



INNER VIEW: A closer look at Conrac Monitors

Active Convergence: Registration made simple.

Conrac's Active Convergence System gives you complete control over color registration adjustments and greatly streamlines convergence checks.

It uses 36 independent controls to individually adjust nine separate areas on the CRT screen—including corners!

You spend less time on convergence checks—and the adjustments you make will be much more accurate.

Conrac's system uses 24 operational amplifiers to independently control red, green, and blue in each screen area. Vertical and horizontal waveforms are referenced for shaping the signals that excite the convergence yoke assembly. Dynamic blue lateral convergence is achieved with operational amplifiers.

Beam Current Feedback: The Ultimate in Black Level Stability.

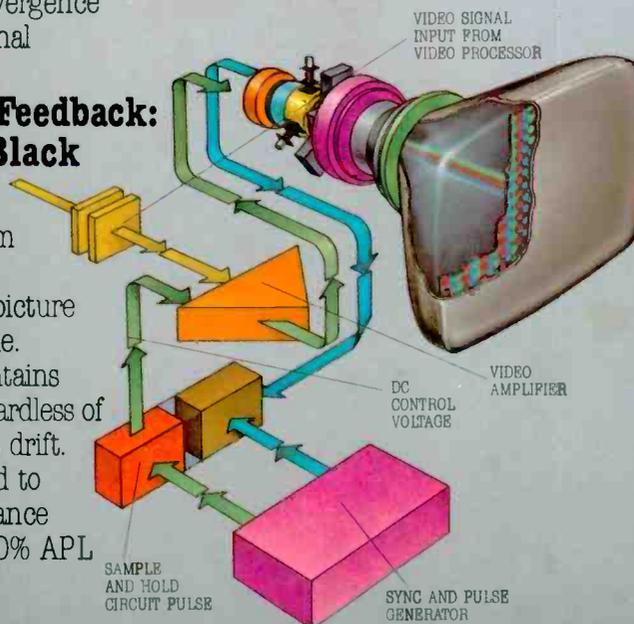
Conrac's unique Beam Current Feedback system maintains a more stable picture for a longer period of time.

It automatically maintains black level stability—regardless of CRT aging or component drift. In fact, black level is held to within 1% of peak luminance level between 10% and 90% APL (Average Picture Level).



Conrac's Active Convergence system lets you adjust color registration on nine separate areas of the CRT.

Conrac's exclusive Beam Current Feedback system automatically maintains black level stability.



Conrac's unique system uses a keyed back porch video amplifier and beam current sensing that occurs during the vertical interval.

The video signal is ac coupled to the video amplifier, thus eliminating the dc component and retaining the level between black and white. It is then amplified and applied to G1 of the CRT. The feedback loop is completed when a sample cathode current (gated by the brightness pulse) is applied to a sample and hold circuit.

If the cathode current changes for any reason, the video amplifier's dc level is automatically adjusted. Result: reference black level will remain constant.

Conrac Technology: 30 years of leadership.

Conrac's track record of technical innovation stretches back nearly three decades. And what we've learned since then goes into every monitor we make today. That's important to you. Because the more technology we pack into each monitor, the more performance you'll receive from it.

Active Convergence and Beam Current Feedback are just two ways Conrac technology can save you time and money.

For the complete inner view of Conrac technology, call or write us today: Conrac Division, Conrac Corporation, 600 North Rimsdale Ave., Covina, CA 91722, Telephone: (213) 966-3511, Telex: 67-0437

Quality you can take for granted.

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Three more reasons for ADDA's leadership in digital image technology.



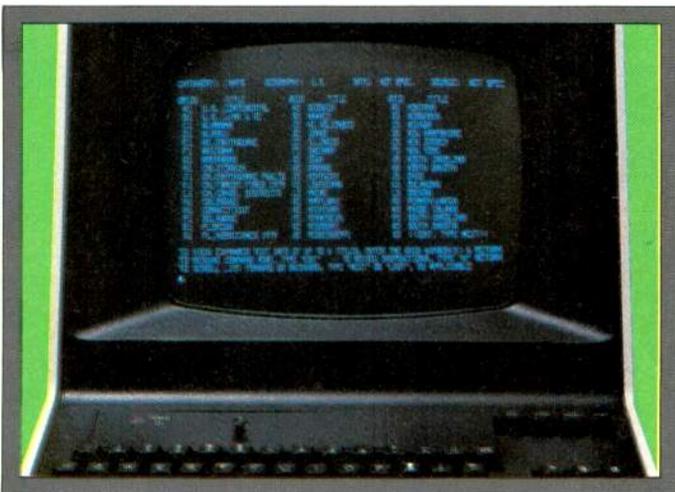
The VIP-2 . . . affordable video compression.

ADDA delivers low cost video compression, featuring one-hand joystick operation and pre-programmed picture sizing and positioning. The selectable "zoom" mode features fixed picture center or fixed picture edge.



The VW-2 . . . TBC/Frame Synchronizer for Type C VTR's.

The VW-2 is designed for Type C format VTR's, with time base correction and digital dropout compensation. Other features of the VW-2 include velocity correction, heterodyne time base correction, freeze frame, and freeze field.



Computerized Library Control for ESP Systems.

ADDA's new computer-directed library control system records the description and location of as many as 64,000 stills stored in the ESP System. It provides the off-line capability to preview stills, assemble and edit sequences through the use of subject, time, and program source codes.

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New
from Hitachi

A Colossal One-Inch Step

One-inch is the VTR format of the future. It's too important a step forward for a scaled-up 3/4" or a scaled-down 2" system. It deserves to be totally original, with every advance designed in. That's how we approached the new Hitachi HR-200, after almost 20 years of experience making quad machines. The result: a one-inch Type C VTR destined to establish new broadcast standards everywhere. In every department, the Hitachi HR-200 is miles ahead of the one-inch competition!

Fast, sure, easy operation

Hitachi one-inch VTR's are loaded with features—many of them Hitachi exclusives. Like the brake release for easier threading. Both video and audio confidence. A "B-wrap" configuration for reduced dropout. A precision moveable tape guide for easy loading, with an incredible 1-micron tolerance that's accurate for up to 2 million threadings! Plus a sloped design and easier-to-see top mounted drum for still easier threading.

Dazzling performance extras

Imagine shuttling a 1-hour tape end-to-end in just 80 seconds! It's possible, only on the Hitachi HR-200, because an internal air compressor injects a column of air into the tape guides to reduce friction and increase acceleration. The same air compressor provides air for the non-contact air drum, cushioning the tape when in the standby or fast shuttle modes. For fumble-free shuttling and jogging and fast editing, a single knob controls both. There is audio spot erase capability. And a Hall-Effect head on the third channel reads the time code more accurately, regardless of tape speed.

A microprocessor makes the built-in editor the most advanced you'll find today. And, just as important: it can be re-programmed to interface with editing systems of the future. Serial or parallel logic for remote control? Both have advantages, so Hitachi gives you both. Built-in cable compensation boosts the signal so you can use cable up to 300 feet.

Uniquely simple service

Serviceable components have been human-engineered for easy access and replacement. The PC modules are front-mounted and can be removed in an instant. The six heads come as a pre-aligned drum assembly that snaps out and snaps back in minutes.



HR-100 Portable Model

The HR-200 is available as a console, or for tabletop use or 19" rack mounting. Best of all, it costs no more than ordinary 1-inch VTR's!

Smallest Type C portable ever!

The HR-100 portable model has many of the HR-200 features, yet it's the smallest Type C portable in the world. And the most serviceable too, with plug-in PC modules. Die-cast uniblock construction makes the HR-100 durable yet extremely light. And like the HR-200, it has a non-dropout tape path. Plus an extended tape path for less edge wear, an auto back space assemble editor, and 3-way power with built-in battery pack, AC adapter or external DC.

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Hitachi...Tomorrow's technology today.

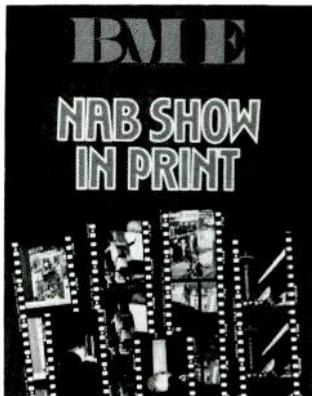
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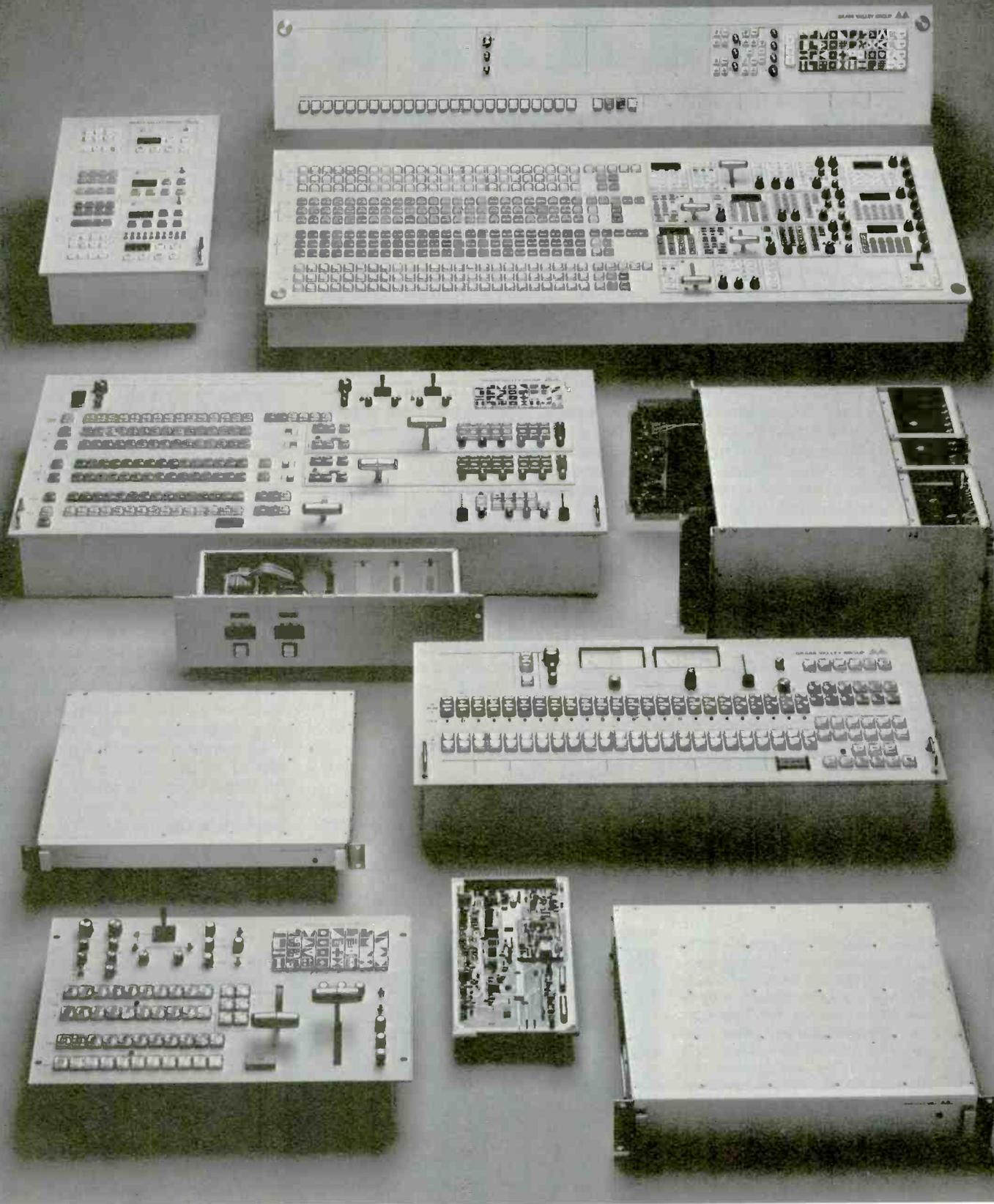
Court reaffirms that misrepresentation will mean disqualification

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BROADCAST INDUSTRY NEWS

EBU Opts For Component Encoding

The European Broadcasting Union (EBU) has recommended that the CCIR, Europe's standards-setting body, approve a component encoding standard for digital video. According to R. Gressmann, the EBU's technical director, his organization studied a particular set of parameters using 12 MHz sampling for the luminance and 4 MHz sampling for each of the color-difference components. The results of the study convinced the EBU to recommend adoption of component encoding with a spatially static sampling pattern. It also suggested co-siting of the luminance and color-difference components and a number of samples per line that would be compatible to all TV systems.

In its recommendation, the EBU stressed that digital standards-setting should be pursued through worldwide cooperation. It said it would maintain close contact with the SMPTE in the endeavor.

Component encoding received much support at the recent SMPTE meet in Toronto (see *BM/E*, March, 1980 for a complete conference wrap-up). Frank Davidoff of the CBS Television Network and John Lowry of Digital Video Systems both spoke strongly in favor of a component standard, which seemed to be the clear choice of the conference.

Streamlined FM Rules Proposed

Seeking to speed the processing of new FM applications, the FCC has proposed a major streamlining of its procedures for processing requests for channels. The Commission said in its notice of proposed rulemaking that the proposals do not constitute a radical departure from existing policy; rather, they would codify existing trends and eliminate rules that have outlived their purpose.

Several rules would be deleted or modified if the FCC proposals are implemented. For example, the population guidelines and the assignment of different classes of stations on the basis of community size would be abandoned or changed substantially. The requirement for demographic data in non-comparative cases would be eliminated and the steps leading toward issuance of a notice of proposed rulemaking would be shortened. The Berwick issue, which forces the FCC to try to "second-guess" an applicant for a slot in a small community when its real purpose appears to be to serve a nearby larger community, would also be reconsidered.

Deregulation Comments Flood FCC

More than 25,000 comments — over 1000 from broadcasters — have been

filed in the FCC's current controversial inquiry on radio deregulation, with opposing sides lined up as expected. Broadcasters, of course, largely support as much deregulation as is possible under existing laws, while citizens, public interest, and religious groups point to dire consequences if the rules are dropped.

Both NAB and NRBA filed extensive comments, with NAB calling for almost total deregulation. The enormous number of competing radio stations, NAB claims, makes many long-standing rules obsolete, and economics forces stations to listen to the public interest in order to maintain a competitive edge. NRBA also expressed support for deregulation, but pointed out that true deregulation would require congressional action. Because of present legal constraints on the FCC, NRBA suggested retention of requirements for programming dealing with community issues and establishment of minimum percentages of nonentertainment programming, to be increased or decreased depending on the number of commercials broadcast per hour. The group's other proposals included elimination of commercial limitations, logging requirements, and ascertainment.

Government agencies appeared disunited on deregulation; for example, the White House Consumer Affairs Office opposed total deregulation, while the Justice Dept.'s Antitrust Division

KOOL Gets Avails In Seconds Via Computer Link

A set of avails in seconds — rather than the two to three hours it takes by hand — is just one benefit of KOOL-TV's new computer hookup with its New York-based rep, HR Television. Harry Ebbesen, general sales manager of the Phoenix CBS affiliate, calls the interface "the most accurate and efficient computer system developed for providing demographic statistics to our clients."

In addition to avails, KOOL's Teletype Corp. Model 4540 terminal receives preprogrammed data, such as Nielsen and ARB statistics, direct from HR Television by dedicated lines. Ebbesen raves about the system, saying, "It's cleaner, more accurate, quicker, and even provides comments pointing out demographic advantages for the salesperson to use."



HR Television has been providing its clients with access to its "System One" computer system for some time now. Any client station can access the system, an IBM Series/1 computer with software designed by MPI, Inc., and HR, 24 hours a day, seven days a week for up-to-date data for sales and sales or management planning.

KOOL-TV sales assistant and key operator Laurie Schwartz sits at the CRT while (left to right) Dave Kirks, supervisor of data processing, Harry Ebbesen, general sales manager, and Homer Lane, executive VP and GM, look on

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and the Council on Wage and Price Stability supported it. NTIA urged the Commission to eliminate commercial time limits and ascertainment but to keep requirements for nonentertainment programming.

The United Church of Christ, one of the leading groups opposing deregulation, submitted its comments "under protest," saying that it wanted

more time for preparation and angry that its numerous Freedom of Information Act requests had been denied. The UCC did support certain aspects of deregulation, such as elimination of processing rules for nonentertainment programming and an end to formal ascertainment. Another citizens group expressing limited support for deregulation was the National Black Media Coalition, which backed dropping unnecessary paperwork. The NBMC has submitted several proposals to the FCC for promoting the position of blacks in

mass communications.

AM Stereo: Set For A Struggle

Rough weather is the outlook for AM stereo in the aftermath of the FCC's tentative approval of the Magnavox system (see *BM/E*, May, 1980, p.8). Faced with the possibility of lengthy litigation brought by the makers of the other systems — most notably Leonard Kahn — and dissatisfaction on the part of broadcasters and engineers, the FCC was vacillating in its resolve just a week after the vote.

The possibility of reconsidering the decision was raised at a question-and-answer period during April's NAB convention in Las Vegas, and the commissioners appeared willing to consider such an action. At a luncheon later the same day, commissioner Robert Lee admitted that there had been "a lot of flak" about the decision and said he'd be willing to reconsider.

In the forefront of the fight against the decision is Kahn, developer of the Kahn/Hazeltine system. Asserting that his system is technically superior to Magnavox's and that it enjoys large support among broadcasters, Kahn has promised the FCC a battle. Some observers feel that the latter assertion has some basis in truth, as was evidenced at NAB where much was heard in favor of the Kahn/Hazeltine system from broadcasters. In addition, support for the system has come from ABC, RKO Radio, and Meredith Broadcasting, all of whom tested it and liked the results.

NAB itself, however, refused to get into the fray, staying firmly on the side of the FCC in its decision. The association had urged the Commission to pick a single system, and at the conference president Vincent Wasilewski reiterated the group's position — support for the FCC in naming any one of the five competitors.

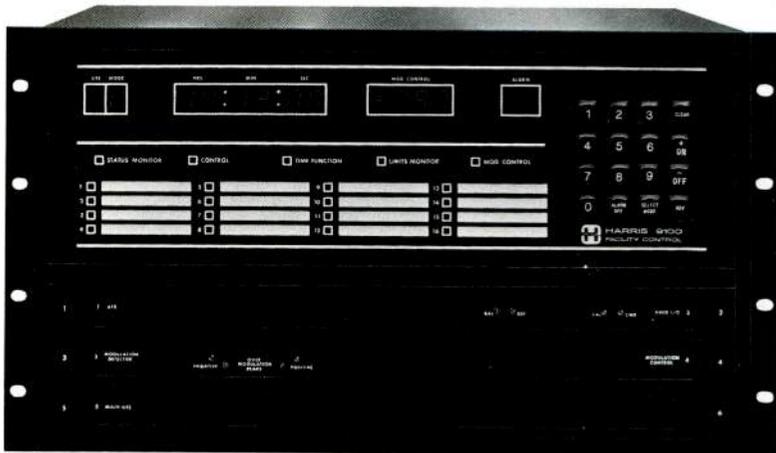
Financial Disclosure Harmful, Claim NAB, NRBA

"Substantial competitive injury" to broadcasters would result if stations' financial records are made available for public inspection, according to NAB board chairman Thomas E. Bolger. Bolger gave testimony before the House Communications Subcommittee, urging it to drop proposed legislation that would make such disclosure compulsory.

Bolger cited a number of ills that could follow forced financial disclosure. Such action "could bring about employee discontent, pervert union negotiations, increase station programming and operating expenses, re-

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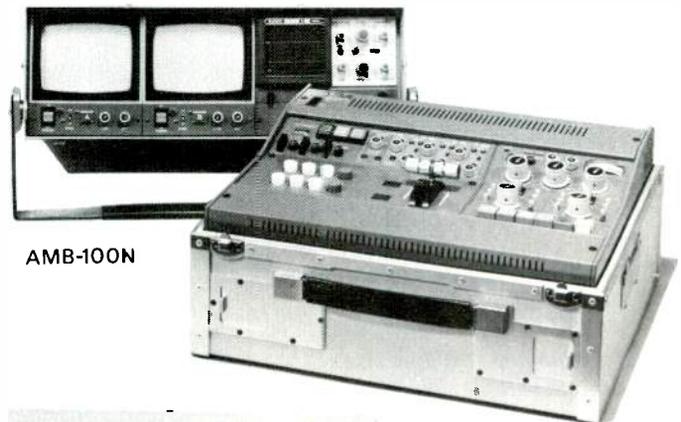
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duce revenues, affect credit standing, and serve to damage the station image in the community," Bolger asserted. He called the proposal "a step backward."

Also testifying against the bill was NRBA president Sis Kaplan. Rather than strengthening the public interest, passage of the bill "has the potential to do harm to that interest by introducing

an extraneous factor into the competitive picture." She claimed that public interest groups, which have supported the measure, would use the information in ways that would be detrimental to the public interest, and added that a station's profitability should not be a factor in determining its service to the community. It would be undesirable, Kaplan continued, to make financial records available to "a broadcaster's competitors, advertisers, and employees, none of whom would use the records for any public interest

purposes."

The FCC proposed its own changes in the financial reporting requirements late in April. The suggested changes included deletion of the requirement that employment and tangible asset data be reported, restructuring of the income statement, expansion of the information required on the income statement schedule, and revision of the income summary schedule for FMs filing together with a commonly owned AM. According to the Commission, the proposal was sparked in part by NAB's petition to drop the financial report requirement entirely; another motivating factor was that the requirements had not been reviewed for 18 years.

CNN To Start On Time; Satcom Suits Still Pending

Ted Turner's Cable News Network will make its June 1 startup date after all, thanks to a temporary order from the FCC's Common Carrier Bureau authorizing RCA Americom to provide transponder space on Satcom I to CNN's common carrier, Southern Satellite Systems, Inc. Turner was one of several cable services that had been dunning RCA for use of a transponder since the demise of Satcom III threw the cable world into a turmoil last December.

The FCC action, which grants CNN access to RCA's main cable bird from May 20 to December 1, was greeted with delight by CNN. Turner himself called the FCC staff "super" and said, "I want the public to know that our system of government is working." In disagreement with him, no doubt, is Spanish International Network (SIN), which has been pressing a suit to get its Galavision Spanish-language service onto Satcom I. The Commission did not deal with SIN's complaint, or with similar petitions from Eastern Microwave, Inc., a program resale carrier, and National Christian Network.

Shortly before the FCC decision, Turner had dropped a \$35 million suit against RCA for damages CNN allegedly suffered when RCA denied it transponder space on its primary cable satellite. SIN's complaint rests on its allegation that it applied for a transponder before CNN and should therefore be granted preference.

Olympics Oversight

Our story "ABC The Winner In Olympics Coverage" (April, 1980) went into detail on coverage at the ski jumping venue. The station supplying the mobile van to coordinate the international feed was WTBS-TV, Atlanta, which we inadvertently identified under its former call letters, WTCG.

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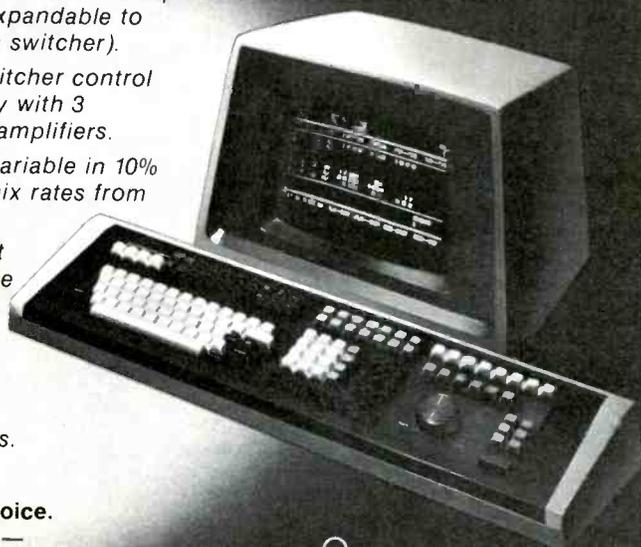
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News Briefs

Ampex Corp. and the Signal Companies have mutually agreed to **terminate negotiations for Ampex's merger** into Signal through an exchange of common stock (see Broadcast Industry News, May, 1980). Reason given for the decision was economic conditions and depressed stock prices; the original agreement called for the exchange of 0.79 shares of Signal common stock for each common share

of Ampex **STV and MDS could reach as many as 10 million television homes by 1985**, according to Microband National System, Inc., New York-based MDS representative.

The National Organization for Women (NOW) will conduct a survey of **employment opportunities in broadcasting for women and minorities**. Indiana is the first target of the study, funded by the NOW Legal Defense Fund By the end of the decade, competing technologies such as **teletext and viewdata will draw**

\$2.7 billion in advertising from traditional broadcasting, according to an analysis by *VideoPrint*.

Current **methods of measuring TV receiver noise are inaccurate** and unrealistic, according to an FCC-commissioned study by Dr. J.B. O'Neal, Jr. of North Carolina State University. The study proposes a new measurement procedure for gauging receiver noisiness; copies are available from the FCC Public Affairs Office, Room 207, 1919 M Street NW, Washington, D.C. 20554 Comments are still sought on the Commission's **kidvid rule-making**. Deadline is June 2; replies are due August 1. The Children's Television Task Force has moved to the Broadcast Bureau's Policy and Rules Division; new address is 2025 M Street NW, Washington, D.C. 20554, Room 6328, telephone (202) 653-7586 **A. Daniel Kelley has been named special assistant** to FCC chairman Ferris. Kelley is a senior staff economist in the Office of Plans and Policy.

Costs of libel and slander insurance vary widely across the country, according to an NAB survey. Eight states — South Carolina, Alabama, Oklahoma, California, Hawaii, Florida, Vermont, and New Hampshire — had rates 50 to 100 percent higher than elsewhere in the U.S.

New Orleans got its **first black-owned radio station** with the recent purchase of **WYLD-AM/FM** by Inter-Urban Broadcasting Co. of New Orleans Partnership Sheridan Broadcasting Corp. has formally agreed to **assume management responsibility for WIGO**, Atlanta, under direction of its present owners. Sheridan recently appointed William Butler as director of stations relations Renaissance Broadcasting Corp. broke ground March 7 for **WRBV-TV**, its new UHF facility in Vineland, N.J. The black-owned station will be the **only commercial TV outlet in southern Jersey**.

Marlite Broadcasting Co. will purchase **KNEW**, San Francisco/Oakland, from Metromedia, Inc., for \$5 million **KNCR**, Fortuna, Calif., will be sold to Woodruff Broadcasting Systems, Inc. . . . Dr. John K. Major, director of research and marketing for WFMT, Chicago, has been granted a construction permit to build the **first commercial fine arts station in Oklahoma**. The 100 kW FM will be located in Owasso.

The second annual **Satellite Communications Users Conference** will take place August 4 to 6 at the Marriott Hotel in Denver. Information on the meet, which is of interest to broadcasters, is available from *Satellite Communications* magazine, Cardiff Publishing Co., 3900 S. Wadsworth Blvd., Denver, Colo. 80235.

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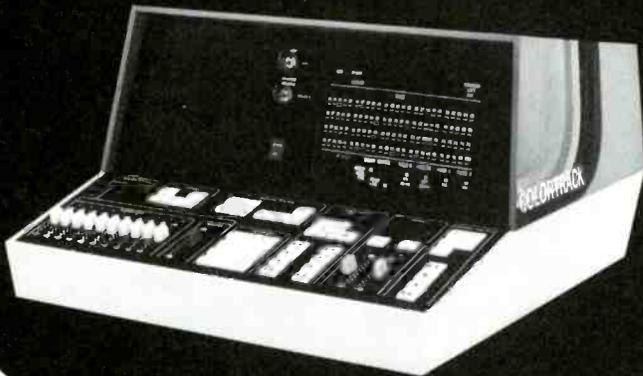
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City _____
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BME680

WALL STREET TODAY
 DOW JONES: 757.54
 ↓ 5.80
 VOLUME: 21,950,000
 NYSE: ↓ .00
 AMEX: ↑ .02

News Index

- ✉ Postal Strike
- ☁ Storm Watch
- 🎻 Maestro Returns
- 🎬 Movie Review
- 🏆 America's Cup

GAS RATIONING
80% REPORTING
 NO 53,942 58%
 YES 38,617 42%

17 17

THE MORNING SHOW

TIME: 8:25
 TEMP: 68° 
 COMMENTARY NEXT:

FOR HOME DELIVERY
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 Daily Sentinel
 Daily Sentinel
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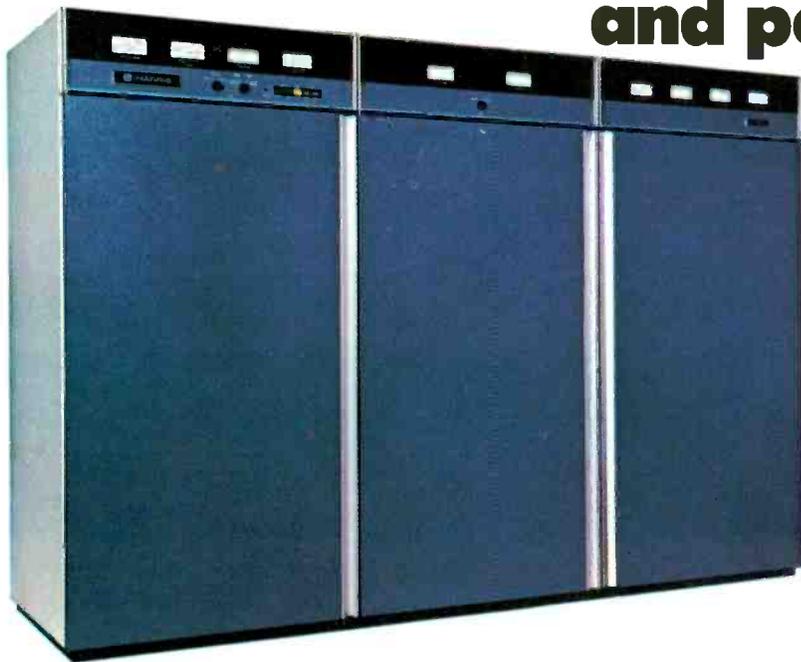
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Harris' TV transmitters lead the way to greatly enhanced reliability and performance.

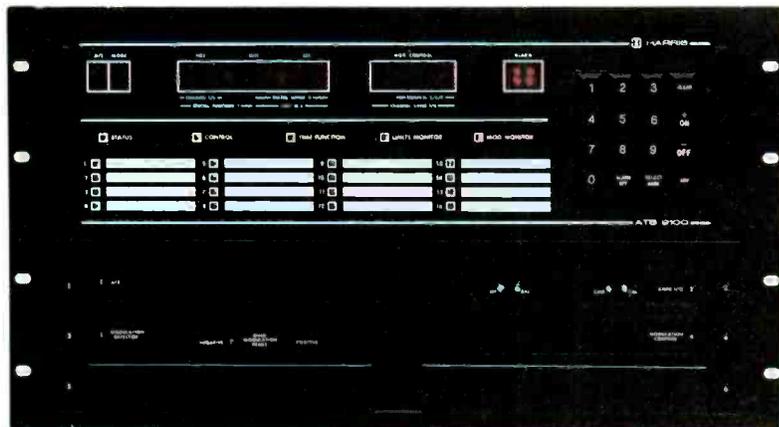


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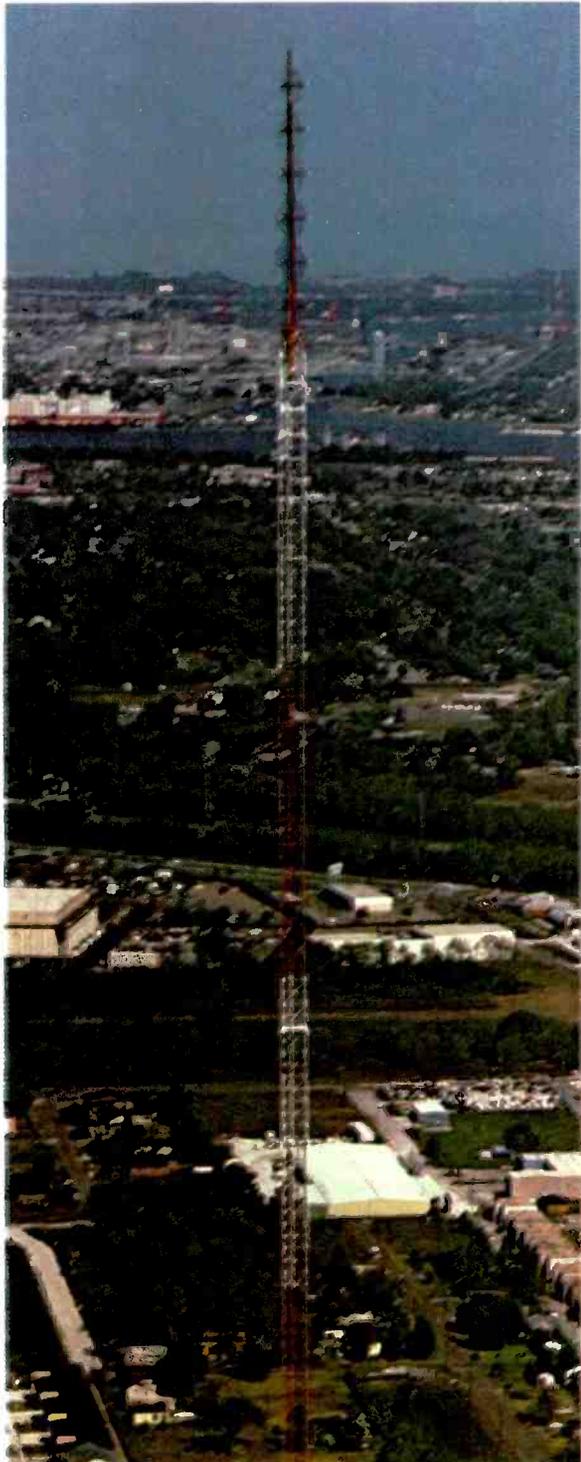
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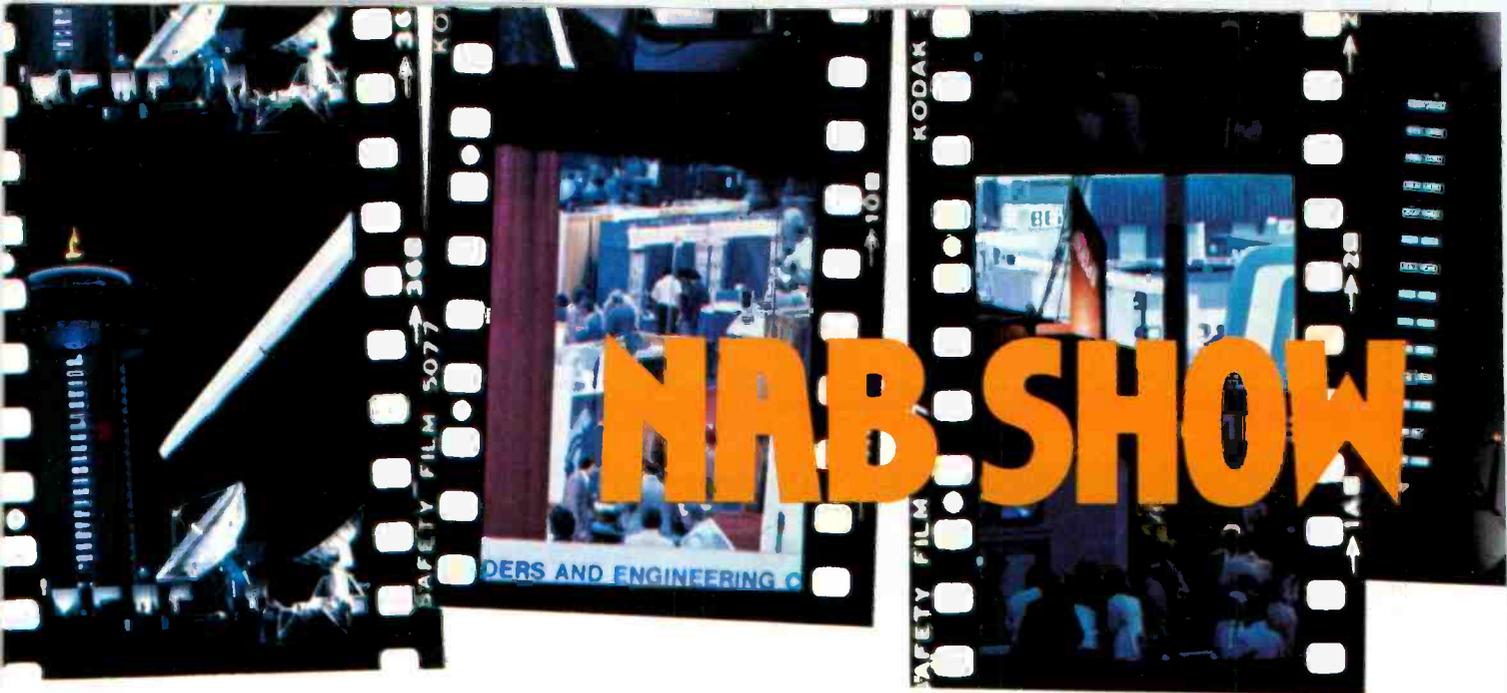
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*Circular Polarization



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COMMUNICATION AND
INFORMATION PROCESSING



Technology for communications was the focal point of this, the first convention of the National Association of Broadcasters in the new decade. The changes in technology have thrown open the doors to a new era

AS JUST UNDER 20,000 PEOPLE involved in the communications industry departed from Las Vegas after the fifty-eighth annual convention of the National Association of Broadcasters (April 13 through 16), most left certain only of the tools with which a new era would begin. Their visions of what these tools would bring about differed sharply depending on the political, economic, and social lines drawn on their individual blueprints for the future.

Technologically, the information age is upon us with its microprocessors, microcomputers, software designs, and information processing systems. The technology of distribution has been irrevocably changed by satellite, microwave, cable TV, and a family of information systems for home use.

Regulation, long the nemesis of the broadcast industry, was declared an endangered species by FCC chairman Charles Ferris, if broadcasters let technology develop a "truly competitive" communications industry. Said Ferris, "The genie of innovation is loose, creating new programming pathways into the home, and it cannot be stuffed back into the bottle."

But Congressman Lionel Van Deerlin, chairman of the House Communications Subcommittee, chagrined by efforts of broadcasters to affect the 9 kHz spacing proposal for AM radio at the Region 2 WARC, warned that less regulation is not possible without more competition. Nevertheless, broadcasters continued to smart from what they see as unfair use of their products by emerging technologies and feel that new competition can only be fairly based when those who would compete face the same costs and conditions of producing the products they take to market.

This then, was where the hardware displayed on the exhibit floor entered the picture. Greater efficiency, higher quality, more productivity hold the promise that broadcasters and others in today's communications industry will be able to meet the public's demands for more,

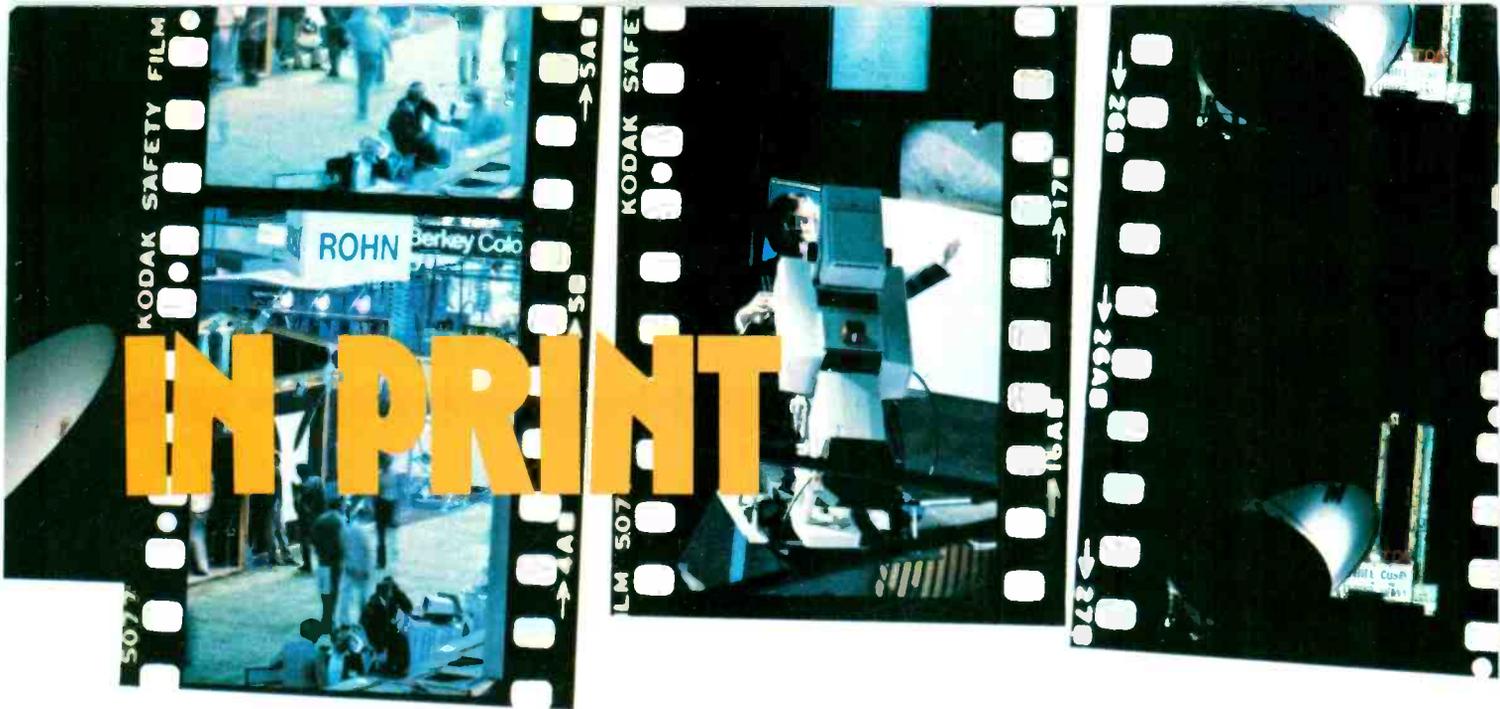
new, and different program services through whatever distribution system they choose to receive it.

Television technology today

A panel of broadcast engineers in one session outlined what they wanted for production and post-production in the 80s. Bill Nichols, director of systems development for the CBS Television Network, summed it up best: "We would like to do everything we now do in film, faster and cheaper." The rest of the panel indicated that the way to this lay in 35 mm film-quality electronic production and post-production. The great hope of the panel members rested with a variety of digital technical approaches that would keep the information that makes up pictures and sounds in its most fundamental form so that changes and improvements could be made at any and all stages of production without having to go backward.

Emory Cohen of Compact Video expressed a similar view in which the key ingredient was "flexibility." He foresees vast improvements in the quality of delivery systems, and for that reason a need to produce in an optimal quality medium capable of fully rendering the visual and aural potential of any delivery system. Cohen's objective goes beyond the interchangeability of 35 mm film and video tape, all the way to the freedom to "think" about programs without regard to the limitations of a particular recording process.

As the following articles will show, the industry is approaching this stage — where the technology will allow you to concentrate on "why" or "for whom" you are producing rather than "how" you are to produce. Vast improvements in mid-range editing systems that will permit multiple sources to be interfaced with intelligent switchers, graphics systems, still stores, slow motion devices, enhancers, telecines, complex (and purer) audio systems — all connected via straightforward digital communications systems — will allow far more freedom to concentrate on the product. Though baffling still, the language of intelligent systems is becoming more like our own — using words with human meanings. Slowly, the language of engineering will start sounding more like ordinary English. Already, routing switchers are telling us that CAM 2 and CAM 3 are assigned to STU B, not forcing the operator to remember what 53, 29, and 548



stand for.

Field production equipment, recorders, cameras, microwave equipment, and a vast array of broadcast gear are all lighter and better. The demand of the industry is for equipment that can be operated by people concerned with "stories," and the manufacturers are responding by making the equipment concerned with setup, direction, location, distance, and other logistical considerations. Audio is being better integrated and is of higher quality. Readers should examine the radio section of this report closely.

We are a long way from perfection in these areas, but manufacturers and users seem to agree on the urgency to develop systems that fulfill the human demand to communicate. With a digital standard coming into clearer view, even discussions of NTSC, PAL, and SECAM begin to focus on how to do away with them.

Radio, ready to soar

The satellite avalanche, AM stereo, digital techniques, sharp refinements in all main units of the broadcast plant, new sophistication in programming — forces that will affect radio strongly in the coming decade — were all evident at NAB's 1980 show. It was clearer than ever that these forces will lift radio to the highest levels of performance and success in its history.

The biggest single technical innovation, AM stereo, was barely represented on the floor but was very much present in the minds of AM radio broadcasters as a result of the FCC's long-awaited choice of the Magnavox system. While Magnavox announced, just prior to going to press, that it would license manufacturers of broadcasting hardware to use their design without charge, there were still grumbles by some manufacturers and broadcasters alike that the April 9 decision was not going to be the end of the AM stereo controversy.

Interest among radio broadcasters in taking advantage of satellite systems ran high and a return of interest in syndicated programming — evidenced by the presence of more than a score of syndicators at the convention — provided a hint of things to come.

In radio too, the digital/computer age has blossomed. Digital audio recorders both as mastering machines and as future playback machines for radio stations began to catch the imagination. Computer control of radio equipment

continues to expand and the first practical station applications for digital audio began to appear. At this stage, digital is in processing and problem-solving, but the feeling that this was just the beginning was strong.

In the meantime, analog recorders, and especially cart machines, have responded to demands for still higher quality. Console manufacturers continued to show more automation and more humanly engineered units offering greater quality and flexibility. The console question was: "How much better can they possibly get?"

Whether in radio or television, broadcasting takes the beginning of a new decade seriously. In Las Vegas where gambling is king, the success of broadcasting proved the only sure bet.

BM/E

NAB . . . More To Come

This year's convention was impossible for a delegate to see and grasp in just four days. Likewise, the industry has grown in such a way that a single issue cannot do justice to all the new and important trends reflected in the convention. Next month *BM/E* will take a special look at a few of the areas that deserve more attention:

- **Broadcast Vehicles:** They fly, they drive, they bring back programming never before obtainable. We'll take a look at some of these beautiful mobile systems onland and in the air. They come from Hughes, Bell, Wolf Coach, Compact Video, E.N.G. Manufacturing, Centro, Television Engineering, World Video, ENG Helicopters Limited, Airborne Video Systems, and others.
- **Newsroom Computers:** These systems will change the way news is gathered and delivered forever. We'll look at Basy's, Newscan, SBS's Newscom, Jefferson Data, TvNs, BCS, System Concepts, Quantanews, and others.
- **Business Automation:** Now an accepted practice, automated business is bringing greater service than ever to the business of broadcasting.
- **Pay TV:** A number of companies showed up with both hardware and programming for over-the-air pay TV; we'll look at what they offer. There may be a new business in your future.

THE NEWS— THE NEW **Schneider** KREUZNACH



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10× Standard 1.8/10–100

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Other lenses for studio and O.B. cameras:

TV-Lenses for cameras
with $\frac{1}{4}$ " pick-up tubes

11× Studio 2.1/18–200
15× Wide Angle 2.1/16–240
30× Wide Angle 2.1/16–480
30× Standard 2.1/20–600
30× Tele/OB 2.1/33–1000

TV-Lenses for cameras
with 1" pick-up tubes

10× Studio 2 /17–170
20× Standard 2 /17–340
11× Studio 1.7/14–150
15× Wide Angle 1.7/12.5–190
30× Wide Angle 1.7/12.5–375
30× Standard 1.7/16–480
30× Tele/OB 1.7/26–800



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CLEARER IMAGES FOR TV

One-inch VTRs are the standard; camera manufacturers respond with greater versatility and hints of things to come

THE ONE-INCH VTR became the uncontested "industry standard" this year for high quality video recording. Quad VTRs hardly figured into the discussion, and though Sony showed yet more advances in digital video recording, the contention of manufacturers and informed users was that for the foreseeable future, digital video recording would have only a minor role to play.

U-type 3/4-inch VCRs showed major progress as all important manufacturers introduced new models and improved performance standards. Several news schemes to bring highband performance to these smaller format VCRs were demonstrated. While such efforts seem to offer an opportunity to greatly improve the appearance of U-type recordings, the superior operational and signal characteristics of the one-inch machines will attract most non-news production.

The newest entry into the one-inch VTR field came from RCA, with the introduction of its TR-800 Type C VTR. While RCA has been marketing the Sony Type C VTR for some time now, its new TR-800 is of its own design and manufacture. The machine offers truly impressive performance and operating features that confirm RCA's contention that it has been carefully watching, waiting, and planning its own one-inch entry for some time.

The TR-800, which comes in a variety of console configurations for transportable or studio use, offers especially remarkable speed and tape handling capabilities. With an acceleration rate of 125 in./sec./sec., a 90-minute tape reel can be wound in just under 135 seconds. Microprocessor-controlled dynamic braking and tape-end sensors assure gentle tape handling. A 30-second recue can be made in less than four seconds.

The signal characteristics of the TR-800 are comparable to other Type C

machines with a video S/N of 48 dB (peak-to-peak video to RMS noise) and two program audio channels with 57 dB S/N (from three percent harmonic distortion level). A third audio channel suitable to SMPTE time code recording is offered, as well as a fourth audio track configuration to accommodate the EBU version of Type C standards. Built-in time code modules offer options for both longitudinal and vertical interval time code systems.

The editing capacity of the new VTR includes a built-in previewable editor that utilizes a tape timer updated by the control track. A Super Search Editor option, coupled with SMPTE time code, permits the operator to store up to nine search-to-cue points, modify edit points through the console's keyboard, capture edit points on the fly, and perform other more sophisticated editing functions. Both levels of editing are microprocessor-controlled and designed to interface with RCA's AE-800 editing system (see section on editors) or other computer-assisted editors.

A series of LED readouts provides tape time in SMPTE format as well as accurate feedback on tape speed. When tape directions and speed are shifted to the variable speed control knob, the exact speed and direction of the tape is indicated on an associated readout.

The Supertrack option, used with the system's TBC-8000, provides broadcast-quality pictures in forward, reverse, and pause. Since the variable speed playback control and readout provides precise settings, program material can be marginally stretched or condensed to alter program time. At near normal speed, control is field accurate; at slower or faster speeds control is frame accurate.

3M, which markets the NEC TT-7000 one-inch VTR, announced a complete sales and services program in support of the machines. A major addition to the TT-7000, which NEC showed at last year's NAB, is an ATF (Automatic Track Following) feature.

ATF is a system designed and built by 3M to give the TT-7000 broadcast-quality images at one-quarter reverse to twice forward speed, including still

frame. The option is microprocessor-based and field-installable on all TT-7000s. Only two plug-in modules and a new scanner need be added to existing machines. The ATF is priced at about \$11,000. ATF requires NEC's TBC-10.

Ampex demonstrated several new features for its VPR series recorders. Many of these features were in response to requests made by customers, particularly ABC, which used 25 specially modified VPR-2s in its coverage of the 1980 Winter Olympics.

The enhanced VTRs have been designated VPR-2B, and when used with the TBC-2B they provide reverse slow motion capability. Another enhancement added to the new model is an internal character generator used in conjunction with a SMPTE time code reader/generator or tape time inputs to generate monitor displays during dubbing operations. This accessory provides time code or tape timer data in selectable sizes for recording in longitudinal or vertical interval format. The new model also features improved audio performance, selectable audio



RCA's SMPTE type C VTR, the TR-800



3M is now delivering NEC TT-7000 SMPTE type C units

NAB SHOW IN PRINT

muting, a spot erase capability, improved handling of spot reels, and a new digital head hour meter.

The TBC-2B has a higher speed A/D converter, a 16-line window, and a one-line DOC. The wider correction window is necessary for the reverse slow-motion feature and is available for PAL and SECAM versions.

A new option for the VPR-2B is the STC-100 multi-point search-to-cue device, which provides up to 99 automatic searchable cue points for slow motion control. The same option also can be used to locate and display up to 99 still frames. The STC-100 has a read/write memory so that once the cue points are coded onto the relevant tape, the tape can be played back to its cued locations on any other STC-100 equipped VTR.

Hitachi's HR-200 studio one-inch VTR and its HR-100 portable have just begun to reach customers within the past couple of months. Hitachi has now added HST, which gives the 200 broadcastable pictures at twice forward to 1/4 reverse speed.

The built-in air compressor in the HR-200 makes extremely fast shuttle speeds possible. A 60-minute reel can be completely wound in under 90 seconds. The air cushion also protects the tape during standby and shuttle modes. Microprocessor-assisted editing is built into the HR-200 and can be reprogrammed to interface with external computer editing systems. The portable unit will take a 60-minute reel and weighs under 42 pounds with tape and battery. The studio unit is currently priced at about \$45,550 plus an associated TBC, TC-200, priced at



Ampex showed VPR-2Bs along with the SMC-100 slow motion controller and HPE-1 editor



Bosch Fernseh showed the automatic BCN-100 multicassette player

\$23,900.

Bosch Fernseh's BCN Type B standard VTR system made its first appearance at NAB under the banner of Fernseh, Inc., the new corporate entity established by Bell and Howell's TeleMation and Robert Bosch. Three major advances were exhibited in the BCN VTR line. First, Fernseh's portable unit, the BCN-5 one-inch videocassette recorder, is now in full production. Second, the slow-motion and variable speed playback function of the studio BCN system has been improved. Fernseh has added a second field store to the BCN-50 which takes up the same space as the previous single field store. With the new capacity, the system now offers field accurate slow motion and visible search up to 12 times normal speed.

The American market got its first look at the BCN-100 automatic multicassette VTR. The one-inch cassette player uses up to three playback decks. Random access to 32 30-minute cassettes is provided for programmable play durations for station IDs, commercials, news cuts, or for 16 hours of continuous play. SMPTE time code-encoded tapes can be played back simultaneously for automatic playback redundancy. The BCN-100 also offers parallel recording on all three decks for dubbing procedures, editing, or production of multiple master tapes.

On-line editing is also featured in the BCN-100. The three-VTR equipped unit can be configured through use of its control panel to set up any combination of slave and master recorders. Up to 99 editing events or programmable sequences can be stored in the unit's memory. Eventually, Fernseh expects to add a picture archive to the system that will permit the storage of up to 30,000 stills per 20-minute cassette.

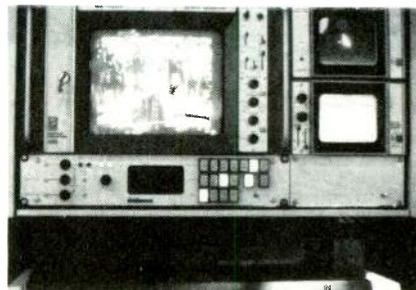
IVC introduced its new highband one-inch (non-SMPTE standard) color videotape player/recorder, the IVC 1-11. This unit utilizes a highband signal system derived from IVC's IVC-9000 helical two-inch VTR, which has earned high marks as a mastering recorder over the years. The new unit, also intended for mastering, utilizes DolbyTM video processing and features an integral TBC. Dolby noise reduction is also used on the system's two high-quality audio tracks. Video signal-to-noise is rated at 49 dB and audio signal-to-noise is rated at 55 dB.

Priced between \$30,000 and \$35,000, depending on options, IVC feels that the new VTR offers a low-cost alternative to Type C machines for mastering and other requirements relying on multi-generations.

Dolby, whose video and audio processing is employed in the IVC machines, introduced two-channel audio noise reduction systems for both the



IVC's alternative high band one-inch recorder, the IVC 1-11



Marconi's versatile VPR1/2 monitoring system

Sony BVH-1000/1100 and Ampex VPR-2.

Dolby's Cat. No. 255 unit for the VPR-2 provides Dolby Type A noise reduction of 10 dB upwards of 20 Hz to 15 dB at and above 9 kHz. The Cat. No. 155 unit, designed for Sony VTRs, provides the same specified type noise reduction. Both devices are on plug-in PC boards that reside in the PC chassis of the VTR. The 155 should be in production during this quarter of 1980 and the 255 should be ready this fall. Only minor changes to the VTR's backplane are required for installation.

Marconi has come up with a special monitoring unit that has proved popular not only with users of the MR-2/MR-1 video recorders, but also with VPR-1/VPR-2 users. The monitoring unit allows waveform or picture monitoring and the superimposition of the waveform pattern over the picture material. Audio monitoring even of the fourth EBU channel is provided and both monitoring and TBC controls are on the same panel. Marconi reports 12 orders for the B4624 VTR monitoring units, priced at \$2800.

For more information: RCA TR-800, 350; VPR-2B, 351; Hitachi HR-200, 352; HR-100, 353; Fernseh, Inc. BCN-100, 354; IVC 1-11, 355; Dolby Cat. No. 255, 356; Cat. No. 155, 357; Marconi B4624, 358.

Digital VTR still distant

While Sony made no major changes in its lines of type C and U-type VTRs, its progress in the development of a digital VTR was impressive. At this stage of the game significant strides are being made in DVR packing density. The experimental unit demonstrated by



Angenieux 42x lens shown being used during evening magazine show in KMJ's 40'x50' studio.

angenieux 42x lenses at KMJ-TV, Fresno, California

"We can get any shot with minimum camera movement!"

"The picture is sharp with good image quality throughout the entire range of focal lengths."

"Time savings are realized and unexpected or last minute changes in programming are no longer a problem!"

The above comments were made by Mike Stone, Continuity Director, KMJ-TV, Fresno, California when asked about his Angenieux 42x broadcast studio lenses.

"We use our two 42x lenses for any shot, from a wide angle to a tight close-up. The end result is a crisp, clear picture for both our commercial productions and our news shows," Stone pointed out.

KMJ-TV (Channel 24/NBC) has used their 42x lenses for about one year. The cameras and lenses are used strictly in their 36'x43' and 40'x50' studios.

"We are heavy into commercials and the efficiency of the 42x lens allows us to keep up with a very busy production schedule," states Bob Hess, KMJ's chief engineer. The commercial business in our market is very competitive among seven stations and offering top quality cameras and lenses to our customers is imperative," Hess said.

"Our cameramen enjoy the smooth operation of the 42x lenses and they have proven to be reliable during the year we have owned them. The fact we don't have to flip extenders in and out also is a plus for the 42x lenses." Hess commented.



Angenieux 42x lens being used for a tight close-up on the news set in KMJ's 36' x 43' studio.

NOTE: Angenieux Corporation is pleased to report that a total of 250 42x lenses have been delivered throughout the world including 55 for the 1980 Summer Olympics in Russia.

angenieux corporation of america

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Sony demonstrated a new high in digital video recording bit-packing density

Sony in its suite provided a recording data rate of 198.22 Mb/second, a tape speed of 122 mm/second (half the tape speed of type C machines), and a head drum rotation rate of 60 rps. According to Mori Morizano, senior managing director of Sony Corporation, Japan, a doubling of the packing density might occur again in the next four years.

