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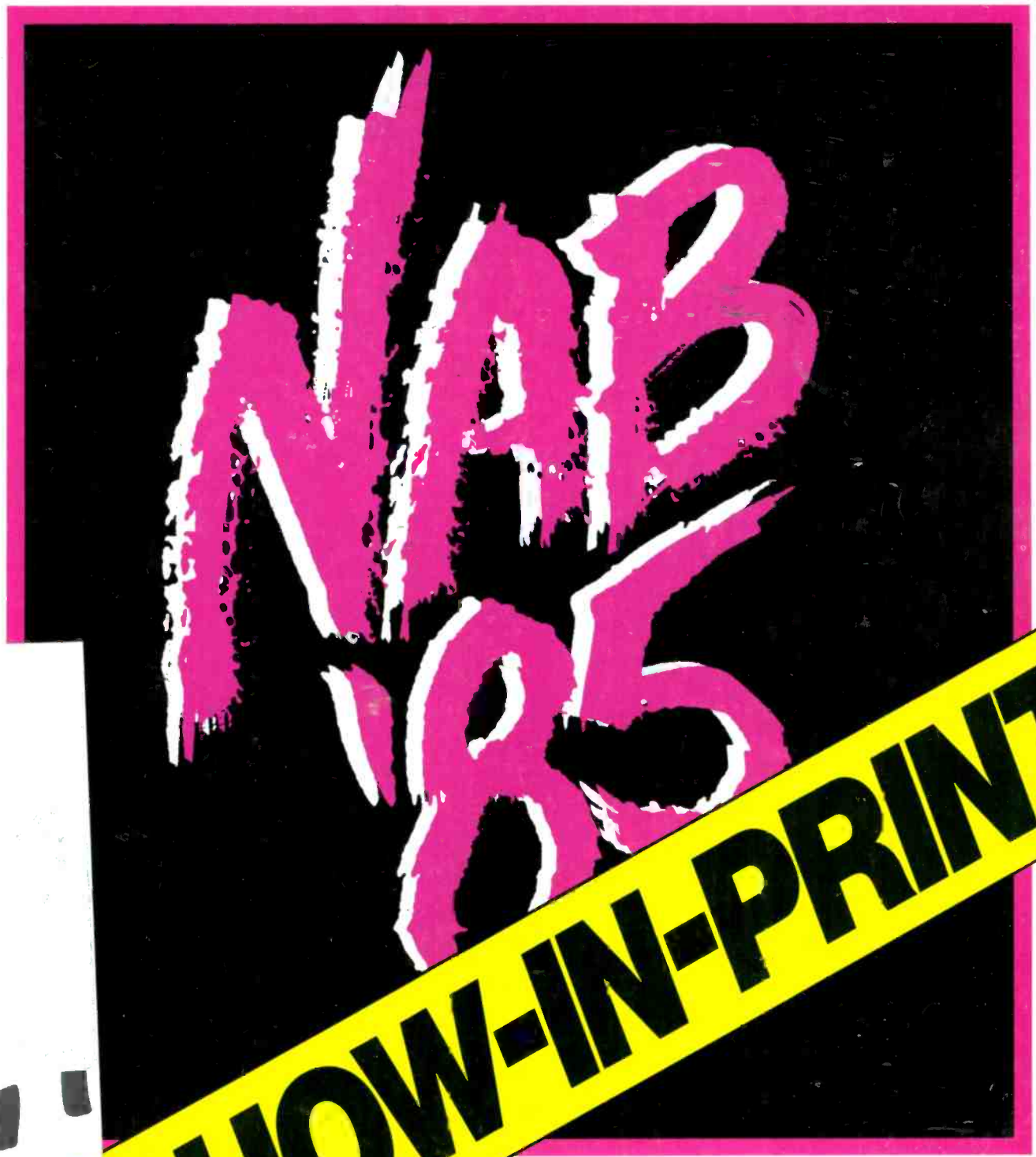
BROADCAST MANAGEMENT/ENGINEERING



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PM5565 Waveform Monitor

Enjoy the luxury of examining one line and one field at a time. On top of this, there's a convenient front probe input so you can use the monitor as a troubleshooting oscilloscope.

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Take it on a quick trip through your studio or control room and adjust all monitors to the same color temperature in a matter of minutes.

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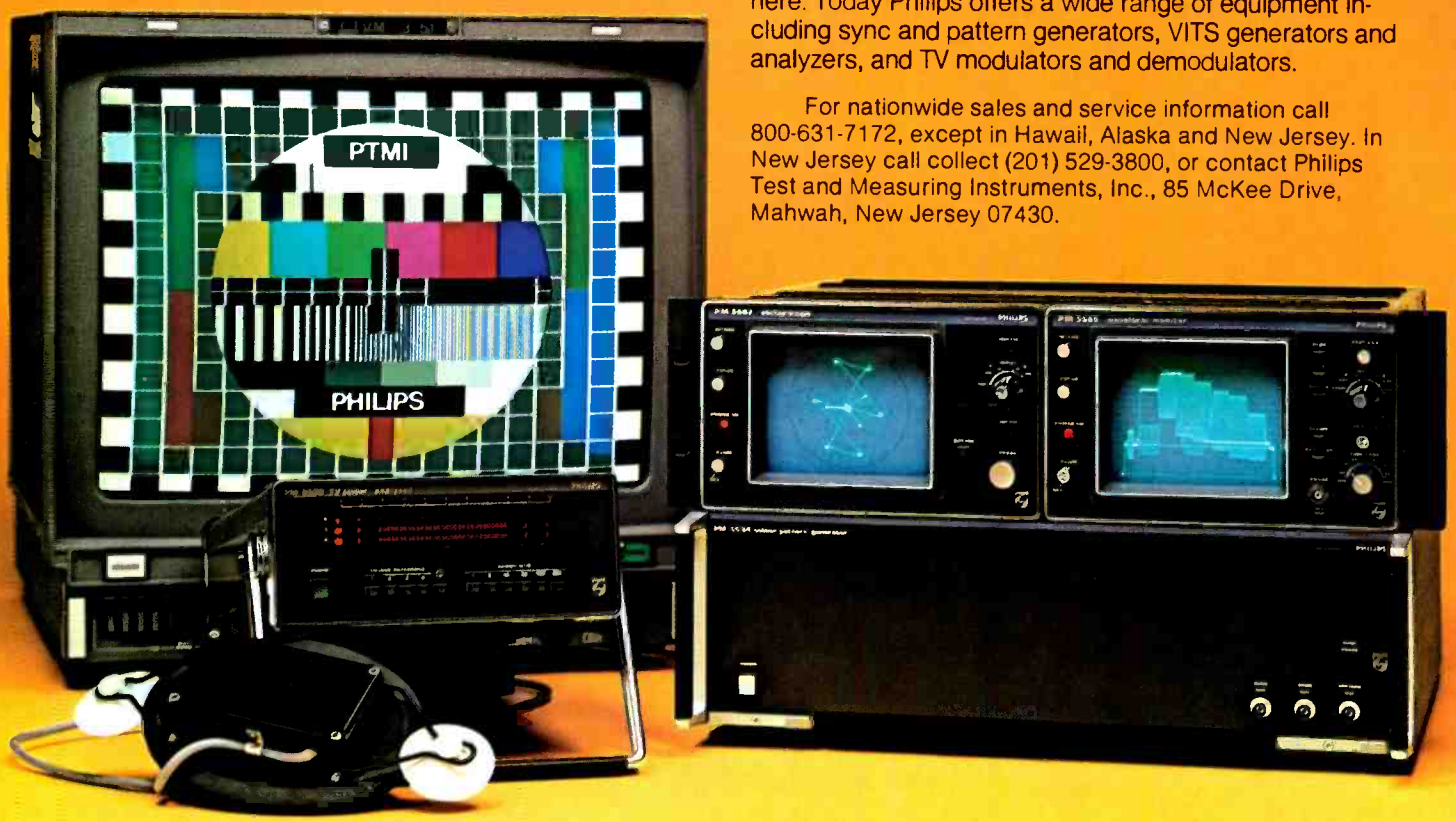
Of course our TV test equipment line doesn't end here. Today Philips offers a wide range of equipment including sync and pattern generators, VITS generators and analyzers, and TV modulators and demodulators.

