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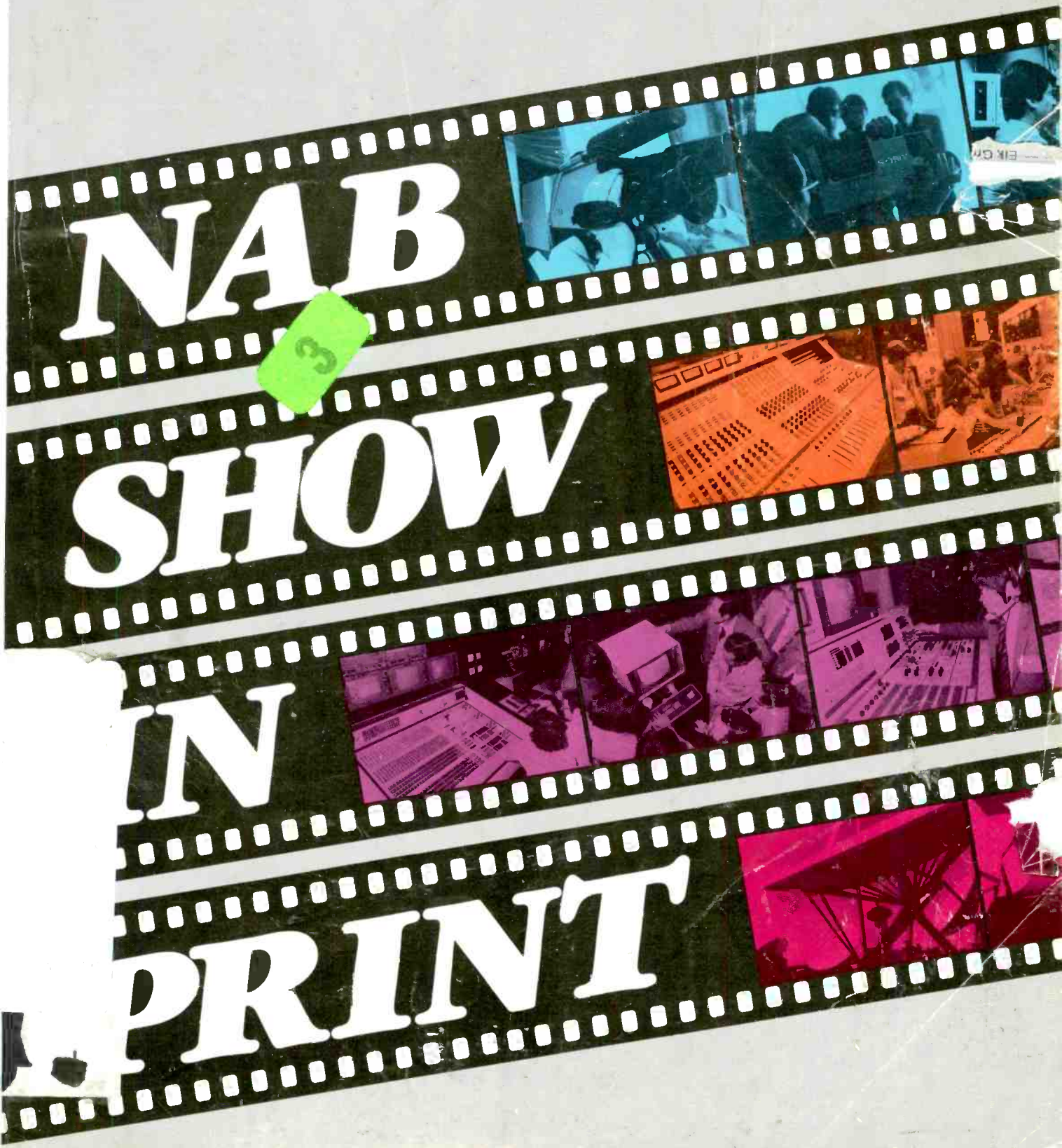

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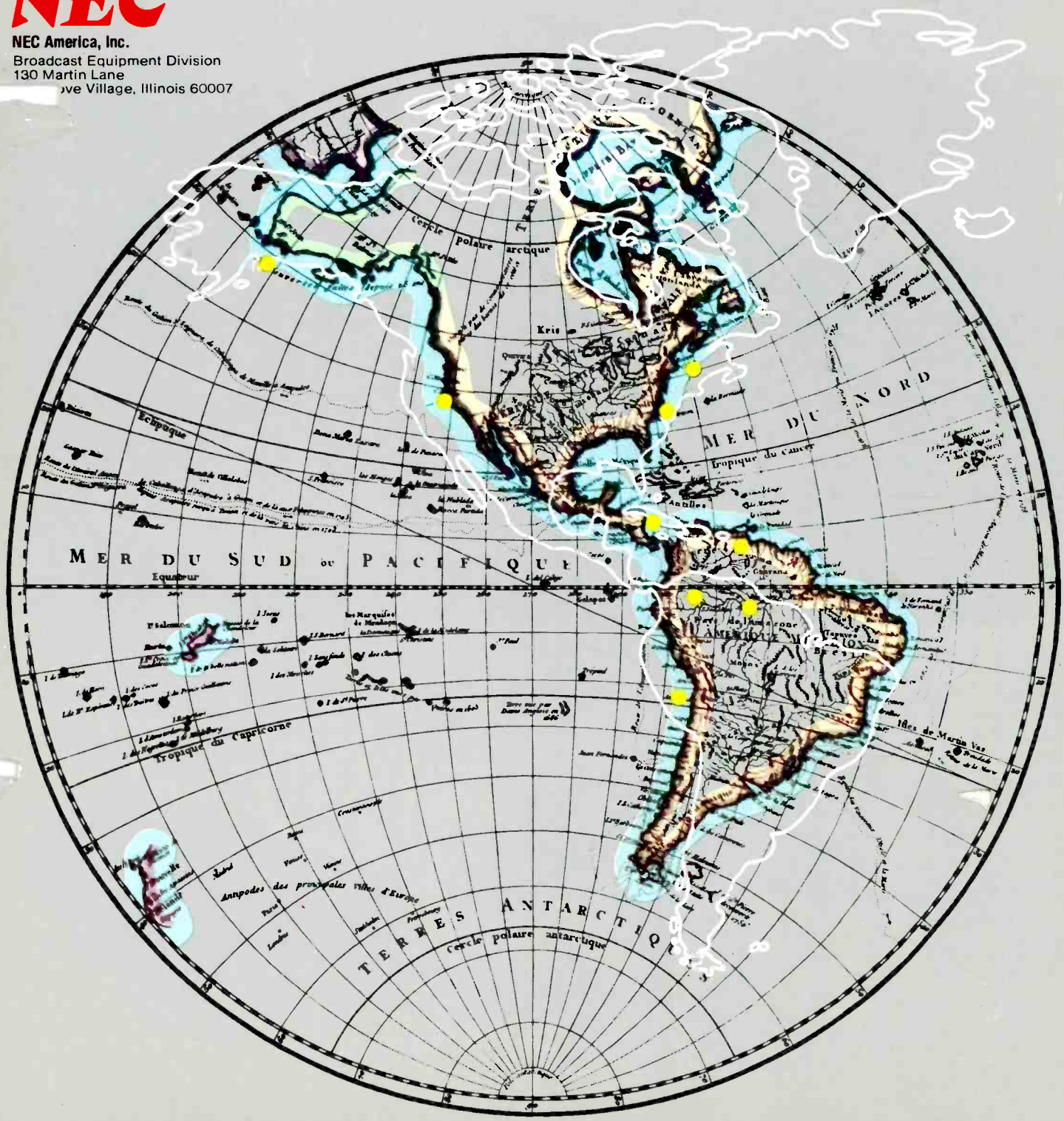

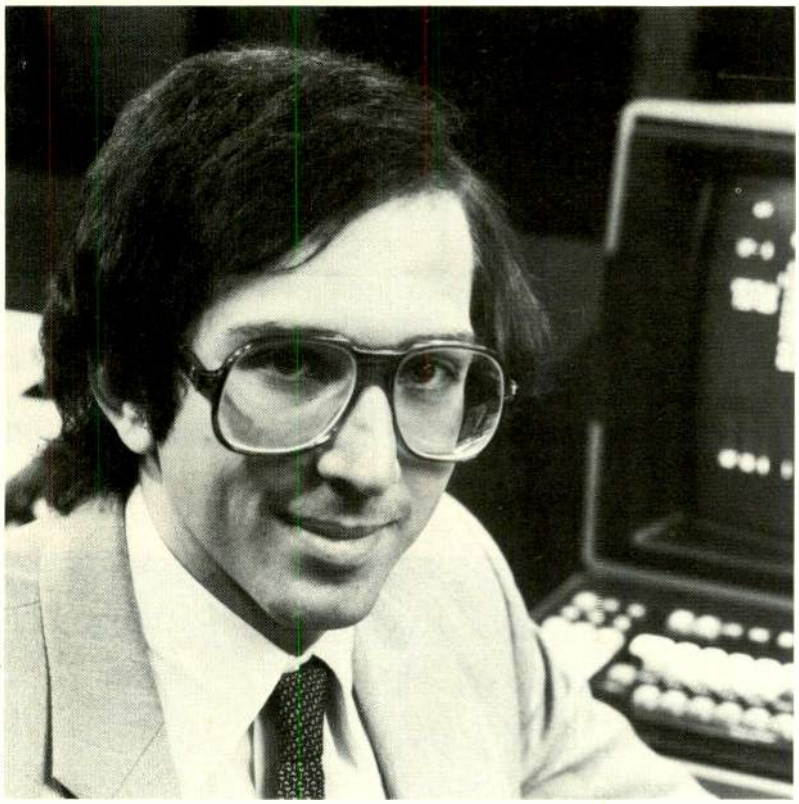

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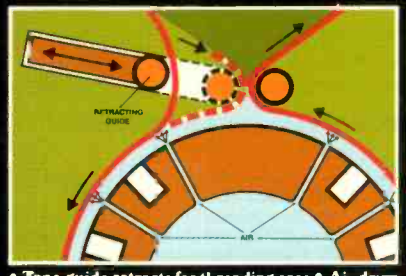

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• Full audio and video confidence • "PRO" tape path reduces dropouts

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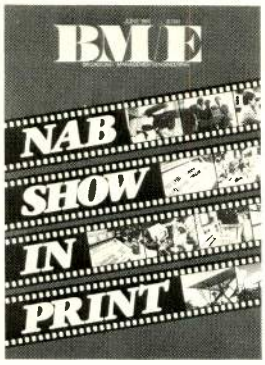
JUNE 1981/VOLUME 17/NUMBER 6



The 1981 NAB Convention sustained an upbeat response in the broadcast industry. Whether the talk was of computerized post-production, high quality audio, or simply more reliable equipment, broadcasters left with a feeling that the tools they need are available.

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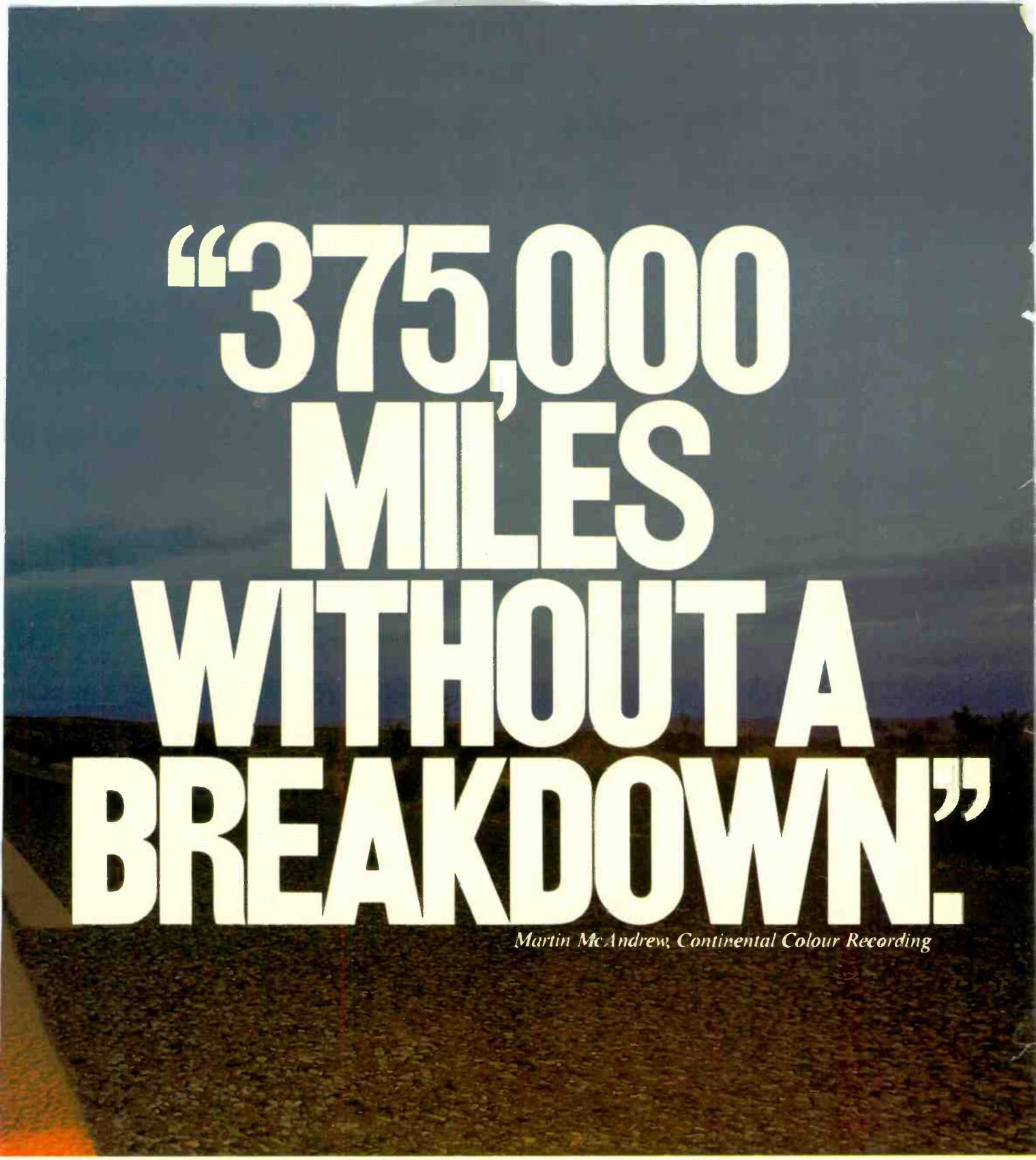
"Seventy per cent of the time, our equipment is used by ABC and NBC, but we also rent it to local television stations and production companies."

Continental Colour, the country's largest video equipment rental company, has specially built trucks and trailer trucks that are virtually television stations on wheels. Two of these trucks are equipped with one-inch equipment, including a total of two BVH-1100 and four BVH-1000 one-inch high-band video recorders. Continental has also purchased additional Sony recorders for its brand-new post-production facility.

"Sony picture quality is excellent," says McAndrew,



"much better than its main competitor. And the slow-motion capability of the BVH-1100's means that each can do the work of two separate machines, in less space, at less expense. No one else's equipment can match these 1100's.

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BROADCAST INDUSTRY NEWS

Fundraising Rules Relaxed For Public Broadcasters

Public broadcasters gained the right to air the logos of corporate contributors as part of a recent FCC action loosening the fundraising policies for noncommercial stations.

The action eliminated the "name only" rule, allowing public stations to use logos, locations, descriptions of product lines, and similar information to identify companies that make monetary contributions. The Commission emphasized, however, that any product promotion in this context was still prohibited.

Unpaid promotions of goods and services will be permitted under the new rules, though, if the station determines that the promotions are in the public interest.

Time and frequency of acknowledgements were left to the stations' discretion, as were limited on fundraising activities for station purposes.

The rule relaxation, according to the FCC, is designed to make fundraising easier for noncommercial stations, as the lessened restrictions on acknowledgements should be more attractive to corporate donors. The resulting increase in number of donors. The resulting increase in number of donars, the FCC said, would serve as a guard against any single donor being able to affect programming decisions.

AT&T Satellite Plan Suspended By FCC Action

The startup date for AT&T's three-year satellite TV programming distribution trial has been pushed back five months to allow the FCC staff additional time to investigate the service. The move was a disappointment for AT&T, which had planned to start distributing NBC programming May 18.

The April 9 vote, however, did not prevent the other two television networks from signing up for the AT&T service at the NAB Convention in Las Vegas. Program distribution for CBS and ABC is scheduled to start November .

The CBS service will interconnect the net's Television City, Hollywood production center and its New York City Broadcast Center.

In announcing the contracts with CBS and ABC, AT&T's Bill Brock pointed out the "unique features" of the satellite distribution service, including "total, end-to-end networking" and total control by the customer over its own network from a console.

Another big name in satellite television distribution. Wold Communications, recently announced an agreement with Microdyne Corp. of Ocala, Fla., under which Microdyne will supply as many as 100 TVRO earth stations to be installed at TV stations around the country. The earth stations will help implement Wold's nationwide satellite distribution of *Entertainment Tonight* and *The Merv Griffin Show;* the first 50-plus units are expected to be installed by late summer.

FCC Plans Interim DBS Over Broadcasters' Protests

Opposition from broadcasters and terrestrial microwave users failed to stop the FCC from proposing interim policies and issuing a notice of proposed rulemaking for direct broadcast satellite services late in April. At the same time, the Commission also accepted for filing the DBS proposal of Satellite Television Corp., a subsidiary of Comsat.

The move delighted Comsat, of course, and STC was quick to announce that it had requested two space shuttle launch dates in 1985 for its two DBS satellites, one operational and one an in-orbit spare. This would set the start-up date of what will probably be the first actual DBS service well after the 1983 Regional Administrative Radio Conference, at which Western Hemisphere rules for DBS are expected to be set. A second DBS proposal is expected

KCBS Electronic Newsroom Goes Public

When all-news KCBS, the network's San Francisco O&O, installed an all-electronic newsroom late last year, it did so very quietly. The station's caution seems to have paid, off, however, and culminated in its April 16 unveiling of the very successful system. Station users report significant savings in time and paper usage as well as that rarest of birds — a *quiet* newsroom.

Built by Integrated Technology, Inc. of Kansas City, Mo., the "News Machine" was designed with the full cooperation of station news personnel to meet the specific requirements of radio broadcasting. News wire inputs — 15 of them — tie into the central computer, which automatically files and crossfiles the stories. Editors and reporters have instant access to any material in the station's files through their terminals, which allow them to write, edit, and rewirte quickly and easily.

Bulletins flash on the terminals as soon as they are received, keeping all personnel up to date. Eight electronic "scratch pads" at each terminal allow reporters to work on several projects at once, while a split-screen facility lets editors see two stories side-by-side, moving entire blocks of copy from one to the other if desired.

The system also streamlines staff communications and coordination. Each terminal has instant access to all others, allowing users to send each other messages and instructions electronically. Newsroom activity and assignment lists are readily accessible; reporters in the field can even file their stories with portable terminals.

KCBS mid-day editor Jim Cullen reviews news input in the Electronic Newsroom computer

KCBS's experiments with electronic news handling go back to 1977, when it joined with UPI in a "limited" test that lasted until December 1980. Greg Endsley and Dave Cunningham of Integrated Technology were called in by CBS in August, 1980, and installation and debugging of the complete system began in October.

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to come this fall from the aptly named DBS Corp., whose 32-channel common carrier service, free to consumers, would cover half the country. STC's proposal involves three channels of pay TV and initially would cover only the Eastern states.

Much of the concern over what some see as a hasty move by the FCC has centered around the RARC date. NAB's Vincent Wasilewski, for example, suggested that Latin American countries might see the proposal "as a 1980's version of a 'land grab' . . . strictly a nationalistic move." Wasilewski called the FCC's decision to process applications prior to setting actual policy "short-sighted. This is a cart before the horse situation." He said that NAB opposed allocating "prime spectrum space" to the service, but did see experimental opportunities in DBS, especially involving high-definition television.

Also opposing the DBS proposal was a group whose members stand to lose a lot if the 12 and 17 GHz bands go to the satellite service, as Comsat has requested. The Operational Fixed Microwave Council, representing tertestrial microwave users, filed comments with the FCC claiming that the band wasn't big enough for both uses.

Comments from the individual commissioners were almost all favorable, as might be expected after a unanimous decision. Some doubts came from Anne Jones, who mused that the FCC's "preliminary determination that DBS is in the public interest may be premature."

The impact of DBS on local television broadcasters is another question raising a variety of replies. Robert E. Lee, FCC chairman at the time of the proposal, questioned whether local broadcasting "can economically exist on local and regional advertising since national advertising will surely go on the bird." In a study conducted by Harvard University, however, 60 percent of the telecommunications experts who participated indicated that they felt DBS would have no "significant" effect on broadcast TV. A large majority (83.1 percent) said that DBS would not serve local needs and 79.2 percent said local needs would continue to be served by commercial TV stations.

An interesting, if insignificant, sidelight was provided by an AT&T exhibit at the NAB convention, two weeks before the FCC's DBS move. A demonstration of the company's Dial-It telephone polling service asked broadcasters, among other things, whether they thought Comsat should set the go-ahead on DBS. Sixty-two percent of radio broadcasters and 58 percent of television broadcasters voted "yes"—of the tiny, statistically meaningless number that voted at all.

CNN's Satcom 1 Access Upheld By FCC Decision

Ted Turner's right to a transponder on Satcom 1, RCA's primary cable satellite, has been assured by the FCC in a recent decision affirming the legality of his Cable News Network's contract with RCA Americom.

In its decision, the Commission found that CNN's right of first refusal under its contract with RCA was legal and enforceable under the Communications Act. Space on the main cable bird is a clear victory for Turner, still working to get CNN into the black.

CNN, which had originally planned to be on the ill-fated Satcom 3, was left with a distribution dilemma when that satellite was lost after its December, 1979 launching. The FCC granted the net temporary access to a Satcom 1 transponder in time for its June 1 start-up date, but permanent access was not

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Congratulations to the NBC Electronic Journalism Department in New York. You found the solution – the DO56.

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assured until the current decision. The temporary authority was extended late in January for another six months.

LPTV Applications Halted

Citing insufficient staff and computer capacity to handle the flood of low power television applications that have inundated it, the FCC voted early in April to stop accepting new applications.

Nearly 5000 applications had been accepted at the time of the cutoff, creating an enormous backlog of work for Commission staffers, who must analyze them for mutual exclusivity. Applications already received will continue to be processed, however.

Applicants meeting one of three criteria can still file: locations currently receiving less than two full-service TV stations, requests to change from channels 70 through 83, and requests for frequency changes to resolve interference with full-service stations.

In a related action taken the same day, the Commission denied a renewed request from CPB, PBS, and the National Association of Public Television Stations to stay the LPTV interim processing policy. The petitioners had asserted that two *ex parte* meetings between Commission staff and applicants had adversely affected two petitions of theirs, one requesting a stay of interim processing and one requesting that channels be reserved for public broadcasting. The FCC ruled that since the LPTV rulemaking is designated as nonrestricted, the *ex parte* meetings did not violate the rules.

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Wold, Visnews Offer New Broadcast Satellite Service

U.S. and international broadcasters can now "rent a news bureau" in New York or Washington to cover stories breaking in those cities. The complete newsroom services, including transmission facilities, are being offered by Wold-Visnews Broadcast Services, a joint venture of Wold Communications and Viscom International (USA), Ltd., a subsidiary of Britain's Visnews Television news agency.

Initiated early in May, the service allows news personnel of client broadcasters to produce and edit stories at the Wold-Visnews facilities and transmit them via satellite. Headquarters for the operation are in New York City's Empire State Building, where users can find ENG and editing facilities. The Washington outlet features three fully equipped newsrooms and an editing room. Both offer fixed microwave links to Wold's satellite uplinks. Visnews will handle the European side of the operation.

Another phase of the venture will involve end-to-end videoconferencing services for international businesses. The regular operations of Wold and Visnews will be unaffected by the new business.

Earth Station Facility Kicks Off D.C. Service

MetroSat, a sophisticated receive and transmit earth station complex serving the Washington, D.C. area, opened its Bren Mar, Va. facilities in a spectacular fashion last April — assisting broadcasters with emergency satellite links for transmitting news feeds about the assasination attempt on President Reagan.

According to Bob Schmidt, president of MetroSat's parent company, Communications Technology Management, Inc. (CTM), MetroSat was "able to transmit these broadcasters' signals out of Washington when other

Picture shows Model 5315/32 TV Audio Console
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communications networks were unable to respond." The uplinking service is available on an occasional or long-term basis for broadcasters — radio as well as television — CATV programmers, and business users.

The Virginia facility, which includes three 10-meter dishes, is capable of simultaneous transmission to any three domestic satellites — four transponders on each.

Another CTM project just getting off the ground is MetroNet, a common carrier microwave system. MetroNet and MetroSat have both announced that they will provide microwave and earth station facilities for the Bell & Howell Satellite Network of Washington, D.C., for its teleconferencing services.

Tele Cine, Inc. Becomes Schneider Corp. Subsidiary

Schneider Corp. of America, U.S. arm of Jos. Schneider GmbH & Co. of West Germany, has purchased Tele Cine, Inc., exclusive U.S. and Canadian distributor for Schneider's line of broadcast television lenses. A new corporation, Tele Cine Corp., will continue to operate the broadcast lens distribution business from Tele Cine's current headquarters in Massapequa, New York.

Donald Collins, Tele Cine, Inc. president, will continue as executive vice president of Tele Cine Corp., while Schneider president Gil Hoffman will serve as president of both companies. Schneider is currently working on plans to move both operations to expanded facilities in the vicinity, although the companies will retain their separate identities and functions. Schneider Corp. handles North American sales and distribution for the German company's non-broadcast products.

Earth Station Antenna Maker Signs On At NAB

SatCom Technologies, Inc., a fledgling Atlanta-based manufacturer of satellite earth station antennas, made its first appearance at last April's NAB Convention at Las Vegas.

The new company is a subsidiary of Radiation Systems, Inc. (RSi), which primarily serves the military market with a broad line of antenna products. SatCom Technologies will aim its service at the domestic satellite market, offering a complete line of satellite antennas from three to 13 meters in diameter. Expected customers include broadcasters and CATV operators, common carriers, and business and industrial users.

One new product from SatCom is the comsat-designed Torus antenna, notable for its ability to receive signals from several satellites simultaneously. The Torus will be built by RSi under exclusive license from Comsat.

"TV University" Gets Carnegie Foundation Grant

The National University Consortium, which aids an increasing number of at-home students to get college degrees over the air, has received a $446,000 grant from the Carnegie Foundation, the third (and largest) such grant to NUC from Carnegie.

NUC, now ending its second semester, currently involves 11 universities, 32 PBS TV stations, and three cable systems across the country. Plans call for a goal of 100 participating universities, with a corresponding increase in public television and CATV systems.

Students pay tuition for the courses and member schools pay a fee to help support the program, which is also supported by grant money such as the Carnegie funds. Study guides and texts

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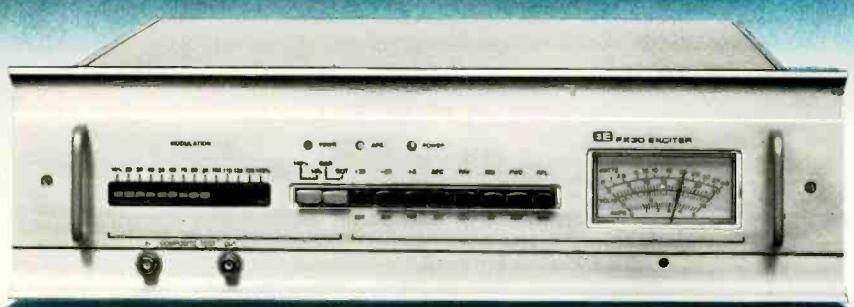
Broadcast Electronics' FX-30 Exciter.



With almost 50 already in use
Broadcast Electronics' new FM Exciter
—the FX-30—provides superior on air performance.

For the Purist, Purest Sound.
The FX-30 has the lowest distortion, with THD and IMD less than 0.08%. And, it's the first exciter to specify Transient Intermodulation Distortion (TIM) at less than 0.1%.

Loud, yet Quiet.
The FX-30 is loud and sparkling clean with your programming, yet it's the quietest exciter of all, with a typical S/N ratio of 78 dB.

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Automatic control circuits eliminate adjustments after initial setup. Exciter output is automatically stabilized and fully protected. Set it and forget it.

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RF power output is adjustable up to 30 watts. The FX-30 will improve the performance of any transmitter and will fit directly in place of your present exciter.

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Elegant in styling as well as in performance, the new look in FM is the elegant look of the FX-30.

For more information on the FX-30 Exciter and BE's exciting new FM transmitters, call or write Joe Engle at: 217-224-9600

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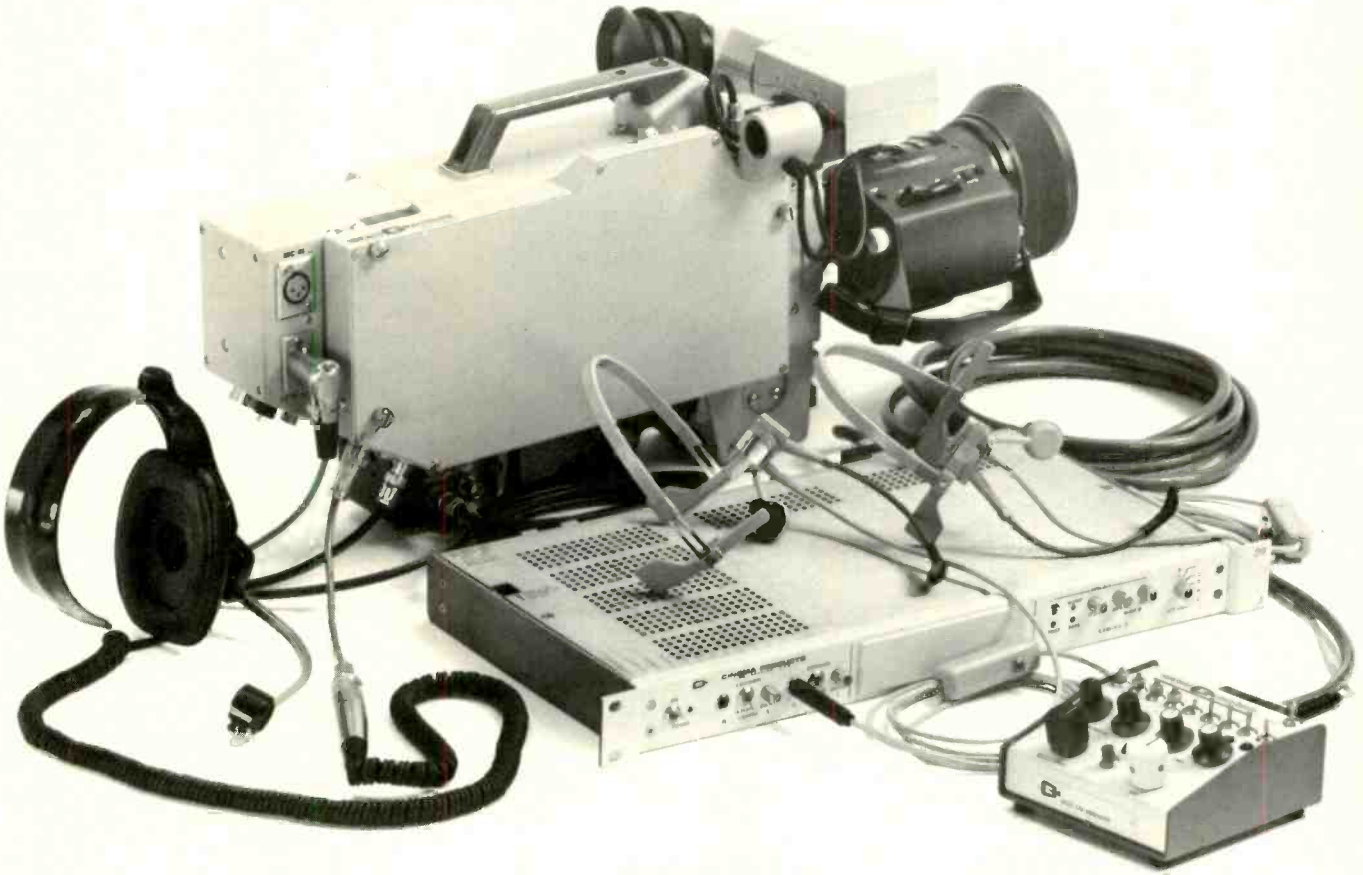
Our Co-Ax Digital Remote Control system is now available for:

Sony BVP-300/BVP-330, Thomson MC-601/MC-701, Ikegami HL-77/HL-79A, RCA TK-76B/TK-76C, and NEC MNC-71CP ENG/EFP cameras.



- ☐ Cinema Products' exciting new 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!*
- ☐ 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.
- ☐ Digital encoder (19" rack-mounted) designed to accommodate *two* mini-CCU's to control *two* cameras (each equipped with its own decoder).
- ☐ Lightweight, camera-mounted decoder features intercom capability. (Decoder is either side-mounted on camera door, or neatly "sandwiched" between camera body and door.)
- ☐ 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.
- ☐ The most affordable and reliable remote control system available on the market today, the CP co-ax digital remote control system is ideal for all extended shooting situations such as sports events, live concerts, political rallies, etc.

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provide the major part of the course work, which is supplemented by the television broadcasts. Students enroll through the nearest affiliated university, which assigns them individual "telephone tutors" and may provide a "learning center" for at-home scholars. All courses are fully accredited and lead to bachelors' degrees. The "guided study" teaching method is similar to that used by the British Open University, founded in 1969, which enrolls 80,000 students in its telecommunications teaching system.

Fiber Optics Company To Concentrate On ENG/EFP

A new fiber optic communications systems manufacturing company has been formed by two former employees of Valtec Corp. Artel Communications Corp., described by one of the principals as "a small, high technology systems company" with "some excellent opportunities," is aiming its initial product offerings at the ENG/EFP market.

The new gear, seen at NAB, is a portable ENG/EFP system that can transmit video signals from a camera a distance of one to two miles over small, lightweight optical cable with high video quality. It is expected to be available within a few weeks. Artel productions will include terminal equipment and systems to multiplex, process, and transmit video, voice, and data signals over fiber optic cables.

Richard A. Cerny, formerly marketing director for Valtec Communication Fiberoptics, heads Artel as president. Tadeusz Witkowicz, Artel executive VP and treasurer, previously managed Valtec's Systems Group.

Women Logged Broadcast Job Gains In 1980

Figures recently released by the FCC show that women continued to make significant gains in broadcast employment, including those jobs in the higher-paying categories.

Of total employees, 33.3 percent were women in 1980, compared with 31.8 percent in 1979. Women showed good-sized gains in the four highest-paying job areas, also, making up 25.3 percent of officials and managers (up from 22.6 percent in 1979), 25.7 percent of professionals (up from 24 percent), and 34.5 percent of sales workers (up from 30.7 percent). In the fourth category, technicians, women also gained — to 9.7 percent from 8.3 percent — but remained at a relatively low level of employment.

Figures for minority employment also showed increases, although these were less rosy than the statistics on women. Total employment of minorities (including Blacks, Asians and Pacific Islanders, American Indians and Alaskan Natives, and Hispanics) rose slightly to 14.6 from 14.3 percent the previous year. Gains were seen by most minority groups in most of the higher-paying categories, but these also were rarely more than a few tenths of a percent, with an occasional category showing a slight loss.

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News Briefs

The FCC must take into account public TV stations' **service to their hearing impaired viewers** during license renewal proceedings, the U.S. Court of Appeals for the District of Columbia has ruled. The station involved in the case is KCET, Los Angeles, currently participating in a major teletext experiment involving captioning (see *BM/E*,

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Nurad offers the broadcaster a comprehensive approach to airborne ENG/EJ operations that strikes a balance between two equally desirable attributes: sophistication and simplicity.

Even a casual glance at the COPTER POD™ and MINI POD™ reveals our radical departure from ordinary airborne ENG/EJ systems. In COPTER POD™ and MINI POD™, four circularly polarized directional transmit antennas, each providing 90° coverage (forward, aft, left, and right), and a circularly polarized receive antenna (for ground-to-air-to-ground relay operations) are utilized instead of the usual multipath-prone omnidirectional antenna. This approach not only results in a significant increase in gain, but, because the transmitted energy is confined to a single segment, virtual elimination of multipath effects.

With COPTER POD™ and MINI POD™'s AUTO TRANSMIT™ Automatic Antenna Selector System, the proper transmit antenna (forward, aft, left, or right) is automatically selected and switched into the system, thereby allowing complete freedom of helicopter movement.

In addition to the directional antenna system, COPTER POD™ incorporates a frequency-agile transmitter with power amplifer, and a frequency agile receiver, all embodied within a sleek, aerodynamically streamlined envelope. MINI POD™, a scaled-down version of COPTER POD™, incorporates the directional antenna system and built-in power amplifier, and is complemented by our MINIPAC™ transmitter/receiver pair.

Our SUPERTRACK™ Central Receive Antenna System combines the virtues of the field-proven SUPERQUAD™ II with the capability for operator-controlled tracking of airborne microwave transmissions. With SUPERTRACK™, the operator is provided with a simple TURN LEFT/ON TARGET/TURN RIGHT readout telling him whether and in which direction to pan the antenna for tracking.

Nurad has the total answer for airborne ENG/EJ operations. By combining the directional transmit antenna system of the COPTER POD™ and MINI POD™ with the operator-controlled tracking capability of the SUPERTRACK™, Nurad offers the broadcaster reliability not found in other systems for airborne ENG/EJ operations.

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News Briefs

January, 1981) . . . . FCC has proposed **deleting VITS requirements** for remotely controlled TV transmitters, in response to a petition from ABC . . . . The EBS weekly test requirements have been amended to allow stations to **substitute EBS activation** for the test . . . . The Commission has terminated its proceeding proposing that new or changed VHF stations be required to allow **UHFs to place their antennas** on the VHF's tower . . . . The FCC inquiry on transmission of **test signals in the vertical interval** during international broadcasts has also been terminated.

Japanese network **TV Asahi** operated out of Boston's **WNAC-TV** for its overseas coverage of the Boston Marathon in April . . . . **KGO Radio,** ABC affiliate in San Francisco, won four first-place awards in the UPI California-Nevada Broadcasting Competition, for spot news coverage, editorial series, public service reporting, and major-market feature . . . . Allen Rosen of **KOMO-TV's** *PM Northwest* has been named Television Photographer of the Year (1980) by Region 11, National Press Photographers Association — the second year in a row Rosen has been so honored . . . . **KMSP-TV,** Minneapolis, received the 1980 INTV award for "best print and visual promotion."

Business Briefs

E&O Systems Ltd., U.S. distributor of **Barco** color monitors, has announced a name change and move. Now known as **Elector,** the company is located at 5128 Calle del Sol, Santa Clara, Calif. 95050 . . . . **Bardwell & McAlister** has moved to larger quarters at 7051 Santa Monica Blvd., Hollywood, Calif. 90038, (213) 466-9361 . . . . **Victor Duncan, Inc.** has opened the doors of its new facility at 661 N. LaSalle, Chicago . . . . **KEF Electronics** has opened a West Coast office at 425 Sherman Ave., Palo Alto, Calif. 94306.

A new research and marketing consulting firm, **Bushyhead, Wortsman & Klein Inc.,** will offer its services to television stations from its offices at 2131 Union St., Suite 4, San Francisco 94123, (415) 921-1881 . . . . **Frederick N. Doner Productions, Inc.,** specializing in theater, motion picture, and television production, has opened offices in Detroit, with plans to add a New York branch this fall . . . . A new company, **Western Broadcast Systems,** will sell and market broadcast-quality audio and video products from its headquarters at 10707 Amulet Pl., Cupertino, Calif. 95014, (408) 749-0900.

Klark-Teknik Electronics has been appointed exclusive U.S. distributor for **Rebis Audio** of England, manufacturer of a range of signal processing modules . . . . **Scharff Communications** is the exclusive Northwest distributor of Britain's **Audio Developments** line of professional portable mixers . . . A new San Rafael, Calif. audio supply house, **Recording and Broadcast Supply,** has been appointed California distributor for **Neotek** and **Apsi** consoles . . . . **Nortronics** has retained **R.A. Albrecht Co.** of Rochester, Mich. as manufacturer's rep for that state.

U.S. JVC Corp. has installed two automated parts storage and retrieval systems at its Elmwood Park, N.J. warehouse in an effort to improve customer service . . . . **Chyron Telesystems** is offering three new training courses for Chyron IV operators; more information from Chyron, 265 Bethpage-Spagnoli Rd., Melville, N.Y. 11746, (516) 249-3296 . . . . **TSG** of 1009 S. Fourth St., Louisville, Ky., is

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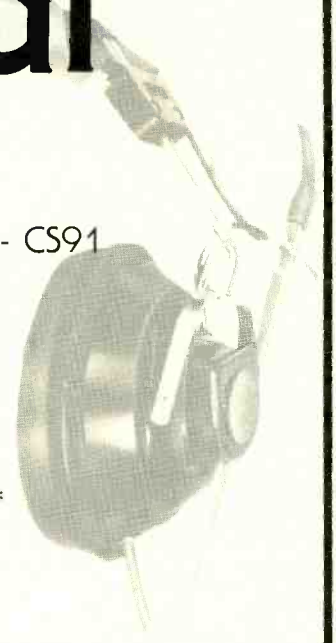

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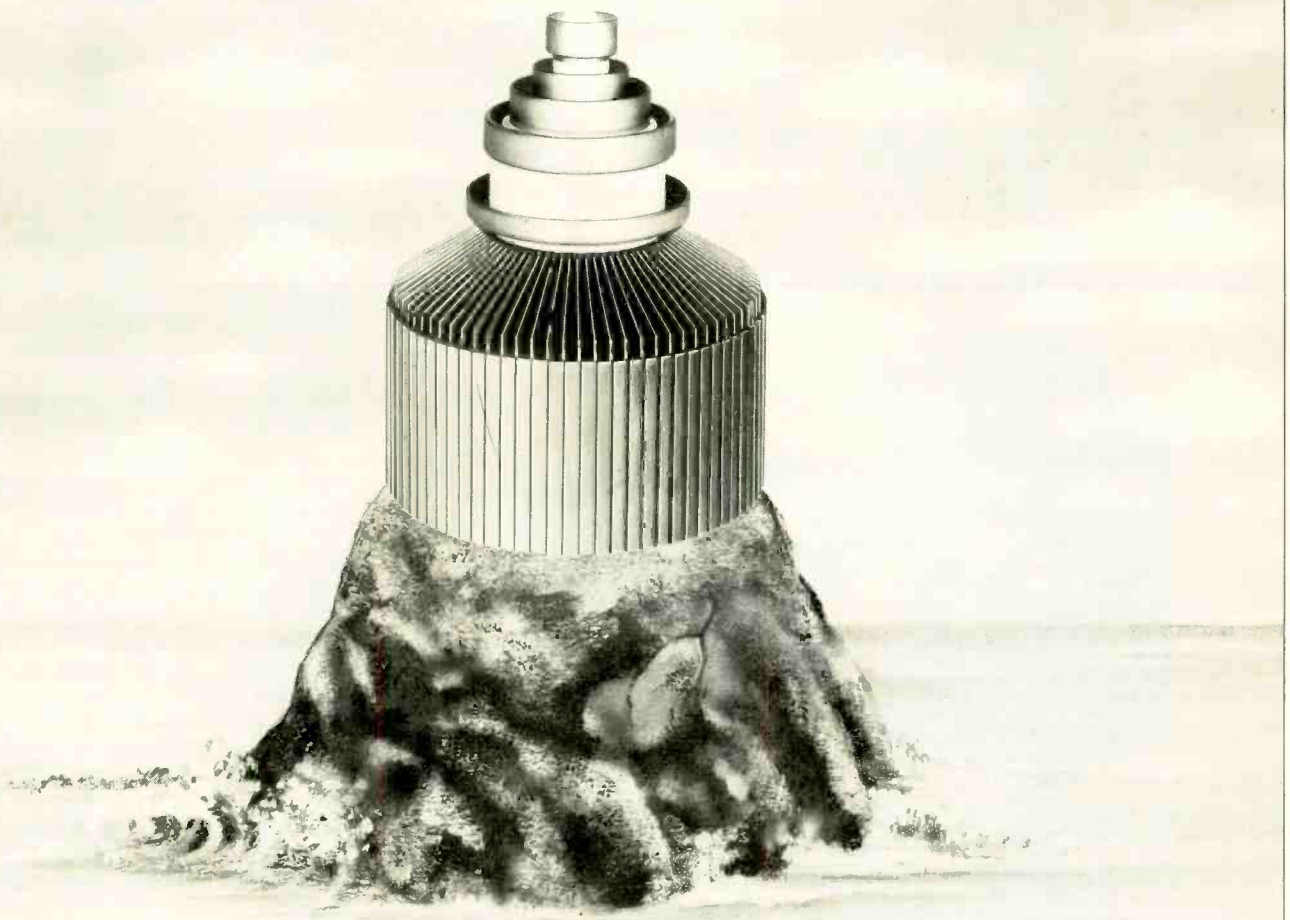

In UHF-TV tetrodes, there's just one name: **THOMSON-CSF.**

- for high gain, exceptional linearity and matched coaxial-cavity circuits,
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- and for proven reliability and long operating life, it's THOMSON-CSF.

Typical of this exceptional product line, the **TH 347,** an ideal choice for 1 kW UHF-TV transmitters/translators.
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Business Briefs

offering hands-on seminars on broadcast equipment repair for engineers. The company's phone number is (503) 589-3880.

The Nigerian Television Authority has ordered over $10 million of television cameras, video recording systems, and outside broadcast vehicles from **Ampex Corp.** Other major contracts recently reported by the company include $4 million of videotape for Magnetic Video Corp., a major video program duplicator, and $250,000 of equipment including VTRs, a production switcher, and an editor for Hayes Productions of San Antonio, Texas. The company delivered its three-thousandth VPR-2 helical VTR in March, to McDonnel-Douglas Corp. . . . **Editel** has expanded its Chicago post-production facilities with one-inch VTRs and off-line editing equipment from **Sony Corp.** Recording house M&K Sound of Los Angeles has just added a Sony digital editor to its equipment lineup . . . . San Francisco production house Chronicle Productions has installed a **TeleMation** Compositor I graphics system.

WXIA-TV, Atlanta, has purchased a **Harris** TVD-100H 100 kW circularly polarized VHF antenna, along with a 9100 Facilities Control System and a two-bay Batwing antenna. The company has also sold a TV-50H 50 kW transmitter, TAH-15H helical antenna, and 9100 system to KCTV, San Angelo, Texas . . . . WOLE-TV, Aquadilla, P.R., has increased its coverage area with an **RCA Broadcast** TTG-30H 30 kW transmitter and a TW-12A12 travelling wave antenna worth about $1 million. WVEC-TV, Norfolk, Va., has purchased two similar transmitters, and Rainbow Communications of California has installed $900,000 of RCA broadcast equipment in its new post-production facility . . . . **Rupert Neve, Inc.** will supply sophisticated TV sound production consoles for CBS Television's New York City Broadcast Center. The first Neve NECAM II computer-assisted TV audio post-production system in the U.S. has been installed in Motown Studios in Hollywood.

Compact Video Sales has completed a custom-made Compact 27 mobile video unit for Video West of Salt Lake CITY. Video Production Services of Kansas City will lease a Compact 27 for coverage of sporting and other events for the TV nets . . . . Bonneville Productions has upgraded its Studio C facility with **UREI** 813 monitor speakers . . . . **American Video Products** of Anaheim, Calif. has installed a dual editing suite for American Film Factory, complete with UMI Commander IIs, Vital 114Xs and a shared Vital SqueeZoom.

Jack E. Banister has been named division video president, marketing for **RCA Broadcast Systems** . . . . James A. Smith has been appointed vice president, director of marketing for **R.F. Technology** . . . . William E. Gibson has been promoted to vice president-general manager of **Harris Corp.'s** Transmission Systems Division, part of the Farinon Group . . . . Stewart Greenberg has been elected vice president of marketing and sales at **James B. Lansing Sound.,** . . . . **RTS Systems** has appointed Jack Sympson international sales manager.

Donald O. Kiser has been appointed president of **GTE Lenkurt** . . . . James K. Baker has been elected president and CEO of **Arvin Industries** . . . . **EECO, Inc.** has named Dr. Stuart Krasney director, marketing development . . . . **Oak Communications** has announced the appointment of H.K. "Hank" Sauer as vice president and of Ronald S. Comm as vice president of finance.

Record, play and dub complete sporting events and full-length movies . . . non-stop.

Record and playback up to 2 hours, 40 minutes on any standard Sony BVH 1000, 1100, and 1100A or Ampex VPR-1C, VPR-2 and VPR-2C Type C VTR with the Merlin ME 238 conversion kit.

Extended play time allows most full-length movies and sporting events to be recorded on a single 12½" reel. Ideal for master playback when dubbing to small format machines as well as for cable and broadcast automated programming.

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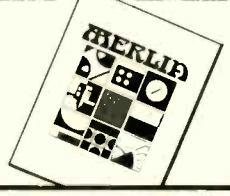
Merlin Engineering has a full range of products and assemblies for bringing your broadcast VTR up to date, as well as complete engineering facilities for custom applications. Write for your copy of the Merlin catalog.



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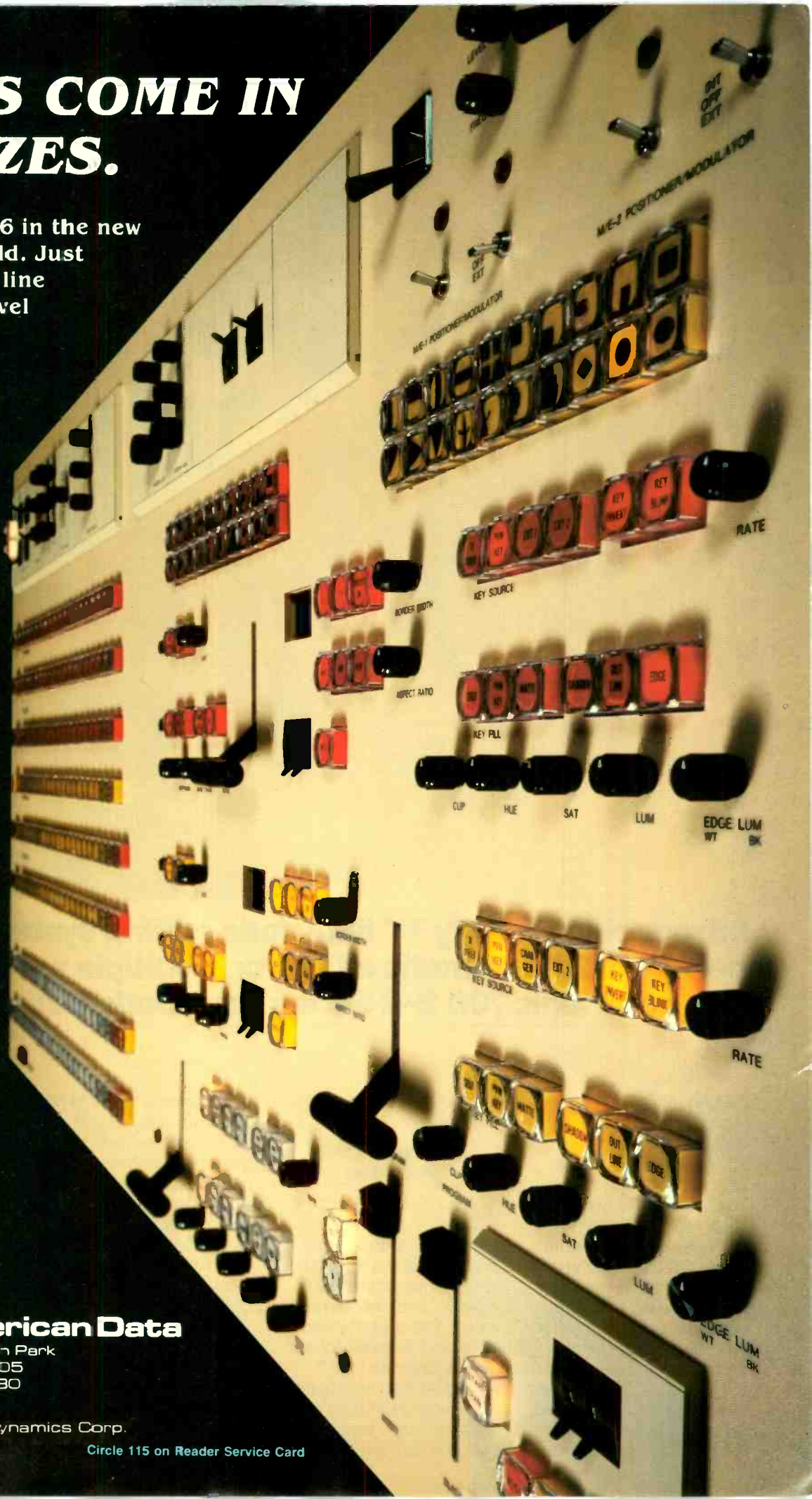
Model Shown: 3106 in the new American Data Gold. Just one in a complete line of quality multi-level video production systems. Simple to operate, yet advanced in design and reasonable in price.



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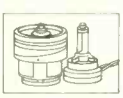
Now Panasonic adds a new dimension to the speed and accuracy of time code editing with our new 700 B-2 Series Time Code Editing System. The AU-700 editing recorder, the AU-A70 programmable editing controller, and the AU-J10 multiple source adapter. Together they let you do what other time code editing systems don't: Perform up to 20 automatic, multiple-source insert and assembly edits. And the 700 B-2 Series is packed with outstanding performance features.

The precision of direct drive.



Check out the excellent stability and precision of the AU-700's direct-drive video head cylinder and capstan servo motor. The superb performance and durability of our crystal-oriented HPF™ heads. All combine to produce an outstanding picture with horizontal resolution of 260 lines color, 330 lines monochrome and S/N ratio of 46 dB color, 50 dB monochrome. You'll also get an edit with less video noise because video head switching has been moved to the vertical interval so it never shows up in the picture. At the same time, we incorporated DUB IN and DUB OUT connectors with separate Y/C signals and a flying erase head. And to keep that good-looking picture looking good, all circuitry is mounted in a durable annealed aluminum die-cast chassis.

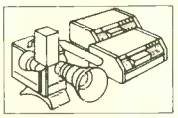
The speed of microprocessors.

Another touch of ingenuity is the AU-700's microprocessor controls. Designed to work perfectly with the AU-A70 editing controller, they give you the speed, accuracy and versatility of full-logic, mode-to-mode switching. The AU-700 will accept SMPTE time code on a separate track or on audio track one as well as standard CTL pulses. And its electronic

Shown from left: AU-700 editing recorder, AU-A70 programmable editing controller.

digital tape counter displays LED readouts of CTL pulses in minutes and seconds—even in fast forward and rewind.

Multiple source versatility.



With our AU-A70 editing controller not only can you generate and read time code pulses, microprocessors let it perform up to 20 time code edits automatically. Add an AU-J10 multiple source adapter and it will accept inputs from two source decks and one live line plus perform A/B rolls. Microprocessors also let you automatically go to specific tape locations. You can also search both ways at speeds of 1/20X, 1/5X, 1X, 2X, 5X plus pause with picture. Other features include program check, program exchange, insert programming and overflow indication. For editing convenience, separate address time and lap time indicators are included. The AU-A70's error codes pinpoint any procedural errors to avoid incorrectly programmed edits. The AU-A70 can also be used with any Panasonic solenoid-operated ¾" and ½" VHS™ decks. For worldwide versatility, there is a built-in voltage selector that is compatible with 100V / 120V / 220V / 240V AC, at either 60 Hz or 50 Hz.

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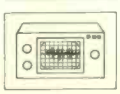

When it comes to servicing and maintaining the 700 B-2 Series, Panasonic backs you with a full network of B-2 dealers, equipped with total service capability. Each has the parts and technical expertise that professionals require. For further information, call your nearest Panasonic office:
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THE 1981 NAB SHOW IN PRINT

Thousands of broadcasters witnessed "dreams come true" in the one-piece camera/VTR; visions of better things yet to come with superior audio for radio and television and technical support for new ventures; low-power television, STV, and satellite networking.

IN ONE OF THE BEST NABs in recent memory, genuine technical advances were made leaving broadcasters and exhibitors in a state of mild euphoria. In both radio and television, the broadcast industry seemed more self-assured and confident that the "emerging technologies" seemed at least as much an opportunity as a threat. According to exhibitors, the best evidence of this was the heavy purchasing of equipment that went on throughout the four day exhibit.

There was some grumbling about the size of the show, which featured 479 exhibit booths, and some foreboding over next year's Dallas site. A movement was afoot to have the show return to Las Vegas in 1982 but this seemed impossible given commitments already made by NAB for Dallas, and Las Vegas's own heavy '82 schedule of events. That Las Vegas wants the NAB back is no question at all. One Vegas taxi driver said, of the thousands of broadcasters in town: "This is the first time we've made any money since the (hotel) fires started scaring business away."

Radio broadcasters grumbled some too, stating that the show seemed heavily geared to television. Certainly, the show gave that impression given the flash and appeal of television exhibits. NAB did, however, make a valiant effort to balance its papers program and sessions between radio and television but that the momentum was decidedly on the television side was undeniable. Once again, many radio broadcasters were heard to suggest a separate "all-radio" NAB, perhaps in conjunction with NAB's Radio Programming Conference.

