and so was the price of the truck ($55,000 without equipment). The truck, however, had some new features, including a higher ceiling, more spacious layout, raised director's platform for a clear view of the monitors, and optional chrome railings,



Centro's truck for KWGN-TV.

bumpers, and other fittings. The basic style continues: a 22-foot truck with a 14-foot production area. The truck also has a 6.5 kW generator with power line monitoring and spike protection, plus air conditioning and heat pump. Shook has joined forces with **Magnetic Media,** a Dallas company that supplies the equipment for the truck and works with the customer on the design.

Another specialist in smaller production vehicles is **Television Engineering,** whose booth featured two Ford trucks, one 17 feet long and one 19 feet long. The 17-footer, built for Houston Multimedia Productions, is designed to aid the company in its commercial production business. It has two Ikegami HL-79Ds, a JVC production switcher, ¾-inch VCRS with Sony edit controller, and dual 4 kW generators. The 19-footer has two Ikegami ITC-730 cameras.

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# Introducing the New Electro-Voice RE30 omni and RE34 cardioid ENG/EFP microphones

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### And EV listens.

Properly designed broadcast products are the result of pooled efforts. That's why EV devoted years to research, by working with network and local broadcasters to engineer all of the desired features into a pair of rather revolutionary new microphones for ENG and EFP.

EV confirmed that field microphones should incorporate low handling noise, resistance to humidity and moisture problems, extreme durability, and the same reliability and level of performance that the industry has become accustomed to expect from EV microphones like the phenomenal 635A and RE20.

### Introducing the RE30 and RE34.

Because remotes present a variety of acoustic environments, EV engineered the RE30 with an omnidirectional pickup pattern, and the RE34 with a cardioid pattern. Except for their polar patterns, each model has the same features.

Both the RE30 and RE34 have switchable outputs—either line level or microphone level. No longer will field crews

be stuck without the right signal level. A flick of the recessed switch adjusts the output level, producing instant compatibility without the need for extra equipment or cables. The low distortion line-level amplifier allows direct interface with line-level inputs such as those common on microwave and fiber optic transmitters.

Additionally, the RE30 and RE34 will drive and hold telephone lines*.

*F.C.C. approved interconnect may be required.

Each microphone includes a low-distortion limiter which functions at either output level.

The RE30 and RE34 can be powered by either phantom power or a standard, available anywhere, 9-volt "transistor radio" battery. With both power sources present, the battery becomes a redundancy powering system that instantly and silently takes over if ever required.

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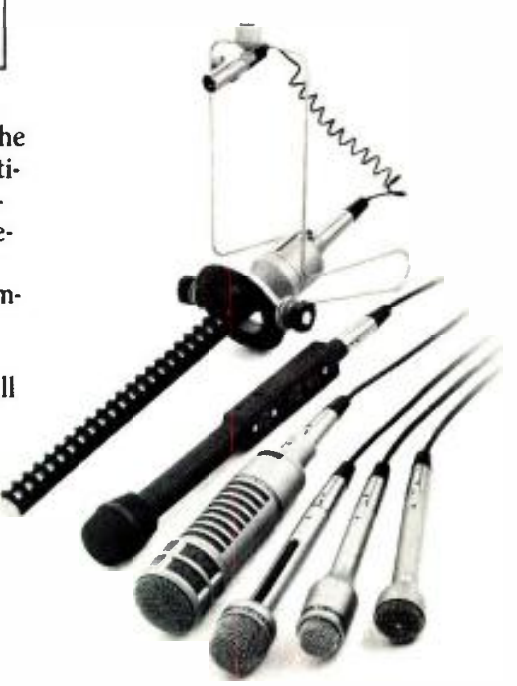

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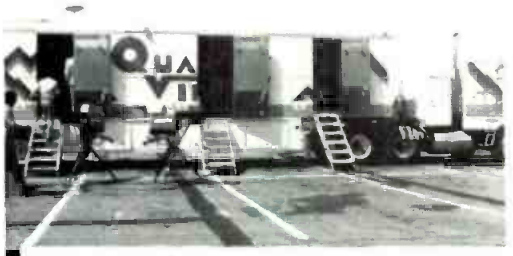

Quality Video truck by RCA.