For nationwide sales and service information call 800-631-7172, except in Hawaii, Alaska and New Jersey. In New Jersey call collect (201) 529-3800, or contact Philips Test and Measuring Instruments, Inc., 85 McKee Drive, Mahwah, New Jersey 07430.



Philips, of course.

PHILIPS Test & Measuring Instruments

PHILIPS

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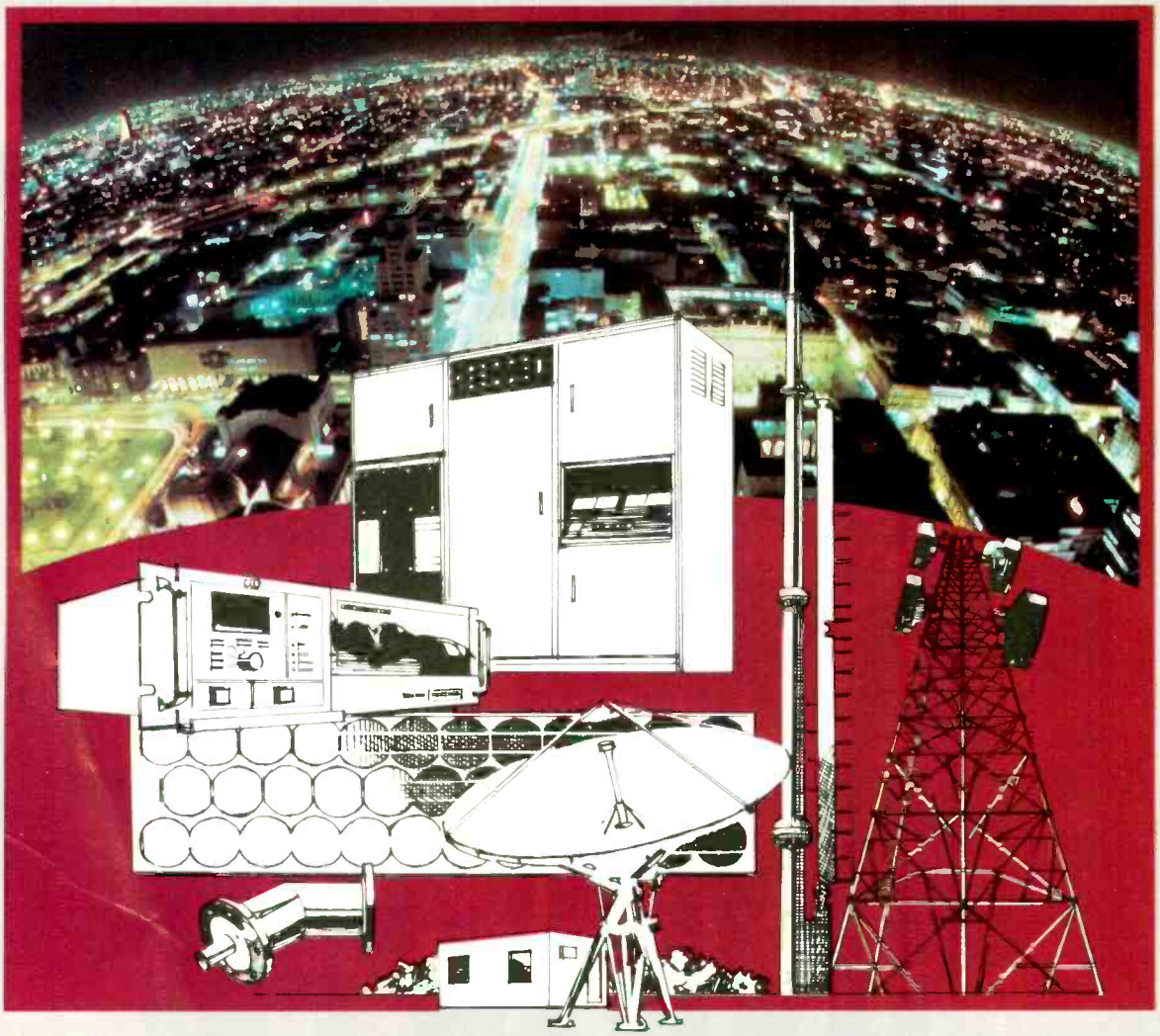
There's a New Acrodyne



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WHILE EVERYONE ELSE HAS BEEN PROMOTING A FORMAT, SONY HAS BEEN PERFECTING A SYSTEM.

Over the last three years, Sony's rivals in the combination camera/recorder arena have spent considerable time inventing wonderful things to say about their new formats. But apparently, they've overlooked inventing many wonderful new products to go along with these formats.

Sony has taken a different course.

In 1982, Sony introduced Betacam™ and the BVW-10 playback unit. An evolutionary system that didn't force stations to abandon their existing ¾″ and 1″ equipment.

Then, in 1983, Sony expanded the system with the three-tube Betacam, the BVW-40 edit/recorder, and the world's first battery-operated ½″ field playback unit.