According to NAB, the 1981 convention in Las Vegas drew 5870 broadcasters as pre-registrants, exhibitors provided guest passes to 9890 individuals, many of whom were broadcasters, and the exhibitors themselves accounted for another 11,275 people. Hospitality suites drew some 4000 people for a total NAB body count of 31,035.

Television is more vibrant than ever

There can be little doubt that the television industry grows more exciting each day. There is a general air of optimism around television's technology that promises to bring today's broadcasters into easy reach of the opportunities that lay ahead in satellite communication (see *BM/E* last month for NAB Satellite Report), low-power television, and subscription television. But this eye on the future has by no means diminished the industry's concentration on the issues at hand.

Equipment for newsgathering has taken a tremendous step forward with the introduction by RCA, Panasonic, Sony, and even For-A Co. (a relatively new but nonetheless innovative Japanese concern) of one-piece camera/VTR units. While the units from the big three use ½-in. videocassette cartridges, few concerns were aired about "another format." All three of the major companies took care to offer easy integration of the new systems with existing technology. While RCA and Panasonic supply full post-production and studio support in half-inch, and see it eventually subplanting ¾-in., Sony has opted to begin by making the new format compatible with ¾-in. post-production systems.

For high-end program production, production and post-production equipment continue to surge ahead in their use of the computer. Automatic set-up cameras, computer assisted switching, and computer aided post-production controllers are talking to each other and working together to give the producer unprecedented creative freedom. The awesome power of computer control and digital processing were graphically demonstrated by the flood of major digital art systems and surge in character generator capacity. Uniformly, broadcast engineers and managers began to talk enthusiastically of the day when a digital standard for communication and control would arrive to bring all of this equipment into efficient use.

In the five sections of this report that follow, broadcasters will see clearly that the technology is available to create highly efficient radio and television facilities. The burden is now on broadcasters to throw out the old assumptions and to begin to look at new applications for this technology. The broadcast industry is about to enter an age more competitive than any it has seen before but it has the tools to create the services and images that will capture the public's attention this year and in the years ahead.

Radio to get the listener's ear with higher quality

For most makers of radio broadcasting geat it was an excellent show. The broadcasters came in a serious mood. Exhibitors were pleased with the prevalence of real buying interest among the visitors to the booths.

The health on the exhibit floor reflects the health of the radio industry, with sales and profits at the highest levels in history. Radio is doing very well, and makers of radio gear are riding high along with the broadcasters.

But radio broadcasters can see coming up the road an array of competitors for the ears of the public. Competition from home high-fidelity systems has been massive for a long time and is still growing. Coming up toward large-scale use is the videocassette machine, and the videodisc has just made a strong entry. A few years off is the digital audio disk. All these alternate entertainment media bring top-grade audio and will be putting more and more pressure on the technical quality of the radio signal.

Adding to the push on quality from these "outside" sources is the high quality of satellite distribution. Broadcasters are showing their awareness of the need to have a high-grade signal in a number of ways. For instance, they

are buying high-priced, high-performance cart machines, such as the ITC Series 99 and the Pacific Recorders Tomcat, in large numbers. In fact, exhibitors at the show reported a general trend among broadcasters to pay much less attention to price than in the past; it was all-out performance they were after. A new unit that seemed to guarantee superlative handling of the audio signal was the one that stirred the broadcasters.

NAB . . . More To Come

NAB, 1981: an industry headed into uncharted waters. Manufacturers have offered broadcasters sleek new vessels in which to face the years ahead. The skeptics amongst us wonder if these "things of beauty" will endure against the rigors of a practical competitive broadcast environment. Next month, in *BM/E's* July issue, we'll answer that question. Whatever the industry selects as the technology appropriate to the task ahead, it will have to maintain, support, and grow with it. In the July issue of *BM/E,* Test and Measurement for today's broadcast facility will be the topic. We'll look at what is available to support all the 1981 technology and how best to pursue — not the optimum plant — but the real plant. Part of that report will include all of the latest details on T&M equipment introduced in Las Vegas.

Two other topics at NAB '81, deserved more thorough treatment than could be provided here: Broadcast Vehicles and Pay-Television. *BM/E* will give you the full story on these two vital concerns next month when we'll be able to tell you why they are important as well as what is available.

A closely related phenomenon is what seems to be the beginning of the end of the "loudness war," the push for super modulation density that has afflicted American radio for a number of years. A number of industry observers told *BM/E* that many broadcasters, especially in highly competitive markets, are backing away from the drive to squeeze the last half-dB of modulation through their transmitters. They have found that the distortion from extra-heavy processing causes listener ear fatigue and drives the audience away.

These broadcasters are now looking for a "clean" signal that will stand comparison with the average stereo disc and home high fidelity system. The makers of audio processors are helping by emphasizing the low distortion their systems produce when they are used carefully (more on processors below.)

The satellites, as reported in detail in last month's issue, were the big hardware story for radio. Makers of radio earth stations got plenty of "serious" booth traffic: radio broadcasters in substantial numbers are looking for the Satellite Connection. The satellites are, of course, not just a new kind of radio hardware — they are a massive programming revolution. They are going to affect radio operation fundamentally: for instance, full-scale satellite programming will alter sharply the way many radio broadcasters use program automation.

Another lift to quality is embodied in some of the new AM transmitters, which incorporate much more careful handling of the audio signal than was prevalent among AM transmitters in the past. Three of these new-age AM transmitters were described in detail in the May issue: the Continental Model 317C-2, 50 kW AM; the Harris MW-50B, another 50 kW AM; and the RCA BTA-5SS, 5 kW AM. All were on the exhibit floor. Also on the floor were a substantial number of high-performance FM transmitters from a number of makers, as detailed below.

In the best consoles, turntables, reel-to-reel tape recorders, microphones, and audio amplifiers, the fidelity has been extremely high for a long time. The exhibits of these studio items continued and extended the opportunities to build studios for radio with top-most fidelity. There was, for instance, a mini-explosion in wireless microphones that can hold their own with the best wired types (see below). Turntable preamplifiers with extraordinary precision in performance continued to appear.

The trends in test equipment, too, continued along the line established in recent years toward much higher precision and much easier operation. The upgrade in radio technical quality must have high-precision test equipment to sustain it.

Other categories of equipment in which the upgrade appeared and was supported were intercoms, telco interface equipment, and studio-transmitter links.

The summary of radio at the 59th Annual Convention of The National Association of Broadcasters therefore stands as follows: the broadcasters came with another record year under their belts, by and large satisfied with the present. But they know that their future hangs on a signal of high technical quality, one competitive with today's superb stereo discs and home high fidelity systems and with tomorrow's videocassette machines, videodiscs, and digital recording. The broadcasters were shopping for equipment that would help them produce such a signal. Fortunately for them and the future of radio, the equipment was there.

Julius Barnathan, President
Broadcast Operations and Engineering
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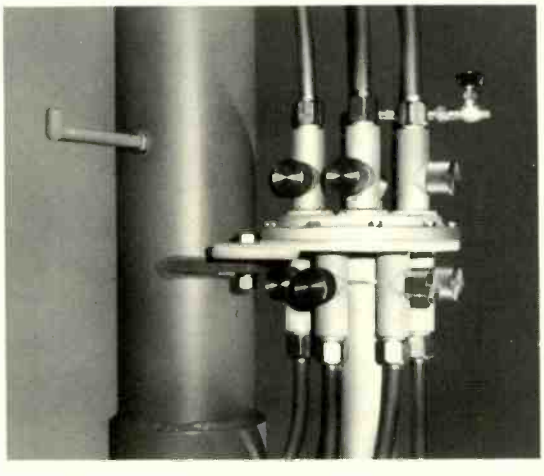

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WCTI (12), New Bern, NC.
WFMY (2), Greensboro, NC.
WITN (7), Washington, NC.
WLS (7), Chicago, IL.
WNCT (9), Washington, NC.
WPBT (2), Miami, FL.
WRAL (5), Raleigh, NC.
WVTM (13), Birmingham, AL.
WTTV (4), Indianapolis, IN.
WTVD (11), Durham, NC.
XETV (6), Tijuana, MX.
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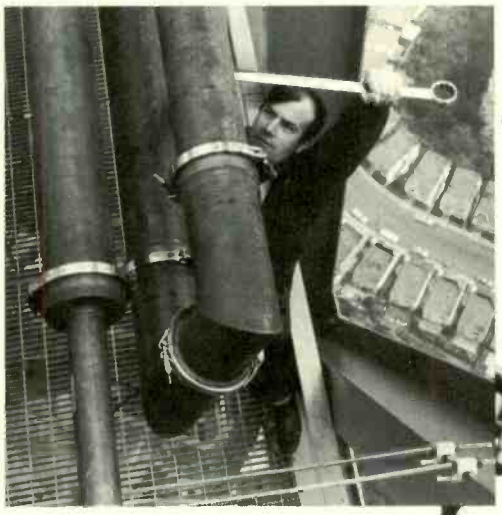

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NAB SHOW IN PRINT

CAMERAS AND VTRS LEAP AHEAD

The one-piece camera/VTR is at last a reality. Recording technology progresses towards higher quality with special purpose designs.

Four ENG recording cameras introduced

The arrival of a combination color TV camera and recording unit has been predicted for some time now as the next logical ENG development. It was generally assumed that the first such integrated camera/recorders would not arrive until a solid-state pickup array was ready. Therefore it came as some surprise at the 1981 NAB Convention to see not just one but four new combination camera/recorders — three as integrated units, the fourth as a hybrid.

Exhibiting the completely integrated systems were RCA, Panasonic, and Sony. The recorder portions of these three systems use half-inch tape, but achieve performance better than that obtainable with ¾-inch videocassette recorders.

The hybrid combination camera/recorder, on display at various times in both the A.F. Associates and For-A exhibits, was actually a system developed by the Nippon Television Network of Japan.

The RCA and Panasonic units were similar in that both used the same recorder, described as a "joint development of Matsushita Electrical Industrial Co. Ltd. of Osaka, Japan [Panasonic's parent] and the RCA Corp." The compact recorder uses standard VHS cassettes. The Sony unit differs in that it is designed to use L 500 Beta videocassettes as the recording medium.

Panasonic showed a completely integrated camera/VTR system featuring the recorder developed by Matsushita and RCA

The two new formats are in no way similar to those used in the VHS or Betamax consumer products and they are not compatible with each other.

Baseband recording techniques are used, most likely with separate luminance and chrominance channels being recorded. RCA, which had more printed literature than the others, said the new format, which it called Chroma Trak, improved chrominance resolution, distortion, and noise by a factor better than 3:1 compared to ¾-inch cassette systems. Two audio tracks plus a dedicated time code track are included. All systems get 20 minutes of recording time from standard one-hour cassettes.

The camera portions of the three integrated systems were quite different. RCA's system (called Hawkeye) uses new half-inch pickup tubes, either Plumbicons® or Saticons®, that offer performance equal to 2/3-inch tubes. The Sony camera uses a new single-tube highband SMF Trinicon. Panasonic elected to stay with three 2/3-inch pickup tubes designed into a new camera head.

The RCA and Panasonic systems include, in addition to the combination camera/recorder, full-featured studio editing recorder systems. All functions on the new studio units are controlled by soft-touch controls. Other features of the editing recorder/player include individual edit point selection, preview, review, and return to go functions, and LED time/lap time indicators.

With just a single tube, the Sony BVW-1 was the lightest in weight. Including lens and battery, the BVW-1 weighs 15 pounds and measures 110 by 360 by 200 mm. Recording time is 20 minutes but continuous recording time was stated to be over one hour per battery. RCA's Hawkeye unit (HCR-1) weighs 21.5 pounds. The Panasonic unit with 2/3-inch tubes weighs a trifle more — 22 pounds.

The new combination systems permit TV camera manufacturers to boast complete mobility. (Cases are sealed against dirt, moisture, and RFI.) RCA stressed that its unit "handles like a film camera." According to the company, with no camera to recorder connecting cables to interfere, the operator has complete maneuverability — one of the frequent causes of technical problems in field.

The use of half-inch tubes in no way hurts performance, RCA asserts. While the smaller tubes theoretically offer a lower S/N, a new optical system that is very fast (f/1.4) compensates for this.

Sony's one-piece camera/VTR was the lightest of the three integrated units

RCA's Hawkeye weighs less than early TK-76's without lens and battery

More glass can be used, giving an f/1.4 rating without increasing the weight of the lens. Camera head circuitry improvements, in combination with a new rigid prism optic system, permit camera picture quality to meet or exceed that of 2/3-inch tubes.

The Hawkeye's viewfinder includes LED displays that indicate battery status and verify that there is a signal on the tape. The display also indicates shooting time remaining and end of the tape.

Among the camera features are automatic white balance, black balance, flare control, automatic iris with variable spot size, and automatic comet tail suppression. The camera includes a 30-day memory for balance setting and features a six-position filter wheel. The battery is a snap-in type. A live encoded

Sharp's lightweight camera was displayed in hand-held and studio configurations

Visitors at A.F. Associates and For-A saw NTV's hybrid camera/VTR

output is also available to feed other VTRs or a monitor.

The camera can be separated from the recorder so that the latter can be slung over a shoulder or carried by another person. When linked to its genlock adaptor, the camera can be tied with microwave feeds, the HR-2 studio recorder, or other videotape units.

Sony stressed that its BVW-1 concept has system compatibility with U-Matic and one-inch videotape recorders. Recordings from the BVW-1 can be transferred for editing to these other formats, Sony said. In its demonstration suite, cassettes were dropped into a player controlled by an edit controller. (This same controller also operated a new BVU-800 U-Matic videocassette recorder; see section on ¾-inch advances.) Recordings from the quarter-inch tape hybrid system, the CV-One, were played back and edited (without dubbing into another format) through the use of the CVF-6000 videocassette recorder/player unit from For-A. This unit includes remote control, various shuttle speeds (twice normal, one-fifth, and one-twentieth), a pause control, and reverse modes of operation. It is compatible with a TBC and has a capstan servo mechanism that locks to external sync vertical drive.

This system uses the Funai format, a helical scan format with two rotating heads. Tape speed is 32.1 mm/s. Both luminance and chrominance signals are recorded; the former is frequency modulated, while the latter goes through a "chroma-conversion." The system uses CVC cassettes, which are about the size of audio cassettes. CV-One is considered to be in the development stage and the camera manufacturer has not been identified. The unit will be marketed in a year.

Both RCA and Panasonic promised production units of their respective systems by the first quarter of 1982. It was quite evident from the exhibits that the systems are complete and that the two companies were ready to take orders. Sony, on the other hand, anticipated marketing its system in Spring 1982.

For more information: RCA Hawkeye, **299**; Sony BVW-1, **300**; Panasonic, **301**; A.F. Associates/For-A CV-One, **302.**

New high resolution one-tube cameras

The new Sony BVW-1 VTR-in-camera system, as just described, incorporates a single highband SMF Trinicon. This same tube has become the basis of another new camera, available as a separate unit, the BVP-110.

Weighing in at about six pounds without lens, the camera is lightweight and about half the size of conventional three-tube cameras. It draws only 9 W of power. The Sony-patented tube is called the HBST (High Band Saticon Trinicon) for short. Incorporation of a Saticon photoconductor layer results in high sensitivity and resolution with "excellent" spectral response. The camera is expected to be priced in the $10,000-$15,000 range.

The tube's built-in bias light reduces lag and an automatic beam control system suppresses comet tailing effects and beam defocusing when bright spectrals are encountered in a scene.

Sony said the tube's unique deposited electrostatic deflection electrodes, combined with a new electron gun assembly, provide absolute and precise control over beam spot size and position. Improved RGB filter dimensions result in a horizontal resolution of 400 TV lines, according to Sony.

The camera includes an NTSC encoder with a two-line enhancer. A color framing pulse enables VTR synchronization during edits.

Automatic light balance can be stored digitally for later use. This enables the camera operator to reset white balance to new light conditions, retrieve a previous setting, or use a preset balance condition. A variety of zoom lenses are available. The new camera is expected to be ready for delivery by the end of next year.

Hitachi also showed a new high-performance single-tube camera, the FP-10, with an expected price tag of $7500. While Sony boasts a resolution of 400 TV lines, Hitachi claims 430 for the FP-10, which incorporates a new one-inch tri-electrode HS302 Saticon. Claimed S/N is 48 dB. Sensitivity is listed as 2000 lux at f/4 (grey scale 89.9 percent reflected); −6 dB and −12 dB high gain switches are included.

Both the Sony BVP-110 and the Hitachi FP-10 carry one-tube cameras to a new performance high. The Hitachi tube, like the Sony, has a built-in bias light for reducing lag. The FP-10 camera has an automatic beam optimization circuit to extend dynamic range and reduce comet tailing. The FP-10 also includes a number of automatic features, for example, built-in four-position color temperature corrector filter, built-in color bars, and genlock. A 1H delay line improves vertical contours; a two-line enhancer is available as an option. The FP-10 can be controlled remotely through the use of a serial data transmission system.

An optional five-inch viewfinder converts the FP-10 into a studio camera. The FP-10 weighs about 11.5 pounds and draws about 15 W.

There were several other new one-tube cameras in the lower price range, all aimed at the market garnered by the Panasonic WV3900. JVC introduced the S-100 U, which has a Saticon with a color-striped filter and provides 282 lines of resolution and 45 dB S/N. It boasts a sound zoom microphone — an industry first. Switches permit omnidirectional, superdirectional, and autozoom operation. This camera features many automatics at a price under $3500. Hitachi also showed a low-end line of one-inch tube cameras but did not promote them for broadcasters.

For more information: Sony BVP-110, **303**; Hitachi FP-10, **304**; JVC S-100 U, **305.**

Under-$20,000 ENGs improve

Advantages such as low weight, low power, and perfect registration offered by the improved one-tube cameras made them serious challengers for the lower-priced end of the ENG range. Choosing a camera remains difficult, however, due to the growing sophistication of three-tube models.

JVC has improved upon the KY-2000, which this spring reached 2000 in sales. The new KY-2700, introduced at NAB, provides horizontal and vertical contour correction thanks to new circuitry. Its improved deflection yoke has increased registration accuracy in the second and third zones to 0.2 percent and 0.4 percent, respectively. The KY-2700U boasts a S/N ratio of more than 54 dB with 230 foot candles at f/4.0 (contour correction off).

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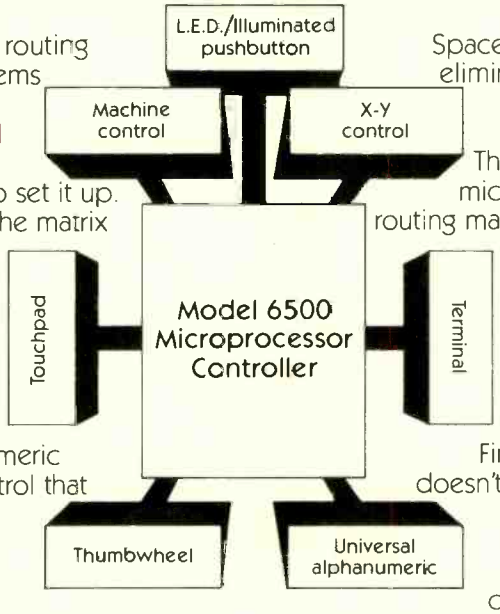

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Sony's tiny BVP-110 has the same single Trinicon pickup tube as the BVW-1 one-piece

The Hitachi FP-10 one-tube camera boasts 430 lines H resolution

The additional circuitry has increased weight to 11.6 pounds — half a pound heavier than the older KY-2000U. The unit is about half an inch wider to accommodate the new circuitry.

The KY-2700U sports a 14:1 zoom with an f/1.6 relative aperture. This lens is faster than that supplied with the KY-2000U and has improved outer area focus and lower distortion. The new unit has most of the usual built-ins including automatic white balance with memory and automatic beam control. The $11,990 suggested price of the KY-2700U makes its cost about the same as the new performance one-tube cameras.

Hitachi introduced two new cameras described as "professional high-quality cameras ideal for ENG and EFP." Known as FP-21 and FP-22, the cameras are quite different from the FP-20S industrial camera. As a result of a new prism beamsplitter and low noise preamps, they feature horizontal resolution of 550 lines at center, an S/N ratio of 55 dB, and built-in H and V contour correctors. The FP-22 incorporates digital auto setup, complete computer control of auto centering pedestal, and pulse cancellation. Previous setup information is held digitally in the memory even when power is turned off.

The camera's ABO circuit extends the dynamic range and reduces comet tailing. There is a diagnostic indicator in the CPU unit. The FP-22 weighs 12 pounds (excluding lens and viewfinders); the FP-21, minus the digital microprocessor, weighs 11.2 pounds. The $18,000 price of the FP-22 is quite remarkable for so many features.

The new JVC KY-2700U and the Hitachi FP-21/22 series are, in a sense, a response to last year's improvements in low-priced cameras marketed by Sharp — the XC-700. Over the year the $12,600 XC-700 became a best-seller — over 500, according to the company. This year Sharp introduced a two-line vertical enhancer ($1400) as an option.

A new approach to spare parts was the biggest attention-getter at the Sharp exhibit. The company offered a complete spare parts kit consisting of all the printed circuit boards, mother board, and power modules used in the XC-700 (*BM/E* counted 19 pieces). The kit is priced at $1995.

For more information: JVC KY-2700, **306;** Hitachi FP-21, **307;** FP-22, **308;** Sharp vertical enhancer option, **309;** spare parts kit, **310.**

Top line portables advance

High quality and automatic features for less than $20,000 have created a market for lower-priced cameras, but there was also something at NAB '81 for those who want the very best.

Last year Ampex promised the most with its BCC-20 Digicam. As a result of its exclusive Spatial Error Correction System, Ampex's computerized setup camera offered a new high in picture quality (registration accuracy of 0.05 percent in all three zones, geometry distortion less than 0.1 percent in all zones). This year Ampex showed how its Master Setup Panel (MSP) could control eight BCC 20s — or eight BCC-21s (a BCC-20 converted into a studio field production camera).

During the past year two new top-of-the-line ENG/EFP cameras emerged at the 122nd SMPTE Exhibition and Convention in November, 1980. Both were reshown to NAB audiences. RCA introduced the successor to the famous TK-76 — the TK-86. It included a new sealed f/1.4 beamsplitter and was lighter and easier on power.

Toshiba was the other mid-year newsmaker with its introduction of the PK-60. Weighing only 9.24 pounds, drawing only 20.6 W, and delivering S/N better than −54 dB with standard lead oxide tubes, this camera head is truly state of the art. It can be operated remotely by digital means and can be set up automatically by a digital master controller. An analog version offers up to 5000 feet of separation between the camera and the base station through triax. (A wireless triax system using a microwave link is also possible.)

The digital remote system designed for the PK-60 was unveiled at NAB. This latest system incorporates Digital Data Loc™ — a microprocessor-controlled adaptor that plugs into a connector at the rear of the camera head. An auto setup box and/or a digital base station are also available.

Command signals can be sent from the auto setup box directly into Digital Data Loc or remotely via the digital base station, which in turn connects to the auto setup box.

Stored data is converted to analog and supplied to the camera, always maintaining initial setup levels. Since the memory is non-volatile, the setup levels are retained.

Compensation data from the auto setup box can be stored at the Digital Data Loc, allowing the box to be disconnected from the camera to set up additional cameras sequentially.

During this past year Philips began talking about its LDK-14S, the most recent version of the popular LDK-14 model. It was performing at NAB '81. The 14S uses new diode gun Plumbicons. New low-noise FETs, mounted on the tube target contact, yield high S/N ratios and provide protection from spurious signals. A new high-transmission f/1.4 prism system is incorporated. These features plus those earlier associated with the LDK-14 make it a no-compromise EFP portable.

A totally new camera, the HL-83, was announced by Ikegami, who said this camera introduced a new era. It's smaller in size, lighter in weight, and uses less power than the HL-79D, yet it has all of the performance operational features required by broadcasters.

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It takes only a second to release your entire camera with O'Connor's new quick release option. To prevent accidental releases, it has a built-in safety feature.

WITH BASES, WE'RE LOADED.

The Model 50 can be ordered with one of six bases. Besides two Pro Jr. types, Mitchell, Arri 16 and Arri 35, we also offer the O'Connor Claw Ball Base with the "ultra positive grip." The distinctive aluminum ridges

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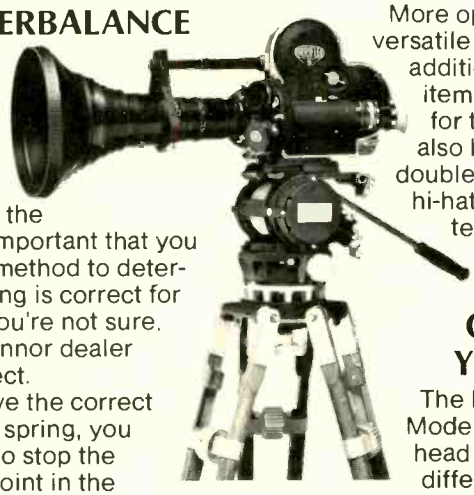
O'CONNOR COUNTERBALANCE DEFIES GRAVITY.



Three counterbalance spring options are available for the Model 50. It is important that you use the proper method to determine which spring is correct for your needs. If you're not sure, consult an O'Connor dealer or talk to us direct.

When you have the correct counterbalance spring, you should be able to stop the camera at any point in the normal tilting range and release the handle without the camera moving. And it should take no more effort to tilt it upward than it does to tilt it downward. We specifically design counterbalance into all our heads to correct this natural act of gravity so that your "tilts" are as steady as your "pans."

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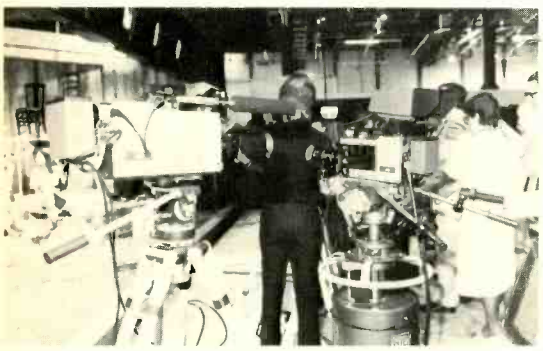
Circle 120 on Reader Service Card

Harris's TC-85 features computer setup of fine registration, black and white balance, gamma, and flare



JVC's camera display highlighted the improved KY-2700U, successor to the KY-2000

cluding viewfinder, the new camera is amenable to having a miniature VCR attached to it (presumably the quarter-inch For-A or Technicolor system).

The HL-83 draws only 15 W which permits up to three hours of operation with an attachable Ni-cad battery. The system boasts a f/1.4 prism system with bias light and a 57 dB S/N ratio.

Both Thomson-CSF and Sony have refined their portable camera product lines into essentially two cameras each (Sony manufactures the units under license from Thomson-CSF).

In the new line-up, Thomson-CSF has apparently retained the term Microcam only for the 501 series. The 501 is a lower-priced version of the MC-701. The MC-701 is described as a three-in-one camera (a studio camera, an on-location camera with multi-core or triax to a CCU, and an ENG/EFP one-piece camera). The MC-710 ENG/EFP version weighs 11.4 pounds and includes automatic color balance and auto registration centering. A diode gun tube can be used. The MC-501 offers two-line enhancement and automatic white/black balance.

Sony refers to its versions as the improved BVP-300A and the BVP-250. Through low-noise FET preamps, the BVP-300A has an S/N ratio of 56 dB, compared to 53 dB for the older BVP-300. (The Thomson-CSF 701 claims 57 dB, but with a diode gun tube. Sony's diode gun version is the BVP-330.)

The BVP-250, derived from the 300A, offers stable auto color balance and an S/N of 54 dB, but no automatic beam optimization.

Hitachi continued to show its top-of-the-line cameras, the SK-91 ($33,000) and its slightly heavier and lower-quality cousin the SK-81 ($23,000.) It also showed the general-purpose FP-40S. Likewise, Toshiba continued to show its older units such as the PK-39 ENG/EFP camera. Fernseh, Inc. showed the KCA 100 ENG/EFP camera, introduced several years ago, and Cinema Products stood pat with the MNC-81.

For more information: RCA TK-86, **311;** Toshiba PK-60, **312;** Philips LDK-14S, **313;** Ikegami HL-83, **314,** Thomson-CSF 501, **315;** 701, **316;** Sony BVP-300A, **317;** BVP-250, **318.**

Convertible cameras everywhere

Top-of-the-line ENG/EFP cameras are so good they perform as well as most studio types — and with the availability of a full range of lenses, there is no reason why such cameras should not be used in the studio. This year, as mentioned, the Ampex Digicam BCC-21 was introduced as a convertible.

In the Ikegami booth the HL-790 studio camera had an HL-79 inside it. RCA had the TK-860.

Of course, there were some cameras designed to be convertible right from the outset, such as the CEI-310. Although this was something of a special case, CEI showed how a 310 was converted by Panavision to shoot tape using the same lenses, matte boxes, filters, and gear heads used in shooting film. The unit is called the Panacam Electronic Cinematography Camera.

Last year Thomson-CSF introduced a top-of-the-line camera designed for multi-role use, the TTV 1525.

For more information: Ampex BCC-21, **319.**

Studio cameras stress auto setup

The trend to more and more automatic setup of studio cameras continued at NAB '81, following the lead set by the RCA TK-47 two years ago. Ampex touted the BCC-21 as a studio digital convertible capable of being set up by a master setup panel. Harris introduced the TC-85. Hitachi promoted the fact that its SK-100 automatic studio camera was selected by the CBS Network. Ikegami announced a new totally automated field/studio camera, the HK-322. Marconi has taken a further step in automating the Mark IXB by including a dedicated microprocessor for the control of automatic registration sequences. And Toshiba said its PK-40 digitally controlled studio camera is "perhaps the finest video camera ever built."

Harris's new TC-85 represents a slightly different approach. An independent computer is used for each TC-85. There is no waiting to set up cameras in sequence and no disaster if the master computer fails. With each camera having its own computer, every camera in the studio can be readied in 45 seconds or less. If a new tube is installed, the TC-85 can set itself up properly.

The TC-85 system allows a video operator to override the computer setting if desired. Although the computer setup is standard, the camera may be ordered without this feature.

Marconi's Mark 1XB, like the Harris TC-85, incorporates separate computers in each camera.

Ikegami has adopted a centralized digital control system for its new HK-322 line. As many as 100 cameras can be set up from a single control point. Although the camera was designed to be automated rapidly and accurately, operational performance in terms of colorimetry, stability, and reliability has not been compromised.

Through the use of special digital registration, the HK-322 is making the same claims as the Ampex BCC-20/21: less than 0.05 percent color registration error and under 0.1 percent geometric distortion over the entire raster. As with the Ampex unit, complete digital shading and correction is provided.

The HK-322 camera uses one-inch XQ-2070 diode gun Plumbicons or XQ-1500 anti-comet tail tubes. The camera also includes some special effects as a result of deflection modulation. A lower-cost version of this camera *sans* automation is available as the HK-302. It uses 2/3-inch diode gun Plumbicons.

Many camera options

Something new in camera options was shown at this year's NAB by a small company called RAVE (Reliable Audio Video Enterprises). The company sells a PC board for insertion in the camera to produce an in-camera reticule. The RPG-1000 generates a video pattern showing the composite safe title and action area as specified by SMPTE.

RCA announced the TK-47T as a triax version of the company's automated camera. Cable links of more than 10,000 feet are possible. The TK-781 was also introduced as a triaxial version of the TK-761 studio/field camera. The Ikegami HK-322 and 302 cameras offer triaxial capabilities, as does the new EFP camera the HL-83. The Toshiba TK-60 offers triax options, and so does the new Marconi Mark IXB. The

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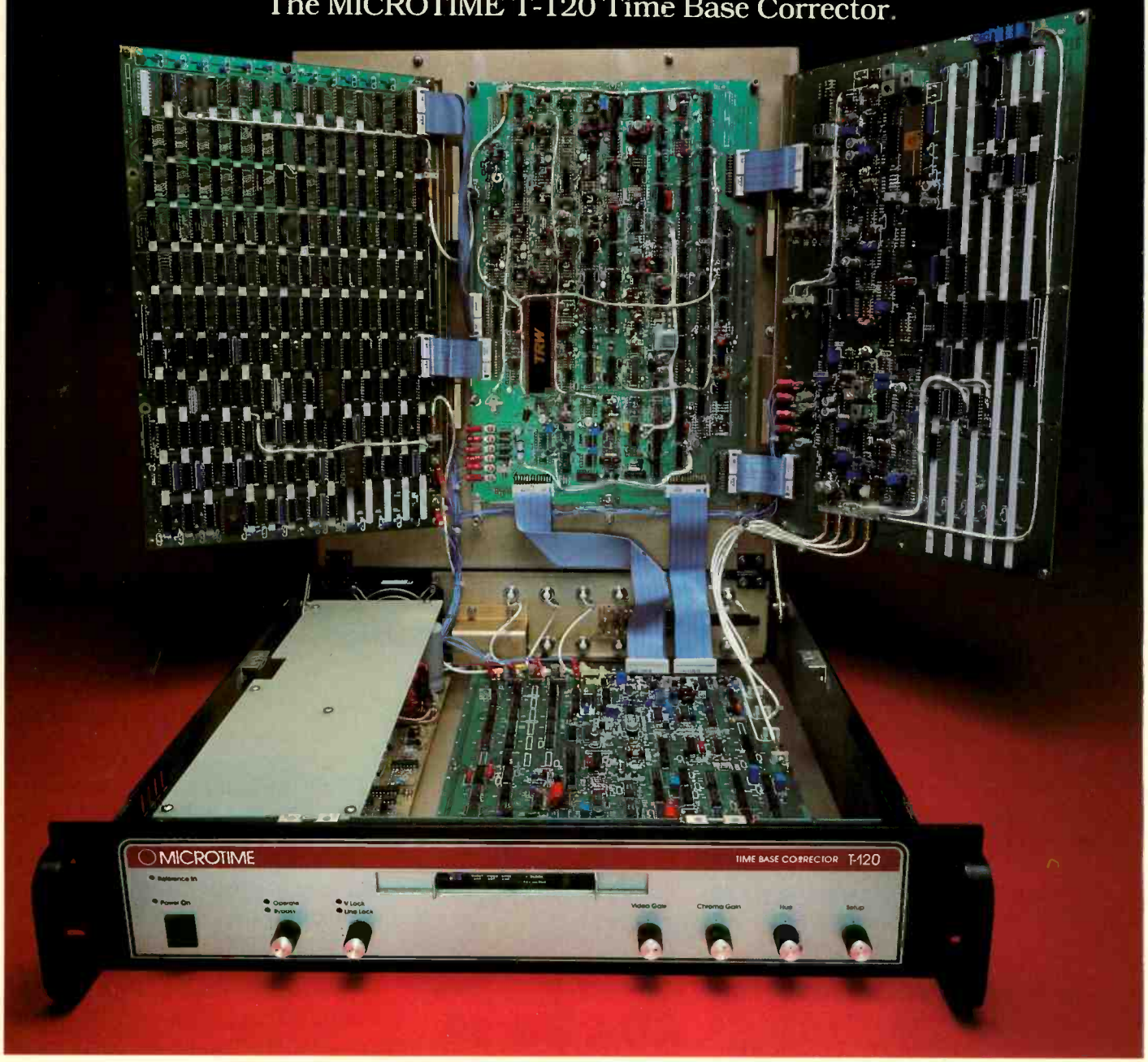

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Thomson-CSF 701 has a triax adaptor for up to 4000 feet remote operation. Harris's new TC-85 is available with a triax option.

Fiber optic connections were promoted by Ampex in the BCC-20/21 and by Fernseh and various independent companies, but there was no ground swell in this direction. This subject is treated more extensively later on.

In order to eliminate bulky multicore cables between the camera and remote control unit, Cinema Products has created a healthy business for itself by promoting coaxial remote systems for various cameras. At NAB '81, CP said it now offers coax remote control for the Sony BVP-300/330 and Thomson-CSF's MC 601/701 cameras. (The system has already been available for the RCA TK-76 B/C, the Ikegami HL-77 and 79, and NEC's MNC-71 series of cameras).

Rank Precision Industries has also entered the business. It offers triax and RF link adaptors for Ikegami HL-77 and HL-79 cameras.

For more information: Harris TC-85, **320;** Ikegami HK-322, **321;** HK-302, **322;** RAVE RPG-1000 PC board, **323;** RCA TK-47T, **324;** Marconi Mark IXB, **325;** Rank triax adaptors, **327.**

Half-inch, improved stripe filter tri-gun tubes stand out

The major advances of the last few years gave way this year to half-inch tubes, both Plumbicons and Saticons, and improvements in stripe filter tri-gun tubes.

Although RCA was alone in showing a camera using the new half-inch tubes, at least four other manufacturers have received or are about to receive sample tubes. Half-inch tubes have been heralded as the *last* major advance before solid state pickup devices take over.

Amperex said the new tubes, which are only three inches long, are both lighter in weight and lower in power drain than 2/3-inch types. They incorporate most of the advances worked into other Plumbicons, however, featuring diode electron guns for dynamic beam control. Their output capacitance is low (3.5 pF), thanks to a special signal plate and contact. The new tubes include isolated front-end mesh contacts for reduced line pickup, evaporated wall electrodes, reduced magnetic deflection power, and low power electrostatic focus.

Despite its miniature size, the new Plumbicon delivers high quality pictures. The sensitivity is somewhat less than that of larger tubes, but this is made up in a faster rated optical system. The new tubes are made in Eindhoven, Netherlands, and will be priced around $3000, according to Amperex.

Half-inch Saticon tubes were announced by RCA Electro-Optics Devices. (The RCA Hawkeye uses either Plumbicons or Saticons.) These new tubes were designed by RCA and are expected to be manufactured in RCA's Lancaster, Penn. plant.

The half-inch Saticons feature low capacitance by virtue of their small scan formats and have low-lag guns for good low light level performance. The photoconductor has low reflectivity throughout the visible spectrum, resulting in minimum flair.

RCA says resolution is excellent. At 400 TV lines, amplitude response is typically 40 percent. Lag performance is typically less than 2 percent. Identified as BC 4398B, G, or R, the tubes are priced at $1850 each.

The high resolution and good spectral response of Saticon photoconductors showed up in stripe filter tubes for single-tube cameras. Sony identified its new stripe filter tube as the Sony-patented highband Saticon Trinicon. It incorporates a built-in bias light and automatic beam suppression circuitry. The tube incorporates deposited electrostatic deflection electrodes along with a new gun assembly to control beam spot size position. Advances in striped filters make 400 TV lines of resolution possible.

Hitachi identified the new pickup tube in its single tube camera, the FP-10, as a "one-inch M type tri-electrode Saticon HS 302." It, too, has a built-in bias light and accommodates an automatic beam optimization circuit. Although Hitachi did not have a bulletin on this tube at NAB, its most recent catalog describes a new approach to "filter integrated color Saticon targets and "electrostatic focusing of electron beams" (phrasing similar to that used by Sony).

In other Saticon tube areas Hitachi promoted the fact that a second-generation low-lag Saticon layer was at hand. It described these tubes as Saticon IIs.

Fujinon said its new 30X lens for 2/3-inch cameras could eliminate the need for large cameras at sports events

Angenieux's 15x9 ENG zoom offers high performance in a small package

Tentative bulletins prepared just prior to the NAB show described an H8397B, an H8398B, an H9366B, and an H9369B tube. Saticon IIs use computer-aided evaporation technology, new doping approaches, control of impurities and refined materials purification methods.

A new diode gun Leddicon for "advanced generation" 30-mm cameras was shown by English Electric Valve. The tube has an ultra high-resolution target with low output capacitance. It uses a one-inch scan format for precise geometry and registration. A new 25-mm diode gun HOP (ACT) Leddicon was also shown, along with an array of other camera tubes.

With so much emphasis on ½-inch tubes and striped filter tri-gun tubes, CCD was easily forgotten at NAB '81. But Fairchild Camera did exhibit a camera with a single chip 488x380 element sensor in operation along with a striped filter. Three chips in a camera would produce very acceptable pictures at reasonable light levels, Fairchild said. (A 488x380 array when operated in a 7.16 MHz clock frequency provides a signal compatible with NTSC b & w standards).

For more information: Amperex half-inch Plumbicons, **328;** RCA Electro-Optics half-inch diode gun Saticons, **329;** Hitachi Saticon II, **330;** EEV 30mm diode gun Leddicon, **331;** 25mm diode gun HOP Leddicon, **332;** Fairchild CCD area image sensors, **333.**

Lenses continue to proliferate

Brand-new lenses were, of course, needed for the half-inch tube cameras and both Fujinon and Angenieux responded. But beyond that many other lenses were announced, including a new autofocus lens by Canon.

Fujinon showed two types for half-inch tubes: a 14X and a 12X. Both lenses offer f/1.4 speeds that remain flat for a very wide focal length of 7 mm out to a zoom of more than 10X. The longer of the two, the Fujinon S14X7, has a built-in 2X extender and an extended range of 196 mm (equivalent to a 550 mm lens for 1¼-inch format tubes). With hood and servo unit, the weight is

Canon's autofocus lens lets broadcasters prefocus on sound stages, for example

1.7 kg. The S12X7 weighs only 1.3 kg.

Angenieux showed a similar aperture lens for half-inch tubes, an f/1.4 15X system. It too had a built-in 2X range extender. Its weight is 1.2 kg as given in the "preliminary" data sheet. Its minimum focal distance was 0.8 meters (same as the Fujinon). Horizontal field angle was given as 48 degrees to 3½ degrees.

Angenieux devoted more attention to its 15x9 zoom for 2/3-inch tube cameras, which has a high aperture of f/1.5 with a photometric factor of 1.1. This lens is flat to 100 mm and drops to 1.9 at 135 mm. A built-in turret-operated 2X extender can be used in low light levels. Despite the large lens elements, it weighs only 2.1 kg. The lens is weather-resistant, with shower-proof optical and servo units. An 0.8X retrozoom provides a wide angle of 60 degrees.

The new Canon autofocus lens uses a through-the-lens focusing design based on an infrared system. A strong infrared emitting light comes from a diode within the lens. Infrared light reflected from the subject automatically adjusts the focusing to the proper position. Canon says the major advantage of an infrared active system, as opposed to other methods, is that it can focus even in darkness — for example, for prefocusing on a sound stage during a live presentation.

Automatic focus can be accomplished between one and 30 meters. A touch of the control button activates the system. Wide-angle or telephoto positions do not affect the unit. The focus zone for the infrared beam is only 1 cm, making it very precise. The autofocus was shown in a P18X16 B lens, which has an aperture of f/2.1 to 2.7 and a practical focal length range of 16 to 288 mm. The lens also has built-in 1.5X and 2X extenders.

Canon showed a new ENG/EFP lens, the J13X9BIE-II. It is lighter in weight than its predecessor with no loss in optical quality — the II weighs 1.45 kg.

The major theme at Canon was to get more use out of ENG/EFP cameras through different lenses. The Canon J13X9B or J13XBIE with built-in extenders are ideal for news; the J20X8.5B IE lens is ideal for field or studio commercials; the J25X11.5B IE converts the camera to a fixed-position sports camera. The J20 and J25 lenses were introduced last year.

New from Schneider (Tele Cine booth) was a 15X wide-angle lens with 2x flip-in range extenders and a diascope. Type TV 51 fits 1¼-inch cameras (zoom range 16 to 240 mm with extender), while the TV 61 is for one-inch cameras (zoom range 12.5 to 190 mm without extender). The horizontal angle of view is 53 degrees to 3.9 degrees (without extender).

Fujinon showed a series of new lenses in addition to its offerings for half-inch tube cameras. One of its prize lenses was a new high-quality 30X EFP lens the company called "the ultimate zoom lens for 2/3-inch format cameras." (The 30X goes beyond Fujinon's earlier 22X and Angenieux's and Canon's 25X zoom's for 2/3-inch cameras. Although Schneider has sold 30X lenses, adaptors are necessary and weight is high.) The new Fujinon A30X11 lens with built-in 2X extenders has an f/1.6 aperture flat from 11 mm to 220 mm. At 330 mm the speed is f/2.4. The lens with hood weighs approximately 9 kg.

Another new Fujinon lens is a 14X zoom for one-inch format cameras. Designed for a wide range of studio lighting levels, the lens has a maximum aperture of f/1.6. The company showed several other lenses, including lightweight and economy versions of others in its line. It also showed a fixed-focus lens suited for the Ikegami EC 35 electronic cinematography camera, introduced in 1980.

An EFP matte box for "the film look in video" was a new accessory at the Cinema Products booth. It fits most 15X to 17X lenses for ENG/EFP use. The unit accommodates two flip-on rotatable filter sizes and 4½-inch diameter special filters, such as star and fog filters available from Tiffen.

Tiffen itself had a variety of lenses and accessories, but its principal new product was a sturdy stackable filter case that holds seven filters.

For more information: Fujinon half-inch format lenses, **334;** 30X EFP lens, **335;** 14X zoom for one-inch cameras, **336;** Angenieux half-inch format lenses, **337;** f/1.4 15X system, **338;** 15x9 zoom, **339;** Canon autofocus lens, **340;** J13X9BIE-II, **341;** Schneider (Tele Cine) 15 X wide-angle, **342;** Tiffen filter case, **344.**

New means of supporting cameras; new teleprompters

The more cameras that evolve, the more the need for new mounting heads, pedestals, tripods, dollies, and other camera support equipment. NAB '81 had quite a lot to offer in this area.

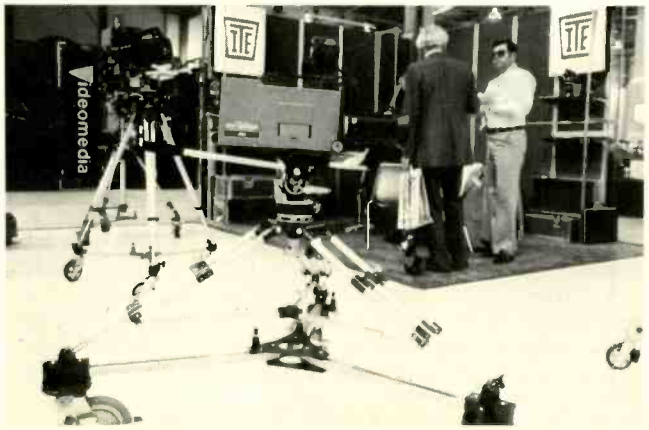
Many of the new items on hand were designed to make producers more creative. One such item shown at Las Vegas was the Video Mini-Jib from Matthews Studio Equipment. The Mini-Jib arm provides smooth fluid camera action in vertical, horizontal, and diagonal directions. Its arm rotates 360 degrees for an infinite variety of camera positions.

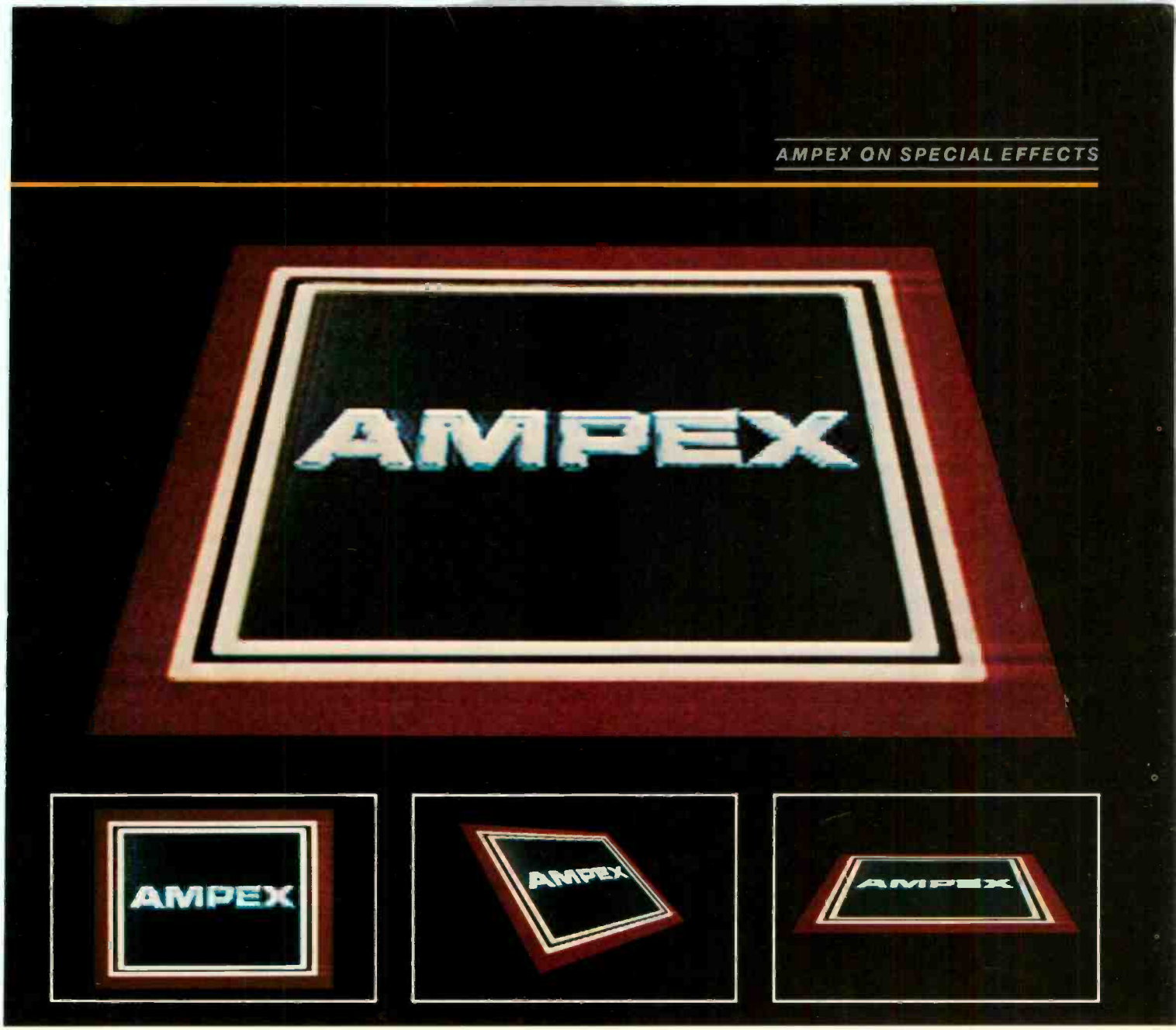
Matthews boasted 75 new innovations for 1981, including such items as furniture clamps, meat axes, drop ceiling scissors clamps, and gimbal roller heads.

Listec showed five new systems at NAB '81. The Vinten Plover transportable pedestal model 3179 was the first. This compact pedestal, suitable for remote work, handles 50- to 230-pound loads without changing gas pressures. (A new multi-ram system allows the user to change camera or lens in the field without changing apparatus.)

A new production pedestal for lightweights — 200 pounds or less — is the Vinten Raven studio pedestal. The Raven offers a 24.5- to 59-inch elevation range at no sacrifice in smoothness or flexibility.

The T-13 tripod from ITE supports up to 70 pounds





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NAB SHOW IN PRINT

The Vinten ENG pan and tilt head, Model 3199, is designed for light ENG and location shots with small cameras and big lenses. The new head handles 25-pound weights and offers 90 degrees of tilt and 360 degrees of pan.

The fourth Listec system, the Cygnet pan and tilt head, operates with lubricated friction dampeners and was introduced last year. This year's model 3089 weighed only 10 pounds. Camera lenses weighing up to 25 pounds can be panned and tilted smoothly since the camera rotates about its own center of gravity, with no cams or spring.

The fifth Listec item was a Digivision monitor prompting system, D12/D17 SH and ESH. The new model is available for smaller ENG cameras and includes video keyer enhancement.

Innovative Television Equipment offered several new products in addition to its full line. The ITE H10 Hydro Head represents a new concept in viscosity drag control for pan and tilt. It incorporates adjustable center of gravity controls that permit perfect counterbalance load control, thus providing constant camera balance.

A second new product was the ITE T-13 tripod, designed for EFP cameras equipped with video viewfinders. The design eliminates any radial torquing to the top assembly and legs. Loads weighing up to 70 pounds can be supported.

Several new Sachtler products were shown by Arriflex, including the Studio 7 plus 7 fluid head tripod, designed to handle larger and heavier cameras in a compact design.

Sony's BVU-800 VCR has new tape-handling features for editing efficiency

Television Products, Inc. brought two new products — the P-80 air-counterbalanced camera pedestal, designed for studio production, and the P-25 low-priced unit. TVP says the P-80 was designed through inputs from a national user questionnaire in consultation with network studio camera operators. Vertical height range is 21 inches to 58 inches. A single steering and lift ring allows simultaneous steering and elevation movement. Ballast can be added to compensate for lightweight EFP cameras. The P-25 is based on the P-20 model but incorporates features found on larger units. Adjustment of counterbalance force is achieved by adding or subtracting air pressure through a Schrader valve.

Two new universal fluid heads were shown by Davis and Sanford Co. The dual-handle fluid action head, Model 12, accommodates all cameras up to 12 kg in weight. Features are positive tilt lock and tilt tension control and auto slip — a self-adjusting automatic breakaway quick pan. A snap lock quick-release camera mounting plate is included. The Model 808 fluid head is designed for cameras weighing up to eight pounds. It includes Hydralock, a new concentric hydraulic lock/tension device.

Both O'Connor and Quick-Set showed complete lines of video and motion picture support equipment. The Quick-Set exhibit featured Samson, Hercules, and Gibraltor heads, tripods, dollies, and pedestals and Husky dollies. O'Connor displayed its own heads and tripods, including the ingenious HydroPed, Model 102B, which locks on any terrain and is very rigid in torsion and bending.

New Gitzo fluid heads and tripods were shown by Karl Heitz. The Video Combi tripods handle cameras weighing up to 35 pounds. Featured was an extra-light (1¾ pound), short (14 inches) tripod capable of handling light video cameras.

Progress Toward the All-Digital Studio Reported at NAB 1981 — No Standard Yet

As it did a year ago, the SMPTE made a presentation to television engineers attending NAB on its progress towards reaching a world standard that will help usher in the all-digital studio. A highlight was a panel discussion covering the SMPTE digital video component tests conducted in San Francisco the first week of February. (See *BM/E*, April, 1981, for a report of the San Francisco event.)

Those tests lead to two perferences being stated, one by SMPTE and one by EBU. SMPTE, consisting mostly of engineers coming from 525-line countries using NTSC, favored a component-coded digital television system in which the luminance signal is sampled at a frequency of 14.3 MHz and the two color difference signals sampled at the frequency half that rate (the so-called 14:7:7 scheme). EBU members, witnessing the tests in San Francisco and having made many tests of their own, favored a 13 MHz sampling rate, or at best, a 13.5 rate. Both groups, however, agreed that a single world sampling rate acceptable to all parties would be most desirable. SMPTE's Digital Task Force on Component Digital Coding and selected members of the SMPTE Digital Working Group attended joint meetings with EBU Working Party V subsequent to the San Francisco meeting to discuss the preferred rate.

During those meetings the SMPTE Task Force concluded it could not get the EBU to agree to the 14.3 MHz sampling rate. It could however get the EBU to move up to 13.5 if that were to become a world standard. The Task Force came back with the recommendation that 13.5 MHz be accepted as a standard to be passed on to the ITU CCIR committee for ratification and approval.

On the last day of the NAB Convention the SMPTE Working Group on Digital Video Standards met to review its position in light of the EBU stance (made public in a press release of that date — April 15.) EBU said it had the support of other broadcasting unions such as the OTI (Organizacion de la Television Iberoamerica), as well as encouraging reactions from the Union of National Radio and Television Organizations of Africa (URTNA) and the North American National Broadcasters Association (made up of ABC, CBS, NBC, and PBS of the U.S. and CBC of Canada).

But the Task Force could not get consensus that 13.5 MHz should be the new standard. Indeed, an ad hoc committee on digital television from Japan, represented on the SMPTE committee, arrived at the conclusion that perhaps two standards should be set: 14.3 and 13, which are convertible to each other within an active TV line by a 10:9 relationship.

The committee meeting at NAB did decide that it would look further into the possibility of adopting 13.5 after its impact on the cost and performance of 525-line equipment was understood more fully. The SMPTE Task Force on Component Digital Coding will continue to meet with other concerned groups; a trip to Japan is planned in May. The EBU Administrative Council had a meeting scheduled for May 22 to 25, 1981 (after press time), at which time it planned to make a formal recommendation to CIR.

While this process has been going on, potential manufacturers of digital video recorders have been quiet. There were no demonstrations at NAB showing new highs in packing densities or support for this or that error correction code. Only Hitachi showed a working digital videotape recorder (using a modified Type C transport); no unusual claims were made for it.

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NAB SHOW IN PRINT

Lee-Ray Industries showed lightweight wheeled cart carriers, including folding equipment requiring minimum storage space.

Camera remote control systems were shown by Evershed Power-Optics and Canon. The Evershed equipment has been exhibited before, but the Canon remote control pan and tilt system, U-182, is quite new. This computerized system can be pre-programmed for up to 10 shots. It is quite compact and lightweight and consists of four modular units: the pan/tilt unit (180 degrees of pan, 40 degrees of tilt), the master control unit, and two different operating units. The pan/tilt unit comes with a Canon J13X9B f/1.6 zoom lens. Panning, tilting, focusing, and zooming can be accomplished by the remote control unit. One operational unit handles programming and playback; the other is playback only.