A specialist in ENG vehicles, **E-N-G Corp.** also showed two vans, a Chevy Suburban built for KMGH-TV in Denver, and a Ford Econoline built for the show. The company builds its own pneumatic masts, and the Suburban sported two, each about 32 feet high when fully extended. Microwave equipment is by BMS. The Suburban has a second equipment rack that allows the station to do some production work, along with a 4 kW generator, ac and dc compressor, 1000 W inverter, and provisions for shore power.

**Wolf Coach** had two ENG microwave vehicles at NAB, both destined for users after the show. The **B-102** vehicle, built for WBZ, Boston, has a Wolf-built aluminum box on a GM chassis. The box is completely reusable, according to Wolf, and can be reattached to a new chassis if the old one wears out. It has a 42-foot Wolf pneumatic mast with external controls that raise or lower the mast in a minute and a half. The truck is priced in the $64,000 range.

The second truck, Wolf's **V-118** design, is built on a Ford E-350 Supervan with conversion by Wolf. The one at the show was built for WTTG, Washington, DC. In addition to its 42-foot Will-Burt mast, the news-style truck has a pair of rollout racks for ENG electronics, deep shelf storage accessible through the rear doors, a 6.5 kW generator, and provision for shore power.

A pair of 14-foot vans was shown by **Film/Video Equipment,** which plans to rent them out as a "dual-truck" production system. One van holds the switcher and audio board, the other the camera and electronics. Together they can handle up to five cameras (Sony BVP-300s and 330s) with Cinema Products coax remote control units, up to four one-inch record-only VTRs and two studio playback VTRs with slow-mo (Sony BVH-1102 and BVU-820), plus Sony BVU-800 and Panasonic VHF units.

Perhaps the only disappointment in the vehicle area was the lack of helicopters on the exhibit floor. At last year's show, in Dallas, three companies had birds in booths and a fourth had one in the lot outside. This year, only two helicopter companies exhibited, and neither brought a chopper. **Bell Helicopter** claimed lack of space as its excuse, but showed a videotape extolling the virtues of its big birds, the five-place **JetRanger** and seven-place **LongRanger.** According to the company, these turbine-powered choppers offer much better response time than do smaller machines.

Wolf's V-118 for WTTG.

**MBB Helicopters,** a U.S. subsidiary of Germany's Messerschmitt-Boelkow-Blohm GmbH, also brought no hardware. Its **BK 117** "space ship" helicopter, developed in partnership with Japan's Kawasaki Heavy Industries, boasts a roomy, unobstructed passenger/cargo compartment with access from the rear as well as sides.


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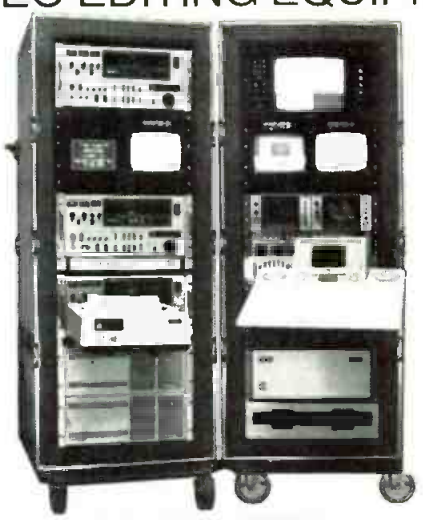

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# Deregulation of SCAs and TV Auxiliary Frequencies

By Harry Cole
FCC Counsel

NEVER LET IT BE SAID that the Federal Communications Commission isn't looking out for broadcasters. In a series of decisions reached just before the April convention of the National Association of Broadcasters, the Commission expanded markedly the uses to which broadcasters may put the nonbroadcast aspects of certain of the frequencies they are licensed to use. This expansion, of course, opens to broadcasters a variety of vistas previously closed off to them. And, since some of those vistas may prove to include new sources of potential profits, these are not matters which can be ignored.