And this year at NAB, Sony announced a major breakthrough in cart machine technology with Betacart.™ A system

that demonstrated the Betacam format's strength beyond the newsroom, beyond the studio, and beyond field production.

At the same time, Sony also unveiled the world's lightest camera/recorder, the BVW-2 Newsmaker.™ And a prototype coder/decoder system that will make it possible for Betacam to be transmitted by microwave.

Each of these products is the result of Sony's dedication to the needs of the ENG and EFP industry. Work which has earned the Betacam format widespread acceptance by television stations and production companies around the world.

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ABP BPA

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Customer Orientation

No. 2 in a Series
Subject: The Convergence Principle

204

Editors experienced with sophisticated computerized editing systems know that behind the pictures are numbers — time code numbers, edit numbers, reel numbers.

The Convergence Principle is to keep the numbers in the background and the action up front.

Consider JoyScrol in the 204. Just as the Convergence Joystick gives you control of tape shuttling, backwards and forwards, JoyScrol gives you a uniquely simple way to keep track of where you are in an edit list.

As you review your cut visually, JoyScrol causes the edit list to scroll along in tandem. When you stop at a shot, the edit containing that material is automatically highlighted on the display screen. To call up the edit and change it you need never know a number.

So if you are the kind of Editor who still thinks of the beginning of Act Two as "MED. SHOT - ELIZABETH" and not as "016 01 VI 00:23:08:03 00:23:09:05 1:10:30:00 1:10:31:02", see the Convergence 204.

204 may be the only number you need to know.

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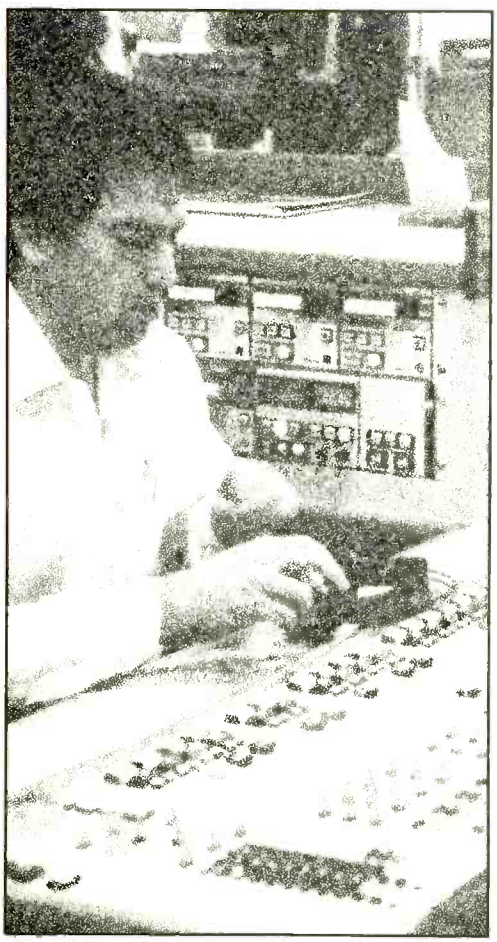
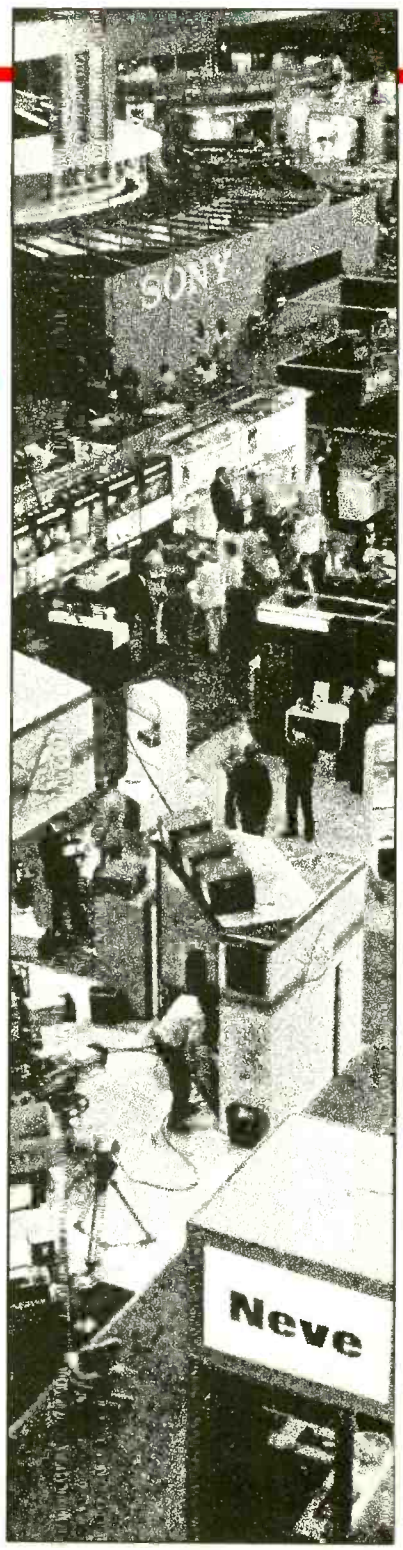
BM/E
BROADCAST MANAGEMENT/ENGINEERING
JUNE 1985 VOLUME 21/NUMBER 6