The newest experimental DVR showed a number of changes over Sony's earlier version. This unit was capable of recording 16 channels of digital audio interlaced with the video. The audio sampling frequency was 50.4/1.001 kHz, using 12 bit quantization. Only four channels were installed on the demonstration unit shown, though the capability to use 16 channels was assured. Error protection for both video and audio used error correction and concealment through a system of concatenation code.

The newest version also used a $4 f_{sc}$ sampling rate rather than the $3 f_{sc}$ system shown before. Also, slow motion and variable shuttle speeds were shown in the new model. At twice normal in reverse the picture was recognizable though ragged, and at $1/4$ normal in reverse the picture seemed quite acceptable. In forward, picture stability was good up to two times forward but began to show serious degradation at six times normal.

Morizano stated that later in the month, Sony expected to demonstrate an experimental DVR using a U-type VCR transport. This demonstration was to take place in England.

At a special press conference, Sony's Morizano and CBS managing director of development William Connolly outlined some concerns regarding DVR technology. Both cautioned that progress toward a DVR need not be rushed; ultimate benefits beyond analog technology should not be sacrificed in the interest of developing a marketable DVR sooner rather than later. Said Connolly, "With the rapid progress being made in digital technology now, it would be premature to commit to the digital technology which currently exists."

Connolly and Morizano threw their support behind a component encoding scheme rather than a composite standard such as is being considered for adoption in Europe. Said Connolly, "Component digital coding offers the television broadcaster the opportunity to remove the limitations of NTSC, PAL, and SECAM standards, and to obtain a universal standard that is impossible with analog or composite digital standards."

Morizano stressed that the DVR demonstration was "solely to obtain users' opinions . . ." Further, he said, "There are still too many unanswered questions and unsolved problems for us to ask broadcasters to begin making the enormous investment that analog-to-digital conversion will require. But most significant is the fact that the answers and solutions are on the not-too-distant horizon, say three to five years."

Small format VCRs show vast improvement

Both Panasonic and JVC introduced new U-type VCRs offering beefed up performance for broadcast applications. Sony had introduced the more rugged and versatile BVU series a couple of years ago.

JVC, dubbing their new line of VCRs "the Tape Handlers," introduced three new machines. The CR-8200U is an editing VCR, the CP-5500U, a videocassette player, and the CR-6600U recorder/player. Each machine features direct drive motors for head drum and capstan as well as direct drive motors for the reel servo system.

Other features in the new machines include FM-to-FM connections for dubbing, manual/automatic audio limiter circuits for each audio channel, external subcarrier inputs for connection to a TBC, video signal to noise ratio of 48 dB, monochrome resolution of 330 lines and color resolution of 240 lines. Circuits for tape control use microprocessor-based logic.

The CR-8200U has a rotary erase head and blanking switcher to assure clean assemble and insert edits. Luminance jitter for the CR series VCRs is rated at less than plus/minus 5 micro-

seconds. When connected with any of the new line of JVC edit controllers, continuously variable speed is available at up to five times normal speed in either direction.

The CR-8200U is priced at \$5300, the CP-5500U at \$2850, and the CR-6600U at \$3,400. July availability is expected for the new line.

Panasonic introduced its new editing VCR, the AU-700. This unit is also direct drive employing a direct drive head cylinder, and capstan servo. Wow and flutter is rated at just 0.12 percent RMS.

Editing features on the new machine include individual time code track, flying erase head, frame servo, horizontal phase adjustment, and the ability to perform frame-by-frame edits. When used with the AU-A70 editing controller, the unit has single field advance capability.

Signal characteristics are 260 lines resolution in color, 330 lines in monochrome and a video S/N of 48 dB. Video head switching has been relocated to the vertical interval. A microprocessor-controlled tape function system provides quick response to function changes without requiring the operator to take the machine through stop.

Three systems now exist for getting high quality, and in some cases, high-band color, performance from small format VCRs. Recortec has continued to develop a complete production and editing system built around their HBU-series VCRs. The HBU VCRs in both portable and editing models triple head speed and tape speed to provide highband color recording. Recortec has now begun to package their own tape cassettes especially for these highband VCRs. Added to this year's HBU line is a color playback unit for the HBU-4400 which provides full color playback in the field.

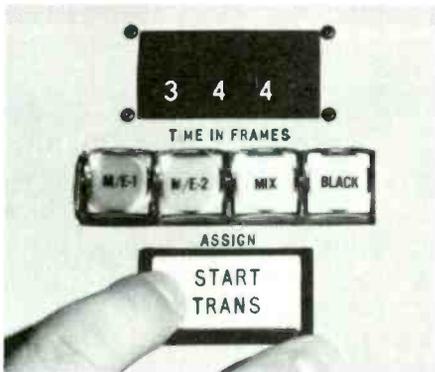
Cezar International, Ltd., displayed a prototype of its new Chromax[®] VCR system at a special press briefing. The new system is unrelated to Tri-Chroma, an earlier method developed by Bob Cezar to achieve highband color on small format VCRs. The new system achieves full color bandwidth by shifting the 3.58 MHz color signal to around 1.5 MHz and operating the VCR in the monochrome mode. The unit, which is



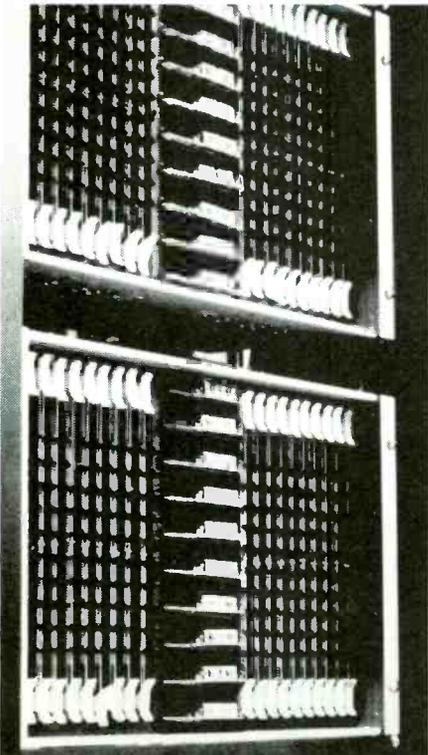
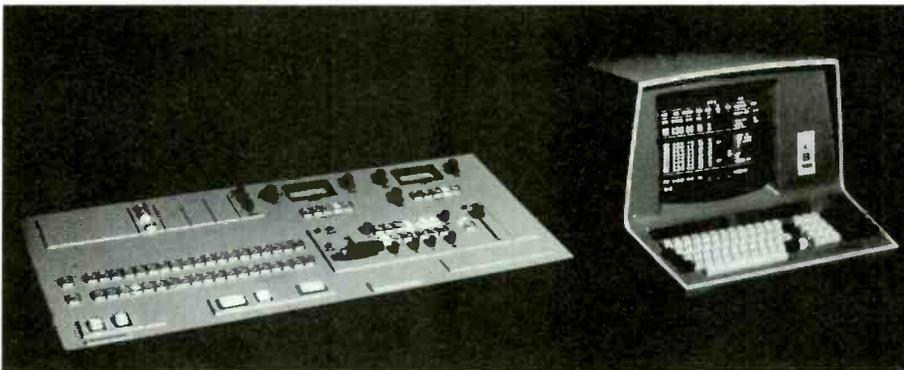
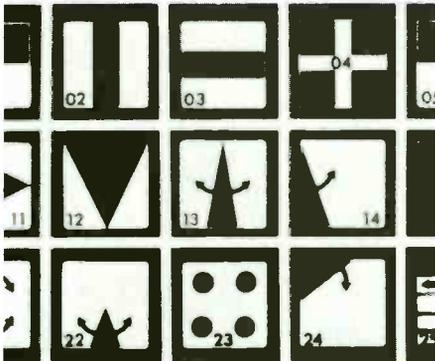
JVC's new ENG editing cassette recorder, the CR-8200U, with direct drive motors

Video Associates Labs' RAVE system provides random access to VCR frames





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packaged in a 1¾-inch rack mount configuration, accepts the color signal input from camera or other source. Using comb filters and crystal oscillator, the luminance and chrominance are separated. The chrominance signal is then shifted downward and the composite video signal is recorded on the VCR normally, but seen by the electronics of the VCR as black and white. When the encoded signal is played back through the Chromax unit, the process is reversed and the color signal is shifted back up to the 3.58 MHz level. Video S/N is rated at about 50 dB.

The Chromax system is applicable to any VTR in any format so long as it is capable of monochrome recording. No luminance to chrominance delays are introduced so the signals can be processed normally by TBCs. The unit is expected to sell for under \$5000, and should be available later this year.

Other approaches to improved performance in small format VCRs included Yves Faroudja's Image System, discussed elsewhere under signal processors, and Video Associates Labs' Pro-Pak-1, which was introduced more than a year ago. The Pro-Pak provides servo and frame synchronization stability to small format VCRs.

Video Associates Labs did introduce a new VTR accessory, the RAVE (Random Access Video Equipment). This microcomputer-based system provides random access to any frame location on either VCRs or disc players. The unit demonstrated at the show used an Apple II microcomputer and an industrial Sony Betamax.

About the only action in quad VTRs was from the machine rebuilding companies like AF Associates and Merlin Engineering and the head refurbishing companies like Videomax (now Capitol Magnetics) and Spin Physics, a Kodak Company. There are still a lot of quadruplex recorders on the market and these companies report continuing demand for upgrading and refurbishment of these machines.

Sony, JVC, and Panasonic all brought their industrial ½-inch VCR systems with them to the show. Inter-

faced with the new edit controllers, these small units would seem to offer a serious challenge to the U-formats for industrial use, and certainly their size will tempt other professional video users if the video signal quality can be enhanced.

For more information: JVC CR-8200U, **359**; CP-5500U, **360**; CR-6600U, **361**; Panasonic AU-700, **362**; Recortec color playback unit for HBU-4400, **363**; Cezar Chromax™, **364**; Video Associates Labs RAVE, **365**.

Brand new cameras

Unveiling new camera models were Ampex, Thomson-CSF, Panasonic, and Sharp. From Ampex came the new field portable production camera, the BCC-20 Digicam, which boasted many firsts including the ability to be set up by a computer.

The BCC-20 camera is of Ampex's own design, manufactured in a new plant in Cupertino. It does everything Ampex's BCC-14 (LDK-14) does and more.

The BCC-20 has the extraordinary ability to achieve 0.05 percent registration in all three zones and to reduce shading error. This outstanding registration spec is accomplished through a new digitized approach called Spatial Error Correction System (SECS). The SECS system's cursor allows the operator to rid himself of such typical distortions as "bowing," S distortion, and off-axis corner registration errors.

The Digicam has a microprocessor in its head and can be set up automatically (and remotely). The main controller for the camera is a Master Setup Panel (MSP), which can be used to manually set the digital BCC-20. The job can be done automatically when the MSP is coupled to the Automatic Setup Unit. Up to eight cameras can be handled by the MSP.

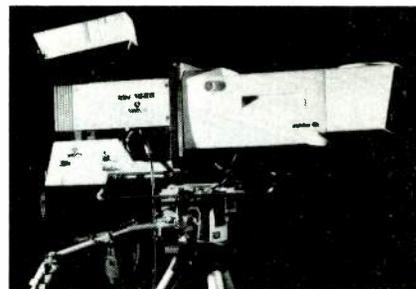
Desired parameters to be adjusted are selected by function buttons. LED display legends over the four knobs change as the function buttons are depressed. Rotating the knobs send up-count or down-count pulses to the memory in the camera head. The sequence button tells the operator what the next sequence should be.

The Digicam Automatic Setup is a sophisticated computer-based system that analyzes the video signal derived from a test chart or diascope in the lens and sends digital commands to the camera head microprocessor to correct the error. It does this in 182 zones on the picture to give unexcelled picture quality.

The camera is capable of using an integrated fiber optic RGB transmission cable with power conductors built in. The optics offer flat response, no RF



Ampex unveiled an advanced portable BCC-20 with outstanding registration



Thomson-CSF's three-in-one high sensitivity color camera, the TTV 1525

interference, low weight (about 45 pounds per 1000 feet), small diameter (0.3 inches), and a range of up to 2 km.

Thomson-CSF's new camera is a top-of-the-line color camera offering high sensitivity (even with poor illumination) and high flexibility. It is essentially a three-in-one camera — a full-featured studio camera, a lightweight tripod-mounted camera, and a stripped-down hand-held portable. The camera head can operate up to 1500 meters from its CCU without accessories. High sensitivity permits shooting in only 2 fc of light with a lens opening of f1.5 and a video gain of 18 dB. Many automatics are built into the camera or its CCU. Remote control through PCM multiplexing is possible.

It has a mixed tube complement. A one-inch lead oxide tube is used in the green/luminance channel; ⅜-inch types for red and blue channels. Diode gun tubes offering highly improved depth of modulation may be used. In this case, an automatic beam current control circuit enables the target to be washed up to three stops above rated level.

The camera can be operated in two modes: normal and incremental. In the normal mode the camera is operated conventionally from a camera control panel or remote control panel. In the incremental mode, the camera can be operated from a centralized location automatically.

Panasonic Video Systems moved firmly into the professional broadcast products field at NAB by introducing two new cameras.

The new cameras were a high performance AK-760 and an economical compact AK-710. The AK-760 incorporates a high index prism optical system and three diode gun Plumbicon



Videomagnetics showed VTR head refurbishing services



Panasonic's new AK-760 is a full broadcast-quality ENG camera



Sharp's new XC-700 is of broadcast quality at less than \$12,000

tubes. The high-transmission f1.4 optical system and advanced Plumbicons with bias light circuitry assure good sensitivity, high resolution, and excellent colorimetry. The rugged mechanical design (diecast chassis) insures op-

timum mechanical and thermal stability. A quick-release bayonet mount makes lens changes easy. Power consumption, including that of the viewfinder, is only 24 W. Signal-to-noise ratio is 54 dB. Horizontal resolution is 600 lines at the center.

Model AK-710 is an inexpensively priced self-contained ENG camera using prism optics in a rugged chassis. S/N is rated at 52 dB and horizontal resolution is 500 lines at center.

The XC-700 ENG camera from Sharp is more than an extension of the original XC-500. The principal similarity is low price. At \$11,950 (less lens) the camera offers features normally associated with more expensive cameras. The XC-700 uses three bias-lighted Saticon tubes, prism optics, auto white balance with memory, I and Q encoders, color bars, H and V enhancement, and dynamic beam optimization. Other operating features include adjustable blanking, zebra pattern in the viewfinder, and more. The camera S/N spec is 52 dB with 500 line horizontal resolution at center. There are 6 and 12 dB switches.

A new species: the electronic cinematography camera

Possibly the most unusual new TV camera at the NAB show was the Ikegami EC-35 electronic cinematog-

raphy camera. It looks and feels like a 35 mm film camera. Indeed, it was designed as an electronic alternative to 35 mm film cameras. The camera is rugged, reliable, and simple to operate. Its performance equals or exceeds that of film cameras, says Ikegami.

The EC-35 uses 3/8-inch diode gun tubes with minimum 100 percent horizontal modulation depth at 400 TV lines. Special horizontal aperture compensation and detail correction circuits adjust for out-band and in-band responses. Corner modulation is improved with a dynamic beam focus circuit.

To provide a wide dynamic range similar to film, a unique compensation circuit compresses signals 400 percent of the rated signal level down to the 100 percent level. This avoids video saturation on highlights. A dynamic beam



A truly new camera at NAB was the Ikegami EC-35. It is an electronic alternative to film cameras

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stretch circuit effectively reduces comet tailing. It is possible to operate four stops in excess of normal peak video level.

Auto setup is another feature, thanks to a built-in microprocessor. No skilled video engineers are needed to set up or operate the camera. One button establishes black and white balance, gamma tracking, and registration. A special set of lenses have been developed by Canon for Ikegami so that the camera is equivalent to 35 mm film.

Next-generation types

Among the next-generation types were the all-new MNC-81A video camera from Cinema Products, three cameras from Sony, a new CEI 340 camera, and the Hitachi SK-91. In the industrial single-tube category, Panasonic showed the WV-3900.

The new MNC-81A, built exclusively by NEC for Cinema Products, offers superior handling and reliability with a wide range of sophisticated remote control capabilities (including new fiber optic video transmission).

The new camera is lightweight (less than 11 pounds) and compact. Power consumption is 24 W. Among its features are S/N of 54 dB, choice of Saticon or Plumbicon tubes (including the new diode gun Plumbicon), f1.4 prism optics, three extra gain settings for low



Cinema Products' new MNC-81 is a logical successor to the MNC-71

light levels, ABO control for handling highlights, automatic white balance, black balance, iris beam, and optional centering control. It has other built-in features to make it easy to use, including test pulse setup. The camera starts (without lens) at about \$35,000.

Two of Sony's new cameras were described as intended for the industrial markets, but the DXC-6000 has very respectable ratings. It is a three-tube color camera with f1.4 prism optics. S/N is better than 53 dB and there are two high-sensitivity amplifiers. The unit weighs less than 12.4 pounds less viewfinder and lens, and the power drain is only 22 W. It features a built-in microprocessor and full automatic controls.

The DXC-1800 is a successor to the DXC-1610. It includes a newly developed Trinitron imaging tube that provides low lag and high sensitivity

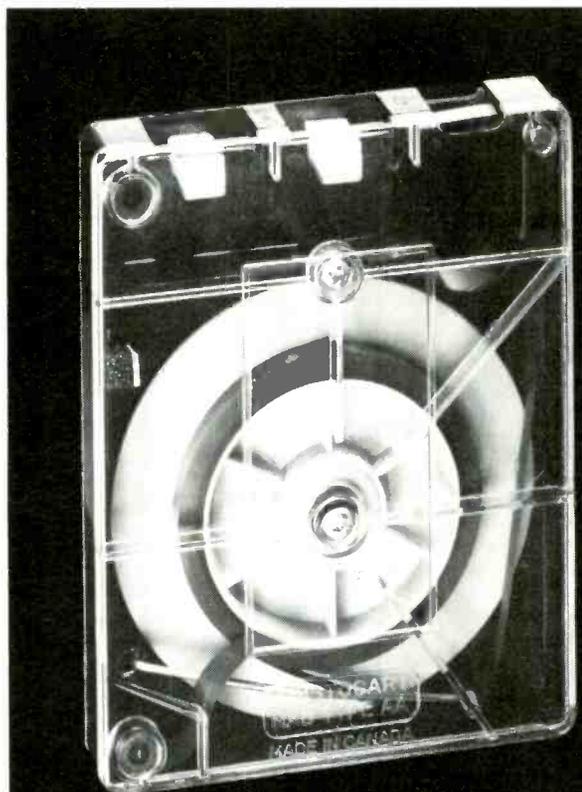


Sony introduced three new cameras. Shown is the DXC-6000, an "industrial camera" with broadcast-quality ratings

never before possible in a single-gun camera. Its S/N is 48 dB and horizontal resolution is 300 lines.

Sony's new broadcast camera, the BVP-330, is at the high end of the scale. Weighing less than 12 pounds, the new unit has a high S/N of 57 dB and a higher overall resolution (600 lines at center) than the popular BVP-300. The BVP-330 consumes 23 W of power and produces clear pictures in as little as 2 fc of light. It has many automatic features including auto centering with digital memory and incorporates a two-line enhancer, automatic beam control, split color bar generator, and zebra pattern video level indicator in the viewfinder.

Commercial Electronics, Inc.'s new



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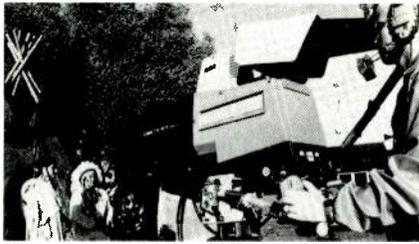
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RCA took its cameras, including the TK-47EP extended performance studio unit, a new TK-780 triax field unit, and the TK-76C hand-held outdoors to prove performance. Shown is the TK-47

340 is perhaps more of a new camera (or at least part of a camera) than a new generation type, but it does tie in with the older 310 camera head. Actually the 340 is a new electronics package that attaches to the 310 head to make a new self-contained camera. The camera features a microprocessor for automated black and white balancing and self-diagnostic operation. Remarkably stable, the camera can go anywhere without test equipment, according to CEI. As a fully equipped camera, the CEI 340 is priced to sell at approximately \$45,000.

Also called a new generation camera, the SK-91 from Hitachi betters the SK-90 on matters of weight, power drain, and electrical performance. Weighing only 9.7 pounds, a result of using a magnesium alloy casting, the camera sits balanced on the operator's shoulder. The SK-91 offers a useable picture in five seconds and runs for over two hours on a battery belt. Power drain is only 20 W.

Built-in automatics for beam current, lens iris, white balance, and black balance are standard. Two lines of horizontal and vertical contour correction are used. More than 54 dB is claimed for the S/N ratio.

The new WV-3900 single-tube camera from Panasonic incorporates a new higher sensitivity Newvicon that boasts good colorimetry. Ten fc of illumination at f2 is the minimum lighting required.

Improvements in cameras

Aside from brand-new cameras and new generation cameras related to predecessors, there were a number of camera improvements shown at NAB. By incorporating broadcast-quality Saticon tubes Hitachi has both FP-40S and FP-40SS ENG/EFP cameras. The latter full-broadcast unit yields an S/N of 52 dB with over 550 lines of horizontal resolution. Other features include auto white balance, a two-line enhancer, and an optical remote operating panel.

Last year Hitachi showed the SK-100 studio camera featuring one-inch low-lag Saticon tubes, S/N of 56 dB, and

resolution in excess of 600 lines. This year, full computer setup was demonstrated. The computer sets up and controls over 100 parameters within two minutes. Green, red, and blue channel setup are handled automatically, with full manual override at any time. Fault diagnosis display is automatic and a hard copy printout is an option. There are six data reference files for lens correction in the computer repertoire.

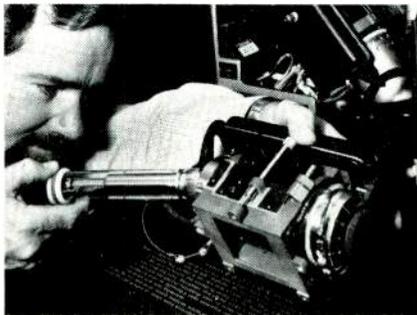
There were other refinements in computer-setup cameras. Last year Toshiba unveiled the PK-40. This year, even before the delivery of the first unit, the camera is called the PK-40A. Essentially, the computer setup procedure has been modified somewhat to satisfy requirements of American broadcasters.

RCA has a new TK-47 computer camera, the TK-47EP extended performance camera. By using low-capacitance diode gun Plumbicon tubes, S/N has been raised. A narrow angle of scan on the 30 mm tube reduces geometric distortion and improves registration accuracy and resolution, particularly in the picture corners. RCA says the camera is unexcelled in performance and meets the most stringent teleproduction requirements.

Part of the news from Harris was that the TC-80A will be available this year with a full automatic computer setup. Each camera is provided with its own microprocessor. The computer system is designed for any TC-80 or TC-80A and can be added in the field.

Harris's lower-line studio camera, the TC-50A, has been upgraded to the 50B. The principal change is new precision yokes.

There were other camera improve-



New 30 mm low capacitance diode gun lead oxide tubes are used in the TK-47EP camera

Toshiba's pride was the TK-40A featuring complete computer setup



ments to be sure. Enhancements made to the TK-76C ENG/EFP camera and the TK-760 production cameras included a new system for contrast compression and an increased gain mode for low light conditions. The TK-76C was further improved by reducing power consumption (to 37 W) and improving the preamplifiers.

Although Ikegami had a large array of cameras on display, most sported model numbers reported in the 1979 Show-In-Print issue, with the exception of the new EC-35 already mentioned. The ITC-350 ITV camera is new since last NAB but was mentioned in *BM/E's* January Los Angeles SMPTE report. The same can be said about JVC's KY-2000U camera, also shown at SMPTE.

We have not mentioned Marconi, Philips, IVC, or Bosch Fernseh. All four showed cameras, but there were no changes in model numbers over last year. The Bosch Fernseh hand portable, the KCA 100, was new to many delegates, however, since it was announced in Montreux last year after the 1979 NAB convention. Philips did add a "B" to the LDK-5 and -25 cameras. Contour control and S/N were improved.

For more information: Ampex BCC-20, **366**; Thomson-CSF, **367**; Panasonic AK-760, **368**; AK-710, **369**; WV-3900, **370**; Sharp XC-700, **371**; Ikegami EC-35, **372**; Cinema Products MNC-81A, **373**; Sony DXC-6000, **374**; DXC-1800, **375**; BVP-330, **376**; CEI 340, **377**; Hitachi SK-91, **378**.

Camera lenses

Most of the new lens activity at NAB 1980 centered around meeting ENG and EFP camera needs. Fujinon introduced eight new lenses in all, including lighter weight models of ENG lenses, a wide angle zoom, an EFP zoom with built-in diascope, and two more high resolution studio lenses. Canon brought out two new lenses for EFP cameras — a 20x zoom for studio use and a 25x zoom for field use.

Four of Fujinon's lenses were in the EFP category. One of these was the new 14 x 9.5 zoom with built-in 2x range extenders that also incorporated a diascope. This lens was built especially for the new Ampex BCC-20 EFP camera but the diascope feature will prove valuable to anyone doing automatic

Pictured is the Hitachi Night Hawk, which features MOS image sensor



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The non-diascope lens is a light-weight 14 x 10 model which will replace older 14x zooms. It is about 25 percent lighter (one pound) than previous Fujinon models through the use of a compact servo and magnesium construction. Both new 14x zooms provide a fast f1.7 aperture and an overall range of 9.5 mm to 266 mm. Automatic iris, servo/manual zoom, and adjustable back focus are standard.

Fujinon claimed a big first with its wide angle EFP lens, the 3.5 x 6.5 zoom. At the maximum wide angle, the horizontal coverage is better than 68 degrees. The new lens is rated at f1.9, weighs 1.4 kg, and focuses as close as 30 cm.

The fourth EFP lens introduced by Fujinon was a lightweight 22x zoom. Weighing only 3.8 kilograms, the lens offered an f2 speed plus two ranges of built-in extenders: 12.5 mm to 275 mm and 25 mm to 550 mm.

Both of Fujinon's two new ENG lenses are 12 x 9 zooms. One is very low cost: \$3200. The other is a high-quality version with a built-in 2.2 extender.

In the studio area, two new ultra-high resolution lenses were added to the one introduced last year by Fujinon. These lenses have a 1300 line resolution. One of the new lenses is used for one-inch pickup tubes and the other for 1¼ inch. Both have built-in 2x extenders and built-in diascope for microprocessor-equipped cameras.



Canon's new field and studio lenses for cameras with 2/3-inch tubes



Angenieux's 90 degree super wide angle adapter lens for 15x zooms

Both of Canon's new lenses were for 2/3-inch cameras. One is for studio use (the J20x8.5B IE); the other is ideal for outdoor use (the J25x11.5B IE). The studio version is a 20x zoom with a focal length range of 8.5 to 170 mm. The field lens is 25x zoom with a focal range of 11.5 to 288 mm.

Both Canon lenses have a maximum aperture of f1.6. The f number holds from 8.5 mm to 129 mm for the 20x and from 11.5 to 219 for the 25x. At the maximums, it is f2.1. The angular view is 54.7 degrees at 8.5 mm for the 20x and 41.9 degrees at 11.5 mm for the 25x. Weight of the 20x is 8 kg; for the 25x it is 10 kg. Built-in 1.5x and 2x extenders are options on the 20x unit. An additional 2.5x extender is available for the 25x zoom. Canon describes these lenses as having high MTF, minimized distortion, and minimized chromatic aberrations. The studio type is ideal for the TK-760, HL-790, and KCP-60 cameras. The 25x fits all hand-held cameras including the new BCC-20, MNC-81, KCA-100, FP-40SS, and CEI-340.

The major new product shown by Angenieux was a 90 degree superwide angle adapter for its 15x zoom lens. Called the 0.57x adapter, it works in conjunction with the retrozoom attachment. The f stop is not changed by the adapter, but the zoom is changed into a fixed-focus lens with a depth of field of two feet to infinity at maximum aperture.

Tiffen, well-known for its filters and special effects lenses, had a few new offerings. New was a 12-point star effect adding to the 4-, 6-, and 8-point



Tiffen captures attention with its multi-image lens



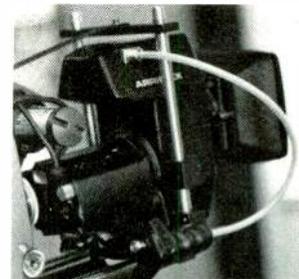
Fujinon Optical introduced a new 3.5 x 6.5 wide angle zoom which offers a field of view of 68 degrees

stars already available. It also added to its range of multi-image lenses that can be added to studio ENG lenses.

For more information: Fujinon EFP lenses, **379**; ENG lenses, **380**; studio lenses, **381**; Canon, **382**; Angenieux adapter, **383**; Tiffen star effect, **384**; multi-image lenses, **385**.

Camera support equipment

Improved stability was the theme among many camera support makers and dealers at the show. In addition to improved camera heads and hydraulic pedestals from several makers, a couple of manufacturers are creeping into the domain of the by-now-venerable Steadicam, Cinema Products' Oscar-winner.

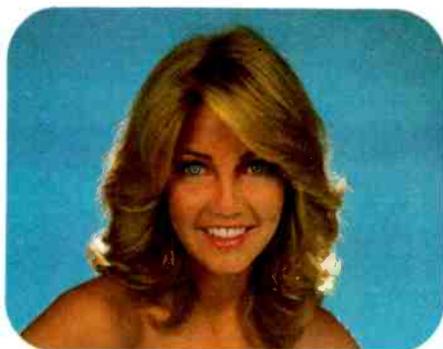


Victor Duncan showed Arriflex Image Stabilizer

A stabilizing camera arm, developed by Japan's NAC, will be imported by Alan Gordon. But the device is so prototypic at the moment that all Gordon officials could do was to show a demonstration videotape of the camera arm in action — in what appeared to be NAC's parking lot. Although in principle like a big Steadicam, you certainly would not wear this device. The base of the camera arm is a wheeled pedestal, from which sprouts a mast that is articulated at three points: two joints on the mast — effectively forming booms — and at the camera head. The camera operator controls camera movement with dual handles.

Meanwhile, Arriflex and Victor Duncan drew crowds with the Arriflex Image Stabilizer, which the company is promoting as an alternative to either a Steadicam or helicopter mount. In fact, it is neither. It is, however, a small (less than one foot high), light (five pounds) gyroscopically gimboled mirror system that smoothes erratic camera movement. The Arri Image Stabilizer is powered by a single flashlight battery. Entering light is reflected off a mirror mounted on two gimboled mirrors powered by the gyro. The image is reflected off the "floating" mirror onto a fixed mirror and then into the camera lens.

Both Alan Gordon and Camera Mart are handling the new Elemack Cricket, an Italian hydraulic dolly. The Cricket's four adjustable legs can fold into 12 different positions for crabbing, twist-



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ing, and a variety of other configurations. It can take camera loads up to 240 pounds.

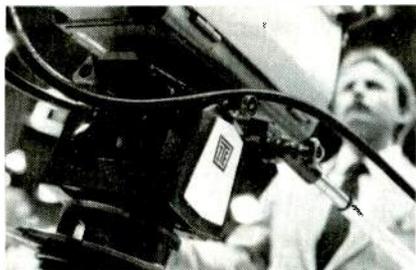
O'Connor Engineering's newest support is its Hydro-ped, a hydraulic quick-leveling tripod that will raise and lower a camera. The nitrogen gas controlled Hydro-ped, which weighs 30 pounds, will support camera weights up to 100 pounds.

Smaller than the Cricket, but every bit a dolly, is Matthews Studio Equipment Inc.'s new Video Mini-Jib, which boasts both an infinite number of camera positions and smooth fluid action. Available in either dolly or pedestal configurations — prices range from just under \$4000 for the jib arm up to well over \$5300 with a dolly carriage.

Several pieces of support equipment were debuted by Listec, which showed the Vinten Plover three-stage pneumatic pedestal that takes weights up to 200 pounds as well as Vinten's Dolphin, a small (50-pound capacity) crane for ENG camera production work. Although the Dolphin was shown at last summer's Montreux, this was its first U.S. showing.

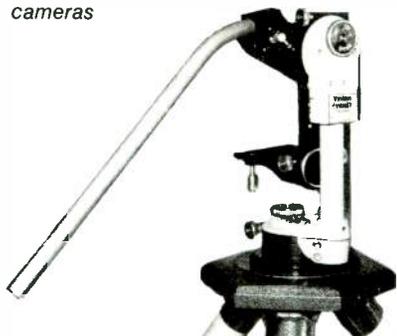
A center of gravity principle has been adapted to the Vinten Cygnet post head, designed for ENG/EFP and small cine cameras. Again, the camera swings on its own center of gravity rather than relying upon cams or springs. As a result, pan and tilt have identical feel, helped along with Vinten's lubricated friction system.

Listec also introduced Vinten's Mk 7 L.F. (for lubricated friction) cam pan and tilt head, which accepts camera weights up to 200 pounds. The head



ITE introduced the ITE-H6 hydrocam for 120-pound cameras

Vinten Cygnet's post head for ENG/EFP cameras



incorporates Vinten's externally placed cam system (cams can be replaced without taking the head apart) and will allow tilt angles of up to 60 degrees. The new Mk 7 head is expected to replace the Mark III head.

Innovative Television Equipment (ITE) pulled the wraps from its ITE-H6 hydrocam head. Priced at \$1875, the dual-handle head accepts a camera load of 120 pounds and provides tilt angle of 50 degrees.

New to NAB was Karl Heitz, Inc., of New York, introducing a range of Gitzo Video Combi tripods. The range consists of six sizes that weigh between 2.5 and 11.5 pounds, cost between \$109.95 and \$359.95, and accept camera weights between five and 50 pounds. The attached video/cine heads offer more than 100 degrees front tilt, 45 degrees rear tilt, and full 360 degree panning. The tripods are covered by a five-year warranty.

For more information: Alan Gordon camera arm, **386**; Victor Duncan Arriflex stabilizer, **387**; Camera Mart Cricket, **388**; O'Connor Hydro-ped, **389**; Matthews Video Mini-Jib, **390**; Listec, **391**; ITE ITE-H6, **392**; Karl Heitz tripods, **393**.

Power supplies

This was a year when many battery makers sat back and rehashed systems that have been introduced over the last few years — but with a twist. With dubious thanks to the massive hike in silver prices, there was a flurry to push nickle-cadmium (Ni-cad) rather than silver-zinc products. Sealed lead-acid batteries also were being pitched by suppliers who question the worth of Ni-cad batteries.

A camera-mounted prototype Ni-cad that is fully rechargeable in 20 minutes was shown by Christie. The 4.5-pound battery will fit Sony PVV 300, Ikegami HL 79, and Thomson HT 601 units.

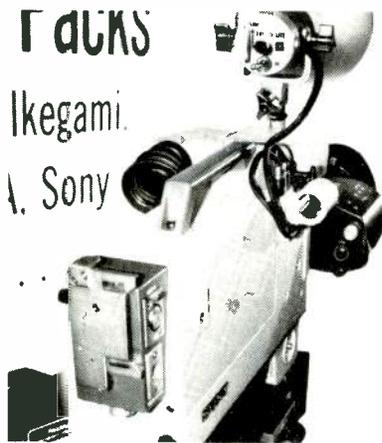
Frezolini Electronics Inc., introduced a new Ni-cad "on-board" battery series, the FBP-12 and FBP-13, which boasts a pared-down profile. The 4.2 amp hour batteries can be recharged in one hour or less and can be directly mounted to Hitachi FP-40 or Ikegami HL-79A cameras. Other cameras require Frezzi mounting brackets.

A new sequential high-frequency fast charger that will handle four batteries simultaneously was unveiled by Cine 60. The fast charge operates either automatically or manually, and weighs in at 10 pounds.

Comprehensive Video Supply Corp., on the other hand, is strongly behind Speedcharge Pagbelts ranging in rating from 4-AH to 7-AH and weighing between five and slightly more than 9.5 pounds. With a Speed-



Low capacitance Plumbicons for less noisy cameras were promoted by AmpereX. (RCA showed a low-capacitance Saticon)



Frezolini introduced the Ni-cad "on board" battery series

charge "4000" charger, a completely discharged 4-AH belt can be brought to full power in about 40 minutes.

Anton Bauer had on hand its silver cell equalizer, introduced last year. The company showed for the first time a unit that provides digital readout for discharge voltage and current drain within silver-zinc or Ni-cad batteries. Similar in theory to the Anton Bauer silver cell charger/equalizer is a new equalizer from Perrot Engineering Labs. Dubbed the EQ-9-3000, the fully automatic solid state equalizer takes all the cells in a battery down to a predetermined discharge for balance, which extends the life of a silver battery anywhere from three to six months.

If you have to swap batteries in rotten climates, you might take a page from Alan Gordon's book. The company, which handles the Swintek wireless receiver, Ultra G-3, reworked the battery pack on the receiver so that it can be changed while an operator wears mittens. The company substituted a plastic battery case, on the back of which it attached Velcro snaps.

For more information: Christie Ni-cad battery, **394**; Frezzolini FBP-12, FBP-13, **395**; Cine 60 fast charger, **396**; Comprehensive Video, **397**; Anton Bauer, **398**; Perrot Engineering Labs equalizer, **399**; Alan Gordon rigged battery pack, **400**.



EDITORS LEAD IN A GALAXY OF NEW POST-PRO STARS

The expanding range of devices in post-production, from time code to digital effects, show the way

THE DRIVE for more editing power, which was launched in 1978 with the introduction of several "super editors" to compete with the CMX 340X type systems, took a different turn at the 1980 NAB. Though the powerful super editors showed some changes, the major technological fallout impacted on the mid-range editing controllers with the extensive use of microprocessor technology giving these systems impressive new powers that put them at the threshold of the larger systems.

These radical improvements in the mid-range edit controller area, like lunch, are not free. The mid-range editor, depending on options, covers the gamut from just under \$20,000 to more than \$50,000. The main price-sensitive options seem to be machine interfaces for multi-source editing in excess of two source machines, some software options such as special effects or switcher interfaces, and the number of events stored.

There has been a breach between the sophisticated capabilities of the super editors and those of the low-cost to mid-range edit controllers, and nearly every manufacturer has poured into the gap. CMX entered this mid-range field for the first time this year with its new system, "The Edge."

The Edge is a uniquely configured device that incorporates a small CRT with a row of buttons lining the right and left sides of the screen. At the base of the screen are three function buttons, MOTION, MARKS, and EDIT, plus SETUP and ENTER A/B buttons. A different status menu will be displayed on the screen for each mode. Each new display assigns new functions to the keys alongside the CRT.

The entire control panel is molded into a single plastic case, or tablet, which permits the operator to rest it on a desk top or, for that matter, in his lap.

At \$17,000 for the two-source machine handler, the machine is targeted at the industrial and educational markets as well as broadcast and commercial teleproduction. A three-source version is slated to be introduced shortly and will probably sell for around \$26,000. Standard CMX I² interfaces are used, and modifications to VTRs are required. The machine will control 1/2-inch, 3/4-inch, and one-inch VTRs. As with most of the systems in this category, an RS-232 output is provided for punched tape or floppy disc storage of the edit decision listings.

Convergence Corporation reorganized its edit controller line, reaching both upwards towards more sophistication and downwards towards greater simplicity. For simplicity, Convergence has brought out the ECS-90, an edit controller for U-type and 1/2-inch VTRs (more on this later). In its ECS-100 series, Convergence has taken last year's ECS-103 multi-source editor and reconfigured it into three models, the 103A, 103B, and 103C, and by adding the IFP-100/ATR interface to the ECS-102, created the 102A. The new interface gives the 102A control of Ampex ATRs-102, 103, and 104 for synchronous editing of audio and video recorders. The joystick will now control either video or audio tape transports.

The changes in the 103 are in response to demands for multi-source machines in news operations. The 103A provides keyboard selection of up to three U-type VTR source machines and features programmable fast search, as well as manual tag, split audio/video, keyboard entry of edit points, and recall of 99 scene locations. The 103B is basically the same machine as last year's 103, featuring multi-source synchronizing. The 103C includes the EDL-100 Edit Decision Lister, list management, Action-MatchTM, automatic store and recall of scene location and reel numbers, and other necessary features for Auto Conforming or auto assembly. The ECS-103, minus certain options, begins at \$22,000. The ECS-103A starts at \$12,500. An SWI-100 interface enables the 103B or C to

work with professional production switchers.

Convergence also showed a prototype of the ECS-104 which it hopes will lead the way to better list management in editing systems.

Datatron moved to close the gap between its Tempo '76 editor and its very powerful Datatron 2000. Its new machine, the Vanguard, offers editing for up to five tape transports in the \$50,000 range. The Vanguard employs a well-organized CRT display that mimics the layout of the VTRs.

Above the VTR status displays the operator may indicate a number of variable conditions such as preroll time, postroll time, operator reaction time, identity of the VTRs assigned to the VariscanTM variable speed search controls, and the method of edit selected such as assembly, insert, or normal.

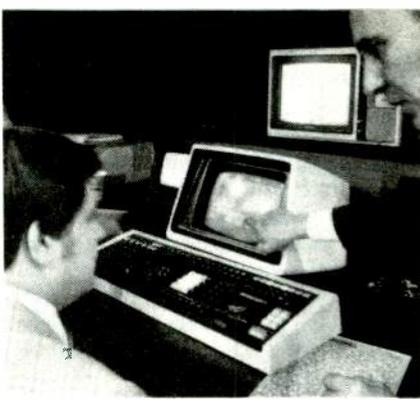
The keyboard is well organized, with keys grouped by function and color-coded for easy visual reference. The Vanguard will interface with a variety of production switchers, offers SMPTE time code or control track operation, permits edit point marks on the fly, auto cuing, previewing, editing, and assem-



CMX "The Edge" marks this company's first attempt to provide an editor for the mid-range market

Datatron's Vanguard editor provides a monitor display that mimics the VTR layout and operation





Commander II from United Media is one of those mid-range systems pressing the super editors



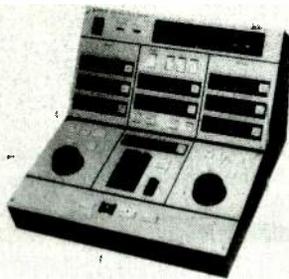
Broadcaster examines Videomedia's Z6E. One of their Z6E systems was sold right out of the booth to the National Republican Committee

bly, and will store 320 complete edit events.

Videomedia showed its full blown Z6E system this year which offers control of three source machines and an editor for a base price of \$32,500. Utilizing the Z80 microprocessor, this system offers the full range of options for video/audio editing as well as its unique Micro-Loc* or standard SMPTE time code synchronizing system.

Because Videomedia has used the Z80 in each of its machine interfaces, extremely complicated event sequences are possible. The CPU concerns itself with the executive functions while the interface Z80s take care of the house-keeping chores on each VTR. Virtually any remotable source can be interfaced, including ATRs, film chains, etc. All transport activities are echoed back to the main computer so no blind commands are given by the system. A new TE-1 Text Editing option is available for the Z6E (priced at \$5000) that allows the operator to modify any event and automatically adjust all other events. A "Slide" function in the text editing system allows any edit in memory to be recalled and previewed without entering any numbers.

United Media, which introduced its Commander I two-VTR editor last year for just under \$15,000, pulled out all the stops this year by introducing the Commander II, capable of handling two VTRs for \$27,500 or taking on eight VTRs for \$65,500. The basic system configuration will accommodate up to four VTRs and reaches the maximum number of transports with the addition of a second interface elec-



Sony's BVE-1000 walks the operator through each editing step by flashing the next function required

tronics chassis.

This very sophisticated edit controller provides automatic switcher control of three mix/effects amplifiers and permits double reentry. Color framing, assembly, and backtiming of edits is all automatic. Program list management is also automatic, and each listing change results in appropriate adjustments to all other list entries. When editing material recorded with multiple isolated cameras, a special "Sync Step" mode locks the VTRs together and a "Cut/List" key allows the operator to switch from VTR to VTR on the fly.

The Commander II will store 500 edit decisions internally and an additional 10,000 edit decisions on an optional floppy disc drive.

Multi-source editing has spread throughout the range of editing controllers, and with it the use of SMPTE time code. Virtually every manufacturer of multi-source editors introduced companion SMPTE time code readers and generators for their systems and as standalones.

For more information: CMX "The Edge," 401; Convergence ECS-103A, B, C, 402; ECS-102A, 403; Datatron Vanguard, 404; Videomedia Z6E, 405; United Media Commander II, 406.

"Super editors" show little change

The flurry of activity in the super editor field has died down somewhat, and few manufacturers showed anything new besides normal software enhancements that flow naturally from experience with such units.

The chief advance in these machines has been the interface with Grass Valley's E-MEM system, for computer control of special effects. Grass Valley and CMX pioneered the approach with an installation at ABC's New York headquarters. With this interface, the edit event passes control of the sequence over to the Grass Valley E-MEM system and regains control after the switching sequence is completed. Since E-MEM has full learning capability of all switcher crosspoints and values including DVE functions, the interface provides the editor with an infinite effects menu. As E-MEM does

the learning, the editor needs no descriptive language to select the effect.

Grass Valley has added several new features to E-MEM in order to further exploit its potential in the post-production suite. E-MEM II stores the effects setup in any of 20 registers per mix/effects bank. As in the original E-MEM, the selection of one of the buttons recalls the switcher setup stored. Transition rates between registers are selectable and a new effects dissolve feature manipulates all analog controls such as lever arm, positioner, rotary wipe controls, border width, key clip levels, etc., at preselected rates. A "Se-Quencer" feature now permits the linkage of effects dissolve to produce a chain of events from register to register.

Other new additions to E-MEM include an audio E-MEM, which does for audio what the regular E-MEM does for video, and E-Disk, which provides permanent storage for E-MEM contents.

GVG also offers a parallel edit interface with audio mix and AFV for edit controller users who wish to work without E-MEM, and an E-MEM serial interface for operating character generators and still stores in addition to computer-assisted editors.

Other editors interfaced with E-MEM, besides those of CMX, were Datatron's 2000, Fernseh's Mach One, and Harris Video System's EPIC.

While EPIC, Datatron 2000, Sony's BVE-5000, and Mach One from Fernseh all showed improved operational and display features, this marks an expected trend in these powerful software-based, computer-assisted editing systems. Each manufacturer reports numerous installations since entering the super editor sweepstakes. This year, the CMX 340X included jam sync to obviate the need for prerecording SMPTE time code on the edited master; edit decision list notes that permit the operator to tie explanatory or operational notes to specific edits; and Frame Bump, which allows the editor to adjust the sync of two sources.

RCA's AE series Time Code Editing Systems took some new twists this year. With the introduction of the RCA TR-800 one-inch Type C VTR, which



Convergence Corp.'s ECS series showed both more powerful and more simplified versions of their edit controller line



Dynasciences Model 80 editor is designed for ac or dc operation for field use

incorporates some impressive new performance standards, RCA added the AE-800 editor to be capable of exploiting the new VTRs.

The AE-800 can control up to eight playback machines and one recorder. The new editing system is compatible with the AE-600 system, so the machines in the system can include any combination of TR-800s, TH-200s, and TR-600s (quads). The AE-600 has been modified to handle the TH-200, which is the Sony Type C VTR licensed to RCA.

The AE-800, like the 600, is designed for stand-up editing at the VTR console, but an AE-800 remote panel is available for desk-top editing if desired.

For more information: GVG E-MEM II, 407; CMX 340X updates, 408; RCA AE-800, 409.

Even low-cost editors take on sophisticated airs

While Sony beefed up its editing VTRs a couple of years back, it was joined this year by JVC and Panasonic, who presented heavy duty, direct drive VTRs in the U-type format for editing. All three companies introduced new controllers.

Sony showed the BVE-1000 editor and announced that this unit, as well as the slow motion controller for the Type C machines, would henceforth be manufactured in the U.S. Both products will be manufactured at the Sony Technology Center in Palo Alto, Calif.

The BVE-1000 is a very smart, two-machine editor for either Type C one-inch VTRs or 3/4-inch U-type VTRs. It handles both regular SMPTE time code and vertical interval time code. A color frame "learn" system automatically checks for repeated time code offset between the record and source machines, and color framing is selectable in either four or eight field schemes. A discontinuous time code system automatically compensates for missing time code.

Perhaps the most intriguing aspect of the new system is the way it walks the operator through editing sequences. As each function is required, the associated function button flashes, letting the operator know what he is to do next.

JVC and Panasonic introduced new lines of edit controllers and editing VCRs. The JVC line covers the gamut from the RM-70U, which offers remote control of all VCR functions and has preroll editing capability, through the RM-82U for frame-accurate editing, to the RM-88U, designed for advanced editing requirements.

All of the edit controllers are designed to work with JVC's new series of U-type VTRs, the CR-8200U, CR-6600U, and CP-5500U.

While the RM-70U Remote Control Unit is basically designed for remote control of playback functions, the mid-range RM-82U offers fairly complete editing capabilities in a system for less than \$10,000.

The RM-82U system includes the CP-5500U player and the CR-8200U editing recorder. This combination provides the operator with frame-accurate editing and superior FM-to-FM dubbing. Like the other RM series units which have microprocessor-based logic designs, the RM-82U features a rotary search dial for variable bidirectional search to five times normal speed.

The RM-88U high performance Automatic Editing Control Unit will control three source VCRs, feeding a master editor. In addition to the features of the 82U, the 88U offers independent entry of edit in and out points, edit point correction, elapsed time counting, and automatic preroll. Though no firm price has been set for this system, visitors to the JVC booth were told that it should come in under \$30,000.

Panasonic Video Systems Division established a new Professional Video Products Department to market some 350 separate items to broadcasters and other professional video users. Chief among the products of this division is a new U-type 3/4-inch editing system, the AU-700, AU-A70, and AU-J10 combination.

The AU-700 is a new direct drive VCR which provides an audio track for time code in addition to two regular program audio tracks.

The AU-A70 programmable editing

controller with built-in SMPTE time code generator is designed to control two source machines in addition to the editing VCR with the use of the AU-J10 multi-source adaptor.

The controller works with both control track pulses and SMPTE time code. Editing points are found through the controller's search function or via entry of a SMPTE time code location. The entire system including VCRs will be priced around \$25,000.

Dynasciences introduced two new edit controllers, the Model 80 and the 80P. The Model 80 is designed to be particularly well suited to field work since it operates on ac or 12 V dc and weighs just 22 pounds. Both edit controllers operate using Dynasciences' Memory Mate™ interface, which automatically identifies the types of VTRs connected to the editor. The up/down counters are employed to track both program time and insert duration. A Multi-Mode Insert feature allows insert duration to be determined in four ways, "stopwatch," numeric keyboard entry, on-the-fly during preview, or automatic entry of in/out points from still frame to continuously variable speed. An Auto-Stack feature cues the record VTR to the end of the last insert to allow the operator to "stack" edits by merely entering in/out points. The base price of the unit is \$4795.

The Model 80 is field-convertible to the Model 80P, which is a multi-source edit controller. Depending on options, the Model 80P, which should be available by October of this year, will cost between \$11,000 and \$18,000. This versatile unit will offer special effects, multiple event memory, and a microprocessor control display format.

Both models of the Dynasciences editors use the patented Positive Reverse Drive feature that provides braking to the tape transport just prior to a change in direction.

As mentioned earlier, Convergence Corp. introduced a new low-cost editor in its ECS line. The ECS-90, with a base price of \$3990, is a microprocessor-controlled editor for 3/4-inch and 1/2-inch VCRs. The unit is plug-



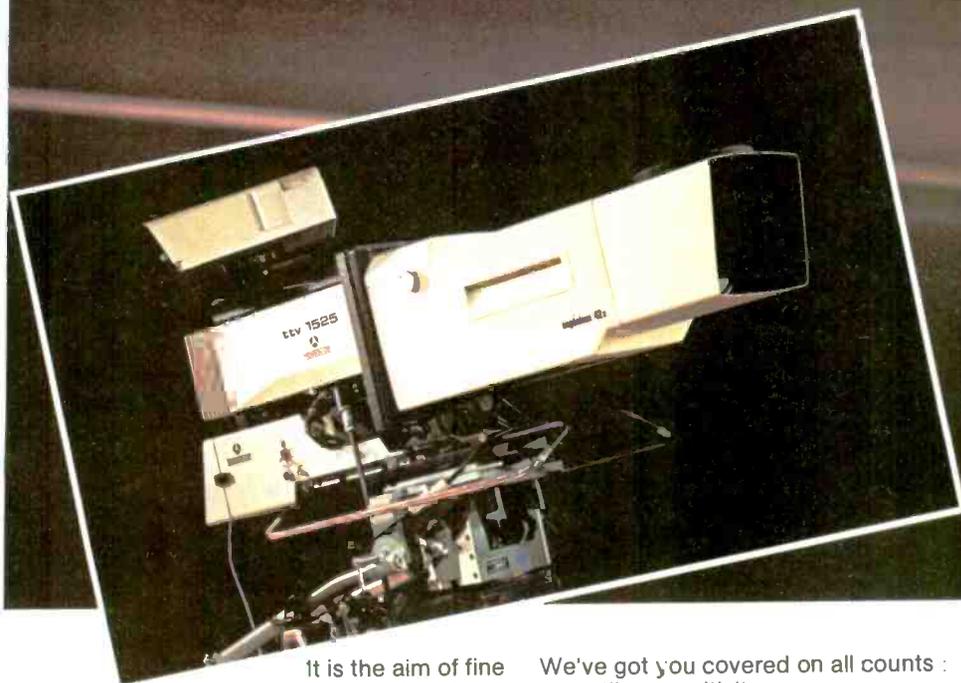
EMS was one of several companies to show 1/2-inch cassette machine control by sophisticated editors

Panasonic's AU-A70 is part of the company's move into a professional line of editing and VCR products



World introduction to the TTV 1525 camera by THOMSON-CSF.

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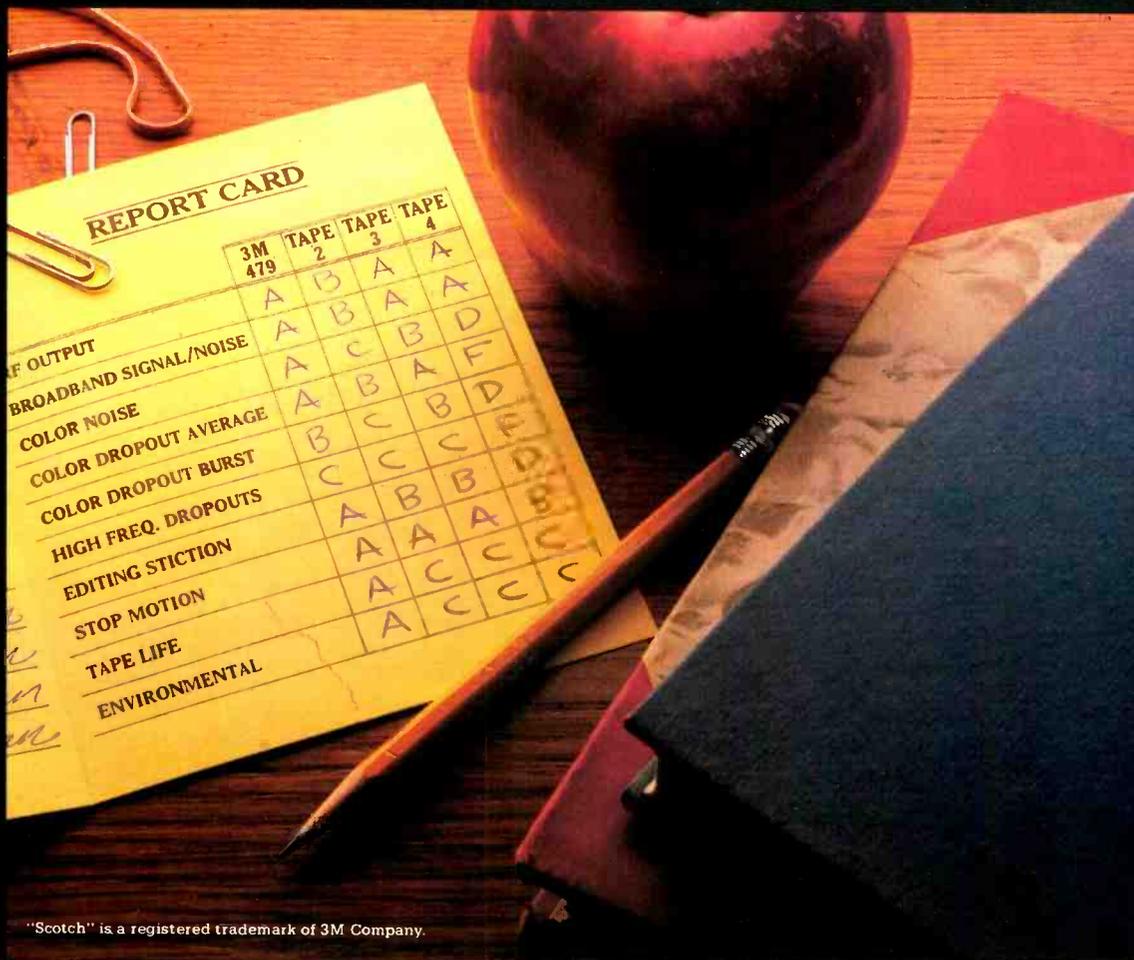
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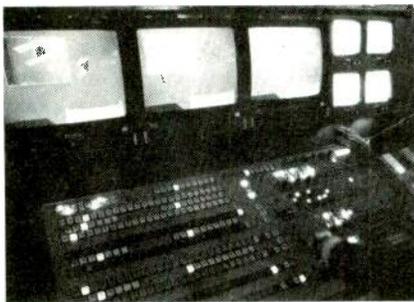
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SCOTCH 479

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NAB SHOW IN PRINT



Vital's SqueezeZoom showed rotation of real-time video. Quantel demonstrated a similar new effect

compatible with most VCRs and requires no modifications of the recorders. Included in the system is Convergence's Pulse Scan™ system that provides step-speed controlled machines with continuously variable speed control. The system will operate with either SMPTE/EBU time code or control track pulse counting, with an optional TCR-90 dual channel time code reader.

EMS, using its unique single-cable BNC connection approach, introduced its first multi-source editing system. The RES-Q II, at a base price of \$6750 with an additional cost of \$1500 for IF-80 interfaces, is capable of handling up to three VCRs.

The RES-Q II provides a full range of edit modes and can store edit decisions on optional floppy disc or punched paper tape.