Telescript's line of monitor prompting equipment included an infinitely variable digital prompter, the MPS. It incorporates Electrohome's 1981 1000-line resolution monitor for good readability.

Q-Tv-Telesync showed a new lightweight (9 pound) on-camera videoprompter, the VIV. A six-inch monitor is magnified by an optical beamsplitter to equal the image of a monitor. Also shown was a new Mini-Q-Prompter for ENG cameras.

For more information: Matthews Video Mini-Jib, **345;** new equipment line, **346;** Listec Plover, **347;** Raven, **348;** 3199 pan & tilt head, **349;** Cygnet 3089, **350;** Digivision prompting system, **351;** ITE H10 hydro head, **352;** T-13 tripod, **353;** Arriflex (Sachtler) head, **354;** Television Products P-80 pedestal, **355;** P-25 pedestal, **356;** Davis & Sanford Model 12 head, **357;** Model 808 head, **358;** Heitz (Gitzo) Video Combi tripods, **359;** Canon U-182, **360;** Telescript MPS prompter, **361;** Q-Tv mini-prompter, **362.**

Power packs

Things have settled down somewhat in the battery market. Most manufacturers have returned in full force to Ni-cads. The improvements were to meet the needs of lower power consumption in the newer cameras and the battery weight loss that means. There was also the problem of charging a variety of VTR and camera batteries without having to buy a charger for each.

Frezzolini Electronics introduced what seemed to be the most versatile of the systems, the MBC-2. This multiple battery charger can handle five Frezzi camera packs in the fast charge mode and eight VTR batteries on a trickle charge simultaneously. Frezzolini also showed its complete line of batteries and chargers.

While the cost of silver has made it costly to continue manufacturing silver/zinc batteries, the ones that have been sold are precious to their owners. To help prolong battery life, Anton/Bauer introduced a diagnostic discharger/equalizer for silver/zinc portable power packs. There is also a unit for both silver and Ni-cad batteries. Anton/Bauer also introduced a new four-position slow charger.

Christie Electric continued to make improvements in its ReFLEX-20 fast chargers and batteries.

CINE 60 introduced a multiple battery charger that can handle seven mismatched batteries and dememorize another battery on an eighth channel. The CATC 35 is modular in design, with each charger a separate unit that can be programmed to whatever type of battery is plugged in. It sells for $2195.

Two other chargers were introduced by CINE 60. The Four-Channel Sequential Fast Charger handles four Ni-cads in four hours. The ENG-1 is a versatile fast charger that can charge any Ni-cad battery, from 1.2 AH to 7 AH. Charge time depends on the kind of battery.

CINE 60 also introduced a new lightweight power belt, the Sofbelt™. It provides the same power capability as other CINE 60 power belts but is foam-cushioned and attaches with Velcro® fasteners.

Comprehensive Video was displaying the PAG Power line of belts, batteries, and chargers.

PEP, Inc. introduced a new line of 4 A Ni-cad batteries weighing about two pounds and good for one hour of continuous use. They have on-board adapters and cost $595.

PEP also introduced replacement batteries for most VTRs. A new fast charger can bring batteries back up to power in 40 minutes.

Perrott Engineering Labs introduced the 8100 Series fast charger. The new unit will accommodate any Ni-cad battery and charge it in an hour.

For more information: Frezzolini MBC-2, **363;** Anton/Bauer silver/zinc discharger, **364;** Cine 60 CATC 35, **365;** Sequential Fast Charger, **366;** ENG-1, **367;** Sofbelt™, **368;** PEP Ni-cad batteries, **369;** replacement batteries for VTRs, **370;** Perrott Engineering 8100 fast charger, **371.**

More formats on VTR's 25th anniversary

Twenty-five years ago Ampex exhibited the first quadruplex videotape recorder to the broadcast industry at the 1956 NAB convention (then the National Association of Radio and Television Broadcasters). 3M participated in that historic event by providing the first two-inch videotape. There were many refinements to follow, some by Ampex, others by RCA, but essentially there was only one format — quad.

In 1970, Sony showed the ¾-inch U-Matic videocassette format, which did not impact the broadcast industry until the ENG revolution began several years later. On videotape's twentieth birthday at NAB, '76, Ampex unveiled the VPR-1 one-inch VTR with AST,

The studio portion of RCA's Hawkeye system includes the HR-2 VTR and HE-1 edit controller, which provide full production and post-production capabilities

Two BVU-800 U-Matic editing VCRs can be interconnected for complete editing capability. Microprocessor control is built in

RCA had a new Supertrack option for its AE-800 editing system

Sony introduced the BVH 1000, and Fernseh brought the BCN. Things have never been the same since.

The twenty-fifth anniversary saw yet two other formats emerge at NAB—high band half-inch videocassette types from RCA, Panasonic and Sony incorporated in new camera/VTR combinatio's for ENG, and quarter-inch video cassettes for ENG from For-A and Technicolor.

We said all that is available for print about the new half-inch recorders-players when we talked about the combined cameras/VTRs earlier. This section will look at the new round of ¾-inch videocassettes for broadcast and new half-inch entries for ENG-institution work. The Technicolor quarter-inch recorder will be covered briefly. Finally, advances in one-inch machines will be discussed. We will also take a look at wideband VTRs — those able to record up to 12 MHz.

¾-inch and half-inch advances

The biggest news in the ¾-inch field was Sony's unveiling of yet another videocassette recorder, the BVU-800. The technical capabilities of the BVU-800 take ¾-inch recorders to a new plateau in terms of quality, portability, and cost efficiency, says Sony. What distinguishes the BVU-800 from other U-Matic equipment is a built-in microprocessor control system which makes it capable of editing with a second BVU-800 without an equipment controller interface. A Sony spokesman said, "Two interconnected BVU-800s provide complete editing capability, eliminating the need for a third box."

The BVU-800 is a front-loading device for added convenience (units can be stacked) and incorporates new tape handling features. Six dc motors are incorporated in the die cast transport, which keeps the type threaded around the drum in all modes except eject. This avoids the load/unload cycle found in standard U-Matic VTRs.

Since the tape remains threaded around the scanner, the BVU is capable of capstan control in search and jog modes. Front panel control offers fixed speeds of one-thirtieth, one-tenth, one-fifth, one-half, one, two, five, and 10 times normal speed. Color pictures are provided up to 10 times and monochrome up to 40 times normal speed in either forward or reverse.

The same video and audio editing concepts found in one-inch VTRs have been refined for the BVU-800. Video and/or audio one and two, insert and assembly editing are possible, as is the ability to rehearse, implement, and review in manual or auto edit modes. This gives the BVU-800 editing flexibility more commonly associated with microcomputer-assisted editing systems.

Audio inserts have timed entry and exit sequences, enabling perfectly matched "split edit" on audio one and two. High speed search and forward/reverse jog ability make audio and video editing fast and accurate.

An audio mixer between audio channels one and two allows for switching of two inputs or mixing. The Sony BVU-800 is compatible with the Sony BVE-500A editing system. Delivery is anticipated for summer of 1981.

Panasonic, which last year introduced a new ¾-inch editing videocassette recorder, the AU-700, showed up this year with an editing controller with SMPTE time code accuracy, the NV-A970. Its microprocessor logic allows insert and assembly editing on Panasonic AU-700, NV-9200, NV-9500, and NV-9600 series machines, as well as on the VHS industrial models. The controller reads both control track pulses and SMPTE time code. Five edit point search speeds are included. Plus and minus trim points and single field shift buttons for use with the AU-700 are included, as is a length-of-tape memory.

Another development in the ¾-inch U-Matic category was the availability of a unit designed for airborne use. TEAC showed the V 1000AB-F Type IV, a rugged but compact unit intended for installation in aircraft, including helicopters. A remote control panel with TTL logic enables the recorder to perform a variety of tasks from the vantage point of the cockpit.

As a means of increasing the value of ¾-inch VCRs, Recortec showed a long playing attachment. The attachment incorporates a reel-to-reel transport. When 14-inch reels are added to a standard recorder, up to 12 hours of play can be achieved. In combination with Recortec's high band system, the HBU-2860 (which operates at high speed), the result is four hours of extended play.

In the half-inch videocassette area, JVC introduced a new heavy-duty BR-6400U recorder and a BP-5300U player using the VHS format. Among the features of the recorder are direct drive of the head drum; a four-head system (two pairs of video heads — one for normal recording/playback, the other for slow motion or still frame playback); high speed search up to 10 times while watching pictures; remote control of playback from still to five times normal; two-channel audio and automatic front loading of the cassette. Both units directly interface with JVC's editing controllers, the RM-88U and the RM-82U.

A half-inch videocassette recorder configured into a time lapse recorder was shown by Panasonic. The NV-8050 offers time lapse modes — two hours (real time), 12 hours, 72 hours, 160 hours and 240 hours. A VHS videocassette is the recording medium, although the format is not compatible with other VHS machines.

Another highlight of the Panasonic

Dolby's 221 brings two channels of noise reduction to the BVH-1100

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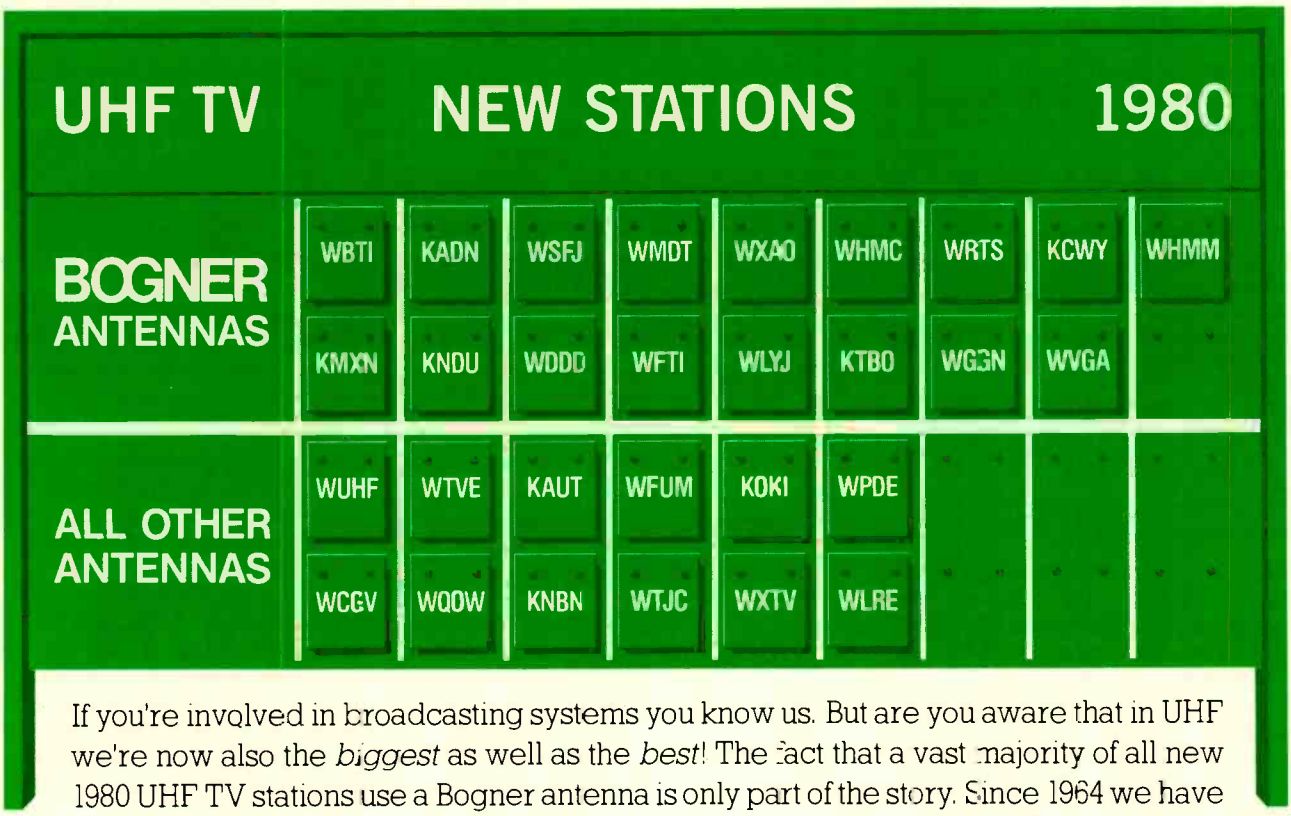

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exhibit was a new high-speed VHS tape duplicator system, the Video Tape Printer (VTP). It can produce copies of two-hour and four-hour VHS cassettes in about four minutes. The VTP consists of a master recorder and printer. The master printer makes mirror images of the original, recording it on a high coercivity half-inch tape contained in a cartridge. In the printer, the master and slave tapes are tightly wound together by a contact bifilar winding method. A magnetic transfer field is applied to complete the duplication. A slave tape feeder holds up to 15 tapes for automatic operation. The master tape can be used for about 1000 copies.

For more information: Sony BVU-800, **372;** Panasonic NV-A970 editing controller, **373;** TEAC V 1000AB-F Type IV, **374;** Recortec LP attachment, **375;** JVC BR-6400U, **376;** BP-5300U, **377;** Panasonic NV-8050, **378;** VTP, **379.**

Those quarter-inch machines

This year's show was the first NAB to show quarter-inch videocassette recorder/players. Two were on hand: the CV-One (as part of the VCR attached to the camera by Nippon Television Network and shown at the A.F. Associates and For-A exhibit) and the Technicolor seven pound VCR. Both use the same format, that of Funai of Japan. Although ¼-inch formats have not heretofore been seriously considered for broadcast use, both were being promoted as suited for ENG work. Nippon Television Network reported that it had taken its unit up Mt. Everest to produce a documentary. Editing is possible with the CVF-6000 recorder player from For-A. Quality is similar to that of Super 8 film or better.

Visitors to NAB could see the touchdown of the spaceship Columbia at the Technicolor stand. The recording was a bit noisy, but it was not a direct feed. Rather, it was made off-the-air *through a tuner*. Actually, the recording was made on a brand-new Technicolor product, Video Showcase, which includes a quarter-inch recorder, a built-in all channel tuner, a 7.7-inch color picture tube, and a rechargeable battery. This whole package measures just 18 by 13 by 8¼ inches and weighs just over 20 pounds. (The standalone VCR 212 recorder/player portion weighs 7 pounds). The 30-minute videocassette measures 4⅛ by 2⅝ by one-half inches. The company claims 240 lines of resolution for the product, with a luminance S/N of 43 dB. The recorder employs helical scanning with a tape speed of 1.26 inches per second and two heads using FM modulation.

The Panasonic NV-8050 time lapse recorder provides automatic time recording through an internal time/data generator

The For-A CVF-6000 recorder/player has built-in features that make it suitable for editing purposes. There are four shuttle playback speeds: two, one, one-fifth, and one-twentieth times. The operator can switch forward to reverse without going through stop. The 26.4-pound CVF-6000 contains several level meters.

For more information: CV-One VCR, **380;** Technicolor VCR, **381;** Video Showcase, **382;** For-A CVF-6000, **383.**

One-inch VTR innovations minor

There were no startling new announcements in the one-inch professional videotape recorder field at NAB '81. Indeed, Ampex had nothing new to report other than that sales were fantastic — over 5000 of its VPR series have been sold since the unit's introduction in 1976.

RCA, which introduced the TR-800 Type C system last year, stressed the complete recording and editing capabilities of the AE-800 editing system. The AE-800 system takes advantage of several of the TR-800's facilities, such as operation of playback machines in synchronization at variable speeds forward and reverse.

RCA displayed the TR-800's supertrack accessory operating in conjunction with the TBC-800 time base corrector, playing broadcast pictures in reverse frame and forward at jog and other speeds. Also in view was the Multi-Rate Video Controller MRVC accessory for instant replay, which includes a nine-point permanent memory and a scratch memory for automatic search-to-cue and control of multi-rate video operation.

Sony's only new announcement was a three-hour long play one-inch Type C machine, the BVH-1180. This full-console version of the BVH-1100A has 14-inch reels that record 186 minutes, with a fast shuttle speed of 4.5 minutes for a three-hour tape. The machine has been designed for mastering and tape duplication and for playing automatic late-night or early-morning broadcasts. To provide audio confidence, a simultaneous record and play function has been added to three audio channels of the BVH-1180.

3M's slow mo controller for VTRs stores up to 10 cue points

Hitachi also showed a three-hour one-inch Type C VTR, the HR-300, which incorporates a new transport with high-power dc motors. The HR-300 was described not as a specialty machine, but rather as a full production and editing system. It includes all of the exclusive features of Hitachi's HR-200 VTR.

The control focus of Hitachi's VTR display was the one-inch H.P.C. (Hitachi Production Center) system. The HPC package includes the HR-200 VTR, a TBC, and a new control console. Added benefits includes automatic correction of chroma level, independent differential gain and phase control, instant cue point shifting (with no need to re-search to the edit point), tape end sensing, illuminated tape path, expanded TBC control, and audio playback level controls brought to the console's front panel.

3M made a fairly significant addition to its TT-7000 line with the TT-7000-3. A new feature permits the user to go automatically to a preset slow mo or shuttle speed from any other mode (without going to stop). 3M says the feature allows forward and reverse speeds to be preprogrammed for natural slow motion playback.

3M also showed a number of new accessories including a slow mo controller, remote control, and studio console with a monitor bridge. The slow mo controller has memory storage of up to 10 cue points with selectable preroll from 0 to 10 seconds. It includes a 90-minute course clock, pre- and post-cue clocks, and a fine or exact second cue clock.

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Studio console and monitor bridge are available as options with 3M's TT-7000 VTR

The new remote control permits operation of the recorder from up to 100 feet away. The monitor switch panel (rack mount) allows selection of the VTR input/output and remote control of TBC functions.

Part of the 3M exhibit was devoted to showing 3M's digital audio recorder synchronized with the TT-7000 VTR for improved TV sound.

New at the Marconi exhibit was a tie-in with A.F. Associates (AFA) — a side-by-side exhibitor. AFA, as exclusive sales representative for Macroni's broadcast products, exhibited the MR-2 one-inch recorder and the B 4624 monitoring unit (introduced last year) and described the company's expertise in designing and building systems. (Outside the exhibit hall, AFA's handiwork could be seen in the Total Communication System's 45-foot studio-on-wheels, the Video Voyager I.)

Options to the BCN 51 videotape recorder were demonstrated at the Fernseh, Inc. booth. First was a new slide store option that handles 171,000 frames (slides including random access and editing). With the TDF-2 frame store memory, full bandwidth video in both still frame and slow motion is possible. Another option was an extended play recorder, first shown at the 122nd SMPTE Convention. The BCN 51 EP can play a two-hour and 20-minute program without performance degradation. An analog TBC helps avoid quantitization noise; Dolby noise reduction gives for optimum audio reproduction. The BCN-51 EP uses 12-inch reels.

The benefits of Dolby NR for one-inch VTRs was one of the themes at the Dolby exhibit, which offered custom modification kits for Sony and Ampex machines. New this year was item 221, which provides two channels of Dolby A for the BVH-1100 and plugs directly into the VTR in place of the Sony Audio One and Two record/playback module. No modifications are required. A similar unit (220) is being prepared for the RCA TR-800.

Yet another source of long-play VTRs was Merlin Engineering Works, which offered extended play conversion kits (ME-238) for all Ampex and Sony one-inch machines. Merlin's most interesting product, however, was its ultra wideband video recorder, the ME-128.

This unit, a modification of the standard Fernseh BCN-51 records 14 MHz signals. Although it uses a standard scanner and standard heads and regular tape, the transport and servos have been changed to run both the scanner and tape at twice speed. New electronics join with this to produce 14 MHz at 45 dB S/N. The conversion is done at the module level so that machines can quickly be converted back to normal.

For more information: RCA supertrack accessory, **384;** MRVC, **385;** Sony BVH-1180, **386;** Hitachi HR-300, **387;** H.P.C., **388;** 3M TT-7000-3, **389;** slow mo controller, **390;** remote control, **391;** studio console, **392;** Fernseh BCN options, **393;** Dolby 221 kit, **394;** Merlin ME-238, **395;** ME-128, **396.**

Magnetic tape and accessories

The tape talk in Las Vegas centered around the future of metal tape for video. That may have been the talk, but only Fuji introduced any metal videotape, and that in VHS and Beta formats.

Fuji took two approaches: metal videotape (MV) and Vacuum Videotape (VV). Both are experimental at this point, with the formats being tested by major machine manufacturers to see how much redesigning is necessary.

Fuji says that the packing densities available on the metal tapes achieve recording wavelengths below the one micron level.

Jim Ringwood of Maxell feels that the trend in metal tapes is for use in digital VTRs and that metal tape "won't be around commercially for a year or two."

Maxell, for its part, introduced a new 20-minute version of its ¾-inch U-Matic videotape. In the half-inch format Maxell showed a new 4½-hour Beta videocassette, the L-750.

In audio tape, Maxell introduced two new open-reel tapes for slow-speed recording — the UD 18-180 and the UD 25-120. The two new tapes are designed to produce quality recording at speeds as slow as 1⅞ IPS.

3M's Color-Plus U-Matic line now boasts an improvement of 2.5 dB chroma S/N over the industry standard. In the one-inch Type C format, most tape manufacturers made available extended play lengths for the new machines that can handle up to three hours of recording.

Tape accessories manufacturers were also hawking their wares at the show. Audico showed the production model of its 751 VTL videotape loader, introduced in prototype at last year's NAB. The company has upgraded the system so that it can handle almost any tape format from quarter-inch audio tape to ¾-inch videotape. The 751 VTL, priced at under $5,000, will load tapes onto reels, carts, and cassettes.

Capital Magnetics has been making progress in the marketplace over the past year or so and is trying to expand that base. No new carts were introduced, but the company said it is developing metal tape carts.

Television Equipment Associates exhibited the production model of the Elcon EA 750 cleaner/profiler for U-Matic cassettes. The EA 750 allows the user to determine standards for acceptability for tape stock. Simple to operate, the system allows three functions: rewind only; rewind and clean only; rewind, clean, and profile.

The Garner Industries booth highlighted the Garner 1100 degausser for one-inch videotape. Introduced last year in prototype, the 1100 is capable of erasing 13 one-inch tapes per minute.

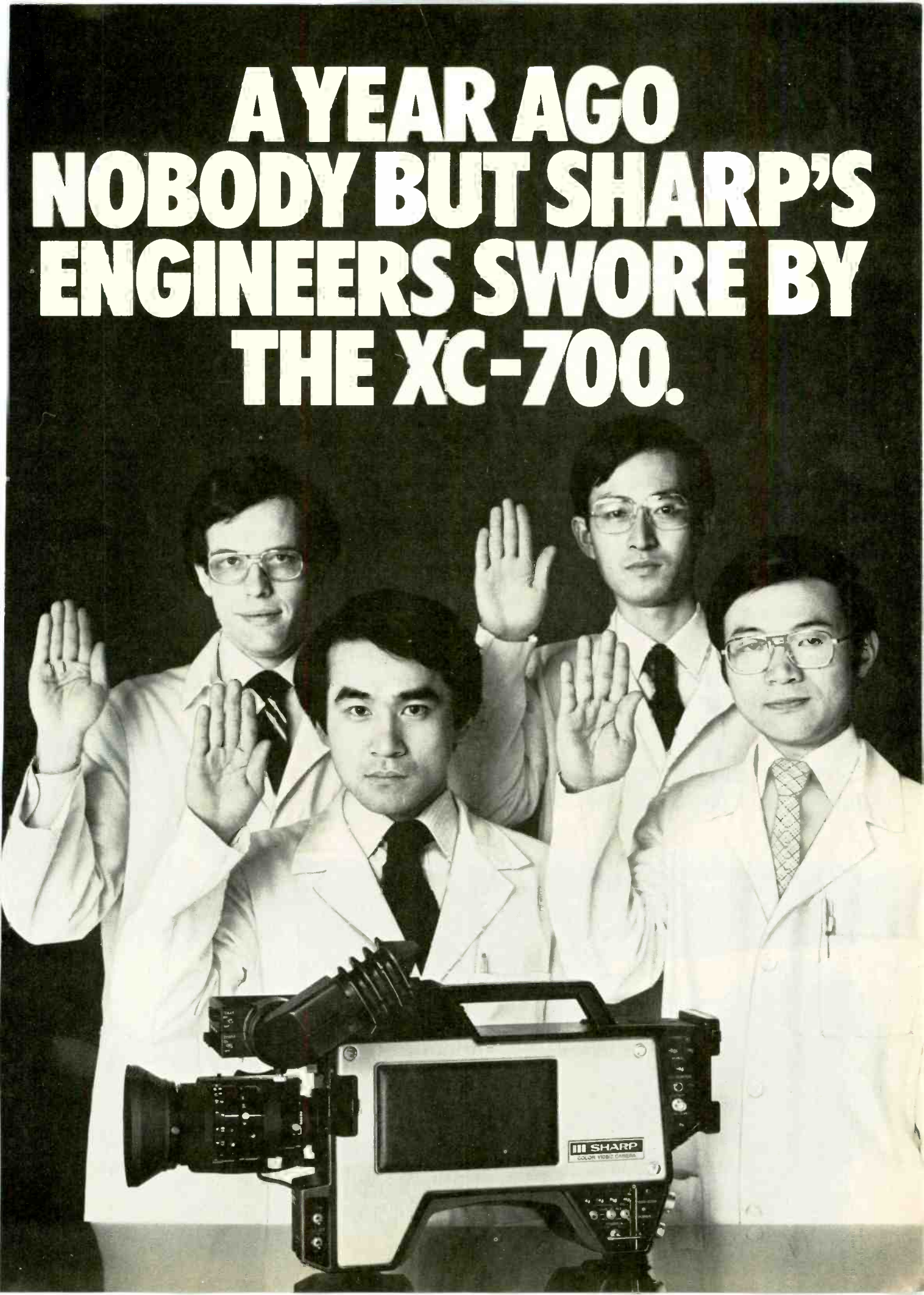
Nortronics introduced two new height gauges, the PF-710 and the PF-720. The PF-710 is a zenith/height gauge that provides zenith adjustment and height adjustment on both tape guide and track. The PF-720 checks tape guide adjustment on any open-reel recorder, checks all tape contact points, and has a locking thumbscrew that prevents movement during use.

Optek had the production model of the Model 8000 bulk tape degausser. Brought as a prototype last year, the Model 8000 handles all tape and completes its erase cycle in 32 seconds.

Taber introduced the Taberaser 409, which the company said is 40 percent more efficient than the older Model 309. Model 409 handles all tape formats and cycles in 20 seconds.

For more information: Fuji MV, **397;** VV, **398;** Maxell 20-minute U-Matic tape, **399;** L-750 half-inch videocassette, **400;** UD 18-180, **401;** UD 25-120, **402;** Audico 751 VTL loader, **403;** TEA EA 750, **404;** Garner 1100 degausser, **405;** Nortronics PF-710 height gauge, **406;** PF-720, **407;** Optek 8000, **408;** Taber Taberaser, **409.**

A YEAR AGO NOBODY BUT SHARP'S ENGINEERS SWORE BY THE XC-700.



TODAY THE PROS

"WE DON'T SEE A $27,000 DIFFERENCE BETWEEN SHARP'S XC-700 AND A $44,000 CAMERA."

—Larry Hatteberg, Chief Photographer KAKE-TV (ABC's Wichita Affiliate).

"My cameramen were pretty skeptical when Sharp® introduced the XC-700 last year.

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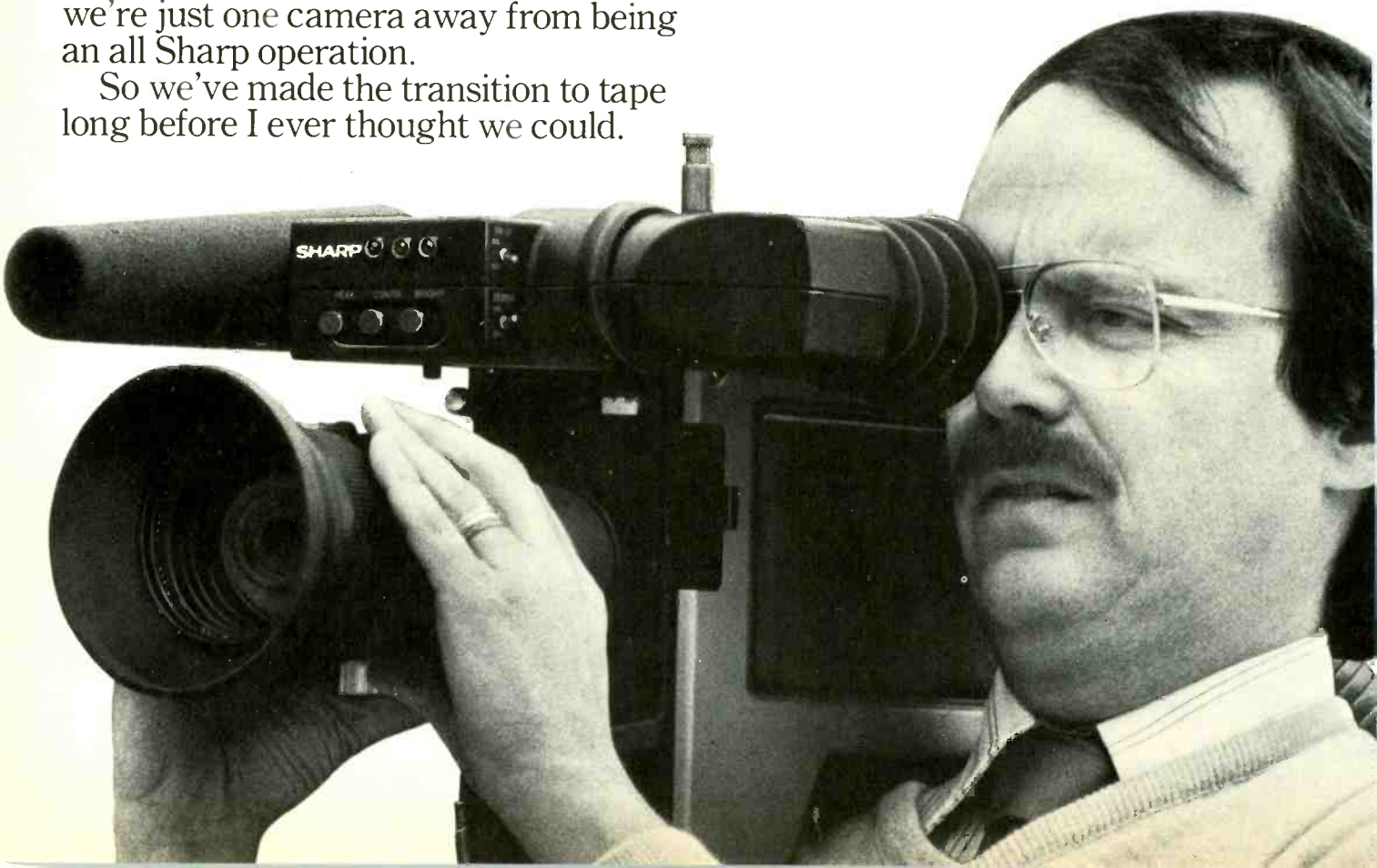

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NAB SHOW IN PRINT

ARTISTIC ADVANCES IN GRAPHICS SYSTEMS; STILL STORES

Computers for control and signal processing have opened new vistas for video graphics

Digital graphics

Virtually no field has grown as spectacularly during the past few years as digital video art systems. Ampex's AVA system continued to draw crowds as its artist rendered vivid pictures directly into the television medium. This year, however, AVA was joined by several others, ranging in sophistication from powerful computer-based systems arriving at NAB from the computer-based design industry to simple personal computer-based systems using the Apple II.

The flexibility and power of dealing with video in its digital form under computer direction has also created a massive upsurge in the graphics capabilities of character generators. Systems such as Thomson-CSF's Vidifont V and the Dubner Computer System have forever blurred the distinction between digital art systems and character/graphics systems.

This surge of activity in digital video art systems can be directly attributed to the progress made in removing the distinctions between video information for NTSC (PAL and SECAM too) and the processing of digital information as practiced in the computer industry at large. When the broadcast industry finally develops standards compatible with those of the large general-purpose digital world, a flood of powerful new systems will become available. The larger computer industry will then enjoy the economies of scale it requires in order to profit from paying attention to any particular computer application. Research and development investments will be spread over a much larger market base and development of devices can move from expensive, low-volume custom designs to inexpensive, large-volume generalized designs.

While last year's NAB Show-in-Print listed only one digital art system — AVA — this year there were nearly a dozen if character generator/graphics systems and computer animation systems with overlapping functions are counted into this group.

AVA (Ampex Video Art) is essentially unchanged in its hardware configuration. Software changes have been added, however, with AVA's increasing on-air experience. The software improvements include an improved lettering mode to permit left, right and center margins to be set automatically and to allow line or word justification (proportional spacing between words or lines so that each word or line begins and/or ends exactly at the margin). Individual characters on a line can now be inserted or replaced randomly.

A new "blue pencil" mode permits the artist to draw guidelines on the artwork without modifying the art itself. These guidelines can be used to establish definitions for the creation of new art derived from the preceding image or to alter the existing image. A new "art director's mode" permits the creation of specific artists' files. An entire piece of art, or elements of it, can be recalled or transfered from file to file. Such software enhancements, tied with improvements in other modes (such as "cut and paste," overlay grid, and design palette), continue the process of providing the artist with the computer-assisted equivalent of techniques used in conventional artistic media. Depending on options, the AVA system is still priced in the $150,000 to $200,000 range.

MCI/Quantel, similarly concerned with emulating traditional artists' techniques and tools, withdrew in 1976 from offering a computer art system called "Intellect" to the broadcast marketplace. This year, however, Quantel retumed to the field with a system it has dubbed "Telegraphics" 7000. As with earlier Quantel product introductions, the 7000 was shown only to a limited audience in the company's suite. Pending analysis of the reaction to the product, it will make its debut to the general public probably within the next year.

With the four years' development between "Intellect" and "Telegraphics," Quantel claims to have produced a system that offers a new approach capable of "fine art"; that is, art devoid of the "electronic look." According to the manufacturer, there is "no discernible difference between the electronic result of the machine and a camera looking at conventional artwork."

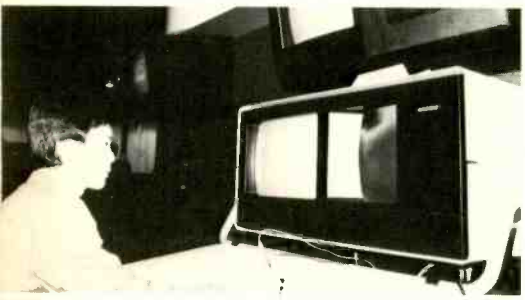
The 7000 is "full color" rather than "partial" color. Instead of offering 256 colors, or some other fixed number of color selections, the 7000 offers the user the ability to mix any of the colors presented on the palette to create new colors, shades, and hues, just as a conventional artist mixes colors. Even the way the operator accomplishes this is "operationally similar" to the way it is accomplished conventionally. The color menu presented to the artist includes a "mixing" area. The artist dabs the brush (stylus) into one paint color and smears this in the mixing area; selects a second color and then smears and mixes this with the first color in the same area. When the desired hue or shade is achieved, this color can then be assigned to the brush for use on the "canvas." In appearance, the system is similar to the others. A color monitor output displays the results of the artist's activity, while the artist actually moves the stylus over a touch tablet. There is also a monochrome screen and keyboard for housekeeping displays and functions.

To achieve textural qualities similar to those associated with oil colors or watercolors, the artist can build up saturation levels on the canvas by varying the pressure he applies to the stylus. This, says the artist who demonstrated the Quantel system, has very much the same "feel" as the conventional technique.

The picture output of the 7000 is of extremely high quality with virtually no aliasing. The system consists of a minicomputer, supporting electronics (10½ inches of rack space), Winchester disk and floppy disk memories (occupying 5¼ inches of rack space), in addition to the operational equipment. Twenty full pictures can be stored within the system or the pictures can be either output to the floppy disk or aired directly. A full digital interface is provided for the direct connection of the Telegraphics unit with Quantel's DLS-6000 still store and library system.

A firm price has not yet been established for the 7000, but company spokespersons indicate that it will eventually enter the market priced between $90,000-100,000. Included with the

Thomson's Tom Hindle runs through the new Vidifont Graphics V



Ampex's AVA system was joined this year by nearly a half dozen other digital video art systems

functions discussed above are brush selection, various art modes, and an inventory of functions similar to those offered by other systems.

Aurora Imaging Systems, a company new to NAB, showed its Digital Videographics System, which is already on-air at KRON-TV, San Francisco. Another system is on order for installation by the Societe Française de Production, France's national production center. Depending on the configuration of the system purchased, a Digital Videographics System could cost between $125,000 and $225,000.

In addition to the electronic mimicry of conventional artists' techniques, this system features three animation modes. The simplest form of animation, cycling, is common not only to this system but to a number of character generator/graphics systems. Basically, different colors, or shades of color, are cycled through. When the color of the foreground object is the same as the background it seems invisible, while objects of a different color are visible. By cycling through the colors, the appearance of motion is achieved as the objects, drawn at different locations, come in and out of the background color. Cycling and the other two types of animation, step-wise and reveal, are achieved by smooth, internally generated dissolves between individual steps in the process.

Another aspect of the Aurora Imaging approach is its use of a symbolic menu display. In addition to a written function label on the menu screen, each function is identified by a symbol — the "fill" mode, for instance, pictures a partially full beaker with an arrow rising from the fluid towards the brim. "Fill" is a mode common to many of these systems that permits the artist to direct that a particular area of the picture be filled with one color rather than having to actually paint in the desired color to the drawn borders.)

From the systems design standpoint, Digital Videographics consists of two operating stations with different functions tied to the CPU and storage systems. The design station, probably located in a graphic arts department, is the station used by the artist to create the graphic or animation sequence. The display station would probably be located in a control room from where the operator would call forth stored artwork for inclusion in a program. The CPU, imaging electronics, and storage system can support up to three design stations (though only one design station may be active at a time) or one design station and up to six display stations (though only one display station may be active at any one time).

The system's disk storage is 10 Mbytes, capable of storing 100 or more typical pictures. Complex pictures or animation sequences might reduce the number of actual pictures stored. An optional library disk storage system increases the capacity of the system by 80 Mbytes, allowing storage of up to 2000 or more typical pictures. A one Mbyte optional floppy disk storage is offered to permit pictures to be carried from the system, or stored away from it for other purposes. The design station system has two standard RGB video outputs (with sync) plus one NTSC RS-170A output. The display station has a single RS-170A NTSC composite video output.

Appearing at NAB for the first time was the $102,400 system from Computer Graphics Lab. This system is the offspring of the digital graphics work done at New York Institute of Technology. Anyone who has followed the development of digital graphic art systems will recall the pioneering efforts initiated by NYIT.

The system shown at NAB is a standalone unit using 11 Mbyte Winchester-type disks with a 5 Mbyte removable back-up disk. The computer is an LSI-11.

Resolution is 512 by 508 with a 60 ns per pixel resolution. The system provides eight-bit color with selection between 256 colors or an optional filtering system for color mixing.

Another videographics unit was exhibited at NAB by Ramtek. While Ramtek is new to NAB, it has supplied the computer industry with video graphics systems for some time. Shown at its booth was its 6214 Colorgraphic computer, based on the Z80 microcomputer with 96 Kbyte RAM, a floppy disk drive and controller, 164 Kbytes of RAM-based screen refresh memory, high resolution color monitor, and keyboard. The system, as is, is user-programmable in Pascal or assembly language. A digitizing tablet is available for "hand drawn" input.

The system, like many that are used in the computer industry, works in RGB, but output for broadcasting is via an NTSC (PAL or SECAM) encoder. This highly modular system provides a long list not only of computer peripheral equipment but also of operating program options. In RGB, the resolution is 1280 elements by 1024 lines, but the NTSC encoded output is 640 elements by 480 lines. Extremely high quality images are achieved through Raster Scan Technology, which the manufacturer claims is superior to techniques used in some of the other systems.

Because the system is a generalized computer capable of running not only color graphics but also other Pascal (version IV.O) programs, the company's spokesperson suggested that numerous stations' display programs would be appropriate to the system. Specifically, sports graphics and scores, election reporting, and weather reporting functions were suggested. Station management functions, such as statistical analysis, graphing, and chart needs could also be met.

Joining with other exhibitors from the U.K., Logica, Ltd. discussed its ICON digital graphics computer system. This system was exhibited at this past September's IBC in Brighton, U.K., and reported in *BM/E's* November, 1980 issue. At that time Logica demonstrated a smaller scale digital video art system it had developed in conjunction with the BBC. With its NAB presentation, Logica took its first tentative steps into the American market.

While the ICON system is a very large, very sophisticated computer system for graphics and data processing, the smaller system, now dubbed Flair, is intended for station-level operation. Flair is operationally similar to the other art systems and should be ready shortly for its American debut.

The Apple II was evident in a number of exhibits, operating for business programs, off-line graphics, and on-air graphics. For on-air use, however, the Apple II needs modification. Two companies, Adwar Video Corp. of New York and Video Associates Labs, Inc. of Austin, Texas, showed the necessary interface modifications.

Adwar's version is called the ARS-170A. This PC board based modification provides crystal black burst gen-

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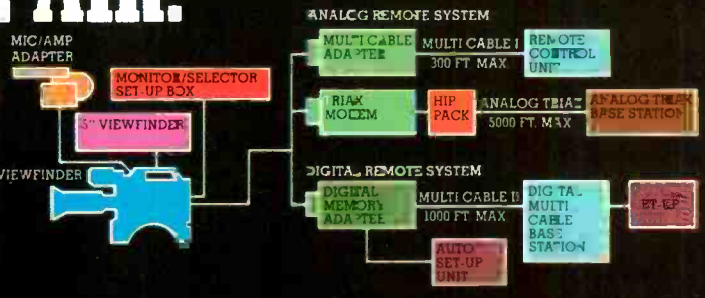

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lock, H, V, and burst phase adjustment, blanking width adjustment, and other necessary signal conditioning to meet RS-170A requirements. The output of the Apple II graphics system can then be keyed, mixed, or aired.

Video Associates' version of the modification is based on two additional PC boards that plug into the Apple II, but use none of its memory. The VAL VB-1 features downstream keying, chroma on/off switch, programmable horizontal offset, adjustable hue control, adjustable chroma amplitude, preview automatic color framing, and an external power supply. The output is NTSC. Installation of this modification takes about 15 minutes and involves no tracing or soldering. One of the two boards fits into one of the Apple's seven slots while the other mounts above the power supply and is connected by DIP.

About 18 stations, according to a spokesperson, are already using this $2200 modification. With it, stations use the Apple II as a color titler, for generation of weather maps, limited animation effects, and animated logos. By purchasing the optional digitizing pad or tablet from Apple directly or a similar unit, the Versawriter, from Versa Computing, Inc., users can create their own graphs and charts.

For more information: Ampex/AVA "Blue Pencil," **410;** MCI/Quantel Telegraphics 7000, **411;** Aurora Imaging Digital Videographics, **412;** Computer Graphics Lab, **413;** Ramtek Colorgraphic, **414;** Logica ICON, **415;** Flair, **416;** Adwar Video ARS-170A, **417;** Video Associates VB-1, **418.**

Character generator/graphics systems: artful improvements

Broadcasters have grown accustomed to seeing a new round of software-based enhancements in color character generator/graphics systems at each successive NAB. Hardware changes have also been introduced from time to time, particularly in the area of new input systems, digitizers, and font compose options. This year, the digital video art systems had not only camera inputs for grabbing whole black and white pictures for further manipulation but also increased text capabilities. Character generator/graphics systems responded by greatly improving their own animation and colorizing capabilities. The result? A much more difficult job of distinguishing between the two approaches.

The best way to distinguish between the systems seems to be their principal functions. Character generator/graphics systems still primarily serve to

The Chyron IV's CCM allows two-channel effects

quickly compose text-based messages for display on television. The graphic arts capabilities in such systems are largely in support of the textual functions. Digital video art systems, on the other hand, primarily allow the artist to create hand-crafted art directly in the video medium with textual capabilities in support of the artwork. As a result of this, art systems focus on the digitizing tablet as their primary input device while character generator/graphics systems still rely on the keyboard.

Vidifont Graphics V, from Thomson-CSF Broadcasting, Inc., is undoubtably the largest step forward made by any established character generator/graphics system manufacturer this year. By adapting a full framestore and employing bit mapping techniques, Graphics V has gained random access to any and all pixels independently. Once complete access to all pixels has been achieved, software can be written that defines a wide range of dynamic events which occur temporally as well as spatially.

One of the major benefits to be derived from such an approach is the freeing up of at least one production switcher mix/effect bank. For instance, if a diagonal banner is to ripple onto the screen over a keyed graphic, the effect would generally require at least one switcher-initiated wipe in addition to the key. Moreover, the diagonal banner, with lettering properly kerned, would conventionally be accomplished not by the character generator but through the use of an art card, which the switcher would see through another camera input.

The Graphics V can accomplish this effect completely internally, with the aid of the switcher required only to put the function on-air. If, for some reason, it is also desirable to make some on-air change in the graphic under the banner without affecting the banner, this too can be accomplished without involving the switcher.

What is involved here are several fundamental changes in system architecture achieved as a result of the framestone and bit mapping aspects. The two most difficult things to achieve in the foregoing example are writing on a diagonal and altering one element in a graphic without affecting other elements in the same graphic. Normally, the alteration of a graphic could be achieved on a dual-channel system, but the Graphics V requires only a single channel to accomplish this because it defines the graphic as existing on a series of transparent planes, similar to layers of acetate as used in conventional graphic arts techniques.

The Graphics V is available in single and dual-channel systems so that displays can be faded in/out as a downstream key on a single channel or cross-faded with the independent output of the other channel. Background and foreground displays can be manipulated independently of the other planes. Up to 16 character planes can be stacked, permitting such effects as fan-out, and information on each plane can be "swapped" with the information on another plane. The system has two low-resolution channels in addition to its two high-resolution channels. The low-resolution channel permits access to formatted displays to change or update information in the high-resolution channel. While the low-resolution channel will not show the actual graphic, it will describe that graphic in English so that if sports scores or vote tallies were existing on a separate plane in a multi-planar display, only the information requiring updating would need to be changed and other elements of the graphic would remain unaltered.

Up to eight keyboards can function simultaneously, two operating with access to the high-resolution channels and six operating with the off-line low-resolution channels for updating and editing of messages. The basic Graphics V system sells for $59,500.

Another multi-plane display character generator/graphic system was shown by Dubner Computer Systems, Inc., a newcomer to NAB. Readers of *BM/E's* ABC Olympic coverage (April, 1980) will already be somewhat familiar with what the Dubner CBG unit can do. Viewers of ABC's *Wide World of Sports* and *20/20* have frequently seen the CBG at work.

This $76,000 system (more with options such as dual floppy disk drive and digitizer system options) has two display planes. Each plane can use any 64 of 512 possible colors. Colors are specified by eight levels each of red, blue, and green; each color can be keyed or unkeyed, transparent or opaque. The two planes (background is defined as an entire plane of 525 lines

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by 1024 pixels, while the foreground plane consists of standard fonts or custom fonts such as logos or graphic symbols) can be merged or "woven" to make ever more complex pictures.

A 54-key ACSII keyboard is the primary operator interface to a system controlled by two Intell 8080 microprocessors (a CPU and memory manager). A hard disk drive with two 5 Mbyte disks (one removable) provides the main memory for up to 255 fonts, 9999 text messages, 100 to 500 backgrounds, or any combination of these aspects on each disk. A dual floppy disk option is available for library storage, as is a digitizer for input of NTSC or black and white art through a camera. The digitized image is stored as a 64 grey level background.

Operating modes include a normal compose mode for working on either or both planes; a Palette mode for selecting up to 128 colors from the 512 possible (64 colors on each plane); Font Load Mode; and Font Fix Mode for the creation and modification of font characters and backgrounds. Fonts may be of any size up to 485 lines high by 1024 pixels wide. Each font can contain up to 96 characters.

Like the Vidifont system, the Dubner CBG can type on the diagonal with character kerning. A full range of dimensional, drop-shadow, and colorizing capabilities are provided. Animation, particularly strong in the Dubner CBG, can be any length in duration up to the capacity of the memory, and can occur at any rate up to real time (or 30 fps).

As part of its design commitment to not obsolete its system, Chyron has taken a different route to achieve some of the same capabilities. This year, the Chyron IV has added Channel Control Modulation (CCM) which permits the outputs of both channels to be mixed. The operation, supervised by a Z-80 microprocessor, provides a number of benefits. Like the multi-level systems previously discussed, the two channels can be seen as two planes or levels — that is, laid one over the other. One difference, however, is that information is tied to the channel it is on so that it does not, in fact, pass information from one level to the other.

Nevertheless, this approach does allow a large number of functions to be achieved simply and economically. A Scoreboard function, for instance, allows alphanumeric data on one channel to be updated independently of graphic material on the other channel. Up to six "box scores" can be chained together for updating. When the score is superimposed over the graphic elements there is no required change in the other level. This option is a less than $1000 change to the basic Chyron IV software.

In addition to "Scoreboard," the CCM approach has allowed for a lot of switcher-type effects to be added to the Chyron, including wipes. An autosequencing mode is now available because of the handshaking that takes place between the channels, allowing very substantial animation results. Also, operator strokes can be learned by the microprocessor for modification and recall. All of this, it should be noted, has been achieved with modest costs in mind.

For more information: Thomson-CSF Vidifont Graphics V, **419;** Dubner CBG, **420;** Chyron CCM, **421.**

New systems debut, others change

High-quality character generation and graphics capability already has been achieved. Now the game is cost and function. Last year the stir was caused by the interface of character generators to other computer systems for the purpose of updating displays such as weather, scores, and vote tallies. This trend continues, though now taken in stride by many manufacturers of such systems. The force of multilingual audiences in this country and the pressure of a "new" international market has led to a sound round of subtitling capabilities.

Wholly new systems were also in evidence. System Concepts introduced its Q-8 system, which features the capacity of up to 18 fonts in resident memory, a disk library, and stored logos. The Q-8, priced at $27,995, has an impressive array of standard features for the price. This dual floppy disk system permits control from multiple keyboards with tally and lockout controls for the delegation of authority.

The fonts can consist of three different type faces with different sizes. Custom design fonts and logos are possible with the Q-8, which also features proportional spacing of its 64-element character designs. Random access or sequential access to both of the 100-page disks is provided with unlimitted "next disk" sequencing. Automatic centering, right justification, and a variety of roll, crawl, and positioning capabilities are provided. Eight colors are selectable by row for backgrounds; colors for letters as well are available in a variety of block and underline functions.

While scaling up one end of its line, System Concepts also displayed the Microgen, a low-cost titler. Microgen offers 12 pages of internal memory, capable of 6000 characters, with all the basic titler level functions such as crawl, roll, and flash. The Microgen

System Concepts brought its Quantanews system for television newsrooms

also offers a complete second channel for composition while on air.

Videomedia's first offering to the character generator field is the KR-6000, a high resolution (35 ns) character generator designed specifically for inclusion in the post-production stage. Depending on options, the system is priced between $10,000–15,000 and though it is especially suited to operation in post-production with Videomedia's Z-6000 editor, it also operates as a standalone.

What makes the unit a post-production system is a variety of "switcher"-type functions and its interface with the edit controler. In the simplest post-pro setup, the KR-6000 will lock to any incoming color subcarrier signal and provide fade in/out and fade up/down from black for both the keyed text and/or the incoming color video. Obviously, a host of simple post-production needs involving titles can be met with the KR-6000. Such functions would normally require a four-bus switcher with downstream keying. Control of the KR-6000 can be local or delegated to the Z-6000.

Even though its design feature is its inclusion in the post-production system, the KR-6000 offers a good range of normal features including full drop-shadow and edging, colorizing by character, changeable font cartridges (up to four resident fonts on-line; each font can be any size), 16 programmable colors, vertical and horizontal centering, proportional spacing, and a variety of other functions. Careful consideration has been given to the I/O structure of the system so that it will be compatible or expandable as new options and configurations become available.

A new low-cost titler ($4595) was shown by Video Data Systems. The TPT-2500 is a microprocessor-based titler offering 32 pages of internal memory (each page is 14 lines of 32 characters). Characters are of two widths (16 or 32 characters per line) and three heights (16, 32, or 64 per field). A "word integrity" editing function will automatically reformat lines and words to eliminate any broken words at the

end of lines. For subtitling, crawls can consist of two lines of either 216-character length or 984-character length.

Characters, borders, and drop shadows can consist of any combination or permutation of black and white. Page display can be automatic with an operator-designated dwell time of one-quarter to nine seconds, in quarter-second increments, one to 63 seconds. An optional DC-2500 Digital Cassette Memory can hold 58 blocks of data, each 480 characters long, for automatic dumping into the resident memory for extended titling or message cycling.

For-A Company's Video Typewriter, VTW-600, is an extension of the concepts introduced in the VTW-300. The 600 essentially adds a number of new options and functions including a character design unit and a color control unit. The wipe unit and card memory unit available with the 300 have been retained.

The character design unit permits the operator to "draw" with a lightpen new characters (or symbols) which are assigned to one of the keys on the keyboard at the operator's discretion. In subsequent operation, when that key is depressed the created character or symbol will appear rather than the letter inscribed on the key. Thus, using either the shift key or infrequently-used symbol or numeric keys, a large number of custom symbols can be brought online. The color control unit can assign any of eight colors on a character-by-character basis. The full system, with all options, runs around $15,000.

Several of the more familiar systems showed new functions and options. As mentioned earlier, a couple of new approaches have been taken for subtitling foreign language programs and for other subtitling needs.

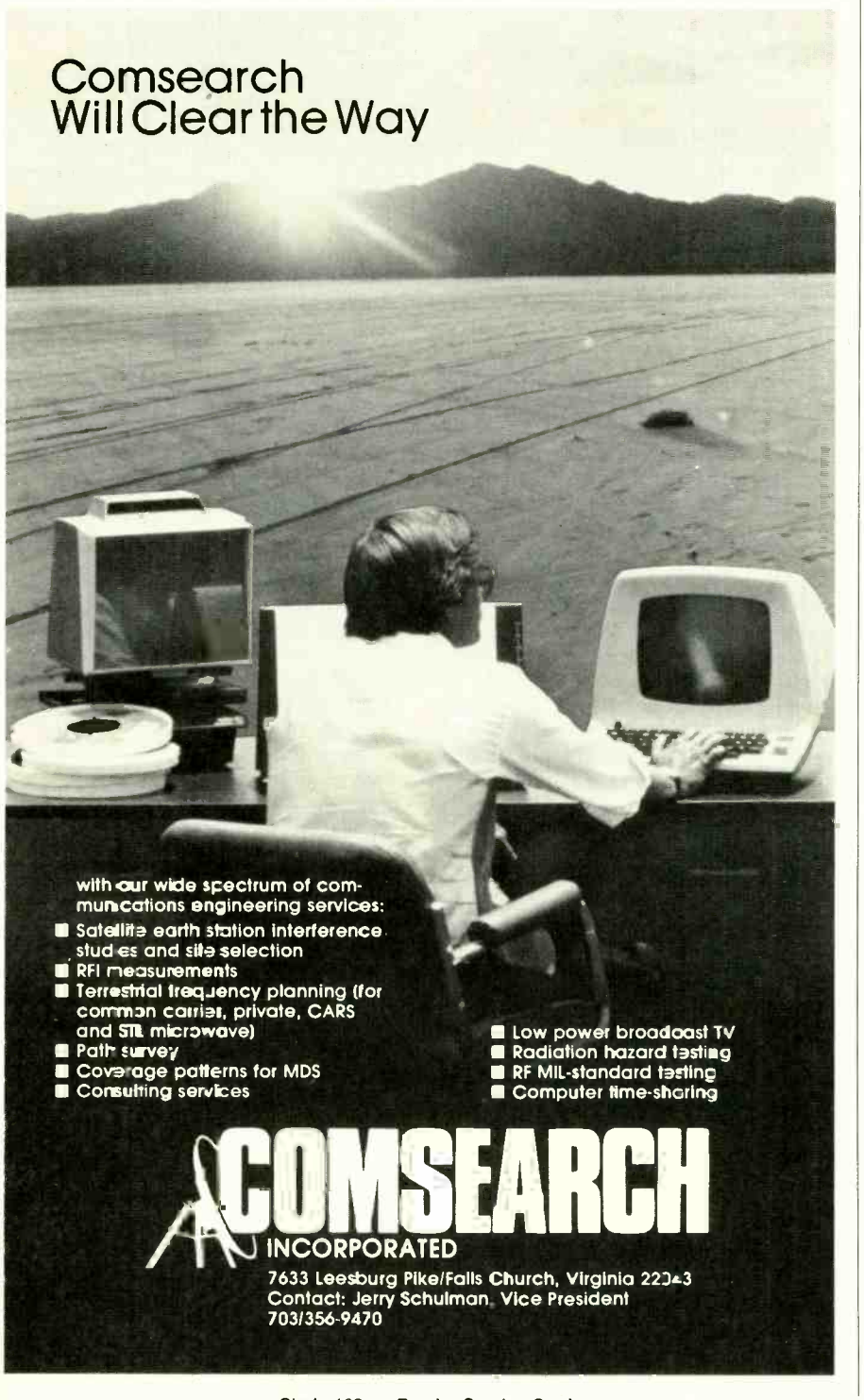
Fernseh Inc.'s Compositor I, for instance, showed its new subtitling option for the Compositor I. Up to 2000 subtitles can be stored for up to 2400 events on a replaceable disk cartridge memory system. Since each subtitle is randomly accessed, repeated subtitles can be assigned to appropriate events without having to duplicate the composition of the subtitle. For instance, a dialogue response like "Yes" need only be entered once and used whenever appropriate.