FEATURES

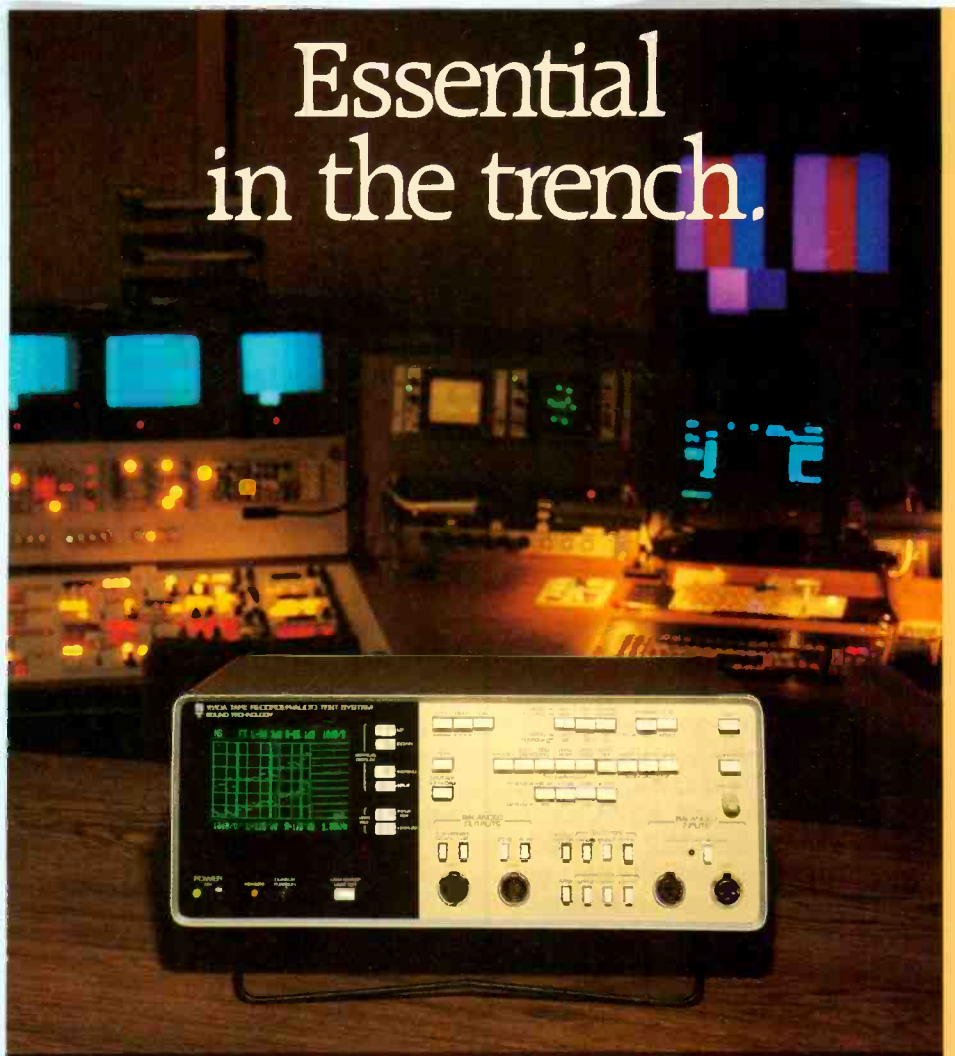
NEXT MONTH

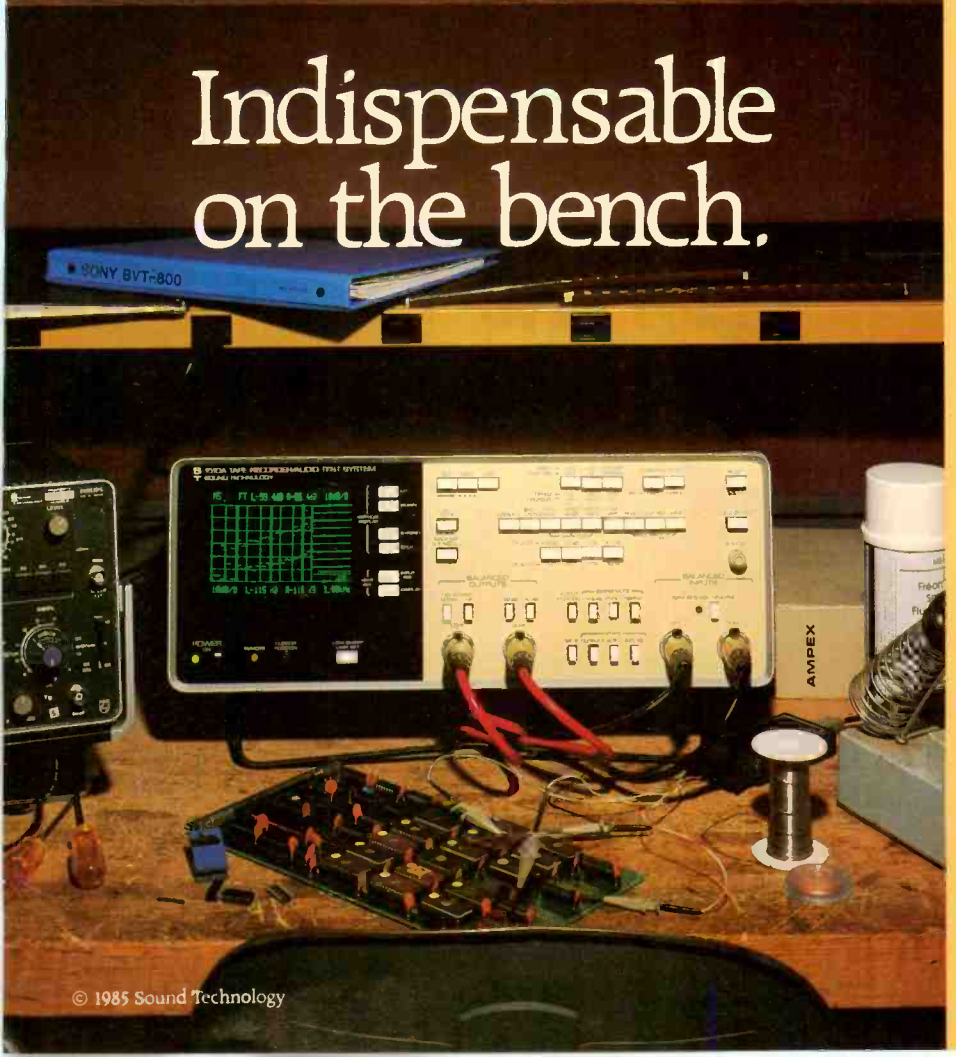
- **THE TECHNOLOGY OF TAPE**
- **PROCESSING FOR TV STEREO**





DEPARTMENTS





THE SOUND TECH 1500 SERIES TEST SYSTEM

With a microprocessor-controlled Sound Tech 1500 Series test set, you can sort out the fiction from the facts—quickly and easily. Audio manufacturers the world over have come to rely on the 1500 Series. As high-tech goes higher and time seems to get shorter, the benefits of having immediate, precise and critical test data gets even greater. And that's where a Sound Tech 1510A comes in—on your bench, or in the trench.

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When a pro needs to know the truth, he can select from over fourteen different test programs that are stored in the 1510A. Because the instrument is modular, you can easily add options like a one-third octave spectral analysis card for noise & flutter measurements, a GPIB IEEE-488 computer communications interface, an MOL level test, and more. Much more.

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Midwest puts on a great show because it uses the best components

One of the reasons that the Midwest M-40 Series is the most advanced class of large mobile teleproduction units available today is our policy of only using the finest components. This "no compromise" design philosophy ensures a system of superior quality and reliability. Our M-40 units give you up to 47 feet of unparalleled technical and creative capacity. Because we only use the best components . . . from companies like Ikegami.