The Jatech VSEC-42TD Automatic Editing Control Unit, introduced at last year's NAB, has added the enhancements promised. The unit, priced at \$2500 for the basic editor and now ranging up to \$7000 at its most sophisticated, will control U-type, 1/2-inch, and Type C tape transports.

Cezar International demonstrated a new editor control unit in its suite. The EA-3x uses the Micro-Loc* time code system developed by Bob Cezar and used in the Videomedia Z6 editing systems.

The low cost EA-3x, priced under \$4000, will handle U-type and 1/2-inch format VTRs. A variable speed shuttle arm provides remote control of search speeds as well as cruise control. Pre-roll, numeric trim of in and out points, programmable pre- and postrolls, and on-the-fly edit point selection are available in this microprocessor-controlled unit.

For more information: Sony BVE-1000, 410; JVC RM-70U, 411; RM-82U, 412; Panasonic editing system, 413; Dynasciences 80, 414; 80P, 415; Convergence ECS-90, 416; EMS RES-Q II, 417; Cezar EA-3x, 418.

Digital effects — dramatic new forms

If any new television technology hints broadly at the promise of digital television, digital effects is it. While analog effects systems — particularly production switchers — always left the producer and technical staffs pushing their art against the hardware barriers of available wipe patterns, number of M/Es, bus structures, and the like, digital effects systems are so open-ended that the challenge to the creative user is to accurately describe the effect desired.

The principal digital effects systems come from MCI/Quantel, Grass Valley Group, NEC, and Vital. All of these systems have answered the fundamental needs of users by offering a wide range of basic effects, multi-channel operation with synchronous or nonsynchronous sources, and some form of buffered control system to bring down the vast number of possible effects into more humanly engineered proportions.

The Grass Valley Group's Mk II digital video effects system has achieved its greatest advance through further implementation of its E-MEM II control system. E-MEM II with "Sequence," covered in more detail in the section of this report dealing with post-production systems, is just as applicable to production. Coupled with the E-DISK, E-MEM can be used to create standard effects sequences for program openings, closings, bumpers, commercials, or any other circumstance in which a particular effects "look" is required. This year's new addition to the DVE itself is Actiontrak (a trademark of CBS, Inc.). Actiontrak™, as readers will recall, is the digital special effect that provides a strobe motion photography effect recording start points, intermediate points, and end points of an object moving through the video frame. This effect is available in DVE Mk II on its own select button. The Mk II will handle up to four channels of video in both NTSC and PAL.

Actiontrak™ has been incorporated into NEC's DSA-15 digital strobe action unit on an "exclusive" basis, according to R. Dennis Fraser, VP and GM of NEC America's Broadcast Equipment Division.

A new extension to NEC's DVE system, also the basis of GVG's digital effects systems, is its DME digital mix effects. DME offers the basic DVE effects plus the addition of full-frame synchronization and digital programmable control (DPC).

The controller will remember 18 complete effects setups with durations of one to 17,982 frames for repeatable effect recall. The DPC allows for incremental "posterization," a process whereby natural pictures are given a

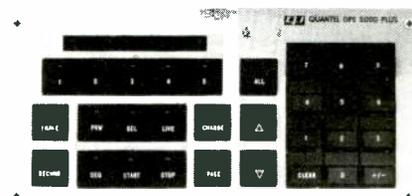
"poster art" look. Some other features are memory reveal, chroma key tracking, split, and frame/field freeze with auto freeze. Automatic control of effect executions in pan and tilt patterns assures smoothness and eliminates drift. A new effect, mosaic, is included.

DME was designed as an economical system for ENG applications, according to the manufacturer. Sports, weather, and other real-time applications are obvious. The system is available in three months as DME-B, DME-1, and DME-2. A retrofit package for existing DVE systems is also available.

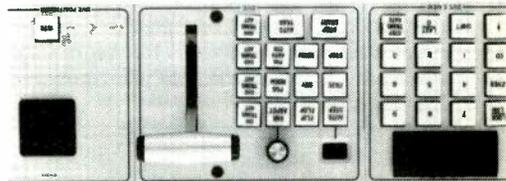
MCI/Quantel "went one better" by developing the DPE-5000/Plus, now offering independent digital effects on five channels. The new configuration employs the single-channel DPE-5000, but puts the LSI-11 computer in executive control of four additional framestores for a total of five.

Each store has its own analog input for picture information and converts the input to digital form. The basic 5000 framestore acts as the "housekeeper" for the other stores generating necessary pulses and determining data flow. The desired output configuration of each of the five framestores is sent via a common bus to the combiner, which outputs the final signal, made up of signals from all or some of the five framestores, as a single video picture. Since each store has access to all effects the final output picture can consist of all five pictures manipulated in any fashion or sequence.

The DPE-5000/Plus can consist of two to five framestore units. To handle

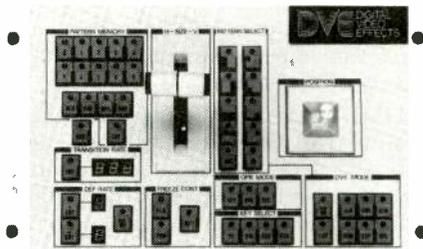


Quantel's DPE-5000/Plus offers control of five asynchronous channels

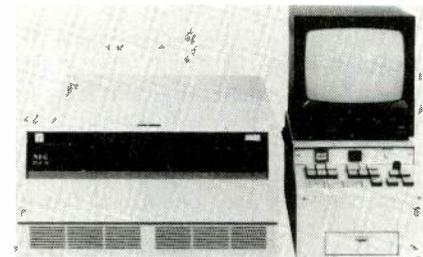


E-MEM from GVG has been extended to allow sequence-tied events

NAB SHOW IN PRINT



NEC is now offering a standalone digital effects package — the DVE



The DSA-15 from NEC incorporates Actiontrak™ (CBS, Inc.)

this sophisticated system, a new two-tiered approach to control has been undertaken. The basic DPE-5000 control panel is retained with its seven pre-select buttons. Each button is programmed by the operator to remember the characteristics of the effect desired. Essentially, the endpoint of the effect is described and then the duration, number of spins or tumbles, and other characteristics that describe how the image reaches that point are established. This means that when the effect is to be executed, only the single key is depressed. While this approach is very fast for a single channel, a new control panel has been added for the Plus. The second panel is used to build an effect description that acknowledges the existence of all five channels. The new five-channel effects are then dumped into the memory of the standard 5000 control system. In effect, five-channel effects are executed with the same single keystroke during production or post-production.

The 5000/Plus control system functions as an effects programmer, and coupled with a floppy disc memory and special CRT display, allows any combination or permutation of effects on all five channels to be structured into wholly new effects. The CRT display provides a variety of "menus" to the operator and a variety of techniques for keeping track of channel priorities and event sequences.

MCI/Quantel also showed a new effect in experimental form this year. "Rotation" acts on a full frame, real time video picture and rotates it clockwise or counterclockwise a full 360 degrees. It is also possible to rotate the picture in fixed increments, which

should be helpful for correcting shot alignments in post-production.

MCI/Quantel president George Grasso and Quantel Limited managing director Richard Taylor announced that a new firm, Micro Consultants Technology, Inc., had been formed to manufacture Quantel products in the U.S. The new company will be headquartered in Santa Clara, Calif., a few miles from MCI/Quantel's headquarters in Palo Alto.

Rotation of active video was also added to the repertoire of effects available in Vital Industries' SqueezeZoom four-channel digital special effects system. Like the other SqueezeZoom effects, rotation is a software option. Active video can be rotated a full 360 degrees at variable rates and combined with other effects such as compression, giving the impression of a picture rotating out of a pinpoint to full frame. At full frame, the picture is locked in its normal upright position.

The new rotation effect is added to SqueezeZoom's 23 preselectable events, with 100 additional events available through thumbwheel selection. Rotation is retrofittable to full four-channel systems. No firm price for the addition has been stated. With SqueezeZoom and Vital's PSAS, virtually infinite effects and switcher sequences are programmable.

With all four of the major digital video effects systems now offering user programmable effects — thus leading to a theoretically infinite repertoire of effects — approaches to control of the systems will become increasingly important. MCI/Quantel, Vital, and Grass Valley have thus far taken different approaches to control schemes, with Quantel going for as independent a system as it can get and GVG looking to total integration (see report on the GVG-300 in the production switcher section of this report). At the single-channel level control is relatively simple, but as more and more channels are added control becomes more critical in order to keep the potential of these systems exploitable in the production environment.

For more information: GVG Actiontrak™, 419; NEC DSA-15, 420; DME, 421; Telestrator color graphics, 422; XIPHIAS, 423; MCI/Quantel DPE-5000/Plus, 424; Vital rotation option, 425.

Time code generators and readers — the long and the vertical of it

This year's crop of time code equipment carries on the tradition of improving accuracy and sensitivity. As mentioned earlier, just about every editing equipment manufacturer includes time code generators and readers as part of its product line in the interest of of-

fering perfectly integrated systems. Manufacturers of tape synchronizing systems have done likewise, providing both integral and outboard generator/readers.

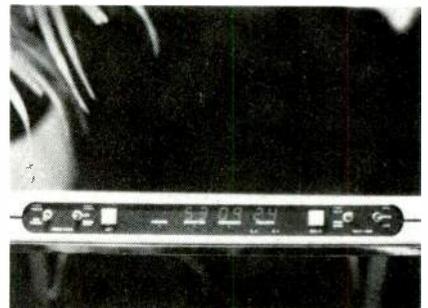
SMPTE generators and readers nonetheless continue to appear as separate devices. This is especially true of portable units designed for ENG/EPF applications. One of the newer systems is from Dynaquip, displayed at the Adcom Communications booth. The Model 3500 runs on eight "C" batteries, allows entry of both SMPTE time code and user bits, uses a calculator-type entry, and provides for jam sync.

Dynasciences showed its TCG Mk III SMPTE code generator, measuring only nine inches long and weighing less than three pounds. A time code reader can be added as an option. A special feature is a preserve-battery mode in which the LED displays are cut out even though the clock is still running.

Shown by Glentronix was the Telcon Model 7000 generator, a pocket calculator-size unit that runs up to eight hours on its internal battery and an additional 18 to 30 hours from a reserve



Portable SMPTE equipment showed up everywhere. Skotel's offers user bit entry



Smaller time code reader/generators appeared from several manufacturers, including this one from BTX

power supply in its book-size carrying case. Both time and user bits are programmable; a time code reader is optional.

Skotel showed its Model PTC-100 portable generator/reader, again an extremely compact unit with programmable code and user bits. The unit, powered by four "AA" batteries (providing approximately five days of normal operation), is jam sync capable.

Shintron showed the updated version

How the right mike helps you get the most for your video dollar.

You spend a lot of good money for video equipment. And a lot of expensive time to produce a great picture.

But audio is a critically important part of that picture, too. Much too important to take chances on just any mike.

That's why it pays to choose mikes carefully. Especially since choosing the right one for the job is one of the most effective ways to upgrade a video program without spending a lot of money.

It pays to pick a Panasonic.

Economy (From \$18.95*)

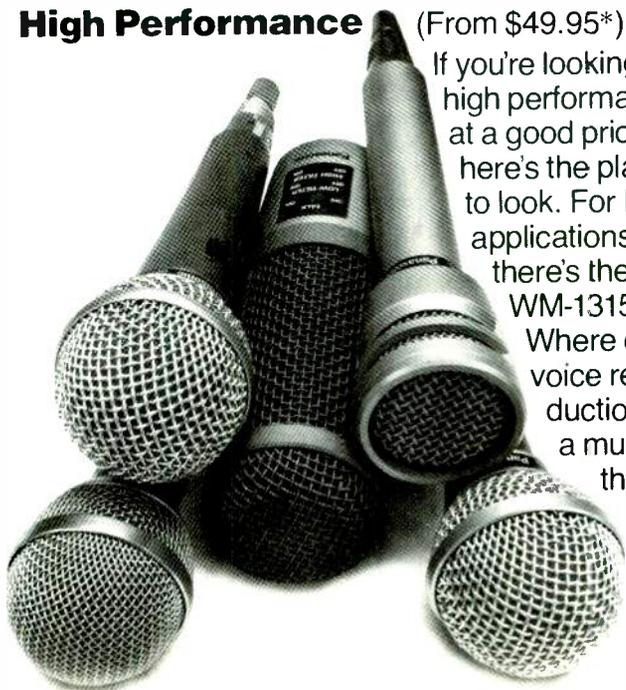
These mikes are best used for basic video recording. The omnidirectional WM-1100 will stand up to rugged handling. Both the WM-1150 and WM-1151 are unidirectional, with the WM-1151 providing sharper reproduction. For crisp outdoor recording there's the unidirectional WM-1181 with a 16.4-foot cable. The WM-1610, an electret condenser lavalier mike, comes with tie clip holder and mercury battery.



High Performance (From \$49.95*)

If you're looking for high performance at a good price, here's the place to look. For PA applications, there's the WM-1315.

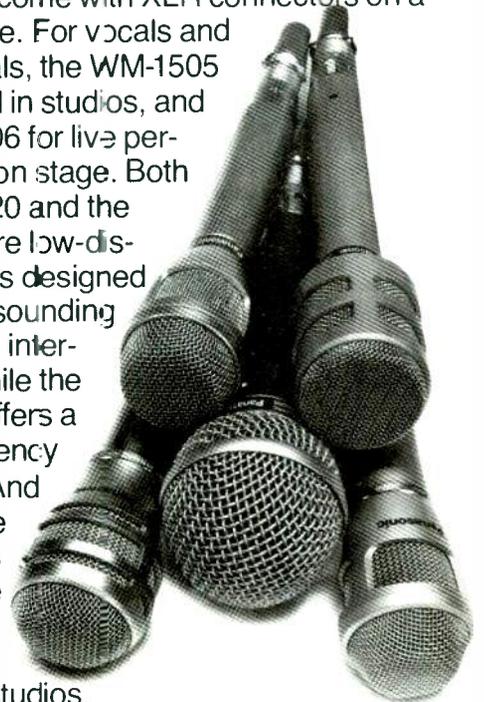
Where clear voice reproduction is a must, there's the



WM-1323 with switchable impedance (200 ohms/20k ohms). For vocals or percussion, there's the WM-1325. For onstage vocals, percussion and brass, the WM-1326 is outstanding. And in theatres and large rooms, the WM-1400, with wide frequency response and high and low tone filters, is tough to beat. These are all unidirectional, dynamic mikes, and are equipped with a 15-foot cable and 1/4-inch phone plug. Also, all but the WM-1315 have an XLR connector at the mike for use with balanced cables.

Professional (From \$94.95*)

Professional quality is what you expect from Panasonic, and these mikes deliver it. They are all balanced, unidirectional, low-impedance mikes, and come with XLR connectors on a 15-foot cable. For vocals and instrumentals, the WM-1505 is best used in studios, and the WM-1506 for live performances on stage. Both the WM-1520 and the WM-1521 are low-distortion mikes designed for natural-sounding speech and interviewing, while the WM-1521 offers a wider frequency response. And the versatile WM-1555 is our ultimate hand-held mike for broadcast studios.



So whatever kind of mike you need, pick a Panasonic. You'll like what you see because you'll love what you hear.

For more information, write: Panasonic Company, Video Systems Division, One Panasonic Way, Secaucus, N.J. 07094. In Canada, Panasonic Video Systems Department, Mississauga, Ontario.

*Panasonic recommended price but actual price will be set by dealers

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of its portable SMPTE code generator, the Model 641. New features of the unit (formerly Model 640) include liquid crystal time code and user bit display, thumbwheel setting of user bits and lower power consumption.

In larger studio systems, vertical interval time code generator/readers were popular. New from Philips was a generator/reader designed for one- and 3/4-inch VTRs. Rather than laying down time code longitudinally, the Philips unit puts the code down in the vertical interval between each frame; the big advantage is that this enables time code readout even during still frame operation. The microprocessor-based TC-600 also provides for the simultaneous display of user bits.

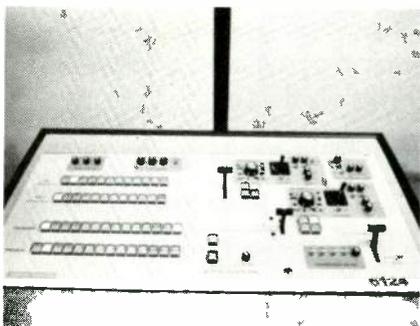
Skotel, too, showed a vertical interval time code system. The generator/reader mounts internally to and is powered by a standard generator/reader, but inserts the code and user bits into the vertical interval including an even/odd field identification. The system can also be used in conjunction with Skotel's RS-232 intelligent interface for its time code generators and readers.

From Dynaquip was the new Model 3800 Edit-Code Master, a microprocessor-based unit with separate displays of time code editing and reading functions. User bit entry is accomplished through front panel keys. Operational speed is from one-thirtieth to 70 times play speed.

For-A, the diversified Japanese company marketing for the first time in the U.S., showed its TCG/TCR-3100 time code generator/reader. The time code/user bit system provides for both serial and parallel inputs and outputs. Powerful error detection and correction circuits are provided on the reader.

Datametrics showed its complete line of SMPTE generators and readers, ranging from the simple SP-700 SMPTE character generator to key hexadecimal characters into the video signal, to the SP-760/SP-766 time code reader and generator.

Glentronix showed the complete line of time code generators and readers



Crosspoint Latch's 6124 marks this firm's expansion into the larger market for EFP

from Telcom. At the top of the line is the "Time Code Centre," a generator/reader/time code calculator all packaged into a rather compact unit. The calculator function permits calculation of offsets and other complicated editing functions. The unit can be remotely controlled from up to 1000 feet away.

ESE showed its full line of clocks and timers including master clock systems and clocks with large digital readouts.

For more information: Dynaquip 3500, 426; 3800, 427; Dynasciences TCG Mk III, 428; Glentronix 7000, 429; Skotel PTC-100, 430; vertical interval system, 431; Shintron 641, 432; Philips TC-600, 433; For-A TCG/TCR-3100, 434.

Production switchers with memory

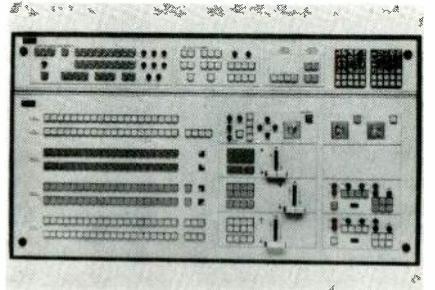
As at last year's show, considerable attention was drawn by high-end production switchers. Many were put through their paces by highly accomplished TDs and editors: at the Ampex booth, for instance, a former editor from Versatile Video in San Francisco demonstrated the Ampex 4000H (formerly Duca-Richardson) switcher. CDL borrowed an editor from Reeves Teletape in New York City for its demonstration of the 480 switcher. The same was true at several other booths, and may represent an attempt by manufacturers to counter claims that these large switchers are too intricate to be handled by a single person.

Once again the Grass Valley 300 Series production switcher stole the show as preprepared tapes reminded booth visitors that this was the switcher used by ABC in Control Room A of the Lake Placid Olympics broadcast center. E-MEM effects memory (one for each of the three mix/effects buses, each capable of instantly reproducing 20 M/E configurations), quad splits, and the NEC/GVG Digital Video Effects are fully integrated. The switcher features unlimited reentry of effects from one bus to another, permitting creation of highly complex images stacked and keyed within each other. Further, every M/E bus has an independent title mix/cut key with its own automatic transition timer. Four input buses per M/E allow transitions from one background to another, the addition of a video key (chroma key, DVE key, self key, or matte key), a title key, or any combination of the above to generally be accomplished with a single lever movement on one of the M/Es.

Grass Valley was also stressing the "personality programming" of its switcher, enabling operator preferences to be programmed by the user. RGB and external key inputs are assignable to video inputs, for instance, so that the inputs are programmed as RGB, exter-



Grass Valley's GVG switcher got its first workout with ABC's Olympics



NEC demonstrated a voice activated production switcher

nal, or encoded chroma keys, or as external key sources.

The ability to stack images and perform complex, five-level transitions was also demonstrated by Central Dynamics with its CD-480 line of production switchers. Using what is called SFX (Sequential Effects), the switcher is able to get around the traditional problems encountered when M/Es are cascaded, tying up three M/Es when an effect such as wiping between a chroma key over a background and another background scene while holding a title key over the composite image is required. In the 480 switcher, this is accomplished with a single lever movement since the M/Es are stacked sequentially and the title key is independent.

This setup also permits easy automation with the Central Dynamics CAP (Computer Assisted Production) system.

Not to be outdone, Vital showed a preliminary model of its VIX-114-4B switcher, promising delivery in four to five months. The switcher has three M/Es, each with a chroma keyer and two title keys over or under the chroma key; the title key offers four levels of edging, two levels of drop shadow, and outline. Sixty-two preset wipe patterns are provided with full positioning and three mode/two dimensional modulation. Each M/E permits dissolves or wipes to or from a chroma key, behind a chroma key, or within a chroma key. Dissolves or wipes can be made to either or both of the title keys, or the keys placed over or behind the chroma key. Automatic transitions from a few frames to 33.3 seconds, entered as numbers of frames, can be programmed for all M/Es independently or simultaneously.



Blue chip ENG on a budget

If you thought that an Ikegami ENG camera's been beyond your budget till now, take heart. The HL-78A approaches the high performance standards of the HL-79A. But the price is encouragingly lower.

The HL-78A is the quintessential ENG camera—20 pounds complete with lens, battery and ready for action. It is beautifully balanced, human engineered, with BK-7 glass beamsplitter optics, and state-of-the-art electronics. +18 and +9 dB gain settings enable you to invade domains of darkness that daunt lesser cameras.

And with studio options like 4½-inch electronic viewfinder, remote paint box, program microphone and intercom, it does double duty. What's more, it meets EIA Std. RS-170A including SC-H phase criteria, with adjustable H&V blanking pulse widths to meet FCC limits. Put the HL-78A on your ENG team. See your Ikegami dealer/distributor or contact Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; (201) 368-9171. West Coast: 19164 Van Ness Ave., Torrance, CA 90501 (213) 328-2814; Southwest: 330 North Belt East, Suite 228, Houston, TX 77060 (713) 445-0100; Southeast: 552 South Lee St., Americus, GA 31709 (912) 924-0061.



Ikegami HL-78A

The Vital PSAS-2 (Production Switcher Automation System) is the counterpart of CAP and E-MEM. Providing memory of over 1000 events per floppy diskette, it allows sequential or random recall of switcher settings, which can either be "learned" from an operator's motions or programmed to provide linear transitions between two switcher setups. A new feature on PSAS-2, the learning mode provides smooth analog move tracking for effects up to 15 minutes.

A new entry into the field of highly sophisticated, highly automated production switchers this year is ISI's 200 Series, available with one, two, or



The J&D 705 from Beaveronics was one of several small ENG switchers shown

three Polykey Effects (PKE) M/Es. Each PKE unit uses a four-input bus system for A & B primary buses and chroma key and video key buses; each PKE also provides quad split. This arrangement permits simple setup of complex effects. Auto transitions and rotary and spin wipes are also standard, as are flip-flop mixing, downstream keying with border edging and colorizing, a pointer generator, and master fade to black with pulse processing.

ISI's A.P.E. (Automated Production Effects) system, an option to any 200 or 1200 Series switcher, was shown controlling only a single M/E bus on the 200 Series switcher at NAB; it will shortly be available in its full-blown version, however. A.P.E. will recall up to 60 events with its internal memory in up to three M/Es, and over 3800 events on a dual-drive floppy disc system.

Another large, three M/E production switcher — the TAKS-1000 — was unveiled by NEC. A major feature is the use of LSI circuits throughout the design. The switcher handles 20 inputs (including color black and color background) and provides eight output buses. Each M/E has a modulated positioner, colorizer, and digital pattern generator for 128 patterns.

The switcher was also shown with an ingenious "super low cost character generator" — a type scanner that works directly off a black and white title camera.

Enjoying continued popularity is the three M/E Ampex 4000H with its calculator-type keypad entry of 100 pat-

terns. Though Ampex does not have a production switcher automation system, the effects capability is strong, with images composed from as many as five sources (including chroma and title keys) controlled by a single M/E.

Also reaching for the high end of the market, American Data introduced its new two-M/E 3104 switcher. Each M/E has its own quad split, chroma key, and title key inputs along with a four-channel video processor to provide 100 patterns, variable softness and borders, positioning, variable ratio spotlight, and more.

ADC also announced that it would have available later this year an automation controller for its production switcher, dubbed ACTS. The price is expected to be \$45,000 maximum. The Automatic Control Television Switching system seems primarily designed for post-production applications.

Ross Video's two-M/E switcher was also popular. The M/E amplifiers (dubbed MLE for Multi Level Effects) each process two background and two key signals. Rotary and spin wipes, pattern multiplication, auto transition, downstream keying, master fade to black, border and background generator with soft keys and wipes, and RGB and encoded chroma keyers are all standard.

Viscount showed its Model 1127, the largest in its line, with two M/Es, three buses, up and downstream keying, and pushbutton pattern select including rotary wipes.

Shintron showed a prototype of its Model 374 "Super 80" switcher, like the previously introduced Model 375 but with two M/Es. Other features in the \$9000 unit are an encoded chroma keyer, quad split on each M/E, and downstream matte keyer.

In a surprise move, Vital announced that it would no longer market the Vitex line of switchers. A company spokesman explained the technology was too costly to market it as a mid-range switcher, but hastened to add that Vital would continue to service Vitex units already in the field.

With the heavy phase of production switcher R&D over, manufacturers have begun applying the new digital control and other technologies to more moderately priced switchers. An example is the Central Dynamics CD-480-4, a new, compact model of the 480 line with an SFX generator (see earlier description), an add-on key module for RGB or encoded chroma keys, and a wipe module with 23 preset patterns.

Another example of the new technology is Vital's 250 P/N, shown in prototype with a six-month delivery quoted. The completely digital system uses a single fader bar to control almost every function including five levels of video (program, preset, and three

keyers) and three levels of keying. An internal memory stores up to 100 transitions. Price is expected to be approximately \$27,500.

Several Grass Valley 1600 Series switchers fall into the category of versatile production switchers ideally suited to the controlled environment of a post-production suite. Featured at the show was the new 1600-1X, a single M/E switcher with modulated positioner, color matte generator, pattern generator (both rotary and standard), and downstream keyer. The system can be provided with a parallel audio switching system for AFV or audio only edits.

The 1600-1X also comes standard with an E-MEM II.

New from Datatron this year is the Model 2100E (this line of switchers was acquired from Image Controller). This single M/E post-production switcher, ideally suited for post-production interface with an editing controller, also includes an audio mixer for AFV or audio breakaway operation. A spotlight and 87 other effects are joystick-positionable.

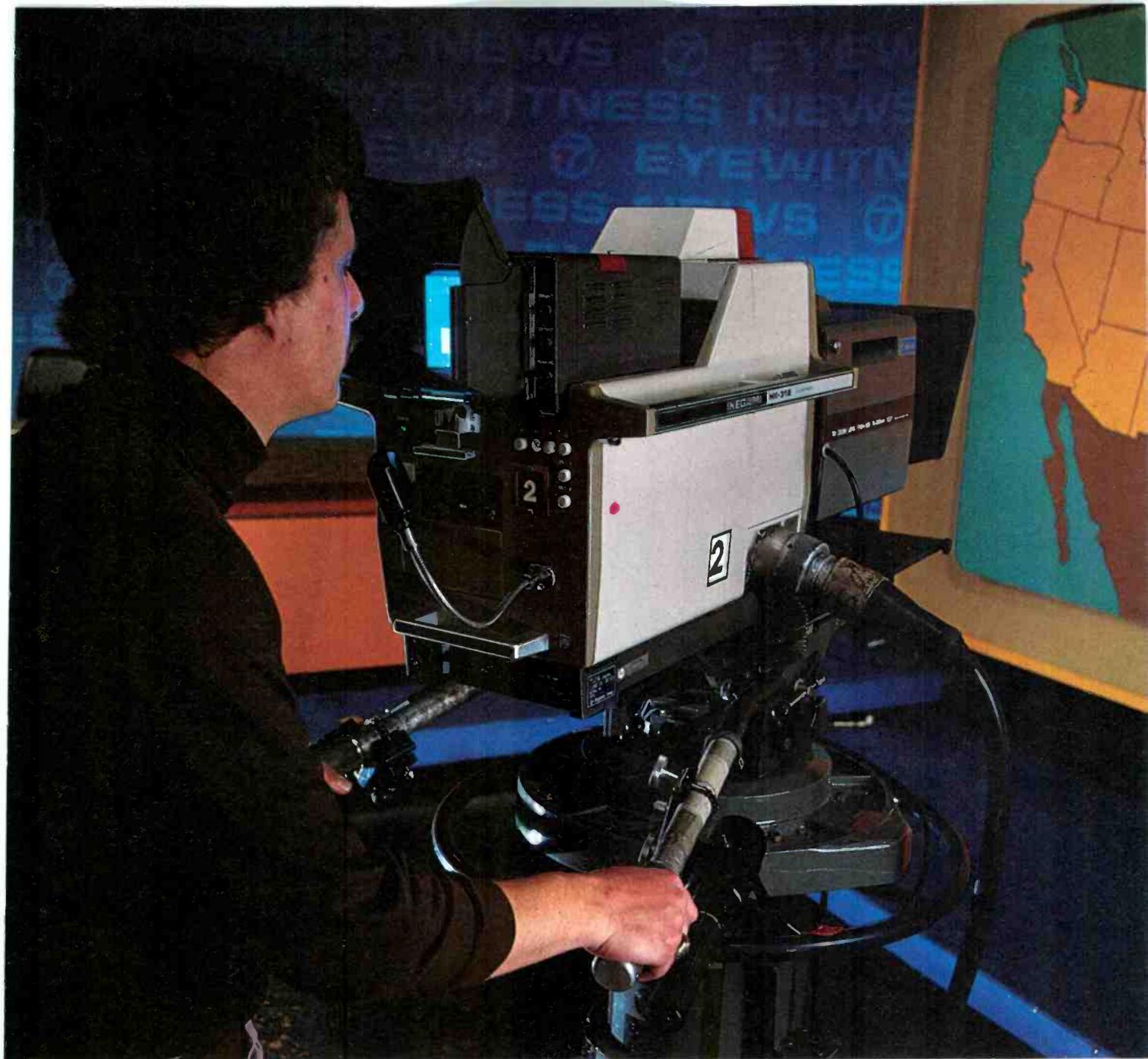
A new single M/E switcher — Model 2103 — was also shown by ADC. Priced at \$5400, it is designed specifically for remote truck installation. Nine patterns are positionable with separate H and V controls. Black burst and color background are included; a chroma keyer is optional.

Somewhat disappointing was Crosspoint Latch's failure to show a working model of its Auto Drive switcher automation system, designed as an outboard addition to its 6112 and 6124 production switchers; delivery is promised soon, however, at a price around \$10,500. Up to 256 switcher configurations are memorized at a time, with automatic transitions between effects programmable up to 99 minutes.

Also at the Crosspoint Latch booth: the 6118 "Pixie." The \$2500 switcher includes a colorizer and downstream keyer as well as 12 selectable patterns. One of the switcher's most important features is automatic locking of Sony 1610 and 1640 cameras and the JVC G-71US.

Beaveronics, too, had a new portable (35 pound) self-contained-electronics switcher. The single M/E Model 705, developed by J & D International, has a built-in sync generator with three black burst outputs for locking cameras as well as genlock, 32 positionable wipe patterns and spotlight, reentry of mix effects, wipe modulation, matte generator, adjustable edging and softness, and many other features. Price is \$7900.

Shintron's Model 375 Super-Switcher is also designed for remote applications, though here the electronics are in a separate, rack-mounting



Computer set-up and triax too

Today, broadcasters are classing computer setup and triax as necessities. Ikegami offers you a choice of two such cameras. Both are proven in the studio and field.

- The HK-312, with 1¼-inch pickup tubes, is the only proven computer setup camera today. More than 100 are in service throughout the ABC Network, at WGBH, and at other major stations.
- The HK-357A with 1" diode gun pickup tubes offers the same high standard of performance along with the convenience of field capability.

Both are extremely stable cameras that can be operated manually. And both accept computer control for automatic setup for on-air readiness in 45 seconds.

Both cameras can be used with multi-core cable. With triax the cameras can be a mile from their base station.

Of course, in colorimetry, automatics, circuitry excellence, and range of options, both are incomparable. But seeing is believing. Experience a demonstration soon at Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; (201) 368-9171. West Coast: 19164 Van Ness Ave., Torrance, CA 90501 (213) 328-2814; Southwest: 330 North Belt East, Suite 228, Houston, TX 77060 (713) 445-0100; Southeast: 552 South Lee St., Americus, GA 31709 (912) 924-0061.



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brilliant combination that is unsurpassed in today's video recording industry. Available in SMPTE Type "C" or "B" formats. 34 min/66 min/94 min.

Contact Ampex Corporation, Magnetic Tape Division, 401 Broadway, Redwood City, CA 94063, 415/367-2011.

AMPEX

unit. The versatile switcher provides effects reentry, 10 wipe patterns with soft wipe, edge wipe, modulation and position controls, and wipe limit controls, encoded chroma keyer, three color background generators, downstream keying, and master fade to black. The switcher handles up to 12 inputs.

With increasing emphasis on ENG and EFP production values, "switchers in suitcases" were hot items at the show. The Crosspoint Latch 6104, introduced two years ago, appears to be enjoying the most popularity at this time. Asaca's ASW-100, whose switching unit for three cameras weighs less than 33 pounds, was also demonstrated, though featured less than last year when it was first introduced. A surprise was Toshiba's decision to apparently discontinue marketing its FPC-10 portable production switcher here in the U.S. for the time being.

One very small newcomer to the show was Viscount's \$995 Model 1107. An amazingly large number of features are packaged into an amazingly small unit not much larger than a portable audio mixer. The ac/dc operated switcher handles three camera inputs on two buses with 22 effects patterns.

New for the audio side of production switchers is the Hallikainen & Friends TVA 142 audio mixing system. Up to 36 balanced inputs in groups of six can be handled with balanced audition, program, and cue outputs plus two monitor channels. Switching can be controlled manually, but is totally automatic in the AFV mode of a video switcher.

For more information: GVG 300 Series, 435; 1600 1X, 436; Central Dynamics CD-480 Series, 437; Vital VIX-114-4B, 438; 250 P/N, 439; PSAS-2, 440; ISI 200 Series, 441; NEC TAKS-1000, 442; American Data 3104, 443; ACTS, 444; Shintron 374, 445; Datatron 2100E, 446; ADC 2103, 447; Crosspoint Latch Auto Drive, 448; Beaveronics 705, 449; Viscount 1107, 450; Hallikainen & Friends TVA 142, 451.

Action intense with slow motion and still stores

Still stores and slow motion devices showed strong advances at the convention.

MCI/Quantel introduced its DLS-6000 Digital Library System. Though this unit was shown privately last year as a prototype, this year it was introduced as a market-ready product.

The DLS-6000 is a computerized, digital video, disc-based system. The basic configuration will store up to 350 pictures on a single IBM-developed Winchester disc system. The disc sys-

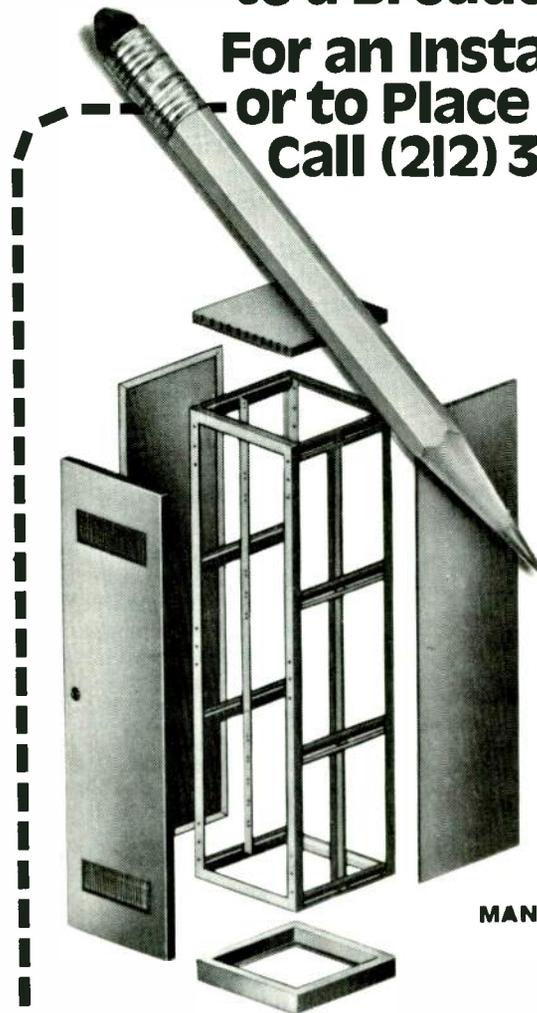
tem is expandable so that a basic control system can handle 10 or more discs providing a 3500-picture capacity. Theoretically, the extension of storage capacity through the addition of disc drives could continue beyond 10 units, but the manufacturer feels users will prefer to go to a tape-based "archive system" similar to the one demonstrated at the show.

Aside from the library characteristics of the system, Quantel's main thrust has been to provide a still-storage production system. Three framestores are employed, two for output and one

shared for preview and input. The theory behind this approach is based on several operational assumptions. First, using framestores as buffers to the disc system permits the use of standard EDP-type disc units. Data rates in standard EDP discs run about 8 Mbits/sec, while real time video requires a rate of about 100 Mbits/sec. The use of framestores, then, means that read/write operations involving the discs can take place at lower rates while video capture or display can take place in real time via the stores.

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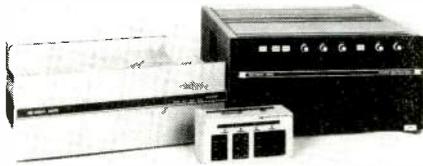
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MCI/Quantel's DLS-6000 is one of several new library approaches

two output stores give near instant access to display frame and "next up." The third assumption is based on the compose and capture functions. When entering video frames into the system, it is assumed they will be entered in full frame — that is, one frame at a time. Because of the extensive editing and manipulation powers of the system, it is assumed that composition of frames may be a separate operation. In other words, while most frames displayed will be identical to frames stored, in many cases the operator will wish to modify the frames stored to present new frames for display.

Other aspects of the system provide for captioning of slides, numbering slide locations, and "Browse," a system which permits the operator to scroll through the disc contents at 25 slides per displayed frame for selection and editing.

ADDA Corp.'s new Library Control System provides access to as many as 150,000 slides by description and location stored in its ESP system. ADDA has attacked the problem of retrieval in a very sophisticated fashion.

The new library system is based on four fields of search. The fields — category, geography, source, and date codes — are established when the slide is entered into the system. The entry process prompts the operator to label the slide according to groupings established. Each of the four search fields is further divided into 255 possible sub-identifiers, each 16 characters in length. Further identification is provided by slide titles, each of up to 18-character length. Further, 128 characters of descriptive language can be associated with each slide. Each slide is also provided a still number.

Thus, when searching for a particular slide the operator can call for it by number, if known; by recording date, which will produce a list of all slides recorded on that date; by title, if known; by category (i.e., "presidential candidates"), which will produce a list of all such slides; by geographical location (i.e., "Three Mile Island"), which will produce a list of all slides with that same location. The price for the Library Control System will be \$25,500.

Last year IRIS, from Harris Video Systems (then, CVS), was shown in prototype form. This year the system is ready for market. IRIS offers on-line access to as many as 5840 stills at one time, though smaller configurations are possible and off-line storage is infinite, using additional disc packs.

Stills are stored with either a system-generated ID number or a house ID. An entry date tag allows search by date or deletion of old material. Browsing is possible by calling for a specific disc pack number or for stills with similar descriptions. A "wild card" feature allows the playback of all slides with a common disc pack number, directory ID, or title.

Most functions are on single keys so keyboard data entry is kept to a minimum. To build a sequence, for instance, a cursor is positioned next to the slide identifier desired and a SAVE key is pressed. Once all the desired slides have been "saved" they can be recalled in forward or reverse order by pushing the SEQUENCE button. An auto sequence function allows for strings of slides to be presented at preselected rates.

Frame synchronization for the IRIS is through HVS's new 630 frame synchronizer. The basic system comes with a full HVS 630 for read/write functions and a read-only 630 for an additional output channel. A full IRIS system can employ as many as three full HVS 630s and three read-only 630s.

Arvin/Echo's line of analog disc recorders for slow motion and still storage has been reconfigured and expanded to offer a number of new twists. The new Image Maker system is based around Arvin's EFS-1, and offers random access to 500 on-line images. The new system also will provide variable speed motion loops of from one second to 16 seconds. A serial digital interface makes the stacking of units possible.

Another new device in the Arvin/Echo line is the Squeezer. This unit will compress still or active video to $1/4$, $1/9$, $1/16$, and $1/25$ normal size with complete positioning capability. The compressed image can be inserted into another image or into itself or keyed over other video. Both new products can utilize Arvin's new low-cost TBC, the LCT-1. This CCD unit has two lines of correc-

tion and meets RS-170 standards.

JVC introduced to the U.S. market its VM-1200 video disc recorder/player for still storage and slow motion recording. The VM-1200 comes with two different controllers, one for still store functions and the other for variable speed motion recording. In use in Japan for the past one-and-a-half-years, the slow motion configuration will sell for less than \$26,000 and the still store configuration for under \$30,000.

As a still store, the VM-1200 offers 600 frames of randomly accessed video; when configured for slow motion, it provides 20 seconds of real time video recording. A zone recording technique gives the user the option of using the device to provide two discrete 10-second recording segments or the full 20-second continuous recording.

Eigen showed a new slide store, slow motion controller option for its disc recorder this year. The new controller, according to Eigen's George Foster, was developed in response to the needs of stations that want to use the same unit during the weekdays (normally) to do slide tags and such but wish to be able to use it on weekends for slow motion recording of sport events.

Oktel's main thrust at this year's NAB was the introduction of the BDR-600 slow motion recorder. The new unit, priced at \$39,000 (without TBC), offers a 60-second record time capacity. The BDR-600 has all the standard options and performance characteristics of the BDR-400 plus a switchable signal/dual channel configuration that permits the system to be operated as two 30-second systems.

In its line of "Slide File" recorders, Oktel now offers a system with a 2400 on-line slide capacity. The BDR-300 is priced at \$39,000 without TBC. Both the Slide File and slow motion recording systems offer an RS-232C computer interface as an option.

Both RCA and Sony announced the development of a new remote controller for Dynamic Tracking-equipped one-inch VTRs. The new remote controller provides playback control of variable speeds from one-fifth reverse through still to twice normal speed. Sony has designated the new unit, DTR-1100, for use with its BVH-1100, and RCA has designated the Dynamic Tracking Remote Controller for use with its TH-200.



ADDA Corp.'s library system offers extensive storage and retrieval capacity

For more information: MCI/Quantel DLS-6000, 452; ADDA Library Control System, 453; Harris IRIS, 454; Arvin Echo Image Maker, 455; Squeezer, 456; LCT-1, 457; JVC VM-1200, 458; Eigen controller option, 459; Oktel BDR-600, 460; Oktel BDR-300, 461; RCA Dynamic Tracking Remote Controller, 462; Sony DTR-1100, 463.

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Synchronizing — the fundamentals of control

A long time ago when SMPTE forged a standard for describing the physical location of specific information by identifying its relative position in time, they called it SMPTE Time and Control Code. For a long time manufacturers devoted their energies to building generators and readers that would accurately ascribe this time code to specific locations on tape.

Now, with a plethora of accurate time code readers and generators on the market, a number of manufacturers have decided to turn their attention to the "control" potential of this code.

Initially, these controllers have been described primarily as time code synchronizers, but as they become more sophisticated the term synchronizer becomes increasingly an understatement.

CVC (Control Video Corp.) introduced the IC system which extends the notion of synchronizing.

While the IC can be equipped with two SMPTE writers, two readers, two keyers, and two VTR controllers, these features are merely the articulators of the IC's purpose. The microprocessor intelligence of the IC is open-ended so that users can apply these articulators in a variety of ways or combinations to solve a wide range of problems requiring control of two VTRs.

The system can be used as a synchronizer, or it can be used to sequence record or playback functions of VTRs. The highly sensitive time code reader/writers allow recording of time code at lower levels, so crosstalk is minimized. An optional keyer allows time code to be keyed over video for monitor display. User bit entry allows scene and take numbers to be recorded, and a GO TO function allows the search and cue process to be accomplished by the scene/take reference rather than SMPTE time code.

Since all of these time code functions are associated with a real-time clock (RTC), events scheduled for real-time implementation can be executed automatically. No operator has to cue or roll tapes at given times.

A unique Strokes™ function allows the IC user to bring tapes into synch (or to offset) by simply stroking a touch-sensitive strip on the unit's front panel. The direction of the finger movement coincides with the direction of the tape; left to right will advance the tape and right to left will slow it or reverse it.

According to Larry Seehorn, a primary developer of the HVS EPIC editor, the IC is built on a modular design and will eventually permit the control of film chains, character generators, switchers, and other television

equipment, ultimately leading to a production automation computer system. A full two-VTR system at this point is priced at about \$6500.

Synchronizers for audio-audio or audio-video post-production work continued to gain attention. A new system shown this year is the Q-lock 210 Synchronizer from Audio Kinetics, (U.K.), Ltd.

The Q-Lock generates and reads SMPTE/EBU Time and Control Code for any two multi-track audio recorders or an ATR-VTR combination. Up to 10 cue points can be stored and cued automatically. The unit works on a master/slave configuration or permits chase and offset functions. Fast wind or search operations can be executed without head-to-tape contact.

A special cascade mode allows the addition of another Q-Lock for controlling a third recorder or for control to be passed to an external computer. The basic Q-Lock 210 is priced at \$14,950; an optional XT-24 intelligent locator device which learns individual tape transport behavior patterns is priced at \$3150.

BTX showed its own, quite powerful, audio editing controller, the BTX 4600. This was the first full demonstration of the SMPTE tape controller for BTX. The unit will control up to four ATRs or an ATR-VTR combination. The 4600 has a new and broadly applicable "learning capability." Operator-established sequences are "learned" by the unit so that replays occur in the fashion chosen by the operator. The intelligent interface unit automatically adapts the operational behavior of the 4600 to the dynamics of the transports used.

The basic 4600 controlling two non-sync recorders is priced at \$6500, but if extended to optimal control of four synchronized recorders, the system cost would be about \$21,100.

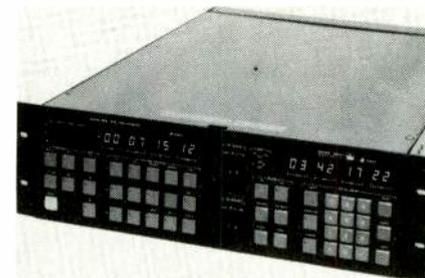
Both Philips and Studer Revox returned with their ATR-VTR SMPTE time code synchronizers. The Studer TLS-2000, while providing tape lock through SMPTE time code for ATR-VTR operations, reads time code bit by bit (eight-bit code) for audio-audio editing. This, in effect, has the TLS-2000 decoding two additional bits for an accuracy of 20μ. Fully installed, the TLS 2000 is priced at \$25,510.

Philips' T5-605, which will handle up to two slave transports (audio-audio or audio-visual), provides synchronization to the frame rate and phasing resolution to one-hundredth of a TV frame. A digital time code recovery system allows the TS-605 to work with inconsistent or mixed time codes.

MCI introduced several new synchronizing and autolocating add-ons for use with its popular line of tape transports. Most comprehensive of the



JVC was a new entry with a disc still store and slow motion system



Philips TS 605 synchronizer is the breed of device bringing more careful attention to audio post-production in television

new devices is the JH-45 Autolock. This unit is a SMPTE/EBU generator/reader/synchronizer in addition to autolocator. The device will slave any MCI tape transport to any master transport (film, video, or another ATR) providing time code. Offering the full range of synchronizing functions such as chase, offset, lip sync compensation, and so forth, it also provides for memory of 10 scratch pad locations. Locations can be recorded cumulatively on any 30-second unused portion of the tape so that when the tape is reloaded or transferred to a similarly equipped transport, the location information can be dumped back into active memory — eliminating the need to reenter the data manually.

MCI also showed its Auto-Locator III, which provides these functions independent of synchronization and time code read/write functions.

Sony Corp. was taking a different shot at audio post-production for television by touting its PCM series of digital audio products as ideally suited to the task. Not only do the PCM machines offer 90 dB dynamic range audio, but since the transports are based on U-type video machines their integration into computer assisted television post-production environments is absolutely homogenous.

For more information: CVC IC, 464; Audio Kinetics Q-Lock, 465; BTX 4600, 466; MCI JH-45 Autolock, 467; AutoLocator III, 468; Sony PCM series, 469.

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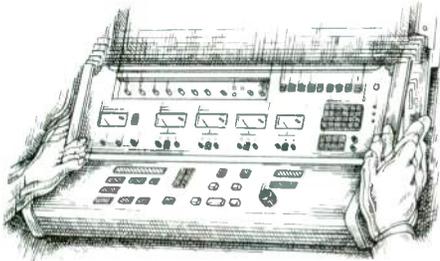
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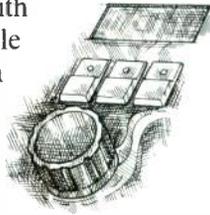


through threading. And tucked all electronics behind a drop-down panel for on-air accessibility. This panel includes all the

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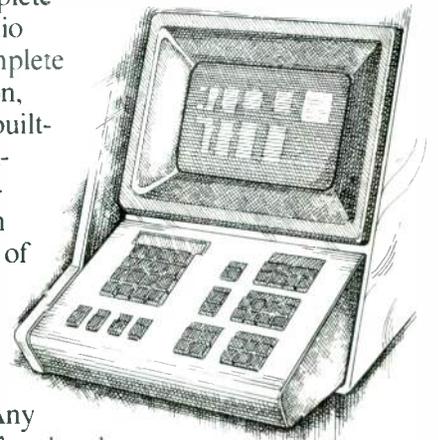
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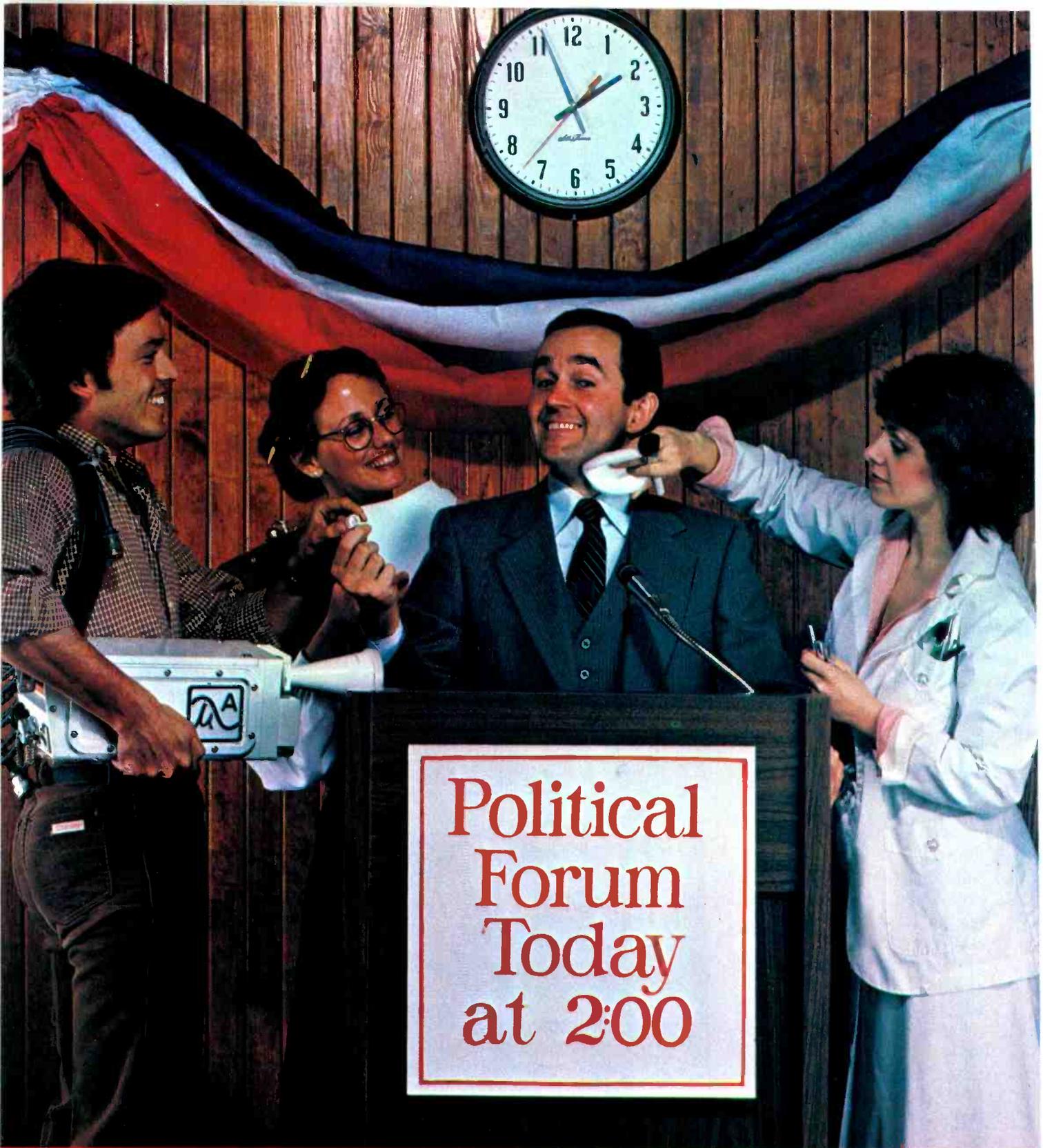
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THE BROADCAST PLANT: CONTROL AND ACCOUTREMENT

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THE LONGER frame synchronizers are on the market, the more applications are found for them. As more applications are found, the greater the diversity of design. When ADDA Corp. introduced its VW-1 frame sync two years ago, the stated intention was to provide a device that was inexpensive enough that multiple units could be used. The assumption was that the main application for frame synchronizers was the handling of asynchronous signals from multiple sources. Both the assumption and intention proved well founded.

At the time frame synchronizers were also being elaborated to include a host of other functions, especially effects such as compression. This approach also had its valid applications.

MCI/Quantel and NEC both introduced low-cost frame synchronizers intended to attract the user desirous of synchronizing multiple sources. Both of these units make an additional point with reduced size and weight, taking up only 1 3/4 inches of 19-inch rack space — a single rack unit! Microtime and Thomson-CSF Broadcast have addressed the need of multiple sources in a different fashion. The new Microtime 2525SP incorporates an 8 by 1 switcher, permitting eight sources to use the same unit, albeit one at a time. Thomson-CSF's 9100 incorporates a 4 by 1 switcher with the same end in mind.

A second notable trend in frame syncs is in response to the sheer potential of handling video in the digital domain. Many manufacturers have gone to offering a variety of signal enhancement functions.

Perhaps one of the most broadly conceived of these new units is Microtime's 2525SP. The 2525, introduced last year, is essentially unchanged, but its integration with the SP option makes it a wholly new approach. The 2525 is priced at about \$25,000 plus the SP

option at \$6500.

The SP option provides, first of all, the 8 by 1 switcher. It contains a "smart proc amp" that permits each input to be adjusted for optimal video gain, chroma gain, hue, and pedestal. As each channel is set up, a SECURE button is pushed that then remembers the setting for that particular input signal. Whenever that signal is selected for program, the proper settings are automatically applied. If circumstances are rushed and there is no time to optimize each channel, a preset button will bring all channels to a "best average" point. If an input needs to be relocated to another input, a "transfer" function will take the setup data from the former location and assign them to the new location.

The remote SP panel also provides control over normal 2525 modes. Processing of all other video parameters is possible with introduction of the optional 2121SP Video Image Processor into the 2525SP system. Optional picture compression was demonstrated in Microtime's suite.

Sony Corp. also entered a multi-purpose frame synchronizer into its line, the Digital Video Multi Processor (DVMP). The new DVMP, in addition to frame synchronization, offers freeze frame, image enhancement of both horizontal and vertical detail, noise reduction, TBC functions, and color correction. The color correction mode offers RGB adjustment for gain, pedestal, and gamma as well as RG adjustment for flare. The DVMP is fully remote controlled.

ADDA Corp. announced its intention to introduce the VIP-2, though this unit was not quite ready for an NAB introduction. The new VIP-2 will offer infinite area compression along the H and/or V axis with positioning under joystick or pre-programmed control. The compression will be fixed to either picture center or picture edge. The unit will offer full frame sync/TBC functions as well and is expected to be ready by early July. The price of the unit will be pegged under \$40,000.

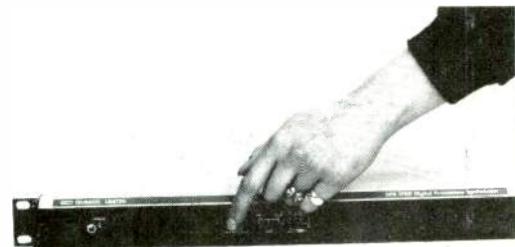
By reducing size, weight, and cost, MCI/Quantel hopes to introduce the

idea of the "routine" synchronizer. Their new DFS-1750 is just 1 3/4 inches high, 17 inches deep, and compatible with a standard 19-inch rack. Weight is about 15 pounds and power consumption is 90 V ac using a 110 V line.

The DFS-1750 offers a full frame-store, accepts phased or non-phased video automatically in NTSC, provides a fast hot cut, freeze frame/field, full TBC, and completely calibrated proc amp controls. Test equipment and test reference signals give the unit quick troubleshooting and repair characteristics. All controls are removable from the back via a 37-way Cannon D connector. All cards, including the power supply, are accessible through a flip-down front panel.

Marking another trend, the DFS-1750, like many of the 1980 frame syncs, offers a digital I/O for future integration with other digital video systems.

NEC's new FS-16 is another one-standard-rack-unit-size frame syn-



MCI/Quantel's 1750 is just one standard 19-inch rack unit high



NEC's FS-16 offers small size and low cost



ADDA introduced the VW-2 synchronizer especially for the Type C recorder market

chronizer. Also equipped with full proc amp controls, it features a low power consumption of just 150 W. The new sync employs a number of failsafe and troubleshooting features such as data rotation, which automatically substitutes the most significant bit for the least significant bit should RAM failure occur. A built-in memory analyzer permits isolation of any memory failure.

The FS-16 operates at $4 f_{sc}$ with nine-bit quantizing and also features a digital I/O. Priced at \$12,995, the FS-16 sets a new definition for "low cost."