Each subtitle address is tied to a specific SMPTE/EBU time code location by a mark-in, mark-out process. After the subtitles have been composed and associated with their proper events, their playback is slaved to the VTR playback and the subtitles burned into a new videotape containing both subtitle and picture information. Accuracy of each subtitle to SMPTE time code location is plus or minus one frame. The necessary SMPTE/EBU reader equipment is included in the option, which is available on all 64K computer-equipped Compositors. Earlier 32K Compositors are retrofittable.

System Concepts has added a subtitler option to its Q-7A/R character generator system called QST. Working with the dual floppy disk, Q-7A, QST offers up to 500 three-line subtitles and 50 inserts per disk. When the first disk is completed, the second disk comes on line automatically. The first disk can then be replaced by a third disk, essentially making the subtitling/event complex infinite.

While the three 32-character rows are normally displayed in the lower third of the picture, they can be positioned for the deaf or in any part of the raster to eliminate conflicts with the background.

A full range of timing mode adjustments are available using either external or internal time code cues. For display, the subtitles can be run in parallel with the program material or burned in.



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3M's D-8800 Graphics Generator introduced a new camera compose unit at this year's NAB. The camera digitizer takes the standard output image of any monochrome camera, digitizes it, and stores it in the on-line memory of the D-8800 unit. Once stored, the image is cleaned up of digitizing errors and can be modified manipulated (both H and V flips), reduced in height, italicized, and affected by a variety of other color-based functions.

Another new aspect to the D-8800 and 3M's 2000 series units is an interface with Telesource Communications Service's information system computer. The interface will permit the station character generator to tie into a national computer information network for updating of election returns, sports scores, weather information, and — ultimately — a wide variety of other database services that may become available. The interface, Television Titler Controller (TTC), will permit the automatic updating of a variety of formatted displays.

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BEI, now manufacturing the Marquee 2000 under license here in the U.S., has added two new options to this high-end character generator/graphics system. Font compose is a $5000 option that permits the user to create new fonts using the 2000's keyboard. Characters can be any size between 18 and 66 TV lines, while logos or other artwork input via a monochrome camera can be up to 100 TV lines in height. The Marquee's character resolution is 31.25 ns. A number of editing functions permit the refinement of the composed fonts, which are ultimately assigned to any selected key on the keyboard.

Both Knox and Laird Telemedia showed their full lines of character generator systems fundamentally unchanged from last year. Knox did say that it planned "some new things for next year"; until then, the K128, K50 and K60 character generators will carry the banner.

Laird showed a new video pointer, Model 1060A, as an addition to its line. The video pointer is a standalone accessory that permits an operator to insert a black, white, or transparent arrow into a picture. The arrow can be positioned via a joystick and "pointed" in any of eight "compass directions." It can be varied in size or flashed.

Shintron introduced a new version of its Model 505 Videotypewriter, the 505L. The new model provides 16 pages of non-volatile memory that can be retained for up to 30 days after power is shut off. The non-volatile memory permits the 505L to offer such features as roll control, crawl, window display, flash, and isotropic font enhancement. Lower case fonts are also possible now.

For more information: System Concepts 0-8, **422;** Microgen, **423;** QST, **424;** Videomedia KR-6000, **425;** Video Data Systems TPT-2500, **426;** For-A VTW-600, **427;** Fernseh subtitling option, **428;** 3M camera compose unit, **429;** TTC, **430;** BEI font compose option, **431;** Laird 1060A, **432;** Shintron 505L, **433.**

Still stores/slow motion

There was not a lot of action in the still store and slow motion recorder area this year, though there were a couple of new systems and new models.

Several of the models that were introduced last year are now in production, and new options have been added to some of these. New slow motion controllers have been issued by several one-inch VTR manufacturers, including RCA, Sony, and 3M.

A new still store system was shown by ADDA Corp. — ESP R. This system is portable and uses 14-inch fixed disk drives with still storage capacity of 80 stills per disk. The unit, which sells

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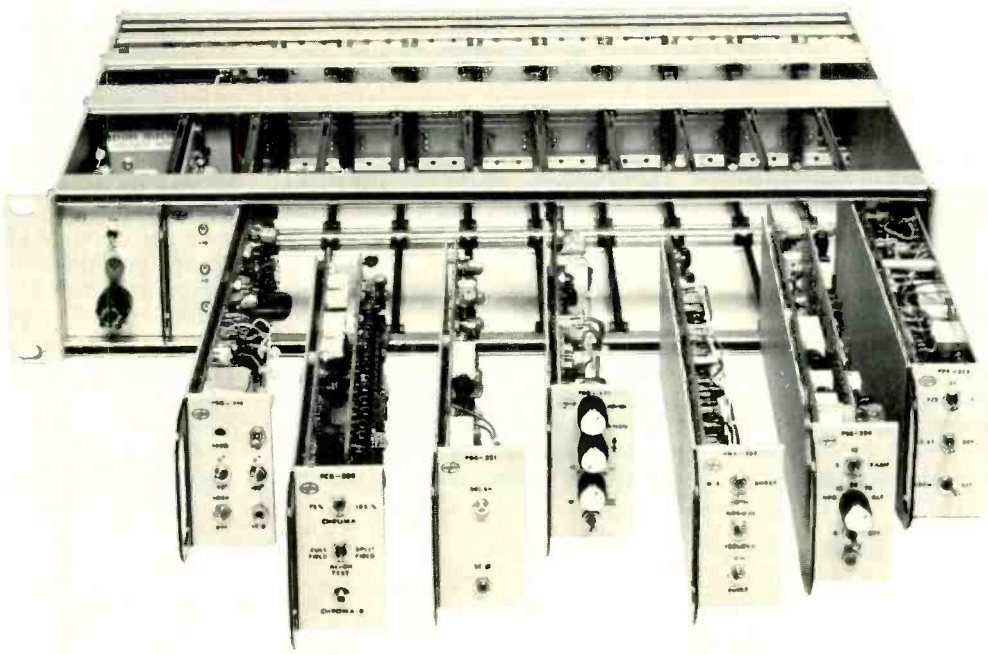

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Compositor I from Fernseh Inc. was one of several systems to offer subtitling capabilities

for between $60,000 and $70,000, has control functions identical to those of the larger ESP C Series. Up to four disk drives can be employed.

A new option for the larger ESP C Series systems is the Multiple Access Controller (MAC), which allows modular expansion of still storage to a maximum of 12 disk drives, accessed by as many as 15 ESP mainframes. Three mainframes may operate simultaneously through MAC, each accessing a different drive group. Time and information sharing is possible with MAC and the expanded system may be programmed to set up a priority control function for one drive group over another. A fully expanded system provides access to 9000 stills, each accessible in less than half a second.

With systems as large as this, a Library Control System proves useful. ADDA has modified its system to provide for management of up to 200,000 stills, each slide identified by a sorting reference label consisting of title, category, geography, and date code established by the user. The off-line Library Control System can be used to sort, edit, and sequence slides through three user-designed sorting references. At the SMPTE Conference this past fall, ADDA previewed another new option which it showed at NAB, "Multipix." This display option allows the ESP user to preview up to 25 slides displayed in a five-slide by five-slide matrix. Multipix is also available in a smaller version that provides a three-slide by three-slide matrix. The option is priced at $3500.

MCI/Quantel, which introduced its DLS 6000 Digital Library System last year, showed the system with three new operating levels this year. The systems at all three levels are compact, using just 10½ inches of rack space. They feature Winchester-type hard disk recording and standard SMD disk drive interfaces for the eight disk drives that each level can handle, with each disk drive capable of storing 800 stills. Multiple control panels are available for each system level, and the modular design allows each system to be expanded to its next superior level.

The three levels are 6010, a basic still store; 6020, which allows on-air transitions between slides; and 6030, which adds a variety of picture manipulation capabilities for editing, composition, and display. Also common to each of the three levels is an off-line videotape archival system that stores still frames in digital form.

The 6010 uses a single framestore while the 6020 and 6030 each employ two framestores. The 6020 has two output channels that permit the execution of on-air effects, plus a preview channel. Cuts, dissolves, and wipes can be performed, and an external key allows recording of captions. The 6030 permits picture repositioning, compression, cropping, variable aspect ratio, and multiple picture montage. A Browse picture mode displays 16 picture grids for review, editing, and sequence selection. An interface with a Chyron graphics system was shown to demonstrate the 6030's ability to work with titlers and graphics systems.

U.S. JVC Corp. showed its VM-1200LU series magnetic videodisc recorder for slow motion and still storage. Shown as a prototype last year, the unit appeared at this year's show as a deliverable production model. The VM-

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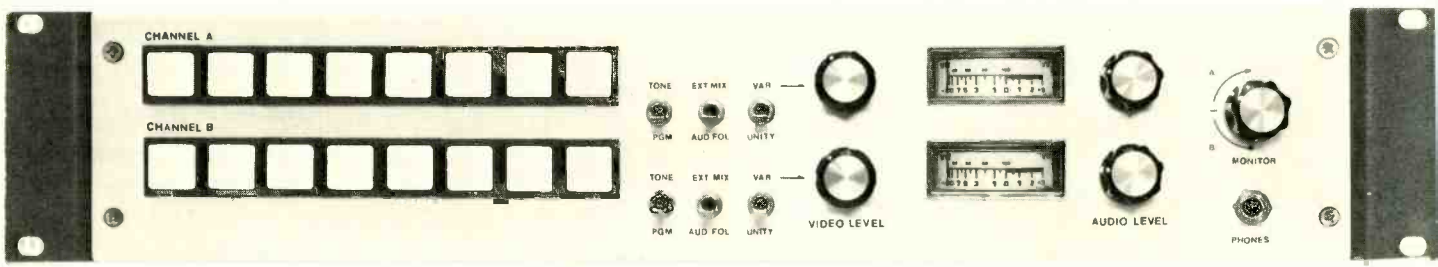

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1200LU stores up to 600 frames or 20 seconds of real-time video for variable speed playback from freeze to 30 fps. The single hard disk unit records on both sides, and continuous loop recording and playback is possible. Playback is fully bi-directional at all speeds.

Variable playback speed is controlled through a lever, and a time base display permits checking of the recording or playback process indicating time base in seconds. An A/B zone function permits the recording cycle to be established in two 10-second continuous segments. Playback can also be preset for half-speed or one-fifth speed.

Harris Video Systems presented its Iris system in an eight-drive, 5849 online still storage version. Up to three control panels can now access the Iris system for preview and program outputs, as well as for editing. Two new options for the system include quarter-picture compression with joystick positioning for composition and display and a library system featuring a 20-character description for search routines. If the slide is positioned for a key, that position is stored and the slide displayed in that position automatically.

There were no significant changes in the Ampex ESS system this year, which was demonstrated in conjunction with the Ampex AVA art system. The addition of the ESS to the AVA provided powerful animation and sequencing capability.

Arvin Echo showed production models of its Image Maker videodisc recorder for slow motion and still storage. The Image Maker, an extension of Arvin's EFS Series of analog disc recorders, stores up to 512 frames of high-band color stills. Full random access to the 512 frames is provided with preview independent of the on-line channel. The variable speed playback with frame-by-frame editing provides for good animation functions. Up to 64 still locations can be preset.

Priced at $39,900 and weighing less than 50 pounds, the disk unit and controller are suitable to mobile as well as in-studio applications. Motion loops can also be programmed from 16 to 512 frames. As in the other EFS series machines, the storage medium is low-cost discassette.

Colorado Video, which for several years now has shown its line of Slow-Scan video transmission systems, reports that a nonbroadcast women's magazine show will make use of its narrowband system for transmitting video images. Essentially, subscribers to the program will receive information on food, health, fashion, and travel, with accompanying still picture information via the narrowband technique. The system, which includes a video compressor on the input side and an expander on the receiver side, transmits 10 MHz video via telco. Such systems can transmit via any narrowband technique including SCA, microwave, satellite, or other data-grade lines.

Ampex, Sony, RCA, Hitachi, and Fernseh continued to show slow-motion controllers for their one-inch VTR systems. The newest of the slow-motion controller systems was from 3M for its NEC TT-7000-3 VTR. It and others are discussed in the videotape recorder section of this report.

For more information: ADDA ESP R, **434;** MAC option, **435;** Library Control System, **436;** Multipix, **437;** MCI/Quantel DLS 6000 updates, **438;** U.S. JVC VM-1200LU, **439;** HVS Iris options, **440;** Arvin Echo Image Maker, **441.**

Animation

No one showed the traditional methods of single cell film animation at this year's NAB, but several showed other methods. Animation Video, a new division of Convergence Corp. brought its Anivid system to NAB for the first time. The system uses a traditional animation stand, but a video camera photographs the artwork, which is then fed to a one-inch or ¾-inch VTR. The Anivid controller al-

Circle 138 on Reader Service Card

lows for precise one-frame exposure. Animation Video says the system has a number of advantages over the old film method. There is no waiting for the lab to process the film, error corrections is instant, and video quality is higher than film transferred to tape.

Lyon Lamb is a company new to NAB but well-known in the world of animators. In 1977 Lyon Lamb introduced the first Video Animation System for animators to test their work without waiting for the film to come back from the lab to see if it was what they planned.

The early versions of the VAS were black and white. Now with the introduction of VAS IV, the company has come up with a broadcast-quality color system. It operates much the same as the Anivid system but claims a more accurate measurement of frame control. The time code is read on the vertical interval.

Frank Woolley & Co. offers a low-cost method that gives the appearance of animation through the Motionmaster™ video animation system. The animation stand is a light box that gives the appearance of motion when a properly produced gel is attached to the front. A studio camera shoots the Motionmaster™ and either tapes the output or airs it live. The system is priced at under $3000.

For more information: Anivid system, **442;** Lyon Lamb VAS IV, **443;** Woolley Motionmaster™, **444.**

Teletex and closed captioning

This was the year that teletext — or more generically, videotex — and closed captioning systems came out of the closet at an NAB show. Although many of the systems have been emerging for several years, this is the first time they have arrived at NAB in strength — and showing self-confidence, despite the FCC's nearly comatose position regarding approval.

Antiope, French pioneer and a heavy

Harris's Iris system for still storage uses the HVS 630 frame synchronizer (above) to achieve some of its effects

ADDA Corp.'s Library system for its ESP series still stores offers a variety of customer designated search routines

contender for eventual FCC approval, was on hand through its U.S. marketing arm Antiope Videotex Services of Washington, D.C. Heartened by CBS's enthusiasm over the system in testimony to the FCC, Antipoe displayed its videotex system. Company officials clearly feel the French system leads a growing pack of competitors. Corporate buoyancy among CBS and Antiope officials was weighted down, however, when a heavily touted press demonstration was to have taken place in a Caesar's Palace suite. Transmission difficulties on a satellite feed from Washington, D.C. to Las Vegas blitzed the interactive demonstration.

But CBS remained enthusiastic about Extravision, a teletext news, information, and captioning service it is testing over its O&O station in Los Angeles, KNXT. (See report in *BM/E's* January, 1981 issue.) The test is expected to last through this year and will involve about 100 receivers in the Los Angeles area. Equipment and system software has been provided by Telediffusion de France, the agency behind Antiope.

Pooling their activities, a host of United Kingdom systems designers and suppliers rallied around the British Videotex & Teletext stand. BVT, supported by the U.K.'s Department of Industry, is a marketing venture formed by British Telcom and Logica. Included were Prestel, the videotex system developed by the General Post Office; Ceefax, the BBC's videotex offering; Oracle, from the Independent Television Network; and Jasmin Electronics Ltd.'s teletext, designed for commercial and industrial customers but completely compatible with Prestel.

Also represented in the BVT stand was VG Electronics, which manufacturers teletex editing terminals, digitizers, keypads, and hardcopy printers as well as page generators, data bridges, decoders, regenerators, and vertical interval inserters.

BVT's co-founder, Logica, was showing its Context fielding/library system, based on BBC's Ceefax (which Logica helped develop in the first place), while Philips subsidiary Mullard (and its California-based affiliate, Signetics) was discussing its range of dedicated LSI circuits designed specifically for videotex and teletext systems.

Emerging from the British effort is a second-generation system that BVT officials feel is a beat ahead of Antiope. Two matched decoders — one standard, the other capable of reacting to signals below the vertical interval's twenty-fourth line — can pull out slightly different messages on the same terminal.

Meanwhile, Prestel International said that by this autumn, its first U.S. videotex computer will be on line and in full service in the Boston area.

This was the first year that Telidon, the Canadian videotex system, took its own booth at NAB. The Canadian system, which went on line commercially last month (May) in Manitoba, expects to install 25 terminals in agricultural representatives' offices within a few weeks. Although terminal rental will be $50 a month per unit, data retrieval is free on the service, which is being called "Grassroots." By the autumn, Telidon expects 50 terminals to be in place, and by the first quarter of next year, about 1000 terminals are expected to be installed.

Another Canadian company, Skotel, has developed an intelligent interface for its timecode readers and generators. The interface, which is aimed at closed captioning, encodes information into the 32 binary user data bits of the time and control code. The advantage is that real language text can be encoded into the time code; the two-data encoding formats can interface — through a standard RS-232C — with computers, character generators, terminals, keyboards, and editing systems.

Computer Video Systems of Salt Lake City showed its Compuvid CDD series of data display systems, which are aimed primarily at cable operators. The Compuvid, available with 16 or 27 page memory, performs a range of teletext services, from news to stock market reports to weather information.

EEG Enterprises, from Farmingdale, N.Y., was on hand again this year with its closed captioning system for the hearing-impared. A user-bit inserter loads eight-bit characters reduntantly into the time code, which is then encoded on television line 21. Sears and Roebuck builds a color television with a Sanyo decoder for $550; a set-top decoder is available from Sanyo for $250.

For more information: British Videotex and Teletext Prestel, **445,** Ceefax, **446;** Jasmin Electronics teletext, **447;** VG Electronics, **448;** Mullard LSIs, **449;** Logica Context system, **450;** Telidon, **451;** Skotel interface, **452;** Computer Video Systems Compuvid CDD, **453.**

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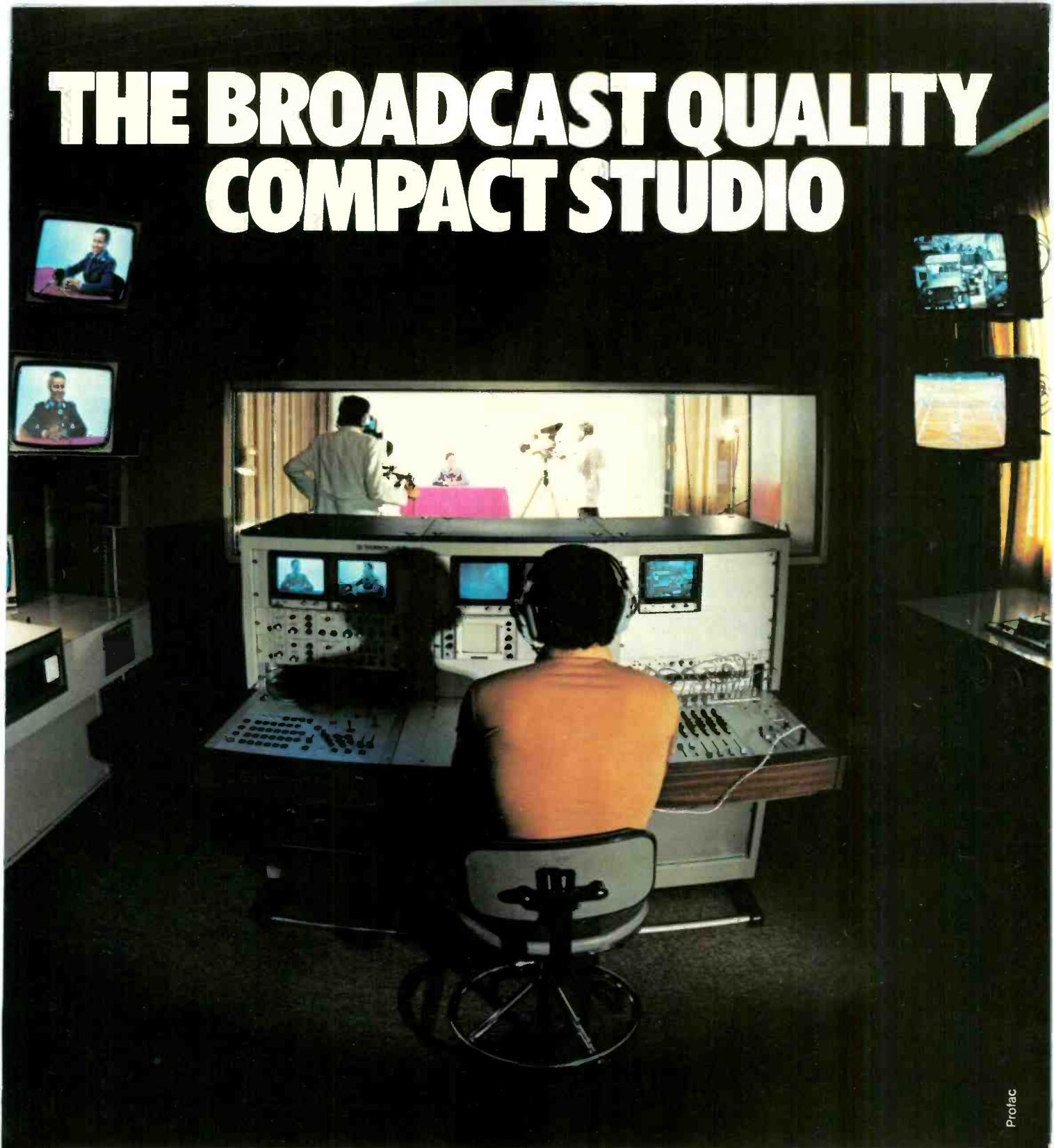

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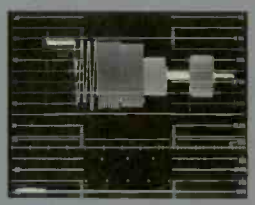
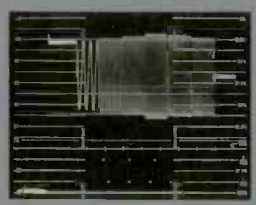
Conrac's Comb Filter Separator delivers the high resolution needed for today's high performance camera and taping equipment. It removes color information from the composite video signal without the luminance loss in the 3.58 MHz region produced by notch filters.

Conrac's Comb Filter takes advantage of spectrum interweaving to separate luminance from chroma, without reducing luminance bandwidth.

But the best part of Conrac's Comb Filter is that it gives you this improved picture clarity without the drawback of conventional comb filters. Because, unlike conventional comb filters which exhibit heavy dot patterns in the luminance path, Conrac utilizes non-linear techniques to virtually eliminate these patterns around vertical and horizontal transitions.



1. Multiburst test signal with conventional bandpass and notch luminance/chrominance separator.



2. Multiburst test signal with Conrac's Comb Filter luminance/chrominance separator.

Conrac Quality: Computer-controlled for the 80's.

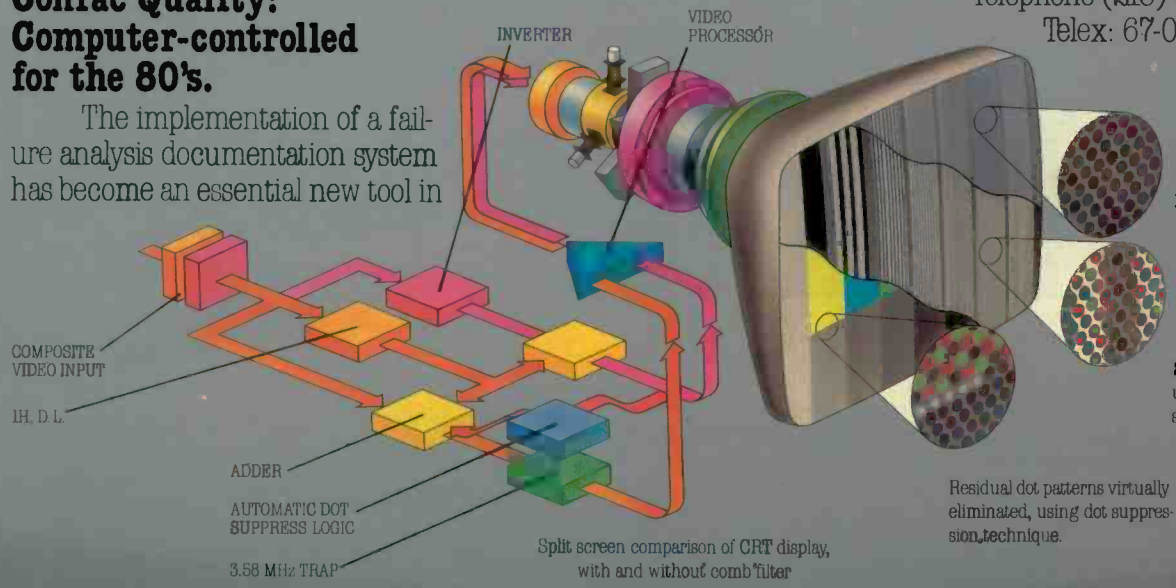
The implementation of a failure analysis documentation system has become an essential new tool in the quality factor. This system provides the capability of daily test analysis from four different product test and inspection areas. The net results are improvements in product quality and long term reliability.

Conrac Technology: Over 30 years of leadership.

Conrac's track record of technical innovations stretches back nearly three decades; and what we've learned since then goes into every monitor we make today. That is important to you because the more technology we pack into each monitor, the more performance you will receive from it.

Comb filter separator and computer-controlled quality 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 Avenue, Covina, California 91722, Telephone (213) 966-3511, Telex: 67-0437.



Split screen comparison of CRT display, with and without comb filter

1. Luminance resolution using the conventional notch/filter separator.

2. Luminance resolution using the comb filter separator.

Residual dot patterns virtually eliminated, using dot suppression technique.

Quality you can take for granted.

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NAB SHOW IN PRINT

RADIO EQUIPMENT HEADS FOR THE LEAD

With competition for the radio listener's and television viewer's ear, manufacturers of radio and audio equipment respond to the pressures felt by broadcasters.

Audio consoles and mixers

The advance in audio at this year's NAB was conceptual. There seemed to be almost universal agreement among the console makers that quality sound was to be very important to television. In preparation for that conceptual change, a number of manufacturers introduced new products aimed mainly at TV broadcasters.

A spokesman for Harrison, which up to now has specialized in large consoles for film and recording, made it plain where the marketing strategy lies. "We're showing our large post-production consoles now," he explained, "but next year you are going to see an entirely new line of products geared to quality sound for broadcasters."

Predating that philosophy were the products from ADM, including seven new consoles redesigned with the needs of television broadcasters in mind. The 800 Series (now the 800 Series II) was radically redesigned so that it could be reduced in size, resulting in a line of consoles for OB vans and mid-range television studio post-production.

There were a number of consoles that had digital components. Harris's Micro Mac™ modular audio console attracted a lot of attention because of its digital manipulation of the board's controls. Harris says that because the system is software-based, a number of functions can be incorporated that under normal conditions would call for a much larger console and additional control modules.

The system specs allow for a maximum of 16 channels in and three out, plus mono/sum, three assignable submasters, and machine control of up to 32 sources. There is a built-in keyboard that allows the user to program

Panasonic's Professional Audio Division brought three new Ramsa consoles. The WR-8816, above, has 16 inputs and four outputs

Broadcast Audio exhibited the System 20 stereo consoles, available with up to 60 inputs

many of the system's functions, for example: source machine assignment, momentary or latching source start/stop commands, speaker muting in up to six different areas, setting the up/down timer and the 12/24 hour clock, cart machine replay lockout, and stop-delay on reel-to-reel machines.

Broadcast Audio showed its System 20 stereo broadcast console. Depending on the kind of mixers chosen, this system can handle up to 60 inputs, three mixing and seven frequency graphic equalizers, stereo/mono switch, and three stereo outs with a mono/sum.

Cetec Broadcast Group introduced its new audio console, the 8000, which comes standard in an eight-channel, 24-input model but is expandable to 16 channels and 48 inputs. Few options are offered with the Cetec 8000 because Cetec says that its standard configuration is available as options on other consoles. The standard features are Penny and Giles attenuators, liquid crystal display clock/timer, built-in intercom, 4 W cue amplifier, and read/play cart machine indicator.

Farrtronics Ltd. of Markham, Ont., was another console maker looking toward the audio needs of television. The M70 Series has all the normal options of a modular system but also has an interface for post-production editors such as those from CMX, Datatron, and Convergence.

Fitzco Sound showed three new Audioarts Engineering consoles. The 44 Series mixing console is a modestly priced unit that comes in 16-, 24- or 32-input models. The 8000 Series is the midrange console and features 6, 24, or 32 inputs and eight out configurations. The Wheatstone Project, the top of the line console, is modular in design and can be put together in whatever configuration is necessary.

The new Cetec 8000 stereo console, in version with 16 channels above, comes complete with eight channels or more. Additional channel modules, or an integral equalizer, can be added

Howe Audio displayed the prototype of its new 8000 Series stereo mixing console. It has 22 inputs and four outs (two stereo, one stereo program and one mono). The TTL logic in the electronics package adjusts the signal so that the faders and program/audition keys do not directly affect the signal. Howe says that the logic in the system virtually eliminates on-air mistakes. The 8000 series will be available in the fall and should sell for under $9000.

Quad Eight brought a new modular console called the 248 Component Series. The basic system comes in an eight-input by four-output console that can be expanded to 24 inputs and eight output buses. The cost, depending on options, ranges from $8000 to $24,000.

Sphere Electronics made its first appearance at NAB as an exhibitor, but the appearance was timed to attract a lot of attention. Sphere debuted its 1604 satellite mixer in the Best Audio truck. The first test of the Satellite 1604 came in the telecasting of the Academy Awards and the Diana Ross special (Best Audio provided the audio services for both broadcasts). The Satellite 1604 is a 16-in, four-out console priced in the $6000 range.

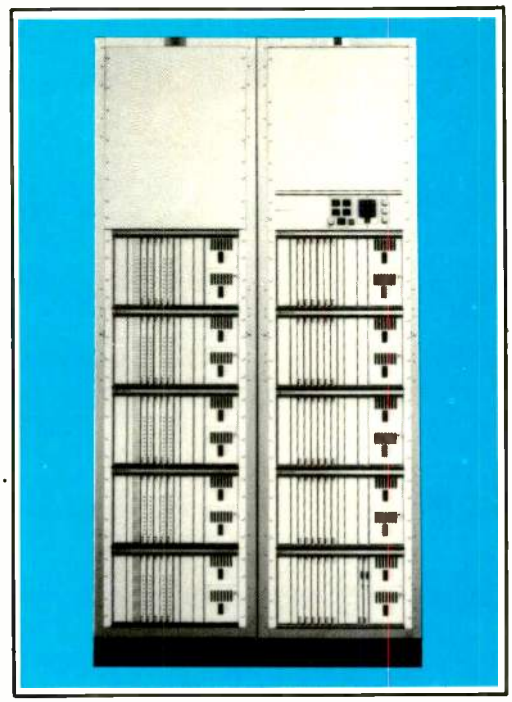
McCurdy continued the move toward smaller broadcast consoles with its introduction of the SS9800 Series of consoles in 16- or 24-channel versions. Machine control interfaces are available for either board control or control from a remote location. The unit comes in stereo or mono versions and costs $16,000 to $30,000 depending on the options.

MCI introduced its JH-618 Series consoles in eight-, 16-, and 18-input versions. Options allow for a non-

McCurdy showed a complete operating studio built around a McCurdy console, with turntables, cart machines, monitor system

OUR SWITCHER SPECS SPEAK FOR THEMSELVES

Following is a summary of test data compiled from the final test measurements made on a 50-input by 50-output audio/video switching matrix sold to Capital Cities' Houston outlet KTRK-TV. We invite comparison of these test results with our published specs and with the published specs of routing switchers manufactured by others.



50 x 50 KTRK MATRIX

KTRK TEST DATA BREAKDOWN

	Worst	Mean	95th Percentile	Published Spec
VIDEO				
Crosstalk @ 3.58 MHz	−63	71.1	65	−60 dB
Diff Gain	.05	.042	.05	0.1%
Diff Phase	0.1	.056	.08	0.12°
Diff Delay	1.0	.89	.95	±1°
Freq Response	.05	.02	.05	±.12 dB
Hum & Noise	−79	−84.6	−80	−75 dB
Gain Uniformity, All Paths	.017	.006	.017	±.07 dB
Input Return Loss	46	51.2	46	40 dB
Output Return Loss	45	48.8	46	40 dB
AUDIO				
Crosstalk @ 20 KHz	−80	−84.7	−81	−75 dB
Hum & Noise	−88	−91.8	−90	−85 dBm
THD 30 Hz - 20 KHz				
@ 0 dBm	.017	.011	.015	0.1%
@ +24 dBm	.24	.13	.17	0.5%
Gain Uniformity, All Paths	0.1	.044	.09	0.2 dB
Common Mode Rejection	80	88.3	83	70 dB

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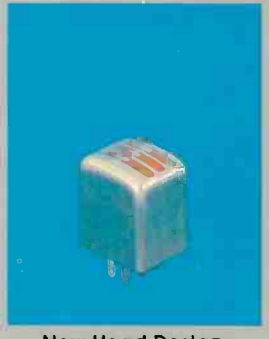
Improved Frequency Response
The head is new. The open-faced design is cylindrically shaped rather than hyperbolic. MuMetal laminations are surrounded by epoxy filler impregnated with aluminum oxide particles for shielding and durability. Core windows are wider than conventional designs. The end result is greatly improved frequency response without low end humps and bumps.

Removable Head Module
True center pivot design. Azimuth, zenith and height adjust independently. Locking one does not affect the others. Steel ball pivots and longer azimuth arms permit finer tuning.

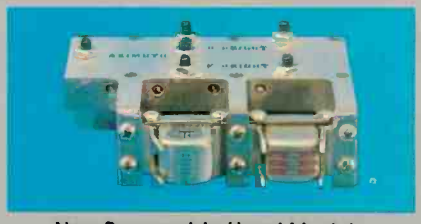
Improved Tape-Head Alignment
New cartridge positioning system assures precise, rigid alignment of tape to head even when insertion is hurried or careless.

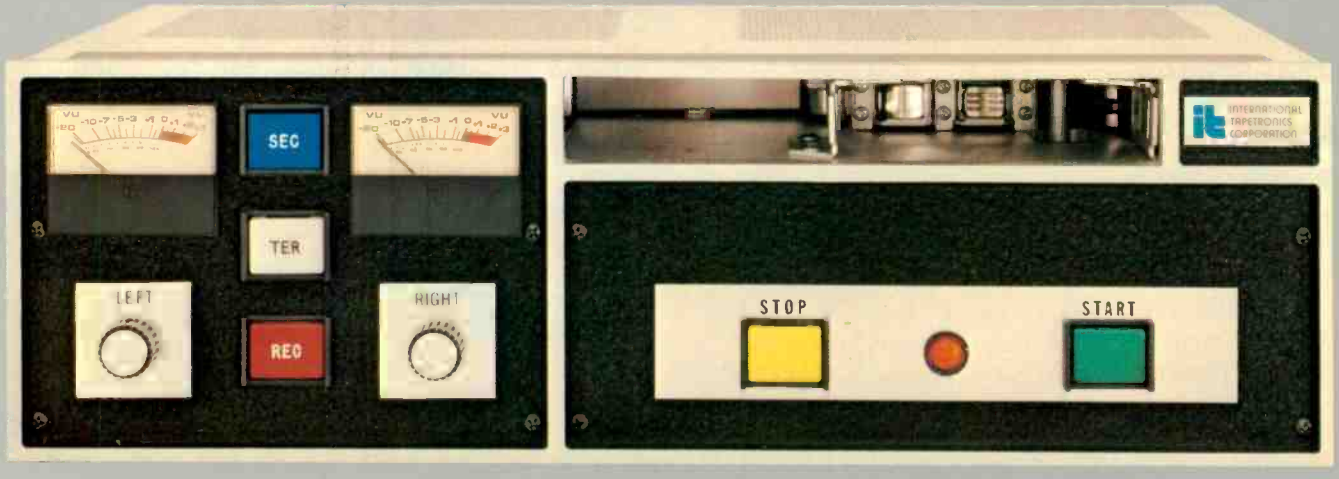
Long-Life Pressure Roller
The 525K pressure roller offers twice the pulling power and extended life. Tolerates common cleaning chemicals. Holds its durometer even in high humidity.

New Cart Hold Down


New Head Design

New Pressure Roller


New Removable Head Module



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automated recording/remixing console with mix only metering up to a completely automated console. Prices range from $15,000 to $35,000.

Rupert Neve showed some improvements in its current lines of consoles. The new software in the NECAM II computer-assisted mixing and editing system for TV audio was impressive. Neve is another manufacturer that feels that the future is in quality television sound and seems to be paying particular attention to that market.

Pacific Recording & Engineering offered no new consoles this year but stressed the range and quality of its BMX consoles and also the kinds of interfaces available for machine control.

Panasonic's Professional Audio Division introduced three new Ramsa® consoles. The WR-8210 recording console has 10 inputs and four outs and is for four- and eight-track recording. The WR-8716 is a sound reinforcement mixing console with 16 inputs and four group and stereo master outputs. The Ramsa® WR-8816 recording and mixing console handles 16 inputs and four stereo master outputs and is, according to Panasonic, ideal for four- and 16-track recording. Production is scheduled for early June.

Ward-Beck Systems showed a custom radio studio setup that had been designed for several stations around the country. It features WBS Standard R 1200 radio console with M 490 modules. Nearly 30 of the systems have been sold.

Arrakis Systems, making its second appearance at NAB, came in with four new consoles. The 2000 Series is a modular board with eight or 16 channels, 32 inputs with three stereo outputs and one mono. It sells for $5200. The 500R Series is an update of the 500 Series and comes in eight- or 12-channel models, either with mono or stereo with 32 inputs. It runs $3750. The $2500 500SC is similar to the 500R except that the eight-channel model has 16 inputs and the 12-channel model has 24. The final new console introduced by Arrakis was the 250SC, a five-channel version with 10 inputs in either mono or stereo that goes for $1500.

Auditronics featured its 200 Series on/air mixer, designed with both engineers and air personalities in mind. Because all the electronics swing up for ease of maintenance, the console can be dropped into a cutout on the desktop. It is modular in design and allows for a number of options and expansion. One interesting module is the Personality Equalizer, which allows all DJs to have customized EQs adjusted specifically for their individual voices. When a DJ comes on shift, a card is popped in the board and — instant EQ. The 200 Series comes in six-, 12-, and 18-input models. With all the bells and whistles the sytem costs about $10,500.

ADM showed the new ST 160-2, designed for television audio as well as general broadcast use. Series is available with 16 channels, as shown above, or with other configurations

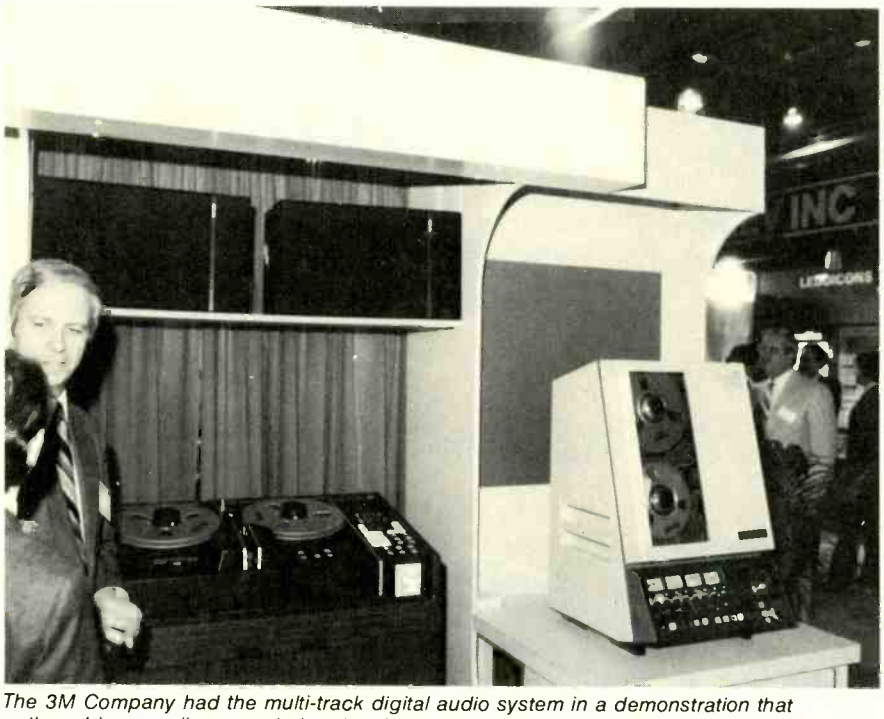
The Micro Mac console shown by Harris attracted attention with its digital manipulation of the board controls. Many functions can be added, changed, simply by changing the software

Micro-Trak had two new consoles to show. Model 6509 is a five-channel stereo broadcast mixer that can handle nine inputs with the option of input preamplifier of user's choice. Type of fader (rotary or linear) is also up to the user. The 6509 sells for $1595. The second mixer is a four-channel version of the Sport III, appropriately called the Sport IV.

Logitek offered a couple of new features on its Custom Audio Series consoles: a built-in six-output stereo distribution amplifier and a preselector module that allows the feeding of eight additional stereo inputs into either of two input modules.

LPB Inc. featured its complete line of Citation Series consoles, shown in prototype at last year's show but now in production. The series comes in groups of six-, eight-, and 10-mixer dual stereo consoles.

Studer/Revox showed prototypes of two versions of the new 900 series mixing console, aimed at the television market. The 901 is a smaller console that would be useful in mobile vans and smaller studio situations, with 12 inputs



The 3M Company had the multi-track digital audio system in a demonstration that gathered in many listeners during the show

and four master outputs. The 902 is larger, but still compact enough for larger remote units and production studios that need a versatile system without going to the very large consoles. The standard model will have 26 inputs and 4 master outputs, expandable to 50 inputs and 24 outputs.

Teac introduced a couple of new products this year. The TASCAM M-35 mixing console, with eight inputs, four bus outputs, and a separate eight-track monitor mixer, sells for $2300. The other new addition to the TASCAM line is the switchless System 20 modular mixing system. It operates like an electronic patch bay, with access to all signals at all points along the signal path. The system was at first designed for the operator who worked alone, but the company felt that its flexibility made it useful for many multichannel uses. The system comes in four modules: the MM-20 with six inputs and six outputs and provisions for four-track monitoring; the PE-20 with four channels of parametric type EQ; the EX-20, which provides four additional transformer isolated inputs; and a meter unit, MU-20. The entire package is priced at about $1245.

JBL has moved into the mixer market with a new automatic mic mixer. The Model 7510 can handle up to 24 input channels. The system is modular and comes in groups of four mixer packages. It offers the flexibility of automatic gain, normal mixer control and priority. The priority mode allows for one mic to be the primary source of the audio and override the other inputs when necessary.

Shure Brothers issued a tease at the NAB about a new compact audio mixer. It listed a number of functions including an automatic muting circuit, fast attack limiter, simplex power, built-in battery pack, LED peak indicator, headphone level control and headphone amp/line switch. It also is said to be able to fit into the space currently occupied by the Shure M67. The first of the production models will be available in August. The new mixer is the M267 and is priced under $400.

Sony also came out with a new portable mixer. The MX-P42 handles four inputs to two stereo outputs. Automatic Level Control combines with onboard compression/expansion for increased dynamic range. The MX-P42 operates on three C cell batteries and weighs 7.7 pounds.

Sphere also introduced a small console for radio that replaced the faders with an electronic light strip. A company spokesman says the system allows for silent operation by the disk jockey. The board is more expensive than most DJ consoles, but Sphere thinks that the quality and uniqueness demand the higher price.

Comprehensive Video Supply Corp. featured the CVMM-15 portable microphone mixer, a lightweight (under two pounds) unit that handles three mic inputs with individual level control. One of the inputs has 9 V phantom power supply for use with shotgun microphones. The mixer comes with a metal belt loop. Foundation Instruments of Canada is manufacturing the CVMM-15 for Comprehensive Video.

ProTech Audio displayed the Satt Electronics portable mixers, SAM 82 and SAM 42, which it is importing from Sweden. Both are geared for remote operations. SAM 82, which is the larger of the two consoles, costs about $6000.

For more information: ADM 800 Series II, **803;** Harris Micro Mac™, **804;** Broadcast Audio System 20, **805;** Cetec 8000, **806;** Farrtronics M70, **807;** Fitzco Sound (Audioarts Engineering) 44 Series, **808;** 8000 Series, **809;** Wheatstone Project, **810;** Howe Audio 8000 Series, **811;** Quad Eight 248, **812;** Sphere Electronics Satellite 1604, **813;** McCurdy SS9800, **814;** MCI JH-618, **815;** Panasonic Ramsa® WR-8210, **816;** Ramsa® WR-8816, **817;** Ward Beck, **818;** Arrakis Systems 2000 Series, **819;** 500R Series, **820;** 500SC, **821;** 250SC, **822;** Auditronics 200 Series, **823;** Micro-Trak, Model 6509, **824;** Sport IV, **825;** LPB Citation Series, **826;** Studer/Revox 901, **827;** 902, **828;** Teac TASCAM M-35, **829;** TASCAM System 20, **830;** JBL 7510, **831;** Shure M267, **832;** Sony MX-P42, **833;** Comprehensive Video CVMM-15, **834;** ProTech Audio (Satt) SAM 82, **835;** SAM 42, **836.**

Audio tape recorders and loggers

One of the few digital products introduced this year came from Panasonic's Professional Audio division. The Technics SV-P100 is a digital audio cassette recorder containing a PCM processor and a tape recorder as a single unit. The prototype of the SV-P100 was shown at the show and production is expected this fall. The cost of the machine will be under $5000.

Accurate Sound introduced the Model AS-100 high-speed duplicator. The transport on the AS-100 is completely dc servo-controlled, handles 10 slaves, and guarantees speed accuracy by crystal control.

MCI introduced two new recorders, one quarter-inch model and one eight-track. The JH-110BX comes in mono and stereo versions with two-speed

Sony brought the MX-P42, a portable mixer with four inputs, two stereo outputs. It has automatic level control, runs on three C cells

Production Studio, WRBR-FM, South Bend, Indiana.

Electro-Voice's Greg Silsby talks about the Sentry® 100 studio monitor

When I first described to Electro-Voice engineers what I knew the Sentry 100 had to be, I felt like a "kid in a candy store." I told them that size was critical. Because broadcast environment working space is often limited, the Sentry 100 had to fit in a standard 19" rack, and it had to fit *from the front, not the back*. But the mounting hardware had to be optional so that broadcasters who didn't want it wouldn't have to pay for it.

The Sentry 100 also had to be both efficient and accurate. It had to be able to be driven to sound pressure levels a rock 'n roll D.J. could be happy with by the low output available from a console's internal monitor amplifier.

The Sentry 100 also had to have a tweeter that wouldn't go up in smoke the first time someone accidentally shifted into fast forward with the tape heads engaged and the monitor amp on. This meant high-frequency power handling capability on the order of five times that of conventional high-frequency drivers.

Plus it had to have a 3-dB-down point of 45 Hz, and response that extended to 18,000 Hz with no more than a 3-dB variation.

Since it's just not practical for the engineer to always be directly on-axis of the tweeter, the Sentry 100 must have a uniform polar response. The engineer has to be able to hear exactly the same sound 30° off-axis as he does directly in front of the system.

I wanted the Sentry 100 equipped with a high-frequency control that offered boost as well as cut, and it had to be mounted on the front of the loudspeaker where it not only could be seen but was accessible with the grille on or off.

I also didn't feel broadcasters should have to pay for form at the expense of function. The Sentry 100 had to be attractive, but another furniture-styled cabinet with a fancy polyester or die-cut foam grille wasn't the answer to the broadcast industry's real needs.

And for a close I told E-V's engineers that a studio had to be able to purchase the Sentry 100 for essentially the same money as the current best-selling monitor system.

I'm happy to report that we've achieved *all* our objectives.

Greg Silsby

Market Development Manager,
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servo-controlled tape transport and separate equalizer and bias settings for each speed. It is available in either NAB or IEC equalization standards.

The JH-110C-8 features full remote control of repro-input-sync functions for each channel as well as remote transport functions. It comes with separate EQ and bias settings for each of its three speeds and offers NAB/IEC equalization switching with no realignment required.

Telex Magnecord introduced its new 3000 Series tape recorder/reproducer, which handles 10½-inch reels and has automatic cycling, automatic cue release (AQR), and CMOS logic tape motion controls.

TEAC showed two new Tascam Series recorder/reproducers. The 22-4 is a four-track model with function and output select, pitch control, and optional dbx interface and remote pause controls.

The 22-2 is a half-track machine with three-motor, three-head transports with independent monitor and record ready controls. It sells for $750; the 22-4 goes for $1425.

Otari introduced the MTR 10 Series two- and four-channel production/mastering recorders using quarter-inch tape, with the four-channel model convertible to half-inch. Both have dc PLL servo-tape transports with microprocessor-based control systems.

The 5050BQ Series II is a quarter-inch four-channel recorder. Otari has installed a proprietary microprocessor to govern the transport control. Though more compact, the 5050BQ has all the features of its predecessor, the MX5050-QXD.

NEAL Ferrograph brought out two new cassette recorders, the 312 and the NEAL 302. The 312 is a stereo model which comes in three- or four-channel configuration, has Dolby HX, and can handle metal tape. It is geared to reproducing music with the full sound.

Consoles, cart players, reel-to-reel tape machines exhibited by Ampro-Scully

The Otari 24-channel audio recorder got a detailed demonstration with the aid of monitoring equipment

At ITC booth the Series 99 cart player/recorder went through its paces for spectrum, distortion tests

The NEAL 302 stereo cassette recorder has a built-in calibration function that allows the machine to be set up for any make of tape. A calibration oscillator is built-in to provide a 500 Hz signal for calibration and Dolby B noise reduction.

International Tapetronics introduced its new reel-to-reel recorder, the 770 Series, which is servo-controlled, capable of remote operation, rack mountable, and available in mono and stereo versions.

Dictaphone displayed its new Veritrac™ logger, an enormously flexible microprocessor-based system. The Veritrac™ is available in configurations from four to 40 channels and provides over 50 hours of recording. It features a time/date option that has an auto search capability and a Safe Scan that (in the dual transport model) will detect recording failure on any channel and automatically transfer the recording to the backup transport.

Ampro-Scully's new logger, the 1500-L series, can record for up to 25.6 hours using a 3600-foot reel. It has four-channel transport with servo motor capstan. There were some upgrades in most of Ampro-Scully's recorder line.

NEAL Ferrograph also introduced a slow-speed logger, the SP74R, a four-channel machine with built-in time code reader that can record for about 25 hours.

For more information: Technics SV-P100, **840;** Accurate Sound AS-100, **841;** MCI JH-110BX, **842;** JH-110C, **843;** Telex Magnecord 3000 Series, **844;** TEAC 22-4, **845;** 22-2, **846;** Otari MTR-10, **847;** 5050BQ Series II, **848;** NEAL Ferrograph 312, **849;** NEAL 302, **850;** International Tapetronics 770 Series, **851;** Dictaphone Veritrac™, **852;** Ampro-Scully 1500-L, **853;** NEAL Ferrograph SP74R, **854.**

Cart machines: on a plateau

All the established makers of cart record and play machines were on hand with their units. UMC introduced a record/play model in its 100 series for A-size carts. It has overload indicators, automatic end-of-message response to the standard cue tones, automatic recue, and both low and high-end equalization. UMC also brought its first triple-deck unit. Model 300 also has cue response, an extra-heavy half-inch capstan, and wow and flutter rated at 0.06 percent. The system allows easy recording on deck 3 from either deck 1 or deck 2.

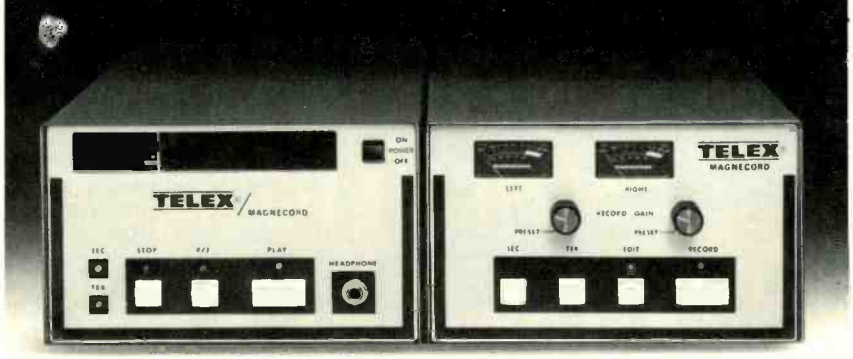
No radically new cart machines appeared at the show, but the two systems that have lately created a new high performance level, in a higher price bracket, the ITC Series 99 and the Pacific Recorders Tomcat, were both getting plenty of attention.

In addition to the display of the Series 99, ITC announced four improvements to its "Premium" line, one of the most widely used in broadcasting. The head has been reshaped to lift and smooth the low frequency response. A new cart hold-down system is aimed for more precise positioning of the cart against the head. A new head adjustment system has true center-pivot design. And the pressure roller has doubled pulling power.

D-B Electronics, new last year when it introduced a two-deck cart machine, expanded the line this year with a three-deck machine that has attractive features. A servo-controlled Hall effect motor aids speed stability.

For more information: UMC Series 100 record/play model, **460;** Model 300, **461;** ITC Series 99, **462.**

D.C. Servo Drive Runs Smooth Steady Cool



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Circle 146 on Reader Service Card

NAB SHOW IN PRINT

Radio program automation: hand-in-hand with business systems

The makers of large radio program automation systems that have dominated the market in recent years were on hand, and no important new rivals showed up. The new trend for these successful automation suppliers was association with business automation firms or systems, with complete interfaces worked out between the two sides for total automation.

Broadcast Electronics has made the interface between its Control 16 and Computer Concepts' business systems. A working pair was on the floor, supplying a live demonstration of instant communication between the two systems. Cetec's Model 7000 program system was similarly connected with the MAPS business system, bought by Cetec early in 1981, for another live demo. Again, speed in all the joint functions was one of the great gains, along with accuracy.

Harris Corp., having bought Automation Electronics, will market the Autotron systems separately as well as in paired association with the Harris System 90 program system. Harris had a live pair on the floor, with the Autotron Star linked to the Harris system. The Autotron system can have eight work stations and will work with other program systems in addition to the Harris. The system will reschedule automatically according to a "best rearrangement" when a spot cancellation or late insertion occurs. The rescheduling follows a program in the computer, with spot priorities established by the traffic manager.

IGM's Basic A was displayed connected with a Custom Business Systems traffic-accounting system. Again, the combination produced very efficient and rapid handling of time orders and other material coming from the traffic department, with spots actually aired reported back to the traffic department for billing and verification.

Sono-Mag brought a new, improved Mini-Pro live assist system with memory for 100 events. On the large Sono-Mag ESP systems, the memory has been extended to 10,000 events. Other improvements include a color monitor and easy interface to any business system, with the digital software now stored on cassettes.

For more information: Sono-Mag Mini-Pro, **463.**

Simpler systems broaden the range

As has been true for some time, program automation systems cover ranges of complexity and price that reach to the

very simple and inexpensive, allowing broadcasters to get into automation on any level desired. Audi-Cord introduced a live-assist programmer with a memory for 16 steps and capacity to control eight sources. It works with tape cartridge machines or other sources that respond to cue tones; if desired, it can be supplied with relay outputs to control other machines.

Another 16-event sequencer, the Broadcast Controls Model 1601S, has microprocessor operation for a broad range of functions. These include special event on any channel; full network join facility with internal clock, including deadroll, fade, reset, ID, net intro, Take Net, commercial, back to net; remote control allowing cluster insert, duck and talk over, talk down and hold. Up to eight expansion decks can be added to raise the memory total to 128 events.

Microprobe Electronics, long a source of inexpensive automation systems, brought an expanded version of the Model 100 live-assist sequencer with memory for 48 events. The system will handle eight sources, plus network, with adjustable deadroll, automatic advance if a source fails, overlap audio, time circuitry with 15-, 20-, 30-, and 60-minute formats to show when to skip over music to the next commercial.

Microprobe's larger Control 3 system will control multicart machines, with random select to any cart, and now has memory for up to 900 events.

ProTech Audio introduced an automation system called Basic-3, consisting of three compact modules on PC boards. The objective is to automate the control of cart and reel-to-reel machines by means of 25 Hz cue tones. The 725ATS card detects the 25 Hz tone, closes a relay to start the next machine, and closes a second relay with adjustable time delay to stop the earlier machine. The 725FA card has a 25 Hz notch filter to take the cue tone out of the program material. The 725OSC card holds an oscillator to provide the 25 Hz cue tone for insertion of the tone on the recordings.