Ikegami HK-322 automatic color cameras make Midwest picture perfect

In the M-40, we wanted the ability to produce the best possible pictures. So we selected the HK-322 as a basic building block of the system. When the position as the world's most popular field camera passes from the Ikegami HK-357A, it will be to the HK-322. This fully automatic color camera sets the new standard for picture resolution, signal-to-noise ratio and registration accuracy. Standard computer set-up takes much of the hassle out of preparing for remote telecasts. With the Ikegami HK-322, the Midwest M-40 delivers perfect pictures everytime.

Ikegami HL-79E Series plays dual role for Midwest units

The Ikegami HL-79E Series camera was selected for use aboard the Midwest M-40 because it can handle two separate functions with superlative results. Although it's renowned as the perfect hand-held camera, the HL-79E Series can easily be converted into a field camera that produces higher quality images than many other manufacturers' top-of-the-line studio models.

This exceptionally fine performance is due to Ikegami's painstaking attention to detail. Designed to meet the most rigorous performance standards, the HL-79E Series also offers optional automatic set-up, either via its own set-up computer or by interface into the HK-322 set-up computer for total system integration. With the HL-79E Series, Midwest's M-40 offers you the versatility required to produce network quality productions in any circumstances.

Ikegami 9-Series color monitors give Midwest "true to life" pictures

Ikegami 9-Series Color Monitors are standard in the Midwest M-40 mobile unit because of their superb resolution and ability to reproduce colors that are amazingly life-like. This performance is unmatched by any other monitor in the world. Since the 9-Series monitors use In-Line Gun CRTs, they provide more than excellent colorimetry and

fantastic resolution. They also offer high stability, unit interchangeability, low power consumption, and convenient pull-out circuit panels. By using the Ikegami 9-Series, the Midwest M-40 can reproduce colors that are true to life.

Midwest road shows

For more information on how Midwest and Ikegami can deliver world class performance for your company, contact any Midwest office in the U.S. or call toll free (800) 543-1584.

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Radio to Ask Court for ASCAP Reduction

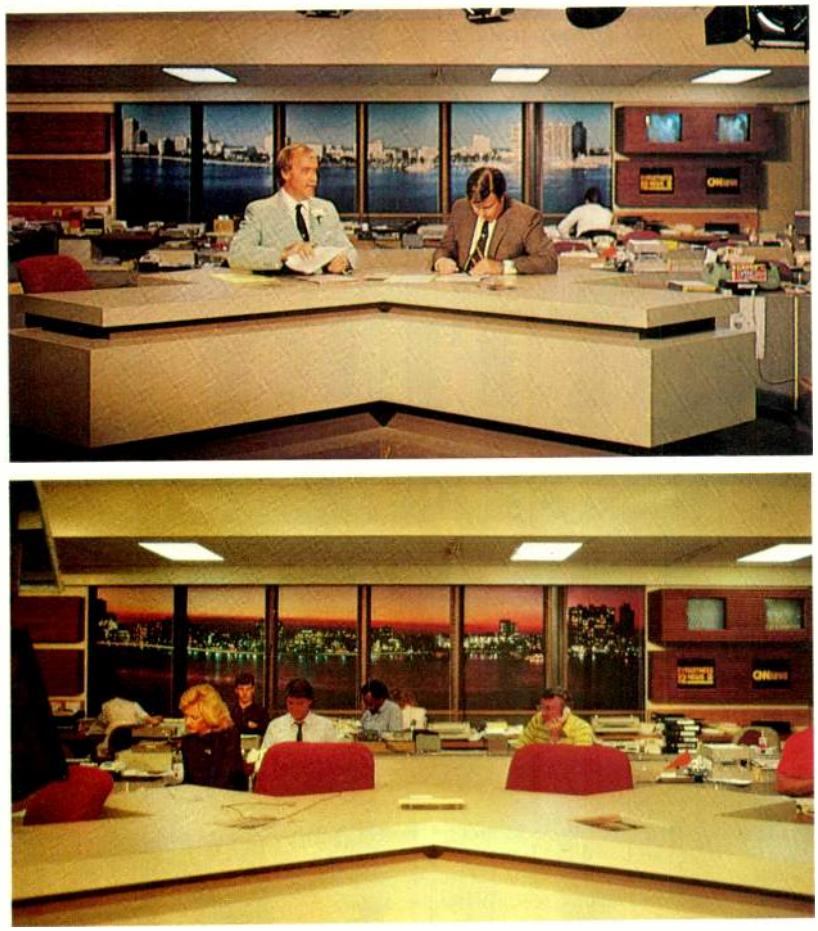
In the ongoing battle over ASCAP's radio license fees and its demand for a sharp rate increase, the All-Industry Radio Music License Committee has decided to take the offensive. It will ask in court that the fees be reduced to equal BMI's since ASCAP cannot prove, the committee says, that its tunes are aired more than BMI's.

In detailing this new strategy, Bob Henley, the chairman of the committee and president of WGNR/WCTC in Sacramento, CA, told *BM/E* he is "extremely hopeful" that the court will actually reduce ASCAP's rate. Henley said ASCAP is justifying its fee hike with the argument that since it has had more songs on the hit lists put out by *Billboard* and others, it is entitled to a higher rate, but the committee is pointing out that most radio stations do not play just hits. Since no proof exists that radio stations play more of either organization's songs, he continued, the rates should be equal, but BMI's license fee is lower than ASCAP's, despite the 8.8 percent increase BMI won last year from radio broadcasters.

Both copyright institutions base their rates for most radio stations on the stations' income, and so receive more revenue automatically when radio profits go up. The increase ASCAP has asked for would amount to an 18 percent rise in license fees, the committee calculates, or about $60 million over five years. The new rate would be retroactive to 1983, when the last contract ended.

ASCAP, however, came under federal court supervision in 1950 when it was ruled to be a monopoly, and one of the terms of the consent decree under which the fee collector operates is that it is responsible to prove the burden of rate hikes.

An attorney for the All-Industry Committee expects that the case may last a year or longer if an outside settlement is not reached, but time is working in the radio group's favor. When end of 1982, an interim arrangement was set up based on the old rate, with no time limit.



Where West Palm Beach Gets Its Views

Johnny Carson, eat your heart out. WPEC-TV in West Palm Beach is highlighting its morning and evening news shows with two specially enlarged backdrops displaying the local skyline. The panels also help decorate the station's lobby since those not in use face out, and the areas share a common wall.

Each 12-foot-wide scene was created from two slides and is composed of six panels measuring 72 inches by 108 inches. To get high quality enlargements of that size, the lab work was done by LaserColor Laboratories of West Palm Beach, which uses lasers to scan a picture and then enhances it by computer.