The Commission's actions included something for all broadcasters: television and radio, commercial and noncommercial. FM broadcasters were given the opportunity to use their subsidiary communications authorizations (generally known as "subcarriers" or "SCAs") for virtually any purpose, whether or not related to broadcasting. Further, noncommercial FM licensees were given permission to use their SCAs for profit-making purposes. In a similar vein, television licensees found their use of auxiliary broadcast facilities (such as studio-transmitter links, remote pickups, inter-city relays and the like) substantially deregulated. As a result, TV licensees may now rent out portions of such facilities for a profit, again irrespective of whether or not the licensee is a noncommercial operator or whether or not the facilities are to be put to a broadcast-related purpose. The particular changes effected by the FCC are as follows.

The first item under consideration was FM SCA use. Prior to the Commission's recent actions, FM SCAs could be used only for broadcast-related purposes. Traditionally, these included transmission data telemetry and limited broadcast services such as background music or special interest information services (e.g., commodities reports). (An additional type of use was authorized last year, in an action which foreshadowed the FCC's recent decision, when the Commission agreed to let FM licensees use their SCAs for utility fuel load management purposes.) Further, in addition to the portion of a station's signal used for stereo transmission, only one subcarrier channel was available. Use of that channel was subject to a variety of regulations: the licensee had to submit a separate application to get permission to use the SCA, it could use the SCA only when the main channel was in use, it had to maintain logs reflecting the SCA program content, and it could utilize only FM modulation. All of these restrictions have now been lifted and, in addition, the FM baseband has been expanded from 75 kHz to 99 kHz, which makes available a second subcarrier channel (except for stations within 200 miles of the Mexican border, which are subject to special treaty considerations).

As a result of these changes, FM licensees may reorient their SCA thinking substantially. Now they can offer 24-hour SCA use without having to worry about operating their main channel on a 24-hour basis. Now they can consider making their facilities available for such nonbroadcast SCA uses as paging or data transmission. And now they need not worry about having to apply for the SCA or keep logs on it, although they will still have to assure that no interference is caused to their main channel. Further, noncommercial FM licensees are now permitted to use the SCAs in commercial capacities.

The SCA action, however, was not a total deregulation. With respect to the question of permitting modulation levels to exceed 100 percent, the FCC decided to await further studies. The Commission already thinks that such modulation levels can be permitted without degrading service or causing stations to occupy excessive bandwidth. However, acting out of a concern for "actual potential for reception degradation," the Commission is holding back on this aspect of the proceeding pending receipt of additional information on the degree of reception degradation to be expected and, in particular, whether short-spaced stations would suffer to any greater extent than would normally spaced stations.

Also, in the nontechnical area, the FCC included strong language in support of existing SCA use for reading services for the visually impaired. A number of groups supporting the blind had expressed serious concern about SCA deregulation, especially to the extent that the lifting of noncommercial restrictions would encourage noncommercial stations to abandon such reading services in favor of more lucrative services. The Commission, in response, indicated that it expected FM licensees already offering reading services for the blind on their SCAs to take appropriate steps to assure the continued availability of such services.

The second important issue before



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the FCC was TV auxiliary use. At the same time that it deregulated FM SCA use, the FCC acted on a two-year-old proposal to deregulate the use of television broadcast auxiliary stations. Its action there closely paralleled the FM SCA decision. In particular, the FCC has lifted all content-related restrictions on TV auxiliary use. As a result, virtually all such stations can now be used for any purpose, whether or not it is related to broadcasting. (Stations operating on 6,425 MHz and 6,525 MHz are still restricted to broadcast-only uses, since those frequencies are already used on a secondary, shared basis with the Local Television Transmission Service.) Nonbroadcast uses could include data transfer, telemetry, facsimile, and audio transmission.