Eumig, Inc. brought its audio cassette automation system, the FL-1000, first seen at the 1980 NAB and now equipped for instant interface with most small computers, including Commodore, Apple II, and various Radio Shack models. With the computer the FL-1000 supplies a new variety of low-cost automation, with an excellent set of control functions useful in radio.

For more information: Audi-Cord live-assist programmer, **464;** Broadcast Controls 1601S, **465;** Microprobe Model 100, **466;** ProTech Audio Basic-3, **467;** Eumig FL-1000 updates, **468.**

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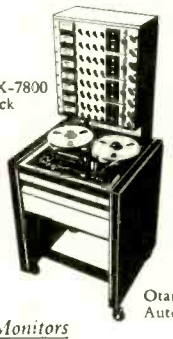
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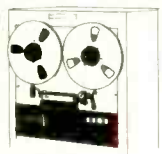
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IGM showed the Basic A program automation system, with Go-Cart and Instacart, interfaced with Custom Business Systems' accounting and traffic automation to make the "complete" auto station

Control of Harris System 90 automation system has been interfaced with Autotron business automation system; the latter is now a Harris-owned product, will be marketed by Harris

Computerizing radio business

Companies offering to computerize radio traffic, accounting, and so on have swarmed to the NAB for a number of years; many have been successful in sales to radio broadcasters. The number of companies on the floor was roughly the same this year as in 1980.

Chase Media was back to describe its CADO system for broadcasters. Now in use by more than 40 stations, CADO includes a music inventory system that stores titles and characteristics and automatically delivers playlists.

Computer Management Systems, also a long-time NAB exhibitor, emphasized its Broadcast Management Information System and related consulting services. CMS announced development of a complete traffic, billing, accounting system for the new RKO Radio Network.

Custom Business Systems, now marketed by IGM and available with interface to the IGM Basic A program system, as noted above, described a new hard-disk system with multiterminal options and expanded software, which includes control for daypart considerations.

Groton Computer, successful with its moderately-priced on-line business service, has adopted the Apple computer for the in-house sector of its distributed-processing system. The subscriber has the small computer and the control, input and readout sections at the station for data needed day to day, hour to hour. Input for the large accounting, billing, and analysis operations goes by telephone to Groton's large central computer, where the complete memory for the station is stored.

The Management is a new venture, organized by Pete Charlton of SonoMag (but separate from that firm) with a fresh approach to low-cost business automation. The company supplies two programs, "Electric Log" and the "Electric Bill." The plan is based on purchase by the station of the $4500 Radio Shack TRS-80 Model I computer, which is easily installed by the buyer and serviced locally. The programs sell for about $2500, which includes complete instructions, plus a package of practice diskettes. The programs have been devised, Pete Charlton says to cover 95 percent of the requirements of the typical medium-to-small radio station, with a standard capacity of 500 schedules (billings). Capacity can be expanded about five times with the Radio Shack TRS-80 Model II.

Nidus, making a first appearance at the 1980 show, came this time with a revision of software in its complete business system that increases scheduling ability and lifts rotation and separation functions. Nidus says it now has ready interfaces to program automation systems of Broadcast Electronics, SonoMag, and Cetec.

A computerized music storehouse that holds up to about 60 hours of recorded music at any time was described by the RITME-CX Library System. The music is arranged in coded subdivisions, each holding about 15 music selections. When the code for that subdivision is punched in on the keyboard, the selections are played on the monitor reproduction system, allowing the operator to choose one for broadcast, background music, or other purpose.

For more information: Custom Business Systems hard-disk system, **469;** The Management Electric Log, **470;** Electric Bill, **471;** Nidus software updates, **472;** RITME-CX Music storehouse, **473.**

The listener behind the numbers

Two firms on the floor offered elaborate analysis of Arbitron book figures to uncover the detailed characteristics of a radio station's audience. Media Service Concepts of Chicago will supply a cume analysis system to explore patterns of listening behavior; trends to show the station's and competitors comparative changes and directions; listening maintenance patterns, and efficiency studies to track hour-by-hour listening for the station and the market.

Simmons Market Research Bureau of New York will determine demographics of the audience in voluminous detail, not only age but also education, economics, living patterns, occupation, etc. Also in their service is determination of buying attitudes toward hundreds of specific products in more than thirty product categories.

For more information: Media Service Concepts, **474;** Simmons, **475.**

Electronic reverb continues up

Also on a strong uptrend is radio interest in electronic reverb, and there was a good supply of equipment for this function on the floor. Ursa Major, with its "Space Station" special-effects system introduced last year now strong in the industry, brought a new digital reverb system, Model 8X32, with attractive adjustment capabilities. It has 32 registers, in each of which a specific reverb program can be stored for use on a pushbutton basis. The user can adjust the reverb by ear, choosing one of four basic programs, setting the level and decay time of early reflections, then the initial decay time and other significant parameters. An "input mute" cuts off the signal so the reverb can be heard decaying naturally. "Reverb clear" momentarily cuts the decay to zero to open the way for a completely new reverb program.

MicMix brought two reverb systems not seen at the NAB before, the XL-210 and the XL-500. The XL-210 uses a spring system with elaborate controls

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and associated circuitry that give it frequency response flat from 20 Hz to 20 kHz, distortion 0.05 percent to 0.4 percent at normal operating levels, noise at −78 dBm. Equalization at low, mid, and high frequencies gives separate ±12 dB adjustment; decay time (T60) is three seconds; price under $1000. The XL-500 has several selectable reverb programs, including a plate mode, a room mode, and a hall mode. It has excellent specifications and more flexibility in adjustment, with the decay time continuously adjustable from one to six seconds.

Quad Eight brought System 5, which has adjustable decay time from 0.5 to six seconds, high-frequency reverb time adjustable over a pre-delay from 0 to 100 ms in 5 ms steps, four-section equalizer, dynamic range of 105 dB, distortion less than 0.02 percent, signal-to-noise ratio 85 dB. The unit has three separate basic reverb programs that can be altered by more than 13,000 different control settings.

For more information: Ursa Major 8X32, **476**; MicMix XL-210, **477**; XL-500, **478**; Quad Eight System 5, **479**.

Lengthening and shortening time

The lengthening or shortening of the running time of recorded material without perceptibly altering pitch is on the upswing. Lexicon, strong in digital reverb, brought a new version of its Model 1200 audio time compressor, introduced in earlier form at last year's NAB. The new unit has speed change range of 0.5 to 2.0, frequency response 40 Hz to 15 kHz, ±1 dB, and extremely low noise and distortion.

Also from a veteran of digital special effects and reverb systems was the Eventide TimeSqueeze system, which is based on a small computer tied to the company's H949 Harmonizer and PIC945 Precision Tape Contoller. The computer can be the Hewlett-Packard HP-85 or one like it. It is programmed so that the user simply punches in the time the tape is to run. The system then controls the tape machine to run at the right speed and sets the Harmonizer to make the pitch correction. Time ratio is adjustable from 400 percent down to 50 percent of original recording time. The system has distortion less than 0.15 percent at 1 kHz, dynamic range of 96 dB, frequency response ±1 dB, 20 Hz to 15 kHz.

A third time compressor appeared in the booth of Integrated Sound Systems from Long Island City, N.Y., a firm formerly emphasizing sound system installation. The Model TDM-8000 audio time compressor has a speed factor adjustable from 1 to 1.5 and excellent audio specifications at all speeds.

For more information: Lexicon Model 1200, **480**; Eventide TimeSqueeze, **481**; Integrated Sound Systems TDM-8000, **482**.

Equalizers: more top performers

In addition to the modular equalizer in the dbx system, noted above, new equalizers came from three companies. Orban Associates introduced the new Model 672A, which combines operation features of a parametric and a graphic. It has eight bands, each tunable over a 3:1 frequency range, with Q variable from 0.3 to 20 (center tuning). Equalization is adjustable ±16 dB on each range. Frequency variation, noise, and distortion are all at today's minimum levels.

Aphex Systems, branching out from the "enhancement" system that has won it a place in the last few years, brought a number of sound-system and studio components, among them the EQF-2 parametric equalizer in a modular package. It has five bands of adjustment, each covering a broad range, with constant 1.5 octave bandwidth, reciprocal equalization curves, expandable resolution, and state-of-the-art characteristics.

Sphere Electronics added another high-technology equalizer with its Model EQ-1014. This is a parametric with four bands — low, mid-1, mid-2, and high — each adjustable over a wide frequency range and amplitude range. Q is variable in the mid bands, shelving is available in the high and low bands. The passband characteristics, once more, are completely state-of-the-art. The unit is another in a modular case, readily dropped into Sphere (or other) consoles. Radio broadcasters will usually want equalization in some form, especially if they do any program production.

For more information: Orban 672A, **483**; Aphex EQF-2, **484**; Sphere EQ-1014, **485**.

Audio processing and noise reduction

Radio broadcasters' interest in audio processing has been on a steady upward curve for several years; in *BM/E's* most recent survey of broadcast industry needs (reported in February, 1981), processors were fourth on the "wanted" list, higher than ever before.

At the show all the makers of audio processors who have been prominent in the field in recent years had their units on display. Gregg Laboratories introduced a new AM processor, the model 2560, with some elaborate design features. The signal is divided into five frequency bands for the major control action. High-frequency equalization is aimed to offset the typical AM receiver roll-off. Clipping circuits are designed to minimize ringing.

dbx, Inc., showed for the first time at NAB its Series 900 modular signal processing system. The system uses a rack into which up to eight modular units, of uniform size, can be plugged. Functions available in the plug-ins are: deessing; a compressor with compression ratio adjustable up to infinity:1; a noise gate; a parametric equalizer; a flanger. dbx says that additional plug-in processing units for the system are coming.

dbx also introduced its Type II noise reduction in two new forms, aimed especially at broadcasting. The 941/942 are encode-decode units, respectively, which fit into the Series 900 rack. The Model 140 is a simultaneous encode/decode unit for the Type II noise reduction in a standard rack mount. All provide the 30 dB of noise reduction and 10 dB of headroom that characterize the dbx system.

Audio and Design Recording brought its Transdynamic Triband processing system, not seen at the NAB before. This unit supplies all the circuitry for comprehensive three-band processing if used with any automatic gain-control amplifier. The Transdynamic has a considerable number of advanced ideas, such as a control circuit on the peak limiter that can be contoured to 25, 50, or 75 μs preemphasis. This, says the maker, allows superclean high frequency processing without high frequency overload. Other operation features are separate control of attack, release, and compression on each band, adjustable peak modulation asymmetry for AM, LED bar graph metering, and built-in pink noise generator for easy setup.

ProTech Audio of St. James, N.Y., had a new compressor/limiter, Model 663CL, which is complete with a power supply in a rack-mount cabinet 1¾ inches high. The unit supplies a compression ratio of 2.5:1; frequency response ±0.5 dB, 30 Hz to 20 kHz; adjustable attack and release times; and 0.5 percent THD at 27 dBm out. Price is under $500.

Circuit Research Labs of Tempe, Ariz., a newcomer, showed an array of processing units for both AM and FM. With each unit in a 1¾-inch high standard rack mount, the systems are based on units that divide the total processing job into sections. The APP-400A "audio preparation processor" uses operational transconductance amplifiers for a broad overall preliminary gain control action. It is ordinarily teamed with the PMC-400 "peak modulation controler," which has five functions; soft and hard clipping for final modulation control; adjustable preemphasis for AM; overshoot-free filters; phase cor-

Digital delay line of Eventide Clockworks has adjustment for many functions, including special effects, a variety of reverb characters

rection to reduce the deficiencies of older, heavy-iron plate modulation; and asymmetrical waveform generation for AM. Similarly, other units in the line include a "spectral energy processor" that controls level in separate bands; an optional "composite controller" for control of the FM composite signal; "stereo preparation processor" for two-band control of a stereo signal; and "stereo modulation processor" for final control of stereo signal.

A dual peak limiter from UREI, Model 1178, puts in one package two separate channels, each similar to the earlier one-channel Model 1176LN. The two can be used entirely separately or tracked together for stereo with a front panel control. Also on the panel is adjustment for both attack and release times and selection of four compression ratios. The unit has high impedance balanced bridging inputs and extremely low noise and distortion. It comes in a rack mount 3½ inches high.

For more information: Gregg Labs 2560, **486;** dbx series 900, **487;** 941/942, **488;** 140, **489;** Audio and Design Recording Transdynamic Triband, **490;** ProTech Audio 663CL, **491;** Circuit Research Labs APP-400A, **492;** PMC-400, **493;** UREI 1178, **494.**

Mics on the front burner

There has been a gradual, steady increase in microphone development acitivity through recent years. NAB '81 showed an acceleration.

Beyer Dynamic, a main source of microphones for years, showed its very extensive line with a model new to the NAB, the clip-on MCE-5 electret condenser. This mic may be the smallest condenser clip-on, at a diameter of 7 mm and length of 23 mm. It can operate as a wireless mic with Beyer's wireless pocket transmitter. A version with 5.6 V battery in the connector section is also available for direct connection to amplifiers or tape recorders. Claimed characteristics are square on the upgrade: very flat 20 Hz to 20 kHz, S/N ratio 62 dB, omnidirectional.

Crown International brought its amplifier line and its pressure-zone microphones. This new twist in microphone technology, now about three years old, invokes the principle that the direct and reflected waves are in phase for a very short distance above any reflecting boundary. By putting the microphone flat against a boundary, in this "pressure zone," the system gains insensitivity to differences between direct and reflected sound. This gives the microphone unprecedented "reach" since all incident waves add cumulatively, and also freedom from comb-filter effects since all sounds are in phase.

Physically, the mics are also handy because of their flat profile, which makes it easy to absorb them unobtrusively into a scene. Crown showed several models, each with an electret capsule mounted very close to a backing plate. Specs for the PZM-31S, for example, include stated frequency response of 20 Hz to 20 kHz, ±3 dB, THD 3 percent at 150 dB SPL, and signal-to-noise less than 25 dB SPL (equivalent acoustic input).

Electro-Voice, probably the seller or more microphones than any other maker for the last two decades, had three new ones this year. The CO94 is a minature lavaliere-clip electret condenser microphone, omnidirectional, designed for connection to clothing. The microphone is about 22 mm long by 10 mm in diameter, and connects by six-foot cable to a power supply/buffer unit, which is normally clipped to the user's belt. It can also run on phantom power supply. Its small size adapts it to barrier recording (ceiling, wall, or floor). Electro-Voice says the mic will handle 20 dB more sound than earlier similar models, or 141 dB. The DO56 is an omnidynamic unit with high shock isolation, intended for hand-held use by vocalists on stage and television, as well as for such applications as sports interviews. The PL77AA is a cardiod electret condenser, with very flat frequency response to 20 kHz, 100 dB dynamic range, and 30 dB equivalent noise level, A weighted.

The Panasonic Video Systems Divison introduced a new wireless microphone system aimed at ENG and other remote pickup operations. The components include an omnidirectional electret condenser microphone; the WX-9000 transmitter, designed for attachment to the user's clothing; and two receivers, WX-9200 and WX-9250. The first receiver is dc-powered from an ENG power source and can be readily mounted directly on a TV camera. The second has internal battery power. The transmitter puts out 30 mW of power in the 450 MHz band. Frequency response of the system is given as 50 Hz to 10 kHz, ±3 dB.

The Panasonic Professional Audio Division also brought a new microphone, the Ramsa VVM-8100. This is a unidirectional back electret condenser with push-pull configuration, allowing handling of sound pressure up to 154 dB SPL. Frequency response is excellent to 18 kHz, S/N ratio is better than 52 dB, and dynamic range is better than 132 dB.

Sennheiser had a new wireless microphone system, recently accepted by the FCC for use on unoccupied TV channels, either the 181 MHz band or the 205 MHz band. The system uses narrow bandwidth and crystal-controlled oscillators to allow multi-frequency installations. A Sennheiser "HiDyn" noise suppression circuit minimizes noise interference for an S/N ratio of 74 dB. The transmitter is FM modulated with 50 mW output and runs on a 9 V battery. The receiver can use the 110 V ac line, a built-in battery, or an external 12 V dc power source.

Sennheiser also added to its line of headphones with the Model HD222. This is a "closed-ear" type, in contrast with the "open air" headphones that Sennheiser has marketed very successfully for a number of years. The new HD222 headphones cover the ears tightly with substantial isolation from ambient sound. Weight is 8.8 ounces.

Shure Brothers, another long-standing bulwark of microphone development, introduced the SM85, designed especially for hand-held use by vocalists and broadcasters on remotes. It has an elastomer shock mount and a three-stage wind and pop filter. Special effort went into controlling distortion, resulting in THD well below one percent up to an input level of 143 dB SPL.

Sony brought its new ECM-989MS, which has an interesting design: three separate cardioids are used in an adjustable M/S (coincident mic) stereo plan. The capsules are back electret condenser mics, which have gold-evaporated film diaphragms six microns thick for frequency response flat to 20 kHz and S/N ratio better than 66 dB. The power supply can be in the same housing as the capsule unit, or can be separated from it up to 330 feet. Orientation of the pickup patterns is electrically adjustable to meet any pickup requirements.

Sony's demonstration of its wireless microphone system was one of the

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pleasantest — and most convincing — of the show. On one side of the aisle, two top-notch violinists played classical duets. Each wore a Sony WRT-57 wireless mic. About 30 feet away the mic signals were received, sent through Sony's digital reverberation system, and fed to headphones. The live sound and the transmitted sound could be compared comfortably, and the latter came off extremely well.

Telex was another firm with a wireless microphone system. The receiver, Model FMR-1, operates as a single-channel FM wireless mic receiver with one antenna or as a diversity system with two antennas. WT-100, the belt-pack transmitter, has a cable connection to Telex's WLM-100 electret lavaliere microphone. The transmitter is also equipped to accept any low impedance microphone. The system incorporates compression-expansion circuitry to improve the signal-to-noise ratio. RF is in the 150-174 MHz range.

For more information: Beyer MCE-5, **495;** Crown pressure zone mic, **496;** Electro-Voice CO94, **497;** DO56, **498;** PL77AA, **499;** Panasonic Video Systems wireless system, **500;** Panasonic Professional Audio VVM-8100, **501;** Sennheiser wireless system, **502;** HD222 headphones, **503;** Shure SM85, **504;** Sony ECM-989MS, **505.**

Turntables and pickup arms

Turntables and tonearms are only as good as the records they play. While table and arm manufacturers were not showing new and radical innovations this year, an Englishman arrived at his first NAB with a record cleaning machine that just may be the industry's "better mouse trap."

Available in a single or double-deck version (Mark II and Mark III, respectively), these professional record cleaning machines are manufactured and marketed by Keith Monks, whose base is outside London but who has a subsidiary company — Keith Monks (USA) Inc. — in Stamford, Conn.

A half-and-half mix of distilled water and industrial ethyl alcohol is applied through a brush to records that spin on a turntable. A suction arm sweeps from the center of the record to the edge, sucking up the liquid cleaner and suspended particles. When the process is completed — about 90 seconds for each side — the record is dry, clean, and free of all chemicals. The machines have been marketed around the world, but this is Monk's first attempt to deal directly with U.S. broadcasters.

Micro-Trak introduced a turntable preamplifier it calls Model 6411. The $169 unit features a transformerless electronically balanced output and is switch selectable for high-frequency adjustment.

Stanton Magnetics was at its first NAB, but the company is certainly not a stranger to broadcasters. The Stanton phono pickups lift the music off disk recordings in hundreds of radio stations. Stanton showed a new pickup, the 980LZS, which the company calls "The Moving Coil Replacement." It is a moving magnet design with mechanical impedance at a very low level for dynamic tip mass rated at 0.2 mg, rise time of 10 μs. Stanton gives frequency response of 10 Hz to above 50 kHz; resistive load can be 100 ohms or higher.

Stanton also showed its line of headphones, the Model 310 preamp-mixer, and its record-cleaning equipment.

Others displaying turntables and tonearms that have been seen at previous NAB exhibitions were Russco, and Technics/Panasonic.

Fidelipac showed Audio-Technica's ATP series of dual magnet cartridges, available with either spherical or elliptical diamond styli.

For more information: Keith Monks record cleaner, **506;** Micro-Trak 6411, **507;** Stanton 980LZS pickup, **508.**

Working on the telco interface

At the show Comrex demonstrated its complete system, the Studio/Telephone Conference Integrator, which allows a talk-show host to put up to two callers on the air, with the audience hearing both callers and the host, and each caller hearing the host and the other caller. The control system allows the host to seize or drop either of the incoming calls at the push of a button.

Comrex also announced an addition to its Low Frequency Extender, which has done so much to improve the quality of telco carried remotes. A high-frequency enhancement unit can be added at the sending end; in a live demonstration at the Comrex booth, this predictably lifted the naturalism.

Russco Electronics introduced two units intended to help the broadcaster with the telco interface. The T411 "Tel-E-Mote" is a portable remote mixer with three channels and switchable line equalization for improving telco quality. The T112 telephone-to-studio equalizer/coupler has two separately adjustable 600 ohm balanced outputs for feeding the console and recording gear simultaneously. It has a 2W headphone amplifier for monitoring without loading the line, a three-band adjustable equalizer for improving telco line quality, and a 60 Hz notch filter for reducing hum.

For more information: Comrex Low Frequency Extender improvements, **509;** Russco T411, **510;** T112, **511.**

More top-fi studio gear

Studio gear for broadcasters has, by and large, caught up with, or gone ahead of, the high-fidelity instruments that used to outdo it. But some movement continues from high-fidelity technology into broadcasting. Crown International represented this movement in specific terms at the show. It was Crown's first time at the NAB, and the company announced a reorganization and enlargement of its product line to meet the needs of the two separate markets, the consumer and the professional. For radio broadcasters, this was a formalizing of a relation that has existed with Crown amplifiers for a long time.

Crown has redesigned the front panels of the DC-300A and DC150A, two of its best-liked amplifiers of the last 10 years, to accord with the new emphasis on "professionalism." The changes amount to a more rugged power switch, a relocation of level controls, and a new appearance. Crown also introduced two brand new power amplifiers in the professional series, the PS-400 and PS-200. Both have topmost specifications like those of the DC series, the immunity to output shorts, etc. The PS-400 is rated at 265 W per channel into 4 ohms, the PS-200 at 140 W per channel into 4 ohms.

Crown also showed its line of pressure-zone microphones, a real first for the NAB. They are discussed in another section of this report.

Another company showing new, advanced power amplifiers was United Recording Electronic Industries. Representative of their series is the Model 6500, rated at 275 W per channel into 8 ohms, 450 W per channel into 4 ohms. The amplifier has a modular design, with each channel and its separate power supply on a module. Specifications are at the all-out levels we get today in the best amplifiers: intermodulation at 0.05 percent up to full rated output, noise −100 dB below rated output, rise time less than 7 μs, slow rate 50 V/microsecond.

We also have today an array of turntable preamplifiers of spectacular performance. Broadcast Electronics brought a new one to the show with specs that are startling even by today's super standards for this gear. The company rates the new EP-1 at 0.01 percent harmonic distortion and intermodulation distortion, less than 0.1 percent transient intermodulation distortion, frequency response within 0.5 dB of the RIAA curve, weighted noise 90 dB below reference with 10 mV input. The

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maker also says the unit is highly resistant to RF interference, with each audio and power conductor having an independent RF filter network.

For more information: Crown PS-400, **512;** PS-200, **513;** UREI 6500, **514;** Broadcast Electronics EP-1, **515.**

Switching and distributing at top fidelity

The top-fi studio must have top-fi switching and distributing networks for its audio. Pacific Recorders has custom-built a number of systems for getting audio around a complex of studios with purity undiluted. The company now is offering several standard systems of the kind. The RS-16 audio routing switcher takes in up to 16 stereo program channels and combines them in any way in the output. A microprocessor supplies any wanted switching logic while reducing the need for hardwiring connections for all possible switching modes. The system has vanishing-level distortion and noise. The SDA-20/XB-200 is a combined audio switcher and stereo distribution system. It has 20 stereo inputs, up to nine very low impedance stereo outputs. The SDA-8 has a bridging stereo input feeding eight stereo outputs. These systems all have characteristics aimed to preserve to the full the quality of the audio.

For more information: Pacific Recorders RS-16, **516;** SDA-20/XB-200, **517;** SDA-8, **518.**

Intercoms

Intercom systems manufacturers arrived in Las Vegas with a clutch of new equipment, much of it designed for wireless operation or for interfacing wireless and hardware systems.

A prototype for a four-channel microcoupler — essentially a four-pack of mini-receivers — was shown by Nady Systems. The single antenna coupler, which will cost about $600 when it is available later this summer, will feed four wireless mic channels.

In addition to showing his line of wireless receivers and Nady Cordless wireless mics, company president John Nady said he would be launching a new wireless intercom system this summer. The new duplex system will have a range of up to one mile. Cost, he estimates, will be about $500 a channel.

A new 20 dB-gain preamp mic transmitter that weighs a scant five ounces was introduced by Swintek. Called Mark 50A/dbs/PZM, the $895 transmitter allows sound transmission even at a whisper. The unit will accept dynamic, electret, or high-level PZM mic inputs. Typical dynamic range is 100 dB for this transmitter that operates in the high band from 150 to 350 MHz. The company also was showing its not-so-new 200/CPS duplex intercom, aiming it to the new generation of ENG camera/recorders, which can carry the $1995 transceiver system on board.

A base station that will interface wireless intercom headphones with any hardwired system was introduced by R-Columbia Products. The audio signal from a hardwired headphone is fed into the base station, then transmitted to any number of wireless headsets on one channel.

A similar system was being discussed at Cetec Vega's stand, where the company was displaying its range of wireless intercom equipment. Cetec Vega expects to market its QX1 and QX2 systems by July (pending FCC acceptance). The QX2 is a wireless intercom that will handle six duplex conversations simultaneously to or from any hardwired intercom.

Television Equipment Associates of South Salem, N.Y., was touting BCA's 929 intercom system. The 929 will feature remote panel capability and will carry a remote mute that can be programmed in the field.

An IFB switchboard main station, the SB-412-IFB, designed specifically for television studios marks Clear-Com's decision to introduce a line exclusively for TV. The board features a 12 by four assignment matrix, a monitor that can be assigned to any of four channels, and a power supply. The matrix will assign 12 stations or groups of stations to any one of four channels or an "off" position, at which time all stations on that line can communicate with each other but are disconnected from the switchboard. Six of the station lines have an ISO function, allowing separate isolated communication between the main station and a selected station line.

ROH, Farrtronics, and Sigma Electronics were showing modular intercom and distribution systems that have been seen at NAB earlier. HM Electronics intends to have a wireless intercom system available next month (July), but did not have a prototype system at the show.

For more information: Nady Systems microcoupler, **519;** wireless intercom, **520;** Swintek Mark 50A/dbs/PZM, **521;** R-Columbia base station, **522;** Contec Vega QX1, **523;** QX2, **524;** Television Equipment Associates BCA 929, **525;** Clear-Com SB-412-IFB, **526;** HM Electronics, **527.**

Monitor speakers

Among studio monitor speaker makers, some faces new to NAB appeared in Las Vegas this year, while some of the old guard promised some new developments.

Tannoy, a U.K. company with a strong track record in Europe, is being handled in this country by BGW Systems of Hawthorne, Calif., a newcomer to NAB. BGW was showing the Tannoy SRM 10B, new to the U.S. market. The speaker has a maximum output power of 80 W and produces 109 dB at one meter over a frequency range of 70 Hz to 20 kHz.

A larger speaker, the SRM 12B, has the same output and sensitivity — 1 W produces an average level of 90 dB from 50 Hz to 20 Hz — as the SRM 10B, but can handle a continuous 100 W input from 70 Hz to 1 kHz, whereas the SRM 10B takes a maximum input of 80 W over the same range.

BGW also pulled the wraps from its Model 150 power amplifier, a rack-mounted 150 W output unit that boasts a frequency response of +0, −0.25 dB at 20 Hz to 20 kHz. Hum and noise level are claimed to be better than 109 dB below 50 W. First delivery of the $549 Model 150 was to Norwegian Broadcast last December.

Three new Time Aligned 75 W studio monitors were unveiled by United Recording Electronics Industries (UREI). The Sun Valley, Calif., company showed its 811A, a single-woofer coaxial model with a sensitivity of 87 dB SPL; its 813A, a dual-woofer coaxial speaker with 89 dB SPL sensitivity; and its 815A, triple-woofer coaxial model with a sensitivity of 91 dB SPL. Frequency response of all three speakers is ±3 dB between 40 Hz and 20 kHz.

While JBL displayed its series of professional speakers that have been seen at previous NABs, company officials allowed as how updates were in the wind. Indeed, JBL was hoping to show the updates at the Audio Engineering Society exhibit — a month after the Las Vegas NAB show had shut down. In the upcoming JBL offering: the 4343 studio speaker will have an 18-inch woofer — currently it carries a 15-inch woofer — and new 10-inch midrange speakers as well as a new network.

Having introduced the Sentry 100 last year, Electro-Voice this year came up with a rack/wall mounting bracket kit — designated SRB-7 — for the 30 W speaker system. The Sentry 100 no longer has to sit on the floor.

For more information: Tannoy (BGW) SRM 10B, **528;** SRM 12B, **529;** 150 power amp, **530;** Time Aligned (UREI) 811A, **531;** 813A, **532;** 815A, **533;** JBL 4345, **534;** 4400, **535;** E-V SRB-7, **536;** QSI VALID, **537;** master clock system, **538.**

"There are cart machines... and then there's PhaseMaster."

"That's me, Johnny P. Shift, morning D. J. at K-FAZ radio. With sound like ours, we're lucky to have any listeners at all. I mean we got it all. Unacceptable phase shift. Annoying holes in the sound. And enough wow and flutter to drive anybody with half an ear to distraction. Sometimes I wonder whether we're trying to entertain people...or get even with them."

"So I keep telling Uncle Bobby, my station manager, about Ramko Research's new PhaseMaster Series. Everything from a single playback through a stand alone record/play unit to a complete package for recording, playing and duplicating cartridges and cassettes."

"PhaseMaster eliminates phase shift, once and for all. Wow and flutter are reduced to absolute minimums. And, there's signal-to-noise, distortion and frequency response figures that are unheard of in the business 'til now. Tape hiss is gone — I mean to tell ya', this sucker's quiet. And, it's completely compatible with existing cartridges."

"If I've explained PhaseMaster to him once, I've done it a hundred times. All about how we can get rid of time-consuming calibration procedures. How there are no complicated, expensive electro-mechanical devices for moving the heads around. How PhaseMaster electronically compensates for any phase shift and corrects the error in real time. And quality, Man, these things are built like a brick... tank. Which is why they've got the longest warranty in the industry."

"I tell him the whole story — including how Ramko will give us a free two week trial (that is, if he hasn't already ruined our credit). So, you know what he keeps asking me? 'What's the phone number?'"

"So what do I look like, the phone book?"

The Ramko Research PhaseMaster Series eliminates phase shift and gives you all the operational and convenience features you ever wanted in a cart system, mono or stereo. Get a free two week trial or more information by calling your nearest Ramko Sales Representative or (916) 635-3600. Collect.

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And that's good news for the whole industry.

Customers in North America will now be served by a much larger integrated organization for fast, efficient service for all products.

With the formation of new U.S. and Canadian organizations, Central Dynamics will market Philips Broadcast and American Data products in the United States and Canada. (Philips will market CDL products throughout the rest of the world, as they have since 1972.) International sales of ADC products will continue through the present overseas network.

In addition, the acquisition of American Data by Central Dynamics doubles the company's manufacturing capacity with plants in the U.S. and Canada. N.V. Philips will concentrate on design and manufacture of advanced cameras, transmitters and equipment for the digital television decade.

This aggressive move establishes a wide range of products available from one source, and represents a long term commitment of these companies to new technology, product and customer service.

The first phase of the plan is already taking place:

- CDL has increased manufacturing capacity 30% in their Montreal plant.
- N.V. Philips Broadcast Products are moving into larger facilities in Eindhoven, Holland.
- An expanded CDL and ADC research and development effort has already been launched.
- And, the new expanded organization will move soon to new headquarters in northern New Jersey staffed for sales, service, parts, product management and support activities.

The compatible products and services of CDL, Philips and American Data are now offered by one U.S. company dedicated to the television industry:

Philips ENG, EFP and Studio cameras	Master Control switchers and Automation Systems
Teleproduction vans and systems	Machine control and pulse distribution systems
Video recorders	Routing switchers
Production switchers	Terminal equipment
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- Package financing for equipment and systems.

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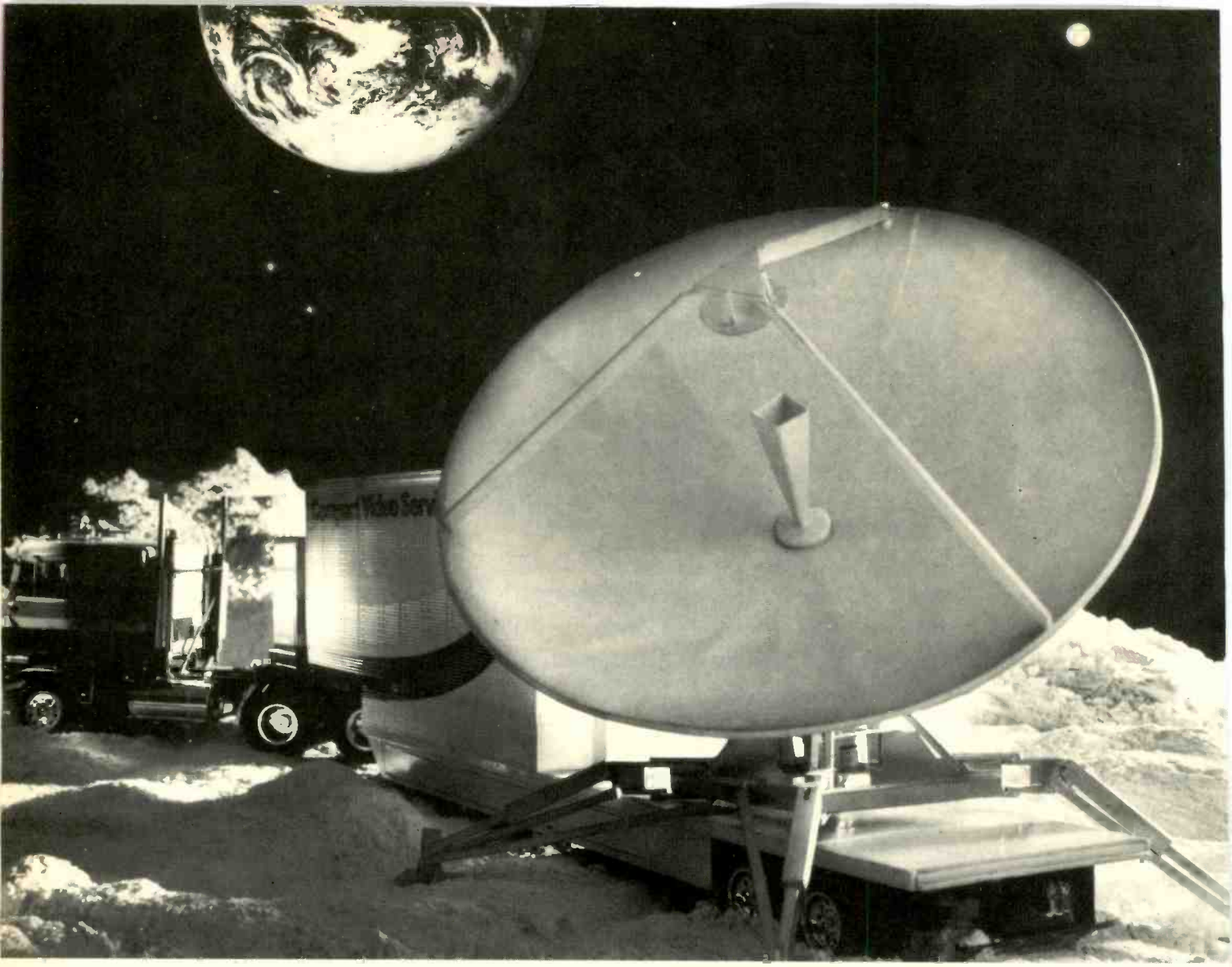

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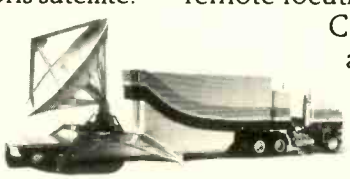

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TELEVISION FACILITIES BENEFIT FROM NEW DESIGNS

Computerization has come to the TV plant with a vengence. In everything from editing systems to lighting systems, the computer is used for efficiency and control.

Editing equipment

Editing equipment at this year's NAB was decidedly "market sensitive." Not only were low-cost systems plentiful, but the cost per feature factor was way down. Another aspect of "market sensitivity" was the arrival of appropriate editors for each user's needs. Whether the task is feature film, prime time programming, news or industrial, a good editor at the right price was available.

Ampex's ACE editing system, a modular design that expands to the size the user needs. ACE interfaces with up to 20 machines, including switcher control for multiple-mix effects. It comes with a choice of three types of control interfaces, a dedicated keyboard, an ASCII keyboard and, what caused the most interest, the TouchScreen™ — a light-sensitive infrared grid within the CRT that responds to a finger touch. By touching the screen at a particular spot a number of edit functions can be called up. The user programs an edit decision list by going through the various menu options. Several people mentioned that the system was not one for untrained editors. A spokesman for Ampex acknowledged ACE's complexity, but added, "If you don't like something all you have to do is stick your finger in it."

Control Video Corp. also had a light-sensitive editor, the Lightfinger, that differs from the Ampex system in a couple of key ways. First, it is marketed toward smaller post-production facilities and stations (though CVC says the system can be expanded to a size compatible with even the largest facilities). Secondly, it is geared for the inexperienced editor and constantly prompts the next edit function necessary. The final way that CVC differs from the Ampex ACE is that it starts at a much lower price as a two-machine editor costing about $17,000.

CMX/Orrox added some improvements in the software of the 340X which are said to increase the speed and simplicity of the editing. A new part of the program is Motion Memory M2, which allows the system to control the edit from a one-inch VTR in whatever speed or direction selected (one-fifth speed in reverse to two times speed forward). The Motion Memory M2 operates on most one-inch VTRs — Sony, Ampex, 3M/NEC, and Hitachi,

Convergence once again came out with a new version of the ECS-100 series. The new ECS-104 (and optional ECS-104S) sports a number of new software additions that expand the capability of the system. The basic unit offers a range of auto assembly list management features. It has a joystick for scrolling through the list, a source and record VTR time code search, an automatic list cleaning function after each individual edit, the "409" program for full list cleaning, and automatic self-diagnostic program testing. The ECS-104 starts at $34,000.

The big news from Datatron was a reduction in the price of its editors. The company announced a 10 percent cut across the board.

In addition to the price rollback, Datatron showed for the first time at NAB the Smart Scan™ option for the Vanguard editor. Smart Scan™ takes advantage of the broadcast-quality variable speed capability of many of the one-inch VTRs on the market. It "learns" the speed and direction in which the tape transport is supposed to run and then operates in that mode when the edit is made.

The final edit decision list, as with a number of larger editors, is compatible with "another manufacturer's system" or can be programmed to whatever EDL standard SMPTE finally adopts.

Fernseh introduced new software for the Mach One™ editor. As did several other editors, it offered a program that allowed for the variable speed capability of one-inch machines. The major innovation in the Mach One™ software was its "cluster event" feature, which allows for the previewing or recording of a complex series of transitions with a single operation. It was developed to go with production switchers with effects memory, such as the E-MEM option from GVG.

UNEMCO was not on the exhibit floor, but showed the Edit Master to dealers in its suite. The Edit Master is a computerized edit controller that can handle 28 sources. What excited some people was that the mainframe costs $5000 and each interface costs $1500. Given a standard configuration of about seven sources, the Edit Master and interface would cost $15,500.

The Edit Master is a distributive system with an interesting approach to the interfaces. There are two types of inter-

To select an edit decision, the user need only touch it on the screen with Ampex ACE

Convergence continued to develop its ECS line of editors — the latest is the ECS-104

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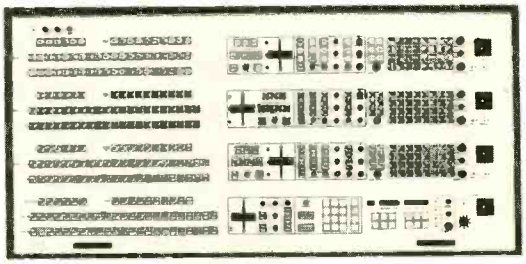

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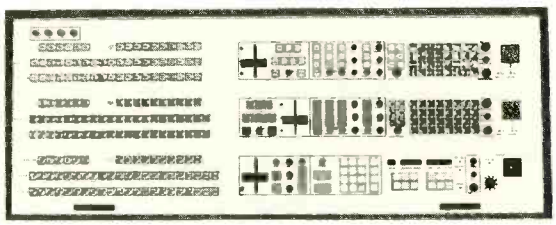

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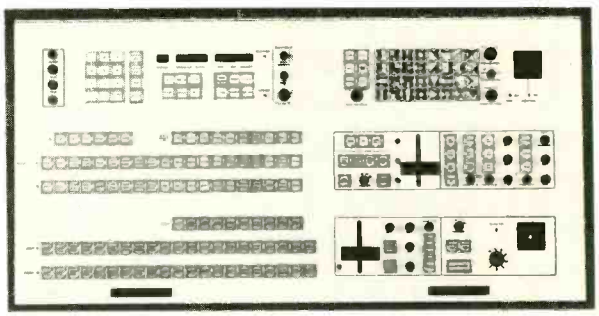

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FACT:

Our optional A.P.E. (Automated Production Effects) offers storage and retrieval of manually executed control panel functions. And with vertical interval recall of 3840 events per disc in our dual 'floppy' system, retrieval is smooth, fast, and flawless.

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faces: interactive (two-way) and active (one-way). The interactive is designed for VTRs and similar sources that need to be constantly monitored, while the active is for programmable sources such as complicated mix/effects through an E-MEM. The system can handle 14 interactive sources and 14 active sources.

Videomedia introduced a new post-production A/B roll editor, the Z6000A. Its use of Z-80 microprocessors at each interface makes the system one of the lowest-priced A/B roll editors with full switcher control, according to the company. In addition to three-machine control, the Z6000A features split edits, auto extend, auto tag, select in and out points on the fly, full VTR status verification, random search and go to functions, and four Z-80 microprocessor controllers. Prices start at $22,500. Videomedia stressed the ability to upgrade any of its previous Z6 editors to the Z6000A format.

Jatex also introduced a low-cost A/B roll edit controller, the VSEC-62TMX, compatible with most one-inch and ¾-inch machines without modification to the VTR. The VSEC-62TMX features its own time code generator, Scene-Dex, which Jatex touts as a cost-efficient way of achieving frame-accurate automated editing. A built-in LED status display indicates operating modes without a CRT or monitor. The system starts at under $15,000.

Sony introduced a new three-machine editor, the BVE-3000. This editor has a number of built-in features that make it a very flexible controller. A built-in sync indicator alerts the operator when the time code from the playback and record machine are offset. A SMPTE time code generator is included, and an optional module reads VITC. The editor has the ability to determine in and out points on the fly. It also has built-in switcher effects for preset cut, dissolve, or wipe. A port controls an external switch/effects generator.

For more information: Ampex ACE, **539;** CVC Lightfinger, **540;** CMX software improvements, **541;** Convergence ECS-104, **542;** Datatron Smart Scan™, **543;** Fernseh Mach One software, **544;** UNEMCO Edit Master, **545;** Videomedia Z600A, **546;** Jatex VSEC-62TMX, **547;** Sony BVE-3000, **548.**

Smaller editors aim for flexibility

The two-machine ENG-type editors kept pace with their big siblings in flexibility and ease of operation, while keeping the cost competitive.

Cezar International came to Las Vegas with the intention of conquering the small controller market with extremely low-cost units. The Controller is a microprocessor-based unit that offers most of the capabilities of more expensive models at a quoted price of $1995. It operates with ¾-inch and ½-inch machines.

Cezar had two other editors at a higher price, but still under what comparable editors were going for. The Executive runs $4495 and is able to produce an edit decision list that is compatible with other large post-production auto assembly systems. The top of the Cezar line is the editing Center, which starts at $5295.

Cinema Products brought an inexpensive edit controller called the Newsmaker. In addition to its low cost, about $3700, it is designed for the inexperienced operator. The controls are few and Cinema Products says it takes only about five minutes to learn how to use the editor. But the editor is flexible enough that no editing functions are lost to an experienced operator.

Panasonic continued to make inroads into the U-Matic market with a new controller to go with its heavy-duty professional ¾-inch machines. The NV-A970 is a microprocessor-based unit that offers the features of most editors in its class — it reads SMPTE time code and control track pulses and has edit point trim and variable search speeds. The controller can also interface with Panasonic's VHS VCRs. The cost of the controller is $5250.

When is an editor not an editor? When it's a Sony BVU-800 VTR. This U-Matic Machine has a microprocessor based editor built-in, eliminating the need for a separate controller.

The BVU-800, when linked with another BVU-800, automatically becomes a full editor. With the addition of a time code generator/reader a fully integrated editing system is formed.

Cezar International and Datatron are both marketing an off-line editor that is a two-source controller but can produce an edit decision list as if it were a three-machine controller. The decision list is compatible with most of the major computerized editing systems. Cezar, who designed the editor, markets it as "The Decision Maker." Datatron markets the controller under the name of "Editt/Plus™."

The crossover between film and videotape seemed to take on added weight at this year's convention. A number of companies were mentioning the advantages of film-to-tape transfer, but Harris and CMX/Orrox showed products expressly for film editing using electronic systems.

CMX/Orrox calls its system the FLM-1 film editor controller. Through a series of interfaces, the system actually controls the film transport and either generates an edit decision list with edge numbers and instructions for the negative cutter or feeds directly to a VTR for cut-only edits.

Harris took a more traditional approach using the EPIC editor. The film is transferred to tape and then edited. The

CMX's Edge system received good attention from mid-range aspirants

Videomedia's Z-6000A continues the capability's expansion in the Z80 microprocessor-controlled editors

Harris system, formally called the EPIC Video Editor with Video-Assisted Film Editing, goes further than the CMX system in that it goes through a switcher to preview all the effects that would end up in the final film. An edit decision list is produced with edge numbers and instructions for the negative cutter.

For more information: Cezar Controller, **549;** Executive, **550;** Editing Center, **551;** Panasonic NV-A970, **553;** Sony BVU-554800, **555;** Cezar Decision Maker/Datatron Editt/Plus, **556;** CMX/Orrox FLM-1, **557;** Harris video editor, **558.**

Time code equipment

Adams-Smith Inc., whose products were shown in the Glentronics booth, took a total approach to time coding. The Series 2600 is a modular group of various kinds of generators and readers that can be used in conjunction with a total editing system. Included are longitudinal generator and reader, vertical generator and reader, a character inserter, a code restorer, and a sync generator.

Amtel offered two versions of the Edit Code Master, the Model 3700 and Model 3800. Both have a generator, reader, a user bit encoder, and a video character generator — all mounted in a 19-inch rack space. Both have two jam sync modes, momentary and continuous.

Datametrics had three new products in its line of readers/generators. Model 716 is a low-cost but versatile time code generator for 25-frame EBU or 24-frame film standards. The $1980 unit syncs to RS-170A color frame standard and has an option for internal detection of color frame ID from incoming RS-170A video.

An upgraded model of Datametrics' SP-722, Model 722A, has all the features of its predecessor (generation, reading and video character insertion) plus more. It now generates and decodes SMPTE code, time, or user data and the character generator displays time or user date in four sizes with switchable background. The unit can read data from 1/20 to 100 times playback speed.

The Model 760, Datametrics' other new time code reader, has the ability to calculate segment durations, perform character insertion, and show time and user data simultaneously. It can read and display code from 1/30 to 100 times playback speed.

ESE introduced the ES 254 SMPTE time code reader. This eight-digit reader, which runs $650, can display code at 1/20 to 20 times playback speed.

Datatron's Vanguard system with Smart Scan™ tracks variable playback speeds

For-A introduced a portable time code generator, the TCG-3200, specially designed for ENG/EFP use. The TCG-3200 has a readout that displays hours, minutes, and seconds but has 32 spare bit capability so that frames will also be recorded.

Skotel showed the production model of its PTC-100 portable time code generator and reader, which was shown in prototype last year. There were some new features in the TCG-80N edit time code production generator, including measurement of sync to subcarrier phase to determine the RS-170 color field.

Sony is also getting into the VITC business with a new portable, the BVG-100. It features jam sync, color frame lock and a built-in longitudinal play speed reader. The BVG-100 is fully plug-compatible with Sony U-Matic and one-inch VTRs.

Telcom introduced a new reader and a new generator. The TCG-550 is the new generator which generates both SMPTE or EBU and sells for under $1000. Its companion reader, the TCR-660, displays time or user bits, is remoteable, and indicates color framed time code. It is also priced at under $1000. Telcom also introduced the 6010 high-speed time code reader, which features time or user data selection, 16 by 16 character generator, parallel time and user data display, and indication of color-framed time code.

For more information: Adams-Smith Series 2600, **559**; Amtel 3700, **560**; 3800, **561;** Datametrics 716, **562;** 722A, **563,** 760, **564;** ESE ES 254, **565;** For-A TCG-3200, **566;** Skotel PTC-100, **567**; TCG-80N, **568**; VITC unit, **569**; Sony BVG-100, **570**; Telcom TCG-550, **571**; TCG-660, **572**; 6010, **573**.

Synchronizers

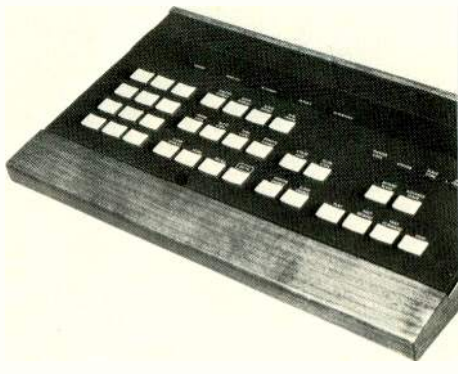
Adams-Smith introduced its Tape Synchronizer Model TS-605, which is an audio editor for television sound. The Model TS-605, which incorporates SMPTE/EBU time code, allows for the control of a master and two slave transports and boasts synchronizing resolution of one-hundredth of a television frame.

BTX brought its new Shadow System, an intelligent controller and synchronizer for audio and video tape machines. The Shadow is compatible with most audio and video editing systems and interfaces with ATRs, VTRs, mixdown consoles, and commercial minicomputers.

Control Video's latest offering was the CVC synchronizer, a two-machine microprocessor-based system that can expand to 32 machines with the addition of intelligent controllers. The CVC synchronizer can sync up machines on a frame-by-frame basis or can create and maintain an offset in all modes.

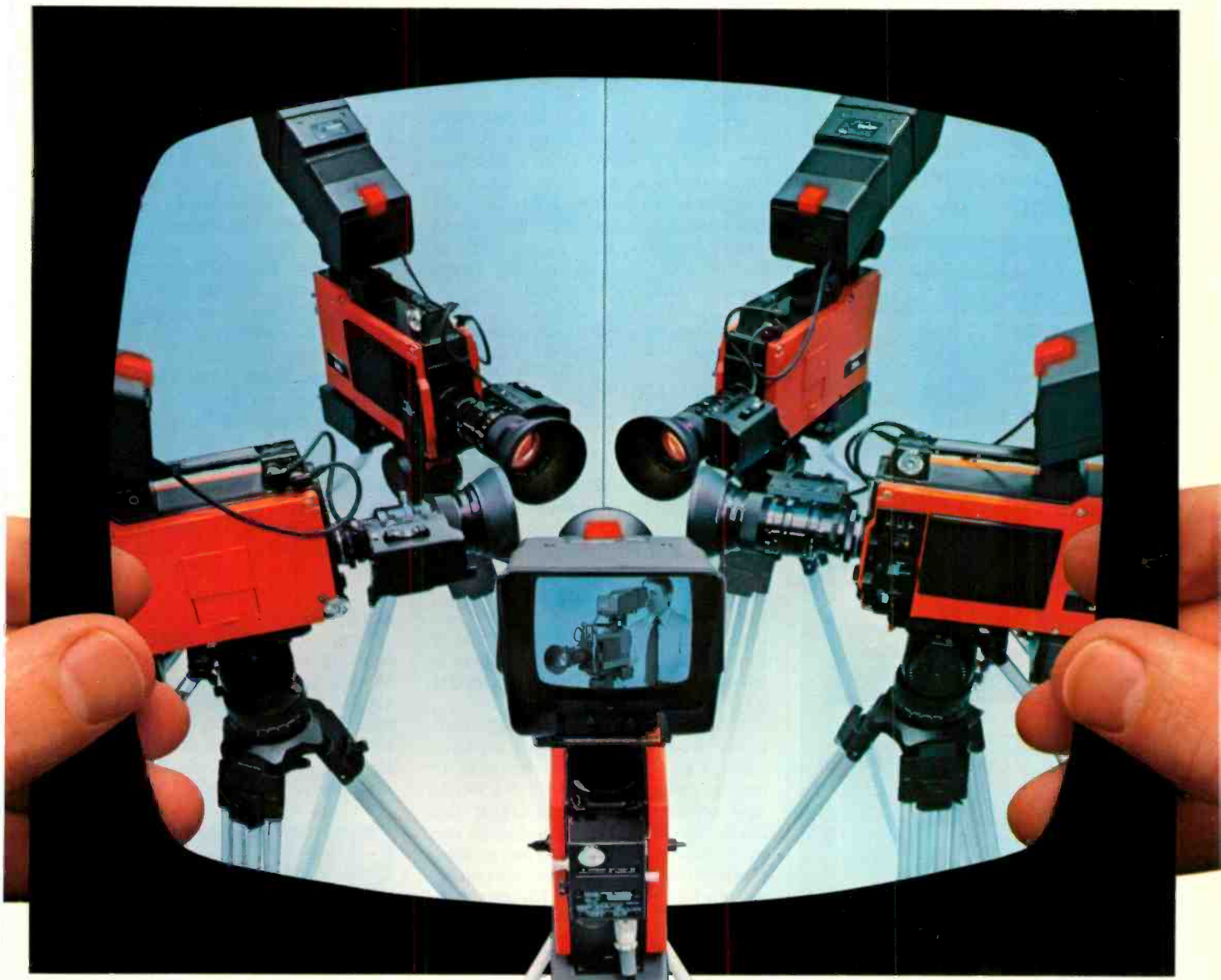
The Elector TCS Mk I time code synchronizer, new from E&O Systems, is a SMPTE/EBU time code system that can work in drop frame and non-drop frame mode intermixed. It features adjustable frame rate, dropout protection, and code error indication.

MCI introduced the JH-45 Autolock



BTX's Shadow System syncronizer control system

Compare



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SMPTE/EBU generator/reader/synchronizer and autolocator. The JH-45 syncs to most machines, has an offset of up to 24 hours, and allows user bit insertion.

Quintek Inc. featured its new unit, the Q-Lock 3.10 synchronizer. An important step for the Q-Lock 3.10 is that for the first time, according to Quintek, a digital audio recorder (3M) has been synchronized with video. The sound quality available with digital audio is another step toward providing better audio for television programs.

For more information: Adams-Smith TH-605, **574;** BTX, Shadow System, **575;** Control Video CVC, **576;** Electro TCS Mk I, **577;** MCI JH-45, **578;** Quintek Q-Lock 3.10, **579.**

Routing switchers learn the language

The recent trends towards multiple audio crosspoints per video crosspoint, more microprocessor control, and improved status monitoring were joined this year by a trend toward alphanumeric control panels. It seems as though just about every manufacturer of routing switchers now offers some type of English-language readout or display to tell operators that VTR 1 is dedicated to STU B rather than 135 to 06.

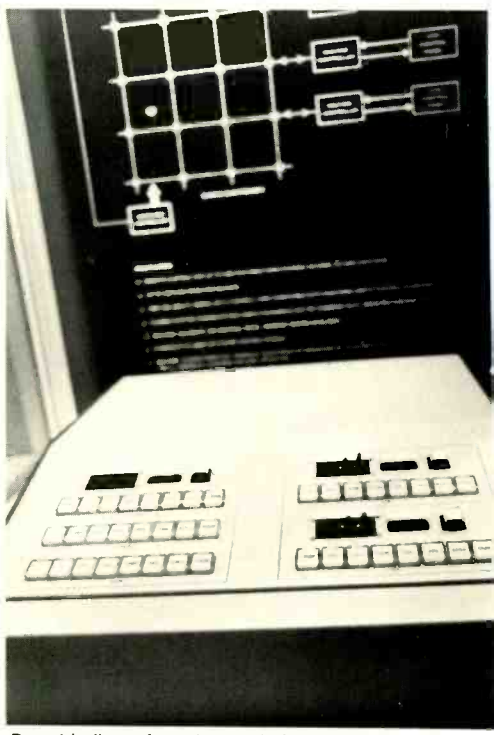
Utah Scientific, one of the pioneers in the development of more sophisticated status and control adjuncts to routing switchers, introduced a whole new series of such products at this NAB. The CSP-1610 is a control and status panel for a 10- or 20-bus system. It offers 1600 name and number combinations for sources and a 16-key touchpad for programming the system. Large LD displays are easily read. A full matrix display, the CSP-16160, features a second four-character display to indicate presently assigned output buses. Up to 160 outputs can be controlled, and the system can also be programmed as a multi-bus panel for controlling any number of randomly assigned buses. (A similar approach has been made available to production switchers through the use of Utah Scientific Source Display Strips — four-character mnemonic display strips that can be added to production switchers to show assigned sources.