ADDA Corp. added the VW-2 to its line. The new unit is specially designed to handle Type-C VTRs, in addition to U-type and 1/2-inch recorders.

Priced at \$24,000, the unit provides simultaneous TBC/synchronizing functions and accepts heterodyne or direct color. Vertical blanking is adjustable between 15 and 21 lines while horizontal blanking is fixed at 10.8 usec. Velcomp is present in both the TBC and frame sync modes.

Another low-cost, limited function TBC/frame sync is now offered by Microtime. The 2520, priced at \$18,950, provides heterodyne infinite window TBC, direct color synchronizing, full proc amp controls, RS-170A compatibility, and advanced V for dedicated VTR playback.

Harris showed its HVS-630 in production form. This very forward-looking instrument uses a newly designed digital architecture, processing an eight-bit signal in component rather than composite form like the company's previous synchronizers. With most of the support leaning toward component processing in the future of digital video, this design seems well-justified.

The performance of the HVS-630 was reported last year. The production version is essentially as promised.

Options to the system, as it now stands, include video compression and positioning, correct color D.O.C., and digital noise reduction. The basic HVS-630 will sell in the mid \$20,000 range.

Digital Video Systems continues to profit from its "mainframe" approach, which allows a basic hardware configuration with a wide range of common components to take on continually new tasks. The DPS-1, which has grown each year from TBC to framestore, offering ever-increasing functions, took one more step this year. John Lowry, president of DVS, showed his DPS-1 framestore this year capable of handling the slow motion output of an AST-equipped VPR-2. No other manufacturer has yet attempted to build a system to compete with the expensive TBCs associated with the type-C VTRs.

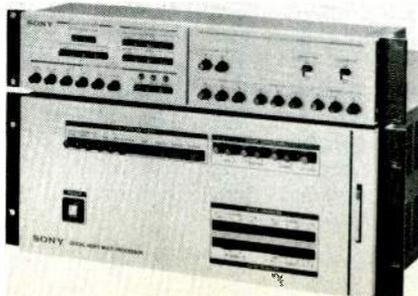
The unit shown in the DVS booth did an adequate job of handling the slow motion but faltered at higher shutter speeds. Lowry explained that the exhibited device was developmental and expected that all AST functions would be accommodated in the final version.

With many manufacturers of frame synchronizers including digital noise reduction in their systems or as an add-on option, only one new digital noise reducer was introduced at this year's NAB. Philips, which showed a prototype of the system earlier, demonstrated its new Automatic Dynamic Noise Reducer at this year's NAB. The system was originally developed for the BBC, but it has been designed for general application in both NTSC and PAL.

Model LDM3001 is a fully digital, totally adaptive noise reducer requiring no adjustments. The unit assesses input noise, picture content, and movement, and then computes optimum noise reduction action for each individual portion of the processed picture. This eliminates lag effects of earlier designs caused by the need for the operator to assess and select the degree of reduction.

Use of a recursive low pass filter and auxiliary side chain detector, predictor circuitry, and simple diagnostics for memory check permits a high degree of automatic operation. Specifications for the system include an input return loss of 40 dB at 4.43 MHz for the two program inputs, output return loss of 40 dB at 4.43 MHz, gain unity, differential gain of 0.5 percent, and differential phase of 0.5 degrees, excluding quantizing error.

Sony was another company to provide significant processing in addition to synchronization



For more information: Microtime 2525SP, 561; Sony DVMP, 562; ADDA VIP-2, 563; VW-2, 564; MCI/Quantel DFS-1750, 565; NEC FS-16, 566; Harris HVS-630, 567; DVS DPS-1, 568; Philips LDM3001, 569.

Time base correctors

TBCs began to show the pressure from low-cost synchronizers this year as most new TBCs addressed themselves either to limited applications such as dubbing or were born Siamese-like with a one-inch VTR.

While the TBCs shown by Sony, Ampex, and RCA can operate as stand-alones, no secret is made of their primary application — the handling of the variable speed tracking functions associated with the VTR systems. NEC's new TBC, the NTC-10, though employed with the TT-7000 to accommodate its ATF functions, is special enough to be positioned as a stand-alone, in the opinion of the manufacturer.

The NTC-10 features $4 f_{sc}$ sampling and 10-bit quantizing, plus built-in noise reduction for a 3 to 5 dB improvement in chroma noise level. The process also reduces velocity errors. The special velcomp circuitry corrects to the nearest nanosecond. With its 16-line correction window complete color processing without floating is possible for segmented or nonsegmented direct color recordings.

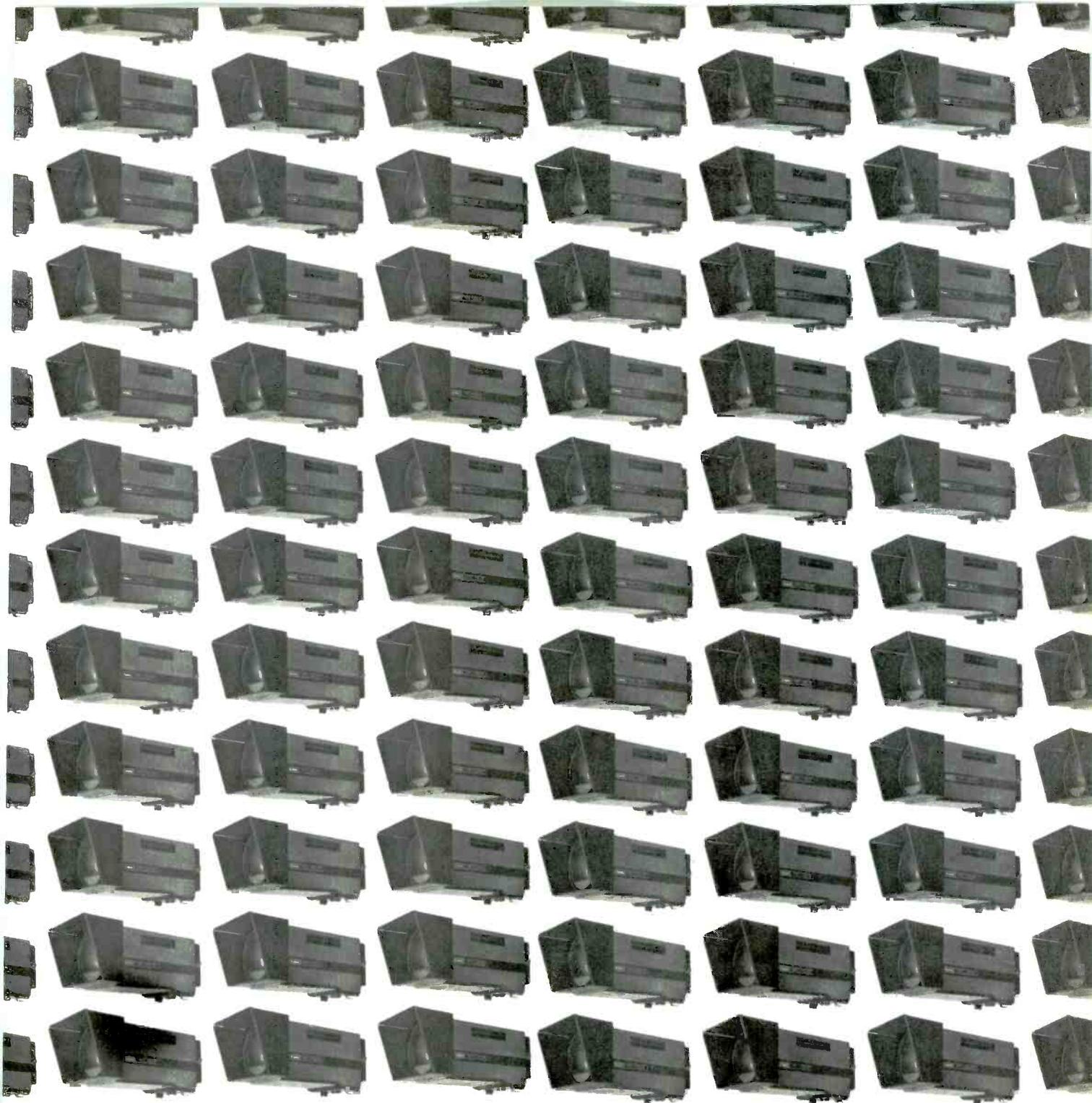
Another new high-end TBC is the HVS-590, shown by Harris. This unit provides a 16H correction window sufficient to correct serious gyro errors. The 590 takes a $4 f_{sc}$, nine-bit quantizing approach and offers a wide range of control over various signal parameters.

The new TBC is designed for use with virtually every type of VTR. Non-capstan servoed VTR dubbing to quadruplex is another design consideration. Signal-to-noise is measured at greater than 60 dB on a Rohde & Schwarz noise meter with 10 kHz high-pass and 3.58 MHz subcarrier traps engaged.

Microtime showed a new TBC for PAL or SECAM systems, the 2080.



NEC's NTC-10 was one of several TBCs introduced for handling variable speed playback rates



OVER 200 SOLD IN RECORD TIME. ZOOM!

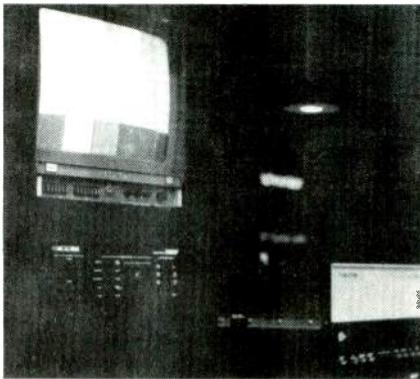
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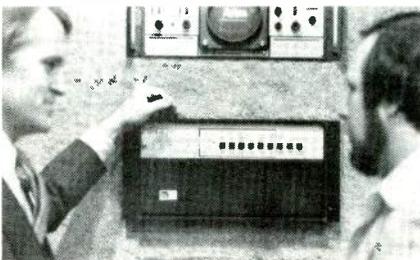
NAB SHOW IN PRINT



Microtime's 2525SP takes the enhancement-plus-synchronization approach. Up to eight sources have access to the unit



Jim Summers of HVS explains the features of the HVS-630



John Lowry (left) showed the DPS-1 handling AST slow motion

This unit provides essentially the same functions as the 2020 in NTSC with the added options of a 16H correction window, DOC, no-lock mode, image enhancement, and noise reduction.

Microtime also showed one of several CCD-based analog TBCs intended for dubbing and a variety of nonbroadcast applications. The Microtime 1700 provides a 4H line correction window with Microtime's Auto-TracSM for centering. This unit is priced at \$5950. V and H lock is available as an option, as well as Image X and Image Plus for image enhancement.

Edutron's line of low-cost CCD time base correctors continues to gain acceptance in cable and other applications. The ccd2 series, available in models with from 2 to 4H correction windows, is upgradable.

Video Data Systems offered a new CCD video time and error corrector, the V-TEC/1H. While not providing genlocking, the unit is intended to clean up

time errors on video signals for dubbing, CATV transmission, and various CCTV applications.

Other TBC manufacturers stood relatively pat on the systems they already offer. With the problems of time base correction so clearly defined at this time, the machines on the market either do it or they don't.

For more information: NEC NTC-10, 570; Harris HVS-590, 571; Microtime 2080, 572; Video Data Systems V-TEC/1H, 573.

Traditional enhancement still has a role to play

With so many manufacturers of digital systems employing a great deal of enhancement to their basic synchronizing and time base correction devices, traditional image enhancers have taken a back seat. While companies such as Dynasciences and other manufacturers of image enhancement systems continue to improve their existing image enhancement systems, few new systems appeared. One exception is the new Image System from Faroudja Laboratories.

The Image System consists of three units. The first unit is the portable Record One, a small booster weighing 1.5 pounds and designed to be attached to a standard U-type portable recorder. There is also a rack-mounted version of Record One that fits in a standard 19-inch rack and measures 1 3/4 inches high. The third part of the system is known as Playback One. This is also a single 19-inch rack unit in size. All three units are intended to work with recording systems using the color under principle.

When a combination of one of the record units and the playback unit is employed, the color picture output is greatly improved, with sharper edges, less ringing, and a signal-to-noise ratio improvement in both chrominance and luminance of 6 dB. Low level, small image details normally lost in color under VTRs are reproduced with greater fidelity. While the concepts and circuitry of the Image System are based upon previous Faroudja products licensed under the names of Crisp-

Yves Faroudja (left) brought a complete system of image enhancement to color under VTR systems



matic, Image X, and Image Plus, the new system features automation. A pilot "training" signal inserted in a non-picture part of the input is recovered by the playback unit and used to precisely control the degree of correction applied to the output; no adjustments by the operator are necessary. The portable Record One is priced at \$2100, with the rack-mounted unit priced at \$2300. The playback unit is priced at \$5995.

For more information: Faroudja Image System, 574.

Proc amps, DAs, DOCs, and analog processing

Until the video system is completely digital — including everything from the VTR to the transmitter — there will be a need for analog signal processing devices. Even large companies strongly committed to digital technology recognize the need for continued development of products to process the analog signal.

NEC, for instance, showed a new, low-power consumption proc amp. The TAP-170 is composed of video, burst, and pulse processing units and is designed to overcome distortion on transmission lines linked to the studio, master control room, microwave receiver, or transmitter input. It processes sync or burst signals by separating them from the input signal, shaping them, and then adding them back to the input. White clipper and black clipper are included.

Versa-Count, too, showed its Versamatic VPA-3000 video proc amp, which combines a digital sync generator with automatic video control. Sync generation is automatically referenced to a crystal oscillator or to the incoming video signal and adjusted automatically according to the magnitude of the time base error, video gain, chroma gain, VITS, or VIRS (optional).

Cross Valley has added an external reference option to its 3240/3241 processor system. The option helps eliminate H picture movement due to timing errors at the input of a studio switching system by providing a constant source of sync, blanking, and burst at the switcher output.

Leitch Video, too, was involved with ABC's coverage of the Olympics and showed its master sync generator used to keep all the venues at Lake Placid in sync with one another and with the Broadcast Center. Leitch also displayed a complete line of timing systems, sync generators, proc amps, and sync and pulse generators.

Sigma Electronics showed a new four-output black burst generator, Model BBG-140. All outputs are separately controlled. In addition the unit

CO-AX DIGITAL REMOTE CONTROL

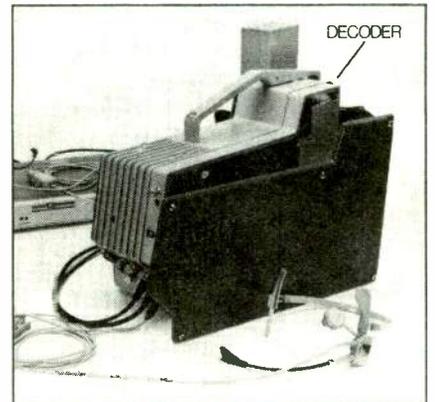
Our new and exciting co-ax digital remote control system provides dependable, studio-like remote control to ENG/EFP cameras in the field *at a fraction of the cost of other systems!*

It is the most affordable and reliable remote control system available on the market today. Easily interfacing with a full range of professional ENG/EFP video cameras currently in use, such as: Ikegami HL-77 and HL-79A, RCA TK-76B, NEC MNC-71 cameras, and many more.

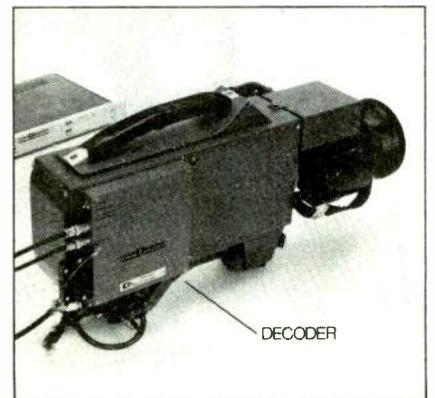


Outstanding Features:

- System consists of mini-CCU, analog-to-digital encoder, and digital-to-analog decoder.
- Permits control of all functions normally required in OB van, including genlock.
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- Lightweight, camera-mounted decoder features intercom capability.
- Digitally encoded control data relayed to camera-mounted decoder through a simple, lightweight and reliable coaxial cable.
- Eliminates the need for expensive, bulkier, multi-core or triax camera cable, and reduces to a minimum the risks normally associated with the use of such camera cables.
- Low-cost coaxial cable allows complete remote control and camera set-up functions from greater distances with greater safety and utmost reliability.
- System is ideal for all extended shooting situations such as sports events, live concerts, political rallies, etc.



RCA TK-76B shown with decoder neatly "sandwiched" between camera body and door.



Ikegami HL-77 shown with side-mounted decoder.

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features three sync, blanking, and sub-carrier outputs, front panel test points for inputs and black burst outputs, and a self-contained power supply. Sigma also showed the CSG-360 and CSG-365 genlock sync generators. The two models are identical except that the 365 also contains a color bar generator.

New audio and video DAs were in evidence everywhere. Hedco showed its new ADA-200 audio DA, which features no perceptible IM distortion, total harmonic distortion less than 0.05 percent from 10 Hz to 100 kHz, and S/N greater than 100 dB. The same amplifier permits distribution of SMPTE time code.

Hedco also showed its new video DA, Model VDA-100. Six outputs supply ± 0.1 dB response to 5 MHz, 0.1 percent differential gain, and 0.1 degree differential phase. Cable equalization is included.

Datatek announced a new video DA, Model 609, which provides six isolated outputs from a single bridging input. Cable equalizing and gain settings for the amplifiers are located on the rack frame rather than on the amplifier, permitting free intermixing of a large number of amplifiers without adjustment. Frequency response is $\pm .02$ dB to 5 MHz and ± 5 dB to 8 MHz. Differential gain is .08 percent at 10 to 90 percent APL. Differential phase is 0.1 degree at 10 to 90 percent APL.

Two new series of distribution equipment were introduced by Dynair. Series 1500 includes one by four DAs, lighted six by one passive switchers, and single adjustment equalizers. Balanced and unbalanced 24 dB post-equalizers compensate up to 3000 feet of standard cable to 8 MHz. The Series 5300 modular distribution system features minimal passband ripple, extremely low differential phase and gain, and excellent transient response through the use of dc servo-stabilized operational amps.

Sigma also showed its audio DA in single-channel one by 10, dual-channel one by 20, and compact one by five



The Vimacs system inserts control commands on unused lines of the vertical interval

configurations. The ADA-105 occupies only one-third of a 19-inch rack. Total harmonic distortion is less than one percent, noise -80 dB, and frequency response ± 1 dB from 20 Hz to 30 kHz.

A new master sync generator was also shown by Lenco. The Model PMG-312 is designed to have control over all pulse widths except vertical drive. A new vertical blanking width option has been incorporated to simplify setup. A five-position switch allows selection of vertical blanking widths from line 16 through line 21. The horizontal timing range is 5 μ s. SCH phase is locked.

A new dropout compensator was introduced by Merlin. The ME-188 is an analog unit with a one-line delay which can replace any dropout with information of the correct color phase and horizontal timing from an adjacent line. The DOC can also be connected with Merlin's ME-188L dropout logger (available later this summer for \$3800). All dropouts are measured and counted, then printed out on the logger showing number of dropouts per four-second interval with special flags for dropouts longer than one line or more than 10 dropouts per four seconds.

Though not as glamorous as most of the systems with which they are used, video filters are critical components of many operations.

Featured at the TEA booth was the Matthey Electronics line gaussian filters, low pass filters, color subcarrier filters, and a range of filters for D/A and A/D converters. The latter are extremely important for rejecting spurious by-products in the digitization and reconversion process.

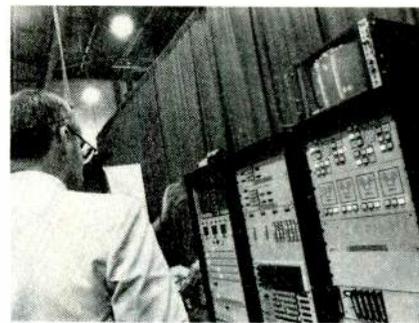
A complete range of low pass, high pass, and carrier baseband filters was also shown by Bayly Engineering.

Another essential element in a TV plant are patch panels; Kings Electronics showed a new, front-panel-accessible model already gaining wide industry acceptance.

For more information: NEC TAP-170, **575**; GVG external reference option, **576**; Sigma BBG-140, **577**; Hedco ADA-200, **578**; VDA-100, **579**; Datatek 609, **580**; Dynair Series 1500, **581**; Series 5300, **582**; Lenco PMG-312, **583**; Merlin ME-188, **584**; Kings patch panel, **585**.

Machine control, master control, and technical automation

Although station managers and directors of engineering continue to deny it, increasing labor costs and the scarcity of good engineering talent are precipitating a movement towards increasingly automated operations — despite union objections. This year's NAB



American Data has carried the automation of on-air switching through to machine control

show reflected a rather startling increase in the number of automation systems.

3M's 6500 machine control system, an outgrowth of the 6500 microprocessor control system used with the 40X and 20X routing switchers, is now fully developed and operational. Fairly typical of such systems, the 6500 uses distributed data processing with individual microprocessors at each machine allowing connection of the entire system with coax control lines.

A universal decoder is used for all different types of machines, capable of controlling up to eight machine functions; eight optical sensors provide a true indication of machine status. Each control panel can control up to 10 different kinds of machine (such as VTRs, VCRs, and film and slide projectors), with up to 99 machines of each type.

American Data exhibited part of its 3200 Series microprocessor-controlled routing switcher/machine control system, borrowed from WPBT, Fla. A special feature is alphanumeric addressing of machines; instead of calling for input 485 to be routed to output 61, the operator selects VTR 3 and routes it to Studio 4. Readouts also display the same alphanumeric addresses. Once the routing switcher pathway has been established, machine control is automatically delegated to the correct control point. Any number of machines can be controlled, with a single standard machine interface consisting of eight relays and 12 optical couplers for machine status indication.

From Fernseh, Inc., is the Tele-Mation TCS-1, also a microprocessor-based distributed processing system that is connected with dual twisted-pair wiring. Up to 100 VTRs and film chains can be controlled, each delegated to any of eight studio control panels (each of which can handle four VTRs and three film chains) or any of eight machine control multiplexers (each of which can handle up to 30 machines). The studio control panels use thumbwheels to select the film chain or VTR to be controlled, with the actual control accomplished with a set of dedicated pushbuttons. On the ma-

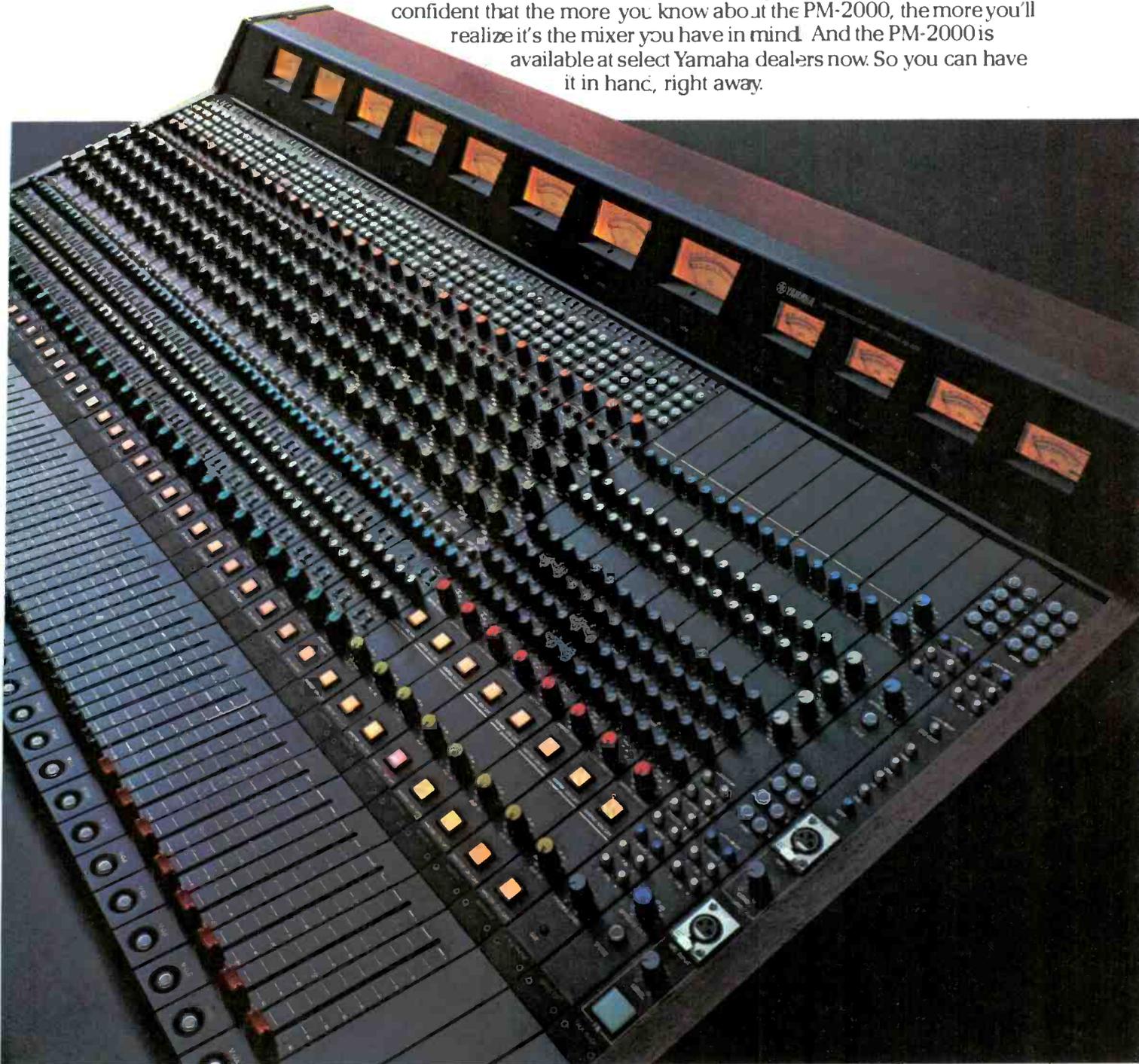
We have on hand what you have in mind.

We had you in mind when we designed our PM-2000 mixer. That's why this is the mixer that more than meets your performance expectations. And feels the way you want it to feel.

The layout is simple and uncluttered. Yet the PM-2000 is sophisticated, versatile, and rugged. It's been proven equally adept in broadcast and recording, both at fixed installations and on the road.

With 5-position, 4-band eq, and six independent sends on all 32 inputs (24 channels also available), plus a full-function 14 x 8 matrix, the PM-2000 has earned a reputation as the consummate console. Distortion and noise specs are as low as much more expensive studio consoles.

Write to P.O. Box 6600, Buena Park, CA 90622 for complete information. We're confident that the more you know about the PM-2000, the more you'll realize it's the mixer you have in mind. And the PM-2000 is available at select Yamaha dealers now. So you can have it in hand, right away.



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630 Frame Synchronizer.



Digital still store . . . digital graphics . . . real time picture analysis . . . whatever the future holds, the HVS-630, with its built-in digital I/O interface, is ready.

And, for today's needs, the 630 has both frame and field freeze, plus a built-in TBC that outperforms the best stand alone units. RGB (in and out) is also standard. Use it to do something special.

The key to the 630's performance is a unique system that processes the video signal in component—instead of composite—form. This technique is inherently immune to H-picture shift, cycle jump and color phasing.

As a result, edits and hot switches are handled smoothly. Chroma and luma are processed separately to make maximum use of picture improvement technology.

An optional Compressor/Positioner/Effects unit provides even more versatility. Choose pushbutton and/or joystick controls. Also optional is a plug-in digital noise reducer that reduces noise by 12 dB, without motion artifacts and resolution loss.

So, for the best return on your synchronizer investment, invest in the synchronizer with a future: the HVS-630. For a demonstration, call or write.

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chine control multiplexer, the individual machine control panels are delegated to a single control bus. Again, software permits special programming.

New this year from NEC is the TMC-105 machine control system, again designed to work with NEC's large matrix TKA-105 routing switcher. Distributed data processing allows simple wiring interconnection between the machines, each of which is outfitted with an identical microprocessor-controlled interface, and the central processing unit. Any type of machine can be controlled.

Seen for the first time at the show, in the Candex Pacific booth, was the British Vimacs (vertical interval machine control system) from Dynamic Technology, Ltd. The system is similar to that installed at ABC in New York City. The great value of the system, which sends control information and receives feedback on a line in the vertical interval, is that it requires no additional plant wiring. The code, inserted on any unused line in the vertical interval consists of two 40-bit words transmitted on alternating fields.

Any type of machine can be controlled; in the case of a telecine, the video monitor is used as the interface. Up to 4095 individual machines and control points can be set up in the system in any combination.

Manufacturers of large production switchers without fail showed up this year with an enormous variety of on-air master control switchers based around microprocessor-controlled M/E systems.

Another spillover from the production switcher area has been the rapid proliferation of master control automation systems. The principal difference between these on-air systems and their CAP, PSAS, E-MEM, ACTS, A.P.E., and other siblings is that the on-air systems incorporate machine control, work in real-time events, and generally have a video data terminal to enter and read out the event list. In this way they are not so different from a production switcher interfaced with a large software-based editing system, except that the event controller is internal to the system.

A perfect example of this spillover is ADC's announcement that its ACTS automation system will be available for interface with its 3110 master control switcher. The switcher, offering 24 inputs on two or three buses with optional audio breakaway, flip-flop mixing, and a variety of auto transitions, comes prewired for automation interface.

One of the more exciting automation systems at the show was the Central Dynamics APC-900, shown with its

new MC-990 master control switcher. An expandable system, the APC-900 starts with a basic 40-event memory with machine control and automatic preroll; VTRs, film chains, or other equipment are put on the air manually through the MC switcher. In the second level of automation, events are cued by scheduled or duration time to within an accuracy of 0.1 second. Three hundred events are stored, with 20 at a time presented on a status monitor listing duration, countdown, house identification number, etc. Aired program material is automatically logged on a hard copy printer. The third level of automation features mass memory for storing an entire broadcast day and future programs, a separate terminal for editing event schedules, full interactive control of ACR-25s, and interface with business automation systems for billing and accounting.

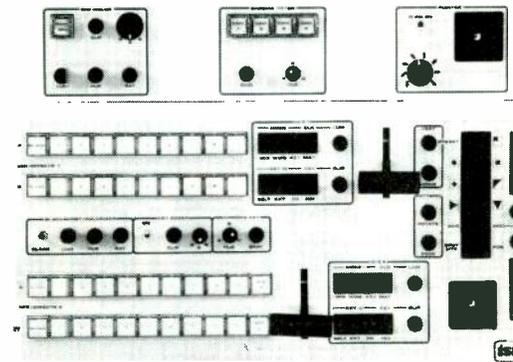
The new MC-900 MC switcher is designed to interface with the automation system, though it will function completely manually. Auto transition rates are stored on PROMs and can be easily changed to meet new requirements; a full range of AFV and audio and video only transitions with varying rates is already preprogrammed.

Vital showed a combination of its VIX-115-5 MC switcher with its Micromax and Vimax automation systems. New features on the digitally controlled switcher this year are an automatic audio preset level control that allows the next audio event to be rehearsed and modulated; a new, adjustable automatic machine preroll from 50 ms to 10 s; and the possibility of direct interface with a business automation system. The digitally controlled 115 offers up to 30 video and nine audio only inputs, five switching buses, automatic or manual transitions, full machine control, and 63 transition effects patterns.

Vital offers two levels of automation with its 115 switcher. Micromax-32 permits storage of 32 events in memory, displayed in sequence on a CRT monitor. Take-to-air is performed manually, with the next event automatically prerolled and cued. The Vimax-200 is a full-fledged automation system, with storage of up to 32,000 events with the optional disc drive. Events are aired according to a time of day or length of preceding event schedule, with completely automatic calculation of time duration. The system handles all machine cuing, preroll, airing, and logging. An interface with a business automation computer also enables automatic billing.

Grass Valley displayed its M200 automation system together with the latest generation of its master control switcher, the 1600-4S.

The automation system is completely modular and can grow from a simple one-event intelligent preroll with ma-



Master control switchers, such as this one from ISI, continue to broaden their role in the TV plant

chine control interface to a 1000-event storage system with event duration or time of day control, editing, alphanumeric keyboard, and full logging. On view for the first time this year was a fully operational error-flagging system that printed out an error code onto the log to show what the error was and indicate its duration. Also completely operational was an interface with the IBM System 1 computer for traffic and billing operations.

Also shown in prototype was the brand-new M208 Material Identification System (MID). All incoming material, such as spots or programs, is identified by the traffic department as to its type (film, tape, slide, etc.) and content. This information is coded onto the outside of the case or can. Scanning the case or can with a light wand will automatically read out on a CRT which machine the material is assigned to and when it is due to air. The system will work either with the standard advertising agency client/agency code or with the station's own internal coding system.

New from Fernseh, Inc., this year was the Automax real-time event controller. Up to 1000 events are stored (with add-on memory if necessary) in an event list containing event number, day and time, VTR play, record, rewind instructions, and printout of events for the day. Essentially the system is a development of the TeleMation routing switcher and machine control systems, accomplishing the tasks of both with a single keyboard entry. Logging and generation of program schedules is completely automatic. The system also includes extensive editing capabilities.

Image Video has come out with a new automation system and master control switcher. The switcher handles up to 30 video and 40 audio inputs, with four AFV transition modes and audio breakaway. Up to 2000 events are stored at a time on the automation system's dual floppy disc drives. Four hundred events at a time are transferred to the internal memory so that the discs can be removed, reprogrammed, and reinserted into the automation system

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Now the Panasonic Professional Audio Division introduces two lines of components for the recording and broadcast industry: Ramsa, a new name in professional mixers, amplifiers, microphones and sound reinforcement equipment. And Technics R&B Series, a specialized line of products from a name you already know.

Technics R&B Series The big news is our new professional turntable console, the rugged and totally mobile SL-9560. It consists of two highly sophisticated acoustically isolated sections. The deck section includes a quartz-locked direct-drive turntable, a static-balanced heavy-duty gimbal-suspended tonearm with dynamic damping and a "companion" moving coil cartridge. The control section consists of a phono-equalizer amplifier with a high pass filter, tone controls and a monitor amplifier with speaker.

There's also the EPA-500 tonearm system consisting of the EPA-501H, a titanium nitride tubular arm unit with dynamic damping for today's high-compliance cartridges. The EPA-B500 tonearm base with four-point gimbal suspension. And the SH-50P1 stylus pressure gauge, fully electronic and accurate to 1/10 of a gram. Also available are four other titanium nitride arm units with dynamic damping to match the mass and compliance of any cartridge.

RAMSA For remote broadcasts there's the Ramsa WR-130, an 8x2 portable mixer. It includes -70 dB attenuation for each input, high and low equalizers and a pre/post sub mixer. Plus pan pot, peak-overload indicators, and balanced mike inputs. While inputs 1-4 will accept turntables. There are also two auxiliary inputs. Outputs include high and low equalizers, a headphone output, echo send and receive, and record send.

To complement the WR-130 mixer, use the Ramsa WP-9210 power amplifier. When you do, you'll get a clean 200 watts RMS per channel into 8 ohms from 20 Hz to 20 kHz with no more than 0.05% THD. You'll also get electronically balanced XLR inputs with continuous level adjustments, phone-jack inputs, as well as overload and short circuit protection.

To meet high performance standards there are three Ramsa hand-calibrated microphones. The WM-8000 and WM-8050 are designed for vocal use and include floating microphone capsules and triple wind screens to suppress shock and pop noise. For instrument miking there's the back electret condenser WM-8150 for improved high frequency and transient characteristics. It operates on batteries (not included) or connects to a phantom power source.

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without interrupting the programming flow. An "as aired" log is maintained automatically, and the automation system will interface easily with a business automation system. The CRT status display screen lists not only event numbers, start time, duration, ID number, and the like, but allows space for comments to the on-air director or other personnel.

Also entering the automation field this year was Ross Video with its PCS-200 MC switcher. The typical system, costing under \$100,000, consists of a Ross 500 switcher with two keys and two M/E buses to handle 32 video and 40 audio inputs. The automation system handles 200 events (expandable to 400) and programs them by real time, including automatic transitions. Titles can be added automatically to an event that is being aired without storing them as a new event. An as-aired log is generated automatically, and an intelligent terminal provides for interface with a business automation system. Machine control is achieved through a variety of different interface packages depending on the type of machine. Preroll times are adjustable in 200 ms increments. The machine control interfaces (each controlling up to four machines) can also be configured as a parallel machine control system allowing delegation of each machine to be switched among up to eight control points.

ISI introduced a new MC switcher—Model 931—designed for small-market applications. The switcher has 10 AFV inputs with five audio break-aways and audio over/under. A downstream keyer with border edging, colorizer, automatic transitions, audio VU meter, and several other features are all standard for \$8750. A time display and event timer option is additional.

Two extremely simple, low-cost systems were also displayed. From Di-tech was the Pace 1000 real-time weekly event controller. Up to 935 events can be stored for any seven-day period, aired by an internal real-time clock; the program can be set to repeat itself after the seven-day period. Up to eight machine control functions as well as audio and video switching instructions are programmed into a CRT keyboard with full edit mode capability—in plain English language. Any audio or video machine can be controlled. Price for the complete system is \$11,700.

New from Sono-Mag Corp. this year is the ESP-1-T automation programmer—SMC's popular automation programmer for radio with a new video application. The ESP ("Extremely Simple Programming") provides real-time programming of 675 events in a seven-day period. Up to eight external



From Australia came this approach to machine control, shown by Glentronix

line functions such as network record can be handled on up to 20 machines. In the CRT display, the "now running" and "next" events are always displayed, whether the system is set for a display, entry, or editing mode. Full manual operation is also possible.

One fascinating system that was on view (and working) was NEC's Connected Speech Recognition System. Speaking in a normal tone of voice, the director can call for a variety of signal sources such as "camera two," "VTR one," "color background," or "fade out." The voice recognition unit, which is user-programmed for 120 phrases and can therefore be addressed by any user in any dialect, is connected to a production switcher that executes the commands based on a serial data interface. The system replaces, of course, the technical director since the director can talk to the production switcher without the TD's interface.

From the British firm Evershed Power-Optics and its U.S. division Power-Optics, Inc., come several new pieces of production automation gear. The basis of most of them is a remotely controlled pan and tilt head for cameras, originally developed for military remote sensing applications. The head can also be instructed to pick up and lock onto any moving object and adjust the focal length of the lens to provide wide and close shots.

Despite the promise of several new production automation systems to be displayed, manufacturers appear once again to be hedging on the subject. AEG/Telefunken, for instance, which was to have shown its remote control



Thomson-CSF explored the U.S. market for its telecine approach

system for TV cameras featuring an automated pan and tilt head, remote focusing, zoom, iris, and other parameters, failed to materialize the unit.

For more information: 3M 6500, 586; American Data 3200 Series, 587; NEC TMC-105, 588; Connected Speech Recognition System, 589; Dynamic Technology Vimacs, 590; Vital VIX-115-5, 591; Central Dynamics MC-990, 592; GVG 1600-4S, 593; MID, 594; Fernseh Automax, 595; Image Video, 596; Ross Video PS-200, 597; ISI Model 931, 598; Sono-Mag ESP-1-T, 599; Power-Optics pan & tilt head, 600; Scene-Sync, 601.

Routing switchers under microprocessor control

A brand new company in the routing switcher field is Hughes Electronic Devices Corp. (Hedco), whose switchers are designed as high-quality additions to the small-market station. The video only, audio only, and AFV switchers are built around a basic eight by one matrix with both single bus and multi-bus versions available in a variety of sizes up to a 64 by 1 AFV unit designed primarily for monitoring and matching. Coding is accomplished within the crosspoint itself, and the single-wire-per-crosspoint control permits the engineer to design his own pushbutton control system.

The large, distributed data processing, microprocessor-controlled systems were in evidence everywhere. NEC, for instance, showed its TKA-105—the large system that will be installed at KNBC, Burbank. NEC's well-established LSI circuitry is used throughout the system, both in the switcher mainframe and in the control panels; only four types of circuit boards comprise the entire system.

Grass Valley, on the other hand, proudly announced the fact that its 440 Series routing switcher had been instrumental in ABC's coverage of the Lake Placid Olympics. ABC's switcher was unusual in that it was a 64 by 96 switcher with a dual video matrix. The second level of video was used to distribute four channels of digital audio multiplexed by GVG's 3280 multiplexer system. During the opening ceremonies, the switcher also carried a video signal and the four multiplexed audio lines supplied by Grass Valley's experimental fiber optics link.

From Fernseh came the TeleMation TVS/TAS-1000 video and audio routing switcher system. The compact switcher (up to 1000 crosspoints per 8.5-inch chassis) has standard configurations from 10 by 10 to 100 by 100. In the larger grouping, the digital control

matrix allows simple, plug-in expansion. Like the NEC and Grass Valley systems, the TVS/TAS is operated by a coax loop "party line" control, and a control card/microprocessor within each card cage controls the various crosspoints associated with it. Six control circuits for isolation of control groups are possible with the system, which may also be interfaced with the Fernseh machine control system.

3M introduced a new 15X routing switcher, designed for smaller markets than either its popular 20X or 40X models. Video only, audio only, and AFV models are available with groups of eight, 12, or 15 inputs and two, six, and 12 outputs. Both local and remote control options are offered. With local control, mechanically interlocked pushbuttons are used to switch video, audio, and tally. Each video crosspoint is isolated with a transistor that allows the crosspoint to bridge the input bus. Remote control pushbuttons are interchangeable with local control modules.

Several developments were shown in the Series 21 routing switcher from Dynair. The 10 by 10 matrix system, expandable to 1000 by 1000, features coax party line control, easily programmed salvo commands, and standard battery protection of crosspoint memory. New this year, however, are several advanced control options — primarily spinoffs from computer control technology that have found their way into switcher control.

The first of these advances is the inclusion of an alphanumeric capability in the control panels. Thus it is no longer necessary to address machines as numbers only. Thus the operator is assigning VTR 25 to STU 7 rather than input source 87 to output destination 15.

The other control option being offered by Dynair is a CRT display of the status of the switching system with keyboard-entered switching instructions. In some cases, as in the American Data Corp. routing switcher/machine control system (see report elsewhere),

the monitor tracks both the crosspoint and the machine control delegation. In the Dynair system, the display shows only the crosspoints of the routing switcher. At a glance the operator can tell, for example, which machines are assigned to which studios or which machines are not currently in use. Switching instructions can be entered with the associated keyboard, cursor-controlled to move as instructed.

The microprocessor also allows the delegation of priority command levels to different control points in the system. Individual machine input/output selects can be overridden by studio controls, which can be overridden by studio group controls, which can be overridden by a central master control, etc.

Utah Scientific is one example of a company that has kept steady pace with all the latest control options available for routing switchers. At this year's show it, too, demonstrated both party line control and status panels, plus a full matrix status monitor for its AVS-1 switcher. The CSP-1, CSP-2, and CSP-100 are control and status panels with 100-input maximum. CSP-100 provides two sets of buttons to separately address the two digits corresponding to any matrix input 00 to 99; a switch is made whenever a unit button is pressed whether or not the tens button has been changed. Panel CSP-100-E is the same except that it contains PROMs that allow the buttons for tens assignment to be used to designate source groups such as CAM; the units buttons still indicate the source number within the group. CSP-1 and CSP-2 are single and two-bus versions of a two-section lever switch also for 00 to 99 input matrices.

For larger switcher matrices — up to 1600 inputs — Utah Scientific offers the CSP-1600, CSP-1601, and CSP-1605. All panels permit addressing by group type and unit number with up to 16 group names and 99 machines per group.

Telemet introduced a new routing switcher, its Model 7934, capable of handling video, stereo audio, and an extra channel for tally, time code, etc. The basic matrix is 16 by 10 with a 32 by 30 configuration standard; maximum size of the system is 320 by 300. Crosspoints and latching CMOS ICs provide energy-efficient operation.

Image Video also displayed new control panel options for its 6200 Series and 10 by 1 self-contained routing switchers. New alphanumerically encoded panels have been added to the coax-controlled systems that once again permit addressing by group name and machine number rather than just a number. Panels include the CP-1/X full matrix or partial matrix desktop panels with LED readouts for bus, video preset, audio preset, video status, and



CRT display of status has been added to many larger routing switchers, such as Di-Tech's

audio status. The CP-1/CX is similar to the 1/X but is coded for alphanumeric operation; CP-1/XK features a lock and key on the Take button.

Di-tech concentrated not on control panels but on its 5840 Series switchers themselves. Available in video, audio, and AFV models, the video and up to three channels of audio are kept in completely separate frames, connected by control cables for AFV operation. Each frame contains a 40 by 25 matrix with expansion possible by simply adding new frames and control cables.

Datatek showed elements of its D-400 series of routing switchers. Several different building-block matrices are available for different types of operations, including audio only (20 by 20), video only (20 by 20), SMPTE time code distribution (20 by 20), and AFV (20 by 10, 20 by 15, 30 by 10, and 30 by 15). All matrix frames can be simply field-connected by control cables for expansion. Also featured was Datatek's 25 by 25 video matrix — the D-2000. The system is expandable to 50 by 50.

New from Datatron this year is the Model 12AV1 — a system that could be ideally used for distributing production and post-production equipment signals throughout a teleproduction facility or small broadcast plant. Video, audio, and AFV configurations are available in a 12 by 1 matrix (providing two video and one audio output).

For more information: Hedco switchers, **602**; 3M 15x switcher, **603**; Dynair control options, **604**; Telemet 7934, **605**; Image Video options, **606**; Datatron, **607**.

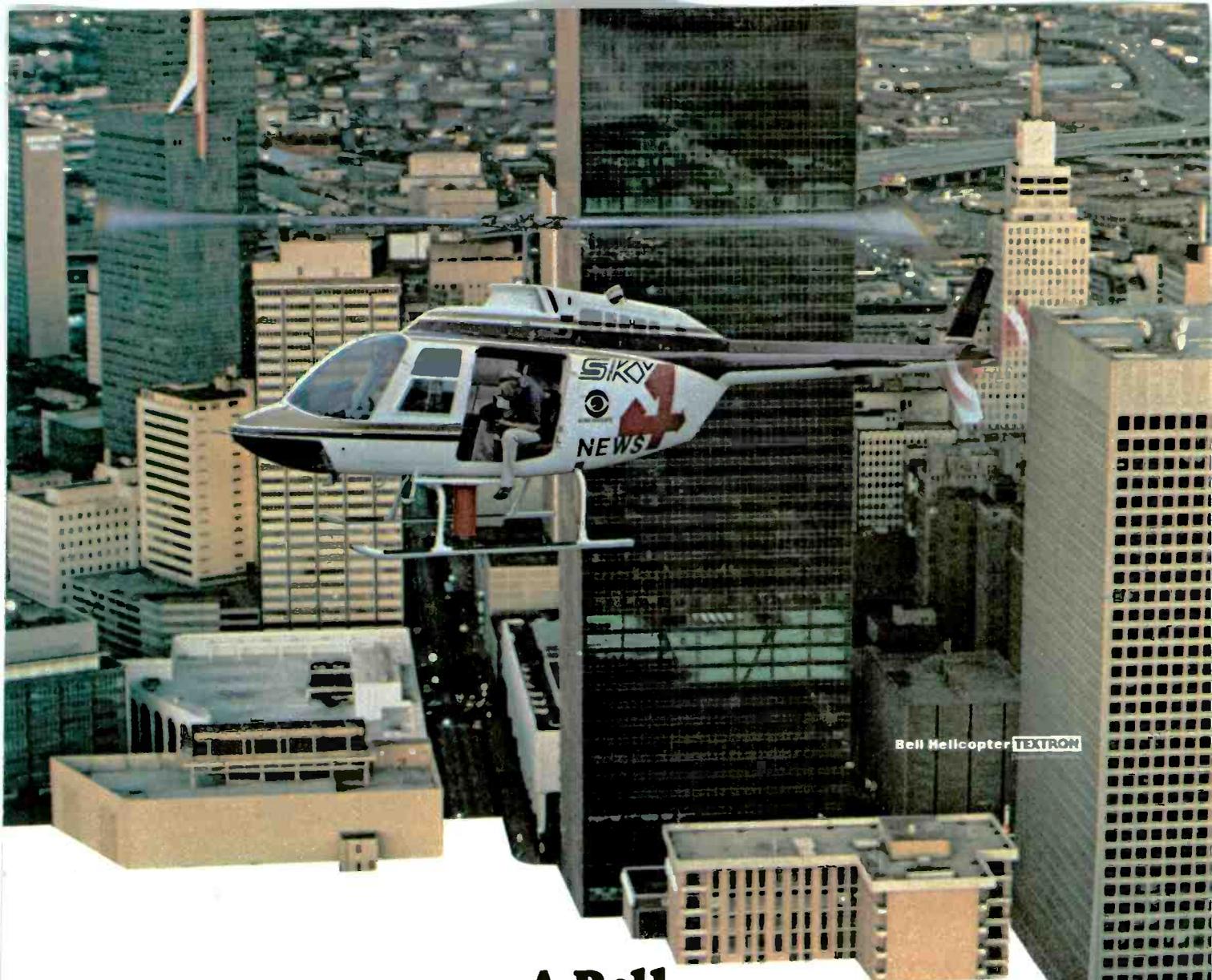
New telecines at NAB

Both RCA and Fernseh provided something new for NAB visitors. Although the Bosch solid state telecine that uses CCD sensors has been much talked about since its introduction at Montreux last year, the 1980 NAB provided most US broadcasters with their first opportunity to see the FDL60 in operation.

As most readers now know, the FDL60 combines line scanning with



Microprocessor control of routing switchers has brought much greater emphasis to plant efficiency, evident in Dynair's System 21



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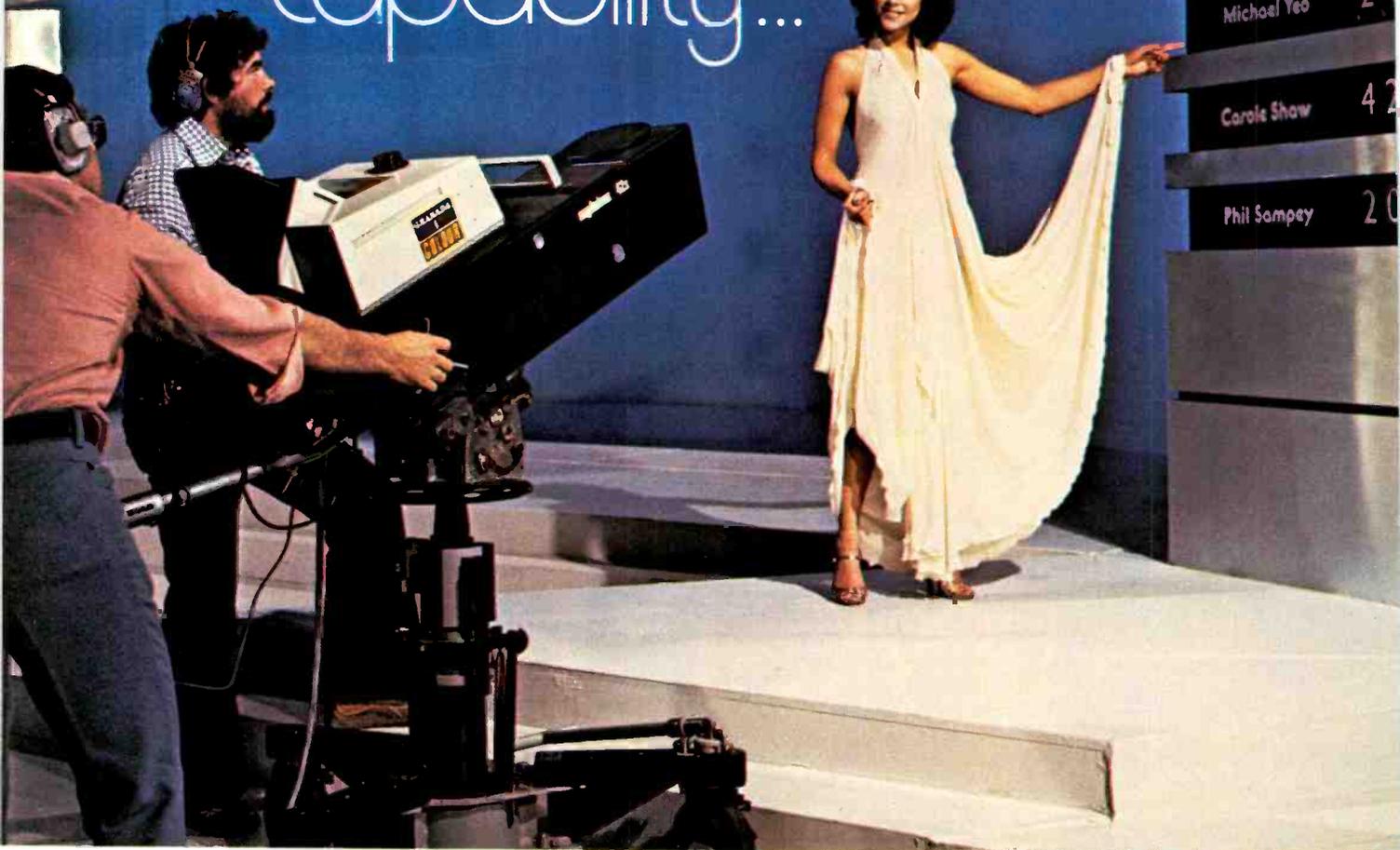


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RCA introduced at the show several new telecine cameras, the TK-29 series. Included, in addition to a standard broadcast model, were a TK-29B high performance unit and a TK-29C model with additional features particularly suited to advanced production requirements.

The TK-29 upgrades the performance of any multiplex camera chain and is the logical replacement for TK-27 and TK-28 models. All models in the TK-29 series feature a new preamplifier design with excellent signal-to-noise performance. This is achieved by coupling the semiconductor amplifier directly with the pickup tube target.

The TK-29C, designed for teleproduction houses, has a built-in dc interface to provide quick access to 29 variable functions in the telecine camera to correct film exposure, density, contrast, colorimetry, and color saturation. All types of films and slides can be accommodated. The dc interface can be controlled by a multiple-event programmer which is computer-controlled. This controller is manufactured by Corporate Communications Consultants, Inc., which had its own booth at the NAB show.

Working with non-encoded RGB signals, a wide range of dynamic compensation was possible. In addition to traditional RGB low light, mid-point, and highlight compensation, it incorporates exclusive control for the six color derivatives for hue and saturation — all under the supervision of the computer. Known as The System, any contrast ratio encountered in film can be handled to create a signal full of luminous gradations even if they were lacking from the original signal. The System is available with 27 or 30 compensation variables.

A major exhibitor of telecine equipment was Rank Cintel, again showing the Mark III Flying Spot telecine with Digiscan and Topsy options. No new features have been added.

L-W International introduced a new slow-motion, freeze-frame telecine projector, the Athena 6000. In addition to slow motion, freeze frame, instant stop/start, and unlimited hold time, the new design handles film gently, said L-W, and the machine can take film

lengths up to 5000 feet.

A dc-controlled shutter drive motor synchronizes with any frequency source between 35 and 70 Hz, and the projector may be lock-synced with NTSC color scan frequency to avoid shutter bar.

L-W International announced a telecine system to bring the spoken word to hearing-impaired television viewers. Essentially, through the use of Athena projectors, frames could be controlled via a computer so that captions or sign language could be inserted during film to tape transfer.

The 1550B series telecine system was shown by Cohu. This professional-quality broadcast color film camera features a new model 8500 color encoder with image enhancer, automatic balance, automatic differential, gamma balance, and an optional color comp variable masking system.

Another new color telecine camera, the TK970, was exhibited by Ikegami. To get a top-grade picture it uses one-inch tubes. Through the use of space focusing on an object, any dust adhering on the lens seldom appears on the picture. Ikegami said the 970 employs new preamplifiers with improved signal-to-noise ratio and that registration has been improved.

A flying-spot telecine was shown by Thomson-CSF. Known as the TTV 2520, this telecine was especially designed for quality broadcast and teleproduction use. The equipment produces four R, G, B, and Y video signals from a 16 mm film. The RGB signals are color-corrected and ready for use directly or on air after encoding. Designed originally for 625-line systems, the TTV 2520 is now available for 30-frame 525-line standards.

In addition to the flying-spot telecine, Thomson-CSF offered a compact slide scanner with very high resolution. The TTV 2705 is a compact unit fitting into a 19-inch rack. Inherent faults are corrected as the spot flies.

Another company to show a flying-spot scanner was Nytone Electronics Corporation. It offered three relatively inexpensive models that include fade between slides. This system offers 450 lines of horizontal resolution.

One of the new products at NAB was a telecine transfer machine. Unveiled late last year at the Los Angeles SMPTE meeting, the Magnasync/

Moviola V-1000 Videola transfer machine provides an alternative to flying-spot scanner systems. In the V-1000 Videola system, film speed can be independent of television sync and vertical scanning rates.

Featuring optical multiplexers were Laird TeleMedia and Zei-Mark. Zei-Mark displayed a new large image multiplexer, the model 750. It meets full broadcast requirements. The image size accommodated is 3.38 by 4.50 inches.

A special system for converting videotape to high resolution film was shown by Compact Video Systems. Known as Image Vision, it is a new encoding/decoding system that provides high definition television overcoming the technical limitations of NTSC, PAL, and SECAM.

Video monitors

Between the prototypes, the pre-production models, and some new off-the-shelf equipment, monitor manufacturers certainly could say they have been busy since last year.

Lenco, for instance, introduced a new four-inch black and white engineering monitor to its existing line of monochrome monitors that includes nine-inch, 12-inch, 15-inch, 19-inch, and 23-inch picture tubes. The new four-inch unit, designated PMM-399, is a 30 MHz monitor with pulse cross and underscan as standard items.

Also new, but unavailable until August, is the PCM-514, Lenco's most recent comb filter color monitor that features RGB and two NTSC inputs. The unit, which has a rugged cast aluminum bezel, will fit a 10½-inch vertical rack.

Belgian monitor manufacturer Barco and its North American agents Rohde & Schwarz and Electro & Optical Systems showed the CTVM 3 Series, available in 15-inch and 20-inch screen sizes, with two new signal processing features in addition to NTSC bandpass: the color monitors now are offered with NTSC comb filter and aperture correction.

In addition, Barco came to the show with a prototype monitor system, the CD-NTSC-5, which the company figures will be in production early next year. The monitor system, incorporating a complex comb that eliminates perturbations, will be marketed as a stand-alone for any of the manufacturer's monitors. The CD-NTSC-5 eliminates color crawl by decoding an input composite video signal and sending out an RGB signal.