There is no limit on the amount of time licensees may devote to nonbroadcast uses of their auxiliaries. The one catch is that nonbroadcast use is of secondary importance in the FCC's eyes. Thus, nonbroadcast uses can occur only with respect to the auxiliary facilities' excess capacity, i.e., "down time" during which the facilities are not being used for broadcast-related matters. As a further safeguard in this connection, new auxiliary licenses will be issued only if it is shown up-front that they are needed for broadcast-related purposes. In other words, the FCC will not let a television licensee stockpile auxiliary authorizations to be used only for nonbroadcast transmissions. Apart from these rather general restrictions, however, the deregulation of this area is more or less complete. The FCC is seeking to encourage the maximum efficient use of its auxiliary frequencies, and is thus making it easy, and potentially profitable, for licensees to find other uses for them. Auxiliary broadcast TV licensees can now share the use of their facilities with anyone they choose on whatever terms they choose for pretty much whatever purpose they choose. They can use auxiliary facilities any time that those facilities aren't being used for broadcast purposes, and, if they take advantage of already available multiplexing technology, they can even utilize their facilities for broadcast and nonbroadcast uses simultaneously. All TV licensees, commercial and noncommercial alike, can use their auxiliary licenses toward for-profit purposes, and licensees will not be subject to any continuing reporting requirements. The Commission has also decided to allow only television licensees to obtain auxiliary authorizations. Some nonlicensee organizations (for instance, Entertainment and Sports Programming Network, Inc. or ESPN) had suggested that, what with the likely

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## FCC

expansion of auxiliary station uses, the eligibility criteria for those authorizations should also be broadened. The FCC, however, disagreed, leaving auxiliary broadcast licensees solely in the grasp of broadcast licensees.

While it was considering television auxiliary facilities generally, the Commission also tinkered with its technical licensing policies covering those facilities. In particular, it decided to codify its practice of the last several years of not issuing authorizations providing for the exclusive use of specific frequencies. Where existing licenses already specify exclusive frequency uses, those licenses will be modified accordingly when they come up for renewal. The reason for this move to nonexclusivity is that the FCC is trying to get itself out of the business of doling out—and then having to police—exclusive rights to frequencies. Such efforts have not proved to be necessary to any great extent for the proper functioning of the industry and, in view of the increasing demand for TV auxiliary service, exclusive licensing is no longer a practical alternative. In its place, the Commission is relying increasingly on frequency coordination efforts by the affected licensees at the local level, a practice which has been reasonably successful thus far. While licensees must coordinate frequency use, they are given substantial latitude in how they should undertake such coordination—they may consult with a local coordinating committee, they may try to coordinate their use on their own, and so forth. If coordination fails and complaints arise which cannot be resolved at the local level, the Commission will step in to resolve the problem if necessary.

The Commission's actions are representative of its consistent efforts over the last year or two to assure that the efficient use of spectrum space is maximized, even if those efforts require redefinition of a number of hitherto inflexible concepts. In the FCC's view, it is simply not acceptable to have available frequencies going unused because of an antiquated belief that frequencies allocated for broadcast purposes should be utilized only for broadcast purposes. Modern technology permits a variety of uses of these frequencies, many of which uses can be implemented without interference to the simultaneous use of those frequencies for broadcast purposes. The Commission's actions recognize the availability of such technology and encourage its use.

The result of this is a windfall for broadcasters who have previously been unable to take advantage of the unused portions of their frequencies for anything but broadcast-related matters. It



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is something like owning an apple tree which can produce more apples than the owner can use. In this context, the old FCC rules would have prohibited the owner from selling any excess apples grown, thus leading to waste and inefficiency; the new rules encourage the owner to sell the excess and, indeed, encourage the owner to utilize modern technology to increase the tree's yield. The profit potential of the existing asset, the broadcast license, has suddenly been increased significantly.

Unfortunately, this rosy picture must be qualified in several respects. In the television area, there will obviously be substantial competition, since everyone holding an auxiliary license will be in a position to take advantage of the new rules. Further, and perhaps more importantly, the new rules encourage greater use of the auxiliary frequencies, which could in turn lead to greater congestion and, thus, potential for interference. The FCC's reliance on private, local frequency coordination—coordination which has so far been successful in handling most problems—may have to be reassessed if the added congestion places greater demands on local coordinating efforts.