Another new option for Utah Scientific AVS-1 switching matrices is a hard-copy event logging circuit card, the HC-1. This card drives a standard line printer and will log all events. If an invalid setup is ordered by the operator, the card will maintain last valid setup, but will print a record of the incorrect order. Two other new options include the SC-150 Supervisory Control Panel for status and control of a full 160 by 160 A/V system and the PDS-1 Scanner/Alarm Circuit, which scans 36 voltages and currents to determine that each card in the system is operating properly. Another new card, the AF/OR, can be programmed automatically to switch associated signals in a follow-mode with the video.

A new company to NAB was AVL Digital Ltd. Working from a basic line of products acquired in a takeover of Richmond Hill Labs, the company, a member of the McCurdy Group, debuted its AVS-100 series A/V routing switchers. This is a broadcast-quality system using a modular design based on a 10 by one building-block card approach. The design is output-oriented and can be configured in multiples of 10, building towards a 26-output bus maximum. There is one audio and one video output per bus. A BCD parallel interface makes the basic system easy to automate.

AVL explained its Universal Alarm Annunciator system, designed for smaller studios. Up to 44 input lines are monitored for failure detection. Audible alarms are provided at multiple locations and distributed for video display. A hard-copy printed record is also made.

Image Video, Ltd. introduced a new series of alphanumeric control panels. Models include a desktop CP-1, and about a dozen other rack-mountable CP models. The wide number of configurations provides for a high degree of customizing. Some panels need not be alphanumeric or A/V, and can be



Dynair's line of routing switchers now includes the System 23 data routing switcher which, with the System 21 video router, leads to a complete machine control system

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single- or multi-designation types. Control is over coax cable (optionally over audio cable) using standard eight-bit word serial communications. Image Video also discussed a large 200 RAM event system that can address its routing switcher for automation. With an optional disk system, up to 4000 events can be stored.

Grass Valley showed a new line of alphanumeric control panels for its 440 Series routing switcher system. The new panels are easily adapted to earlier 440 systems since they will translate the numeric tally pulses into the new alphanumeric display. Extensive error reporting capabilities are built in, with error messages displayed on the "in-use" portion of the panel. Various models of the panels are available, including single-bus and X-Y control panel types.

Dynair, looking beyond the control panel, introduced a new Data Routing Switcher, System 23. While the new system is compatible with Dynair's System 21 A/V router, its primary function is to handle machine control signals in RS-422 or 423, though the system is compatible with RS-232.

It is designed on a building-block approach, expanding in 10 by 10 modules to a 1000 by 1000 system. The control lines are coax or duplex for four-wire serial data.

The system controller is a microprocessor communicating over serial data lines via a unique serial data bus. The system is programmable for simultaneous path switching from a master control panel, lever switch control panel, or CRT. It can also be controlled by an outboard computer. A wide variety of control options provides for redundancy. At data rates up to 256 kilobaud, machine control communication becomes highly efficient. CMOS switching, integrated circuit amplifiers, and isolation elements provide reliability.

3M introduced two models of its BCD or microprocessor-controlled routing switcher systems, Model 20X and Model 40X. The new models are part of the 6500 Series, which can be developed to include the 6500 machine control system.

The 20X is a 20 input by 20 output unit in a single frame, while the 40X is 40 by 20 in a single frame. Performance specifications are identical for the two models. Each system is expandable, with the 20X expanding in groups of four inputs and one output at a time, and the 40X expanding in groups of 10 inputs and adding outputs one at a time.

The dual microprocessor control system allows for programmed salvo switching, AFV, audio breakaway, audio only, and video only switching.

Di Tech was one of several routing suppliers to offer alphanumeric displays

The Universal Control Panel gives readout in alphanumeric notation and is touchpad-programmable in the same fashion. The dual microprocessor provides redundancy and automatic changeover in case of failure.

In addition, second audio channel for each crosspoint can be installed in the field. A third audio matrix can be added by using 3M's AX series of audio routing systems.

Other new control panels were shown by Datatek and Di-Tech, Inc. Datatek's Series 2000 Panels are microprocessor-controlled and are able to operate as single-bus or multiple-bus controllers. The control panel microprocessor communicates over an RG-59/U coaxial cable with an associated output bus microprocessor in the matrix frame. Since the panel has an RS-232 interface, outboard computer control is practicable. The panel can be programmed for AFV, breakaway, and multi-level basis.

The 990 Series control panels from Di-Tech provide for desktop and rack mounted units, also offering serial party line or eight-bit parallel BCD communication. The panels provide alphanumeric displays of source and destination. Source display can be selected by thumbwheel, or by touchpad in other models. Some of the 990 Series panels offer group select as well as preset selection through either thumbwheel or touchpad switches. Configurations are in one-bus, two-bus, and 10-bus form, with the 10-bus touchpad Model 996 priced at $2155. A single-bus desktop thumbwheel panel is priced at $470.

For more information: Utah Scientific CSP-1610, **580;** CSP-16160, **581;** HC-1 option, **582;** SC-150, **583;** PDS-1, **584;** AF/OR, **585;** AVL Digital AVS-100, **586,** SD-XX, **587;** Universal Alarm Annunciator, **588;** Image Video Ltd. control panels, **589;** GVG control panels, **590;** Dynair System 23, **591;** 3M 20X, **592;** 4OX, **593;** Datatek Series 2000 control panels, **594;** Di-Tech 990 Series, **595.**

Digital video effects: can't stand still

Not all the unusual twists and turns in digital video effects were visible on a television screen this year. Ampex entered the fray with a major new system they labeled ADO. (Those readers who attended the Ampex exhibit may recall the system's name as Merlyn, but it was subsequently dubbed ADO, Ampex Digital Optical.) ADO instantly placed Ampex in direct competition with MCI/Quantel, Grass Valley Group, NEC, and Vital. One of ADO's chief shots across the bow of the competition was the ability to rotate images simultaneously on all three axes, giving the appearance of true three-dimensional rotation.

MCI/Quantel returned fire almost instantly. Overnight, they reprogrammed a portion of the DPE-5000 software to produce an effect very similar to the 3-D rotation. While the result of the reprogramming was not perfect, it clearly succeeded in demonstrating the power of the software. Given the little more than the 10 or 12 hours they had between Sunday night and Monday morning, Quantel's bead may very well get more accurate.

When it came to shots from the blind side, DCC — the business automation people (BIAS) — took the prize. With few people looking over their shoulder, DCC joined up with a small company headed by John Davis, formerly with Vital, and issued Digifex, a small digital video effects generator aimed at the small-market station.

While true technological breakthroughs are rare, it appears that Ampex has achieved just that with its ADO system. Broadcasters who viewed the ADO output were clearly impressed, not only by the virtuoso performance of ADO but also by the news that the system would sell for less than $100,000.

The use of the phrase "optical effects" is intended to convey the notion that ADO brings to video the quality and flexibility film obtains through the use of opticals. With digitally encoded

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☐ Exclusive area composition permits composing and editing in one section of the display without disturbing adjacent items. ☐ Free-form manipulation through double-buffered frame store. Character placement not limited by row-structured page.

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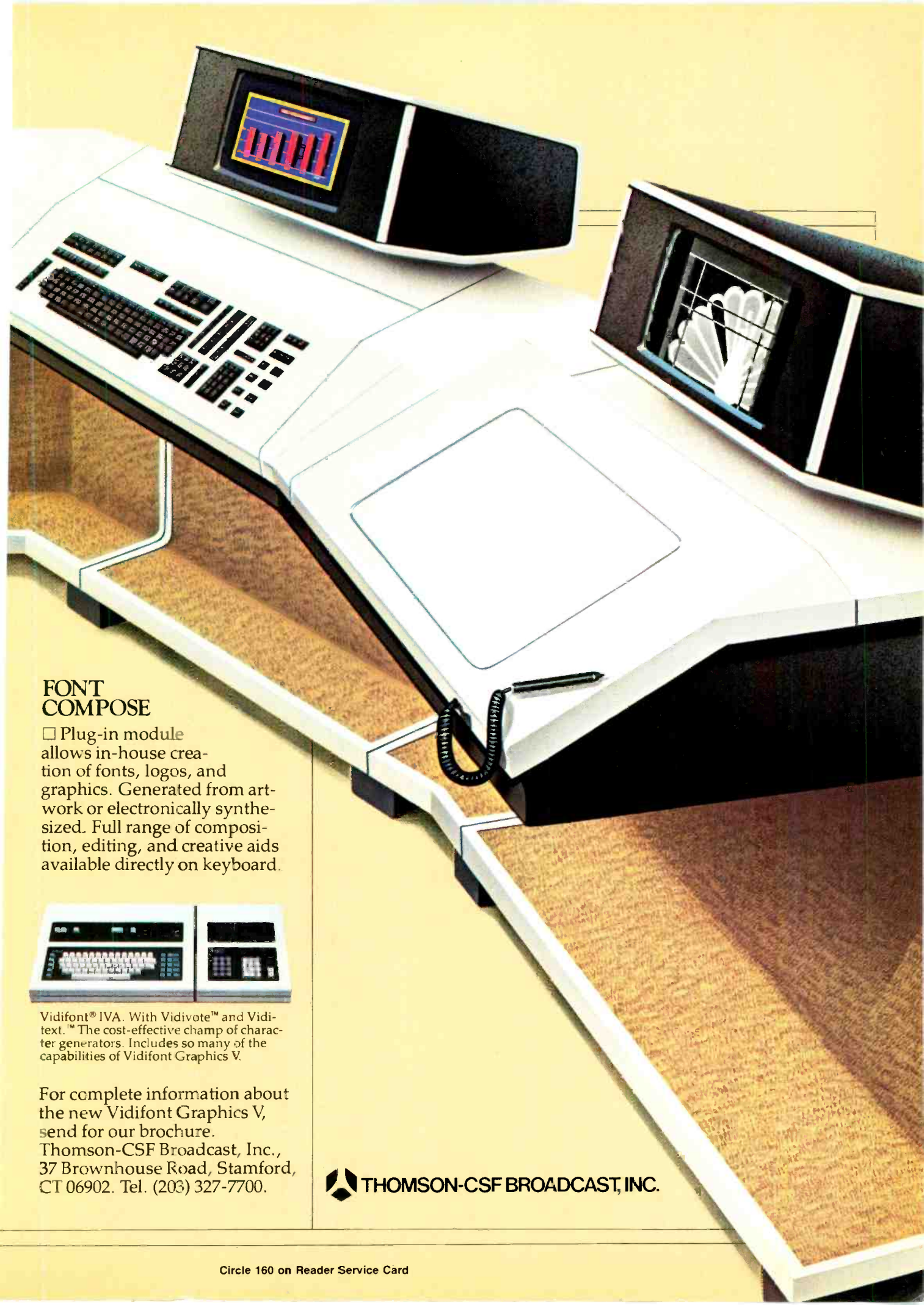

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component video, the ADO system is able to alter the geometry, size, and perspective of video images. The image can be defined as a three-axis, solid geometric shape, rotated a full 360 degrees along all three axes simultaneously while it is expanded or compressed continuously. Compression to zero or expansion up to eight times normal without visible picture degradation is possible. At the same time, the geometric center of the object can be moved to any part of the raster or off the screen altogether.

In the case of an image that is defined as transparent (like a film slide) flips, tumbles, etc., are completed for the entire picture and all of its elements, creating the effect of turning the slide in realtime, real world conditions.

Stop, start points, rates of movement, expansion, and compression are programmable. Up to 24 picture manipulations can be linked in sequence. A joystick control gives the operator basic control over movement, while the executive routine can be altered to smooth out or proportion the steps. Storage of effects sequences is on floppy disk.

Multiple control panels can be employed, though only one may be online at a time. Live or videotaped frames can be grabbed for manipulation. Output is either RGB or encoded NTSC.

The DPE 5000 series of special effects systems from MCI/Quantel exhibited a number of significant changes including new effects, new models, new configurations, and new control options. Perhaps the best news from Quantel is the DPE 5000/SP (Special Performance) unit. Priced at less than $65,000, this single-channel system has many of the features from its bigger sibling — such as infinite compression and two axis squeeze.

The SP electronics are housed in 8¾ inches of rack space. The control panel is similar to the DPE 5000 panels and has seven preselect keys. There is a mini version of the "Shot Box," an option introduced by Quantel at IBC, that has 20 keys for execution of up to 40 preset effects.

"Shot Box," making its U.S. debut at NAB, is a special control panel with 35 keys plus a "shift" key that delivers up to 70 factory-programmed effects. The user can select from a standard inventory of 700 effects, assigning any desired 70 to the keys. To obtain full access to the "Shot Box" option, the user must have the DPE 5000/Plus with the Autosequence™ option.

The user of this $10,000 option does not have to assign all 70 effects. Some key positions can be reserved for user-created effects that the user wishes to call up repeatedly.

Another addition to the DPE 5000 system is a switch for the delegation of control to any of several remotely located control panels. Up to four studios or edit suites can have full control panels with access to the DPE 5000 electronics.

Digifex is the name given to the video effects package offered by DCC, Broadcast Division. The unit is aimed at the small-market station and is priced at $38,000. The assumption made by Digifex is that the small-station operation generally applies digital effects to titles, graphics, and logos and does not

ADO (Ampex Digital Opticals) system impressed broadcasters with its 3-D rotation

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need to manipulate the entire raster in order to get creative use out of digital effects.

Input to the Digifex unit is generally from an artcard through a camera. The image stored can then be manipulated over real-time video using effects such as spin, flip, rotate, zoom, compress, fill with matte, wipe, and combinations of the above.

Speed of the transitions or repetitions can be set for automatic playback or manually adjusted across an infinite speed range set in frames and seconds. The system requires two synchronous inputs.

The control panel for the Digifex unit consists of keypad entry group for identifying effects by number and setting durations. Key clip, hue, luminance and chrominance adjustments, and a lever bar for manual execution of wipes are also available. An LED display provides information on effect speed, pattern number, image source, and mode.

Grass Valley Group's Mark II DVE system, NEC's DME system, and Vital's SqueeZoom were essentially unchanged. There were, of course, new effects shown by each of the systems — most derived by changes in programming. Both Grass Valley and Vital developed further control of their systems through more thorough integration with their switching systems.

Grass Valley showed a four-channel DVE integrated with the GVG-300 production switcher. The 300 was designed from the beginning to work with digital effects, so numerous operational benefits, particularly in the area of effects automation through the use of E-MEM, were apparent. According to a GVG spokesperson, several 300s with DVE are now in the field.

Vital's main thrust was the integration of SqueeZoom with its new Saturn Series switcher (discussed elsewhere in this issue). According to a company spokesperson, PSAS will soon incorporate a bubble memory system to store up to 30 minutes of effects events. Another aspect new to the Saturn/SqueeZoom is a complete on-board diagnostic system using an Ann Arbor data terminal to monitor and report on all switcher functions.

NEC's DME was shown in operation with NEC's TAKS-1000 series switcher. While still offering the full panoply of effects and developing more constantly, the system was fundamentally unchanged. With its exclusive Actiontrak™ system, however, numerous related effects were achieved that were visible in no other system.

For more information: Ampex ADO, **596**; DCC Digifex, **597**; MCI/Quantel DPE 5000/SP, **598**; "Shot Box," **599**; control delegation switch, **600**.

Production switcher innovations; digital leads the way

While microprocessor control of analog switchers is, and has been, the major trend from switcher manufacturers in the past few years, Panasonic carried the process yet another step this year by showing the first all-digital video switcher at NAB.

Several years ago, Panasonic showed a digital video effects system, the 7000. While it was an object of curiosity and marvel for delegates to

Ampex's new switchers have completely eliminated front panel pots

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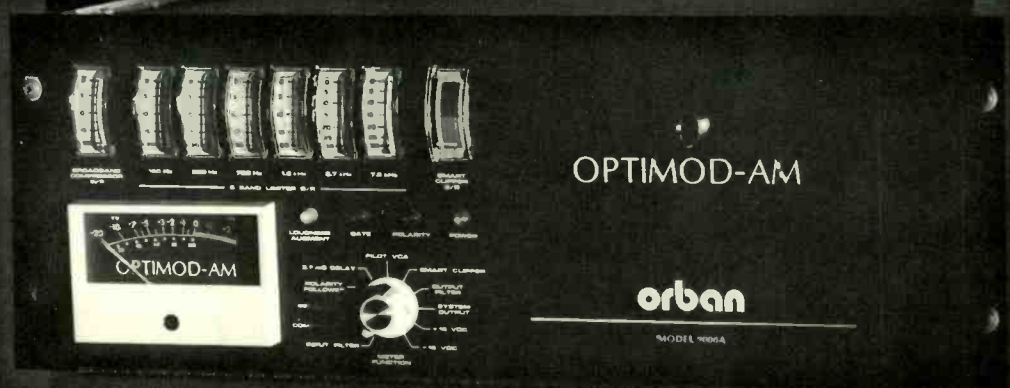

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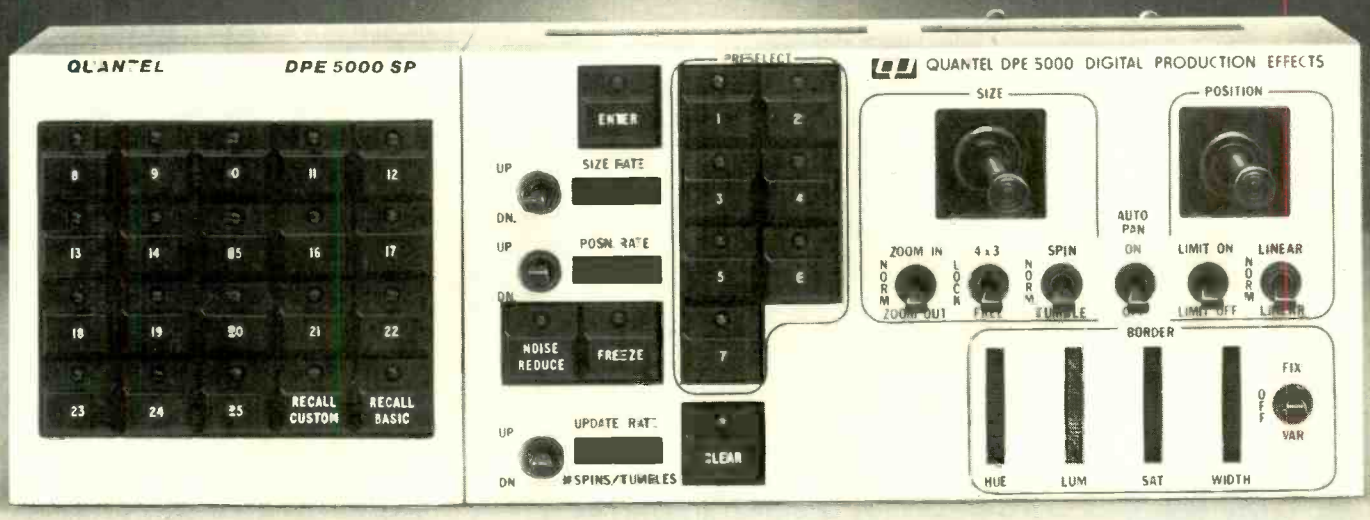
The Quantel DPE 5000/SP.



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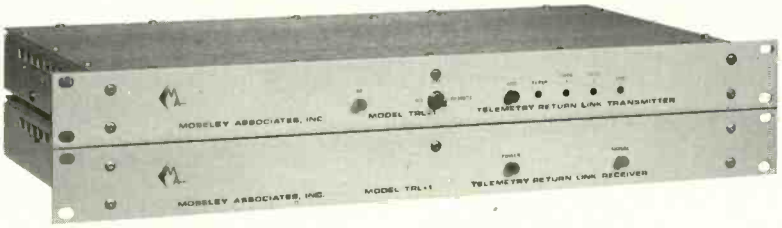

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that convention, the system was never thoroughly marketed in the U.S. The idea for digital video effects, however, was picked up by several other manufacturers and systems subsequently introduced by NEC, GVG, MCI/Quantel, and Vital made digital video effects accepted practice. When digital video effects manufacturers were recognized for their contribution to television arts and sciences, the Academy did not forget Panasonic's pioneering efforts and awarded it an Emmy as well.

The AV-800 Digital Production Switcher that Panasonic showed this year, will be marketed here in the U.S. this winter. The system features a 4 fsc, 10-bit sampling structure and offers the common benefits of digital processing. Regardless of the complexity of the event, absolutely no degradation to the picture is produced. Virtually no adjustments are required from setup to setup since values do not drift.

Input to the switcher is standard NTSC composite video, which is then separated into component digital video for processing. A digital video interface can be provided to a digital video processor for effects such as expansion and compression.

Standard effects with the AV-800 include 64 wipe patterns, generated by microcomputer program. The various wipe pattern formats exist on a series of plug-in "tumblers" similar in concept to music box rolls. Each tumbler is programmed for several versions of its wipe pattern, which can be selected by turning the tumbler once it is in its socket. The tumblers, which are about one inch long and half an inch in diameter, have a series of perforations that define the wipe program to the switcher. The tumbler and socket approach also permits users to order wipe patterns in any sequences that represent their versions of "most frequently used" or according to any other sense of individual priorities.

The digital nature of the AV-800 also

Saturn Series switchers from Vital incorporate automation and digital effects

permits a wide range of new effects in addition to conventional effects. Digital filtering permits a "focus through" effect in which the foreground or background can be brought in/or out of focus in a manner visually identical to the technique used by camera operators. Because of its composite processing and built-in luminance non-additive mix approach, a large number of color-dependent effects can be achieved in addition to conventional chroma key. While the system employs only two ME banks for unlimitted reentry, a number of effects can be achieved on each crosspoint bus, including dual-split, quad-split, and penta-split wipes.

The digitizing of the video signal itself for switching represents another step toward the all-digital plant, but conventional switchers continue to rely on digital technology for control. E-MEM, PSAS, CAPS, ACTS, A.P.E., and other computer-assisted switcher systems were joined by still more offerings this year.

Ampex this year introduced an entirely new series of switchers that employ a high degree of automation. Called AVC Series, the switchers range from a single-M/E, 16-input version to a three-M/E, 32-input switcher. The largest of the series, the AVC-33, was an immediate success as CBS took delivery on one and ordered a total of nine more for installation at its network headquarters in New York and at several of its O&O stations.

The 32-input AVC-33 on display was physically smaller than the 24-input 4000H, Ampex's former top-of-the-line switcher. The AVC series has eliminated all control pots from the panel and instituted instead two centrally located adjust panels containing up/down and on/off pushbuttons. Co-located on the adjust panel is a pattern positioner. All switcher adjustments can be made from this panel with the exception of the quad split and color background functions. A memory system, STAR, stores the setup for each of the system's M/Es and can transfer all parameter information for a particular setup on one M/E to another.

Since the video parameter information is tied to the source, and not the keyer, the key source can be brought up on any of the switcher's keyers with perfect reproduction of switcher setup. The four setups are for two chroma and two luminance key effects.

The output of any M/E can be previewed, as can the individual buses feeding the M/E, the program bus, preset bus, and quad split system. As an option, a Preview Key System permits the preview of keys over a scene, even if the scene is on the program bus.

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The AVC-33 has 70 wipe patterns, with up to 100 wipe patterns available with effects extender options. A pattern modulator unit is also available, as is an optional panel memory system that will store and recall up to eight setups plus "last setup" in order to quickly return to some preferred operating condition.

There are five models in the AVC switcher series. The AVC-33 is base-priced at $124,000; the AVC-31 is $112,000; the AVC-23 is $101,500; the AVC-21 is $96,000, and the AVC-11 is $67,000.

Vital Industries kicked off its 1981 NAB presentation with the introduction of its "Saturn Series" system, which it claims is the "largest production switcher even built." Again, a high degree of automation has been employed in order to master this 24-input, four-M/E system.

Each M/E contains three keyers (both RGB and composite types), two matte colorizers, and two color background generators. Equipped with an "endless effects" transition system, each M/E can mix, non-add mix wipe, or cut between two keys, within the key, or behind the key while maintaining or changing the color background.

The Saturn Series includes PSAS as standard for sequencing and learning events. A microprocessor control system automatically stores all switcher adjustments and values as they are made and holds the settings until they are overridden by a subsequent change. Non-standard setups are indicated automatically to reassure the operator, and an M/E clear system allows the operator to return to a neutral switcher setup whenever desired. A very useful monitoring aspect permits the channelling of the preview channel back to the camera position.

While Grass Valley showed no new switching systems, it did show a new 16-input version of its top-of-the-line GVG-300. Model 300-3B, like the larger 3A, is designed to integrate E-MEM and Digital Video Effects.

GVG's 1600X, shown last year in a post-production configuration, was shown in a similar manner this year. This time, however, E-MEM was shown working with the Chyron IV character generator/graphics system. With the 1600X interfaced to the CMX editor (serial or parallel interfaces may be used) and the E-MEM addressing the Chyron, Grass Valley was able to demonstrate some significant editing features permitting the inclusion of graphics through the 1600's effects system.

Central Dynamics Corp.'s "agreement in principle" to acquire Philips Broadcast Equipment Corp. and American Data Corp. made news all by itself. Basically, CDC will broaden its line of switchers to include the American Data line while handling sales and service for the products of Philips Broadcast Equipment, which will cintinue to be manufactured abroad. According to Arden C. Boland, chairman and president of Central Dynamics Ltd., Montreal, the acquisition should allow for a more focused R&D program.

One of the new model switchers that CDL will bring to the deal is the CD-480 Model 10. This is a 10-bus switcher with two SFX amplifiers, each of which can control up to four video sources. The SFX module provides extended effects capability and permits preview of any transitions without affecting the on-air signal. The modules include encoded chroma keyer with RGB keyers as options.

Two utility buses on the Model 10 supply additional key and program sources or can function as dedicated feeds to digital video effects devices. CDL showed the system interfaced with the DPE 5000. CAP, CDL's computer-assisted production system, can be applied to one or both of the Model 10's SFX systems. The base price of the Model 10, in a 16-input configuration, is $70,000. This year, CAP was shown interfaced with CDL's smallest 480 switcher, the Model 4, which has just one SFX module.

Another new product from CDL was its Model 2170 One Bus Quad, quadryplex effects for inclusion with any small switcher. The 2170, priced at $4500, provides five selectable split patterns derived from either three or four sources.

American Data showed no new switchers but demonstrated a new downstream keyer, Model 860. The 860 is a $2200 option to its 400 series edge and color background generators. ADC's top of the line switcher 3106 has a new interface to permit chroma key tracking.

ACTS, ADC's computer-assisted production system for its 3100 series production switchers, now has an optional cassette-based memory system. The extended memory capacity is particularly useful for event sequence storage, and is in addition to the 80-event, on board 16K RAM.

While ISI still led with its 200 Series production switcher, introduced last year, it explained that a new switcher, the Model 904, would be ready by July. Essentially, the new 904 will be a 10-input, two-M/E, switcher based-priced at about $15,000. According to a company spokeman, the switcher is "90 percent complete."

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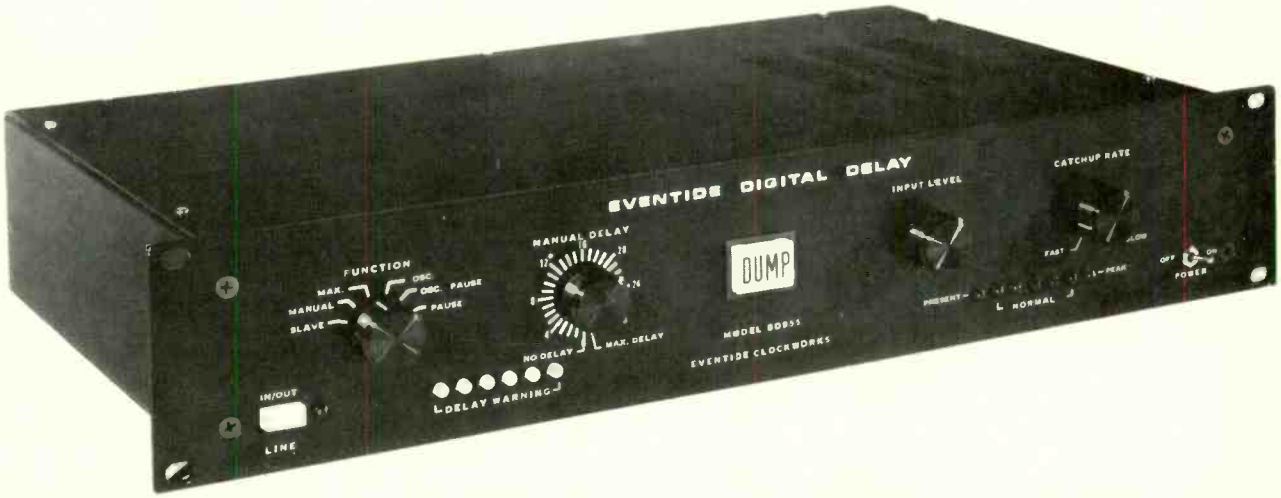

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When finished, the 904 will include all of the features of the 902, ISI's popular mid-range switcher for studio, mobile, and field operations, and add many of the automation and effects features established in the 200 Series switchers. The 904 uses microprocessor control to reach into new levels of application, such as interface with digital video effects system, serial (or parallel) interface to computer editors, and automation.

New to the 200 Series switchers was Edifex, an extension of ISI's PolyKey concept. The new option permits the five level keys (two background and three key levels) to be combined in a single composite frame, which may be faded to black as a single function. EdiFex will also interface a 200 series switcher to digital video effects, high resolution character generator systems, and A.P.E.

The trend towards automated post-production switching was underscored by Crosspoint Latch Corp.'s introduction of two new options for its switchers. Model 6403 is a single event, programmable editor/switcher interface unit. Designed to extend the effects of edit controllers capable of A-B rolls, the 6403 has programmable start/finish points and transition durations from one to 999 frames. It will either store and execute switcher-based effect commands entered by the edit controller, or will take over from the controller to run more complicated events.

A more sophisticated 256-event programmable editor/switcher interface is the Model 7200. This microprocessor-controlled interface will walk through editing sequences with the operator, permit the setting of event durations, learn them, and execute perfectly on recall. The unit is priced at $12,500 and interfaces with Crosspoint Latch switchers.

Echo Lab showed off the power that microprocessors can bring to low cost switchers with its SE/3, a Z-80-controlled system. The remarkable little switcher has a high degree of intelligence. For instance, the basic transition architecture automatically releases preview controls once a transition is taken to program. (Conventional flip/flop architecture is switch-selectable.) Even more importantly, however, are the various automated aspects of the system. A "learn" mode permits the system to learn up to 5000 control operations for recall. Events are stored as shots or sequences. Up to 200 single shots or any of 500 wipe patterns can be stored. Up to five sequences can be stored for recall by using the five front-panel function buttons. Each step in a sequence is learned, entered, and recalled by pushing the appropriate button. The system should be deliverable in September and is priced at $14,000.

Shintron introduced a computer-driven interface for use with its Model 375 switcher in post-production. The Model 575 ISEC (Intelligent Switcher/Editor Control) permits complete access to the 375 for Convergence or United Media editors. Interfaces with CMX, Datatron, RCA-EECO, and other edit controllers will be available as the programming is completed.

Shintron also introduced a compact version of its 375, the Model 372 for mobile van use. The new model retains the Shintron "Superbus" concept for its A, B, and C buses. It also includes a preset/preview bus in addition to a program bus. It will accept synchronous or a synchronous signals and contains a color background generator, downstream matte keyer, and downstream fade-to-black. The system is configured in a single housing, though it can be configured with electronics separate from the control panel.

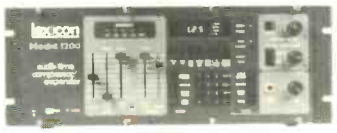
Viscount showed no new models this year in its line of production switchers, but did raise the price of its 1107 compact switcher. The new price is $1117 for this amazingly small (8½ by six by four inches three-input, two-bus unit. The system includes 22 standard effect patterns for wipes, mattes, and keys.

New additions to Ross 500 MLE (Multi-Level Effects) production switchers are a matrix wipe and a pattern selector. The new matrix wipe pattern generator includes 16 new effects, including a five-pointed star and an arrow-pointer. These effects can be made to spin if the 500 Series switcher includes the rotary wipe option. The new 62-pattern pushbutton selector is an option to all 500 Series switchers with the exception of the 514. It will be standard equipment on all future 504, 505, and 508 models.

The "suitcase" model switchers, such as Asaca's ASW-100 and Beaveronic's Model 705, were essentially unchanged from last year. One new limited-purpose device that made it to the show was a special effects keyer from Adwar Video Corp. This unit, the SEK-2, is specifically intended to add color titles and graphics.

For more information: Panasonic AV-800, **601;** Ampex AVC Series, **602;** Vital Saturn Series, **603;** Grass Valley GVG-300B, **604;** CDL CD-480 Model 10, **605;** Model 2170, **606;** American Data Model 860, **607;** memory system for ACTS, **608,** ISI Model 904, **609;** Edifex, **610;** Crosspoint Latch 6403, **611;** 7200, **612;** Echo Lab SE/3, **613;** Shintron 575 ISEC, **614;** 372, **615;** Ross updates, **616;** Adwar SEK-2, **617.**

THERE'S A NEW PRODUCTION TOOL IN TOWN



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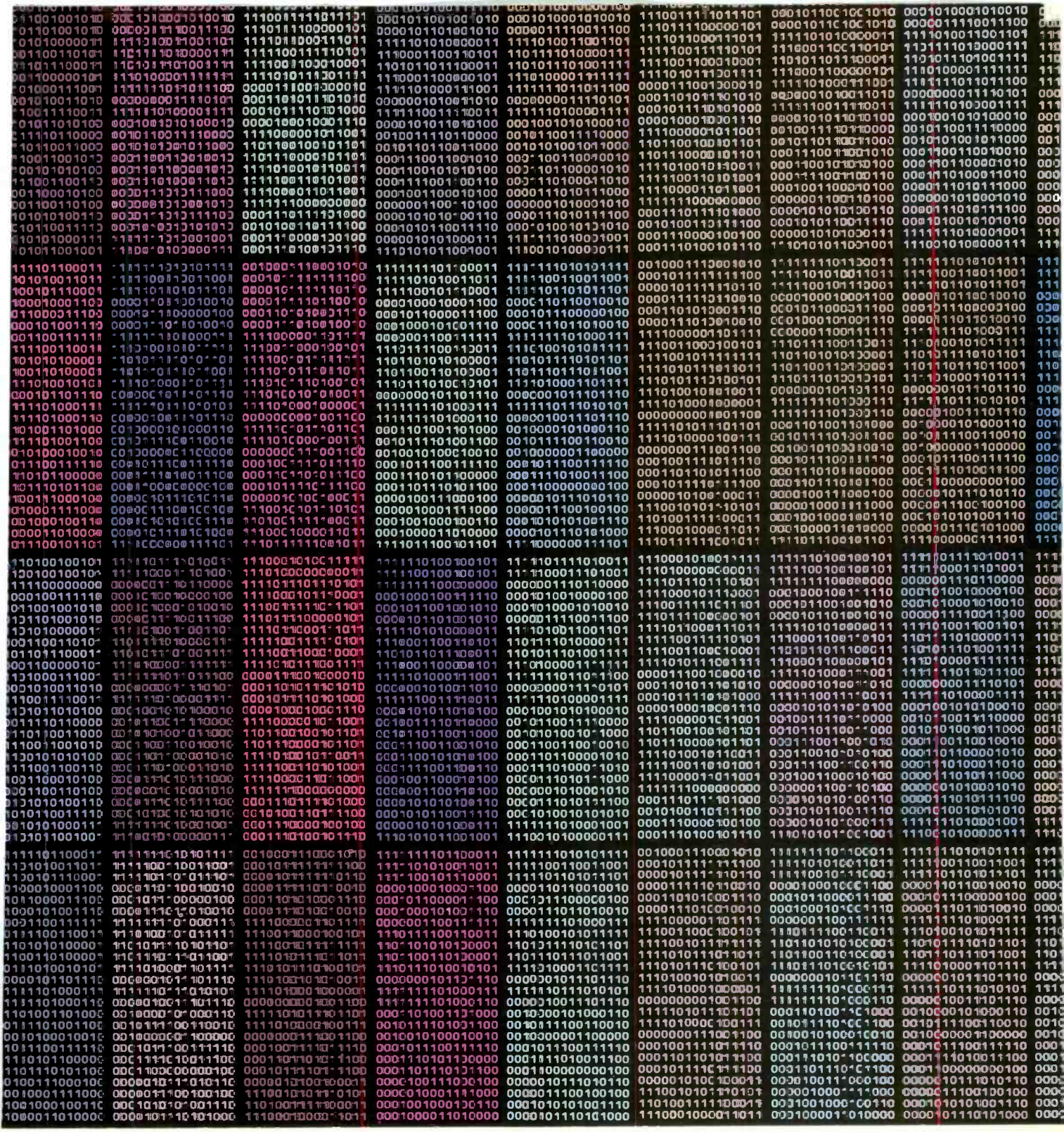
These are the first four notes of Beethoven's Fifth Symphony.



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Master control: gaining control

While there were not many new master control switchers or systems at NAB, there were a great many improvements geared to automation of on-air operations. One new on-air automation system was a first time-entry by Datatron.

Called S.A.S. (Station Automation System), Datatron's computer controller is designed for traffic, scheduling, and automated on-air operation. The system can be interfaced to any master control switcher and is intended for stations in small and medium-sized markets. It will store up to 4000 events on-line, run the switcher or machine control system, and produce FCC logs and billing information. Events can be edited right up to preroll with complete reconciliation of the remainder of the event schedule. The system is a desktop CRT-based unit with disk storage. Full-screen display lists all relevant data for each event in alphanumeric form. Source identification is English-language. The system, depending on options, will be priced between $40,000 and $60,000.

ISI's TAS-100 (Total Automation System) is now ready for operation with the ISI master control switchers (Models 931, 821, and 1199). Machine control interfaces exist for all current television equipment, inlcuding IDA and ADA-equipped ACR-25s. The TAS-100 is a modular, building-block design that starts with a 2000-event controller. Ten auxilliary channels in the system permit control of other events, such as switching transponders or microwave channels for automatic recording of scheduled feeds. The system runs between $44,500 and $85,000.

Central Dynamics introduced its APC-920 Automation System, — the "second stage" in its APC-900 Automation System. The 300-event 920 system was shown operating with CDL's MC-990 master control switcher. It is operationally identical to the 910, which had 40-event storage.

Image Video showed its Model 8100 Automated Master Control system. This unit, incorporating a Z-80 microprocessor, is a plug-in, single-day controller. The 30-input master control switcher can be operated conventionally until station volume justifies automation.

The master control and automation systems from Vital, Grass Valley, and American Data remained stable. These systems have been on-air for some time and, like Grass Valley's M200 system, are designed to grow with the sophistication of the station.

Machine control systems continue to grow in number and complexity. Systems such as Fernseh's TCS-1, 3M's 6500, Dynamic Technology's VIMACS, and Control Video Corp.'s Intelligent Controller were all seen last year. But, as with other software-based systems, exhibited further development this year.

VIMACS, marketed by Candex Pacific, added SAMS (Source and Message System), VIPS, and VISE to its vertical interval machine control system. SAMS is an encoder/decoder unit that allows VIMACS-connected sources (remote broadcast sites or VTR machine rooms) to enter a brief production message, identifier, or program title into the central system. VIPS decodes and displays source IDs on regular monitors and VISE encodes identifiers from equipment such as cameras and telecines. All of this information (time code too) is routed through the system in the vertical interval in addition to the normal machine control signals of the VIMACS system.

3M's 6500 connects through a single coax cable. The microprocessor-controlled system works with any of the 3M routing switchers — including two new models covered in this report — or it can operate as a standalone. CVC's "Intelligent Controller" has used its

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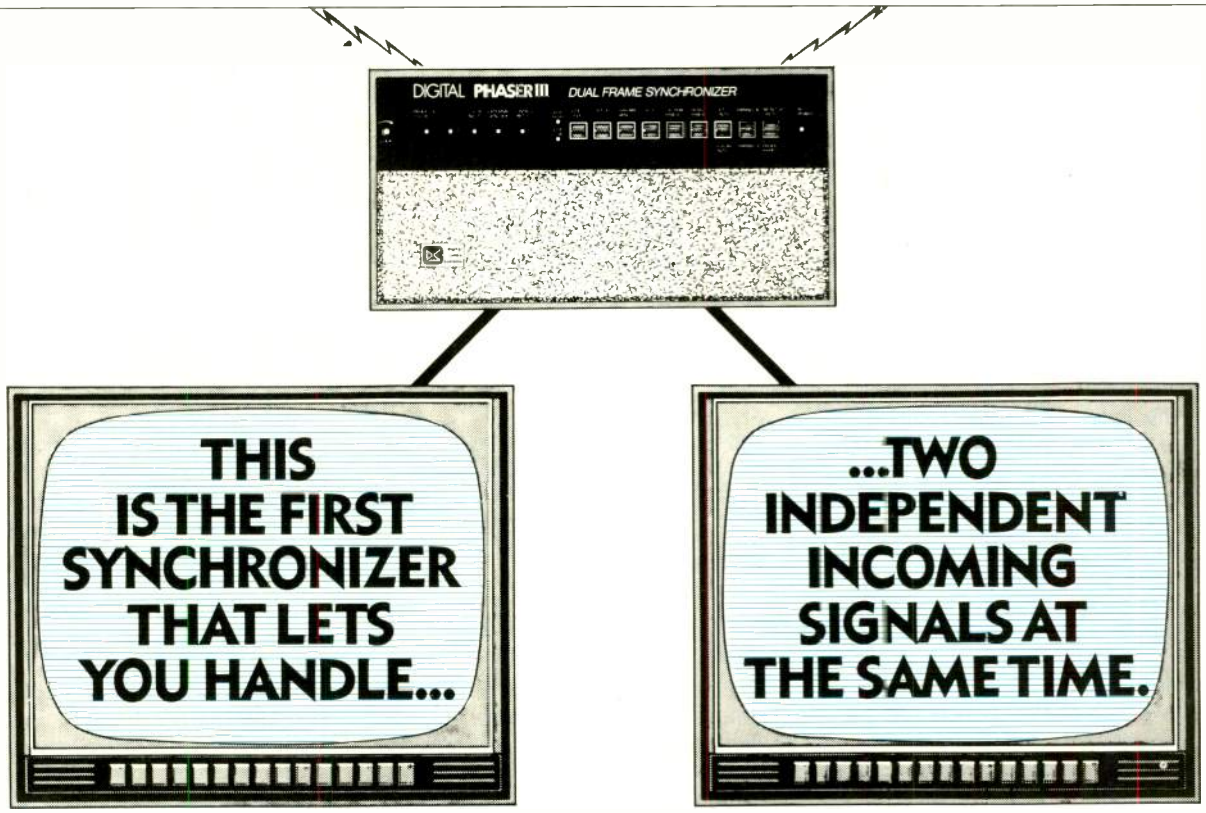

Two remote feeds coming into the station simultaneously? That's exactly the kind of situation Digital built the Phaser III for.

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machine control function and SMPTE time Code read/write capabilities to extend the system to editing and synchronizing applications. These new applications are reported elsewhere in this issue.

Another version of the CVC system, "The Sequencer," is intended for cable or closed circuit television system use. Events of a large number of VTRs can be controlled on a clock basis or programmed on a "chained" event basis — that is, one starts as the other finishes.

Image Video showed its 4100 Machine Assignment System, which handles up to 160 machines. The system's controller is made up of two sections, the Assignment Controller and the Machine Controller. Each section contains its own microprocessor, these communicate with one another over coaxial cable. The assignment section determines which machines will be assigned to which control panels and the machine control section handles communications between the system and the individual machine interfaces. Up to 24 control panels can be involved in the system, controlling up to 25 machines per panel with 35 levels of switching and tally.

Dynair, with its System 23 Data Switching system and System 21 Routing Switcher system, now offers remote control of up to 1000 machines from as many as 1000 locations through its System 23 Remote Machine Control System. Communication is via RS-422 serial data; up to 128 functions per machine can be controlled. Various "delegate" or "demand" modules can be configured to provide the hierarchy of control. Central control over the entire system can be achieved through the System 23 Data Switcher when large numbers of remote control locations are used in the system.

For more information: Datatron S.A.S., **618;** ISI TAS-100, **619;** CDL APC-920, **620;** Image Video 8100, **621;** Candex Pacific SAMS, **622;** VIPS, **623;** VISE, **624;** Dynair System 23, **625.**

Business automation systems expand

Over the years, business automation systems have grown, both in their capabilities and in the sheer number of companies offering business services. This year the established systems continued to offer new programs for radio and television management and to develop new ways of delivering these services (on-line, off-line, time share, service batching, and more). But the power of data processing has gone on to conquer new territory as well.

DCC, perhaps the largest single supplier of business automation services to radio and television stations, launched a new Network Control concept for its BIAS system at NAB. Network Control brings near total automation to a television operations by integrating all the business functions of DCC's on-line BIAS system with a new Master Control Automation system. Automatic letter-writing and other "office functions" have been added to round out the system.

The BIAS system offers traffic and accounting functions, a Feature Film program package for inventory, amortization, and program management. Buy Line, an avails submission system, connects the station with its national rep. The system also links up with the Master Control Automation system, which controls the on-air switcher, identifies material, initiates machine functions as scheduled, prepares several alternative logs including FCC logs, and generates media pull lists. An auxiliary events feature will even allow the system's user to do a full news break automatically — turn on the lights, operate the camera, and air the break — then resume normal on-air operations with all files and schedules updated to reflect the news break.

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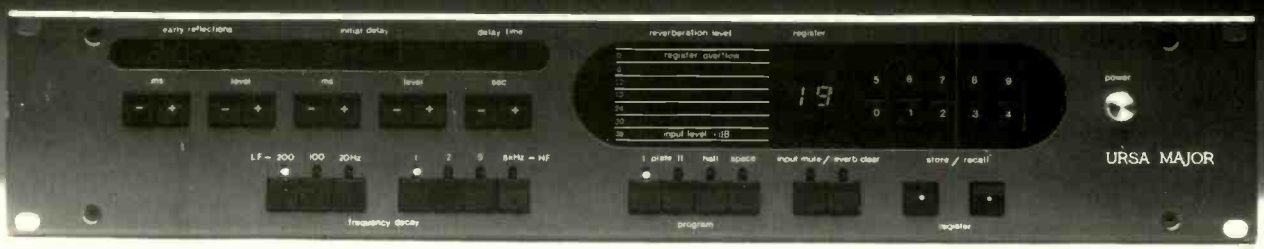

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NAB SHOW IN PRINT

Station Business Systems, which now boasts 35 to 40 television clients for its BAT 1700 system, continues to press on with Newscom. Interest in newsroom computers continues to run high, and SBS's Joeseph Coons said that the system "is now fully mature and ready to be installed on a 60- to 90-day basis." Coons wanted to clear up the impression he attributed to the trade press that Newscom was expensive. A five-terminal system, said Coons, could be purchased for $75,000-80,000.

SBS has not foresaken development of its business system in the least, and has added general ledger software and various new management and budget analysis programs. For radio, an MPI system gives a station's PD better control over music formats by providing a variety of statistical data on music plays.

Systems Concepts' Quantanews has been installed in this van to take it on tour for news directors

Jefferson Data reports that its ENP news system will be ready for market as of June 1. The shakedown of the system which has been going on at WBTV, Charlotte has provided a good test run for the system.

The Quantanews system from System Concepts has found its first full client in KDBC-TV, El Paso, Texas. Unlike the larger newsroom computer systems, Quantanews is focused primarily on newsroom management of assignments, crews, and other scheduling matters. While it is also set up to handle newswire, morgue, and weather functions, it does not include all the text editing features of the larger systems.

Columbine, which offers a wide range of business services and operations programs to radio and television stations, made one of its rare appearances at NAB. Its impressive array of programs is designed for use on IBM System 34 hardware, which the operator purchases. Software is leased from Columbine. The system now boasts 144 television clients, 308 radio station clients, and five network or network-type clients.

Kaman Sciences' BCS system is basically unchanged, but the company reports continued success with its special FILMS and DEMOS programs on its 1100 system. KARTS, BCS's management package for radio audio carts, is also achieving success.

For more information: DCC Network Control, **627;** SBS Newscom, **626;** business system updates, **628;** Jefferson Data ENP, **629.**

Frame synchronizers and digital processors

With NEC's FS-16 and MCI/Quantel's DFS-1750, both introduced last year, the idea of the routine frame sync took hold. Both units, moderately priced and just one rack unit high, made it possible for broadcasters to conceive of multiple framesyncs dedicated to multiple video sources. These units followed the price breakthrough made by ADDA Corp.'s VW-1 unit and its successor, VW-2

DVS joined the low-cost dedicated frame sync march with its Phaser series. This year Phaser I and II were joined by Phaser III, a low-cost dual-channel synchronizer capable of handling two independent feeds. The new unit contains two frames of memory but shares power supply and some other circuitry. Its 6.2 million bit memory is microprocessor-controlled and inputs are examined continuously for automatic adjustment. An 11 TV line hys-

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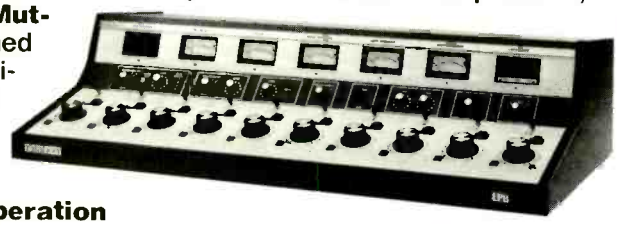

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teresis insures against motion discontinuities and a freeze on the "last good frame" guards against video feed loss.

Microtime, Inc.'s approach to multiple-input frame synchronizers was proffered last year as the 2525 SP. Now in production, this synchronizer features a new TD control panel in addition to its Smart Proc (SP) control panel. Basically, the SP can monitor and control hue, setup, video, and chroma gain for eight video sources. The operator can then switch between these sources without recalibrating. A remote control panel communicating over RS-422 has full control of the SP. This year another remote control panel has been added for use by the TD in the control room. This panel allows the TD to "take control" from the operator and secure a feed for air.

Digital noise reduction, which has been integrated with most of the full-blown frame synchronizers or available as a standalone from companies like Thomson-CSF, Philips, and MCI/Quantel, finds itself applied to yet more aspects of the television system.

Philips showed its LDM-3001 combined with the six-vector Variable Matrix Color Corrector adapted from the LDK-25B camera series. This structure

Phaser III is third in the framesync line from DVS

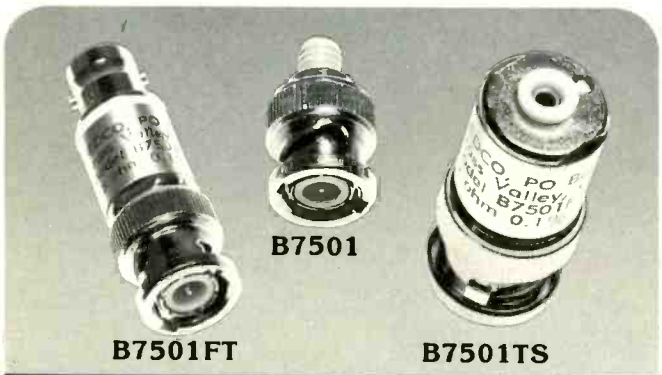
automatically applies noise reduction to film-to-tape transfer. The LDM-3001's automatic correction sensing feature, which made it useful as a dedicated device in transmission systems, is now just as useful for tape mastering, duplicating, and film transfer.

Sony showed the production model of its BVX-30 Digital Video Multi Processor, shown in prototype last year. The unit provides infinite window time base correction, freeze frame, digital enhancement, noise reduction, and full color correction if equipped with the optional BK-31 Color Processor.

The BVX-30 will handle direct or color under sources. Sony claims that its noise reduction system improves a typically noisy picture by as much as 60 percent and eliminates after-image and masking effects on low-level video.

Several observers mentioned that the BVX-30, like other noise reducers, might well find a role in earth station receive systems and in microwave transmission.

Oki showed the LT1200 portable standards converter, which is priced at about $100,000. Encode and decode modules are on boards so that the system can function as either simply by plugging in the correct board. Encode



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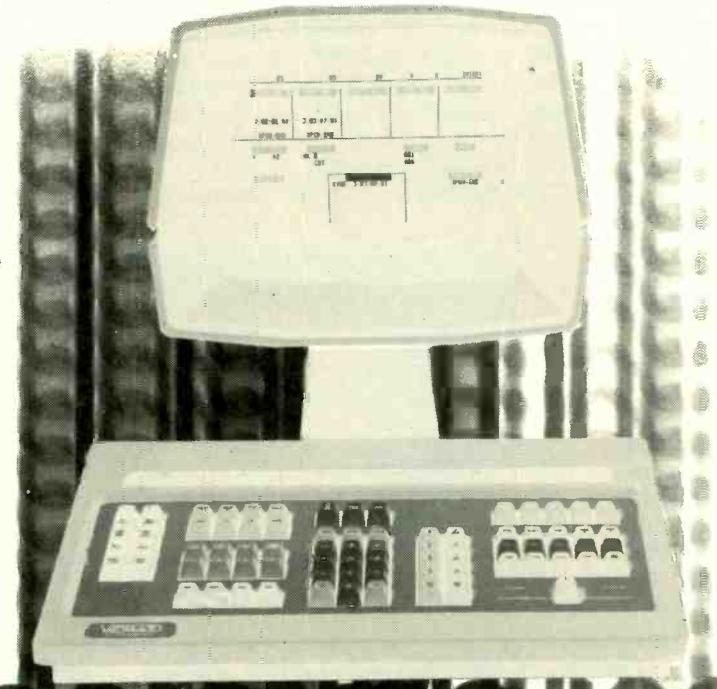

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or decode boards exist for NTSC, PAL, and SECAM. For operation as a standards converter, no adjustments are necessary — one button puts the power on and the system in service.

The LT1200 can also be used as a standard frame synchronizer or TBC. Features such as freeze frame are useful in both applications. Operating as a converter, the machine can be used to integrate different standard tapes.

For more information: DVS Phaser III, **631;** Microtime 2525 SP, **630;** Sony BVX-30, **632;** Philips LDM-3001, **633;** Variable Martrix, **634;** OKI LT1200, **635.**

TBCs and other digital processors

The main trend in time base correctors this year was the addition of signal processing and reconfiguration to support special video environments, such as transfer and editing. Frame synchronizers either got smaller or developed multi-input schemes. Noise reduction systems changed little and standards converters remained the same.

Microtime introduced a brand-new time base corrector, the T-120. Like some other manufacturers, Microtime noted with pleasure that its new TBC features 3.58 MHz feedback, a requirement for working with the new half-inch VTR/camera systems.

The T-120 is an eight-bit, 4 fsc TBC with a 15-line correction window. It is especially designed for non-segmented scan-type VTRs and interfaces with Microtime's 2100 Image Enhancement system. Auto Trac 3™ circuitry automatically assures the correct vertical blanking conditions. The unit can genlock or operate from its own internal RS-170A sync generator.

This $9490 unit is very compact, using only 3½ inches of 19-inch rack space. Though compact, access for service is simple due to a "flower petal"-type arrangement of the boards. Extender cards are no longer necessary since access to all boards can be obtained through the top of the box.