Videotek introduced a 17-inch professional color monitor, the VM-17PR, which is designed to fit a 19-inch rack. The monitor features A-B inputs that provide two selectable channels, internal-external sync, keyed back porch clamping, aperture control and RGB

For more information: Bosch Fernseh FDL60, **608**; RCA TK-29 Series, **609**; Corporate Communications The System, **610**; L-W Athena 6000, **611**; Cohu 8500 color encoder, **612**; Ikegami TK970, **613**; Thomson-CSF TTV 2520, **614**; Magnasync/Moviola Videola, **615**; Zei-Mark 750, **616**; Compact Video Systems Image Vision, **617**.

gun switches, drive and background controls. Pulse cross and underscan are offered as options.

The company pulled the wraps from its VM-5PT, an ac/dc five-inch color monitor designed for portable ENG applications, although it can be rack mounted. The monitor is 15 pounds, yet offers the same features and options as Videotek's larger monitors.

A company that aims its products at the middle range of the market is World Video. Its new video monitor, the CR 1700, is a 17-inch rack-mounted unit that offers high quality display for a modest \$1495. In common with other World Video monitors, all service on the CR 1700 is from the front of the unit. The company's new audio monitor amplifier — the AMP-1 — is 3½ inches high, making it particularly suitable for outside broadcast vehicles.

World Video's pulse width indicator, seen last year in prototype, now is in production and sells for \$1295. Shown as a prototype this year was a test signal generator and sync generator, VATS-1. First production units, which will cost less than \$2000, are expected out by autumn.

Massachusetts-based Shintron unveiled its preproduction Model 909, a nine-inch slotted mask color monitor for NTSC and PAL systems. The monitor, which will be in production in September, features red-yellow and blue-yellow outputs with horizontal plus vertical pulse cross.

Although California monitor builder Conrac had no surprises at Las Vegas, its high resolution 13-inch color monitor 5742, a member of the 5700 Series that incorporates a front comb filter and which debuted at Dallas as a prototype last year, now is in full production.



Corporate Communications' "The System" brings a wide variety of computer-assisted color correction to telecines of several manufacturers

For more information: Lenco PMM-399, **618**; PCM-514, **619**; Barco, **620**; Videotek VM-17PR, **621**; VM-5PT, **622**; World Video CR 1700, **623**; AMP-1, **624**; VATS-1, **625**; Shintron 909, **626**.

Systems "go" for teleprompters

Teleprompting systems, initially variations on the hand-held cue card, have taken a leap into sophistication with electronically generated displays, enhancers, and data processors.

The advanced approach is taken by BEI's Data-Prompter, which uses an all-electronic system for text feed and delivery. Text can be entered by tape, computer, and/or keyboard. Up to 90 pages of six-line, 36-line-high characters can be stored, assembled, and edited up to the last minute. In concept, the system is a specialized character generator with a "pace-time" feature. The operator can enter running time, the microprocessor figures the rate, and the lines will appear automatically. Copy readout (20 characters per line) is accomplished manually or automatically. The system also will count down commercial and segment times.

For ENG and field work, Cinema Products takes a simpler approach with its Camraprompter. Weighing five pounds, 12 ounces (without plate), the unit mounts directly in front of the camera lens. The lens shoots through a one-way acrylic mirror. This mirror reflects a rear-lit script roll mounted on one side. The only electronic parts are the remote-controlled advance motor and the light source, both powered by standard 12 V battery pack or belt. Copy can be typed or hand-printed on the acetate scroll.

Q-TV's VIV-1 video monitor teleprompter mounts above the lens, weighs 5½ pounds, and features an image enhancer that improves contrast and can reverse polarity of the copy image, magnifying as it projects. The VPS Eye-Line superimposes copy directly over the lens. Copy is scanned by remote vidicon camera mounted on a VPS-100 or -200 transport.

Telescript also uses a reflected video monitor, this one counter-balanced in front of the camera. It features a contrast enhancer with its input camera. The monitor, mount, and lens view assembly weigh a total of 23 pounds. It contains its own power supply and negative/positive switch. Telescript also has a prototype digital teleprompter which will store 600 pages with a +1000 page option and input for teletype. Production is slated for the end of the year.

An example of adaptive uses in teleprompting systems is Electrohome's Monochrome Projection Monitor. Besides regular video material in black and white, the projection monitor can be used with a large screen to project copy material at the rear of a studio. Two new countdown generators are of particular interest: BEI's video slate board and QSI's VT-10. BEI's model CG-850 displays a numerical sequence up to 10 with audio cues 10-3. It comes

with keyboard for 16-line text entry and set backgrounds in blue, red, and green. QSI's VT-10 provides video and audio cues but no text.

For more information: Q-TV VIV-1, **627**; Telescript contrast enhancer, **628**; digital teleprompter, **629**; Electrohome monochrome projection monitor, **630**; BEI CG-850, **631**; QSI VT-10, **632**.

Lighting

The NAB exhibit was awash with products from lighting manufacturers — and while a good portion of the equipment on show had been seen at previous exhibits, several makers pulled wraps from new lamps, fixtures, dimmer units, and control boards.

Berkey Colortran came to the show with a compact, microprocessor-based control system, Colortrack. With a capacity of 32, 64, or 96 channels, the unit features a color-coded CRT display that corresponds to keyboard groups. Included in the system, which Berkey reckons will perform 70 percent of the tasks handled by its larger — and now older — Channeltrack, are two independent timed faders. Each is capable of cross fades, but can be manually overridden.

In addition, the Colortrack can assign submasters, override channels, and store approximately 200 cues for each channel within its disc library. For all this capability, the unit is portable: it is less than 20 inches wide, just over 21 inches deep, and less than one foot high. It weighs 46 pounds.

For the cost-conscious buyer, the company introduced a manually operated modular lighting control console. Each module, in the form of a square plate, contains controls for 16 channels. The smallest version is a nine-module frame — six channel plates, a master fader plate that includes manual time set, a submaster, and a C master for house control. Its price is \$3000. Also available is a 15-module frame.

Berkey showed its full dimmer with 18 6 kW CRD dimmers. Sales director Tom Pincu hints that next year, thanks to developments in high density dimmer packing, the same 79-inch high cabinet could accommodate as many as 90 dimmer modules, each rated at 6 kW.

Not to be outdone, Kliegl Brothers introduced its Performer II, a digitally encoded control console that configures from 20 to 125 channels. It will handle over 500 dimmers with more than 200 memories. The Performer II's CRT will display either operation or patch modes. In addition, a hand-held remote interfaces with the Performer II console and has a capacity of 512 instructions.

The unit is available with a hard copy printer that produces a record of channel levels, fade times, group master assignments, and patch information.

Strand Century was showing its Minipalette, an update of its larger Light Palette. The Minipalette looks after 190 dimmers with 200 memories that build an electronic matrix, ensuring that it will handle all patching assignments. It incorporates two manual masters, a split cross fader, and 10 submasters. The Minipalette's microprocessor can be manually overridden.

Last year, the company introduced lightweight "Bambino" fresnels manufactured by Italy's Ianiro. The company still offers the line, but has added a new Bambino: a 1 kW lamp with a five-inch lens.

Another lamp new to Strand Century's line is the Pani Austria 1200 W HMI follow spot. Weighing only 40 pounds, the unit features iris, douser, four-way shutters, a pattern holder, a color boom for gels, and a mechanical dimmer that operates through the front shutters. The Pani Austria is good for 200 fc at 100 feet.

Skirpan Lighting Control Corp. introduced its Cuelog lighting console, a microprocessor-based memory system with a printer interface. A video display, available in several sizes, shows the status of all dimmers, fader assignments, submaster assignments, active and preview cues, fader positions, time assignments, and fade progress. Cuelog will handle 36, 72, or 108 channels, has 12 programmable submaster controllers, and will perform four simultaneous fade functions.

The smallest dimmer board to arrive at the Las Vegas show was exhibited by a newcomer to NAB, TTF Lighting Consultants. TTF had on hand a 30-channel, five-scene, three-set board in its own case that was hardly bigger than an executive's briefcase.

Packaged Lighting Systems arrived with a new quartz fresnel spotlight. Called Traveliter, the slide-focus flood spot is available in three sizes: a 4.5-inch lens for 250 to 325W; a six-inch 350 to 650 W; and an eight-inch 1000 to 2000 W light. Prices range from \$74.50 to \$84.50 to \$165.00, respectively.

Cinema Products was showing the new RDS/HMI fresnel spots, for which it is the exclusive western hemisphere distributor for the manufacturer, Ryudensha Co. Ltd. of Japan. The series consists of four units: 575 W, 1200 W, 2500 W, and 4000 W. Each of the daylight-balanced (5600 degrees Kelvin) lamps has its own ballast designed to operate at 120 V, 60 Hz. The lights, which start at \$2500, also are being marketed through The Great American Market.

Mole Richardson brought a new light this year — its "three by three" Mole-

cool Type 5891, which features a DYS globe with a dichroid filter for daylight or a 3200 degree K filter for interior or night lighting. Each of the three light banks contains three 600 W lamps that have a 75-hour life. Total output is 5400 W. A singular advantage to this type of light is that it can be switched from daylight balance to night light using the same globe.

Cool Light was showing a prototype of its Cool Senior, a 2000 W low amperage flood/spot that uses a standard CYX bulb. The light, which the company promises will pack a lot of punch considering its 17 amp rating, will be ready by mid-summer. In addition, Cool Light introduced its Minibrute for the first time. The 10-ounce light, available in 12 V, 30 V, 110 V, and 220 V powers, measures a tiny two by two by four inches.

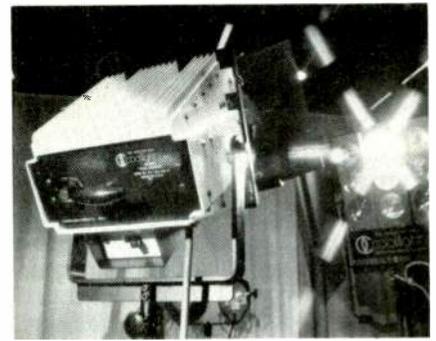
Anton Bauer introduced his "Black Beauty" sun gun type light, which operates on either 12 or 30 V. The camera light features thumb-operated focus and on-off switch at the back of the unit.

To compete with HMI, Thorn Lighting has developed new single-ended 1 kW and 2.5 kW discharge lamps that fit a Mole Junior. Called Compact Iodide Daylight (CID) lamps, they have a correlated color temperature of 5500 degrees K and maintain color rendering throughout their lives — 500 hours. Thorn also introduced a CYX 2 kW bulb with a rated lifetime of 500 hours, about double a normal CYX.

GTE-Sylvania introduced HMI Brite-Arc lamps in 575 W and 1200 W ratings. The company is currently working on a 2500 W and 4000 W lamp, which could be available later this year. Sylvania is the first to manufacture high intensity arc discharge lamps in this country. The company claims the lamps will maintain daylight color throughout their 750-hour life (the 2.5 kW and 4 kW lamps are expected to have a lifetime of about 500 hours).

Frezzolini Electronics, Inc., has moved into production with two new models of portable lights: the FL-250, available in 150 W, 250 W, or 350 W tungsten-halogen 30 V, 3400 degree K bulb; and the FL-100, an 11.5 V 100 W lamp. These are lamp lines that had been manufactured by Sylvania. Frezzolini has picked them up and incorporated them in the Frezzi-Lite line.

Panoak showed a new 2/4K softlight. With a 24-inch by 24-inch aperture, the softlight is rated at 3200 degrees K operating with FFT 1000 W, FDB 1500 W, or FFW 2000 W lamps. The unit weighs only 21 pounds, thanks to its aluminum alloy body. The company also introduced a new ratched-brake polehanger that will hold lights up to 300 pounds. It is available with cable lengths of four, six, and 10 feet.



A variety of approaches to reducing temperatures have been tried, such as Cool Light, Inc.'s



Berkey Colortran, like other lighting manufacturers, turned to computers to control today's massive setups

For more information: Berkey Colortran Colortrack, **633**; manual modular console, **634**; Kliegl Performer II, **635**; HMI Kobold lamps, **636**; Strand Century Minipalette, **637**; 1 kW Bambino, **638**; Pani Austria follow spot, **639**; Skirpan Cuelog, **640**; TTF dimmer board, **641**; Packaged Lighting Systems Traveliter, **642**; Cinema Products RDS/HMI fresnels, **643**; Mole Richardson Molecool 5891, **644**; Cool Light Cool Senior, **645**; Minibrute, **646**; Anton Bauer Black Beauty, **647**; Thorn Lighting CID lamp, **648**; CYX 2 kW bulb, **649**; GTE-Sylvania HMI Brite-Arcs, **650**; Frezzolini FL-250, **651**; FL-100, **652**; Panoak 2/4K softlight, **653**; polehanger, **654**.

Videotape, film, and myriad accessories

There are several tapes now being marketed, including Fuji H621 (with the Beridox formulation), Memorex MRX-716, Ampex 196 Series, 3M Scotch 479, and Sony V-16. These will shortly be joined by an offering from Agfa-Gevaert, the PEV-297, manufactured here.

Many of the manufacturers showed for the first time both 60- and 90-minute versions of one-inch Type C standard tapes using a thinner tape base. In the editing room, of course, with multiple tape passes, the standard 60-minute thicker formulations are somewhat preferable.

In videocassettes, the hot new product was 3M's Scotch Color Plus line with a new magnetic coating and backing that are said to reduce friction and

tape path glide problems in misaligned VTRs.

This year's show also saw the introduction of a number of new accessory products for videotape and videocassettes. From Optek, for instance, came the 8000 bulk tape degausser. A key feature of the high-efficiency system (a complete cycle takes 29 seconds) is the adjustable height of the top, stationary coil. All formats of tape, including videocassettes, can be erased and the coil height adjusted for the different thicknesses. When a tape enters the degaussing chamber, a photoelectric cell detects if the height of the upper coil is improperly set for the tape.

A new belt-type degausser for one-inch tape was announced by Garner Industries; Model 1100 will be deliverable in three months. Belt speed is 2.7 inches per second, with the output averaging over 13 reels per minute (under five seconds per reel).

A belt-type tape eraser was also demonstrated by McMartin Industries with maximum tape width 7 inches (Model TE-70) or 10.5 inches (Model TE-105). Most tapes are erased in four seconds.

From Nortronics was a new manual tape degausser with a 10.5-inch maximum reel size. Protect circuits prevent overheating with a normal duty cycle running approximately two minutes on, 15 minutes off; from a cold start the QM250 will run five minutes continuously.

Tape cleaners and evaluators were also popular items. At Television Equipment Associates, a prototype of the new Elcon Magnatek videocassette cleaner and evaluator, Model 750, was displayed. The unit follows in the tradition of the well-established Elcon 2000 two-inch tape cleaner and evaluator, shown this year in a dual one/two inch configuration. The user programs the unit for parameters corresponding to three quality levels — master/recording, commercial, and dub only — and the evaluator will reject the tape if it falls outside the parameter selected. The evaluation procedure examines both top and bottom edges for edge damage and the center of the tape for dropouts.

Recortec, too, introduced a brand-new tape cleaner and evaluator designed to be completely interchangeable between one-inch and two-inch formats. The conversion, which can be accomplished in under two minutes, involves the simple changeover of heads and the vacuum chamber; the change in tape speed is accomplished automatically. A front panel readout

display is also supplemented by a hard copy printout flagging errors with a one-minute resolution. The complete system costs \$19,500.

New from RTI is the VIM-530 videocassette inspection machine, which checks tapes for defects and damage. The VIM inspects for over-recordings, tape edge damage, jammed cassettes, loss of control or audio track, and long-term dropouts. Damage information is reported both on front-panel LEDs and also on a hard copy printout. The unit will operate up to 30 times play speed and will handle either Beta or VHS format cassettes.

Audico, meanwhile, was offering a useful product for the cost-conscious broadcaster: the Model 751 VTL videocassette loader and unloader, which can also incorporate a cassette unloader; the same unit will load and unload audio cassettes. Audico's big pitch is that the unit can load a one-hour U-matic videocassette for between \$16 and \$25 — a price that includes cost of the raw tape, amortization of the loader/unloader, and so forth.

From Nova was an inexpensive tape cleaning block that mounts to virtually any format VTR or VCR. The replaceable blades, made from sapphire, will each clean approximately 5000 one-hour tapes, sharply reducing dropouts. All sizes of tape can be accommodated, with the VTR's own tension determining the proper cleaning tension.

In film, Kodak's lead continues virtually unchallenged. Kodak continues to hammer home the message that most prime-time programs are still shot on film and that newsfilm operations are more numerous and stronger than ever, particularly with the rapid processing available with the ENF and VNF stocks.

Introductions of new film-related hardware are generally reserved for SMPTE shows, so there were few surprises in Las Vegas. Both Frezzolini and Cinema Products showed their single-system newsfilm cameras, both capable of one-person operation. Cinema Products brought a production model of its new 16 mm flatbed editing console — a simple, rugged design, one of whose principal virtues is the ability to collapse into a completely portable unit that can be carried in the back of a car.

One new piece of equipment was CMX's Film Editor/Controller designed to offer the film and film sound editor the same simplicity now enjoyed by tape editors. The system uses a CMX interface to tie a flatbed film editor together with a VTR through the CMX 340X. The editor determines the in and out points of the picture and sound cuts on the flatbed editor and logs them into the CMX memory. The edit is then performed "automatically" and

the resulting output transferred to the VTR. In this way both sprocketed film and sound tape can be edited with frame-accurate, repeatable cuts.

For more information: 3M Scotch Color Plus videotape, **655**; Optek 8000 degausser, **656**; Garner 1100 degausser, **657**; Nortronics QM 250 degausser, **658**; Television Equipment Assoc. Elcon Magnatek 750 cleaner, **659**; RTI VIM-530, **660**; Cinescan, **661**; Recortec cleaner/evaluator, **662**.

Racks, cases, and furniture

Among the multitude of rack, shelf, case, and related furniture makers, several arrived with new variations on themes that have been seen before.

Winsted, for instance, was showing rack mount extensions — bolt-on items that offer sloping or extended surfaces of six inches to existing Winsted racks. Also new is a 42-inch wide monitor shelf that will accommodate two video monitors. The company's one-inch VTR cabinet is in production and available as an off-the-shelf item.

Stantron introduced its "cooling base," which delivers 530 cubic feet of free air a minute to either the company's 19-inch or 24-inch wide cabinets. An electric intake fan draws air through aluminum filters at both the front and rear of the cooling base, itself only 7.5 inches high with casters (or 5.25 inches high without), and propels it into the cabinet area.

Though not a new item, Storeel's motorized track system for cabinets and storage racks has been successful, according to company officials. Storeel feels that its adjustable units will continue to be highly marketable items.

New to the show this year was Canadian custom case maker Impact Case Sales, which displayed a range of new aluminum cases in addition to laminated ABS plastic-walled models. Thermodyne introduced two new cases to its range — one with an inner rack height of just over five inches, the other just under nine inches. Other case makers at NAB included Fiberbilt, Amco, Bayly Engineering (which also was showing its aluminum extruded racks), and LeeRay, an Arizona company that introduced folding three- and four-shelf video equipment carriers that are wheeled. You can lug your ¾-inch or one-inch VTRs on these carriers, which conceptually are like shopping carts, then fold the carriers up and stick them into the corner of a car trunk.

For more information: Winsted, **663**; Stantron, **664**; Impact Case Sales, **665**; Thermodyne, **666**; LeeRay, **667**.



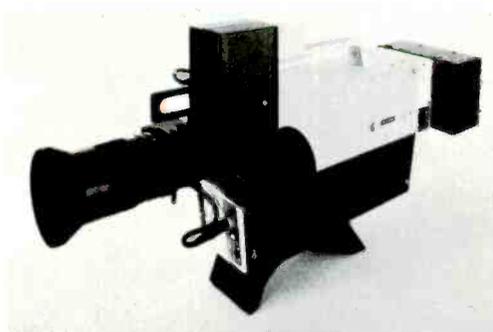
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The ITC-350 is more camera than you ever imagined you'd command in the \$13,000 range. It sets new standards for industrial, educational, and scientific television. Its prism-optics offer twice the sensitivity of a dichroic system (about 1½ additional f-stops). High resolution (500 lines) and an extremely quiet picture (53 dB S/N ratio) tell you a lot about its quality.

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And because it weighs only 13 pounds (with viewfinder), has up to +12 dB extra video gain setting, and draws only 17 watts, it's a great ENG camera.

For a demonstration call your Ikegami distributor or contact Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; (201) 368-9171. West Coast: 19164 Van Ness Ave., Torrance, CA 90501; (213) 328-2814. Southwest: 330 North Belt East, Houston, TX 77060; (713) 445-0100. Southeast: 552 So. Lee St., Americus, GA 31709; (912) 924-8309.



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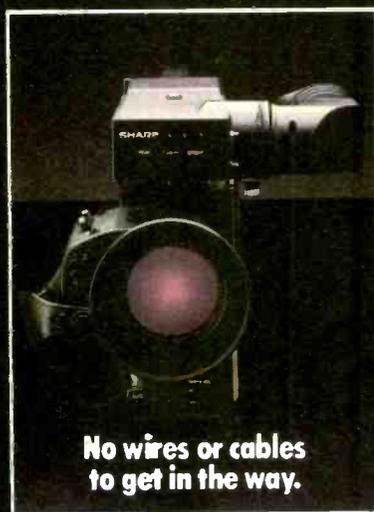
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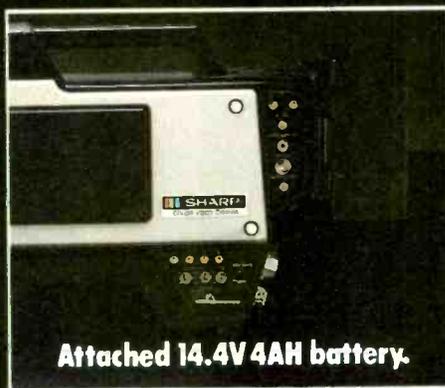
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Models 5050B & Mark II-4 shown in optional cabinets available from the Rus Lang Corporation, Bridgeport, Conn. (203) 384-1266

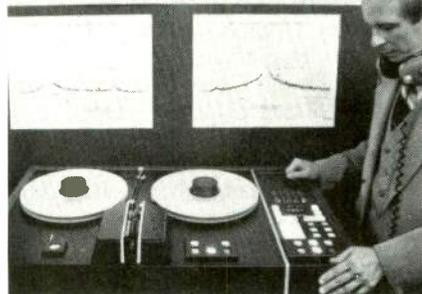
RADIO ON THE VERGE OF THE DIGITAL ERA

While AM stereo's approval had people talking, equipment quality advances and things digital had them listening

ALTHOUGH THE FCC's action of April 9 was immediately hailed in the general press as a final decision for Magnavox, it was somewhat less than that. The instructions to the staff to "write up" a Magnavox-like set of rules can be set aside if anyone on the staff, or any outsider for that matter, can persuade the commissioners to change their minds. What comes out will in any case be a rulemaking subject to comment from the industry.

Some of the developers of rejected

3M Recorders another first — Digital Audio —



3M's digital audio recorder. Both 3M and Sony made strong cases for digital

Magnavox Announces License Plans

As the Show-In-Print went to press, the Magnavox Co. announced that broadcasters and makers of broadcast equipment would have a free license to all Magnavox patents in AM stereo. A "reasonable" license fee will be charged makers of AM stereo receivers, the company said. Broadcasters and makers of broadcast equipment will be aided with information in "any way we can," stated K.C. Meinken, president of Magnavox Consumer Electronics Co.

systems have already said they will file with the FCC, in one form or another, strong objections to the decision. Harris Corporation issued a statement saying the firm still believed its system to be the best but would go along with any system finally approved, and would develop and market modulation and monitoring equipment for that system.

Some AM stereo developers have asked to see the FCC's "decision matrix," the system assigning a quality point count to each important characteristic of each system. The requests, under the Freedom of Information Act, will apparently be granted.

So AM stereo is six months away, at the very least. But the choice of a system is underway; the actions just taken and soon to be taken would have been necessary in any case, and we are getting through them.

Hearing is believing

The presence of digital audio recording, its first in a show for broadcasters, was large and convincing. 3M had on display for the first time its four-track digital recorder, designed to receive the mixdowns from the 16-track and 32-track digital machines 3M has displayed at earlier Audio Engineering Society conventions. A digital tape of varied music recorded on the four-track machine was played back on the machine, with top-grade headphones connected to let visitors sample the superb results.

3M announced that its digital electronic editor, shown in prototype at earlier AES conventions, will be demonstrated in final form at the AES convention in Los Angeles.

Sony, too, made an extensive presentation of its series of converters for turning analog signals into PCM digital in "pseudo-video" form for recording on video tape recorders. All are two-track machines. The top of the line, the PCM-1600, price about \$40,000, uses 16-bit linear coding for a dynamic range in excess of 90 dB. The PCM-100, with 14-bit coding (price around \$15,000), has all the advantages of digital recording with a dynamic range around 85 dB. A new unit in the series,



Otari showed its first multi-track unit



McCurdy's SS8800 tape deck, intended especially for TV

the PCM-10, is designed to mate with Betamax and other 1/2-inch VCRs.

For more information: 3M four-track recorder, **688**; Sony PCM-10, **689**.

More digital machines coming

Other signs of the digital forward march are coming from Studer and Technics. A Studer digital entry is expected in the not-too-distant future. Technics described a converter unit, the SH-P1, similar in basic purpose to the Sony PCM converter series. The unit, not at the NAB show, will be introduced at the AES convention in Los Angeles with deliveries in August.

MCI, tape recorder and console maker of Fort Lauderdale, Fla., announced several months ago a series of digital recorders to be developed in collaboration with EMI, the English electronics giant. MCI did not have a digital machine at the show, but a spokesman

NAB SHOW IN PRINT



Tweed, the English firm, brought a new recorder to this year's show



New logging recorders were brought out by Dictaphone

said that the first machine in the digital series was in an advanced stage of development.

Grass Valley Group, eminent in television switching, control, and processing, moved into digital audio with a transmission system for carrying audio signals in digital form around a studio or production plant. The system has four channels, an S/N ratio of 90 dB, and other digital-style characteristics, and removes the degradation that has always affected audio signals passing through numerous switching, control, and inter-system interfaces.

For more information: Technics SH-P1, 690; MCI digital recorders, 691; GVG digital audio system, 692.

Analog recorders: the best so far

The new Ampex ATR 116/124, introduced at the show, is a multitrack version of Ampex's ATR-100 series. The transport on this new Ampex series uses servo-controlled motors on the capstan and on each reel as well. This allows the elimination of pinch rollers to pull the tape; the reels supply the exact tension needed at all times. Transformerless in/out circuits contribute to the low distortion. The shuttle speed is continuously variable with a one-finger slide control.

MCI announced some improvements at the show. Its JH110 series is in a new version with completely new electronics, designated the JH110B. MCI says that the phase integrity, frequency response, noise, and distortion characteristics are better in the new machine. The JH110B is offered in mono to eight-track versions in a number of

different configurations.

The JH24 series, MCI's multitrack machines, also have completely new electronics with similar improvements. Some of the new operation features are separate bias and erase frequencies, phase compensation, QUIOR (quiet initiation of record) circuitry for quiet starts, spot erase, and easier alignment with fixed bias and cue traps.

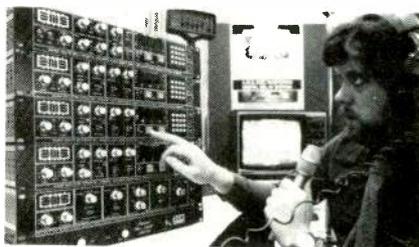
MCI also brought the Autolocator III, an improved version of its locator system, and the JH-45 SMPTE/EBU Autolock, a new version of its machine-to-machine sync system.

Another new entry in the multitrack bracket was Otari's MTR-90, available with 24 in, 24 out, 16 in with wiring for eight additional channels, or 16 in, 16 out. Prices run from about \$34,000 for the 24/24 model to \$23,000 for the 16/16 model.

Nagra, long the accepted symbol for top-grade portable recorders, moved into a new area with the Model TRVR, a reel-to-reel logging recorder. It has four speeds, 15/16 ips to 7½ ips. The TRVR has four heads, two for stereo record and playback and two for reference signal record and playback. The claimed electrical characteristics indicate excellent fidelity. Price is \$5000 to \$6000, depending on options.

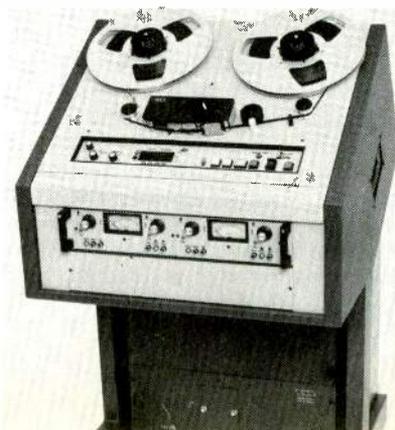
Some other top-grade analog machines on the floor, seen at earlier shows, were the Telefunken Magnetphons and the Studer B67, A80, and A800. Established moderate-priced machines included the lines of Ampro/Scully, International Tape-tronics, and Panasonic (Technics). Telex added to its line of open-reel machines the new Series 3000, designed primarily for handling tape in automation systems.

A class of machine long in use but



Audio Kinetics digital processing system

MCI's analog recorders continued to advance quality



recent to the broadcast market came from Dictaphone — its Series 4000 communications/logging retrieval system. Originally designed for police departments or other organizations that want to record telephone calls and hear them again quickly at will, the system consists of two large reel-to-reel machines plus computer-controlled location and replay electronics. With a time generator, the system also records the exact time of every message.

For more information: Ampex ATR 116/124, 693; MCI JH110B, 694; JH24, 695; Autolocator III, 696; Otari MTR-90, 697; Nagra TRVR, 698; Dictaphone Series 4000, 699.

Audio processors

Audio processing for radio has been aboil for more than five years now, and NAB '80 turned up the heat quite a bit. Commercial pressure is heavy for modulation density. The rising demand for quality, in both the industry and the audience, keeps colliding with the demand for "the loudest signal in town."

Orban's Optimod-FM Model 8100A, introduced at the show, allows the broadcast engineer to use very heavily compressed material with reasonably low distortion. The original Optimod, Model 8000A, was designed primarily for low to moderate compression. The new unit will provide heavy compression, but can also be set for the more open operation that a number of quality-conscious stations want, and will supply even lower distortion than the older Optimod when operated in that "wideband" manner.

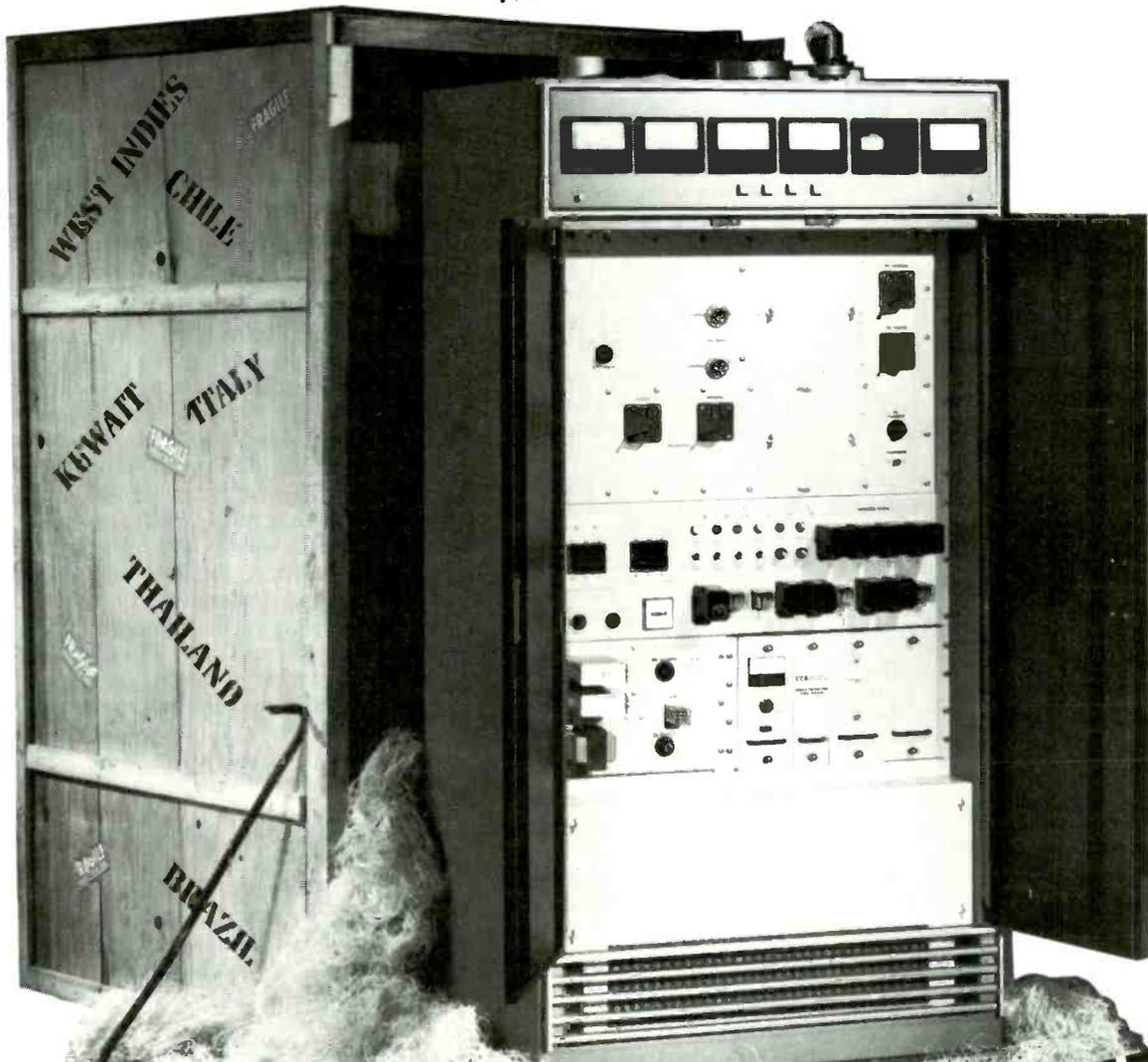
The Gregg Laboratories Tri-band system, Series 2350, introduced at the show, also reflects the steady pressure for high density performance. Gregg units heard at earlier NAB and NRBA exhibits have had a very clean sound, free of the obvious noises and other results of awkward processing. The new Tri-band system is like the new Optimod in allowing high-density operation for those who want it. The Model 2350 comes in versions for AM and for FM/TV.

Another redo of an older system is the new Volumax automatic peak controller for AM, Model 4600, brought to the show by Thomson-CSF. The new Volumax is the final processor in the audio chain just ahead of the transmitter, and is essentially a protective device to avoid overloads from program peaks. It uses a tri-band design, with each band operating independently.

For more information: Orban 8100A, 700; Gregg Labs Series 2350, 701; Thomson-CSF Volumax 4600, 702.

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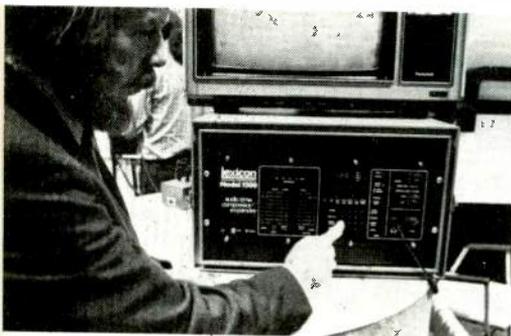


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A broadcaster gets the effect of Lexicon's audio time compressor/expander

Noise reduction as processing

dbx introduced its Model 142, a broadcast noise reduction unit with two separate channels independently switchable from encode to decode. It provides the standard dbx 30 dB of audio noise reduction and 10 dB of added headroom. The system is attractive for reducing noise when putting live or recorded music onto carts, for noisy remote pickups, for production work with older reel-to-reel recorders, and for cleaning up TV audio tracks.

Another dbx introduction was the Model 165 compressor/limiter, a one-channel unit strappable for stereo operation. This has the dbx "over easy" compression, control of compression, attack, and release.

Dolby was on hand with its Model 334 for FM broadcasters, which greatly reduces the need for compression of FM program material. The Dolby "B" system used in the Model 334, which has been available for a number of years, boosts low-level high frequencies during encoding; the decoder in the receiver reverses this, bringing down noise.

Making talk/music go faster/slower

Lexicon, long known for digital reverberation units, brought a new audio time compressor/expander aimed for a number of functions on-air and in production of commercials. Using digital techniques, the Model 1200 will change the speed of recorded material over a continuously variable range from 0.5 times to 2.0 times without changing pitch. Lexicon says it will introduce less than 0.1 percent distortion, with a dynamic range of 75 dB.

Ursa Major, a young firm based in Belmont, Mass., brought a digital delay special effects unit, the "Space Station," with a number of fresh ideas. There are two kinds of "taps," or outputs. The eight audition taps allow the memory to be sampled at eight different delay times. The reverberation or echo taps allow feedback to be controlled over a wide range to determine what is in the memory. There are also a number



dbx's noise reduction equipment continued to gain entry to the broadcast market



Pacific Recorders' new cart approach

of specific reverb programs built into the memory, any one of which can be selected with a front-panel pushbutton.

Moseley showed two new processing units. Model TGR-340 is an audio gain rider with a control range greater than 30 dB, for use on program lines in production studios, for feeding an STL, for telephone line pickups, etc. Attack time on the AGC loop is two milliseconds.

The Moseley Model TAL-320 is an audio limiter for AM stations. Input/output compression ratio is, again, 60 to one; attack time, AGC loop, is adjustable 0.2 to 3 ms; recovery time 100 ms on transients, up to five seconds on program. The limiting and clipping can be adjusted for positive-negative peak asymmetry up to 130 percent. Two of the units can be strapped with a single line for AM stereo.

A series of attractive processing systems made by Advanced Music Systems of Worsthorne Village, England, were shown by the distributor in this country, Quintek, Inc., of North Hollywood, Calif. Among them were the DMX-15 series of digital delay units. A programmable delay unit is specified by the maker to have a bandwidth of 18 kHz, noise ratio of 90 dB, and typical distortion of 0.05 percent. The unit accepts either 100 ms or 400 ms delay cards, with up to four seconds of delay available internally and much greater delay with external memory, for which interface is available. The unit also interfaces to mixdown computers.

Elcom showed a series of moderately priced processing units. The AGC Level Guard is designed to hold audio levels within a few dB through input changes of 20 to 30 dB. It uses a switchable time constant optical attenuator for quiet control. Elcom says

it is compatible with most limiters. The Model AP-50 Insta-Peak II is a two-band gain controller with spectrum split into high and low. It too uses optical attenuators.

The WBL Composite Limiter is designed to reduce all filter and pre-emphasis overshoot, with a circuit that feeds unwanted spikes instantaneously to ground. The maker says that a combination of the Insta-Peak and WBL will supply extremely high performance. The MP-12 modulation processor is aimed to produce asymmetrical peaking for AM stations, using a feedback method that compresses the negative peaks. The prices for these units range from about \$500 to about \$700.

For more information: dbx 142, 703; 165, 704; Lexicon 1200, 705; Ursa Major Space Station, 706; Moseley TGR-340, 707; TAL-320, 708; Quintek DMX-15, 709; Elcom AGC Level Guard, 710; Insta-Peak II, 711.

Turntables and disc preamps

Panasonic's new SL-9560 professional console with SP-16 turntable features a quartz-locked direct-drive motor with no high-speed moving parts, a gimbal suspension tonearm with adjustable tracking force of 2.5 grams, and dynamic damping. There's also the EPA-500 tonearm, made of titanium nitride, and a stylus pressure gauge that's interchangeable with four other arm units. Technics is also featuring the SL-1015 turntable with full cycle detection frequency generator.

On the other hand, a back-to-basics console is Micro-Trak's Ditty Desk at \$2495, featuring its 6445B stereo console, five channels, and adjustable legs.

Russco's Mark V turntables feature variable speed, servo motors, LED readout, and detachable tonearm plates.

McMartin's TT-12C broadcast professional turntable offers stereo rumble less than -48 dB and wow and flutter less than 0.1 percent. Revox introduced a new power amp at NAB, the A68, rated at 100 W/channel into 8 ohms with a signal-to-noise ratio of better than 100 dB. Another new entry is Panasonic's RAMSA WP-9210 amp. Its rated power output is 200 W at 8 ohms with S/N of 90 dB.

For more information: Panasonic/Technics SL-9560, 712; EPA-500, 713; SL-1015, 714; RAMSA WP-9210, 715; Micro-Trak Ditty Desk, 716; Revox A 68, 717.

Carts and cassettes: bright new look

The broadcast cartridge tape system, in disfavor for some time with many quality-conscious engineers, is staging a comeback.

Tektronix 1900 Digital Generator.



Introducing the first all-digital generator.

Plus These New Testing Capabilities.

With the new SMPTE Color Bars test signal, just three quick monitor adjustments take the aggravation out of matching color monitors. The 1900's SIN X/X signal provides an extremely flat, 4.5 MHz spectrum for fast and simple checking of the system frequency response and the multipulse

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This year Pacific Recorders and Engineering joined the movement with the Tomcat series of cart players and recorders.

Tomcat uses a new track format called Maxtrax with two 80-mil tracks, rather than the four tracks of the NAB standard. Pacific Recorders says that a survey of broadcast cart users showed that nearly all used their cart systems in house; only carts they made themselves were played. This made a new track format seem acceptable; with more tape per track, signal-to-noise ratios are better and a stereo/mono compatibility, lacking elsewhere, is easily arranged. The old phase problem is solved by having a built-in matrix system, selectable by switch.

At the show Ampro/Scully had early units of a new series that also represents a push for a new quality level. The first unit in the series is the Model 8300 three-deck player. Ampro/Scully said that price and availability would be announced later; it aims to have further units in the series within a year.

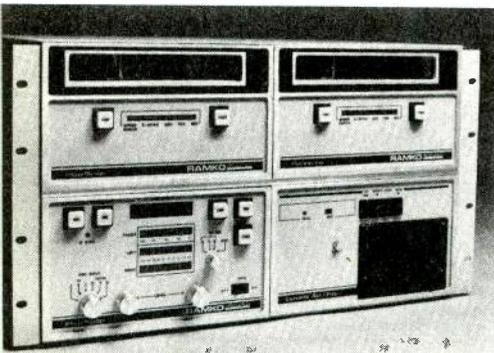
Audi-Cord, which came on the market with a new line of moderately-priced cart machines about three years ago, brought out a new model, Series A, with two cart positions side by side at the top. This allows for making two carts at once, dubbing from one cart to the other with built-in automatic switching, and sound on sound.

A new company, D-B Electronics of Gaithersburg, Md., also introduced a two-deck cart machine, the DB-2000, with attractive specs. This machine is, in a sense, the latest in a long line.

For more information: Pacific Recorders Tomcat, 718; Ampro/Scully 8300, 719; Audi-cord Series A, 720; D-B Electronics DB-2000, 721.

Cassettes to the fore

The Ramko Phasemaster cart machine, introduced at earlier shows, has been praised for its real-time phase shift correction. Reaction at Las Vegas



This was the first NAB for Ramko's PhaseMaster

suggested that some emphasis should also be put on the inclusion of a cassette position on the machine, which can receive signals from the cart position or from outside, and similarly return them.

This throws some emphasis on a new system brought to the show by Eumig, a new NAB exhibitor. Eumig showed the Model FL-1000, a cassette deck that interfaces with a home computer. Its capstan motor has opto-electronic speed control for a claimed wow and flutter figure of .035 percent WRMS. With speed set by an etched tachometer disk, a heavy flywheel is not needed and stops and starts are extremely quick.

Further signs of cassette advance were the cassette decks shown by Technics of Panasonic. Designed to accommodate the new metal-particle tape, the Models RS-M95 and RS-M85Mk2 record and play cassettes at extraordinary levels of fidelity. The units have built-in Dolby noise reduction.

For more information: Eumig FL-1000, 722; Panasonics/Technics RS-M95, 723; RS-M85Mk2, 724.

The carts themselves: old and new

The leading makers of carts showed awareness in their exhibits of the need for close control of cart quality. Capitol Magnetics, with its AA-3 Audiopak equipped with a brand-new HOLN tape, had a cart aimed at long-term phase stability and low wow.

Aristocart and Fidelipac, also long-established brands, presented their carts and a new brand appeared on the floor, Procart, made by Procart, Inc., of Tacoma and designed by Don Kalmokoff, designer of the Aristocart cartridge. The push with Procart is to get the maximum quality possible in a cart selling at the low end of the cart price bracket.

The rise of the cassette as a broadcast tool could be seen in another exhibit, that of the RKO Tape Corporation, a subsidiary of the RKO Network. RKO Tape supplies cassettes to broadcasters in large quantities with customized labels. In its description of the service, RKO says that it grew out of the difficulty the net's stations had in getting cassettes of high quality rapidly, reliably, and in wanted quantities. RKO Tape Corp. will deliver cassettes in any quantity, with specified tape and labels designed to the buyer's order.

Some new aids and accessories for cart and cassette operations were shown. Fidelipac introduced a cartridge machine test system that allows all major adjustments to be made on cart equipment with high accuracy. The test system includes Fidelipac's portable

wow and flutter meter, previously introduced. Four test tapes are included.

Allsop Automatic, Inc., of Bellingham, Wash., new to the NAB, showed a cassette deck cleaner, the Allsop 3. It is a special cassette which Allsop says will clean not only the heads but also the capstan and pinch roller.

For more information: Capitol Magnetics AA-3, 725; Procart, 726; RKO Tape Corp., 727; Fidelipac test system, 728; Allsop Automatic Allsop 3, 729.



ITC stressed the quality of its Series 99 cart system



ADM consoles continued to emphasize modularity as an important advantage in console design

More control for radio automation

Harris showed the H-9003, the most sophisticated model of its automation system. A key feature of the new system is the display of song titles and artists in plain English in the video display screen, along with up to three lines of copy for news bulletins. The dual-intensity video display monitor is ideal for periods of live programming.

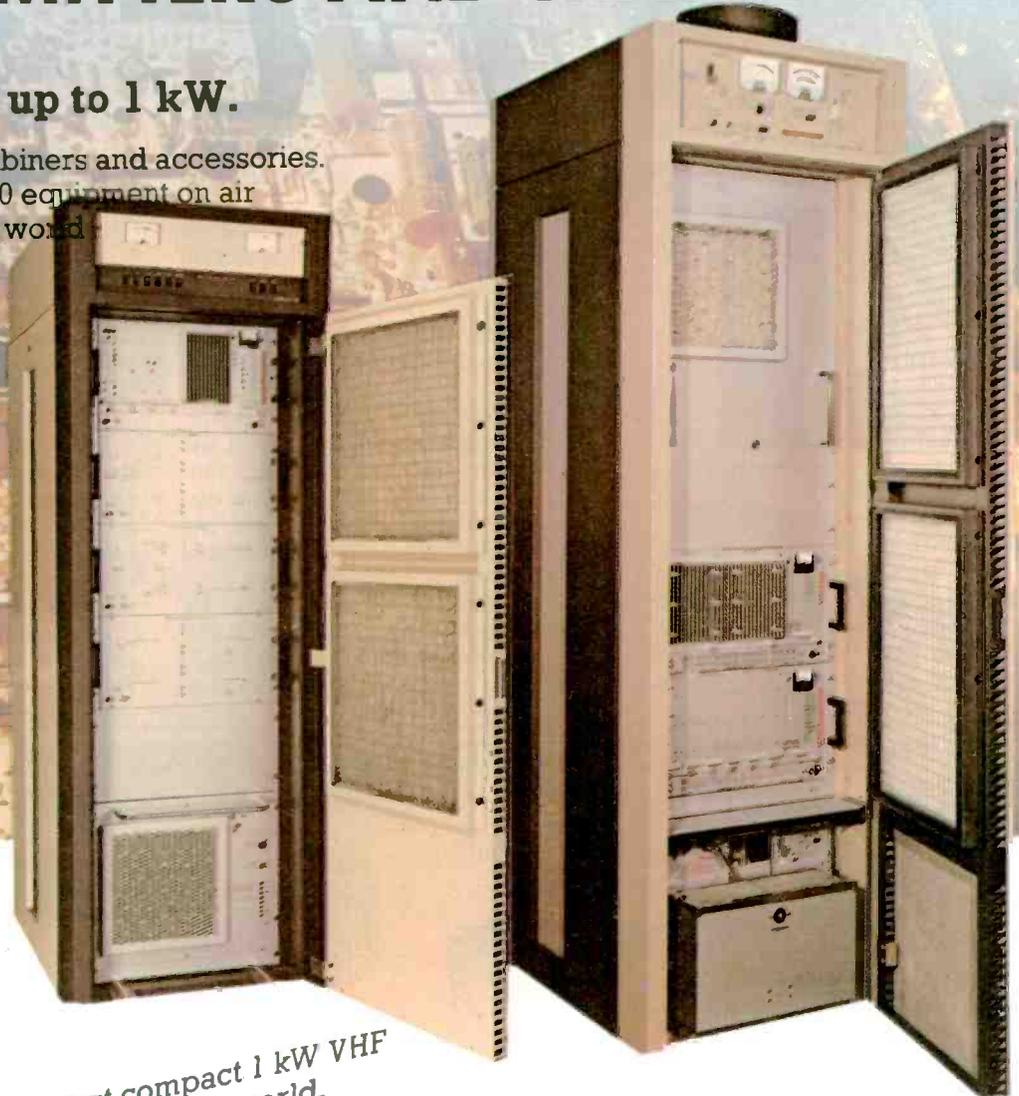
Cetec showed its "Limited Edition" automation system — the Series 7000 — which comes complete for under \$24,000. The system features micro-processor-based control with 1000-event memory storage (expandable to 10,000), real-time clock, and new video terminals. Up to 64 sources can be controlled (either random or sequential).

The Broadcast Controls division of Automated Broadcast Controls showed its new RS-512 random select control-

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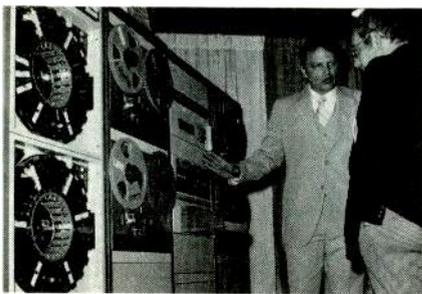
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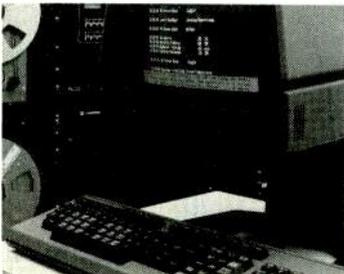
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Automation such as IGM's still draws intense interest from radio broadcasters



Harris's 9003 continues to show the expansion of capabilities that software-based systems have led broadcasters to expect

ler, which allows programming up to 16,384 steps on the ABC, IGM, or SMC "carousel" cart players.

Broadcast Controls also showed its full line of automation systems, in-

cluding the Systems One, Two, and Three. The latter incorporates three ABC Kartel carousels, four reel-to-reel decks, a three-cart deck, and a full automation programmer and memory.

At IGM, the big news was a new interface between the IGM Basic A program automation system and a business automation system from Custom Business Systems. The interface allows significant amounts of data to be transferred between the two machines.

IGM also showed its new Go-Cart 24, a bi-directional, circular playback deck. Go-Cart 24 has a precision, skip-free drive system, microprocessor control, and cart playback without artificial guidance.

Broadcast Electronics showed its popular Control 16 automation system and also the Econo Control 16. The larger system has four reel-to-reel decks, two multicart decks, and full keyboard-entered program information.

Featured by Microprobe Electronics was the Log 4 automation system and the 100B Programmer. The Log 4 consists of four reel-to-reel and two "carousel" multicart decks and can also be interfaced with two additional pieces of station equipment.

Sono-Mag Corp. featured its ESP-1-T automation system with full video monitor display capability. Up to seven days' programming at a time can

be entered in plain English programming through a keyboard.

Di-tech showed its new Pace-1000 real-time event programmer, which can store up to 935 events and play them back based on an internal, real-time clock.

New from Audi-Cord is the LAP (Live Assist Programmer), a "DJ's buddy" designed to permit short periods of automated operation.

ESE demonstrated its ES-280 audio time code generator/reader, which lays a 10-digit serial BCD audio time code onto an audio cart or reel-to-reel tape on the cue track; the frequencies won't interfere with automation cuing systems. The price is \$500.00.

For more information: Harris H-9003, **730**; Cetec Series 7000, **731**; Automated Broadcast Controls RS-512, **732**; IGM interface with Custom Business Systems, **733**; Go-Cart 24, **734**; Audi-Cord LAP, **735**.

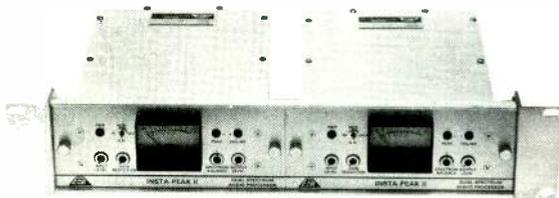
Consoles: still flood-tide

The show proved once again that of the making of consoles there is never an end. The large, high-priced consoles now move ahead mainly by subtle improvements in internal organization and operational ease: small units are showing near state-of-the-art electronics.

Avab America, new to the NAB, is engaged in developing its own American-made products in the broad-

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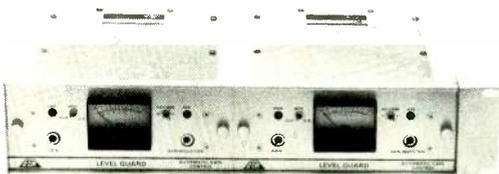
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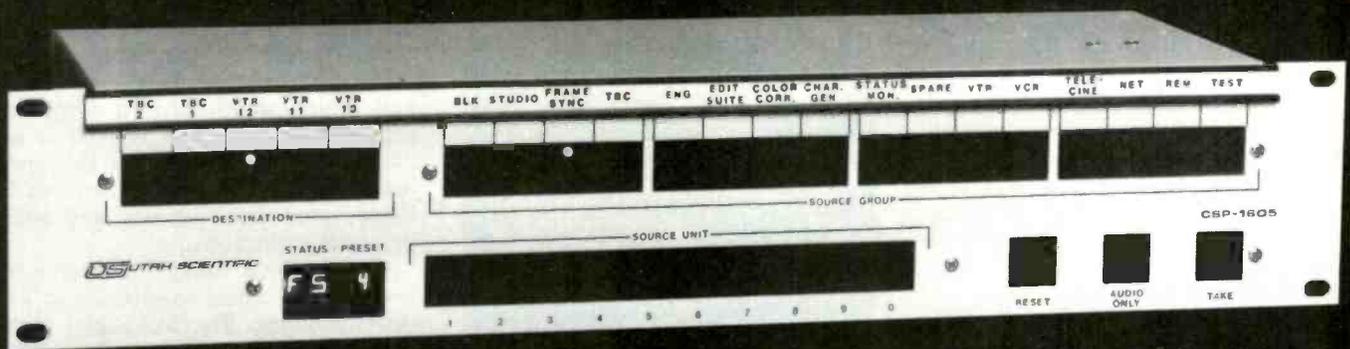
Good audio processing does not have to be expensive and complicated. ESP products are value engineered, have operational simplicity and are maintenance free. Prices start at \$495 for the WBL-1, the original wide band composite limiter. The "Level Guard" \$545, the "Insta-Peak II" \$575. Add second unit for stereo applications.



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cast field. An example on display at the show was the new FM 800 mixer, with eight mic/line inputs. It has operation features aimed at motion picture and television sound production.

Another company new to NAB is Arrakis Systems of Bolivar, Mo., which brought two series of consoles. The 1000 series, five and eight channels, mono and stereo, has all the electronics in rack-mounted units, with a separate control unit linked by dc only to electronics. The 500 series consoles are eight-channel mono and stereo in single cabinets, expandable to 16 channels, 64 inputs.

Broadcast Audio Associates, of Rancho Cordova, Calif., was showing at NAB for the first time a series of consoles with eight, 12, and 16 channels. All have dc switching for easy remote control, two or three inputs per channel, three balanced stereo outputs, cue, phone, and monitor outputs.

LPB, long an important source of moderate-priced consoles, had a new series called Citation with six, eight and 10 channels mono and stereo. These boards feature a comprehensive set of operation features including pre-fader pushbutton cue, LED status indicators, and state-of-the-art electrical specs.

Howe Audio Productions, Inc., of Boulder, Colo., also one of the new companies, brought its Model 7000 console. The board has 12 channels, up to 22 inputs, optically coupled faders, and top-grade electrical performance.

Logitek's Custom Audio Series appeared with new features. This series has models with five, six, eight, or 12 channels; all now have three-band EQ, monitor-mono pushbutton to check stereo phasing, remote control connections for all switching functions, separate equalization and selection for speakers and headphone outputs, and many other operation facilities.

ProTech Audio of Lake Ronkonkoma, N.Y., a new company, brought the 30000 Series, with five, eight, 10, or 12 channels, and "rotary-slider" attenuators with sealed resistive ele-

ments. All active circuits are on plug-in Integra 3 cards, allowing systems to be customized.

McCurdy, known for a long time for medium and large consoles of top grade, added to the flow of smaller consoles with the new SS8800, an eight-channel unit of very low, flat profile for installation on desk or table top. The unit comes with prewired inputs for a long list of optional features, so that additional functions can be achieved by plugging in the proper modules. Price is \$9500.

Modular Audio showed a new console system that expands operational and control features by adding "levels" that stack on top of each other. Level I is the basic console, a complete nine-channel system with channel modules that can be added horizontally in units of nine. A smaller Level II goes on top, continuing the contour of the upper panel of Level I and adding additional output routing and control features. Level III is an even smaller unit that goes on the upper rear of Level II, with equalizers, oscillators, compressor/limiters, and other processing functions.

Rupert Neve brought consoles of several sizes aimed specifically at TV audio handling. The 542 Series starts with a six-channel version in a very low-profile table top unit. It is also



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Harrison, a company new to NAB, stressed the console's role in post-production

available in a carrying-case version. Other models in the 542 Series range up to 36 inputs with similar input, output, and control features.

Studer moved into the console field with a series of portable mixers designed for an unusual flexibility of control in remote operations and also usable as table top studio units. The units are in carrying cases, and all can be battery-powered or run from wall power. Model 069 can handle two microphones and up to three line-level inputs. Functions available are mixing, equalizing, processing and test oscillator. Model 169 has even more operational facilities, with inputs from eight to 11. Model 269 has similar facility, with inputs from 14 to 17.

Panasonic's new Professional Audio Division brought a full complement of

products for the broadcaster. The Ramsa WR-8608 (one of a series of Ramsa products) can mix and control up to three stereo inputs, either turntable or tape deck, and has two microphone inputs with echo generator.

Panasonic's new Model WR-130 mixer has eight inputs, four of which accept turntables as well as balanced mics or lines. There are echo send and receive, telephone audition, input and output equalizers, pre- and post-submixing, and pan pots. Price is \$995.