In the FM SCA area, competition will similarly abound as a result of the addition of the second subcarrier channel and the freeing up of noncommercial SCAs for commercial uses. A more troublesome question is whether or not use of one or both SCAs will adversely affect the signal coverage on the main channel. There are, unfortunately, no easy answers to this question. Some engineers familiar with the theoretical aspects of FM signals claim the addition of an SCA signal is inaudible on the main channel. Others, however, including a number of chief engineers at FM stations, will tell you that addition of an SCA could seriously affect the station's main signal in its fringe areas, with possibly as much as a 10 percent overall reduction in coverage. This, of course, is enough to make any reasonable licensee hesitate, especially if the station's program director begins to evince what one engineer (who claims that SCAs have no appreciable effect on the main channel) describes as "program director's paranoia" about the potential loss of service. The only way for a licensee to resolve this dilemma is to obtain engineering advice from consultants whose opinions are respected, and to weigh against any possible adverse effects the benefits to be derived from additional revenues. The balance could go either way, depending on the nature and extent of the perceived risks and the available benefits in any particular case. **BM/E**


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We will pay $10 for each entry printed. In addition, the solution in each month's competition receiving the most votes on our Reader Service Card will win $50.00. So put on your thinking cap and submit an answer to either of the problems outlined below . . . and be sure to watch this section for the solutions.

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## Problem 19: Wire Service Automation

Although there are several commercial newsroom automation systems that incorporate wire service tracking, does anyone have a program that allows a personal computer to perform this task? Describe your program (without going into a line-by-line rundown) for acquiring AP, UPI and similar services, storing the data, then providing for computer recall by categories (news, weather, sports, and so on). (Problem submitted by J. T. Vobbe, CE, WLEW AM/FM, Bad Axe, MI.)

**Solutions to Problem 19 must be received by June 20, 1983, and will be printed in the August, 1983 issue**

## Problem 20: Newsroom Switching

For expanded news coverage, an AM/FM station will build two news workstations. Design a switching system so each can have two record/play cart machines, cassette record/play machine, reel-to-reel tape machine, and telephone. Each newsman should have pushbutton switching from one recording medium to another, and access to a number of sources: network news (via satellite and wire), air monitor, main studio monitor, local scanner, weather channel, and telephone. Headphones or small speakers can be used for monitoring.

**Solutions to Problem 20 must be received by July 20, 1983, and will be printed in the August, 1983 issue**

### CONTEST RULES

1. **How to Enter:** Submit your ideas on how to solve the problems, together with any schematic diagrams, photographs, or other supporting material. Entries should be roughly 500 words long. Mail the entries to *BM/E's* Great Ideas Contest, 295 Madison Avenue, New York, NY 10017. Use the official entry form or a separate piece of paper with your name, station or facility, address, and telephone number.
2. **Voting and Prizes:** *BM/E's* editors will read all entries and select some for publication; the decision of the editors is final. Those selected for publication will receive a $10 honorarium. Each month, readers will have an opportunity to vote for the solution they consider the best by using the Reader Service Card. *BM/E* will announce the solution receiving the most votes and will award the winner of each month's competition a $50.00 check.
3. **Eligibility:** All station and production facility personnel are eligible to enter solutions based on equipment already built or on ideas of how the problem should be solved. Consultants are welcome to submit ideas if they indicate at which facility the idea is in use. Manufacturers of equipment are not eligible to enter. Those submitting solutions are urged to think through their ideas carefully to be certain ideas conform to FCC specs and are in line with manufacturers' warranty guidelines.

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CBS has agreed in principle with **Metromedia** to purchase **KRLD Radio** in Dallas, as well as the **Texas State Networks.** The total price will be $27 million. The purchase is contingent on FCC approval, and CBS will have to sell one of its O&O since it is presently at the seven-station limit.

**M/A-COM Video Systems,** formerly Microwave Associates Communications, announced that they have established a two-way joint OEM agreement with **HDS, Inc.** providing mutual technical and engineering assistance . . . . The Acquis Corp. formed **Acquis Ltd.** recently as an international marketing arm for the corporation. Among other equipment, Acquis distributes products for **Convergence.**

**Thomson-CSF** has formed a new division, **Thomson-LGT,** in Stamford, CT to handle a line of LPTV transmitters.

ADDA announced that record sales of its still stores and TBCs have helped it to a second quarter sales figure of $4.0 million, up from $2.0 million in the same quarter last year, a 100 percent growth.