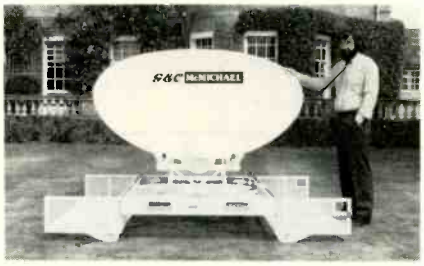
Portable Ku Uplinks

As part of the rapidly developing field of satellite newsgathering, (SNG— see following story and NAB satellite report in this issue), GEC McMichael, a British company with offices in Scottsdale, AZ, says it has signed agreements with CBS Operations and Engineering and NBC to develop and buy unspecified numbers of McMichael's Newshawk Fly-away, a portable Ku-band uplink. Separately, an agreement in principle has been reached with M/A Com MVS of Burlington, MA for distributing Newshawks to broadcasters.

CBS is said to want the portable terminals for a new program it is developing called Rapid Deployment Earth Terminal, or RADET. CBS would not describe its plans for RADET, but ac-

cording to one source the network will probably equip selected domestic news the last five-year contract expired at the bureaus, O&Os, and eventually its international bureaus with the highly portable antenna.

NBC, which has already installed a Ku system connecting its news bureaus and affiliates, is expected to provide Fly-away units for its O&Os in order to extend the range of direct satellite feeds.



CBS will reportedly use McMichael's portable Ku-band uplinks for a new Rapid Deployment Earth Terminal program.

The agreement with M/A Com MVS had not been signed at press time, but Eric Schechter, McMichael's director of operations for the U.S., said that M/A Com had agreed to sell $3 million worth of Newshawks, equivalent to about 18 units. Schechter observed that the U.S. company's microwave division is in good position to provide technical assistance and service to smaller than network-sized broadcasters.

Hubbard and RCA to Give Away Ku Dishes

In an ambitious bid to set itself up as a national news and syndicated programming distributor, United States Satellite Broadcasting, a Hubbard Broadcasting subsidiary, has leased four Ku transponders from RCA Americom and arranged for RCA to install 3.7 m TVRO antennas at minimal-to-no cost for any commercial broadcaster in the continental U.S. within the next year.

Conus Communications, in which Hubbard owns a controlling interest, will sell time on the transponders and also use them to distribute a national news service each night to its member stations and stations in other markets who will reportedly be able to buy material at the rate of about $75 for a five-minute story.

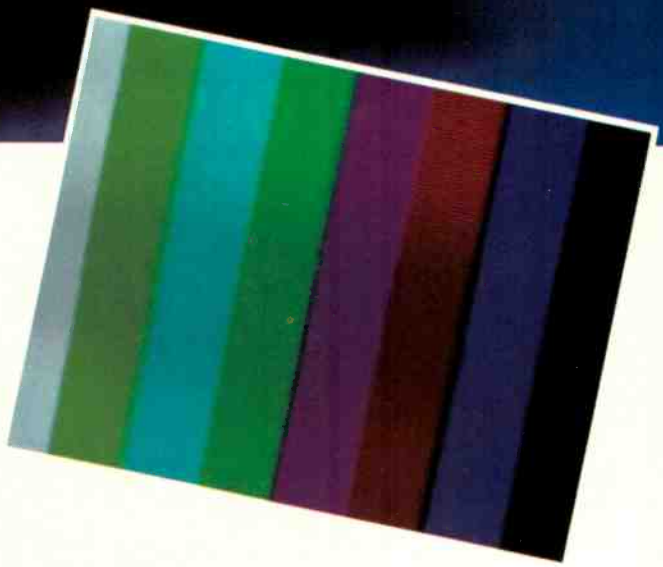
Charles H. Dutcher III, Conus VP and GM, said he expects most television stations, except those with space limitations, to be interested in obtaining the free antenna. NBC affiliates will be able to add another dish if they want, he noted, to the main and backup Ku dishes they are already using for network feeds.

RCA Americom reports that the current agreement with USSB is worth over $85 million, and that USSB holds an option for six more transponders for a total cost of over $300 million. The Satcom K-2 satellite is scheduled for launching next December.

FCC's New Fees Meet Less Resistance

The FCC's revised list of fees on its permit-granting activities, which met with widespread criticism from the broadcast industry when first introduced, is receiving a less harsh reception, especially since the annual

DPS-185



The test generator that's making waves for DVS

Digital Video Systems' DPS-185, test generator features thirty two test signals, as well as six standard sync drives plus black burst signal.

These thirty two selectable signals are available on two independent, buffered outputs. Its seven segment, digital display allows for easy recognition of the signals being generated. This rugged, compact, lightweight test generator was designed to ensure simplification of maintenance, alignment, and service procedures.

Features:

- Thirty two test signals
- Two independent outputs
- Seven auxilliary outputs
- Genlockable
- One dedicated colour black output
- RS-170A specs.

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charges on broadcast licensees have been dropped.

At the NAB, the opinion apparently is that the fees are inevitable in some form. The association had not stated its official position on the new charges as of press time, and a spokesman said that it is not raising objections to the new fee structure. The FCC's bill, which is generally seen as part of the federal government's belt tightening, was headed for the Senate floor and appeared to have a good chance of passage in Congress.

The NRBA, however, is still voicing its objection to the fees. Abe Voron, senior vice president of the radio association, described the revised version as "certainly an improvement in that the new fee schedule is an attempt to tie the fees to specific activities and costs, and the fees are modest enough not to be onerous to most broadcasters." The NRBA is opposing the charges though, since broadcasters "contribute substantially already to the treasury," and since such fees always rise.

As for the new list of fees itself, which the FCC would have a year to implement, the majority of the revenues raised from Mass Media Bureau activities would come from construction permit applications, hearings, and licenses. License renewal fees, the only vestige of the deleted annual charges, would run $30 for all stations, instead of the controversial "tax" of $9000 to $200 each year, depending on the station's class and market size.

All bureaus and services included, the FCC expects to raise $44 million in FY 1985 and $52 million the next year, equal to about half of its budget. Of these totals, 44 percent would come from the Mass Media Bureau in 1985 and 41 percent in 1986.