Tweed Audio, a Scotch firm now established in California, brought a new moderate-sized console, Model RP1603, based on a series of modules supplying up to 16 stereo inputs. Optional modules allow customizing of the console.

MCI announced improvements in the automation system used with its large consoles, Series JH-600 and JH-500C. The latter series is billed as "automation ready"; the user can buy the system and add the automation at a later date. Both series come with numerous configurations, holding from eight to 36 in/out modules.

MCI also announced new electronics for its larger consoles, with transformless inputs and outputs.

Auditronics premiered a new series of broadcast consoles, the 700. The maker says the series manages greater flexibility than earlier models, but with

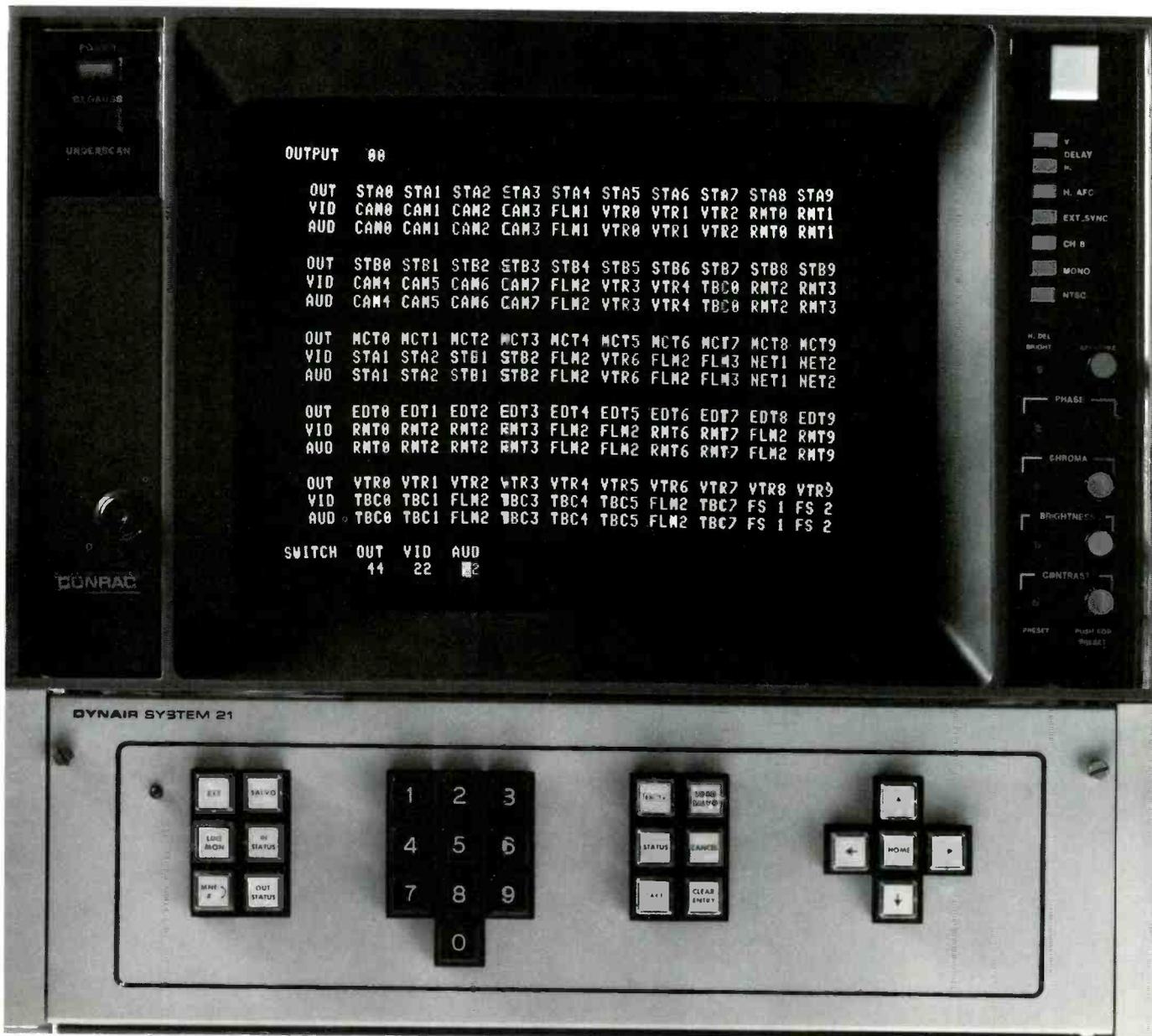
a simplification of signal pathways and control systems that reduces operator confusion as well as maintenance problems.

Harrison, known especially for large, all-out consoles for the recording industry, brought a portable, the "A-live," with 24 or 32 inputs and extremely comprehensive control and operation features.

ADM Technology, earlier known as Audio Design and Manufacturing, brought two new consoles in a stereo broadcast series, the ST-160 and ST-100. The ST-160 has 16 channels and a large complement of control and operation features including pan pot, two-position input selector on each channel, auxiliary pre- and post-fader output, digital cart timer, and many others characteristic of the larger studio consoles of top grade today. The ST-100 has 10 channels with similar operation facilities. Both have top-level electrical specifications. ADM also introduced the Model 800, a monaural console with control facilities aimed specifically for remote applications.

A new company is Sound Systems, Inc., of Long Island City, N.Y. The firm introduced its CX2000 console series. Construction is totally modular, and a single unit can hold 10, 20, or more channels based on standard modules. One configuration is the "split desk," similar to the one made

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There's more! So ask about System 21's capabilities. The SCA-250B is only a 5 1/4" example.

SYSTEM 21

NAB SHOW IN PRINT

by Automated Processes; the center of the board is open for papers, coffee, and other paraphernalia, while the modules with controls are at the two ends. EQ is available for each channel; logic functions have connectors on the rear to allow control of other equipment; console logic is programmable; VCA faders are available to make console totally dc-controlled. There is complete talkback intercom facility, self-contained test oscillator, machine control pushbuttons on all channels, automatic EQ, solo and cue priority to minimize operator error, and many more operational facilities.

For more information: Avab America FM 800, **736**; Arrakis Systems 1000 Series, **737**; 500 Series, **738**; Broadcast Audio Assoc., **739**; LPB Citation series, **740**; Howe Audio 7000, **741**; Logitek, **742**; ProTech 30000 Series, **743**; McCurdy SS8800, **744**; Modular Audio expandable system, **745**; Studer mixers, **746**; Panasonic WR-130, **747**; Tweed Audio RP1603, **748**; MCI automation improvements, **749**; Auditronics 700 Series, **750**; ADM Technology ST-160, **751**; ST-100, **752**; Sound Systems CS2000, **753**; Tri Tech, **754**.

Tri Tech Systems, Inc., based in Hauppauge, N.Y., makes a number of the modules used by Sound Systems. Tri Tech will also have a line of products of its own, including console modules for all the functions of today's advanced console operation. A complete listing of the modules is ready with full electrical and mechanical descriptions.

Small mixers

There were some attractive new small mixers from several sources. Russco brought its Disco 421, a four-channel unit (one mic, two phono, one line inputs). Outputs are stereo line and headphones with panel level control, 1½ V at eight ohms, 2½ V into 600 ohms. There is a VU meter and an LED overload indicator.

Ultra Audio Pixtec had a new small mixer, Model AMA41, about six by two by four inches, with four microphone inputs. It runs on 12 V batteries, quickly replaceable, has 90 dB of gain, a built-in 1 kHz test tone, a standard VU meter, and can be hooked to 600 ohm telco line without tools. Headphone output also feeds an unbalanced

For more information: Russco Disco 421, **755**; Ultra Audio AMA41, **756**; Sescom ENG-1, **757**.

amplifier input. Price is \$595.

A somewhat similar mixer unit, new from Sescom, is the ENG-1, with three channels fed by two 150 ohm balanced mic inputs and one 15K line input, also balanced. Output is 600 ohm transformer balanced. It has a VU meter and switchable low-cut filters for use on voice. Power comes from two 9 V batteries. Gain is 90 dB, price \$175.

In addition to the new consoles sketched above, there were many units on the floor from other long-established makers, including Cetec, Harris, Pacific Recorders and Engineering, and Ward-Beck.

Intercoms: moving far ahead

Farrtronics, Ltd., of Markham, Ontario, Canada, introduced a system based on using 25-pair telephone cable, with the actual switching done at each selective station. Amplifiers are decentralized, too, with each station holding its own preamplifier and listen amplifier.

McCurdy introduced the CS 9400 intercom system, a microprocessor-controlled design. Functions are all incorporated in EPROMs.

RTS Systems of Burbank, Calif., introduced its Series 4000 IFB system, designed for communication with musicians, cameramen, newscasters, sportscasters, and other crew members.

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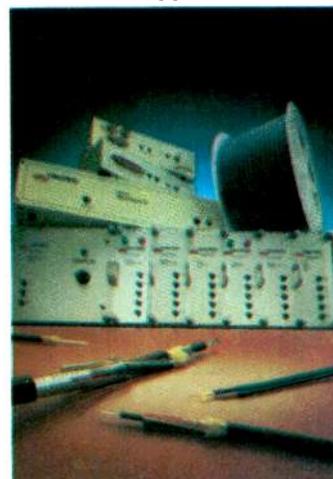
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Another headphone-based system of an entirely different kind was shown by R-Columbia Products Co., Inc. It uses headsets into each of which complete RF send and receive circuits are built.

Telex brought a new system, the Audiocom, for two-way headset communication in radio and television production, theatres, and film production. The combination headset-mic units, each using either a belt pack or a permanent station, are connected daisy-chain fashion or by separate lines directly to the central control unit.

Another and different approach to supplying cues to cameramen, on-air talent, and sportscasters was shown by Television Equipment Associates. Its TWIP system uses a tiny induction-coil receiver that fits invisibly into the user's ear and gets an induction signal (no RF) from a transceiver mounted within the clothing a foot or so away.

For more information: Farrtronics, 758; McCurdy, CS9400, 759; RTS Series 4000, 760; R-Columbia, 761; Telex Audiocom, 762.

For talk shows: better telco connects
Comrex has extended the interface

capability with a new system that supplies not only hybrid action but also a conferencing mode, so that the host and caller can converse two-way. In addition, two callers can converse with each other and the host, all on the air.

This Comrex "Studio/Telephone Conference Integrator" uses two hybrids and some additional Comrex units: a central control unit and studio/telephone integrator.

Studer introduced an advanced hybrid unit with about 20 dB of side-tone attenuation on the average telephone exchange, depending on the quality of the telco line.

A telco interface for a different function is that introduced by Bayly Engineering Ltd. The Model BRT-500 connects a two-way telephone network with an unattended mobile radio base station. It has microprocessor control and modular construction.

For more information: Comrex, 763; Studer, 764; Bayly BRT-500, 765.

Remote pickup: higher power

Marti brought new, higher-powered versions of its hand-held portable transmitters, which have become widely used for ENG in radio. The RPT-2/150 is for use on the 150 MHz

band and the RPT-2/450 for the 450 MHz band. Both produce RF power of 2.5 W, against the 1 W of the long-used RPT-1 series, and are available with switchable dual-frequency operation.

Motorola brought the new "Minitor," a very small belt or pocket alert monitor that can function as a cuing receiver for remote pickup operators. It operates on the 132 to 174, 406 to 420, or 450 to 512 MHz bands.

For more information: Marti RPT-2/150, 766; RPT-w/450, 767; Motorola Minitor, 768.

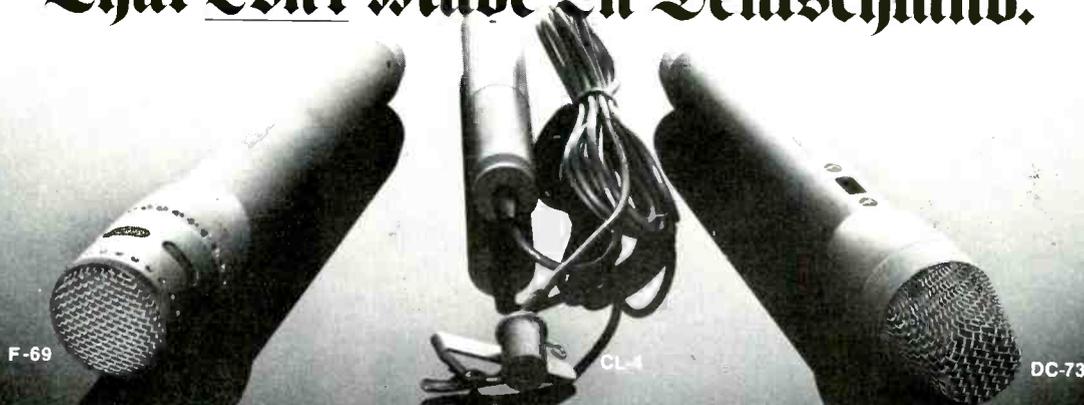
Remote control is at a high level

Harris Corporation introduced refinements in its Facilities Control system that made it even more flexible and responsive to the operator. Since the system is microprocessor-operated, improvements lie mostly in software changes. New enlarged capability enables the system to handle six separate transmitters.

Marti's new RMC remote control systems are available with 15 or 30 channels and use digital synthesized frequencies for no temperature drift on the mod and demod units.

Micro Control Associates showed remote control systems with touchtone channel address, digital uplink for

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minimum. A pre-polarized omni miniature electret condenser, the CL-4 lavalier features outstanding clarity and exceptionally smooth response.

The '69, '73 and CL-4 are only 3 of a full line that includes studio condensers and advanced design XY-axis stereo mics and complete accessories.

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The High Performance Series 8 Color Monitors are available in the 14" TM14-8RC, 20" TM20-8R and 25" TM25-8. The solid-state Series 8 monitors offer high quality color reproduction, a Shadow Mask Dot Matrix CRT, Pulse Cross Circuit, Active Convergence Circuit and low power consumption.

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Ikegami's Eye-Openers are available at most dealers. For details and additional information, contact: Ikegami Electronics (USA) Inc., 37 Brook Ave., Maywood, N.J. 07607, (201) 368-9171; West Coast: 19164 Van Ness Ave., Torrance, Cal. 90501, (213) 328-2814; Southwest: 330 North Belt East, Suite 228, Houston, Texas 77060, (713) 445-0000.



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For more information: Harris Facilities Control improvements, 769; Marti RMC, 770.

EBS moves into offices, schools

At the show the Emergency Alert Receiver Co. of New York showed its new receiver designed for EBS purposes. Sensitivity is stated as better than three microvolts for good fringe area reception. The receiver has a battery pack built in that takes over the power load if commercial power fails.

Time and Frequency Technology has also developed a receive-only, inexpensive EBS receiver, the "E-Alert," which tunes in either AM or FM signals.

For more information: Emergency Alert Receiver Co., 771; TFT E-Alert, 772.

Microphones and headsets

Panasonic introduced its new Ramsa Series WM-8000 and WM-8050 for vocals, both hand-calibrated unidirectional

microphones featuring floating mic capsules to eliminate shock noise and triple wind screens to prevent popping.

Sony's ECM-50s have been popular on news sets for years. A new ECM-30 omni condenser mic weighs 0.18 ounce and rates 50 to 14,000 Hz with a 60 dB S/N. Sony's wireless systems WRT-42 and WRT-57 both rate 50 to 15,000 Hz for VHF and UHF respectively.

Known to the recording industry for some time but making its debut at NAB is NADY with its VHF wireless system, over-all rating 20 to 20,000 Hz and 102 dB S/N.

AKG Acoustics featured its C-567 lavalier omni, 20 to 20,000 Hz and D-130 designed for broadcast news.

With ENG in mind, Switek's Mark 50A ENG transmitter weighs 10 ounces and is equipped to accept a variety of audio inputs with high band frequencies available from 150 to 470 MHz.

Shure's SM63 omni mic weighs 80 grams, rates 50 to 50,000 Hz and is designed to withstand a six-foot drop.

Beyer Audio introduced Burns' MCE-5 electret omni mic weighing 6.5 grams with a response of 20 to 20,000 Hz and 62 dB S/N. Its M-11 lavalier is has a 60 to 15,000 Hz response.

Neuman (Gotham Audio) featured its U series studio mics and KM miniature series. The U-89 offers five directional patterns and selectable roll-off.

Of final interest is the TWIP cuing device. The size of an earplug, it receives an IFB signal from a pin-on transmitter. TEA, Inc., distributes the product.

For more information: Panasonic WM-8000 and WM-8050, 773; Sony ECM-30, 774; NADY, 775; AKG C-567, 776; Switek Mark 50A, 777; Shure SM63, 778; Beyer MCE-5, 779.

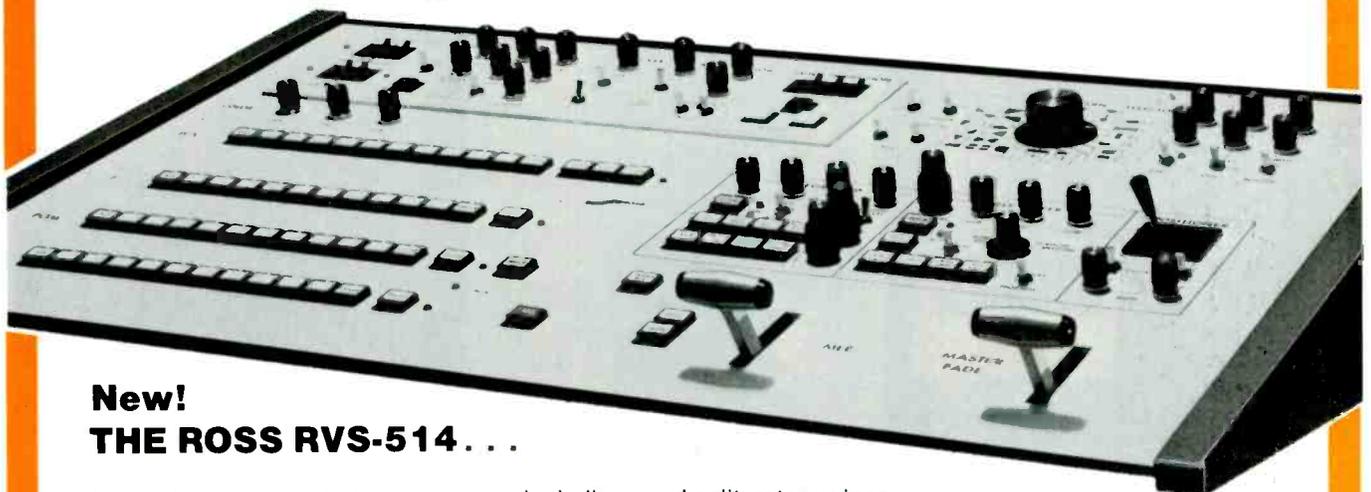
A miscellany of audio units

Prewired distribution system. Farrtronics brought a distribution amplifier system that has been pre-planned, with wired jackfields, to sharply reduce the time needed for installation. The set includes four pre-wired jackfields; three rack-mount frames holding up to eight plug-in DAs each for a total of 24; and a test package for level set and checkout.

Comprehensive amplifier line. Audio Technologies, Inc., of Horsham, Penn., showed a line of audio amplifiers, the "Micro-Amp" series, which includes microphone, line, phono, and distribution amplifiers.

All-out phono preamp. Audio-Metrics is the brand name for audio components developed by Radio System Design, Inc., of Gladwyne, Penn. The new Audio-Metrics phono preamp

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was shown as a serious attempt for best performance. Frequency response is rated within ± 0.25 dB of the RIAA curve; THD is put at 0.03 percent at +18 dBm; IM at 0.04 percent.

All-out power amplifiers. Broadcast Audio Associates brought a series of power amplifiers with ultra-fidelity specifications. Vanishing steady-state distortion is claimed in these amplifiers, which are rated at 70 W, 150 W, and 300 W, respectively, into 4 ohms.

Plug-in amplifiers. Tri Tech Systems brought a series of card-mounted amplifiers, including the UA500 line/booster, the MP508 microphone preamplifier, the PA514 10 W power amplifier, and the MA116 meter amplifier.

New electronics for old recorders. Taber, long known for degaussing equipment and for magnetic head replacing and refurbishing, brought the new "Taberamp," a two-channel magnetic head-to-line amplifier. It is designed to upgrade performance of Ampex and Scully tube-equipped tape machines or to match any professional transport using Taber heads.

Ferrite heads for more machines.

Saki Magnetics, maker of magnetic heads for many machines, announced a series of long-life Ferrite heads for certain machines including Pentagon, Telex, and Recordex in-cassette duplicators.

Phono and distribution amps. Russco introduced a series of phono preamps and a distribution amp. Pre-amp models are for mono and stereo, with or without front-panel switching of high and low cutoff filters. The "Multimatic" distribution amplifier comes with eight or 16 outputs, in rack or table mounts.

Refurbished audio-for-video heads. RE:DB is a new firm, entering the field as a source of new and refurbished audio heads, mainly for videotape machines. Its headquarters is 760 Gladys Avenue, Los Angeles.

Dispenser for splicing tabs. The Editall line of tape splicing devices has added a dispenser that holds splicing tabs on long strips so they can be pulled out one at a time with one hand.

A hi-fi player for Edison cylinders. Although it is certainly not a dream item for broadcasters, a custom-made system for playing authentic Edison cylinder recordings with modern hi-fi playback devices gave the exhibit floor a little extra depth. The system is aimed, of course, at museums, libraries, and wealthy collectors.

For more information: Audio-Metrics phono preamp, 780; Taber Taberamp, 781; Saki Magnetics ferrite heads, 782; Russco phono and distribution amps, 783; RE:DB head refurbishing, 784; Editall dispenser, 785.

New loudspeaker design

Size and sensitivity are crucial factors in broadcast studio monitors. The Technics SB-10 speaker system features a new component design: flat diaphragms. The three-way monitor handles 150 W music with a frequency range of 28 Hz to 125 kHz, -10 dB, and a sensitivity of 87 dB/W (1.0 m). JBL's three-way 4313B handles 40 W maximum input with a frequency response of 40 Hz to 18 kHz, ± 3 dB, and a rated sensitivity of 89 SPL for 1 W at one meter on axis. It weighs 21 kg. The ever-popular 4311B three-way monitor rates a 45 Hz to 15 kHz range and a 91 dB SPL sensitivity and weighs 20 kg.

Also of interest, the Sentry 100 by Electro Voice is capable of 30 W with an 18 kHz maximum response and 120 degrees dispersion at 5 kHz, 41.8 dB sensitivity. It weighs 12.8 kg.

For more information: Technics SB-10, 786; JBL 4313B, 787.

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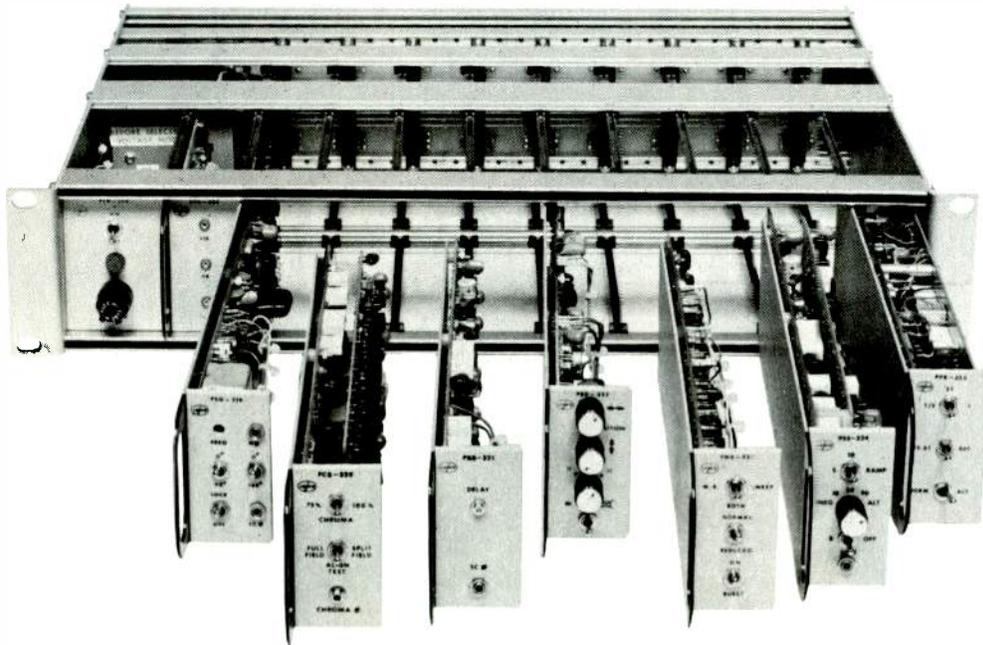
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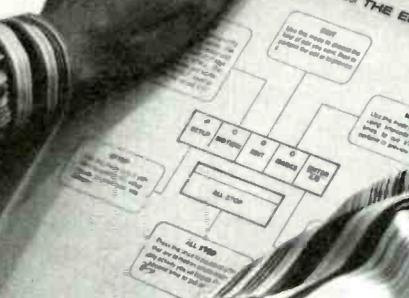
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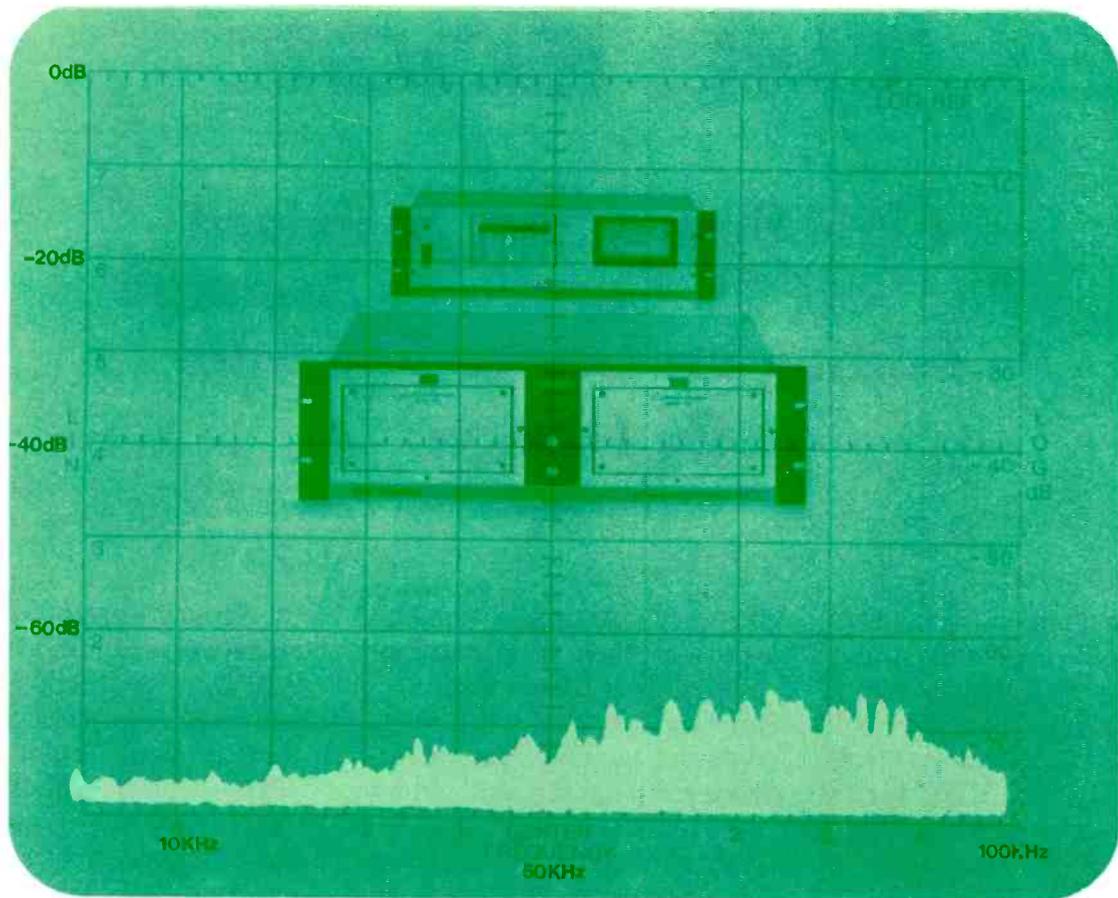
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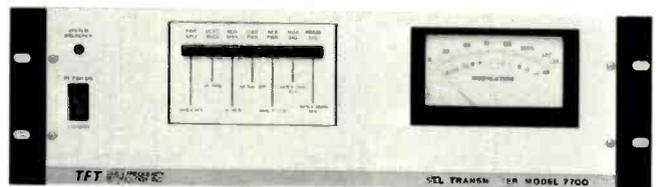
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TRANSMITTING: BETTER THROUGHOUT THE SPECTRUM

Transmission of signals from station to audience, station to station, and out of this world is making RF more exciting

A YEAR AGO everyone knew that satellite distribution of radio programming was coming. Mutual Broadcasting System and National Public Radio were both well along in planning their large networks. But general use by the industry seemed a matter of several years' slow growth, for one reason because it would require an enormous investment by broadcasters in satellite earth terminals. And the satellite nets that would surely come after a while were then mostly in the talk stage.



Ft. Worth Tower's mobile earth station - one of a growing breed

But during the course of the year it has become clear that getting an earth terminal will be extraordinarily simple for a great many broadcasters. All the broadcaster has to do is sign up with one of the several net organizers. Mutual was the first commercial net to establish this pattern: terminals are being installed for Mutual affiliates at the rate of 50 a month. The terminal costs the broadcaster nothing and is maintained by Mutual.

The Associated Press is underway with a similar operation: it has announced that more than 400 earth terminals will be installed for AP subscribers by the end of this year. The broadcasters being brought into the AP net, at no cost to themselves, will also be able to get RKO's extensive entertainment programming, now in the planning stage. RKO will share the

satellite net with AP. Moreover, there are industry rumors that one of the large radio networks will also come in on the AP system. Broadcasters getting an earth terminal through AP can get this programming, too. RKO, or any other central programmer making use of the AP space link, can be brought in without joining AP if the broadcaster gets an earth terminal on his own or from any other source and subscribes to the desired service.

Two more satellite plans were announced at the show. Satelink is a new subsidiary of the Robert Wold organization. Gary Worth is its president; as executive vice president of Mutual he was one of the main architects of the MBS satellite operation. Satelink will act essentially as a common carrier, offering satellite service to all comers.

Satelink announced early installation of its own uplink stations for both radio and television in New York, Los Angeles, and Washington, with other cities to be brought in soon. It is also building a fleet of mobile uplink units, the "Satellite Express," which will be available on lease for short-term satellite linkage.

One push by Satelink that seems likely to stir broadcaster attention is toward persuading radio syndicators they should use Satelink's pathways to reach their subscribers. Everyone knows the advantages: instant delivery of top-grade sound to every subscriber, with money saved at several points in the process. It is almost certain that in the very near future some large syndicators will begin to join up for satellite program distribution. For many broadcasters, getting syndicated music this painless, low-distortion way will be an excellent reason for joining the satellite parade.

The second announcement, which shows again the way the satellite gale is blowing, came from Rasmussen Enterprises of Farmington, Conn., which is setting up a satellite sports network called Enterprise Radio. There will be five-minute sports news 48 times a day; a "National Sports Talk Show" running up to 13 hours with listeners calling in to ask questions of the expert

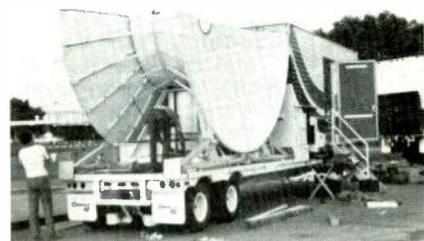
panel; about 20 sports features a week, with interviews and commentary on sports events; plus, of course, live coverage of sports events.

A Rasmussen spokesman told *BM/E* that at NAB representatives of more than 60 radio stations said they would join up. Each station will get a free earth terminal, on the pattern established by Mutual and the Associated Press. Rasmussen had planned to start operations in early 1981 but this response, far above expectations for this stage of the project, led to a decision to make a start in fall 1980.

A new kind of satellite service announced at the show was the RCA ADDS, a system for converting audio signals to PCM digital form for satellite transmission. Digital audio in this case demonstrates an advantage quite separate from and in addition to its quality superiority. By digitizing the audio signals, more program channels can be packed into the transponder circuits than analog modulation allows.

The equipment for the RCA ADDS service has been built by Scientific-Atlanta, Inc. For the broadcaster it brings the possibility of getting several programs at once, with choice among them, using demultiplex equipment and a small-aperture earth terminal (10 feet or less).

The foregoing makes it clear that the radio earth terminal is a "hot" item that will get a lot hotter in a short time. Two firms now selling radio earth terminals in large quantities, as described in the May issue, are California Microwave, Inc., of Sunnyvale, Calif., and Rockwell-Collins of Richardson, Texas. Both had exhibits with information on their terminals.



Compact Video's 42 with its dish in the travel position

NAB SHOW IN PRINT

A sizeable number of other firms — the number grows almost every day — are making the antennas or the electronic units or both. The following is a *partial* list (to be added to the two listed above) which may be useful to broadcasters in the market for an earth terminal. Some make antennas, some electronic units, and some both: Andrews, Avantek, Gardner, Harris, Hughes, Microdyne, Microwave Associates, Coastcom, Moseley, Fort Worth Tower. The list will be longer when this magazine is distributed; the broadcaster looking for a terminal would do well to check with a specialist in the field.

Satellites for TV

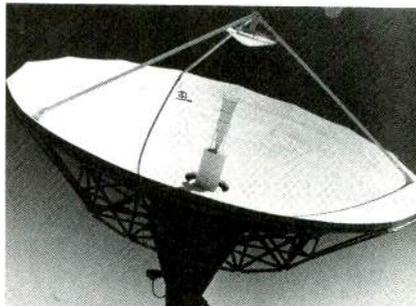
While RCA Americom was stealing a good deal of thunder with its Audio Digital Distribution Service (ADDS), its prime equipment supplier, Scientific-Atlanta, was busy introducing a new seven-meter earth station for television broadcasters who want to pick programming off satellites.

The new station, which Scientific-Atlanta calls Model 8572, boasts a seven-meter dish antenna that is (as an option) motorized. It scans any domes-

tic satellite in the arc for 70 to 136 degrees from anywhere in the contiguous U.S. An automatic position control, linked to the antenna motor, will automatically aim the dish.

Gardiner Communications Corp., which acquired Scientific Communications at the beginning of the year, showed its new 5.6-meter antenna for the first time at an NAB. The electronic package that accompanies the antenna was developed earlier by Scientific Communications.

In addition to an inexpensive and simple four-foot audio receive-only dish antenna, Anixter Mark introduced a new five-meter television receive-only system. The dual polarized antenna operates in the 3.7 to 4.2 GHz band. Consisting of 24 stamped



Harris' 8.8 meter dish, one of many looking up from Las Vegas

aluminum petals, the parabolic reflector, feed, and mount structure can be assembled by two people — no component weighs more than 150 pounds. The mount structure is an elevation azimuth type, adjustable 360 degrees in azimuth and +5 to +90 degrees elevation.

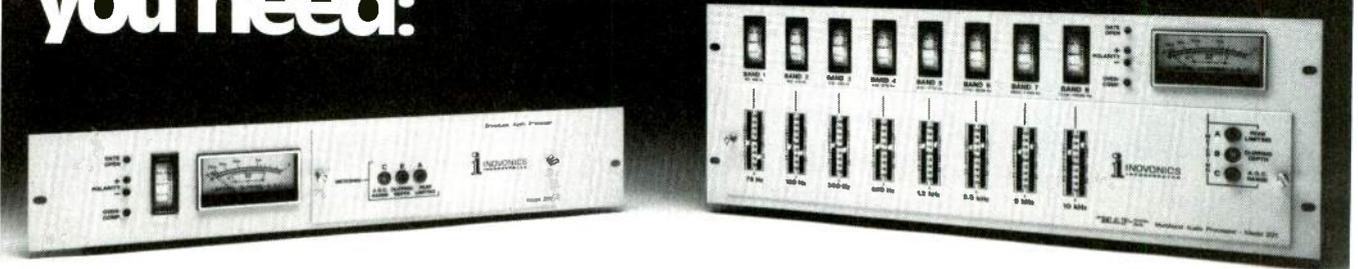
NEC showed its new 4 GHz direct satellite broadcast receiver, which features a 4.5-meter cassegrain antenna, a low noise down-converter, and an FM demodulator for five-channel reception.

Two satellite antenna makers represented at the NAB, but who were not showing new models, were Andrew Corp. and Microdyne. During the convention, Microdyne's merger with AFC was approved, and the company is expected to beef up its efforts to market its redundant two-antenna system that employs a seven-meter antenna.

Other manufacturers on hand included Fort Worth Towers, which showed its five-meter fiberglass dish, and Varian Microwave, which arrived with its 125 W traveling wave tube (TWT) amplifier for operation between 5.925 and 6.425 GHz as well as its high-power (500 W to 2000 W) klystron-tube amplifier that operates in the Ku band between 14 and 14.5 GHz.

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search were on hand, and W.B. Walton Enterprises, a California engineering company involved in antenna erection, was talking about its new deicing system for satellite antennas.

Harris was discussing its satellite to studio link (SSL), a cost-effective alternative to a TVRO antenna for each satellite. By typing a keyboard entry into the SSL, the system will reorient a single antenna to a preselected satellite and transponder, providing a station with more than 40 additional program sources, the company claims.

For more information: Scientific-Atlanta 8572, **470**; Gardiner 5.6-meter antenna, **471**; Anixter Mark, **472**; NEC 4 GHz receiver, **473**; Varian, **474**; W.B. Walton, **475**; Harris SSL, **476**.

Weather services

Three years ago, weather radar and satellite systems cautiously began to spring up at NAB. Now the systems are blossoming, and the Las Vegas show attracted new companies to the field.

Sperry Marine is a newcomer to weather radar, and the company — as well as one of its distributors, David Green — was at the show to test the winds. Sperry arrived with its MK-104 radar, which Green has handled for a



Weather Services International offered on-line, real-time weather data

brief eight months prior to the Las Vegas exhibition. The firm readily admitted that it simply has adopted the marine radar (for which Sperry has a long and successful track record) into weather radar. "We're so new at this game," one company representative noted, "that we don't even have a colorizer yet." What Sperry has, though, is a radar that picks off the weather up to 170 miles away, using an antenna that rotates at 22 rpm rather than 8 rpm, normal speed for colorized weather radar.

In addition to its Tel-Weather radar system, which hooks into the National Weather Service's 116 weather radars around the country, Arvin displayed its Sat-Weather system. Sat-Weather converts the National Oceanic and Atmos-

pheric Administration (NOAA) satellite pictures to video. The system is offered in three configurations: SW-1, which receives satellite weather pictures over phone lines or earth stations, has single frame storage capability, and puts out a black and white picture for \$10,175; SW-2, which for an additional \$2275 performs the same task as the SW-1 but has color video output; and SW-2/DCDS, basically the SW-2 with disc control and 200 frame digital storage with editing and automatic sequence replay — for a price tag of \$22,400.

Enterprise Electronics displayed its color weather radar, which like Arvin takes its information from phone lines linked to National Weather Service radar stations. The system, designed for on-air television, displays precipitation levels in five colors on a colored background.

For \$43,000, Information Processing Systems will set you up with instant weather satellite "movies." The firm's WP-3312 weather satellite recorder, like others, takes its information from NOAA. It allows forward or reverse playback as well as single image viewing, will give a 3:1 blowup of a geographic sector, and offers color enhancement of up to six colors that reveal movement of weather patterns.

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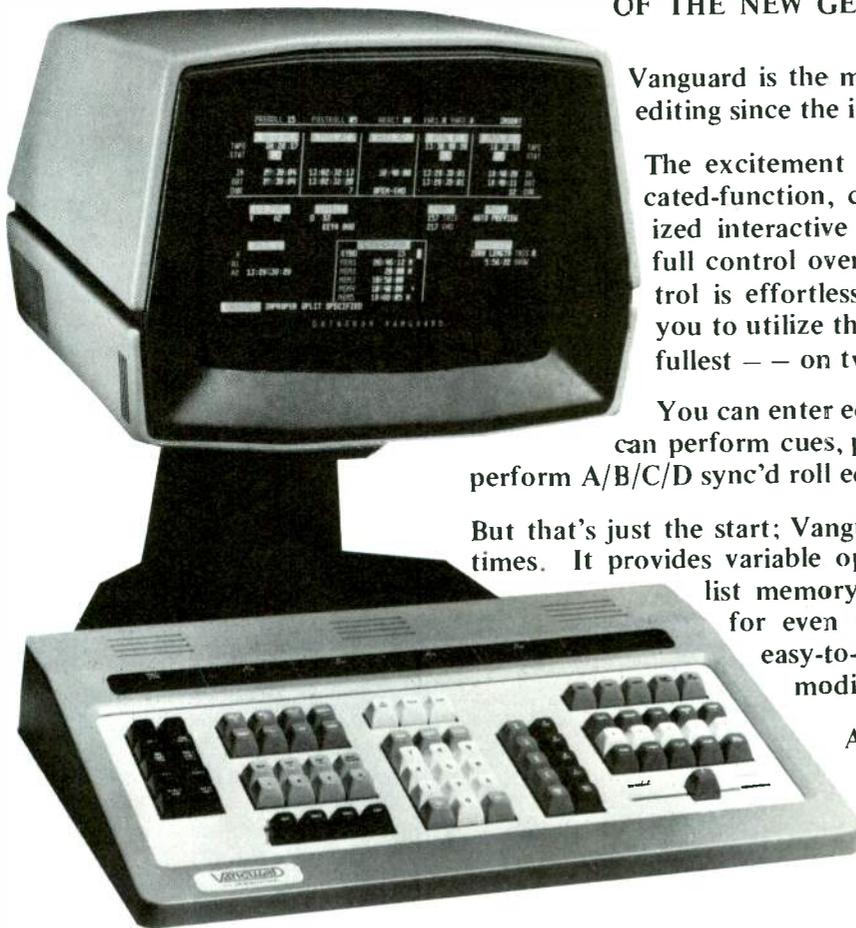
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**NAB SHOW
IN PRINT**



McCinnis, Skinner & Assoc., provide a weather package as part of their Newscan system

came to NAB for the first time, bringing with it its computer-controlled colorizer TD-102A, which gives six-color weather display, a computerized map display, and quadrant magnification up to four times.

Technology Service Corp. of California, a pioneer in weather presentation systems, displayed its WRT-75A. The system allows multiple overlays, random sequencing, and color underlay to highlight specific geographic areas. Its display offset feature centers the studio or city rather than the radar site. The WRT-75A is available with an optional clutter reduction, so that radar ground clutter is contained to a single color.

Weatheration showed its color remote radar system, which can range from 70 to 300 miles. The system contains four separate memory banks, that store information in four locations.

Real time weather information is provided to more than 200 U.S. cities and 26 foreign countries by Massachusetts-based Weather Services International, which plans to extend the radio/TV service into sports and business information.

For more information: Sperry Marine, MK-104, 477; Enterprize Electronics, 478; Information Processing Systems, 479; Technical Designs, TD-102A, 480.

Microwave shoots for greater mobility

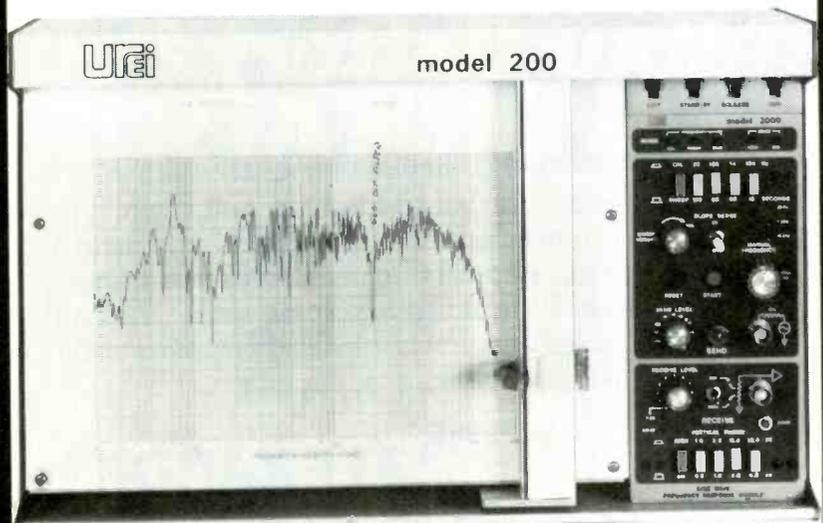
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It's an automatic audio frequency response plotter with features, accuracy, resolution and dollar value previously unobtainable (under \$2500.00!) We took a basic Hewlett-Packard X-Y plotter and modified it to accept UREI audio analysis plug-in modules. The standard Model 200 shown below includes a Model 2000 plug-in, making it an automatic sweep frequency generator and receiver, featuring Slope Sense*, which insures that steep amplitude excursions will be accurately traced without the use of very slow sweep rates. The Slope Sense circuit automatically slows the sweep rate when rapid amplitude changes are encountered, and then resumes normal rate. The Model 200/2000 makes 20 Hz to 20 kHz response plots with 0.05 dB resolution and a dynamic range of over 60 dB on standard 3 cycle semi-log paper, K&E audio paper or DIN standard paper. Vertical scaling is changeable from centimeters to inches from the front panel. A number of accessory plug-in modules are currently being developed which will expand the Model 200's capability to plot other audio parameters. (UREI and Hewlett-Packard quality of course.) Available from your UREI dealer.

*Patent #4090142

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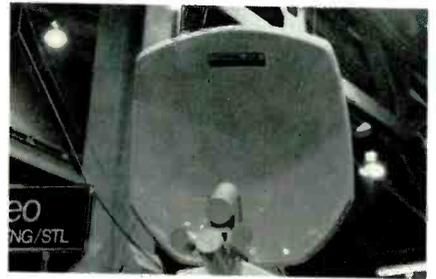
NAB SHOW IN PRINT

and the demands of users than microwave. Microwave bands in the 2, 7, and 13 GHz ranges for both ENG and STLs are seriously crowded. Frequency sharing schemes and the opening of new bands to microwave are moving — but slowly. On the other end of the picture, demand is increasing for point-to-point, intercity, news, airborne systems, short-haul camera links, and STLs. With the approval of AM stereo, the demand for stereo STLs is liable to

become even more intense (see the STL section of this report).

Manufacturers have responded in the only ways open to them: more frequency-agile equipment, circularly polarized transmission, better filtering, more discrete channel designs, and careful consideration to antenna systems in the expectation that better gain will keep power requirements down at the higher frequencies.

Microwave Associates Communications took a number of new steps in the 7 GHz microwave range. A new portable system uses the MA-7CP transmit-



Nurad's new tracking antenna detects direction of signal by its relative strength in antenna array

ter and MA-7CP receiver, which are similar in appearance and function to the familiar MA-2CP units.

Power output from the transmitter is 0.5 W, while the low noise amplifier-equipped receiver provides a typical noise figure of 4.5 dB. The dual conversion receiver offers 30 MHz IF bandwidth as standard with a no-cost optional 12 MHz bandwidth for users facing frequency congestion. The MA-7CP system is available for both 525- and 625-line color video systems and fully complies with CCIR standards.

Another 7 GHz addition to the MA line is the MA-7GU central receiver for ENG systems. Operating in the same band range as the above units, this receiver is frequency-agile across 10 channels. Dual conversion circuitry is used for increased bandwidth and a synthesized local oscillator insures precise frequency selection. The 10 channels are selected through a 10-position rotary switch on the front panel or through use of a telco line-connected remote controller.

Other new 7 GHz equipment introduced by Microwave Associates included a high power 7 GHz heterodyne microwave system using an FET amplifier to provide a 5 W power output over the 5.9 to 6.5 and 6.8 to 7.1 GHz ranges, and either a 2 W or 3.5 W output over the 7.1 to 7.7 GHz range. An OmnexSM aircraft ENG/EJ omnidirectional antenna is also available for 7 GHz in a transmit/receive design. The antenna is CP and covers several bands in the 6.875 to 7.775 GHz range.

The 2 GHz band has not been ignored either in Microwave Associates' product line. This year MA introduced a new 2.5 CP portable system consisting of the MA-2.5CP transmitter, MA-2.5CP receiver, and the PA-250 power amplifier, all extremely compact and designed for outdoor use. The transmitter and receiver are small and lightweight enough to be mounted directly behind the antenna, either on a telescoping mast or tripod. The PA-250 may be located at the antenna or up to 40 feet from the 2 W exciter/transmitter; its power output is 12 W.

With the interest in airborne microwave systems, MA has responded with

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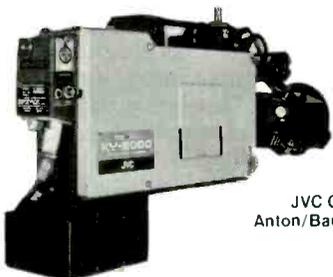
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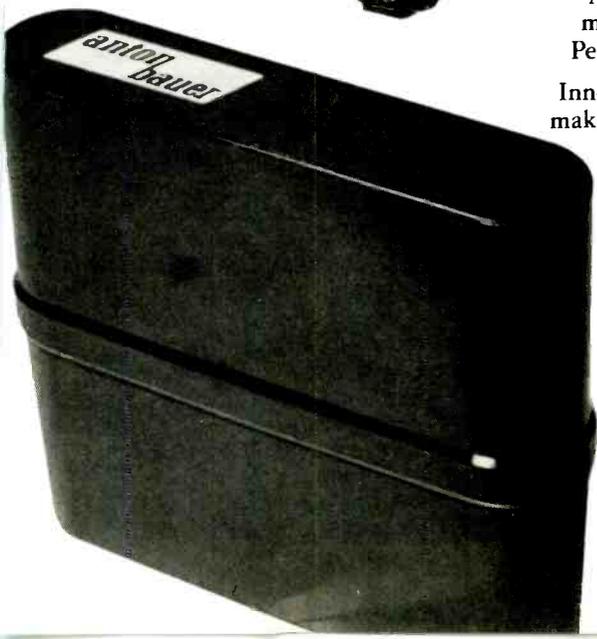
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a new tracking receive antenna. The Sky Scan™ antenna system uses a cosecant squared design and a specially shaped reflector surface to provide high side lobe rejection of 20 dB; gain is 26.5 dB.

Automatic tracking is achieved through a feature called Scan Coding that is able to discriminate between actual signal direction and multipath. Based on a monopulse-type feed system, the antenna can track fast-moving

aircraft or even aircraft flying close in — nearly overhead — in the presence of strong multipath.

Farinon, now in association with Harris Corp., introduced a new central receiver for the 7 GHz band, the FV7CR microwave radio receiver. This new frequency-agile unit offers 30 synthesized channels with instant phase lock. The channel settings can be locally or remotely selected.

While the frequency range of the unit is from 6.875 to 7.125 MHz, channels can be reassigned by changing E-PROMs. The unit's LNA, integral to

the receiver, is rated at 6.5 dB noise, and a narrowband IF SAW filter provides highly discrete split-channel operation.

According to the manufacturer, the 79 dB dynamic input-signal level range and superior adjacent channel selectivity mean that a crew working with a 30 dB gain steerable receiving antenna, a 30 dB gain transmitting antenna, and the maximum permitted transmitting power could operate anywhere from 133 miles out to within 1/8 mile of the receive point with a minimum 20 dB fade margin across the entire range.

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Circle 164 on Reader Service Card



RF Technology's new camera antenna remembers where the receive site is

Farinon's FM7-13MP miniature portable microwave "mini-link" for short-range transmission, introduced in prototype form last year, is now available. Included in the optional 7 to 13 GHz system are transmitter, receiver, and accessories. Depending on accessory selections and antenna choice, the system sells for about \$18,000.

Farinon showed another new central receiver in the 2.5 GHz range offering 16 synthesized channels, any 10 programmable. With the use of LNA, SAW filter, and other circuitry comparable to the 7 GHz receiver, this unit's operating range is rated from 1/8 mile to 250 miles when 23 dB receive and 22 dB dual helix transmitting antennas are used at maximum power.

The new 2.5 central receiver completes the Farinon 2 GHz line, which also includes the 2 GHz transmitter, an FV2.5 MP "mini-link," and a new Type 60505 power amp providing up to 20 W of output.

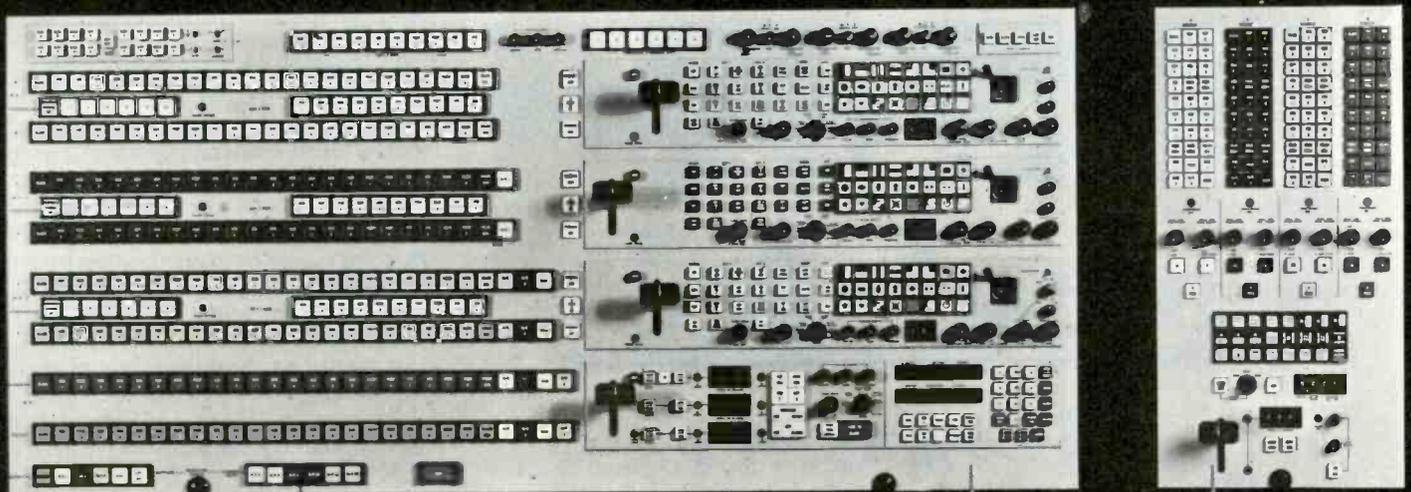
Tayburn Electronics, which made a big splash a couple of years ago by introducing an auto-tracking antenna and 2 GHz transmit/receive system for airborne use, has added a new, smaller auto-tracking receive dish. The new dish weighs just 90 pounds and its two-foot by four-foot concave rectangular design offers a 23 dB gain. While the new design offers much reduced wind-loading, it also abandons the cosecant squared configuration of the larger antenna. As a result, azimuth adjustment is accomplished remotely or manually. The price of the new dish is \$42,000.

Tayburn has completed the outfitting

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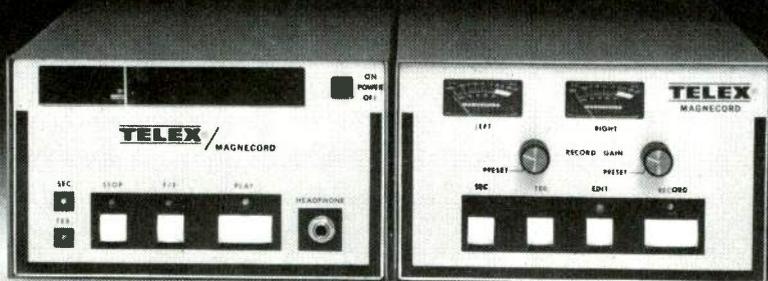


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Circle 166 on Reader Service Card

NAB SHOW
IN PRINT

of its portable 2 GHz system. The system weighs just 11 pounds including the 10 dB antenna and 12 W power output.

Nurad introduced four new products at the convention, particularly aimed at airborne and 7 GHz microwave operation. Copter Pod™ is a uniquely configured, fully integrated microwave package for airborne operations. Somewhat reminiscent of an aircraft auxiliary fuel tank in appearance, the streamlined capsule contains four circularly polarized antennas (forward, aft, port, and starboard) as well as a multi-channel receiver and downward-looking receive antenna.

According to the manufacturer, this approach has been taken to overcome the objectionable multipath problems sometimes associated with omnidirectional antennas. With the Copter Pod™, the operator can select the directional antenna best capable of hitting the receive point. As the orientation of the aircraft changes towards the receive site the operator switches from antenna to antenna. The complete system is priced at \$50,000.

Another addition to the Nurad airborne system is the Supertrack™ receive antenna. Based on the Superquad™ antenna design, the new antenna incorporates a pair of sequential-lobing antennas on the left and right of the center antenna facing the dish. This structure gives the operator a simple left-right signal strength indication upon which to determine the panning direction of the dish. For close-in operation the system employs a quad polarized broadbeam (50 degrees HPBW) directional antenna.

Nurad added two new products to its 7 GHz range equipment. The 70 OR 1 Mini-SQ™ CP antenna is an offset feed antenna featuring extremely low side lobes, high efficiency, and excellent VSWR and axial ratio, according to the manufacturer. This very compact antenna is actually a 14.5-inch version of Nurad's Superquad™.

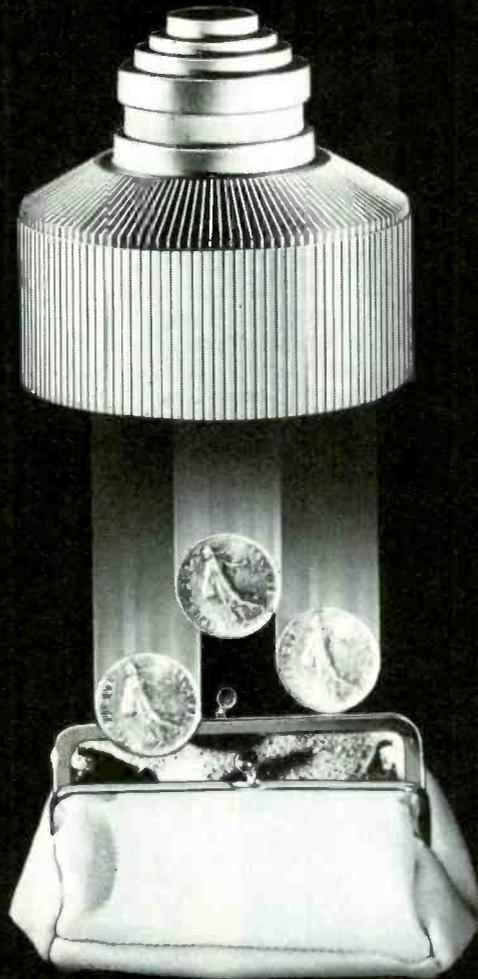
Designed to be co-mounted with the Mini-SQ is a new solid state 5 W PA for the 7 GHz range. The 70PA5 features a dc/RF diplexer to allow both dc power and RF signal to be carried on a single cable between the transmitter and PA. The Mini-SQ is priced under \$3000 and the PA is priced at about \$7000.