Another unique design approach was shown by Digital Video Systems for its new DPS-100 series systems. In appearance, the DPS-100 modules look like a series of chrome-plated drawers, each about an inch high. Modules shown in Las Vegas included the DPS-103 TBC, DPS-162 master sync generator, DPS-175 test signal generator, and the DPS-100 diagnostic

Sony's BVX-30 is one of the new combination digital video processors

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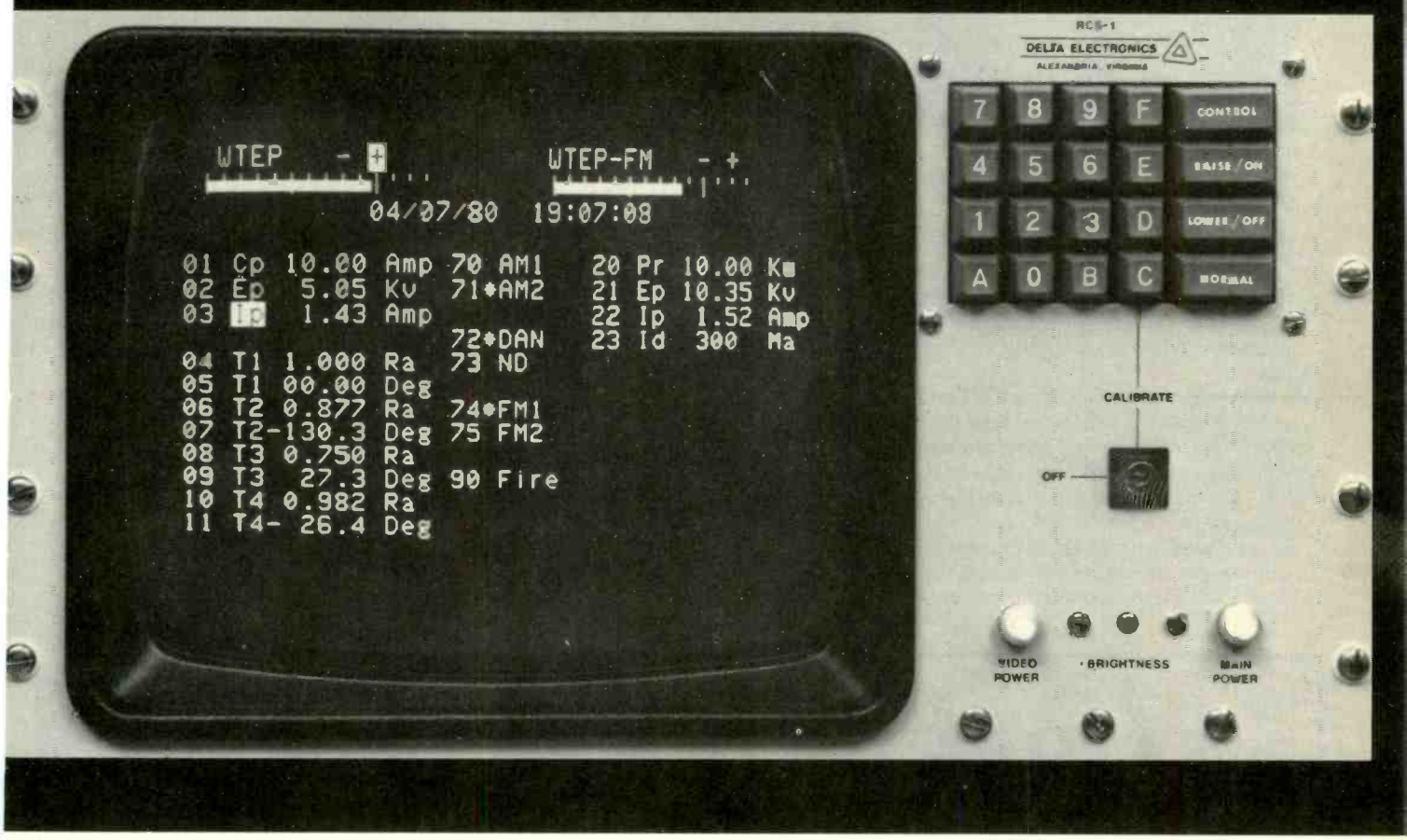

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NAB SHOW IN PRINT

The advent of DBS service to home downlinks like this one lead Oki to see an expanded role for standards conversion

system.

In fact, all DPS-100 Series modules are premised upon a unique diagnostic system that provides constant microprocessor checks of all 100 series circuits.

The system provides both a CRT and hardcopy readout of faults that may occur in any of the modules and isolates them down to board, circuit, or IC level. Several status and alarm levels are formatted to tell the user how serious any problem is. The system will even suggest temporary alternative solutions and advise on ordering information for any needed spare parts. The system provides continuous on-air monitoring and off-line system testing.

For off-line testing, a DPS-175 test signal generator provides all digital test signals in component form. Optional is a new Zone Plate test signal for H,V, and timebased frequency response evaluation. The new series also offers the DPS-162 master sync generator, which provides totally digital RS-170A sync outputs.

The TBC, Model DPS-103, is designed for any heterodyne VTR and features a six-line correction window. Also microprocessor-controlled, the TBC is fully conversant with the other DPS-100 series modules. The 103 is priced under $10,000.

Edutron, long a source of the CCD analog TBCs, jumped into the digital fray with its Y-688[32] Total Error Corrector system. The new unit is a digital TBC (32-line window) and signal processor designed specifically to correct not only time base errors but also errors resulting from the color under process.

One of the boards that constitute the new DVS-103 system, all part of the DVS100 diagnostic system

The Y-688[32] accepts composite or component video but works in component. Correction is provided to reduce luminance and chrominance noise, increase horizontal details, sharpen horizontal and vertical transitions, remove chroma-luminance delay errors, sharpen chroma rise times, and eliminate second order ringing. This processing can be applied selectively by the user or it can be accomplished automatically if the Faroudja Laboratories Record One pilot signal is recorded. Record One is part of Faroudja's series of enhancement products. The Y-688[32] system is priced at $18,500.

Time base correctors from other manufacturers such as Harris Video Systems, NEC, and MCI/Quantel were essentially unchanged. Manufacturers of one-inch Type C VTRs continued to be the main source of special-purpose TBCs designed for the variable-speed functions of their VTRs.

For more information: Microtime T-120, **636;** Digital Video Systems DPS-100, **637;** Edutron Y-688[32], **638.**

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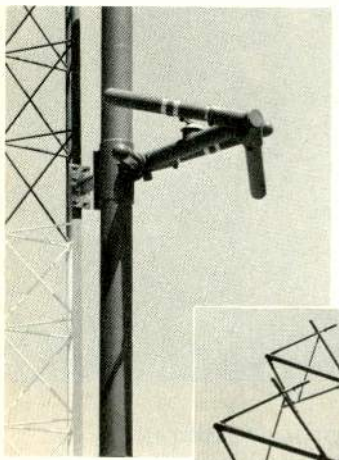

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NAB SHOW IN PRINT

Analog video processors, color correctors, subsystems

Faroudja Laboratories introduced two new devices in its line of video processing equipment. Record-Ex is a low-cost, $995, video signal processing unit intended to enhance the subjective image. Small details generally degraded by color under VTRs are enhanced and the "cartooning" effect eliminated. The unit weighs just 12 ounces and measures five by five by 1.5 inches, so it can be easily mounted to portable VTRs with Velcro™ strips.

On the other end of the Faroudja spectrum, a new Wide Band Playback One processor has been added. Like the regular PlayBack One system, the new wideband version provides luminance and chroma noise reduction, H and V enhancement, automatic correction and eliminates ringing when used with a Record One encoded videotape. Designed for use with wideband VTRs, the $6750 unit has 4.5 MHz bandwidth rather than the 3 MHz bandwidth of the Playback One system.

Leitch Video, Ltd. introduced a new VPA-330N video processing amplifier, a smaller version of its VPA-300N proc amp. The new device is just one rack unit high and features an internal sync generator that can provide system timing. RS-170A pulse parameters can be maintained, and the "fade to black" feature can be selected in a mode that will not affect VITS.

Thomson-CSF showed its IV Series of image enhancers, which includes Models 8010, 8310, and 8410. The 8010 is intended for use on the program line while the other two are intended for processing of camera feeds. Each element of the picture is compared to its adjacent horizontal and vertical elements within the picture field to generate a detail signal, which is then combined with the main video signal to enhance sharpness. A Combed H process removes the color subcarrier from the detail signal before it is inserted in the main video. Enhancement is applied to both H and V. Dynamic black and white detail clipping clips only the black and white peaks of the detail signal. Image crispening is also featured.

Among the new color correctors appearing at NAB was the system from Dubner Computer. According to Dubner, the system was designed in response to needs expressed by post-production users of color correction. The computerized system, with either dual floppies or cassette, can provide approximately 300 correction events. Operator commands are input either through keypads or the 32 pots associated with the control panel. The system, which is primarily intended for film-to-tape transfers, monitors a number of film direction and frame change impulses in order to apply the appropriate correction.

Another color correction system primarily intended for a role in telecines is Thomson-CSF's system, which includes a corrector, remote control unit, and sensor unit. The system samples black and white protions of the signal for anomalies and generates chrominance signals of exactly the same amplitude but opposite phase. Then, in a summing process, the incorrect chrominance is cancelled. The system allows for an automatic mode when the operator assumes no color problems.

Broadcast Video Products showed a range of processing gear from the U.K.'s Michael Cox Electronics, Ltd. The 339 Color Balance Corrector from Cox derives correction vectors from the separated chroma and adds them at the recombination point of the luminance and chrominance signals. Either conventional pots or a joystick control are offered for gain and hue. Chroma level, luminance, level, and setup are also adjustable from the remote panel. Delays of up to 350 ns are provided to cure ghosting in color under video. The unit is priced at $6400.

Thomson-CSF showed its Model 7011 chroma insert keyer for NTSC. The 7011's primary function is to minimize color crawl through a comb filter. Since the bandwidth of the 7011 key signal is the bandwidth of the color difference signal, the key is quieter than a full bandwidth key of typical RGB-type keyers.

For more information: Faroudja Record-Ex, **639;** Playback One, **640;** Leitch VPA-330N, **641;** Thomson-CSF Mark IV Series, **642;** color correction system, **643;** 7011 chroma insert keyer, **644;** Dubner color corrector, **645;** Broadcast Video Products (Cox) 339 color corrector, **646.**

Distribution amps and system modules

A line of video distribution amplifiers new to the U.S. market was shown by Avitel. The Avitel video modules are designed to work hand-in-hand with the Philip Drake Series 7000 audio modules. The products of both manufacturers are available in the U.S. through Television Equipment Associates of South Salem, N.Y.

The Avitel 300 Series includes VDAs, video EQ, video delay and EQ, PDAs and delay units, power supplies, and a video eight by one switch module. Each module is designed to plug into a standard rack. The circuitry of all modules was designed to meet tight BBC specifications. The same design parameters allow the Avitel modules to carefully match the Philip Drake audio modules, which include DAs, PAs, mic

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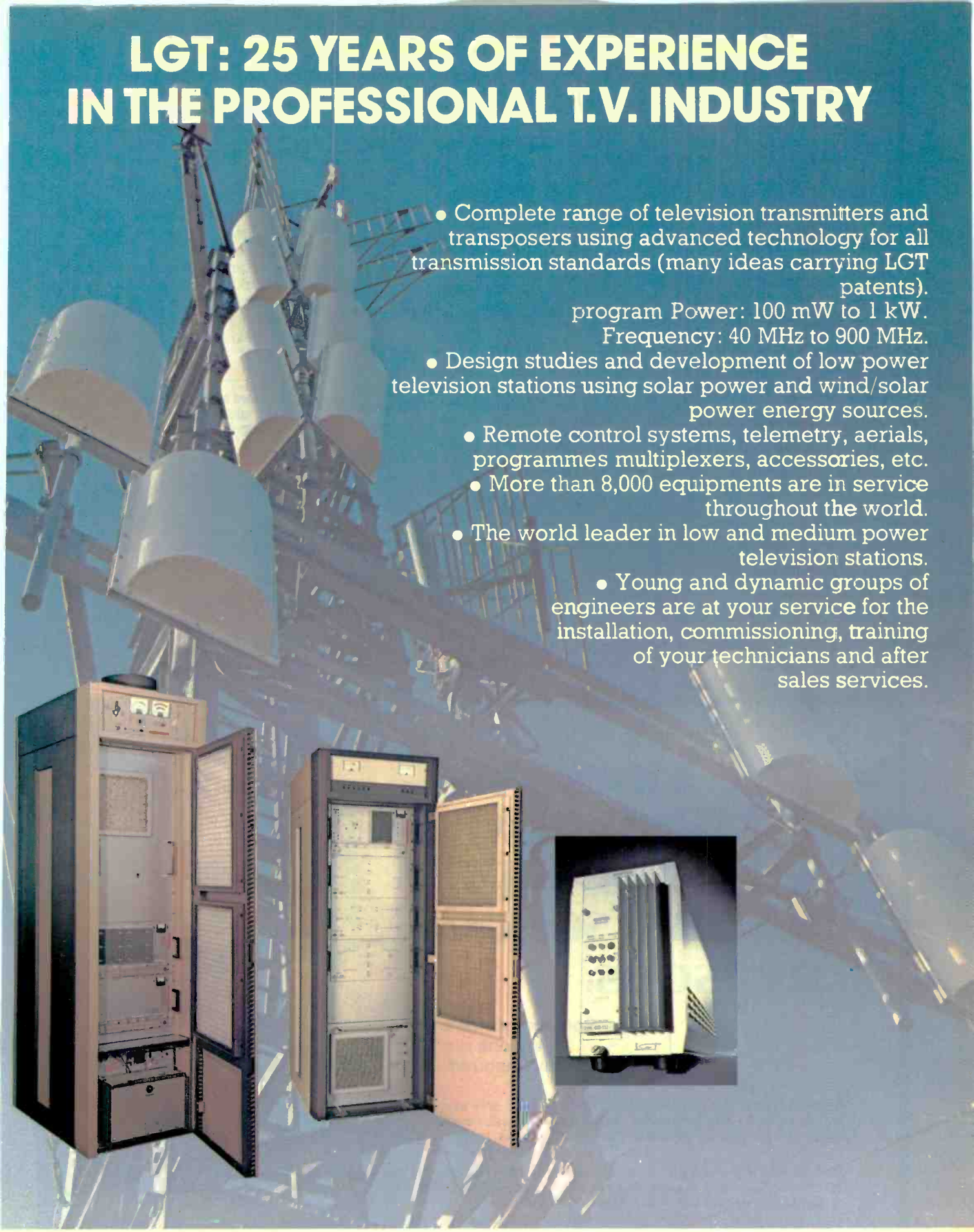

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amps, and others.

Dynamic Technology showed its type 2342 DA, which features 12 outputs for each amplifier. This distribution amplifier will work for video or pulse distribution and contains complete EQ. The module can be configured for three outputs at $303, or for the full 12 outputs for $363.

Viscount brought its Model 804 VDA, a self-contained unit with PC board that carries four individual video DAs (each with a loop-through input) and four 75 ohm terminated outputs. The units can be stacked in multiples of four from eight on up.

Hedco added three new modules to its VDA line. The EDA-102 is an equalizing DA to supplement the VDA for cable runs of up to 500 of 8281 cable. The PDA-108 is a linear pulse DA with loop-through input, six 4 V p-p outputs, and only 30 ns of transit time. The third new module is the SCA-105 subcarrier DA, which features front-panel phase selection of 0, 90, 180, and 270 degrees plus a fine range of 100 degrees.

Datatek showed a new line of VDAs and other modules designed for larger plants. The D-609 and 609F VDAs have cable equalizing and gain controls mounted externally. Modules may be interchanged without adjustment.

Datatek also displayed a preliminary program amp, the D-513 DA and 514 monitor amp, with remote gain control.

For more information: Avitel video DAs, **647;** Hedco EDA-102, **648;** PDA-108, **649;** SCA-105, **650;** Datatek D-609, **651;** 609F, **652;** D-513 DA and 514 monitor amp, **653.**

Digital video gets boost through new filters

While SMPTE toiled over digital video standards, discussions began to focus on the issue of filters and their cost. The meeting which took place at NAB (see sidebar) heard testimony that anything less than 14.3 MHz would result in costly filtering problems for manufacturers of video systems other than recorders.

Filter manufacturers at the show, however, said that lower sampling frequencies did not necessarily corelate to higher filtering costs. In fact, Matthey Electronics showed a line of "triple filters" that cover the 12:6:6 and 14:7:7 sampling structure range. These filters are intended for component sampling. A 13.5 MHz filter was shown at NAB operating in component at 13.5 MHz: 6.75:6.75. These filters were designed for use at the input and output A/D, D/A converters. Two types were discussed a Triple Filter MTF 135P and a Triple Filter MTF 135SP with:

$$\frac{\text{sine}}{x} \; x$$

equalization.

Allen Avionics showed a new line of conventional filters and delay lines. Among the new products were the delay trimmers VARO11 and VAR005. These units permit an infinitely small delay adjustment and can be used as trimmers or in conjunction with other delay boxes to build custom delay times.

For more information: Matthey triple filters, **800;** Allen Avionics delay trimmers, **801.**

Telecines adapt to new film

The dearth of new telecine equipment on display at the 1981 NAB made this area not terribly exciting. After all, RCA introduced its full-featured TK-29 systems last year and the Fernseh FDL-60 CCD scanner had been shown before. Rank Cintel's Mark III is known everywhere. Perhaps the most significant news was the reintroduction by Fernseh of the old TeleMation tele-

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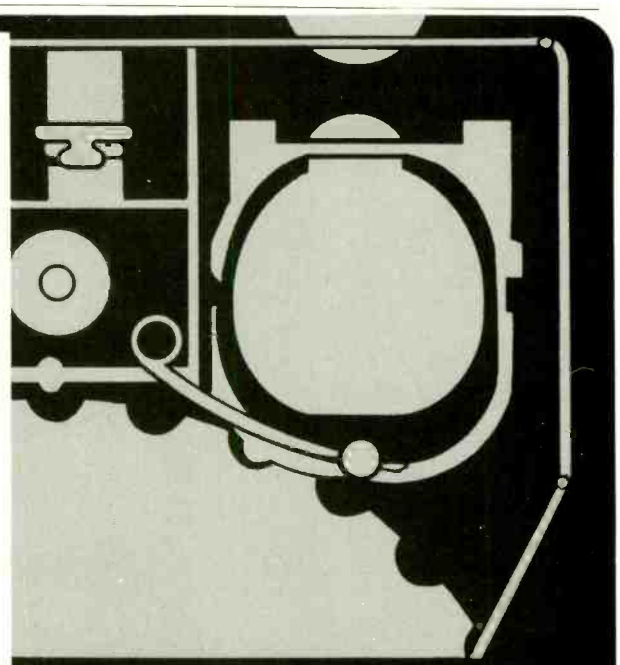

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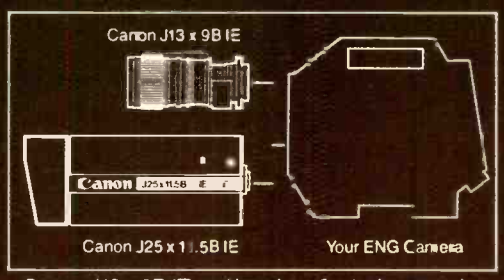

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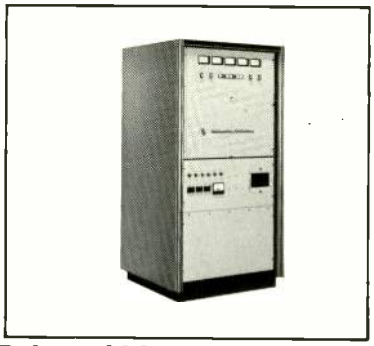

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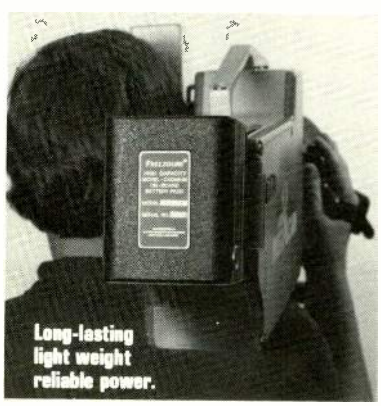

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NAB SHOW IN PRINT

cine, the TCF-3000 Plus, and some new Rank Cintel options.

The TCF-3000 Plus features a number of improvements, including remote gamma, paint, and diode gun Plumbicons for increase resolution and reduced lag. A new preamplifier design improves noise, gamma control, and auto balance performance.

Improvements to the FDL-60 CCd scanner telecine included the System 60 XL programmable frame-by-frame color corrector, a pan scan conversion kit, higher performance preamps, and improve black stretch circuits.

Color correction in the FDL-60 is based on the computerized color correction system of Computer Communications Consultants, Inc. (described in last year's Show-in-Print). The system provides 32 color correction parameters, all under computer control. The XL system is well suited for film-to-tape transfer.

Telecine systems on exhibit at RCA's booth included the RF-35B 35-mm projector, the FR-16 film handling system, and the PM-86SL magnetic sound recorder/reproducer.

Rank featured two new optional accessories for the Rank Cintel Mark III flying spot telecine equipped with T.O.P.S.Y. The X-Y zoom option permits the operator to control both the size and position of the picture being displayed. This permits reproduction of wide-screen format films and cropping of photos for special effects. At the September IBC show, the zoom control was limited to approximately 2:1. Use of T.O.P.S.Y. (Telecine Operation Program System) gives the unit an 8:1 zoom range.

The second accessory shown by Rank Cintel was the VDU video display unit. This option to T.O.P.S.Y. displays alphanumeric information on a CRT (which can be used for color correction or tape transfer instructions).

Another new product from Rank Cintel, shown for the first time at NAB, was Vidigrade. This is a precision color correction system for composite video systems. It can be used to color balance ENG videotape scenes during editing or to match various picture sources during post-production.

It can match film to TV camera pickups or film to video tape.) In operation, composite signals are fed into a precision comb filter decoder and separated into R, G, and B. These signals are individually color-corrected with a joystick control that controls master and differential LIFT, GAMMA, and GAIN functions.

Complete telecine systems (using tube pickups) were shown by Ikegami and Cohu; both had been shown at previous NAB conventions. New from Cohu this year was an option allowing the 1550B telecine system to handle color negative film. The option permits reproduction of pictures with saturation and control characteristics more similar to live color cameras. (Negative film also has the advantage of being more suited to rapid processing.)

A new large image optical multiplex stand, Model 752, was offered by Zei-Mark. It's similar to the three-input, two-output 750, but offers a preview mode of the input signal by virtue of mirror manipulation.

Zei-Mark also exhibited a new 8-mm telecine projector, the Orytec TV 1515. It is priced at $2000.

Another new projector was offered by Rangertone Research, Inc.: the Hokushin 16-mm easy-TV projector SC 105. The quiet-running machine features an auto-threading system and an automatic loop restorer. It is priced at $2500.

In the higher price range; RRI showed the Rangertone 35-mm telecine projector, TC-210. It is designed for use as a direct motion picture projector or as a telecine. The $12,900 NTSC model incorporates a special designed 3-2 Geneva mechanism.

The main thrust of the Rangertone exhibit was the digital interlock system, widely used in the film industry. Stepping motors energized by pulses permit synchronizing operation of several sprocketed film transports. Rangertone film transports can be locked to VTRs with SMPTE time code readers.

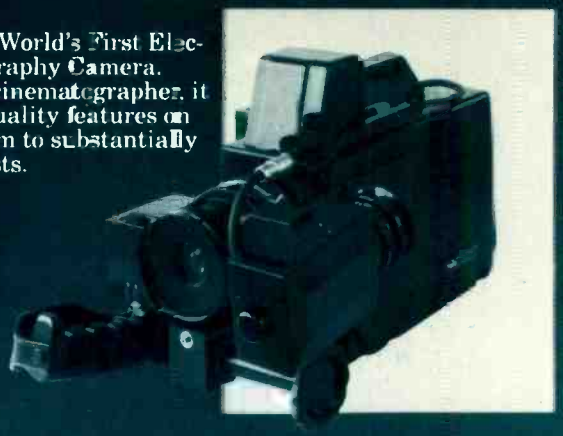
L-W International showed the Athena 4000 and Athena 6000 telecine projectors (both previously exhibited). Laird Telemedia's multiplexer systems incorporated no new features. A zoon option was available this year from Thomson-CSF for its TTV 2705 color slide scanner.

For more information: Fernseh TCF-3000 Plus, **654;** FDL-60 improvements, **655;** RCA PA-3000 multiple-event programmer, **656;** Rank Cintel X-Y zoom option, **657;** VDU option, **658;** Vidigrade, **659;** Cohu color film option, **660;** Zei-Mark 752 multiplex stand, **661;** Orytec TV 1515, **662;** Rangertone Hokushin projector, **663;** TC-210, **664.**

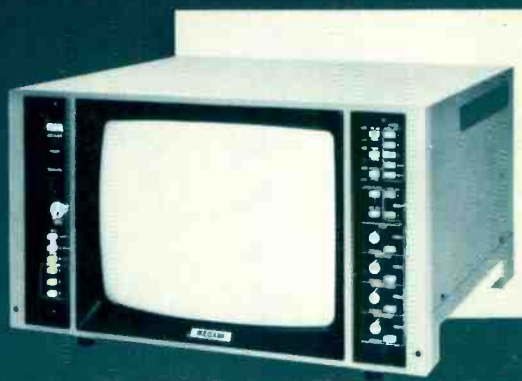
Film-to-tape transfer prominent

The merging of film/tape technologies was apparent at NAB '81, and this subject was the theme of the Eastman Kodak exhibit. EK promoted the notion of producing a program on film for "that film look" (and the flexibility that film cameras still offer over TV cameras), but recognized that distribution might well be on tape. The company heaped praises on the Rank Cintel Mark III telecine as a transfer

The new EC-35. World's First Electronic Cinematography Camera. Designed for the cinematographer, it makes network quality features on tape instead of film to substantially cut production costs.



The new HK-302 Studio/Field Camera. Ideal for the sophisticated program originator who wants a high performance camera with the important operational automatics at an affordable price. This compact, high-quality camera, featuring excellent sensitivity and stability, delivers superior colorimetry.



The new HL-83 initiates a new era in ENG/EFP simplicity and versatility. Smaller, lighter and requiring 30% less power than other broadcast quality ENG cameras, it utilizes proven, dependable ⅔" Plumbicon* and Saticon** tubes. It provides plug-in convertibility for various system configurations. And it's ready to accept the soon-to-be-announced attachable VCR's for self-contained operation.

The new Series 9 High Resolution Color Monitors confirm Ikegami's position as the leader in both quality and value. Excellent color reproduction is achieved through I/Q decoding, high resolution by close dot pitch color mask and comb filter. Stability is enhanced through a new era in-line gun (convergence adjustments are eliminated).

Best of Show

Ikegami's reputation for equipment excellence and reliability drew quite a crowd at NAB '81. And, those who came were most impressed with our new products. So if you missed them in April, the show still goes on at Ikegami. For more information, contact:
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device that makes it possible to convert film to tape without degradation.

Color negative film, which can be transferred to videotape for speedy post-production, is playing an important role in production, according to EK. With more and more film-to-tape equipment becoming available, such as the Fernseh FDL-60, producers can use either medium to its best advantage, said EK.

Magnasync/Moviola, which showed the Videola film-to-tape transfer system last year (baded on a unique Flickerless Prism® optical sub-system), said it now has production machines. New this year was the V2000, which houses the transports in a new cabinet configuration that locates one of the transports of a slope panel. Transfer with Videola is independent of TV synchronization so the film can run at a high speed. Films with separate magnetic sound tracks can be handled.

Showing an inexpensive multimedia system for the conversion of motion picture film and slides to videotape was tri-Tronics. The system is based on a color television camera head with a high-resolution vidicon tube.

Several new strictly film items were unveiled at the show by Research Technology, Inc. Among them were a Cine Scan™ high speed previewer and a low-cost computerized information reporting system for film inspection editing and previewing, Data-Film. The Lipsner-Smith subsidiary of IRT showed a new compact CF-200 ultrasonic film cleaner machine and a new film cleaning system, the CF-3000, that consumes less cleaning solvent.

For more information: Magnasync/Moviola V2000, **665;** Tri-Tronics system, **666;** RTI Cine Scan™, **667;** Data-Film, **668;** CF 200, **669;** CF-3000, **670.**

Picture monitors

The explosion of computerized color graphics systems has caused a flood of introductions of high-resolution color monitors from most manufacturers.

Amtron introduced new high-resolution monitors in the 7800 Series, but the big news from Amtron was the inclusion of a safe title grid as a standard feature on all high resolution monitors. The switchable, pre-set display includes cross hairs to mark absolute center of raster in addition to safe title markers.

Another new feature to aid in setting up and testing picture information is Micro-Rule, an internally generated marker display at 1 μ intervals arranged as a digital horizontal line. Micro-Rule is adjustable over the screen and can be used as a guide for scene matching.

Asaca showed two ShibaSoku high-resolution monitors, the CMM20-11and the CMM14-11. Both monitors feature digital sync circuits, I-Q demodulation chroma decoder, a built-in comb filter, and remote control operation.

Conrac showed off its new QQA graphics display monitor by having it hooked up to Ampex's AVA and feeding the output to its booth for "live" comparisons. The QQA will lock on any field rate from 15 to 60 fields per second and any horizontal line rate between 15 kHz and 37 kHz. The horizontal can handle from 500 to 1225 lines per frame. Any three line rates can be preset and selected from the front panel. The monitor comes in 14- and 17-inch models. Conrac also showed its complete line of monochrome and color monitors.

Electrohome had two new color monitors with 800 lines of resolution, a nine- and a 12-inch. Fifteen-, 17-, and 23- inch models were available with 1000 lines of resolution. Electrohome also featured a number of high-resolution monochrome monitors.

Fernseh entered the high-resolution graphics market with the MC-51BAH 20-inch monitor, which includes front panel aperture correction, internal or external sync, pull-out drawer for convergence and other secondary control, and remote control of signal input, sync mode, brightness, chroma, phase, and contrast. A number of other configurations of the 20-inch MC-51BA series were shown.

In the monochrome line, the FMM Series was shown in 9- and 12-inch models. The series offers 800-line center/700-line corner resolution and dynamic focus.

Ikegami had three new series of high-resolution monitors, the 8, 9 and RH series. The 9 Series features an in-line gun CRT with a black matrix, comb filter, and signal generator for checking deflection linearity.

The RH Series features a high-resolution CRT with comb filter, Automatic Frequency Phase Control (AFCP), normal/underscan and remote control.

The 8 Series comes in a modular design consisting of a decoder, a deflection unit, and a power unit for the TM25-8, TM20-8, and TM14-8. The TM14-8R consists of a decoder/power unit, a deflection unit, and a convergence board.

The full line of Barco monitors were shown by both Rhode & Schwarz and E&O Systems, now known as Elector.

Sony introduced two new monitors, the BVM-1900 and the BVM-4050. The BVM-1900 is a 19-inch broadcast evaluation monitor offering 900 lines of

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resolution, built-in comb filter, and RGB output.

The BVM-4050 is a 3.7-inch field monitor with a high definition Trinitron® tube, pulse cross function, and blue only function for setup. It is plug-compatible.

Tektronix introduced its new 690SR color monitor, a high resolution 19-inch monitor featuring a delta-gun dot shadow-mask CRT, convergence within 0.5 mm, and a pullout drawer containing adjustment and convergence controls.

Videotek introduced a new 26-inch color monitor, the VM-26P, which features A-B inputs, internal-external sync, RGB gun switchers, RGB background and drive controls, raster size regulation, and dynamic focusing with options for pulse cross and underscan.

QSI Systems, Inc., featured a number of source identifiers, including the new QSI VALID Video (Affiliated Line Identifier), which identifies video fields via a digital code on the vertical interval.

QSI also introduced a new master clock system that automatically displays both time and temperature.

For more information: Amtron 7800 Series, **671;** Asaca CMM20-11, **672;** CMM14-11, **673;** Conrac QQA, **674;** Electrohome, **675;** Fernseh MC-51BAH, **676;** FMM Series, **677;** Ikegami 8 Series, **678;** 9 Series, **679;** RH Series, **680;** Sony BVM-1900, **681;** BVM-4050, **682;** Tektronix 690SR, **683;** Videotek VM-26P, **684;** QSI, **685.**

Lighting

Avab America is now manufacturing some of its products in the U.S., including its new Designer Digital Dimmer series. The Dialpatch allows for repatching the dimmer bank by dialing in the proper channel. Each module in the system can process up to 36 kW.

Electro Controls showed its computerized Lite Cue, which can handle 64 channels and 500 cues and features cassette storage. The portable system has a two-tiered display on the CRT that gives constant visual readout of what is taking place both in preview and "real time."

The Great American Market featured the Lighthesizer™ 212 programmable sequencer, which has eight programmable sequences and 32 steps per sequence. There are 12 channels, an adjustable clock, a master relay output switch, and one master dimmer output.

Kliegl Brothers added a remote control unit to its Performer II™ control console. The remote unit controls all the functions built into the Performer II™, which can handle up to 125 channels and 500 dimmers with over 200 memories. Also shown was the Kliegpac 9® dimming system. The system includes a dimmer bank and a control console, but each can be used separately.

To add more flexibility to its Cuelog computerized lighting system, Skirpan has increased the number of MCPs (Modular Control panels) available. The single-function module can be expanded to any configuration needed. MCP modules include faders, masters, timer, matrix, houselight, and non-dim or special effects.

Strand Century introduced two dimming systems with multiplex control signals. Mantrix is a manual four-scene preset control console with eight submasters, split crossfader, and matrix patch for grouping of up to 288 2.4 kW dimmers to 84 channels.

Strand Century also featured the CD80 Pack, a portable version of the CD80 dimmer bank.

Teatronics introduced the Datacue II which is a computerized lighting control console designed to interface with other manufacturers' dimmers. Datacue II handles up to 128 channels, up to 1263 cues, 10 group submasters, and timed crossfades.

As for the lights themselves, Anton/Bauer introduced a new hand-held light called the "Black Beauty." Officially designated the LG-30, the light can be operated with one hand, including focus and on/off control. The LG-30 includes a swing-away dichroic filter.

Arriflex introduced to this country the Arri Daylight HMI. The system is intended as a total design based on the energy efficiency of HMI, including safe ballasting and distribution. The range of lights includes 200 W, 575 W, 100 W, 2500 W, and 4000 W models.

Belden Communications featured the Lee 200 W HMI portable daylight sungun. The unit had been out of production for a number of years, but is now available again.

Walter S. Brewer Co. showed the Brewer Super Softlite, equipped with four 1000 W quartz lamps. There are individual switches on the front of the panel so that the lighting can be varied from 1000 W to 4000 W depending on the need. There is also an option for a 6000 W version.

Cool Light showed a 2K lamp that it claimed would come within 10 percent of the light from a 10K light. As with all Cool Lights, the heat is dissipated so effectively that one almost has to be inside the light before heat is noticeable.

Also at the Cool Light booth was Starbrite Production Services' Star Pak, a super-compact light kit that includes practically everything one would need in a news or documentary

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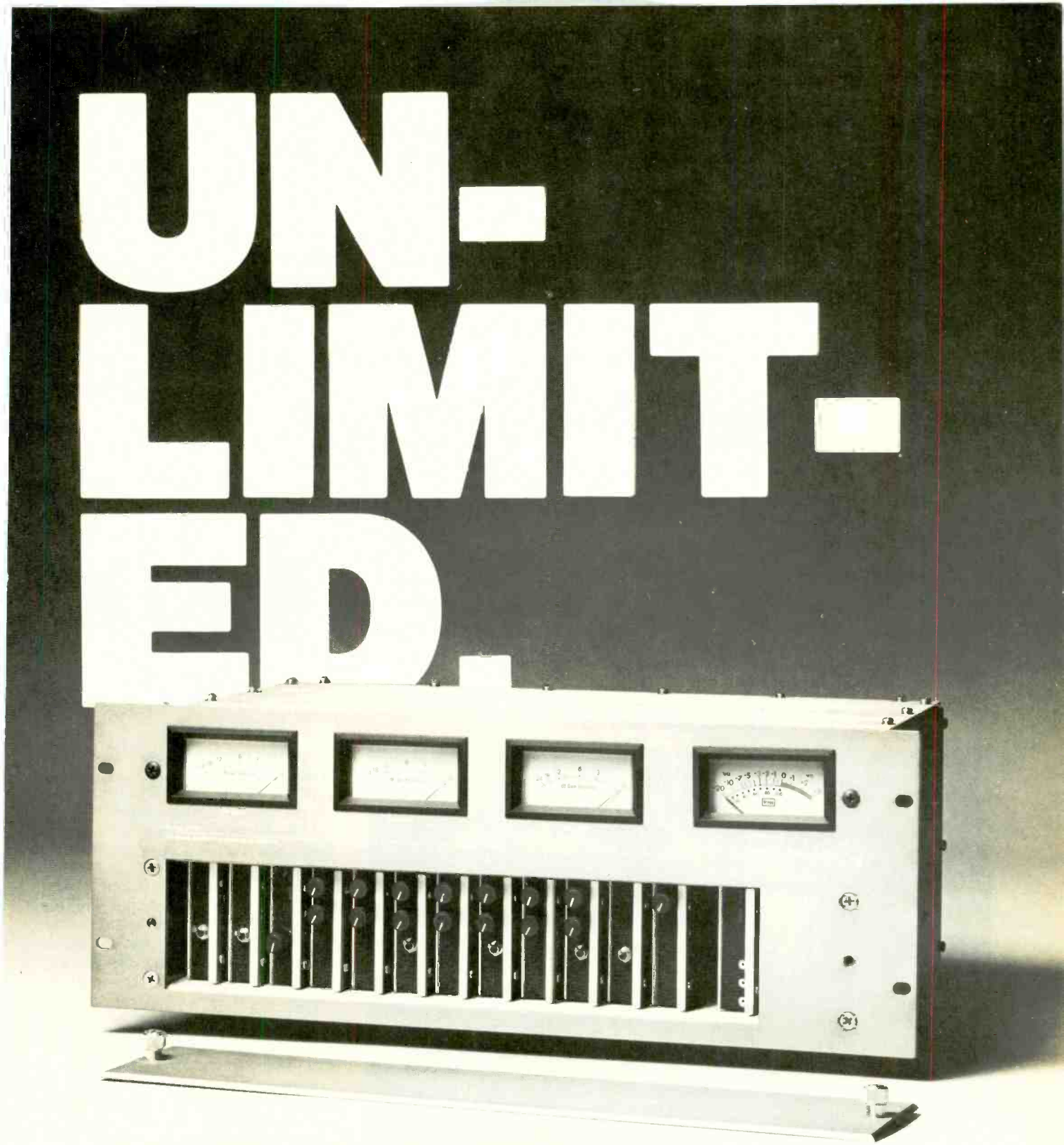

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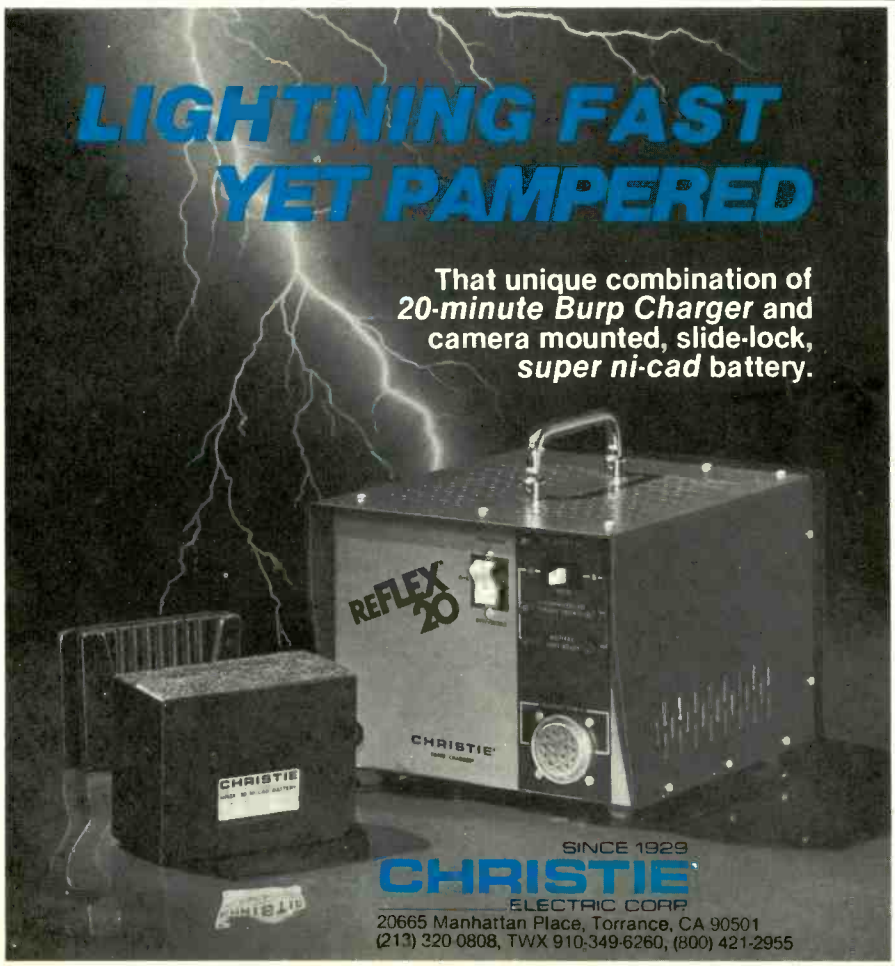

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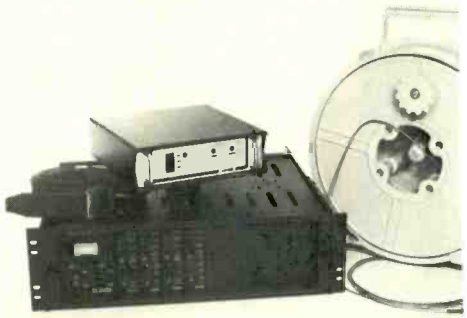
NAB SHOW IN PRINT

situation. The basis of the Star Pak is the small but powerful Mini Cool light.

Phoebus Manufacturing made its first appearance at NAB, displaying its Ultra Arc follow spot. The unit is built to provide high intensity light in a lightweight package. A long throw version throws a beam about 300 feet; the short throw version goes to 125. Both have six color gels and an autofader.

Strand Century featured the Ianiro line of lights, including HMI Fresbekutes in 575, 1200, 2500, and 4000 W versions; Bambino 1000 to 10,000 W Fresnels; Pulsar, an all-fiberglass unit



Artel's fiber optic cable system for ENG cameras. The reel holds thousands of feet of cable

for camera mounting; and Mizar, a 500 W fresnelite that, according to Strand Century, is the most powerful lightweight fresnel on the market.

Mole-Richardson showed its line of lights and featured its new Tweenie Mole Solarspot, which puts out 600 W.

Berkey Colortran featured a new eight-inch 2 kW fresnel spot with the sweep focus located on the side of the housing. The lens also opens on the side for ease in changing the gels. Berkey was also showing a new zoom ellipse rated at 1000 W.

GTE-Sylvania and English Electric featured their entire lines of lamps.

For more information: Avab America Designer Digital Dimmer, **688;** Electro Controls Lite Cue, **689;** Great American Market Lighthesizer, **690;** Kliegl remote control unit, **691;** Kliepac 9", **692;** Skirpan Cuelog updates, **693;** Strand Century Mantrix, **694;** CD80 Pack, **695;** Anton/Bauer Black Beauty, **696;** Teatronics Datacue II, **697;** Arriflex Arri Daylight HMI, **698;** Belden Lee 200 W HMI, **699;** Brewer Super Softlite, **700;** Cool Light 2K lamp, **701;** Star Pak, **702;** Phoebus Ultra Arc, **703;** Mole-Richardson Tweenie Mole Solarspot, **704;** Berkey Colortran fresnel, **705.**

Fiber optic sources grow

Fiber optics cabling is not yet a

common everyday experience in television despite ABC's discovery of another suitable application at last year's Democratic National Convention, when the net tied hotel cameras to a remote studio 1200 feet away with a Valtec VS-100 baseband video system — without RFI troubles.

Valtec, now a Philips-M/A-Com venture (50-50), demonstrated the VS-100 system at NAB '81 — along with a variety of fiber cables and other systems designed for data communications.

Telemet, another pioneer in producing a video baseband system (the model 4210 optical transmitter receiver), this year demonstrated the ease of making up cables — adding connectors and making splices — with the hope of encouraging broadcasters to increase their use of fiber optics. Grass Valley Group continued to show a fiber optics video distribution system. More camera manufacturers announced fiber optic cable options. Despite this activity, the subject has not exactly caught fire.

Hoping to set off a charge to get fiber optics the recognition it deserves, a new company, Artel, hit NAB '81 with a bang.

Aretel, announced, earlier in April by two former Valtec executives, said in a press release, "We will initially be serving markets that the corporate giants are ignoring. Out first line of products will be aimed at solving special problems of broadcast video transmission."

Indeed, Artel showed up with a complete ready-to-go ENG/EFP system, the EN-1000. This is a field-portable video/audio link intended to connect ENG cameras to news vans or mobile control centers. A small transmitter is carried on a shoulder strap. Minature Hand-carried portable cable reels pay out optical cable up to several km in length. The system produces a cleaner transmission path than wire cable, more portable microwave, says Artel. Another product is the SL-2000 19-inch rack mounted system, designed as two-mile STL or microwave replacement.

Both systems employ baseband high-intensity LED modulation and PIN detection circuitry and have built-in self monitoring testing and diagnostics. S/N ratios of 70 dB achievable with either system.

For more information: Artel EN-1000, **686**; SL-2000, **687**.

Cables, connectors, hardware

Manufacturers of cables and connectors have served the industry well over the years and it is difficult to find something newsworthy in this field. New connectors and cables tend to track the

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new cameras available. Thus, Boston Insulated Wire featured many new connectors for the TK-47. BIW also described its expertise in building fiber optic cables, but that was hardly new since it offered the same service last year.

Trompeter offered a new series of TEI connectors for broadcasters installing fire-resistant coax cables made with non-flammable, low-smoke producing FEP materials. Since FEP cables are deminsionally different from PVC-type cables, new connectors are necessary, Illinois Cable Co., incidentally, was selling fire-protective signalling cable.

ADC featured a variety of connectors and jacks for mounting directly onto printed circuit boards, plus new QCB terminals, blocks, and broadcast jackfields. Audio patchfields were featured by Farrtronics. Wireworks Corp. had a *big* line of audio interconnect items. A new illustrated price list showed over 800 items, including the company's unique microphone multicable component group.

Fast-fit RF coaxial connectors of the BNC/UHF type were shown by Cambridge Products Corp. Both crimp and twist-on types were offered.

For more information: Boston Insulated Wire TK-47 connectors, **708;** Trompeter TEI connectors, **709;** ADC terminal blocks & jackfields, **710.**

Shipping cases

With more and more stations developing the confidence to travel with ENG equipment, the need for good travelling cases has become more than a ho-hum subject. Most case manufacturers at NAB were making their show debuts.

Anvil Cases is taking the systems approach to shipping cases. The company says it has designed its newer cases to be permanent homes for the equipment. Its first for this purpose houses the Sony BVU which, according to Anvil, "does not need to come out of its protective environment in order to operate."

Cases, Inc. made its first appearance at NAB with its complete line of Roadrunner® ATA cases. The newest addition to the line is the Roadrunner® Endura, which the company describes as one of the strongest, lightest cases made.

Parsons Manufacturing Corp., also making its premiere appearance at the show, displayed its complete line of heavy-duty and lightweight cases.

Another newcomer, Excalibur Industries, featured a complete line of cases, taking the systems approach with a number of cases designed for in-case operation of recorders, audio consoles, and EIA rackmounts. Excalibur cases were shown at the Great American Market booth.

Environmental Container Systems (ECS) is new to NAB, but has specialized for some years in building shipping and operating cases for computers and other delicate electronic equipment. To show how strong the molded fiberglass laminated cases are, ECS tested the cases by firing a .357 Magnum hollowpoint at the case. The bullet got no farther than the first ply of the 10-ply case.

Fiberbuilt, already familiar to the NAB, also displayed a complete line of its ATA cases.

Thermodyne International introduced its new Shok-Stop™ cases. The company says the new polyethylene cases are more shock-absorbent than fiberglass or metal cases. The cases come off the shelf to fit most standard equipment, but can also be custom-made.

For more information: Anvil BVU case, **711;** Cases, Inc. Roadrunner® Endura, **712;** Parsons, **713;** Excalibur, **714;** ECS, **715;** Thermodyne Shok-Stop™ cases, **802.**

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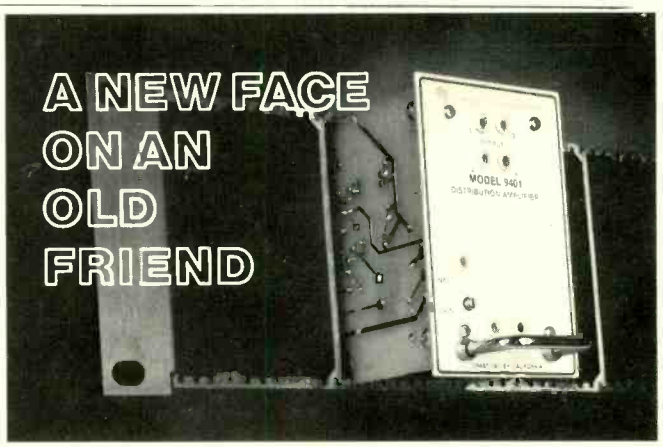

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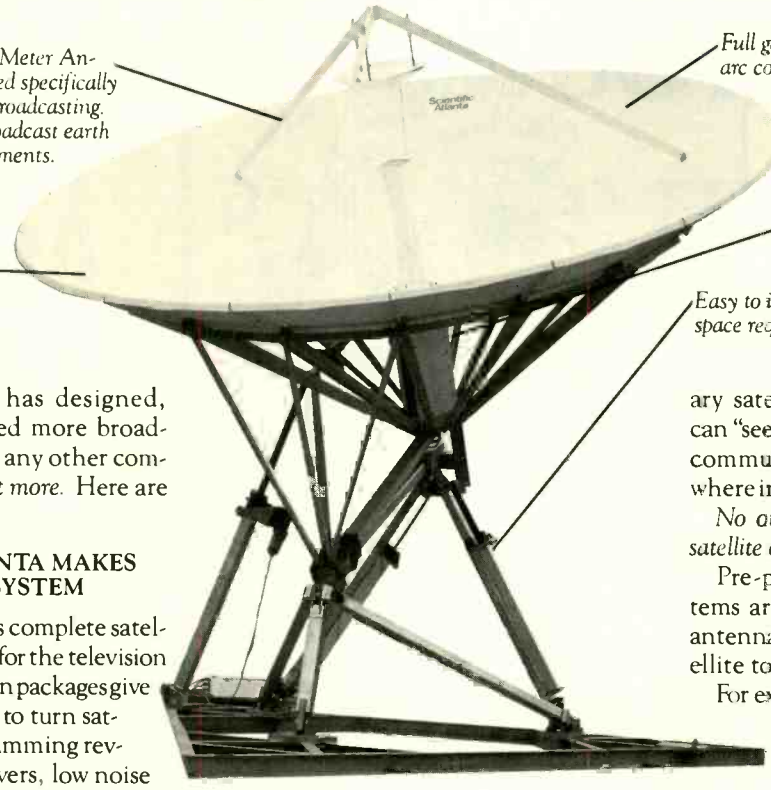

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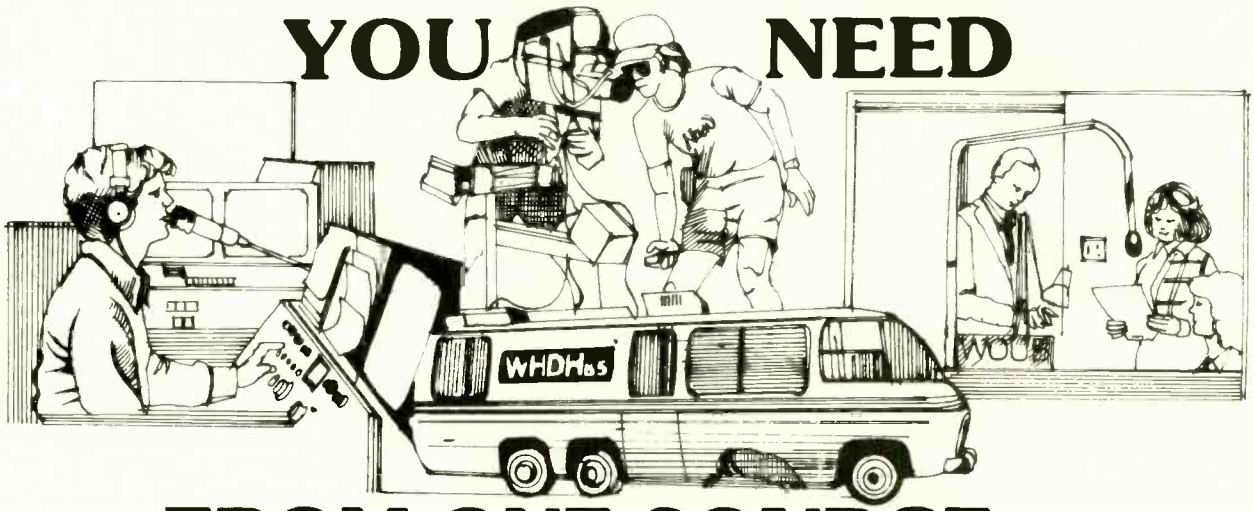

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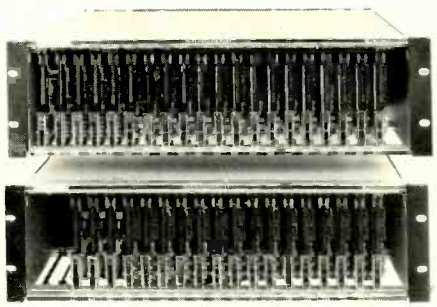

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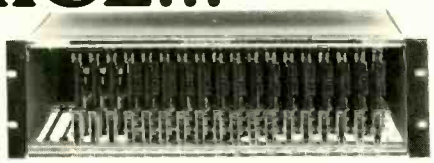

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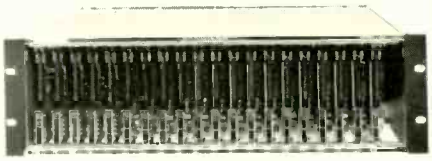

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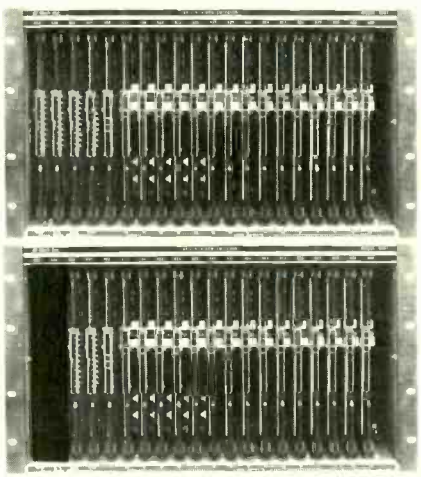

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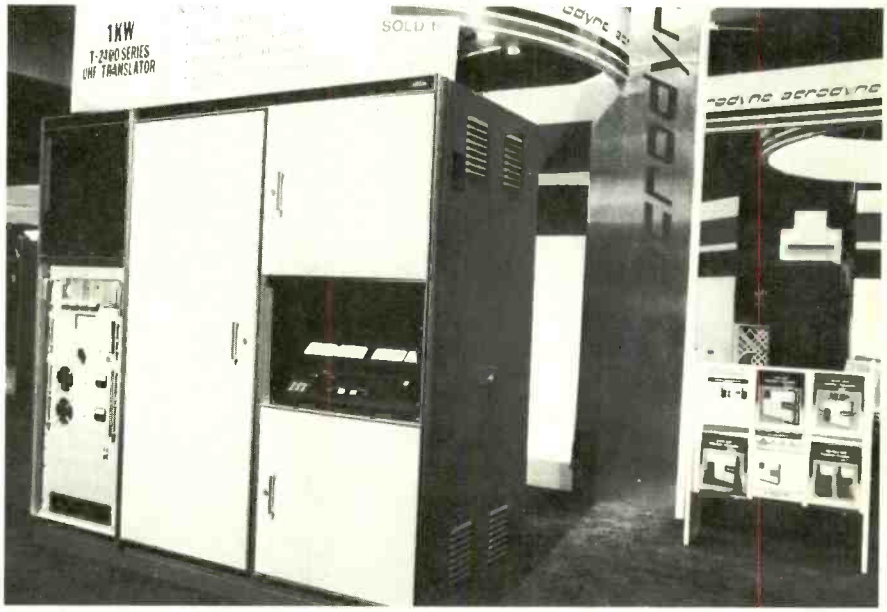
RF TRANSMISSION EXPLORES NEW TERRITORY

Broadcasting has gone after full utilization of available spectrum. Whether point-to-point, satellite, or conventional transmission from the station to the market, equipment has been developed to meet the need.



Acrodyne showed 1-kW UHF translator and new 10-kW VHF transmitter. Also new were 100- and 200-watt VHF transmitters and translators

LPTV equipment everywhere

With nearly 5000 applications filed with the FCC, for low-power television stations, it was no wonder that equipment manufacturers were on hand ready to be of service. Indeed, there was equipment and literature on the subject everywhere. Of course, a great deal of this interest was piqued by programming sessions such as "How to Apply for a Low-Power TV Station" and "Low-Power Television, High Priority." In addition, Acrodyne sponsored two three-hour sessions on the subject of low-power television. On its program were a lawyer, a consulting engineer, several antenna experts, and a satellite earth station specialist, as well as Nat Ostroff of Acrodyne.

Sharing the exhibit floor were manufacturers of low-power TV transmitter/translators, antennas, earth station receivers, and STV decoders. Keen interest was shown in all of this equipment.