**Singer Broadcast Products** has consolidated the manufacture of its AM and FM transmitters by signing Dayton T. Brown as a subcontractor. Brown will assemble and test the products at its facilities in Bohemia, NY, and Singer will provide marketing, service, parts, and field service from Westbury, NY.

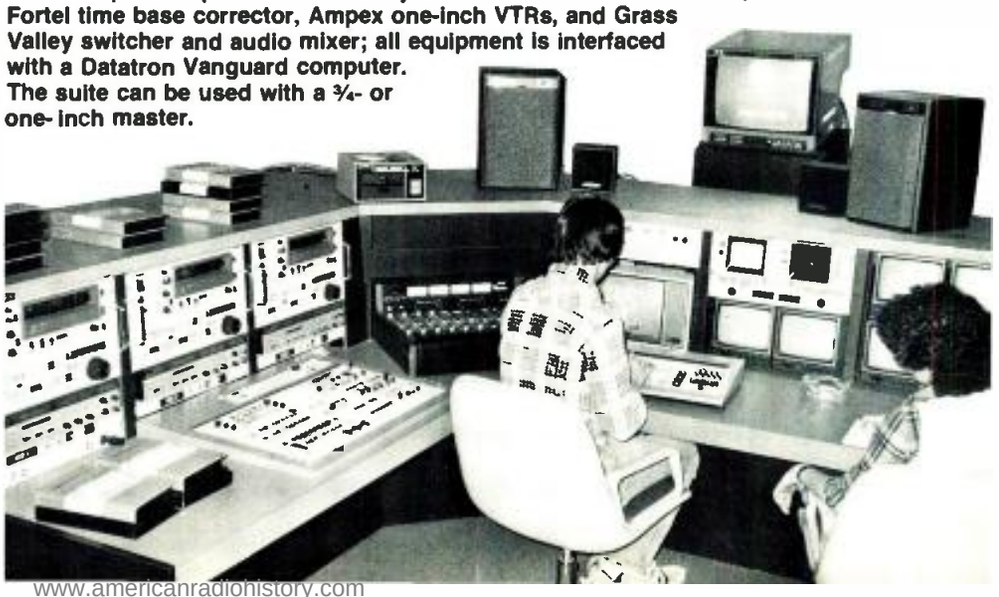
**Devlin Productions** of New York has added a two-channel ADO system to its CMX editing suite . . . . **Ampex** has delivered the first of the VPR-3s to ABC. Six new Ampex VPR-3s have been ordered by the CBS television network for its production facility in Hollywood, CA . . . .RCA revealed an agreement with NBC for options on the purchase of 100 studio cameras . . . . NBC will also acquire 20 Hawkeye cameras with HCA-1 genlock adaptors . . . . KSKN in Spokane, WA, a UHF station, has announced it will go totally half-inch with a complete studio system purchase of RCA products for all phases of production. The purchase included 33 pieces of RCA Hawkeye equipment.

As a result of JBL parent Harman International acquiring UREI, JBL will now market UREI products in the United States . . . . EECO has appointed **Cramer Video** of Needham, MA as a distributor for its computer controls for video production . . . . HEDCO is moving its manufacturing facility to larger quarters, still located in Grass Valley, CA . . . . **Studio Film and Tape** has been selected as a master distributor for TDK film and tape.

Business matters concerning personnel appointments include Risshi Morioka as the new GM at the home office of **For-A Corp** . . . . Ted Jacoby was also named national sales manager for For-A . . . . George Currie has been named to head **Sony Professional Audio** based in Park Ridge, NJ.

Dave Friendly has been selected by **Tektronix** as the new Communications Division GM . . . . **Nurad** has appointed David Fairley as the director of marketing . . . . News from **Townsend Associates** includes Howard McClure being appointed as VP and GM, Robert Anderman as the new director of marketing, and Donald Peters as VP for research and development.

**National Video Center/Recording Studios' interformat computerized editing suite for ¾-inch tape incorporates three Sony BVU 800 Series ¾-inch decks, each with a Fortel time base corrector, Ampex one-inch VTRs, and Grass Valley switcher and audio mixer; all equipment is interfaced with a Datatron Vanguard computer. The suite can be used with a ¾- or one-inch master.**





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