Another manufacturer looking skyward this year was NEC. NEC showed its portable helicopter relay system, the TVL-400. The new system operates in the 7 GHz range with a 1 W transmitter capable of reaching 12 miles or, with a 5 W model, 25 miles. There is also a 13 GHz, 3 W model of the TVL that will transmit 10 miles.

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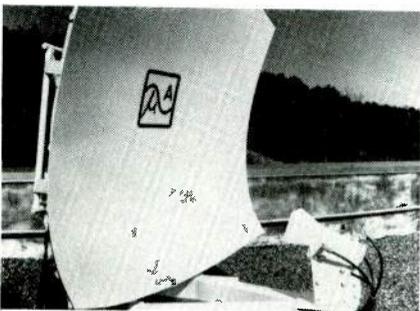
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NAB SHOW IN PRINT

The transmitter uses an SHF band power amplifier in 7 or 13 GHz versions coupled to an omnidirectional antenna. The high sensitivity receiver is capable of automatic tracking when used with the appropriate antenna system. Extremely compact, the TVL-400 can be configured for backpack operation. A TVL-300 system, not displayed at NAB, is similar in design to the 400 but offers a 40-mile range.

International Microwave, long involved in military and industrial microwave communications, introduced its first ENG microwave systems, the EJ Series. Operating in the 13 and 14 GHz ranges, the systems are primarily intended for short-haul links.



Microwave Associates also entered the tracking antenna field

The 13 GHz unit has a range of 0.7 mile using horn transmit and receive antennas.

RF Technology had probably the most unusual microwave link at the show and, with the upcoming political conventions requiring mobile cameras on the floor, a definite angle from which to pitch it. The firm, which has manufactured the mini 2 GHz camera-mounted microwave transmitter for some time now, has added a six-ounce, 6 dB gain quad antenna to it. The QA-4 is a small cube-shaped unit containing sequencing circuitry. Once the location of the receive site has been established with maximum signal strength existing between the camera antenna and the receive antenna, the unit remembers the orientation. As the camera operator moves and turns, the transmit signal is automatically switched to whichever of the cube's four antennas is facing the receive point. The switch always takes place during the vertical interval. So, just like the needle of a compass always faces magnetic north regardless of which way you turn the compass case, the transmit signal always faces the receive site regardless of which way the camera is turned. This unique antenna is priced at \$4895.

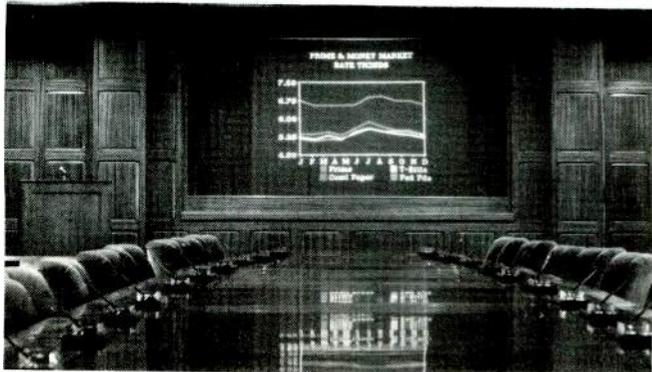
RF Technology also introduced some new gear in the 7 to 13 GHz

range, though no details were available at press time.

Thomson-CSF Broadcast showed the TM313 radio link system, a product of its French parent. This 13 GHz system (available in the 8 GHz range as well) is more appropriate to a semipermanent microwave link system than to the fast-breaking ENG setups for which most American equipment is designed.

This very rugged and stable system is more frequently employed in EFP-type situations where a reliable link needs to be established for a relatively long period of time — for instance, when a sporting event at a stadium is scheduled to run over a period of days or during a political convention. While U.S. broadcasters generally rely on telco lines under such circumstances, the TM 313 or similar system offers a reliable alternative. Such systems offer video and audio channels with two-way communication through the same antenna system. As such, the radio link systems are often employed as temporary relay stations. Though no U.S. price has been quoted, a Thomson-CSF representative suggested that the system may be in the \$35,000 ballpark.

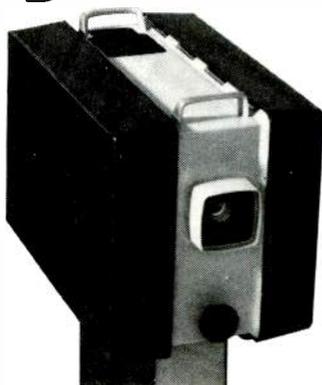
TerraCom, in addition to introducing a new group of audio program channel multiplexers for telco and microwave use, showed a new portable microwave dish antenna. The unique facet of this



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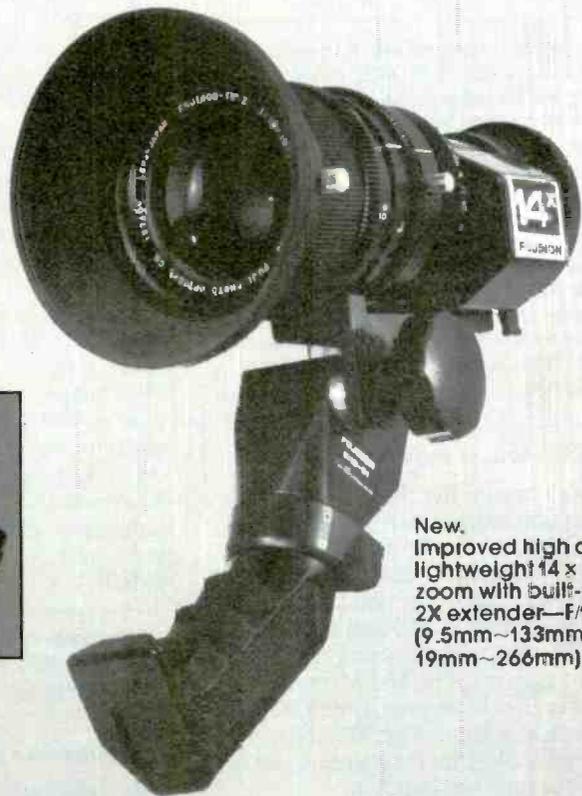
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new dish is that it has a basic two-foot diameter but it is designed to accept a series of "petals" (additional dish panels like flower petals) that give the dish an additional 4 dB gain.

For more information: Microwave Associates MA-7CP, 481; MA-7GU, 482; 7 GHz heterodyne system, 483; Omnex antenna, 484; MA-2.5CP system, 485; Sky Scan antenna, 486; Farinon FV7CR, 487; 2.5 GHz central receiver, 488; 60505 power amp, 489; Tayburn auto-tracking receive dish, 490; Nurad Copter Pod, 491; Super-track, 492; Mini-SQ, 493; 7OPA5, 494; NEC TVL-400, 495; International Microwave EJ Series, 496; RF Technology QA-4, 497; Thomson-CSF TM313, 498; TerraCom portable dish, 499.

The STL, too, is moving ahead

Studio-transmitter links have been pushed upward in quality for the past several years. Bayly Engineering of Ajax, Ontario, affiliated with AEG-Telefunken, described a series of STLs operating on 450 and 900 MHz. Each is designed to carry multiple sound programs. The 450 MHz models carry four mono programs, two stereo, or any combination. The 900 MHz systems carry six mono programs, three stereo, or any combination.

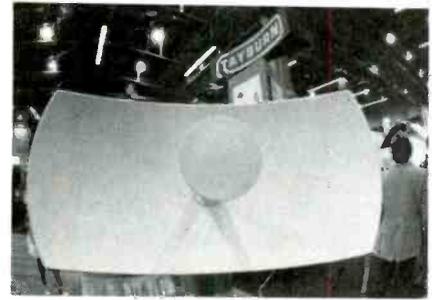
Micro Control Associates of Cleburne, Texas, brought its STL, shown in early form last year, now in production and already in use by nearly 100 broadcasters. It comes in two forms, one for a wideband composite signal (30 to 60,000 Hz) and one for narrow-band single and dual channel (40 to 15,000 Hz). A wideband composite has the advantage of eliminating a demodulator and exciter at the transmitter end. Frequency response is ± 0.25 dB, 30 to 60,000 Hz, distortion 0.4 percent over that range, and noise 65 dB or better below 100 percent modulation.

Versa Count showed an STL for frequencies in the 148 to 174, 215 to 240, 300 to 330, 450 to 470, and 88 to 108 MHz bands. Spurious and harmonic emissions of the transmitter are stated to be more than 60 dB below the carrier, AM noise better than 70 dB down, and FM deviation 75 kHz for 100 percent modulation. It can be used in composite mode and will accommodate sub-carriers.

For more information: Bayly Engineering, 900; Micro Control Assoc., 901; Versa Count, 902.

Showdown in transmitters

On one front, solid state replaced



Tayburn has designed a smaller, lighter tracking antenna for its airborne system

tubes; on another, tubes advanced. Broadcast Electronics, getting into the field for the first time, unveiled one of the most sophisticated transmitters ever built. Others stressed time-tested designs. Decidedly different philosophies were at work this last year in designing broadcast transmitters.

RCA boasted that its solid state 5 kW AM transmitter was the transmitter of the future. Collins Broadcast Products, coming out with its first 1 kW transmitter redesign in years, elected to stay with a tube design. Sintronics, showing a new solid state 1 kW unit last year, arrived this time with a new tube unit as well. Backing away from solid state except for small-powered rigs was Cetec. McMartin and most others were also holding off. Standing pat was Harris, which led the way with the first

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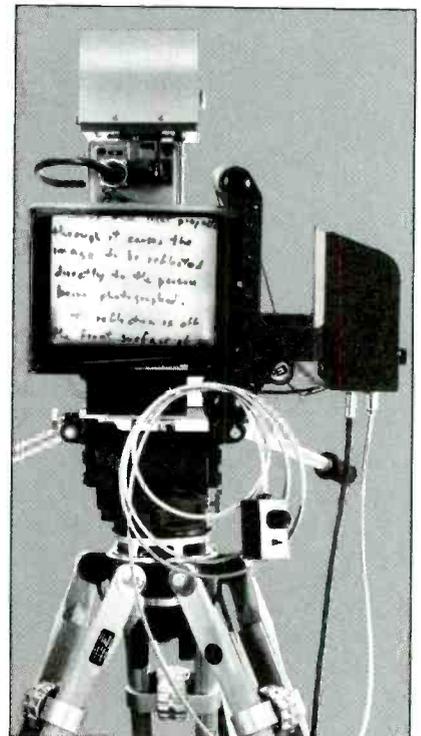
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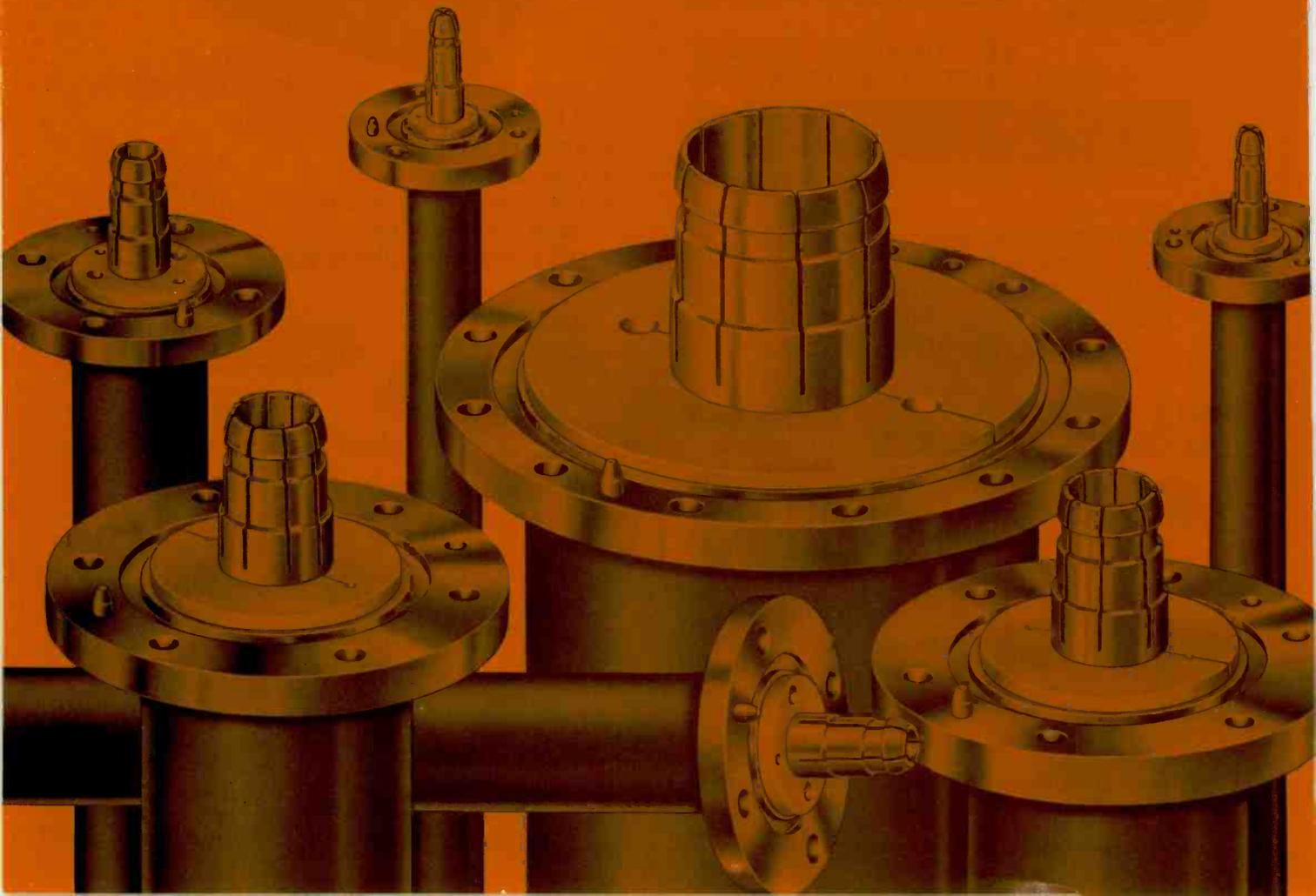
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NAB SHOW IN PRINT

solid state transmitter — the MW-1 — years ago but has made no further announcements since then.

Why no great swing to solid state? Why recidivism to tubes in some cases? One argument was that the solid state designs failed in the field — they simply did not operate well. Others said transients were knocking them out. Lightning was identified as the culprit some of the time, power line variations at other times. Another cause could be sensitivity to load changes — it was too hard to keep the solid state units matched to their transmission lines. A change in load could be enough to badly detune a solid state unit and perhaps knock it off the air.

Of course, RCA wasn't buying any of these arguments. Admittedly solid state approaches have generated risks in the past. Indeed, RCA had shown a 5 kW design before its purchase of the rights to the Westinghouse unit which had been to at least two NABs before.

While AM transmitter manufacturers seemingly held off, solid state did make more inroads into the television side through IPAs and lower power transmitters and translators. Energy savings with solid state is a real force and one destined eventually to win — but more on that later.

So buyers of AM or FM transmitters in 1980 have a choice. They can go for the latest in circuitry and innovation or opt for the familiar and the tried and tested. With these generalities made, we can look more closely at the designs of 1980 offerings.

The RCA 5 kW solid state transmitter, the BTA-5SS, is ready for shipment in early 1981, using the latest in transistors, ICs, and LSIs. The firm said such low voltage and high current devices consume less power, require less cooling capacity, cost less to install, and provide long operational life. The transmitter provides wideband audio response with low distortion and can operate with asymmetric 125 percent modulation.

New pulse linear modulation (PLM) techniques yield "bright audio response and low distortion," said RCA.



Broadcast Electronics was one company bringing FM transmitter design down to a single tube

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To overcome one of the potential disadvantages of pulse width modulation, when modulation approaches zero percent modulation depth, PLM inserts an offset voltage so the modulator will not lose control of the subcarrier switching.

The modulator driver consists of transistor arrays that turn off and on at the subcarrier frequency. The subcarrier filter removes the subcarrier frequency and applies a voltage that varies at the audio rate to the final RF amplifier. The RF section includes six class D modulated bridged power

amplifier trays. The special bridge circuits allow the transistors to switch at frequencies previously unattainable in high power solid state design.

The new Collins Broadcast Power Rock One 828C-1 is the first one kilowatt to combine both pulse modulation and long life tubes. Designed with AM stereo in mind, it has a flat passband, a transformerless audio input, a power supply that allows a flatter low frequency response, lower intermodulation distortion, and increased overall modulation density (loudness). Overall efficiency exceeds



CCA has been incorporating the Optimod FM into its transmitters

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43 percent at 95 percent modulation and harmonic distortion is less than 2.0 percent from 20 to 10,000 Hz.

Using the Collins switcher modulation concept, proven successful in larger transmitters, the interplay among the main power supply, RF output network, and audio output is considered. The 828C-1 combines a built-in instantaneous peak limiter, automatic power control, and automatic modulation control.

The exclusive Collins cue taper output network gives the user the flatter bandpath needed for good stereo performance but provides very steep skirts on both sides. There is no transformer input to the audio chain. Using proven dc-coupled op-amps, ringing and overshoot problems are minimized significantly. The 828C-1 transmitter can handle a 20 kHz square wave at 100 percent modulation.

Sintronics' new 1 kW transmitter, the SI-A1T, although using four tubes altogether, used but a single type, the 4-500A tetrode. One pair is used in the RF power amplifier (class C) and another pair in the modulator. The firm stressed that these tubes are field-proven and that they are operated well below their maximum output, thus assuring high positive peak modulation with minimum distortion.

Tuning and loading adjustment is made by a motor-driven slug positioned within silver-plated inductors that are part of a Pi-L network. The exciter is solid state. Duplicate crystal oscillator/dividing circuitry is used in which the crystal operates at four times the transmitter output.

In FM design the new 30 kW FM transmitter at the Broadcast Electronics booth was the hot attraction. Entering the transmitter field for the first time, Broadcast Electronics was not modest in its claims: "The most advanced transmitter since the advent of FM broadcasting... World's most powerful one-tube FM transmitter... Unique folded half-wave cavity which eliminates all sliding contacts... an ultra-linear exciter... and for the first time a microprocessor-based control

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system."

With these innovations, the FM-30, said Broadcast Electronics, offers the optimum in FM performance, reliability, diagnostics capability, and efficiency.

The design was bold, particularly the power amplifier design. The half-wave length folded tank circuit is unique. Since the FM-30 requires a high power cavity, it is all the more so. As mentioned, the new cavity design eliminates plate blocking capacitors and all sliding contacts.

The high-gain amplifier inherently suppresses second harmonics and less power is lost at the fundamental frequency, Broadcast Electronics claimed. The result is a high PA efficiency. The 30 kW output power stage, using the Eimac 8990/4CX200000 tetrode, can be driven by a solid state device. The plate efficiency of the final tube approaches 80 percent at 30 kW. The solid state IPA uses five identical amplifier modules (a driver plus four parallel modules). Failure of any one IPA causes only a 15 percent power reduction.

Broadcast Electronics also introduced at the show a 3500 W single-tube FM transmitter. It too used the folded half-wave cavity and microprocessor control and incorporated the new FX-30 exciter. The IPA was simpler than that in the FM-30 because of the lower drive power needed.

Just across the aisle from Broadcast Electronics was a new Wilkinson "no-frills" FM 25/30 kW transmitter. The Wilkinson transmitter uses the same final tube, the 8990, as does the Broadcast Electronics unit, but there are few other similarities. Wilkinson has not gone to an all-solid state IPA. It uses a 4CX250B tetrode operating class C to deliver 250 watts of drive power. While not broadband, it is tuned simply by a variable capacitor in a Pi circuit.

The final 8990 operates as a grounded cathode with a grid drive. Output tuning and loading are accomplished through fixed inductive coupling and variable vacuum capacitors (no sliding contacts). The circuit, says Wilkinson, is very stable and efficient (plate efficiency is 70 percent). The

power consumption is approximately 38/45 kW. Although Wilkinson uses plate blocking capacitors, they present no maintenance problem. "They can be repaired in the field," the company says.

At the show, Wilkinson introduced another transmitter, the FM100G. It is an integral exciter and power amplifier that measures only 12 inches high and fits within a 19-inch rack. Several other new products at the Wilkinson booth included 80 kW and 110 kW TV transmitter loads.

In offering a five-year warranty on its

new BFM-8000 FM exciter (which can be operated as a 10 W transmitter), McMartin stressed the use of components that have a long MTBF rating (nearly three times that of typical competitive exciters is the claim). Reliability is also enhanced, says McMartin, through a reduced part count achieved by using proven digital and analog circuits and by having minimal operational controls.

Because a CMOS phase lock direct FM modulator is used, no crystal oven is required. The frequency-modulated oscillator is free-running. It is

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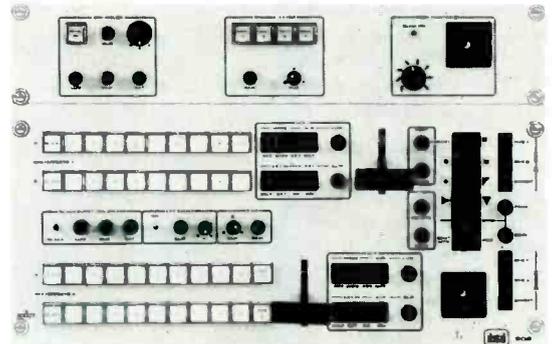
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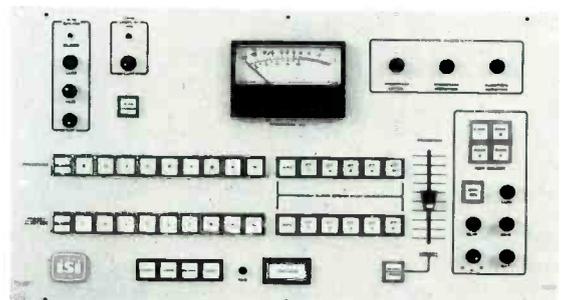
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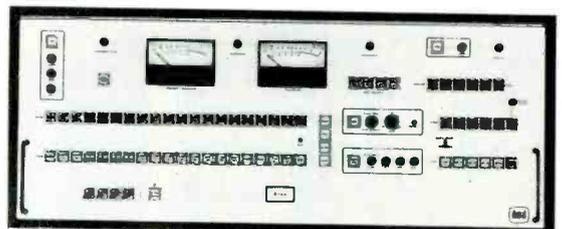
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modulated by both the main and all subchannel audio signals (stereo and/or SCA) and is buffered and amplified in the next stage. This on-carrier frequency is then digitally divided, first by 11 and then by 512, and compared in the phase/frequency comparator with a similarly divided signal from a highly stable temperature-compensated crystal oscillator. Any phase difference between the two signals indicates an off-frequency condition. A correction voltage is then derived, which serves as an AFC voltage to maintain the FMO at its precise frequency. Tuning of the BFE-8000 is accomplished in seconds utilizing the front-panel meter to give an indication of the phase lock condition.

To work with the exciter, McMartin offered four other products: an SCA generator, a stereo generator, a stereo audio processor (Maxi One), and a monaural audio processor. The last was a brand-new product; the others were introduced in prototype form in 1979.

Other FM transmitters

Among the rash of 25 kW FM transmitters shown last year by Collins, Harris, McMartin, and Sintronics was the ST-25 by CCA. This transmitter, having undergone factory and field tests, is now in full production. Energy efficiency is one of the hallmarks of the ST-25, which uses a single tube — the high-efficiency 8985 RCA tetrode. As reported last year, the IPA is an all-solid state unit containing two separate amplifier modules of 200 W each feeding into a power combiner. If one amplifier fails, this transmitter still delivers 80 percent of its rated power.

The exciter in the ST-25 FM is new. The FM-40F2, which combines as a full 40 W exciter, has two 20 W ports (a single 20 W exciter is available, too). The exciter uses an on-frequency modulator oscillator in a phase-locked loop AFC system. The oscillator is synthesized to any frequency and is referenced to a 5 MHz crystal source. An advanced solid state logic control system replaces many electromechanical devices.

There were several new low-power FM transmitters shown. Cetec, for example, had a new FM transmitter, the model 80-250FM. Taking up very little space (40 inches high by 23 inches wide by 31 inches deep) and weighing only 300 pounds, the unit actually has two RF power amplifiers of 150 W each. The amplifiers can be combined for a nominal output of 250 W. The Cetec 690PLL phase-locked loop exciter is the heart of the 80-250FM.

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with a separate regulated power supply with current foldback for maximum reliability; each amplifier can be operated directly into the antenna if required. VSWR protection, a tally light system with memory, and automatic recycling on a momentary fault are also standard.

Also showing a small FM transmitter was Harris. The FM-100K comes in two configurations. The standard system incorporates a solid state 100 W broadband amplifier and the high-performance FM 15 exciter. The customer can, however, use any other exciter that produces 10 W. The transmitter has a fail-safe capability: if an RF transistor fails, the station can remain on the air at a reduced power of 55 W simply by having the operator patch around the defective stage.

A new concept in stereo modulation for FM broadcasting equipment was shown by Bayly Engineering Ltd. Its new 2602A modulator is based on the pilot tone AM/FM system. The modulator circuit employs a direct switching system to combine the left and right signals. The 19 kHz suppression of the audio input is more than 40 dB; harmonic distortion is less than 0.5 percent (50 Hz to 15 kHz). Signal-to-noise is more than 65 dB and stereo separation is more than 40 dB.

New at Versa Count was an all-solid state high-performance power ampli-

fier. Connected to a 10 W FM exciter it could become a transmitter. Cost of the amplifier was \$2850. By putting two LA-150s in parallel, a 250 W transmitter results.

Other exhibitors included LPB, which showed a range of low-powered AM transmitters, and CSI and Continental, both exhibiting broad lines at various power levels. Although we have highlighted only new transmitters in this report, Harris, McMartin, Rockwell-Collins, and Sintronics all showed a large variety of transmitters.

For more information: RCA BTA-5SS, 500; Collins Power Rock One, 501; Sintronics SI-AIT, 502; Broadcast Electronics FM-30, 503; 3500 W single-tube FM transmitter, 504; Wilkinson FM 25/30 kW, 505; FM100G, 506; 80 kW load, 507; 110 kW load, 508; McMartin BFM-8000 exciter, 509; monaural audio processor, 510; CCA FM-40F2 exciter, 511; Cetec 80-240FM, 512; Harris FM-100K, 513; Bayly 2602A modulator, 514; Versa Count power amp, 515.

New TV transmitters

There was plenty of emphasis on TV

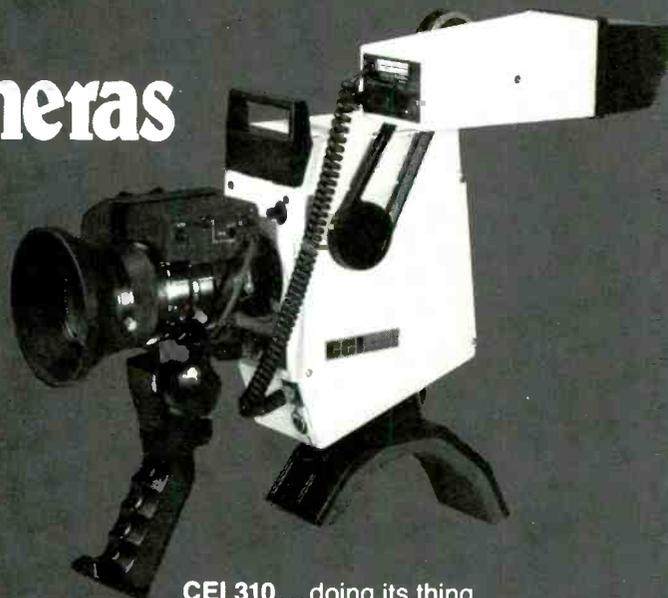
transmitters coming from a dozen companies, including Acrodyne, Bayly, CCA, Canadian GE, Comark, Harris, NEC, Marconi, Philips, RCA, Thomson-CSF, and Townsend.

A brand-new exhibitor was Canadian GE. The non-compete clause GE signed when it sold its television production line to Harris many years ago has expired, paving the way for its reentry. Since the company has always sold to the Canadian market, however, it has really never left the field. At NAB it emphasized four VHF models—a 5 kW high-band unit, a 6 kW low-band unit, and two 16 kW units, both high and low-band.

Canadian GE claims superior performance, reliability, and operating economy for its models. All transmitters in the F series are completely solid state except for two tubes—one in the final visual and the other in the final aural power amplifier. The visual and aural IPAs are broadband with a flat frequency response over their operating range and require no tuning. The transmitter is modular in format and many modules are standard, offering commonality despite different power ratings. Control is by an advanced solid state control logic system. All units can be paralleled for double power ratings.

A new 3-12½ kW VHF color TV transmitter line was shown by CCA. It

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promoted, as did Canadian GE, "maximum reliability, minimum operating costs, and the finest picture and sound quality." CCA offered a solid state exciter and a solid state aural intermediate power amplifier using strip line techniques. A tube (a long life linear tetrode) is required in the visual IPA.

The solid state exciter comes from LGT of France. The control system is completely solid state, employing high level CMOS logic as protection against RF interference. The control system has many features to keep the transmitter on the air; the unit is designed for remote control and unattended operation.

Harris, which had introduced a new highband transmitter earlier in the year, the single-ended TV-50H featuring a new ultralinear drive, filled out the line with other models. Added to the 50 kW model were the TVH-35H (35 kW), the TVH-25H (25 kW), the TV-18H (18 kW), and the TV-10H (10 kW). All use a new driver built around the extremely linear 8988 visual driver tube. Only 15 seconds of warmup time is required. The IPA needs no tuning.

A new feature in the TVH series is a single-PC board logic controller, replacing the six-board controller of the older H2 line. Directional couplers monitor aural and visual power and

generate sample inputs into the AGC loop to provide automatic transmitter power control. Harris said the 50, 25, and 18 kW units could be paralleled for higher output.

RCA, which last year unveiled its new TTG line featuring a single tube in the final, came out with a single-tube 50 kW highband version, the TTG-50H. The visual power amplifier uses the type 8984 tube. It is driven by a 1600 W solid state broadband RF amplifier introduced last year. The new unit can be put into a parallel configuration for delivering extra power into tall towers that reach 1500 feet or more in height. Paralleled units are ideal for circularly polarized antenna applications.

Showing solid state modules for transmitters and translators in the VHF band were LGT in the Thomson-CSF booth and Bayly Engineering, which exhibited AEG-Telefunken products. LGT has a solid state unit rated up to 1 kW. Bayly has a 500 W transmitter model. Ten kW modules from Bayly included an air-cooled tetrode.

A brand new 1 kW solid state transmitter in the VHF band was introduced at the show by Townsend Associates, the first of the new line of VHF transmitters, the company said. The exciter is essentially a VHF version of the TN-22U IF modulated exciter used in the UHF transmitter. The RF power

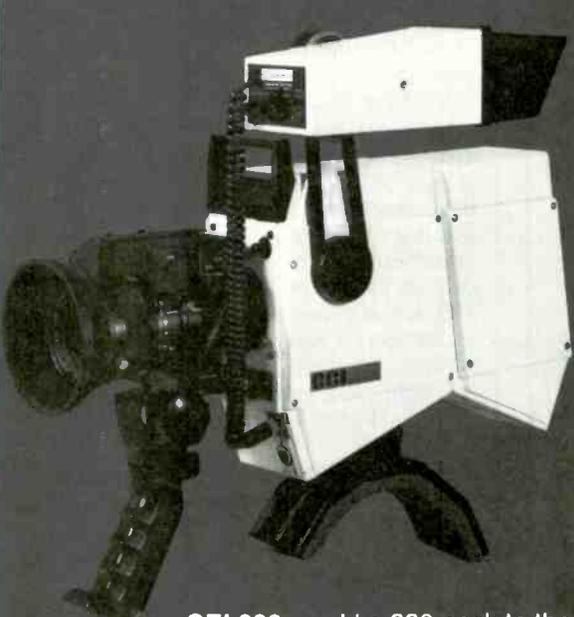


Canadian GE made the first U.S. showing of its transmitter line

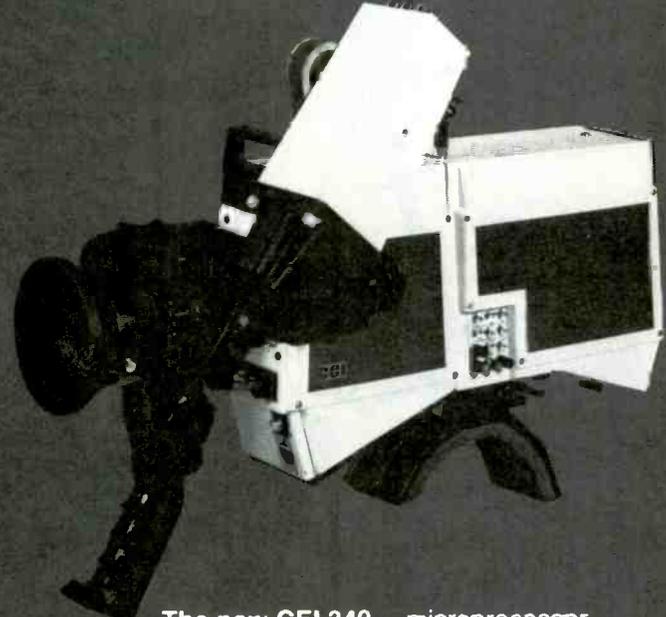
stage is made for Townsend by Microwave Power Associates.

Showing a single-tube TV transmitter rated at 20 kW and occupying only two cabinets was Thomson-CSF. Both video and sound are multiplexed in the final RF amplifier, which uses a TH571 coaxial cavity-mounted tetrode. (Although combined sound and vision amplification are not yet approved by the FCC for VHF television use at higher power ratings, it is expected that this restriction may be removed.)

The signal is processed by two amplifiers grouped in phased quadrature to provide a 400 W output. The combined video and aural signals are fed through a rejection filter and into the transmitter. The automatic control system can put the transmitter on the air in about one minute.



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For more information: Canadian GE F Series, 516; CCA VHF transmitter, 517; Harris TVH-35H, 518; TVH-25H, 519; TVH-18H, 520; RCA TTG-50H, 521; Townsend Assoc. 1 kW solid state transmitter, 522.

UHF transmitters

There was a great deal of activity on the UHF front. Acrodyne introduced a 5 kW UHF transmitter, the TT3480U, which used a single tube. Following European practice both video and sound are diplexed at low levels in a single UHF tetrode. FCC approval will come shortly, Acrodyne said. A pair of these transmitters delivers 10 kW of UHF power. Tetrode tubes in the output stages cut energy consumption about 45 percent compared to klystrons. The signal quality is improved because the tetrode is linear.

Because of the single-tube design, the TT3480U has a low initial cost. Acrodyne says it is the most cost-efficient UHF transmitter offered today. The transmitter is also available in 1 and 2½ kW output.

Stressing efficiency and high power levels was Comark Communications, Inc., whose exhibit at the 1980 NAB show bore witness that it is an important UHF transmitter force. Through a technique called Maximum Video Prediction, Comark said it was able to get optimum power generation efficiency out of klystrons. It claimed the lowest operating-cost UHF transmitter at the show. Its line of CTT-U transmitters were rated at 10, 30, and 55 kW. Features were all-solid state IF modulator exciters and the need for very little floor space. The CTT-U-55 UHF transmitter is supplied with two identical transmitter cabinets, which are capable of producing 5 kW peak power in a standalone situation. Since each cabinet has its own service breaker, a 170 KVA power supply, and a heat exchanger, a redundant system is possible assuring almost absolute trouble-free operation. High-efficiency English Electric Valve klystrons are used by Comark.

NEC exhibited a new exciter for UHF transmitters a bit ahead of its time for the U.S. — a TV stereo exciter. Stereo is significant for the Japanese market, which is now heavily into stereo TV and bilingual broadcasting. So far stereo TV is not permitted in the U.S. Nonetheless, Channel 57 in Philadelphia is buying one for use in its new dual NEC PCU-700H 30 kW transmitter.

The PCU-700H, introduced last year, is now in production. The 700 series uses printed circuits instead of

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plug-in modules for IF modulation, IF correction, UHF mixing, load oscillators, IPAs, and dc regulation. High efficiency compactness and low power consumption as well as reliability are hallmarks of the PCU-700H, according to NEC.

Reduced power consumption was a theme at Townsend, which introduced a new device, the Power Controller. The unit controls the modulating anode bias of any klystron amplifier. Through a front-panel control, the beam power to RF power output can be adjusted optimally for maximum efficiency. Townsend says the Power Controller can be added to any klystron transmitter in both aural and visual stages.

The importance of solid state designs was shown by EMCEE. Its third-generation line featured solid state design which was so economical in its use of energy that solar power becomes practical. Showing a new concept in FM translators was the XLFM series introduced by Television Technology Corp.

For more information: Acrodyne TT3480U, 523; NEC stereo exciter, 524; Townsend Power Controller, 525; Television Technology XLFM, 526.

Tubes, too

Tubes for transmitters were shown by Eimac (of Varian), English Electric Valve, RCA, and Thomson-CSF, plus Ceco as a distributor. The principal new item from Eimac was a new cavity amplifier, the CV-2250. It produces 10 kW peak sync output in transmitter service. Output is Channels 7 to 13 in the U.S. and E1 and E2 in Europe. The unit works with an X2186C high-gain tetrode.

Thomson-CSF displayed its "new generation" TH 382 10 kW UHF tetrode, which is much smaller than the older TH 290. EEV highlighted the K-3277 H high efficiency four-cavity klystron. Operating in the UHF band, the tube produces 58 kW.

For more information: Eimac CV-2250, 527; Thomson-CSF TH 382, 528; EEV K-3277/H, 529.

Fiber optics makes inroads

Fiber optics began to crop up in a number of booths at this year's NAB show. Fiber optic cable for cameras was an option on the latest ENG cameras by Bosch Fernseh and Ampex. Boston Insulated Wire showed how they make fiber optic cables for

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cameras at their booth.

The Grass Valley Group and ABC experimented with a fiber optics video distribution system at the Winter Olympics. Five optical channels carried a variety of video and multiplexed audio (using a GVG 3280 digital audio multiplexer) signals. GVG demonstrated its techniques at NAB.

Complete fiber optics video transmission systems were displayed by Telemet, which showed a capability in this field last year. The Model 4210 is an optical transmitter and receiver. The 4210-B2, new this year, incorporates an audio subcarrier for multiplexing audio. Frequency response is flat from 50 Hz to 50 kHz.

Valtec was a first-time exhibitor at the NAB 1980 show. Strong in the cable TV field, Valtec brought its VS-100 fiber optics system, which handles video, voice, and data over a single fiber. It transmits one wideband baseband video channel and up to two additional channels of voice or data subcarrier.

For more information: Telemet 4210, 530; Valtec VS-100, 531.

RF transmission lines

In the area of RF transmission lines,

product development has stabilized around proven technology and it was hard to spot anything really new. Products such as those exhibited by Andrews Corp. and Cablewave Systems were the same last year and the year before that.

There was something new in transmission line couplers. SWR, Inc., declared its new C-K line with a thermoconnector eliminates hot spots and minimizes breakdown. The thermoprobe, as part of the female connector in the SWR design, helps dissipate inner conductor heat through the connector itself.

SWR offered another new product, the "patchless panel," which permits switching from one transmitter to another in two seconds — without using an expensive motorized switch. The secret is the use of a patented connector using SWR's wristband spring.

In waveguide switches, Micro Communications offered some new five-and four-port switchers. With the variety of switchers now available, the company says coax patch panels are unnecessary and that all-waveguide components can be used in couplers, diplexers, and so forth. MCI also developed a water load (which it showed in model form) that could be used at power levels up to 220 kW. Two models were available — a calorimetric



TFT's microprocessor remote control system continues to expand its capacity

power meter and a load resistor.

In the area of measurements, Bird introduced the RF Power Analyst. Through the use of a microprocessor, one gets direct readings just by pushing a button — no need to consult charts or calculate decimal points.

For more information: SWR C-K line, 532; patchless panel, 533; MCI waveguide switchers, 534; water load, 535; Bird Power Analyst, 536.

Remote control and ATS

Capitalizing on the Motorola 6802 processor was Hallikainen & Friends. The firm showed, in development form, a PCC series process control computer for broadcasting. Essentially, through high-level language, PCC offers the user the ability to expand from a

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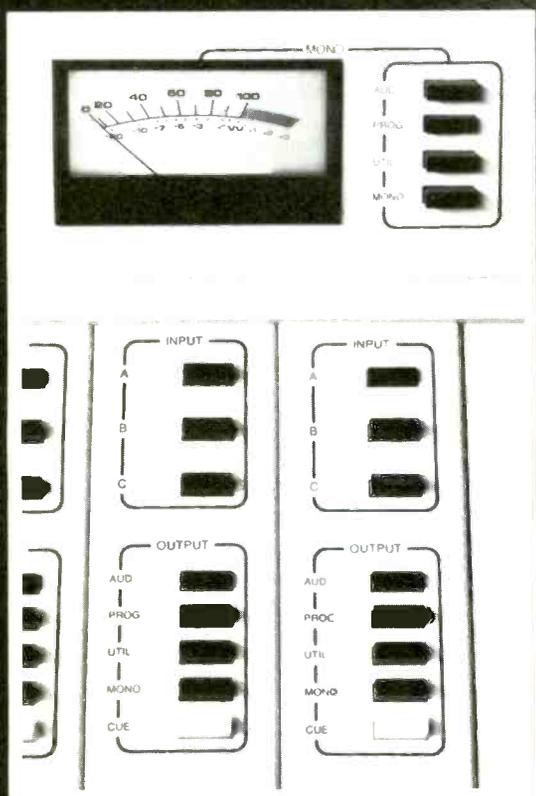
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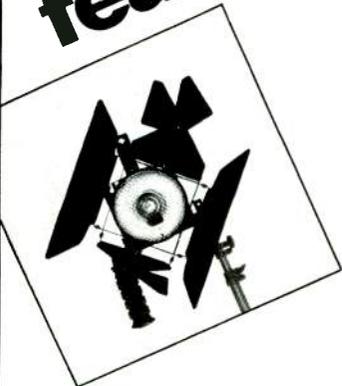
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simple transmitting logging and tolerance alarm system to complete automatic transmitter control (ATS). The PCC can perform more functions than most dedicated ATS systems, such as calculating the current ratio deviation of a directional array.

Delta Electronics model RCS-1 remote control system is a new system exploiting the microprocessor. The RCS-1 is designed as a modular system and permits a selection of options for purchase now or later.

TFT's latest entry in remote control equipment using the microprocessor is the series 7900 Sucosan system. Offering intelligence at both the studio and transmitter, the 7900 is expandable to 64 remote sites, providing 95 channels of control and telemetry per site. Control can be effected at either the studio or transmitter end.

TFT also showed a new data acquisition system, the model 7840. It offers data acquisition and does logging and alarm identification on 20 to 100 channels. It is ideal for microwave link monitors, said TFT.

Moseley Associates featured a new Telecontrol system, TCS-2A. This is a control (command), status reporting, and telemetry system suited for controlling broadcast transmitters, satellite earth stations, and ENG systems. Eight command, eight status, and eight telemetry functions are offered.

Harris has added new capabilities to its 9100 Facilities Control family, which is used for remote control, transmitter control, logging, security protection, and the like. New CRT displays were added to the 9160 automatic control unit (which provides automatic transmitter control — ATS) and the 9120 studio unit. The CRT display provides English prompting, continuous status display, and a seven-day clock.

Another new system at NAB for transmitter control was the CAT system manufactured by Computer Automa-

tion for Tele-Systems. The system provides computer control of parameters for monitoring, control, and protection of unattended transmitters.

QE1, which has offered ATS systems for several years, showed a new version of its model 7775 unit. Additional alarm status points are incorporated in the new model.

A new dedicated digital remote control system was introduced by Marti, the RMC-15/30 digital remote control. The system was designed for simplicity of operation. It features 15 or 30 full function channels including two status and return channels.

For more information: Hallikainen & Friends PCC series, **537**; Delta Electronics RCS-1, **538**; TFT Series 7900, **539**; 7840, **540**; Moseley TCS-2A, **541**; Harris updates for 9100, **542**; displays for 9160, **543**; Tele-Systems CAT, **544**; QE1 7775, **545**; Marti RMC-15/30, **546**.

Antennas and towers

Circularly polarized antennas for FM and TV produced most of the news in the antenna category, except for satellite antennas. There were few actually new antennas unveiled, however. Harris, for example, offered no new designs.

RCA did show a new tetracoil type for channels 7 to 13 which had a gain of five. Vertical beam pattern tilt and null fill provide a uniform signal especially desirable for antennas located in metropolitan areas. The TCL-12A is an ideal replacement for older 12-bay superturstile types.

Getting into the CP field for the first time was Nurad. It displayed a single bay of a Channel 7 unit that it called CPX. Nurad says it has considerable circular polarization experience, having worked both with military and broadcast CP in the microwave portion of the spectrum.

Cetec ran a continuous film loop describing how a CP station in Waco,



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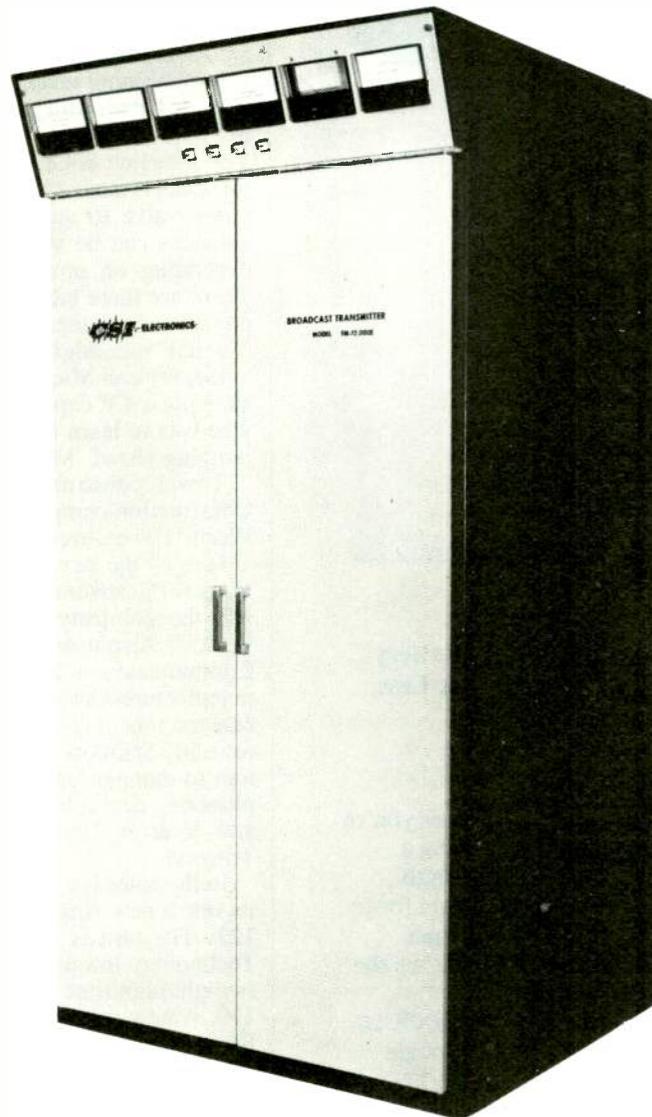
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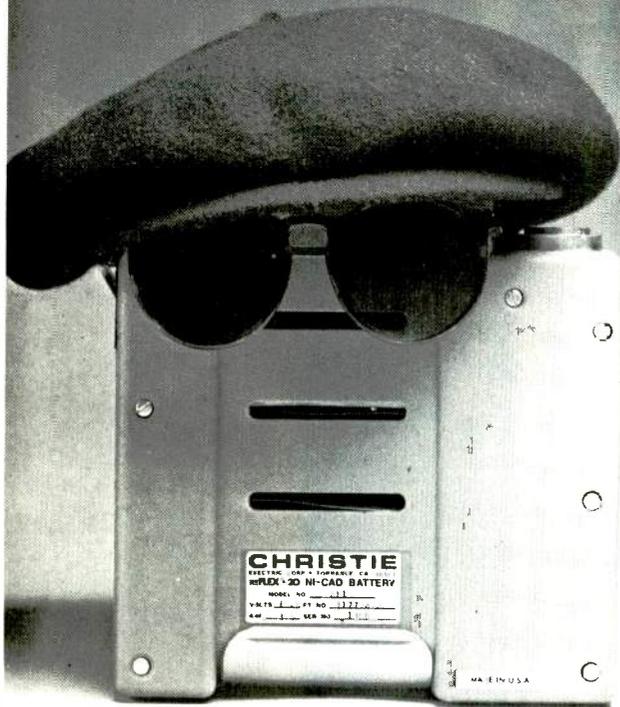
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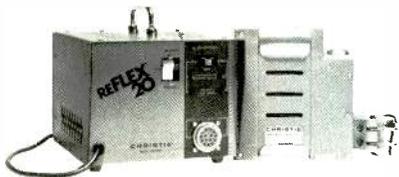
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Texas (Channel 10) was received better than four horizontally polarized stations in the area. Cetec was promoting Ring Panel antennas for directionality and spiral types for omnidirectional radiation.

A new circularly polarized antenna for FM was also introduced by Cetec: the Jampro JBCP. It is insensitive to ice — with up to one-half inch of ice, the typical VSWR is 1.4 to 1 or better.

Thus, deicers are not normally required. The JBCP is a high-power type handling up to 40 kW per bay or 120 kW per system. The elements are fabricated from high-strength thick wall copper with a 3/8 inch outside diameter. The antenna is broadband and internally fed.

A new antenna exhibitor was Tennaplex Systems, Ltd. This Ottawa-based firm specializes in installing Kathrein antennas made in West Germany. Tennaplex's expertise is in combining several antennas on one tower, or in using a single antenna for several frequencies (a European practice).

A new line of CP FM antennas was shown by McMartin. Each is made of welded tubular brass and has a special purge valve to quickly remove feedline moisture. The antennas can be stacked in multiple-bay configurations depending on power and signal pattern requirements. There are three basic antenna models — the MLCP low power series, the MHCP high power series, and the MSHCP superhigh power series.

Bogner and Micro Communications, Inc., were others showing a CP capability but nothing new. Bogner's advice was to learn more from present installations before jumping ahead. MCI has built both FM and TV types.

Tower construction companies abounded at NAB. Construction companies also into satellites, such as Fort Worth Tower, were booming.

One of the newer companies in the field was World Tower. Its personnel have a lot of experience, however, and the company now says it's ready to “cover the world.” Also new at NAB 1980 was LeBlanc and Royle Communications Towers, Ltd., out of Ontario. This firm manufactures the Xit Rod grounding system. Other tower constructors at NAB were Allied, Magnum (self-support towers), Stainless (which showed an anti-galloping system to dampen guy wire vibration), Unarco-Rohn (emphasizing new solid rod legs for less bulk), Utility Tower, and V & B Tower Construction Co. (featuring Atlas Towers).

In the category of lighting for towers EG&G added to its line a new single enclosure obstruction light, the SS-123. The unit is fabricated from stainless steel. Flash Technology introduced a new high-intensity dc-operated twilight/nighttime aviation obstruction beacon, the FTB-119. A new solid state beacon flasher was introduced by Elcom Specialty Products.

Lightning Elimination Associates offered a Guy Charge Dissipation Choke for protection against static charges. This system protects against the phenomenon known as “guy snapping,” or arcing across guy insulators.

The other new LEA product was a transient eliminator for coaxial systems. The TE (HFP) series units are inserted in series with a coaxial (or open) line to intercept lightning-related power surges or induced transients.

For more information: RCA TCL-12A, 547; Nurad CPX, 548; Cetec Jampro JBCP, 549; Tennaplex Systems Kathrein antennas, 550; McMartin MLCP, 551; MHCP, 552; MSHCP, 553; World Tower, 554; LeBlanc & Royle, 555; EG&G SS-123, 556; Flash Technology FTB-119, 557; Elcom beacon flasher, 558; LEA guy charge dissipation choke, 559; TE (HFP) series, 560.

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Professional Television Systems

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Finally you can get your hands on a cart system with reel-to-reel performance.

A cart system that eliminates phase shift error once and for all. That sets new standards for low wow-and-flutter. That provides signal-to-noise, distortion and frequency response that are better than anything else

in the industry.

Finally, the PhaseMaster.

PhaseMaster: the cart machine, redefined.

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PhaseMaster, not just a whole new concept.

generation (15 ips, 7½ ips, 3¾ ips motor speeds field-selectable). The machined head stack is rock-stable, and we've included internal illumination for your periodic head inspections and cleaning. There are no micro-switches to break or jam — and never any start-up wow — because the motor is started by an optical sensor as you begin to insert the cart. And the cart hold-down presses on the edges for greater stability and exacting alignment, pressing with roller contact for velvet smooth insertion and withdrawal.

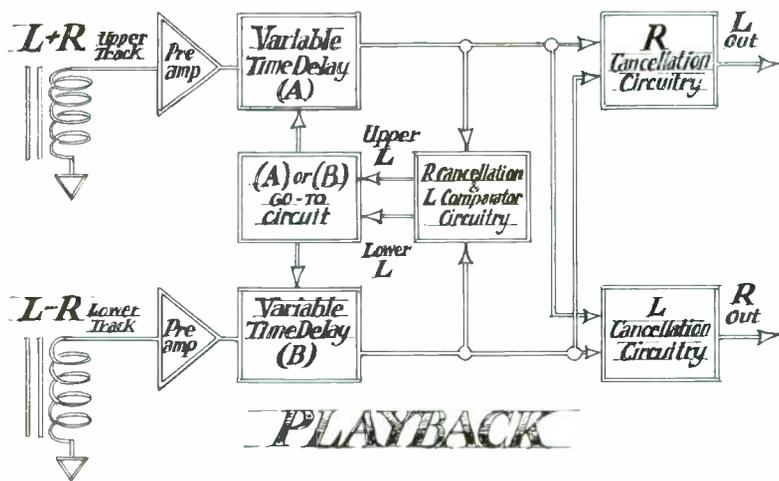
lower track. On playback, the left channel signals from both tracks are compared, and any phase shift difference is corrected automatically by a continuously tracking electronic time delay.

Simple.

And it works — no more holes in your sound, and no more side-to-side spectrum shift.

The ultimate cart system, mono and stereo

The Ramko PhaseMaster System, in mono and stereo, is available as a playback



And no more stereo phase shift error

Phase shift doesn't much matter in mono, so when you're recording stereo, the PhaseMaster encodes a mono L + R signal on the upper track, L - R on the

unit or a record/playback deck.

It also comes as a complete reproduction center which duplicates — as well as plays and records — your mono and stereo carts and cassettes. This consists of four modules: an elec-



tronic control center; two A and B cart decks; and a cassette deck.

To record, you switch-select any of three inputs to record on any or all of the decks. When you play back, the control center determines whether your tape is mono or stereo, coded or uncoded, and automatically reproduces the correct outputs.

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Call collect for the full-featured brochure

Get the brochure. It covers the PhaseMaster System's convenience and ease of operation; the left, right and phase meters; the 4-digit timer; the three cue tones; the integral testing facilities; and everything that you were hoping would be in it.

Write Ramko Research, 11355 Folsom Blvd., Rancho Cordova, CA 95670. Or if you can't wait for the mail, contact your nearest rep or call (916) 635-3600 collect and arrange for a 2 week free trial.

RAMKO



NEW FORMS AND ART WITH CHARACTER

Character generators lead to arts and letters; teletext to follow

VIDEO ART systems, which have been growing more numerous and more versatile over the years, are now beginning to gain acceptance as potentially useful adjuncts to normal station operations.

Ampex drew large crowds to its booth with the impressive performance of its first production version of AVA (Ampex Video Art), now on the market priced between \$150,000 and \$200,000.

AVA, which includes a powerful DEC PDP-11/34 minicomputer with 256K of RAM, a choice of disc drives, AVA video processor, power supplies, and so forth, presents the artist with nothing more than a stylus, art tablet, and a pair of monitors. In fact, the operator can be located up to 1000 feet away from the electronics package; he/she may never have to see it.

What the operator/artist does see is a choice of more than 200 colors, a range of "brushes" to choose from, a variety of traditional art techniques such as "cut and paste," different fonts for lettering, and the opportunity to correct any aspect of the creation, modifying only the element in need of correction — no starting from scratch.

Telestrator from Interand has enhanced its color graphics system. With 64 colors and a light pen-based drawing implement, the artist draws directly on

an associated monitor screen. The picture is drawn on a series of levels, like overlays. This permits background and foreground to be treated differently, for instance. A new Autoprobe feature now allows elements of artwork on the various levels to be moved independently of the elements on the other levels.

For-A Corp. of America showed its FVW-910 and CC-910 writing systems. The FVW-910 handles black and white, while the CC-910 works with color. The basic unit allows the selection of two thicknesses of straight lines, which can be drawn in eight different directions, as can a continuous roll. The addition of three pages of memory to the basic one-page memory permits the system to add the CC-910 functions, including seven colors.

For more information: Ampex AVA, 668.

Character generators get out the vote

Since 1980 is an election year, most manufacturers of character generators were stressing the number-crunching and on-air vote display capabilities of their systems.

At the Thomson-CSF booth, the big news was that the Vidivote election system now has full background colors to emphasize on-air displays. The background color is enterable and controllable row-by-row so that colored boxes can be created. Vidivote was also displayed with Viditext, which offers a far greater range of display capabilities.

Thomson was also stressing the Viditext off-line entry system, which allows the central Vidifont computer to be shared by distributed processing terminals. The basic idea is that at 4:00 p.m., when the production department is still using the character generator for commercials, the news department also needs it to enter sports scores, weather, indexes, and the like. The basic page format for the news presentation is set up in advance and recorded on a floppy disc. Up to nine interactive CRT terminals can then be used to enter data into the system off-line.

At the Chyron booth, meanwhile, Telesource was demonstrating its Elec-



System Concepts introduced Quantanews, a computer news system

tion Reporting System in conjunction with the Chyron IV. The system relies on large time-shared computers for number crunching, interfaced with the character generator through a black box buffer memory back at the station. Very little of the character generator's microprocessor is tied up by the system, which formats all the pages automatically.

Also drawing crowds at the Chyron booth was the first NAB introduction of the new RGU-1 Remote Graphics Unit. In two small suitcases (one for the electronics, the other for the keyboard) can be packed much of the versatility of the Chyron IV, including disc-loaded fonts common to both systems.