Besides containing the schedule of charges shown below, the FCC's bill links fee levels to the Consumer Price Index, allows late payment penalties of 25 percent, lets the Commission waive

FCC's Proposed Schedule of Charges for Broadcast Stations

Commercial TV Stations—New and Major Change CPs:	
Application fee	$2250
Minor change application fee	500
Hearing charge	6000
License fee	150
Commercial Radio Stations—New and Major Change CPs:	
Application fee, AM	2000
Application fee, FM	1800
Hearing charge	6000
License fee, AM	325
License fee, FM	100
Directional Antenna License fee	375
FM/TV Translators and LPTV Stations—New and Major Change CP:	
Application fee	375
Grant fee	75
Station Assignment and Transfer Fees:	
Application fee, (Forms 314/5)	500
Application fee, (Form 316)	70
Auxiliary Services Major Actions—Application Fee	75
Renewals—All Services	30
Cable TV Service:	
Relay service—CPs, Assignments & transfers, renewals and modifications	60
Special relief petitions filing fee	700

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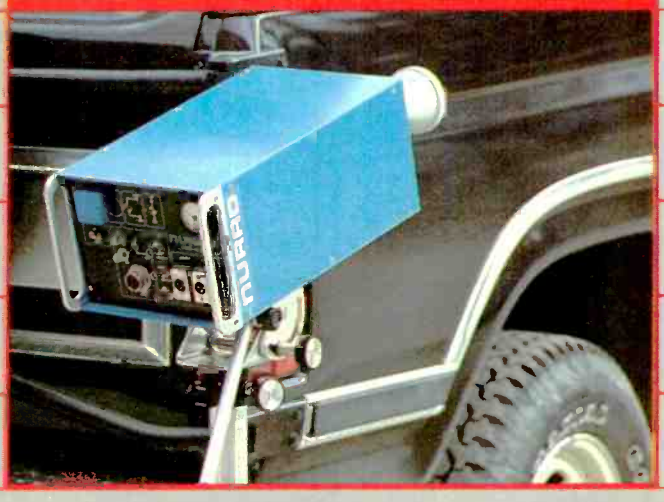

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any fee category not in the public interest, and puts the money collected into the general treasury fund. Also, the courts would be prohibited from changing the fees.

Satellite Baseball

Baseball games, once carried by phone lines to radio and TV stations, have benefitted from satellite transmission over the last few years. This season, a slightly different method of broadcasting for TV and a new sports interconnect for radio will carry the technology a little further.

A new satellite interconnect service called IDB Communications reports that it has signed up 22 of 26 major league baseball teams for its new Sports Satellite Interconnect Service for radio broadcasts of the games. IDB will send home and away games to the team's flagship stations over Westar III, Transponder 2.

The main function of the service is the "backhaul" of games that in the past have been transmitted over phone lines. Since the breakup of the Bell system, such lines have started to cost radio stations more.

The backhaul of the game is strictly play-by-play, which becomes a complete baseball game broadcast when the flagship station adds commercials, jingles and the like, and then sends the finished product "down the line" to other affiliates. With the advent of satellite transmission, "down the line" means two uplinks; one of the raw audio from the stadium to the flagship station, and a second of the completed broadcast to affiliates.

Now, at least one baseball network is trying to accomplish the entire procedure with only one uplink of its TV broadcasts, by adding the commercials and jingles right at the stadium. A spokesman from the Baseball Commissioner's office reports that the Cincinnati Reds, through station WLWT-TV, will broadcast the team's road games from a mobile truck at the stadium. In the truck will be all the equipment necessary to add commercials, supers and stats, and jingles. From the field, the games will be uplinked once to all Cincinnati Reds affiliate stations at the same time.

AWRT Honors Local, Network Productions

Sixteen local and six network radio and TV productions have been honored by the American Women in Radio and Television, for realistic and consciousness-raising portrayals of women this year.

The awards were presented at the AWRT's annual luncheon, which featured as guests TV actresses Loretta Swit and Mary Tyler Moore, along with news, network and local TV and radio members.

Non-network productions commended included news and programming TV segments from WCCO, Minneapolis; WJBK, Detroit; WCBS, New York; KOMO, Seattle; WAGA, Atlanta; and KTBC, Austin.

Local radio segments from WHA, Madison and WLAD, Danbury, were also honored.

CBS's *Sixty Minutes* and NBC's *Nightly News* also received awards, along with several popular network dramas, including *The Burning Bed* (NBC) and *The Dollmaker* (ABC).

KEY PERFORMANCE

Performance and Design simplicity enhance Command Decisions.

Horizon International introduces System Four, a computer assisted video editing system that combines creative engineering and user experience to produce a unique video editing system. System Four offers a five year warranty, is user compatible with CMX, ISC and Mach 1, has edit list for 850 events, includes a printer, and has provision for optional paper tape. It controls a combination of video and dual audio tracks from keyboard or track ball. The Horizon's System Four has bi-lingual capability in Spanish or English. This straight line approach to performance editing provides a key decision for a realistic investment.

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NEWS BRIEFS

The FCC is investigating interference between broadcasting and **VHF aeronautical services.** Existing FM stations would be grandfathered against new protection criteria, which would also require airplane receivers to be better able to reject broadcast signals, the major cause of interference.

The European Broadcasting Union has put its weight behind the 60 Hz HDTV standard recommended by SMPTE and the ATSC . . . . WTBS has started broadcasting and distributing its **cable signal in stereo** .

The FCC has extended **nighttime operations on 14 I-A frequencies** . Daytimers on 540, 690, 740, 860, 990, 1010, and 1580 kHz Canadian Clear Channels, 540, 730, 800, 900, 1050, 1220, and 1570 kHz Mexican, and 1540 kHz Bahamian will be able to operate at night with up to 500 W once they receive notificiation.

The Federal Trade Commission has denied a petition to ban **alcohol ads** on radio and television. . . . The NAB has notified Congress that it opposes mandatory warnings about Reye's Syndrome in **aspirin advertising** .

The NAB's **Radio Audience Measurement Task Force** held its first meeting and reported it can "offer some suggestions" for the radio ratings industry . . . . The RTNDA is selling a cassette on the use of **sound in radio news** . Cost is $3 to members; call (202) 737-8657. . . . **Cable penetration** has reached 44 percent of U.S. households, says Arbitron.