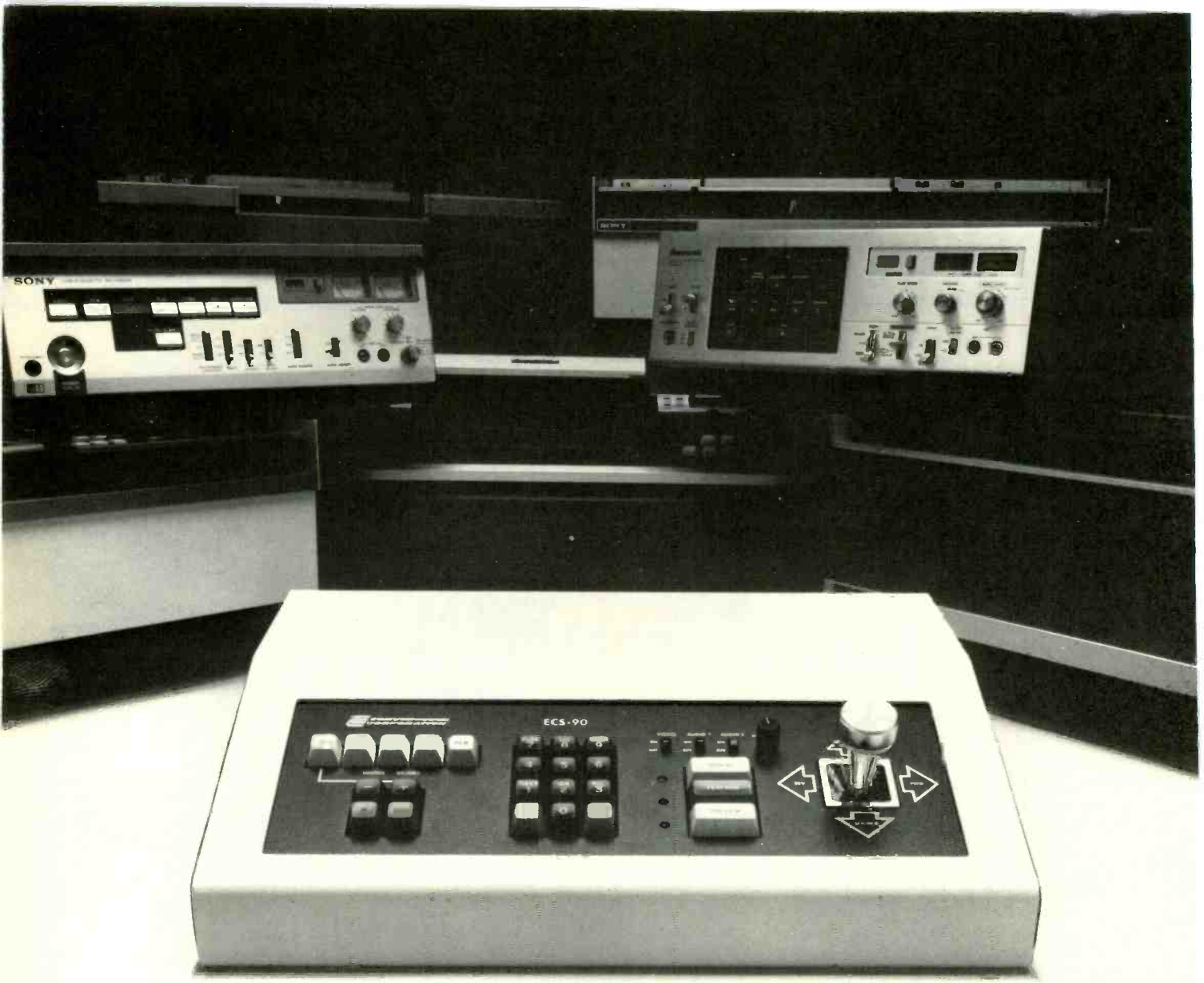
Although the FCC put a freeze on all LPTV and translator applications the week before NAB to give itself time to catch up with the flood of applications, the delay was not viewed with alarm by anyone, except translator manufacturers. The extra time (until September) gave all of those who were thinking about filing, but hadn't, time to sort out their plans.

EMCEE showed systems for low-power television, including new 1000-watt amplifier expandable into a translator

New at the Acrodyne exhibit were 100 and 200 W solid state VHF transmitters and translators, as well as a new 10 kW VHF single-tube transmitter. The new 100 W (Series TT-3300 VH) and 200 W (series TT-3320 VH) units are similar except for the number of hybrid combined amplifier modules. Both have redundant power supplies and rely on proven techniques for transient and surge protection. Acrodyne also introduced a single-tetrode 5 kW aural transmitter amplifier, the model A 1480-U.

Emcee heavily promoted its capability to provide LPTV turnkey systems and hardware. New at NAB was a TVA 1000 C amplifier for which FCC-type acceptance has been applied. This amplifier can be expanded into a translator. Emcee says the unit features high gain, high efficiency, and reliability. It includes solid state control circuits and LED status indicators. The RF stage is a slide-out type. The unit is compact and occupies only a single bay.

Television Technology Corp. showed a new 10 W VHF translator and a solid state 20 W UHF type. TTC also



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offered an informative booklet on LPTV, inlcuding equipment prices for various power output and antenna combinations from Scala and Bogner.

At the Thomson-CSF stand, LGT's equipment for LPTV was on display. Since LGT is a world leader in the manufacture of translators, its technology was closely scrutinized. On exhibit were a 100 W transmitter and a 10 W translator for small area coverage, and a 200 W translator and 1 kW transmitter in the UHF area. Efficient units can be solar-powered.

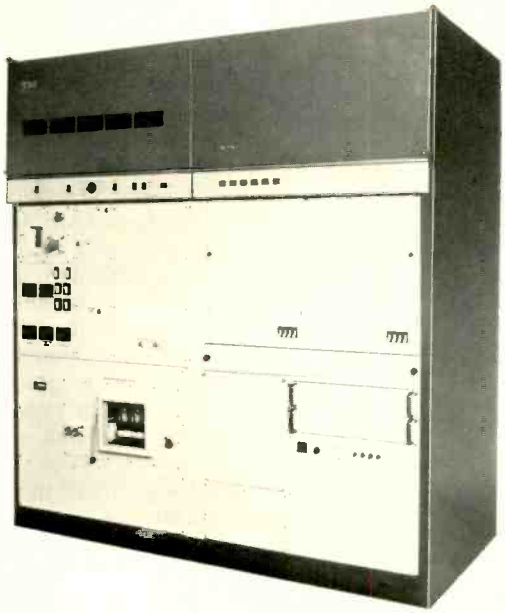
Townsend Associates introduced a totally new concept in the low-power UHF field, combining a solid state transmitter with the antenna. The transmitter antenna of the "Phaestar" (Phase Solid State Transmitter Array) consists of a solid state 100 W amplifier and a broadband printed circuit antenna packaged into a single compact module. Several modules can be combined and phased to form a high gain antenna with omni or directional characteristics. Ten units can be combined to produce 1 kW of transmitter power and an ERP of 80 kW.

Townsend said the Phaestar transmitter antenna eliminates the need for transmission lines and associated losses, requires no transmitter building, and circumvents the need for vacuum tubes and high-voltage circuitry.

Townsend offered two conventional LPTV translators as well: the TA-10 ATH 10 W unit and the TA-100 ATH 100 W unit. The power amplifiers in these series are all solid-state modules with gains of 10 dB. They are wideband and use hybrid combiners. No tuning is required. The amplifiers employ a pair of RF powered transistors in a broadband circuit operated class AB push-pull. Townsend also offered two standard lower power UHF series, the TA-100 ATU and the TA-1000 ATU. The 100 W transmitter becomes the driver of the 100 W unit. An RCA 4228 tube is used as the final.

There were several companies on hand offering turnkey or other engineering services. Both Compucon and ComSearch offered their services regarding site locations, interference possibilities, frequency search, and application preparation. Microwave Associates Communications said it was ready to apply its long expertise in broadcast microwave to LPTV. It offered a turnkey service and stood ready to help plan live satellite or prerecorded programming distribution.

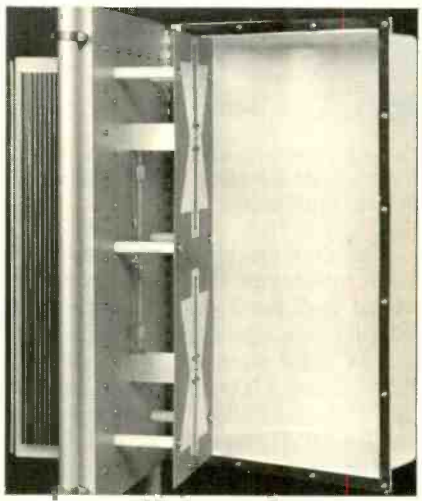
Antennas for LPTV, besides the Townsend Phaestar, were shown by Bogner and Micro Communications, Inc., with information on Scala types available from several translator manufacturers. The standard Bogner slot assembly seemed to be the most popular low-power UHF type. These 12 dB gain units range in price from $2950 for the LPS-4 (channels 53-69) to $3800 for the LPS-1 (channels 14-24).



A single-tube 12-kW VHF transmitter was introduced by RCA. It will be available for NTSC, SECAM, and PAL

A useful handout at the Micro Communications, Inc. exhibit was an LPTV RF planning manual. This book analyzed coverage, cost, and performance using MCI 95000 series panel antennas in one- or two-bay arrays for VHF and two-, four-, or eight-bay arrays for UHF.

For more information: Acrodyne 100 W, **716;** 200 W transmitters, **717;** A 1480-U transmitter amp, **718;** Emcee TVA 1000 C amp, **719;** TTC 10 W VHF translator, **720;** 20 W UHF translator, **721;** Townsend Associates Phaestar, **722;** Compucon, **723;** ComSearch, **724;** Microwave Associates, **725.**



Townsend's "Phaestar" combines a UHF 100-watt amplifier and antenna into one unit; ten units can be put together for 1 kW RF, 80 kW ERP

More high-power developments

BM/E's separation of television transmitter equipment into low-power and high-power products creates a bit of a problem because there is a continuum in power ratings. Companies best known for their low power work such as Acrodyne, Emcee, and LGT, also cross over into the higher power world. Our previous section on LPTV essentially cut off at power levels of 100 W VHF and 1000 W UHF (FCC rules for LPTV). This section on high power therefore really extends downward to include some relatively low-power devices not part of the LPTV series.

Acrodyne introduced a new 10 kW VHF transmitter, the TT-3500 VHF. Using a 200 W solid state driver, the TT-3500 VH uses a single tetrode output stage. Hypervapotron® cooling helps to offer a quiet compact system with good overload protection. All circuits in the new transmitter are broadband. Visual and aural signals are combined at lower levels and amplified together in the output stages. Acrodyne says the high linearity of the tetrode produces very low intermodulation generation. The final tetrode stage, with a coaxial cavity, has a bandwith rating twice the signal bandwidth.

Canadian General Electric this year introduced a high-band 30 kW unit, the TCC 30000 FH. The transmitter employs low-level IF modulation and is completely solid state except for two tubes — one in the final visual, the other in the final aural. A practical, highly efficient design is achieved with UHF/microwave power transistors and combinations of lumped and Microstrip distributed circuit elements, combined with coax hybrid couplers. Each power module consists of two transistors operating push-pull to reduce second harmonic distortion. The modules are connected via quadrature couplers to permit parallel operation. The entire unit is contained in four cabinets.

Eimac brought a new power amplifier cavity, CV-2240, for low-band TV; amplifier uses 3CX10.000U7 triode

Canadian GE also introduced 2 kW UHF translators. These units combine visual and aural carriers through an internal diplexing circuit. The exciter is a 2 W solid state unit followed by a driver using a YD 1381 plan, a triode, and a PA stage with ultralinear tubes of the RS 1054L type.

Comark Industries, in keeping with its heavy emphasis on high-efficiency UHF transmitters, introduced a fiber optic mod anode pulser to achieve the highest level of energy efficiency. The unique feature of this equipment is the fiber optic link between the video input control chassis and the floating high voltage switching circuit. Not only is dielectric isolation provided, but the system is immune to RFI and EMI distortion. The CTP-4500 includes high voltage interlocks and other safety features.

Another new Comark product was an automatic switching system for multiplex purposes. Visual and aural amplifiers can be switched without connecting and disconnecting cumbersome patch panels. Both coaxial and wave guide types were offered. Also introduced was a new remote control system incorporating a new-generation microprocessor, The CI5080 provides control and monitoring of a number of functions over two-way audio frequency channels. The system handles 250 status command circuits. Data is displayed on a video monitor and is organized on a page basis. Commands are entered by a keyboard.

Harris introduced a new low-band 30 kW VHF transmitter, the TV-30L. Among its features is an ultralinear driver with solid state IPA and broadband amplifiers. It operates broadband class A. A single conservatively rated tetrode is in the visual driver.

Vestigal sideband filtering in the visual exciter is accomplished with Surface Acoustic Wave technology. The Transversal Side Band (TSB) filter displays a nearly ideal bandpass function for systems M (FCC) and B bandwidth, according to Harris. This, combined with the filter's true linear phase characteristc, offers excellent reproduction of pulse waveforms and encoded information.

The TV-30L has low-level IF modulation and features true linear power amplifiers. The transmitter can be configured in many ways and is designed for remote control and ATS operation.

LGT showed a 1 kW VHF hybrid modulation transmitter based on a new highly efficient TV signal generation process.

NEC, a major transmitter supplier to Japan and other parts of the world, has begun to make inroads in the U.S. The NEC exciter's ability to handle stereo audio (FM-FM signal), as shown at NAB '81, makes it attractive to those anticipating a U.S. move in this direction. At NAB '81, NEC brought its PCU-700 line, which ranges from 5 kW to 80 kW. A PCU-711 is rated at a 110 kW through paralleling. The series uses high-efficiency klystrons of the 1AV57, 67, and 97 series. The high-performance exciter includes non-distortion compensation circuits and pedestal AGC to maintain constant output power levels. SAW VSB filters are used.

NEC also discussed its PCN-1200 series VHF transmitters, which include broadcast power amplifiers with a minimum number of vacuum tubes. Power outputs range from 1 to 25 kW.

RCA, which in previous years introduced 16, 30, and 50 kW transmitters (the G-line), this year broadened its line to include a high-band 12 kW unit, the TVG-12H, system M. This transmitter combines visual and aural amplification and eliminates the aural driver tube.

With only a one-tube amplifier stage, the transmitter is simple to operate and maintain. All other circuitry is solid state. The exciter employs only one TCXO (Temperature-Compensated Crystal Oscillator) operating on a standard frequency. A unique phase-lock frequency synthesizer generates any other channel. The transmitter takes up only two cabinets and is equipped for remote control. In the event of a power interruption of up to 10 seconds, the control system will bring the transmitter on the air within two seconds of power restoration.

The Townsend Associates exhibit stressed the company's role as a major UHG transmitter source by virtue of the 20 UHF models it offers, ranging from 10 to 220 kW. Most models operate with klystrons, but a "tetron" series was also shown, which uses a tetrode aural amplifier in 10 and 30 kW transmitters. The company has designed solid state aural drivers of up 200 W. A new innovation this year is a fully solid state pulser utilizing fiber optics for high voltage isolation.

The fiber optics isolate video and the IF chassis from high voltage circuits. Townsend says its pulser also overcomes the awkward and even dangerous interface of the pulser with the beam power supply by employing two small bias supplies as source voltages rather than using beam supply directly.

For more information: Acrodyne TT-3500 VHF, **726;** Canadian GE TCC 30000 FH, **727;** 2 kW UHF translator, **728;** Comark fiber optic pulser, **729;** auto switching system, **730;** CI5080 remote control, **731;** Harris TV-30L, **732;** LGT 1 kW VHF, **733;** NEC PCU-700 line, **734;** RCA TVG-12H, **735;** Townsend pulser, **736.**

Improved transmitter tubes

Should your UHF transmitter have klystrons or tetrodes? If you opt for klystrons, should they be external cavity tuned or internal? These are not easy questions to answer since there is much development work going on regarding tubes and cavities.

Tetrodes are more efficient than klystrons, but generally they have been limited in power. At high power levels it has been difficult to get high gain and to achieve high linearity and the tubes are prone to spurious oscillations. Thomson-CSF says it has overcome these limitations, citing its TH382 10 kW tetrode as an example.

EEV stressed its K 3276 high efficiency four-cavity amplifier klystron for high power. This tube produces 50 kW in the 470-596 MHz band.

NEC said its external cavity UHF TV klystrons of the 1AV57, 58, and 59 type (10-12 kW output) are very efficient — typically 55 percent at saturation levels.

Varian distributed at its exhibit a special report on high efficiency UHF TV, authored by RCA and Varian engineers. The conclusion said that internal cavity klystrons could be made as efficient as external cavity types by means of a visual output coupler designed by Varian. Both new and existing transmitters can reach maximum efficiency with the coupler, the report said. This coupler, although still experimental, was shown at both the Harris and RCA exhibits. Meanwhile, Varian's Palo Alto Microwave Division showed some high efficiency external cavity klystrons, the 4 KM series,

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Microwave Associates had ENG system installed in remote-pickup car; also shown were airborne ENG systems

"Copter Pod" from Nurad is airborne ENG system; company also showed new "Mini Pod", a smaller version, also with four directional antennas pointing left, right, fore, aft

which use 10 percent less power than older types.

The Eimac division of Varian promoted the new CV-2200 low-cost practical cavity for high-performance tubes in the FM band. In this cavity, tubes are grid driven for high gain.

Other cavities on display were designed for high linearity and high stage gain triodes in the low TV band and high band. Eimac tubes on display ranged from high mu-triodes to power tetrodes. One was the 4CX12000A/8989, for which Eimac claimed high RF operating efficiency. The highly efficient 4CX40000G was described as a state-of-the-art ceramic-to-metal air-cooled power tetrode ideal for FM, RF linear power amplifiers, and VHF linear amplifer service. A relatively new tube was the 4730 planar triode, intended for TV translator service. A series of travelling wave tubes for satellite use was also shown.

For more information: Thomson-CSF TH-382, **737;** Eimac CV-2200 cavity, **738.**

Microwave for ENG

Harris Farinon Video came out with what had to be the most agile of the frequency-agile transmitters. The Global IX is built to operate on any 2 GHz plan in the world. It allows for selection of 55 channels in each of the 16 different frequency plans in the 1900–2700 MHz range. The output is 3 W with an auxilliary 12 W amplifier. It will accept either a standard video line input or a 70 MHz IF input.

Microwave Associates took to the air with its new transmitter for helicopter use. The MA-2MX Mini-Mac™ is a frequency-agile unit with 21 channels that operates in the 1.990 to 2.110 GHz range. Power output is 12 W. The remote control unit allows full control over the transmitter from inside the helicopter. Both units weigh less than six pounds. The company also emphasized the total airborne system. Everything was shown from Sky Scan™ auto tracking to retractable antenna mounts.

Nurad is also heavily into the airborne use of ENG microwave technology. This year Nurad introduced a smaller version of its Copter Pod™ system, the Mini Pod™. The new system incorporates many of the features of its big brother: four circularly polarized directional transmit antennas pointing left, right, fore, and aft; Auto Transmit™ control on the MS2 antenna selector switches to the antenna closest to the receive point; the optional MiniPAC™

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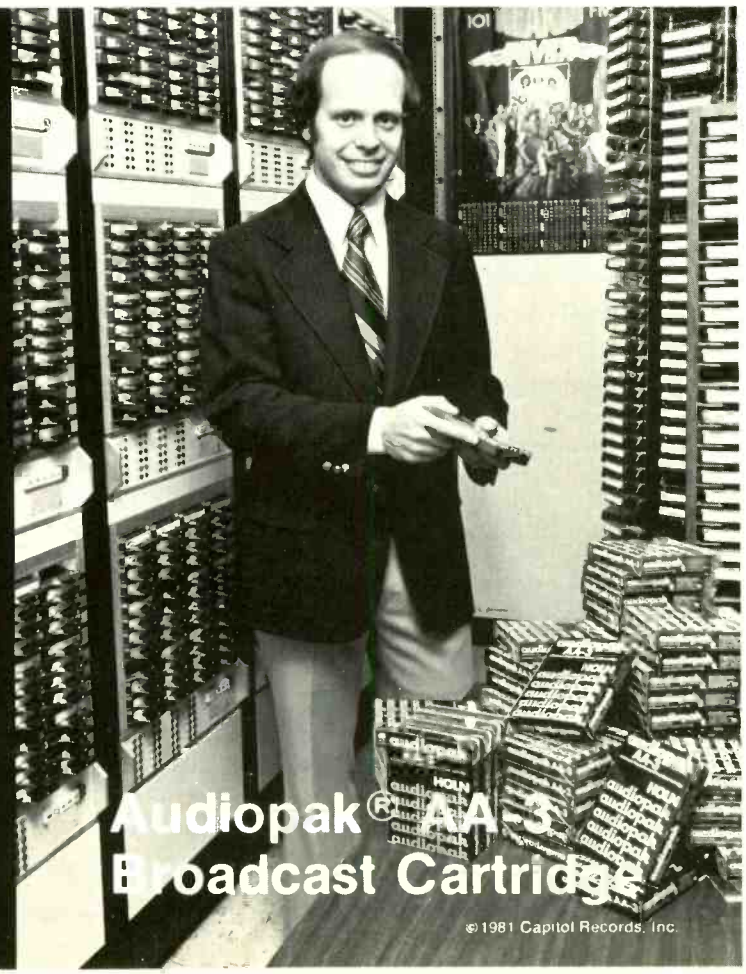

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lightweight, frequency-agile transmitter/receiver which can also be used for non-airborne ENG operation.

Nurad was also showing the new version of its Goldenrod™ antenna, the Goldenrod™ D series. The new series features switchable circular polarization (CW/CCW) on a wide band (2–2.7 GHz). A new amplifier, the 20PA15, powers the antenna. The 20PA15 is mounted at the antenna atop the mast, cutting RF line insertion loss to a minimum. The built-in RF/dc diplexer eliminates a separate power cable.

RF Technology introduced its compact frequency-agile (21 channels) transmitter, the RF-212, which has a high/low switch for 3 or 12 W. The RF-212 is designed for both airborne and ground use with minimal changeover time. A mounting bracket for tripod use contains a combination heatsink and power supply.

Tayburn also joined the supercompact frequency-agile transmitter sweepstakes with its new TBT-50-A transmitter, which has 21 channels on the 1.990–2.110 GHz range or nine channels on the 2.450–2.500 range. When used in conjunction with its companion receiver, the TBR-50-A, it forms the lightest of the airborne transmit/receive systems. Hughes Helicopter has made much of its use of the TBT-50-A in its smallest chopper, the 300C, as a lower-cost method for stations to get into airborne broadcasting.

TerraCom has a new lightweight transmit/receive system, the TCM-7 Miniwave. While it isn't designed for helicopter use the way some of the super-compacts are, it is nonetheless extremely portable. The frequency agility for the Miniwave is provided by interchangeable RF modules that cover the frequencies from 1.7–15.35 GHz.

For more information: Harris Farinon Global IX, **739;** Microwave Associates MA-2MX Mini-Mac™, **740;** Nurad Mini Pod™, **741;** Goldenrod™ D, **742;** RF Technology RF-212, **743;** Tayburn TBT-50-A, **744;** TerraCom TCM-7 Miniwave, **745.**

Weather radar systems

Computer assistance has been giving a leg up to weather radar and satellite systems, those newsroom tools that barely existed four years ago. Last year, only a handful of companies showed weather systems designed for television. This year no fewer than 10 manufacturers arrived in Las Vegas with weather reporting systems.

The hot ticket this year came from Weathercaster, a Salt Lake City company at its first NAB, which showed its CT-1000, a dual-processor computer system that forecasts local weather for

Weathercaster had computerized system for making local forecasts, presenting them in many graphic forms

up to 48 hours. The CT-1000 combines two computers — one for color graphics creation and display, the other for processing information from rooftop sensors that are part of the system's $69,000 package. Software includes weather equations customized for the broadcaster's locality (the system covers a radius of about 40 miles), which, when taken with information from the rooftop sensors, can be combined with computer graphics to animate weather map forecasts.

Although Weathercaster's local real-time forecasts are its selling point, other presentations that can be created

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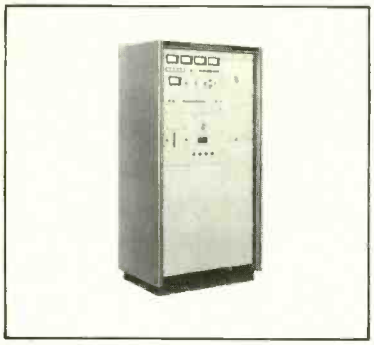

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include satellite, radar, and national map animations (as well as news and sports graphics) at a resolution of 512 by 512. For radio stations, the company offers its R-300, a standalone computer that gathers weather information and computer weather predictions. It will predict, within a 48-hour period, sky cover, probability of precipitation, temperature, and wind characteristics. An optional computer voice synthesizer for on-air broadcasts is available.

Last year, Information Processing Systems of Belmont, Calif., was touting its $43,000 WP-3312 weather satellite recorder, which provides forward or reverse playback pictorial from National Oceanic and Atmospheric Administration (NOAA) satellite inputs. Now the company has pulled the wraps from two microprocessor-assisted color graphics systems that make this outfit a very serious contender in professional computer graphics.

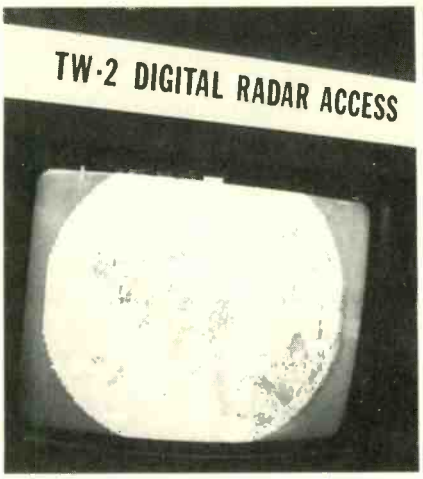
IPS also showed the Model CGS-1000, a weather graphics color system that features a memory of 88 Kbytes, held on two image solid state storage frames with single-port access and a floppy disk. Any 14 of more than 4000 colors can be selected with a light pen from an interactive grid pad. Cost of this model, with a 256 by 242 pixel resolution, is $15,800.

A higher resolution model (512 by 484 pixels), the CGS-4000, was not quite finished in time for NAB, but the company claims it will be ready about the time this report is in print. The CGS-4000 has a 280 Kbyte memory and is priced at $21,000.

A new remote radar receiver and computer graphics display system with a 16-frame memory was introduced by Technology Service Corp. of Santa Monica, Calif. Designated the RRT 77-16, the unit can interface with Radio Shack, Apple, or any other inexpensive graphics control minicomputer.

Any of the 16 stored pictures, automatically recorded from weather radar, satellite, or computer graphic sources, can be randomly selected by an operator. Playback can be anywhere from ⅛ second to 10 seconds for each frame. Precipitation levels can be flashed from memory, and the unit features a 16-quadrant 2:1 zoom.

Sperry Marine showed up with something it lacked last year — a colorizer for its radar systems. Built by Denrad Technical Group, the rack-mount colorizer is microprocessor-based, with the flexibility to display a station's logo on one page and weather on another. The six-color display is resolved at 256 by 256, and a joystick cursor and selectable flash level are part of the



Arvin TW-2 digital access system interfaces with NOAA data and presents forecasts on display screen

package. The Sperry/Denrad colorized radar has three selectable ranges that can pick weather information up as far as 170 miles away.

New options that Weathermation is offering for its color remote system include a variable speed analog sweep line that rotates smoothly — it does not "tick" — from zero to 20 rpm. Four additional memories can be added to the system, which tracks weather from 70 to 300 miles, to give an eight-frame total memory. Another new option for the system is Quadrosearch, a push-button-operated cursor that allows a 3:1 quadrant expansion.

The company also unveiled a high-resolution graphics system — 640 by 240 pixels — that features rotating image and intrinsic functions that the unit generates itself. Although dual eight-inch floppy disk drives are standard, a 30 megabyte Priam 3450 Winchester could be substituted for a disk.

Arvin came to the show with its SW-3 signal processor, an upgraded version of last year's SW-2 Sat-Weather, which converts NOAA satellite weather pictures into color video. Although digital disk storage — with a 200-frame memory — is not new to Arvin's Sat-Weather system, the new signal processor features selectable input (either GOES-TAP telephone line or WEFAX signal) and two picture storage memory, which prevents an incoming picture from being displayed until completed. Other features include four color underlay programs that can be stored and called up automatically, an auto-decode that automatically selects up to four preprogrammed pictures, a header blanking switch that displays time, date, and sector selectively, and a special graphics memory that holds and reinserts exact graphics.

Colorgraphics Weather Systems of Madison, Wisc., was on hand with its LiveLine color satellite computer, which interfaces with Environmental

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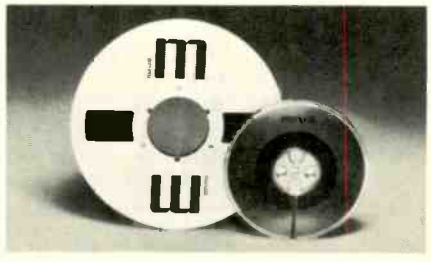

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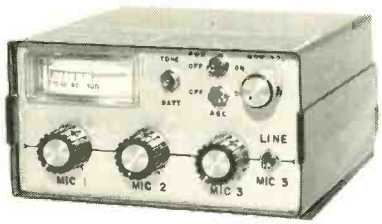

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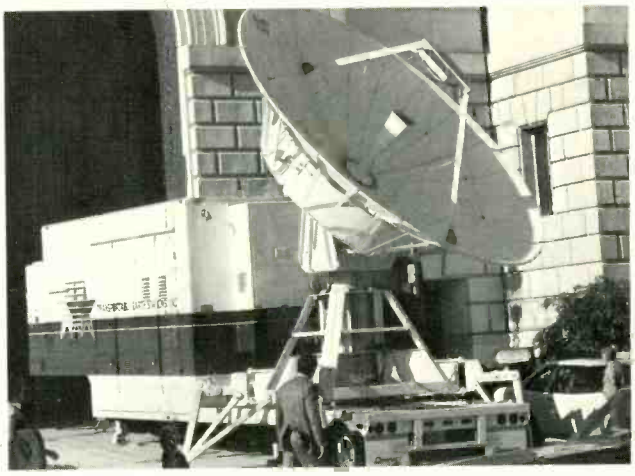

Mobile satellite uplink of Transportable Earth Stations uses Compact Video 7-meter antenna and electronics

Satellite Data Inc.'s dial-up service. Processed weather satellite pictures — including enhanced cloud images — can be on the air within minutes. Colorgraphics and ESDI are working together to expand weather satellite data for real-time weather presentation.

Other weather systems that were displayed at Las Vegas were seen last year. They included Enterprise Electronics Corp.'s color weather radar system that is remoted by telephone lines, and McInnis-Skinner & Associates' Newscan Weathergraphics, a minicomputer system that generates map displays either from Weatherscan's Oklahoma headquarters or from within the broadcaster's studio. Gorman-Redlich showed its receiver for NOAA weather radio, a rack mounted unit designated Model CRW that costs $325.

For more information: Weathercaster CT-1000, **746;** R-300, **747;** IPS CGS-1000, **748;** CGS-4000, **749;** Technology Service Corp. RRT 77-16, **750;** Sperry Marine colorizer, **751;** Weathermation sweep line, **752;** Quadrosearch, **753;** graphics system, **754;** Arvin SW-3, **755;** Colorgraphics LiveLine, **756.**

Satellites: post-show summary

In May, *BM/E* described briefly the satellite hardware and service exhibits at the show, based on a rapid survey made during the first day of the program. Later, interviews with a number of the exhibitors made it clear that this was, indeed, the turnaround year for broadcaster interest in satellites. A number of large-market stations, and especially group ownerships, were actively informing themselves on earth station technology and availability. The 19 dishes on the parking lot had scores of visitors who were finding out all they could about this new technology.

In our May report, Compact Video should have been included as a satellite service organization as well as a maker of uplink and downlink hardware. Compact has a studio in Burbank, CA, allowing complete production of television and radio programs for sending to the satellite through 10-meter uplink systems on the spot. The studio is rentable to software producers who want to reach the ever larger audience connected, through radio, to satellite earth terminals. Compact Video is also emphasizing the uplinking of programs with its seven-meter transportable system, which can be sent anywhere.

Another company moving into satellite electronics (missed in our May report) is McMartin. At the show McMartin introduced two units, the SMR-1 modulator and SDR-1 demodulator, operating in the 50-80 MHz range, and useful for single-channel per carrier satellite communications. The SMR-1 accepts a +10 dBm audio input, and provides RF up to +10 dBm. The SDR-1 has squelch and alarm circuitry, and automatic search that re-locks on the carrier as far as ±5 kHz off center frequency.

It seems likely that, taking into account the Mutual-, AP-, and UPI-sponsored radio earth stations, the next two years will see two to three thousand radio terminals installed, with the rate of installation rising steadily. Thus radio broadcasting will be on the satellites to a major extent in the near future.

For more information: Compact Video, Satellite Services, **757;** McMartin, SMR-1 modulator, **758;** SDR-1 demodulator, **759.**

Transmitter quality is up

The Harris and Continental 50 kWs and the RCA all-solid-state 5 kW AM transmitters of improved audio quality were on the floor, the Harris MW-50B as an introduction.

Another new 50 kW model, the McMartin BA-50K, strongly continued

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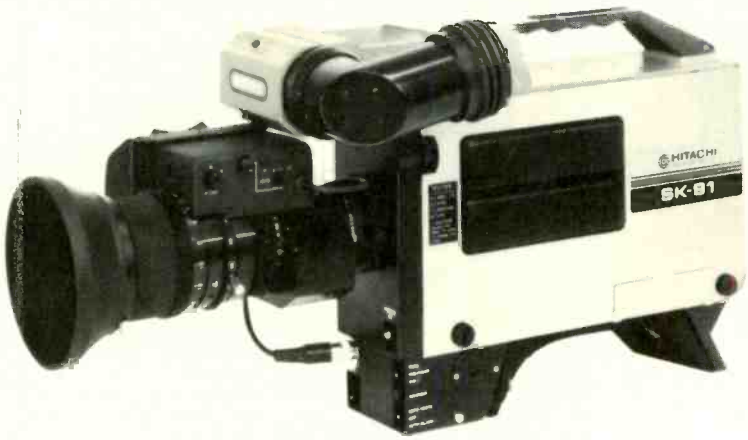

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NAB SHOW IN PRINT

the welcome high-quality trend of the three mentioned. The BA-50K uses extremely high RF efficiency to get good audio performance in a high-level plate-modulated design. Frequency response, control of distortion, and square wave response show the advance to new AM performance criteria.

Singer Broadcast Products of Cherry Hill, N.J., came to the show as the new owner of both the CCA and the Sintronic transmitter lines. A spokesperson for Singer told *BM/E* that all current models in both lines would be continued, and full service maintained for all transmitters of the two brands now in use. However, over some reasonable period there will be a consolidation and updating of models, with Singer to manufacture and market a unified line.

Continental, in addition to the 50 kW 317C-2, had on hand representative models from the Collins line, acquired by Continental late last year. Included in the list are the Collins AM units and the FM transmitters from 1.25 to 50 kW; all are now being made by Continental. Also in full production is the FM exciter formerly made by Collins, now designated Type 510R-1.

Broadcast Electronics, continuing to add FM transmitting units to its line, showed a new stereo generator, Model FS-10, with high-level characteristics. It has a digital modulator and pilot generator for high stability, given as ±1 Hz, 0 to 50 degrees, for the pilot. Total harmonic distortion is rated 0.05 percent or less, intermodulation distortion 0.05 percent or less, transient intermodulation distortion 0.1 percent.

McMartin's new BA-50K, 50-kW AM transmitter was in full operation on high platform, with the 50 kW of RF power going into dummy load

The unit has selectable preemphasis at 0, 25, 50, and 75 μs and dynamic separation 45 dB or better.

Broadcast Electronics also showed the FX-30 synthesized FM exciter which has similar top-of-the-art characteristics including harmonic distortion of a composite signal at 0.08 percent. The company also brought a new transmitter, a 1.5 kW FM model using the firm's exciter and stereo generator.

Magnavox, with exemplary fortitude, had a complete display of its AM stereo system, with a mini-transmitter set up for a live demonstration in feeding several types of experimental receivers.

For more information: Harris MW-50B, **760;** McMartin BA-50K, **761;** Broadcast Electronics FS-10, **762;** FM transmitter, **763.**

Upgrade the STL, too

Radio broadcasters today look carefully at the STL for its effect on audio quality. Micro Control Associates of Cleburne, Tex., showed a new FM STL system with an interesting new design aimed at lower distortion. The STL receiver at the transmitter site, Model ULX-2001, does not demodulate the signal, but heterodynes it first down to the 10.7 MHz IF frequency to supply adjacent channel rejection, then up to the carrier frequency. The STL receiver, in other words, also functions as the FM exciter.

All the conversions are crystal-controlled, locked to a single oscillator frequency. Micro Control says that this system avoids the degradations in the demodulation/remodulation of the usual STL-transmitter linkage. Micro Control's specifications for the system make this claim persuasive: audio is within 0.4 dB, 30-55 kHz; harmonic distortion 0.4 percent or less; intermodulation distortion 0.25 percent or less; S/N 65 dB or better. These figures are based on the use of the Micro Control PTS-10C STL transmitter with the system. The system was type-approved by the FCC just prior to NAB.

For more information: Micro Control Associates STL, **769.**

Remote control for radio

For years remote control systems for radio have been gaining in resourcefulness, in the number of things they will do, and in the number of channels, transmitters, and parameters they will keep track of and control. The makers of remote control systems did not let us down at NAB '81.

Time and Frequency Technology, for example, brought its Series 7900 system with completely revamped software for greatly expanded capabilities. It includes microprocessor action at both the remote and the control sites. The system will handle up to 96 channels each of telemetry, status report, and control, *per site,* and up to 63 remote sites. It has four levels of alarm limit. The software will hold computation programs to determine derived values, such as direct power, indirect power, and efficiency. These and other computations can be done at the remote unit. The communication is based on a fast 1200 BPS time-division multiplex. Remote interrogation over telephone lines with operation at 300 baud can be added, with CRT readout of up to 80 result channels. The system can also take information from site security sensors.

TFT points out that the system is very well suited to control of remote satellite earth terminals. This function is sure to spread through radio broadcasting over the next few years. The refinement of the leading remote control systems has given the industry the power to handle easily the remote satellite earth station.

Moseley Associates, another of our main bulwarks in remote control technology, brought a new, highly refined system, the MRC-2. This building-block system is capable of handling up to 99 remote sites with 16 each of command, telemetry, and status lines at each site. It is expandable with optional blocks to 225 of each line.

A third high-performance system that was new at the show came from Delta Electronics — Model RCS-1V, which is expandable up to 48 channels of raise/lower control, 48 of alarm, and comparable coverage for status and telemetry. The system is very easily modified to become an ATS. It is programmed by the station's engineer for the monitoring format and automatically presents the results on the CRT readout. Out-of-tolerance readings can trigger an alarm, and also appear on the readout in a reverse video flag. Optional additions to the system are a remote modulation display, autologging, and a telephone access system.

Introduced in early form at the 1080 NAB and now in production, the Marti RMC-15 remote control system was demonstrated at the '81 show. Another high performance system, it has a standard 15 channels, expandable to 30 channels, of digital command and telemetry, using internal FSK modems. Each channel supplies one data readout and two commands. Linkage can be by telco line or radio.

A company new in remote control is Comark, known for TV transmitters at earlier shows. Comark brought its new Model CI-5080 remote control system. It is expandable to 256 channels. Microprocessors at both the studio and the remote units give flexibility to operation, with software changeable to meet

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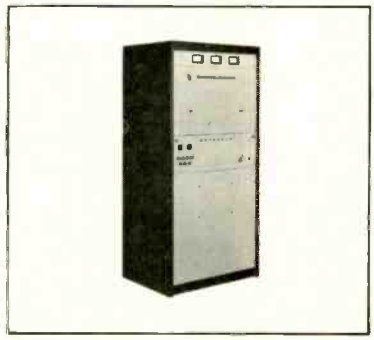

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For more information: TFT Series 7900, **764;** Moseley MRC-2, **765;** Delta RCS-IV, **766;** Marti RMC-15, **767;** Comark CI-5080, **768.**

A pride of towers

Antenna tower builders and suppliers have been appearing at NAB in larger numbers every year; 1981 brought a stronger contingent than ever. Towers are reaching higher, mostly for television, and a high-velocity trend is the adding of satellite antennas to tower lines.

Allied Tower was one of those moving higher with its towers, above the earlier limit of around 850 feet. The company specialized for years in microwave towers for oil company communications. At the show Allied made a strong pitch for TV business by offering to put up towers 1200-1500 feet and above. An Allied spokesperson said that the last few years have seen the broadcasting share of the company's business increase to about half the total.

Athans Communications, relatively new in broadcast towers of all heights, said it was planning to move into satellite dishes in the near future. The company's business has concentrated heavily on towers for cable television.

Fort Worth Tower, as noted in the May issue, has a strong position in satellite dishes but is also continuing to build operations in radio and TV towers, especially for cable TV. LeBlanc and Royle, new at NAB in 1980, had its line of AM, FM, and TV towers with the addition of a turnkey satellite dish service. Magnum is another old-line tower builder now expanding its TV business, but with cable towers still a large part of business.

Stainless, Inc. described some new very tall designs, including three at 2000 feet and one at 1800 feet.

For more information: Allied Tower, **772;** Athans satellite dishes, **773;**Le Blanc and Royle satellite dish service, **774;**Stainless tall towers, **775.**

Antennas and transmission lines

Antennas and antenna expertise were evident in many exhibits, but relatively few new items were shown. A new CP antenna for UHF serivce, channels 14-70, was shown by RCA. This low-

wind load CP pylon is a direct replacement for many horizontally polarized UHF pylons. RCA's exhibit included five other CP antennas for VHF service.

Harris displayed both VHF and UHF antennas, both horizontal and CP types. The Bogner exhibit described that company's slot array for UHF, calling it the best-selling UHF type in 1980.

Another broad line of CP FM antennas came from Shively Labs. Tennaplex Systems Ltd., North American distributors of Kathrein FM and TV antenna systems, showed photographs of some of the most eye-appealing antenna installations in the world.

One of the most intriguing antenna displays was that of AEG-Telefunken, in the Bayly exhibit. There, in model form, was a turntable-mounted wideband folded dipole curtain antenna designed for HF transmitters. The antenna system, about 73 meters across and 79 meters high, rotates to provide coverage for any part of the globe.

One new product in the transmission line category was Cablewave System's Wellflex elliptical waveguide for the 17.7-20.3 GHz band. According to the company, it is stronger than coaxial waveguides and comes in longer continuous sections. The best rigid coax line in the industry was claimed by SWR, Inc. Thermo-probes located within SWR's watchband connectors improve heat transfer.

For more information: RCA CP antenna, **770;** Cablewave Wellflex elliptical waveguide, **771.**

Lightning: the guard must be up

It is a constant threat, and systems for protection against lightning are a constant for broadcasters. Lightning Elimination Associates has been marketing for more than 10 years its dissipation array system, which the maker says will prevent lightning from occuring in a protected area by "leaking" off the potential between cloud and earth.

At the show LEA introduced several more conventional protective devices to add to the line. A surge eliminator for coaxial and open-wire transmission lines goes into series with the line to control voltage surges. Intrinsically Safe Transient Eliminators go between hazardous area equipment and control room equipment to prevent damage to control room equipment. A guy charge dissipation choke goes into antenna guy wires to leak off static charges, while presenting very high impedance to operational frequencies.

For more information: Lightning Elimination Associates surge eliminator, **776;** transient eliminator, **777;** guy charge dissipation choke, **778.**

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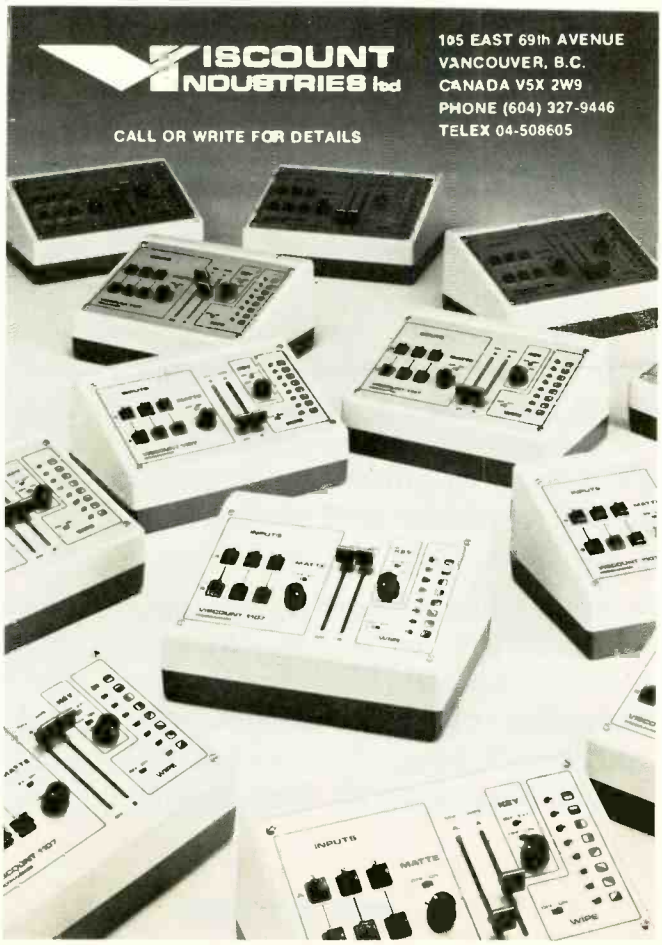

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INTERPRETING THE FCC RULES & REGULATIONS

New Sponsorship ID Rules For Noncommercial Stations

By Frederick W. Ford and Lee G. Lovett; Lovett Ford and Hennessey, P.C., Washington, D.C.

IN THE WAKE of the Reagan Administration's proposed budget cuts in funding for public broadcasting activities, the Federal Communications Commission has loosened rules for fund raising and identification for corporate donors by non-commercial licensees. Among other developments, the FCC's April decision will permit non-commercial TV broadcasters to use corporate logos and similar identification for companies which help provide funding for particular programs.

The Commission said that it had amended the rules for public broadcasters to match them more closely to the underlying purpose and appropriate limits of non-commercial broadcasting. The rule changes also give public broadcasters greater discretion, and, therefore, greater responsibility, in the areas of programming and fund raising.

Four-year proceeding

The April decision is the second Conmission *Report* on the matter since the Commission issued its *Notice of Inquiry* in 1977.[1] The *First Report and Notice of Proposed Rule Making*[2] issued in 1978 proposed a series of rules which would have placed strict limits on some types of fund raising activities. The proposed rules had been drafted in light of comments and responses to 22 different questions in the *Notice of Inquiry*.

The 1978 *First Report* sought to ban the promotion of products or consumer services. For example, announcements stating the origination location by non-commercial broadcasters of events broadcast by a non-commercial licensee from theaters, auditoriums, arenas, or nightclubs, where tickets were required or food or drinks were sold, were permissible. However, urging listeners to attend any program origination point requiring an entry fee was impermissible.

The Commission also proposed extensive rules governing the use of auctions as a fund raising activity. In recent years, auctions and telethons have proven to be favorite fund raising tools for non-commercial broadcasters.

In 1978, the Commission proposed rule changes which it thought would strike a reasonable balance betwen financial needs of non-commercial stations and their obligations to provide an essentially non-commercial broadcast service. In the intervening years of this proceeding, however, the Commission found that the record did not support many of the specific rules that it had proposed to strike that balance. The result was the April decision.

April decision: promos out; logos in

The new basic rule governing fund raising activities by non-commercial educational radio and television stations prohibits the broadcast of program matter by those stations for which the licensee, its principals or employers receive any consideration, *with the exception of acknowledgement of contributions*. The principal changes involve the manner in which contributions can be acknowledged. The result envisioned by the Commission is that broadcasters would not be influenced by financial incentives (as are commercial broadcasters) but would have greater freedom to program in the public interest.

For non-commercial television broadcasters, the principal feature of the revision in rules involves the approval of the use of corporate logos. Although Commission rules still prohibit the *promotion of products*, as opposed to *identification of corporate benefactors*, the Commission eliminated the "name only" restriction on acknowledgements. It determined that the use of (1) corporate logos, (2) the location of the sponsor, and even (3) the identification of product lines did not conflict with the non-commercial nature of the educational broadcasting services. Along with the increased licensee discretion in these matters, however, come increased responsibilities

[1] *Notice of Inquiry, in the Matter of Commission Policy Concerning the Non-Commercial Nature of Educational Broadcast Stations*. Docket No. 21136. 42 FR 15927. FCC 77-162 (1977)
[2] 60 FCC 2d 200. 43 RR 2d 731 (1978).

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FCC Rules and Regulations

on the part of the licensee to make sure that the non-commercial radio and television services do not become little more than a variation of commercial AM, FM, and TV stations.

The Commission expects licensees to utilize the greater latitude and flexibility to develop new policies for acknowledgement of corporate benefactors. These new policies, which remain consistent with the non-commercial status of the licensee, could stimulate new and broader sources of financial support for programs and general station operation. This has become a matter of increasing concern to public broadcasters since the announcement of President Reagan's proposed budget cuts, which included substantial reductions in funds available for non-commercial broadcasting.

Part of broadcast deregulation

A unanimous Commission considered this decision to be another in the line of deregulation decisions made in recent years. Commissioner Washburn noted that although this decision only addressed fund raising rules, "nevertheless, the simplifications and clarifications to those rules signal a new era for public broadcasting stations, their audiences and their underwriters."

The FCC decided against placing limits on fund raising activities because excessive time devoted to fund raising would likely prove counterproductive in terms of declining audiences. In other words, the Commission determined that "market" forces, in this case referring to audience share rather than station profits, should be the determining factor in Commission regulation. Although the Commission decided not to place any time limits on fund raising activities, it determined that fund raising which disrupts normal programming and goes beyond an "announcement" must be for station purposes only. This would seem to clear the way for further telethon and auction activities.

The Commission also decided to permit non-commercial broadcast licensees to engage in the remote broadcasting of events such as sports contests, as long as licensees, their principals and employees do not receive any consideration for the promotion of the broadcast. It is difficult to anticipate how this proposal could affect anything other than amateur sports, since most professional sports and major intercollegiate athletic events are covered by lucrative advertising and affiliation contracts.

Conclusion

The full text of this decision was not yet available at press time. Consequently, we still do not know the effective date of this Commission action. The Commission's determination to deregulate the non-commercial services along with commercial ones is quite clear. However, non-commercial broadcasters should be aware of the fine lines drawn by the Commission because of the particular statutory charges for the non-commercial broadcast services. This action provides greater flexibility for broadcasters buy relies on their good faith efforts to prevent abuses and maintain the essential character of the non-commercial broadcast services. Non-commercial broadcasters should consult with their communications counsel as to the best way of proceeding with new identification rules for corporate backers. **BM/E**

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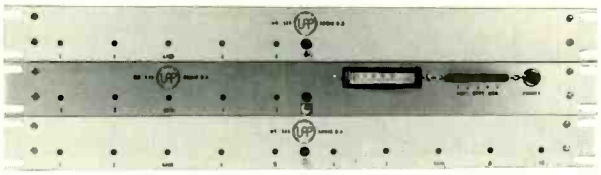

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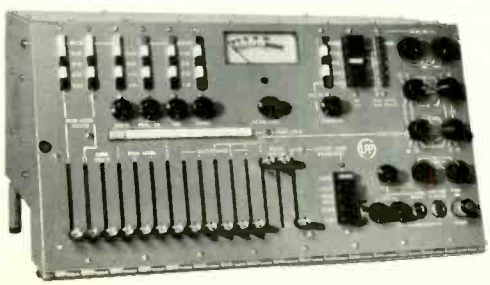

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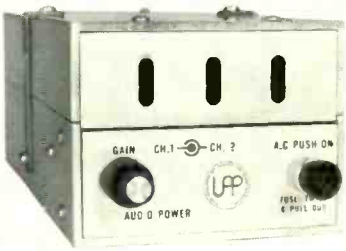

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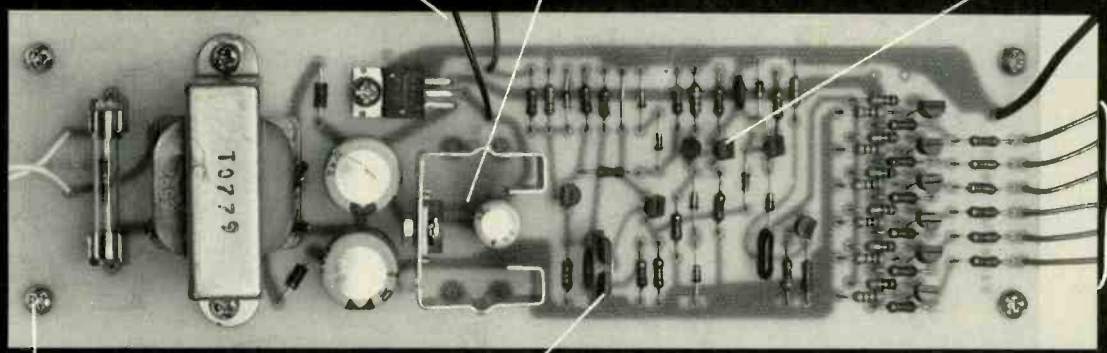

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WINNERS

GREAT IDEA CONTEST

THE VOTES ARE IN — and it's time once again for *BM/E* to congratulate a new set of Great Idea Contest winners. Three top winners in the 1980 contest, overwhelmingly selected by our readers, will each receive Texas Instruments programmable calculators (to use, we hope, in working out more Great Ideas!). They are: Gaetan Boivan, technical director at CKRS-TV in Jonquiere, Quebec, for his "Scanning TV Monitor" (Entry 16, July 1980); Lee Barrette, chief engineer at KOJM-AM, Havre, Mont., for his "Universal Line Amplifier" (Entry 4, February, 1980); and Bruce Mattson, chief engineer at WGPR-FM, Detroit, Mich., for his "Recorder Telephone Interface" (Entry 26, November, 1980).

Our congratulations also to the runners-up, who will receive engineering slide rule calculators:

Category 1, Audio: Ken Anderson, formerly CE at KARR/KOPR, Great Falls, Mont., for his "Auto Phone Feeder for Program Audio" (Entry 12, May, 1980).

Category 2, RF: D.M. Haworth, engineer at KHAS-TV, Hastings, Nebr., for his "Transmitter Ring Repair" (Entry 19, August, 1980).

Category 3, Control: N. Kevin Burris, news engineer at WBRZ-TV, Baton Rouge, La., for his "VTR Status-Start Indicator" (Entry 17, August, 1980); Ken Garber, AV/TV technician at St. Clair College TV Facilities, Windsor, Ont., for his "Disable Edit Suite Remote Position" (Entry 5, February, 1980); and Steve Ellis, director of engineering at WGIL-AM, Galesburg, Ill., for his "Two-Station EBS Test with One Encoder" (Entry 24, November, 1980). There were no runners-up in Category 4 (Video).

Once again, *BM/E* congratulates all the winners. If you have an idea that's made your life at the station easier, why not share it with your colleagues? *BM/E* is always on the lookout for Great Idea Contest entries. Send us your ideas — just read the rules and fill in the entry blank, reprinted here. Who knows — maybe *your* idea could be a winner! **BM/E**

Editor's Note: Before attempting to implement any Great Idea involving the modification of equipment, station personnel should check with the equipment manufacturer to insure that no violation of warranty will occur.

If the Great Idea involves any technical standards governed by the FCC, stations should make sure that the idea will in no way cause a violation of FCC rules.

Rules for BM/E's 1981 Great Idea Contest

Mail to:
Editors, BM/E
295 Madison Avenue
New York, New York 10017

1981 Entry Form

Name _____ **Title** _____
Station Call Letters _____ **City** _____
State _____ **Zip** _____
Telephone No. _____
Licensee _____
Class of Station at which idea is used (check one)
TV _____ **FM** _____ **AM** _____
Category: Audio ____ **RF** ____ **Video** ____ **Control** ____

Objective or Problem: *(In few words; use separate sheet for details)*

Solution: *(Use separate sheet—500 words max)*

I assert that, to the best of my knowledge, the idea submitted is original with this station; and I hereby give BM/E permission to publish the material.
Signed _____ *Date* _____

1. Eligibility: All station personnel are eligible. Consultants to the industry may enter if the entry indicates the specific station or stations using the idea or concept. Manufacturers of equipment or their representatives are not eligible.

2. How to Enter: Use the Official Entry Form on this page or simply send *BM/E* a description of your work. State the objective or problem and your solution. Include diagrams, drawings, or glossy photos, as appropriate. Artwork must be legible but need not be directly reproducible and not exceeding three in number. Camera reproducible material is preferred. Length can vary, but should not exceed 500 words. *BM/E* reserves the right to edit material. Entry should include: Name, title, station affiliation, and the class of station—TV, FM, AM. Indicate if idea is completely original with you.

3. Material Accepted for Publication: *BM/E* editors will make all decisions regarding acceptability for publication. If duplicative or similar ideas are received, *BM/E* editors will judge which entry or entries to accept. A $10 honorarium will be paid for each item published.

4. Voting: Every reader of *BM/E* is entitled to rank the ideas published. This can be done on the Reader Service Card in the magazine or by letters or cards sent to the *BM/E* office. To vote, readers should select the three ideas they like best and rank them 1, 2, or 3.

5. Winners: Top rated entries in the year-long tally will become winners in each of the three major categories (AM, FM, TV). Final winners will be picked in February, 1982, and announced in the March, 1982, issue of *BM/E*.

6. Prizes and Awards: Three top prizes will be awarded; a programmable electronic calculator will be awarded for the highest rated entry in the respective categories of AM, FM, and TV. Ten engineering slide rule calculators will be awarded as secondary prizes for the highest rated entries in the following additional categories (top three winners are not eligible for these prizes): audio (three prizes, one each in the AM, FM and TV categories); RF (three prizes, one each in the categories of AM, FM, TV); Control (three prizes, one each in the AM, FM and TV categories); Video (one prize in TV).

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