The Compositor I, which had been a featured item at the TeleMation booth in previous years, seemed almost lost in its new surroundings at the Fernseh exhibit. New developments in the system have obviously been put on hold temporarily, though it was shown with its light table graphics compose system in which artwork is simply traced over once, then captured.

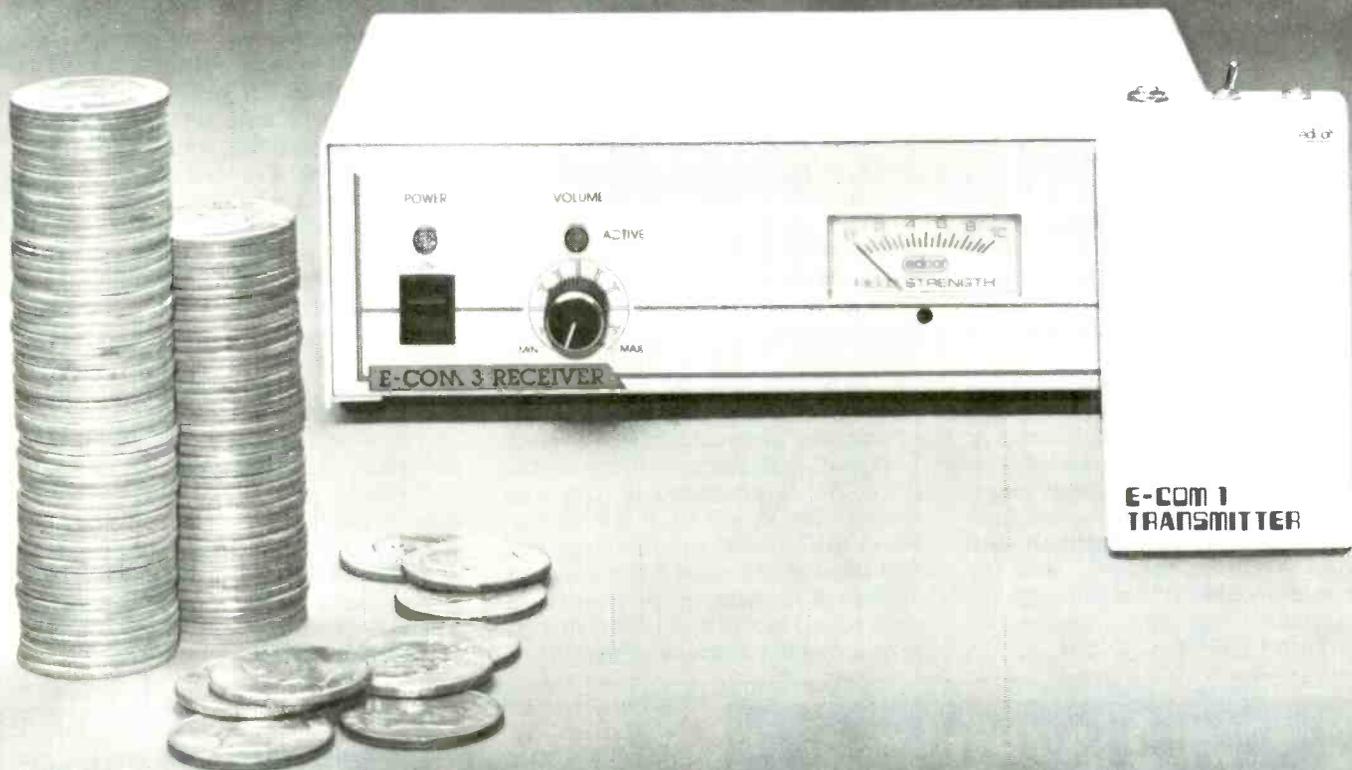
A potentially powerful new vote gathering system was demonstrated at the 3M booth — D-8800/VOTES, a joint marketing venture of 3M and Station Business Systems. The SBS portion of the system is based around an in-house minicomputer normally used for business automation. All the number crunching is performed by the computer, which can handle up to 999 races with up to 12 candidates per race (four displayed on a single page), then fed to the D-8800 character generator.

Data entry from remoted terminals is



Ampex's AVA system drew crowds — as well as stunning pictures

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NAB SHOW IN PRINT

simplified by common-language programming to lead the operator through the various steps. Once called up, a race can be displayed on-air in three seconds; more commonly, once races have been updated the information is dumped from the SBS computer into the D-8800 memory, from which recall for on-air display is instantaneous.

3M also demonstrated a new floppy disc storage system, the D-4500, designed to store up to 400 pages of text (up to 4000 lines in a subtitle mode). The D-4500, designed to be used with 3M's D-2000, D-2500, D-3000, and D-3016 character generators, is similar to the internal memory system on the top-of-the-line D-8800. The system permits animation by playing pages back at any of 10 speeds.

Another new character generator development shown by 3M for the first time is a keyboard-operated font compose program now supplied as standard software with the D-8800. Letters or logos are first drawn by an artist as outline shapes on a plain piece of paper. An acetate grid indicating vertical lines and horizontal pixel elements is then placed over the artwork, and the operator reads the artwork through the grid making the appropriate entries through the D-8800 keyboard.

Landy Associates, which was to have demonstrated the MPB Technologies Vista 80 character generator, instead displayed a sign informing visitors that the unit to have been displayed was recently sold. Another absentee was the Dynasciences Model 9048 with zoom fonts.

At the System Concepts booth, considerable attention was drawn by a demonstration of the Quantanews news computer. The computer output was tied to a Quantafont character generator enabling the stories to be formatted instantly for on-air talent to read. Software is also being developed that will enable the Quantanews/Quantafont system to be used for elections.

The Quantafont Q-7A itself is now fully developed, with the Nanolog character refinement circuitry offering the equivalent of 20 ns resolution. New this year is the QST subtitling system, a self-contained software and time code interface with the character generator.

New to the American market is a line of character generators from the For-A Company, headquartered in Japan. The VTW-200 is a low-end system, with composition in a 7 by 9 dot matrix. For-A's VTW-500 is a midrange system offering character composition of 12 lines of 32 characters per page (up to eight pages) in a 16 by 21 dot matrix. A review monitor displays 16 lines of 32

characters in a 7 by 9 dot matrix.

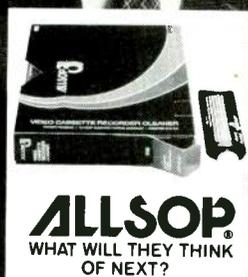
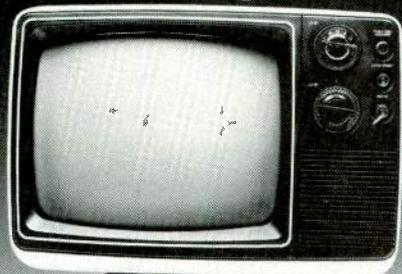
For-A also offers a soft edge generator with drop shadow and four degrees of hardness, in addition to eight colors. Another handy device is a cuesheet display that displays standard markings for auto transitions in a graphic display memorized with information for up to 64 pages.

Most of the newer systems coming onto the market are software-based rather than hardwired. An example of this kind of system is Knox's K128B. The basic character generator offers a single font with four pages of internal memory, instant page italicization, instant doubling of character size with standard and 2x characters mixed on a line, three-position title window, connection with an audio cassette external memory system, and non-additive mixing to allow the characters to be used as either a video source or downstream key.

A brand new option from Knox this year, shown in prototype with 120-day delivery promised, was a character generator eight-level colorizer. The Color Box contains two separate colorizers, one for the characters (letter by letter, line by line, or page by page), and one for the background (also line by line to create boxes, or page by page). The system will genlock to any source and includes a 360-degree phase ad-

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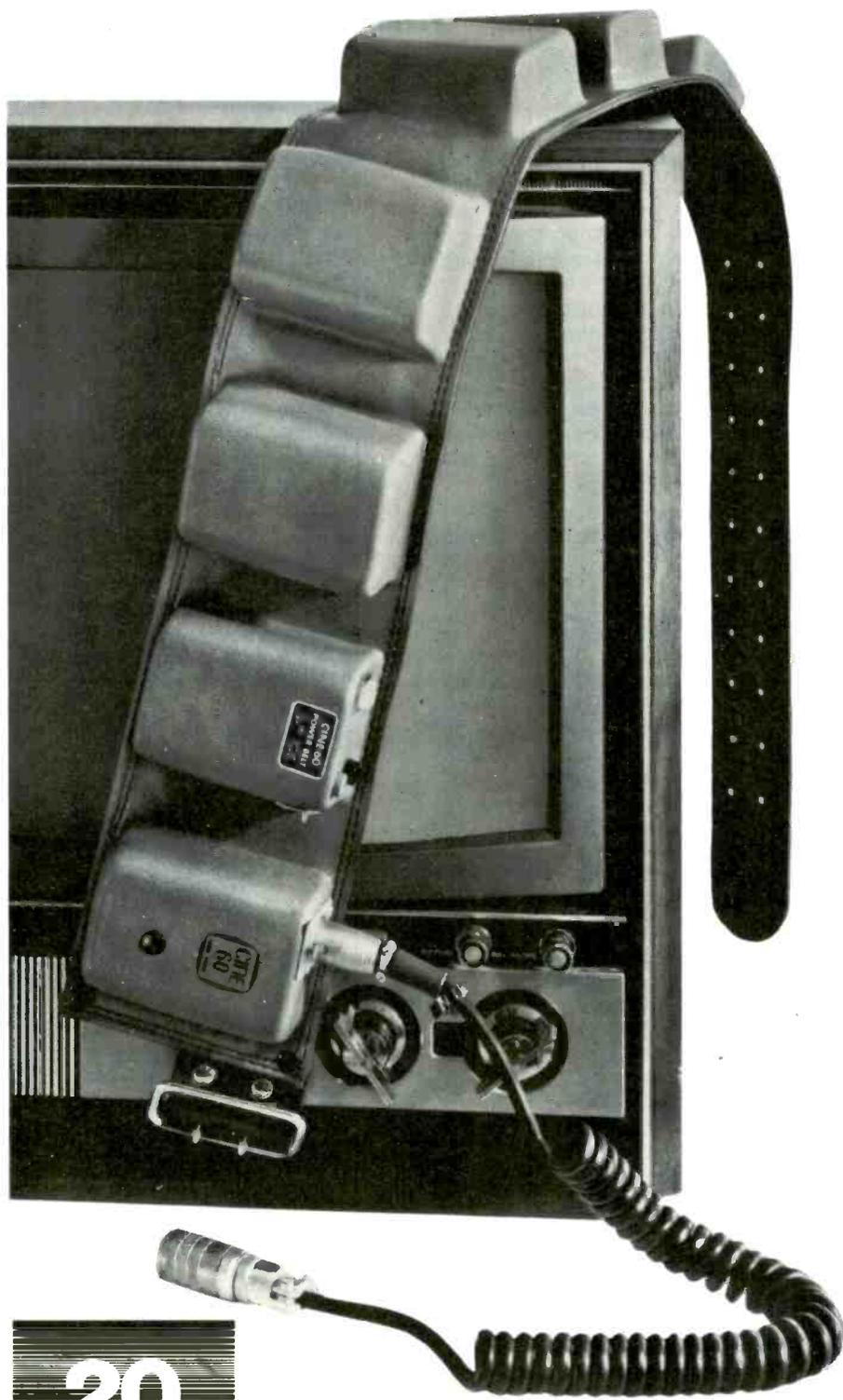


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NAB SHOW IN PRINT



Teletrator offered animation potential this year

justment.

A similar, software-oriented approach is taken in the Laird Telemedia Model 3600A. The basic character generator includes a 10 line by 25 character (9 by 14 dot matrix) page format, four-page internal memory, preview and program outputs, on/off edging, black or white characters, adjustable width font, underline, crawl and roll, flash, and more. Optional features include increased internal memory, new internal colorizer, audio cassette storage of page information, two independent program outputs, auto centering option with additional 1K of memory, internal color sync generator,

time, date, and temperature generators.

A similar approach is taken by Video Data Systems, though here different software packages are offered as different model numbers. At the top of the line is the T-1000 titling system, offering a 16-page memory with full off-line editing capabilities (cursor-controlled).

Video Data Systems also demonstrated its MicroSystem 1, a micro-processor-based system for automatically displaying information for a single or multiple channels. Time, date, various weather parameters, AP, Reuters and other news wire services are some of the types of data automatically formatted.

Featured by Beston Electronics (B.E.I.) this year were the Video Slate Board and Marquis, both of which allow the insertion of titling information. The former is intended as a slate, and includes a 10-second video and audio countdown; the latter is intended for on-air titling. Also from B.E.I. is a new character generator interfaced with the Heathkit Weather Center.

B.E.I. also demonstrated a new use for its Data Prompter, shown interfaced with Station Business Systems' NewsCom newsroom computer. The output of the NewsCom computer, once story orders have been assigned, can then be fed directly to the Data Prompter and presented for on-air talent to read.

For more information: Thomson-CSF Vidivote, **669**; Viditext, **670**; Chyron RGU-1, **671**; 3M D-8800/VOTES, **672**; D-4500, **673**; font compose for D-8800, **674**; System Concepts Quantafont Q-7A, **675**; For-A VTW-200, **676**; VTW-500, **677**; Knox Color Box, **678**; BEI weather system, **679**.

Teletext

Considerable interest was generated by the Antiope teletext booth, with broadcasters in the U.S. finally beginning to awaken to the possibilities of transmitting text and graphic data in digital form alongside the video. It is still a somewhat distant dream for most, however, since adoption of a U.S. standard encoding and decoding matrix and FCC approval of commercial over-the-air broadcast may be some time off.

The first thing that caught the viewer's eye at the Antiope booth was a monitor displaying teletext messages broadcast from local CBS affiliate KLAS.

Closer to widespread adoption is the Antiope closed captioning system for the hard of hearing, developed in conjunction with CBS-TV engineering and used on *60 Minutes*.

Shown for the first time this year was a SMPTE caption synchronizer, designed to provide captions instantly

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Pagbelts come loaded with innovative safety and performance features including our exclusive safety-lock. Unlike some other belts, you can't hurt yourself or your equipment by accidentally using your belt while charging. And Pagbelt's Nicad cells are specifically designed for video's heavy power-drain, so you're not powerless in any situation. Our advanced electronic charge systems prevent other kinds of problems too—by assuring a precise 100% charge everytime—automatically sensing temperature, pressure and voltage. Also available, the exceptional lightweight multi-feature Paglight complete with versatile accessories and rugged aluminum carry case.

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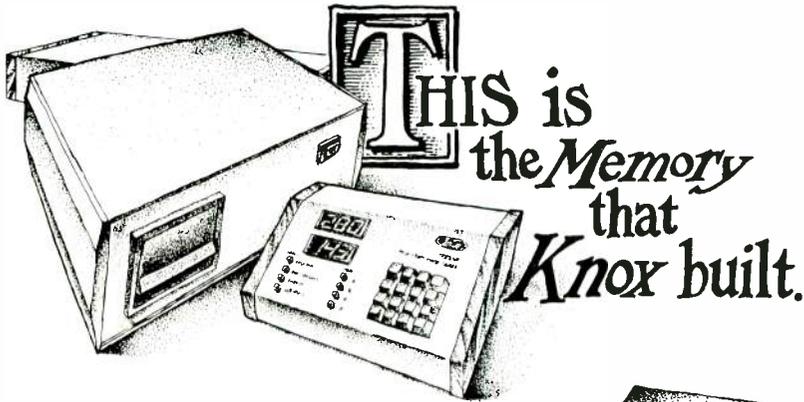
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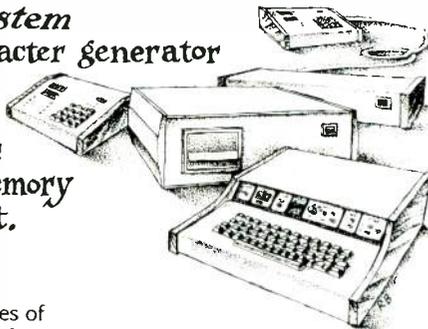
THESE are the *Pages* that store on the disc that plays in the memory that *Knox* built.

THIS is the *Program* that cues the pages that store on the disc that plays in the memory that *Knox* built.



THIS is the *Character Generator* that typed the program that cues the pages that store on the disc that plays in the memory that *Knox* built.

THIS is the *System* that goes with the character generator that typed the program that cues the pages that store on the disc that plays in the memory that *Knox* built.



Create and store up to 400 pages of character generator type on a single five-inch floppy disc.

Using the same keyboard, program the playback and store it — the program — on the same disc with your typed copy.

Call or write today for a demo to see what the Knox memory system can do for your screen.



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Knox character generators again displayed the power of microprocessor technology

based on time code cues from the original program material.

Another new teletext-related product from AVS, Inc. (the U.S. marketing arm of Antiope Videotex Services) is an electrostatic printer that can be connected with any Antiope decoder.

Also new from Antiope/AVS is a memory system for decoded teletext pages. Rather than having to wait for the next transmission of a desired page, the user can program the unit to capture and store up to 64 pages from the teletext cycle, updated automatically each time the page is transmitted.

Probably the most exciting development of all is the evolution of a Dynamically Redefinable Character Set (DRCS) system using a downloaded alphabet. For special characters or graphics not normally in the software program the transmission center first puts out a set of special data to a small section of RAM in the decoder, followed by standard Antiope characters.

Electrohome, a manufacturer of monitors, distributed literature on the Canadian Telidon teletext system in which it has played a significant role.

EEG Enterprises, an American company, has become heavily involved with the closed captioning system for dual-language and hearing-impaired viewers. Following the PBS "standard," the data transmission takes place during field one of line 21 of the vertical interval, with a framing code transmitted during field two.

Colorado Video also demonstrated a system for alternate transmission, though not exactly teletext. The slow-scan TV works in the FM SCA band and has almost all its applications in the educational and institutional environment. Colorado Video supplies both the encoding and decoding equipment.

For more information: Antiope, teletext, **680**; closed captioning, **681**; SMPTE caption synchronizer, **682**; AVS Electrostatic printer, **683**; memory system, **684**; DRCS system, **685**; EEG Enterprises Model EN210, **686**; Colorado Video system, **687**.

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The Eumig FL-1000, an extraordinary new cassette tape deck, has started a revolution in the world of broadcasting. We believe—and radio engineers agree—that it will soon make the cassette the standard tape format in the broadcast industry.

The FL-1000 is the world's first computer-inter-faceable cassette recorder. Up to sixteen FL-1000 decks can be controlled by any 8-bit computer. Some of the decks can be used for commercials; others for news and weather; still others for music and station ID's. And the location of every item on every cassette can be stored at the beginning of each tape and then in the computer, so *any* sequence can then be played back—automatically, with no human intervention, all day and all night long.

Watching a bank of FL-1000's working together

is an awesome experience. One deck is rewinding while another is playing, and still another is moving in fast-forward to locate the next selection. Meanwhile, other decks are copying from a network feed and recording an air check.

The technology of the FL-1000 is so advanced that half a dozen units can do the work of more than 100 individual cartridge players—plus several reel-to-reel recorders. And they do it better, at far less cost, with sound quality comparable to that of the finest open-reel equipment. And the Eumig FL-1000's have none of the mechanical problems that plague endless-loop broadcast cartridges.

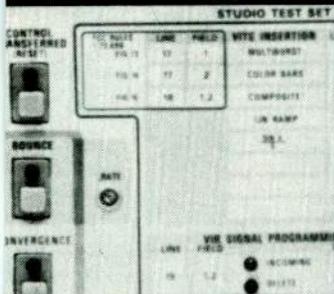
To see the end of the endless loop, call Eumig about the new FL-1000. Once you see and hear this amazing new recorder in action you'll agree that this is the long-awaited deck that will make cassettes the standard medium in the broadcast industry.

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TEST AND MEASUREMENT TURNS TO COMPUTERS FOR ACCURACY AND SPEED



The technology used to examine broadcast equipment has worked hard to keep up with rapid change in design and performance

AS IT HAS in every other field of broadcasting, digital technology has started to make heavy inroads into test and measurement systems, especially in the test signal generation and signal analysis areas.

A prime example is the brand-new Tektronix 1900 Series digital test signal generator. A full set of test signals is supplemented by SMPTE color bars for monitor calibration and VITS insertion — all with 10-bit accuracy. Three versions of the 1900 — a transmitter test set, studio set, and NTC 7 test set — will be offered, all featuring PROM storage of test signal codes; in this way, additional signals may be added in the future by simply reprogramming the PROMS.

In addition to the standard test signals and the color bars, the 1900 offers two other signals now coming to be considered critical. The multipulse test signal, consisting of white flag, a 2T pulse, a 25T (1.25 MHz) modulated pulse, and four 12.5T (2, 3, 3.58, and 4.1 MHz) modulated pulses, is now considered by many a far better test of frequency response than the multiburst signal, though multiburst is also generated. The $\sin x/x$ signal, nearly impossible to generate with an analog test set, provides an almost completely flat signal to facilitate frequency response testing.

The Model SPF-2 is Rohde & Schwarz's brand new digital test signal generator and VITS/VIR test line inserter. Four PROMS store the information for 32 test signals, which can be varied to suit individual needs. A special feature of the unit is the generation of a signal for measuring VTR performance. The composite signal is inserted into the full-field range and repeated three times during the field blanking interval. This permits discrete measurement of the recording heads.

Asaca, too, introduced a new TV test signal generator, Model TG-7. The unit is modular, with plug-in panels to provide linearity, pattern of receiver, \sin^2 characteristics, and other measurement sets. The mainframe contains a standard sync generator, but the TG-7 is also genlock with an external source.

Asaca also showed its Model 226 dc-powered color bar generator with 1 kHz audio oscillator. The unit is designed especially for ENG/EPF field setup of cameras and recorders and also for testing the audio and video of ENG microwave links.

A number of new signal generators were also shown by Philips PTV Measuring. PM 5570 provides all the signals needed to check studios, transmission links, and transmitters. PM 5533 is a TV signal generator supplying the most commonly used test signals, including color bars with several different split fields, crosshatch (or dots) for convergence, flat field, and PLUGE signal with gray step signal.

Also from Philips is the PM 5534 color pattern generator, providing a widely recognized receiver test pattern. A color and sync pulse generator are built in as well as a text generator for insertion of station ID, etc. A clock is another option.

QSI has been experimenting with the insertion of a video source identification signal in the vertical interval; in this way the ID continues to travel with the image until it is stripped off just before airing. The VALID (Video Affiliated Line Identification) system will insert eight characters based on standard ASCII code; the encoder can be easily user-programmed either in the field or in the studio.

QSI also demonstrated its AVID-8000 video/audio source identifier, which combines a color sync generator, split field color bar generator, ASCII-encoded video source identification, and a 1000 Hz audio tone with a computer-synthesized voice ID. The identification is entered by means of small rocker switches that convert data into 64 alphanumeric characters for both visual and spoken identification.

QSI also showed a new color/time/date generator. Time is selectable in



Tektronix's Answer was featured along with its new digital signal generator

either 24- or 12-hour clock formats. The month is spelled out (i.e. "April" rather than "4"), and the unit is pre-programmed to reset itself at the end of the year with the knowledge that leap years have 366 days except the year 2000.

An extremely lightweight portable dc-powered test set was shown in the Achro Video booth. The Multidyne TS-1 provides a standard split field NTSC color bar produced by an I/Q encoder with internal sync generator. Adjustments can be made in carrier frequency, bar width, white and black balance, burst phase, chroma and burst gain, blanking, etc.

The Multidyne TS-3, a video and audio source identifier, was also shown by Achro. The unit supplies the same NTSC video test signal as the TS-1, an audio multiburst variable from sub-audio to 100 kHz, and a 16-character message (programmed on the unit's touchpad) keyed over the test signal or external video.

Several new test charts and slides were introduced by Porta-Pattern. The most important is probably the BBC Flestone Reference Test Card No. 61P, available from Porta-Pattern as an eight-by-10 print (\$145), eight-by-10 transparency (\$175), or two-by-two slide for telecines (\$55). Extremely careful manufacturing insures that the model's face, hair, eyes, and other features exactly replicate the original BBC image.

Also newly introduced by Porta-Pattern is a microscope slide with resolution, registration, and window test patterns all contained within the 3



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cm viewing area of a microscope. The slide has applications wherever a video camera is coupled to a microscope since the camera need no longer be taken off the stand for precision check-out.

For more information: Tektronix 1900 Series, **788**; Rohde & Schwarz SPF-2, **789**; Asaca TG-7, **790**; Philips PM 5570, **791**; PM 5533, **792**; PM 5534, **793**; PM 5537, **794**; Porta-Pattern BBC fleshtone reference card, **795**; Porta-Flector, **796**; microscope slide, **797**.

Video under analysis

Video analyzers were as numerous as signal generators. One system which showed great promise was introduced by Amtron — the DVA digital video analyzer. Accepting up to three feeds (either live or from a digital store), the unit colorizes each waveform a different color, then stacks them one on top of the other and displays them as three bands on a 19-inch color monitor. In this way signals from three cameras, for instance, can be instantly and graphically compared and aligned. Measurements over time of the same signal

source can be accomplished by displaying a live signal alongside a signal previously stored in the digital memory. The sampling rate of the system is four times subcarrier, with a resolution of seven bits (eight bits optional).

The Tektronix Answer automatic video measurement set was in full operation, featuring user-programmable automatic measurement of over 45 parts of the video signal. A terminal or keyboard is used to input inner and outer tolerance limits for each measurement, plus which measurements are to be made at which times and so forth. The measurements are run automatically and displayed on the terminal and/or hard copy printout for FCC logging of signal parameters. Special codes indicate signal parameters out of limits and an alarm sounds when the signal has passed the outer limit.

Marconi displayed its Insertion Signal Analyzer, an automatic VITS test unit providing objective measurement of 16 parameters of the video signal.

Marconi also showed its automatic Television Interval Timer in a new model conforming to the standards set out by the ABC Network in TQN2 and TQN3. Very similar to the RS-170A critical timing standards, the revised model incorporates a measurement of "pre-blanking" in the vertical interval

and measurement of sync to blanked picture start. This makes possible rigid measurement of SCH.

From Video Aids is a new SCH phase meter addition to the company's popular Model 4200 H phase, burst phase, VIRs phase, etc., combination meter. Two switchable scales (in ± 10 degree and ± 100 degree increments) permit the reading of either burst phase or SCH phase.

Featured at the Asaca booth was the Model 1130 color camera measuring set, introduced last year and reported to be enjoying healthy sales. Registration, video level, chromaticity, shading, and flare are all measured either automatically or manually with a hard copy and LED readout display. The microprocessor-controlled unit uses signal averaging and manually or automatically controlled cursor for gray scale, registration, and other readings.

Asaca also had its Model 825C video noise meter, which measures both luminance and chrominance noise on two separate meters. Video signal noise effective voltage value can be measured in addition to the S/N of video band noise and chroma band noise present in video signals with sync.

A video noise meter, the VPSF-2, was also shown at the Rohde & Schwarz booth. The microprocessor-based system measures both video and

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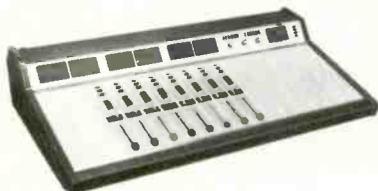
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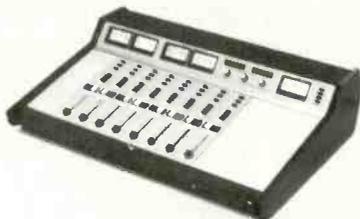
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chroma noise with peak-to-peak or RMS measurements. A full field can be measured with automatic sequencing of a four ms square sensor with signal averaging; alternatively, the sensor can be manually positioned anywhere within the field.

Another new video noise meter — VNM-428 — was unveiled by Lenco. It uses a tangential noise measurement technique that adds a variable, calibrated square wave to the signal being tested, resulting in two identical waveforms one on top of the other. The noise in the signal is then computed by the unit by measuring one against the other and displaying the results in a front panel LED readout of S/N in dB. A set of precision filters is built in.

A handy color monitor calibration unit was introduced by Philips. A small tracing unit is held over the monitor raster while a graphic LED bar chart shows the levels of red, green, and blue. Up to four different types of monitors can be read one after the other with the system since user-programmable PROMs compensate for the different "white" standards that have been established.

Another new measuring instrument was a portable data analyzer, a joint product of Sony (Japan) and Tektronix, marketed in the U.S. by Tektronix. The Model 308 combines four instruments in one (parallel timing, parallel state, serial state, and signature), thereby combining the capabilities of a state and timing logic analyzer, serial data analyzer, and signature analyzer.

Advances in modulators and demodulators were in evidence everywhere. From Philips was the PM 5580 IF modulator, shown in combination with the PM 5581 VHF and PM 5582 UHF converters. The sideband modulator and high second IF converters provide low power transmission over any television channel.

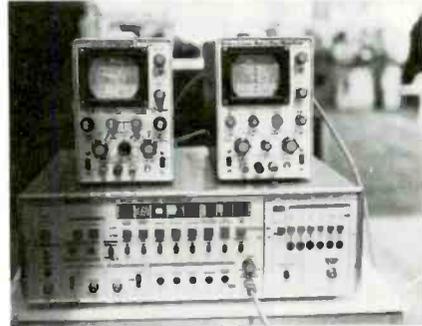
Telemet showed its new Model 3711-A1 RF synthesizer. The unit uses direct frequency synthesis to provide keyboard tuning for all UHF and VHF frequencies.

QSI announced a new broadcast TV demodulator, the Demod 40. Two LSI circuits provide both UHF and VHF band operation with equal selectivity and sensitivity. Manual and automatic controls for varying reception conditions, ceramic filtering for maximum video and audio response and rejection of adjacent channel interference, and front panel VU metering are standard features.

For the more mechanical side of testing and measuring, two companies now offer spindle height alignment gauges for 3/4-inch VCRs to insure proper head-to-tape alignment and prevent



Amtron's display for signal comparison



Ultra Audio Pixtec introduced new scopes

edge damage. New from Tentel is the T.U.S.H. (Tentel U-Matic Spindle Height) gauge. The precision-cast aluminum block with two spindle height indicators is inserted into the VCR as if it were a cassette. Spindle heights are read off in 0.001-inch increments. By rotating the spindles, spindle height wobble can also be measured.

Also new from Tentel is a timer for U-Matic and Beta-format VCRs. Measuring current flow from the head, it is used to keep track of the number of hours the machine has been run in order to schedule routine, preventive maintenance. The timer reads to 9999 hours, then returns to zero.

Memorex's spindle height alignment gauge for U-Matic VCRs, introduced last year, is said to be selling well.

Pace, a company new to the broadcast field though its products have been used for some time in the construction of PC boards and ICs, showed its tools for precision soldering, unsoldering, and repair. In addition to benchtop repair sets, the featured item was a compressed air desoldering system.

A wide range of tools for broadcasters was shown by Jensen, another new-

For more information: Amtron DVA, 798; Marconi Television Interval Timer, 799; Video Aids SCH meter, 800; Asaca digital video memory, 801; Lenco VNM-428, 802; Philips monitor calibrator, 803; Sony/Tektronix 308, 804; Telemet 3711-A1, 805; QSI Demod 40, 806; Tentel T.U.S.H. gauge, 807; VCR timer, 808; Pace tools, 809.

comer to the NAB. Also available from the company are a number of multiple-function oscilloscopes.

Scoping it out

An unusually large number of new waveform monitors and vectorscopes were introduced at this year's show, ranging from extremely high-quality, high-ticket systems to some that any operation can afford.

From Philips is the brand new PM 5565 waveform monitor. Features include probe inputs that work with standard oscilloscope probes, six calibrated time base positions, internal graticule, extremely fast retrace, external synchronization with composite video signals or with sound-in-syncs, and with both sync tip and back porch clamping possible. A matching vectorscope, PM 5567, will be introduced later this year.

New from Videotek was the TSM-5 waveform monitor. The 100 percent solid state monitor features a bright, five-inch CRT display; internal or external sync; flat, IRE, chroma, and differential gain filters; selectable dc restoration; and two-line, extended two-line, two-field, and extended two-field time bases. Videotek promotes it as the first instrument in a forthcoming line of professional test gear.

New from Ultra Audio Pixtec was a \$950 waveform monitor and a \$1450 vectorscope. The waveform monitor features single line/single field display plus H and V blanking intervals, internal or external syncing, and flat, low-pass, high-pass, clamped, or unclamped display. For VITS measurement, a selectable line VITS detector sends the signal to an external trigger for external scoping.

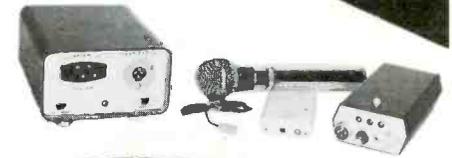
The Ultra Audio vectorscope features full bandwidth and chroma only display, built-in graticule, and 10 to 100 kHz sweep frequency with external H input. Phase error detection is ± 10 degrees or ± 2.5 degrees. The vectorscope and waveform monitor can be rack-mounted as a matched set.

Hitachi once again showed its line of portable oscilloscopes, including the V-550 50 MHz dual trace delayed sweep version.

Finally, from Marconi was the B4624 VTR monitoring unit, which incorporates both TBC and monitoring signal selection on the front panel. Since the unit will superimpose the video waveform on the video image, the TBC can be adjusted to provide both satisfactory picture and waveform simultaneously. Suitable for use with Type C VTRs with no machine modification necessary, the instrument also incorporates audio monitoring with full, independent selection of audio tracks. Front panel LED indicators show TBC information such as

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genlocking, high and low video levels, and other data.

For more information: Phillips PM 5565, **810**; Videotek TSM-5, **811**; Ultra Audio waveform monitor, **812**; vectorscope, **813**.

Radio test equipment: still forward

Amber Electro Design introduced the Model 3500 distortion measuring set, which is very much an example of the high accuracy and automated operation we are getting in the best instruments, combined in this case with small size. The generator covers 10 Hz to 100 kHz in four ranges; the analyzer automatically tracks the generator. Nulling of the fundamental is also automatic, and rejection exceeds 100 dB. Residual distortion of the instrument is given as less than 0.0015 percent to 20 kHz, less than 0.01 percent at 100 kHz.

Belar brought to the show a new FM stereo modulation monitor, model FMS-2, which acts as a peak modulation monitor and also as two independent auto-ranging voltmeters. Left and right channels are read on the two separate meters, which also read 1+r and 1-r separately. The left meter also reads total, pilot, or left channel audio and the right meter reads pilot phase, 38 KHz suppression, or right channel audio.

QEI Corp. also brought an FM monitor unit, Model 691, with a long list of test functions. It has two independent displays for autoranging voltmeter and digitally selected peak indicator. There are a 100 percent total peak per minute counter, null type monitor, and generator phase calibrators. A spectrum analyzer display output for use with inexpensive oscilloscopes may be set to ± 100 kHz or ± 300 kHz, centered on any 100 kHz increment in the band, for Bessel function zero calibration, THD, and IM distortion measurements. An RF amplifier plug-in allows monitoring off-air signals.

Bald Mountain Labs. showed two instruments that work well together. One is the 781F decibel meter with digital readout, which also shows the frequency of the signal. The other is the model 1760 audio step generator, which supplies nine specific audio frequencies, selectable by pushbutton. Frequencies are crystal-controlled and claim stability of 0.01 percent and distortion less than 0.05 percent.

Harris introduced something quite new: an AM modulation monitor, Model AM-90, which uses a neon bar display instead of a moving coil meter as a read-out device. The operator can choose different display ballistics, in-

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Rohde & Schwarz's new video noise meter

cluding peak, FCC-specified, the RMS value of the signal and so forth. The unit has internal AGC to maintain accuracy through carrier drift, a digitally programmable peak flasher, and built-in carrier and modulation alarm units.

Sound Technology also had something new and highly useful, an automated test set which checks all important characteristics of a tape recorder. The microprocessor-controlled Model 1500A has an integral CRT readout on which test results are displayed. Frequency response curves, for example, are graphed directly on the screen. With pushbutton operation the user can make virtually instant checks of (in addition to frequency response) head azimuth accuracy; second and third harmonic distortion; separation levels; flutter and noise weighted or unweighted to NAB, JIS, or DIN standards; speed accuracy and drift. An override allows any test to be made manually.

An automatic distortion measurement set of superb accuracy and facility was introduced at the show by Tektronix. The set consists of the new AA501 analyzer and measurement unit and the new SG505 oscillator. The two mount readily together in various cases in the manner of the Tektronix test line, including table top and carrying cases; and other Tektronix units, such as oscilloscopes, counters, etc., are also compatible in size for mounting with the distortion-measuring pair. Action is fully automatic for level set, tuning, and nulling. THD plus noise can be read down to system residuals from 0.0025 percent to 0.0056 percent over the range to 50 kHz and 0.01 percent to 100 kHz.

Potomac Instruments brought a new monitoring instrument, an AM receiver of ultra fidelity aimed for monitoring functions in AM stereo. The Model SMR-11 has synthesized oscillator frequency with crystal control. The stated flat bandwidth is 13 kHz; THD and IM distortion are each less than 0.2 percent overall. Included are alarm circuits for loss of audio and loss of carrier; relay contacts allow external alarm devices to be triggered. The front end is designed for linear phase response.

A newcomer to the NAB was Eventide Clockworks of New York, which introduced what seems to be a brand-new idea: a system for converting a

small computer into a real-time spectrum and analyzer with third-octave response. The new unit, Model A18232, is designed to work with the Apple small computer. Other versions are ready to work with other popular computers, among them the Commodore PET and Radio Shack TRS-80.

For more information: Amber 3500, 814; Belar FMS-2, 815; Bald Mountain 781F, 816; 1760, 817; Harris AM-90, 818; Sound Technology 1500A, 819; Tektronix AA501/SG505, 820; Potomac SMR-11, 821; QEI 691, 822; Eventide A18232 823.

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INTERPRETING THE **FCC** RULES & REGULATIONS

Misrepresentation Can Mean Disqualification

By Frederick W. Ford and Lee G. Lovett; Lovett Ford and Hennessey, P.C., Washington, D.C.

A RECENT DECISION by the U.S. Court of Appeals will have a major impact on the basic qualifications of all broadcast applicants. The court's decision in the *WADECO* case¹, which reaffirmed an earlier FCC ruling², affirms the Commission's position that willful misrepresentations to the FCC in an application will result in the disqualification of a broadcast applicant. Moreover, in a conclusion which will affect an applicant's attorneys as well, the court found that it is the affirmative duty of an applicant to correct any material discrepancies in his or her application.

The *WADECO* case involves a challenger to a TV license renewal. Nevertheless, the Court of Appeals' findings affect *all* broadcasters since they become applicants whenever renewals, modifications, or transfers are sought. This article will briefly examine the background of the case and then analyze the court's conclusions.

WADECO was a corporation formed specifically to challenge renewal of the license of a Dallas, Texas, TV station. The station was licensed to Belo Broadcasting, a group owner of radio and TV facilities. *WADECO* filed its application in July, 1971. In order to demonstrate adequate financial resources to construct and operate the station, *WADECO* submitted a loan commitment letter from a Dallas-area mortgage company.

However, within one month, the mortgage company withdrew its commitment to finance the station. In October, 1971, James K. Wade, president of *WADECO*, learned that Castle Bank and Trust, Ltd., a bank in Nassau, Bahamas, had agreed to finance the project, subject to three conditions: (1) that *WADECO*'s shareholders personally endorse the note; (2) that *WADECO*'s shareholders show an aggregate net worth of at least \$5 million; and (3) that the financial statements and agreements be satisfactory to Castle Trust and other participating institutions.

The record shows that, apparently, Wade hesitated to reply to the offer of Castle Trust, since news reports had linked various Bahamas-based banks with Las Vegas money³. When Wade could not find other financing, he submitted the Castle Trust letter in December, 1971.

In early 1972, *WADECO*'s Washington communications counsel determined from conversations with the Broadcast Bureau that the Castle Trust letter, as written, would not meet FCC standards for financing. In particular, the clauses requiring \$5 million net worth and possible syndication of the loan to other banks and finance companies were questioned by the bureau.

WADECO's counsel wrote to Castle Trust to determine if the questioned provisions of the letter could be changed, including the reference to other participating lenders. Cas-

tle Trust agreed to drop the net worth requirement and limit the endorsement to certain wealthy shareholders proposed by *WADECO*'s counsel. As to other participants, Castle Trust, after noting its disinclination to name other possible participants, accepted *WADECO*'s attorney, who suggested that the problem with disclosures "might be eliminated by simply deleting all references in the loan commitment to other participating institutions."⁴ So, the revised letter, which had been changed as noted above, was submitted to the Commission in April, 1972.

Notwithstanding these changes, the Broadcast Bureau indicated in a deficiency letter that the Castle Trust offer was not a firm financial commitment. When the bureau received no response, either from the counsel or *WADECO*, it sent a second deficiency letter in September, 1972. Counsel tried unsuccessfully to strengthen the commitment. In an amendment filed one month later, counsel submitted that the Castle Trust letter was "a valid commitment on the part of Castle Trust to make the stated funds available in the event that *WADECO*'s application for a construction permit is granted."⁵

Wade had not seen the entire amendment before he signed the filing affidavit. Counsel included the letter without Wade's knowledge. When he saw the complete amendment, Wade told counsel that he did not consider Castle Trust's letter a valid commitment and that *WADECO* should cease its reliance on this letter.

Wade, however, failed to persuade counsel to remove the letter. Moreover, he did not take any affirmative step to compel counsel to withdraw the commitment letter. Accordingly, since the bureau was not satisfied about *WADECO*'s finances, a financial issue was designated against *WADECO*. Receipt of the designation order prompted Wade to compel counsel to remove the letter from the file. Counsel did not do so, since no new financing had been found. Only when the opposing party, Belo Broadcasting, sought to depose *WADECO*'s principals about the validity of the loan commitment did counsel attempt to remove the letter.

At this time, it also became apparent that *WADECO* had amended its shareholder list in accordance with Section 1.65 of the Commission's rules to show changes in the shareholders. However, *WADECO* never indicated in its amendment that these withdrawn shareholders were

¹*WADECO v. FCC*, Case No. 78-1913, *Slip Opinion* (D.C. Cir., 1980)

²*Belo Broadcasting*, 68 FCC 2d 1479 (1978).

³Interestingly enough, a story which appeared in the *Washington Post* on April 24, 1980, reported that Castle Trust was a depository for CIA funds, as well as various Las Vegas and Hollywood figures.

⁴Letter from counsel to Castle Trust, March 24, 1972, cited in *Slip Op.*, 5.

⁵Letter from counsel to Broadcast Bureau, October 12, 1972, quoted in *Id.*, 6.



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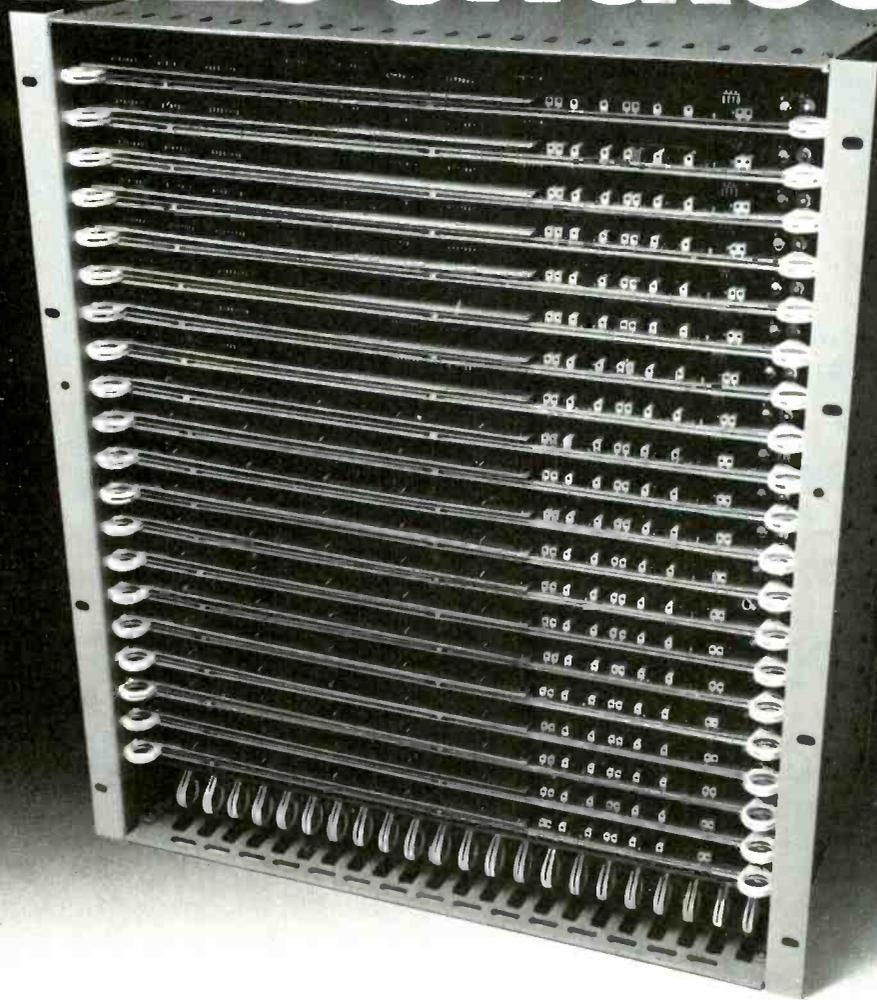
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among those whose endorsements were required by Castle Trust.

WADECO argued that it had met Section 1.65 reporting requirements since by implication, when they withdrew as shareholders, these persons withdrew their endorsements of the loan. Moreover, counsel argued that he assumed new guarantors could be found.

The Commission did not accept the WADECO position. In an initial decision in 1976, the administrative law judge concluded that WADECO lacked the basic qualifications to be an FCC licensee on the ground that WADECO had withheld and misrepresented significant information.⁶ The Commission agreed with the initial decision and disqualified WADECO in 1978.⁷ WADECO appealed the decision to the U.S. Court of Appeals.

The Court of Appeals upheld the Commission. WADECO had maintained that the Commission's ruling was not supported by substantial evidence. However, the court found WADECO's arguments acceptable.

WADECO stated that it had not misrepresented the real intent of Castle Trust when WADECO had references to "participating institutions" deleted from the revised letter. The court dismissed the cosmetic change. In its opinion, WADECO misrepresented the fact that Castle Trust might still participate the loan.

WADECO argued that if, indeed, there had been a misrepresentation, it had relied on its counsel's good faith and judgement. The court responded that although Wade was aware of the continued misrepresentation, he still did not take positive steps to withdraw the letter. Indeed, Wade no longer even considered the letter valid. Not only did WADECO misrepresent the facts, but the court also held that Wade, the company's president, personally acquiesced in the misrepresentation.

The court found that WADECO's reliance on counsel, with regard to the withdrawal of shareholders who had endorsed the loan, was similarly ill-founded:

"[Section] 1.65 places the responsibility on the applicant to come forth with all information needed to keep its file accurate and complete, not on the Commission to infer significant additional information from the less than complete information it receives."⁸

Moreover, the court felt that this was in keeping with longstanding FCC policy, as enunciated in other cases.⁹

Finally, WADECO claimed that disqualification was an arbitrary and capricious sanction because it deviated from FCC precedents which held that good faith reliance upon counsel protects an applicant from disqualification. The court stated:

"We agree that such a reliance on counsel may render too harsh a sanction like disqualification. But we disagree with WADECO's premise . . . that its conduct amounted to no more than good faith, albeit misplaced, reliance on counsel."¹⁰

The court determined that WADECO's and Wade's reliance was not uninformed, for Wade knew of each of the misrepresentations and did nothing to correct them. These findings were similar to the *Folkways* case in 1974, in which an applicant was disqualified when the record

⁶70 FCC 2d 1380.

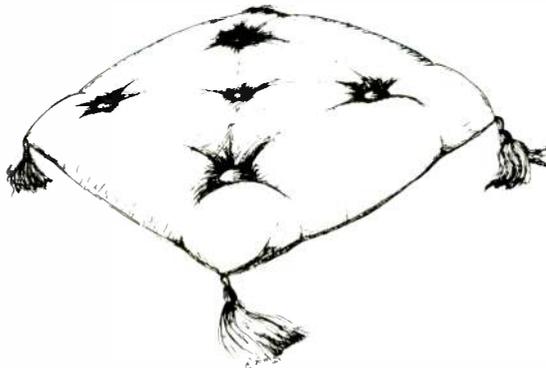
⁷68 FCC 2d 1479 (1978).

⁸*Slip. Op.*, 13. Emphasis added.

⁹See *Lorain Broadcasting*, 18 FCC 2d 686 (1969).

¹⁰*Slip Op.*, 13. Citations omitted.

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clearly demonstrated that he was aware that certain documents were false and misleading when they were filed on his behalf.¹¹ The Court of Appeals concluded in the *WADECO* case:

"The Commission has stated that evidence of fraud, an intent to conceal, or other violations so numerous and serious as to reflect on the applicant's responsibility to be a licensee warrants disqualification . . . Given the findings of misrepresentation [in this case], the Commission did not abuse its discretion on deciding that *WADECO*'s conduct adversely reflected upon its responsibility to be a licensee."¹²

In a dissenting opinion, circuit judge Abner Mikva took issue with the majority's sanctioning of disqualification. According to Mikva, *WADECO*'s degree of misconduct did not merit disqualification:

"The evidence does not adequately support the Commission's finding that *WADECO* misrepresented or intentionally concealed information. The record is replete with uncertainty, confusion, some dubious practices, and a few mistakes, but fraud or its equivalent is not to be found."¹³

Mikva questioned the existence of misrepresentation with regard to other participating lenders, pointing out that it is a relatively routine matter to hedge on such commitment:

"Castle may very well have ended up as the only institution involved . . . That the letter did not clearly acknowledge the possibility of future participants is not fraud."¹⁴

The judge felt similarly about the failure to acknowledge the withdrawal of endorsement by the resigned shareholders:

"It is sophomoric for the Commission to characterize the failure to notify the Commission as a 'deliberate action designed to mislead the Commission' . . . There is not a smattering of proof to buttress such a conclusion."¹⁵

Mikva wrote that the Commission punished *WADECO* excessively. In addition, the decision had a potentially grave effect on license challengers. He felt that the decision might:

" . . . send out a false signal to those who might have the temerity to challenge a well-ensconced licensee at renewal time. Such a result is certainly not in the public interest."¹⁶

Conclusion

WADECO has requested that the case be heard again by a full panel of the Court of Appeals. *WADECO* has reaffirmed its arguments, adding the Mikva condemnation of the disqualification sanction.

Meanwhile, pending a reversal, the *WADECO* ruling is now the law. The court has again sanctioned FCC disqualifications based on misrepresentation and withholding of information. Moreover, an applicant cannot claim deference to his counsel as a mitigating circumstance if he has been fully aware of the misrepresentation. In accordance with FCC Rule 1.65, it is the affirmative duty of the applicant to provide current, relevant information.

Broadcasters, as well as their attorneys, should read this decision carefully and keep apprised of future developments.

BM/E

¹¹*Folkways Broadcasting*, 48 FCC 2d 723 (Rev. Bd., 1974). Rehearing denied. FCC 75-1017.

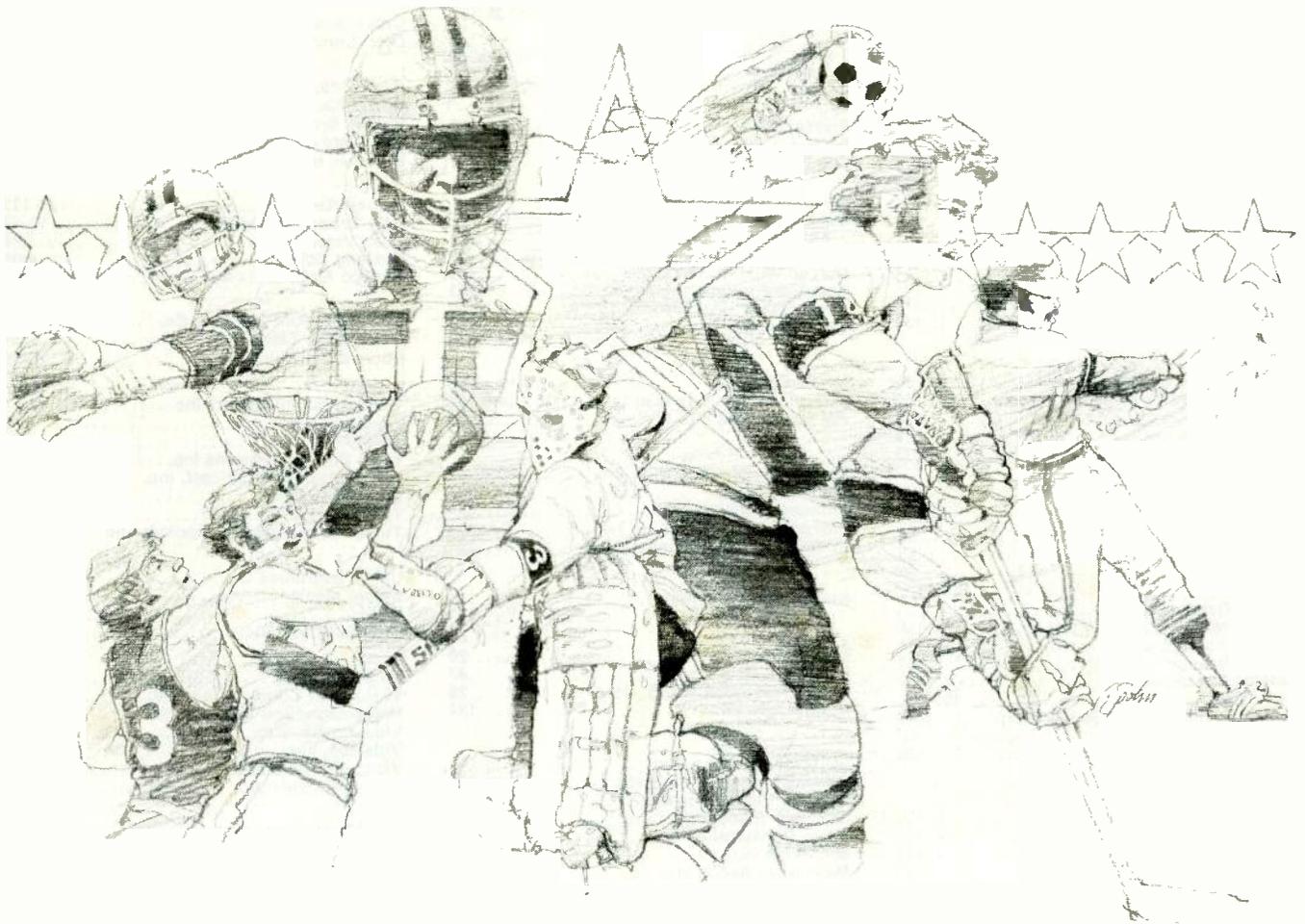
¹²*Id.*, 4.

¹³Dissenting Opinion, Judge Mikva, 9.

¹⁴*Id.*, 3.

¹⁵*Id.*, 4.

¹⁶*Id.*, 9.



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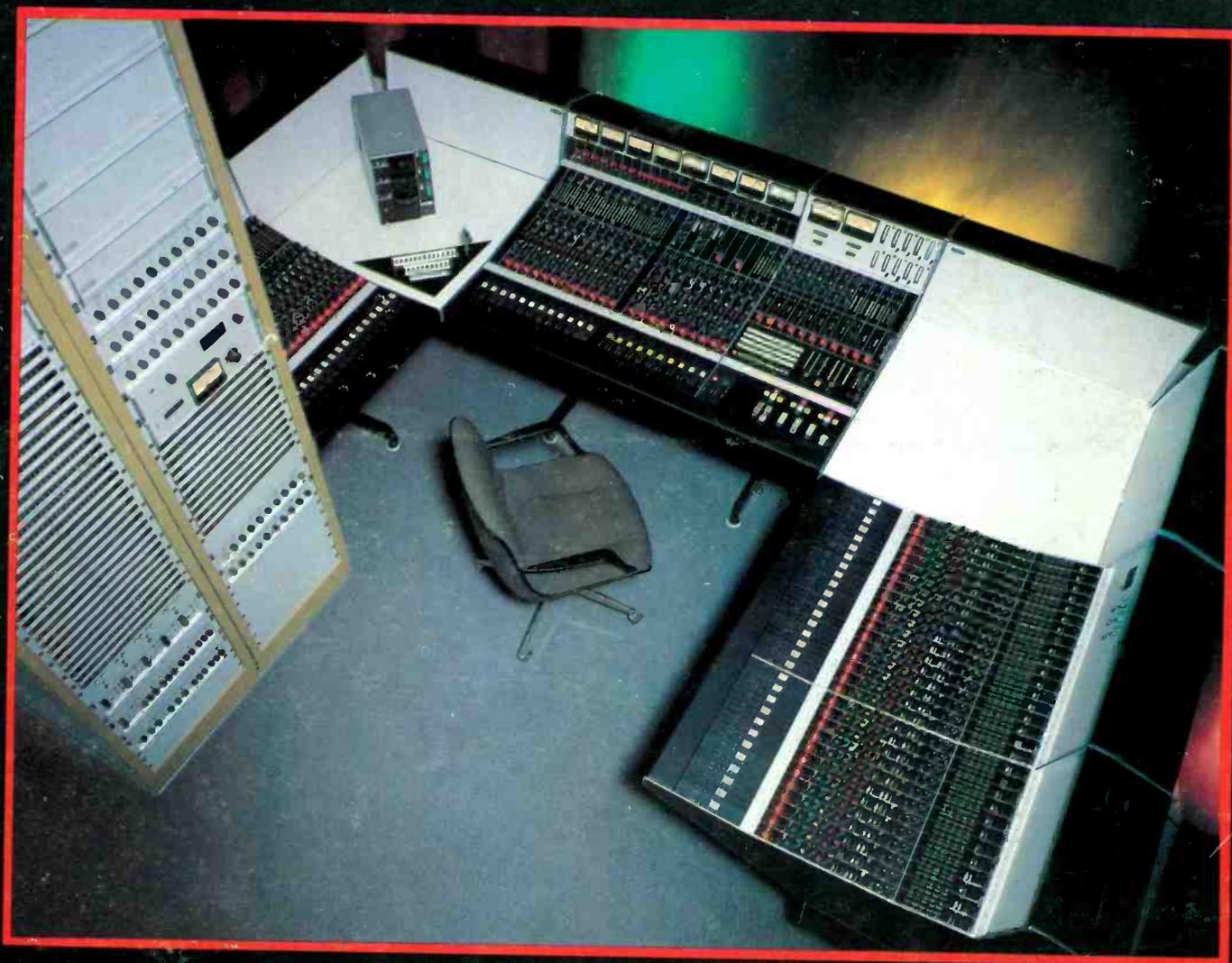
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