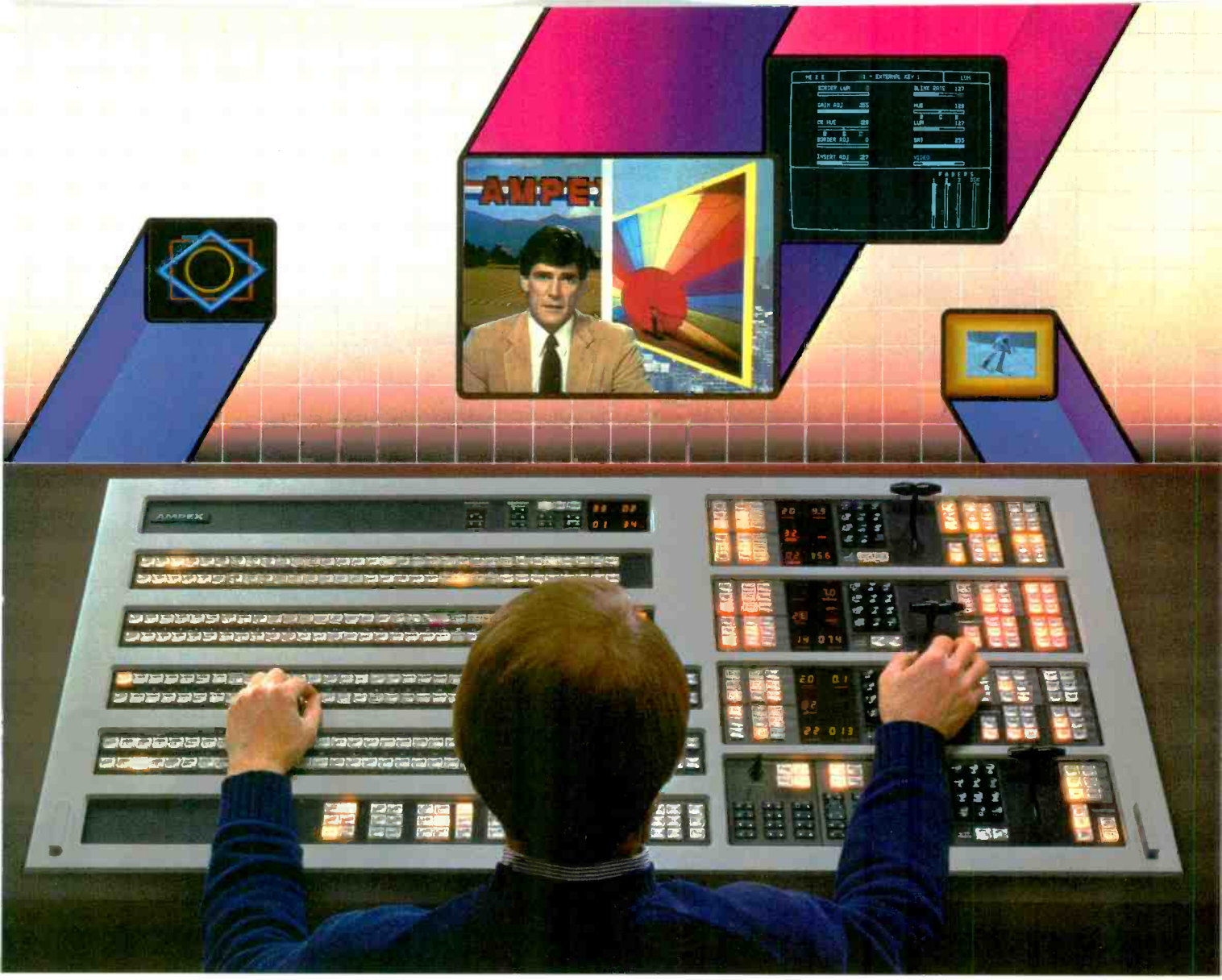
A license renewal hearing has been scheduled for **KTTL** although the FCC rejected petitions to deny renewal, saying that the Babbs station's broadcasts in the winter of 1983 and 1984 had not incited violence though they were racist and urged listeners to break the law. Commissioner Rivera said the broadcasts may have violated the Fairness Doctrine but the petitioners had improperly stated their case. The station may still lose its license for failing to meet community service requirements and for not paying taxes.

A $14 million cut in **CPB's 1987 budget** has expired, and the funds have been returned at least temporarily.

U.S. winners of the international **Parigraph Computer Animation Awards** in Paris were Judson Rosebush, formerly of Digital Effects in New York City, for best demonstration tape, and Jim Kristoff of Cranston/Csuri Productions . . . . Entries are being taken for the **1985 World Hunger Media Awards**, founded by Kenny and Marianne Rogers. Categories include best radio and best television coverage. To submit broadcasts appearing between July 1, 1984 and June 30, 1985, write World Hunger Year, 350 Broadway, New York, NY 10013.

The **National Federation of Community Broadcasters** will hold its tenth annual conference on July 22 to 28 in Madison, WI. For information, call (202) 797-8911 . . . . The **RTNDA** will hold its fortieth annual convention in Nashville on September 11 to 14.

The **SBE** has elected the following new officers: Richard Rudman of KFWB as president; Jack McKain of KSN as VP; Bradley Dick from KANU as secretary; and Wally Dudash of Group W as treasurer .



Technology to Power Your Creative Imagination

You can give your creative energies free rein when you have an Ampex AVC-series switcher at your command. These microprocessor-based production switchers provide more creative power per M/E than any other switcher. And they're so easy to operate that you're firmly in control at all times.

Unparalleled Key Flexibility

Every video input and two external inputs can become key sources on the AVC. The standard Key Memory System lets you store up to four completely different key setups for each key source. When a key source is recalled, Key Memory sets up the key exactly as it was stored—even when the key source is called up on a different keyer in a different M/E.

Three unrestricted, full capability keyers per M/E let you introduce any type of key on any keyer: RGB chroma key, character generator and special effects keys, luminance keys and—with an optional composite chroma keyer—encoded chroma keys. And every keyer has its own independent matte generator for matte fills or outlines.

Independent M/E Pattern Systems

Over 100 patterns are keypad selectable. Pattern borders can be hard, soft, soft colored (halo) and half-halo, a feature that allows a pattern to have one hard edge and one soft edge. All pattern borders can vary in width, color, luminance and saturation. These capabilities coupled with the AVC's exclusive pattern modifiers can produce a dazzling array of effects and effect combinations. Try rainbow border, pattern border hues that vary over time and with position, rocking and spinning patterns, even effects combining all these variables.

Simplified Controls

With all their innovative technology, AVC Series switchers are easy to operate, thanks to logical and familiar A-B operation and simplified controls. Pushbuttons are used exclusively instead of knobs for fast, simple setup and to let you set virtually every switcher adjustment from one compact central panel.

The AVC's unique Panel STAR Memory™ system with its extensive capabilities can further speed and simplify even the most complex production tasks.

System Compatibility

AVC switchers from Ampex are designed for state-of-the-art on-air, production and post-production systems. RS-422 serial communications capability assures easy interface with other compatible equipment. Many users have teamed the AVC with an Ampex ACE editor, Ampex VTRs and ADO for an unbeatable system with completely compatible software throughout.

Find out what an AVC switcher can do for your creativity. Call your Ampex Sales Engineer for complete information.

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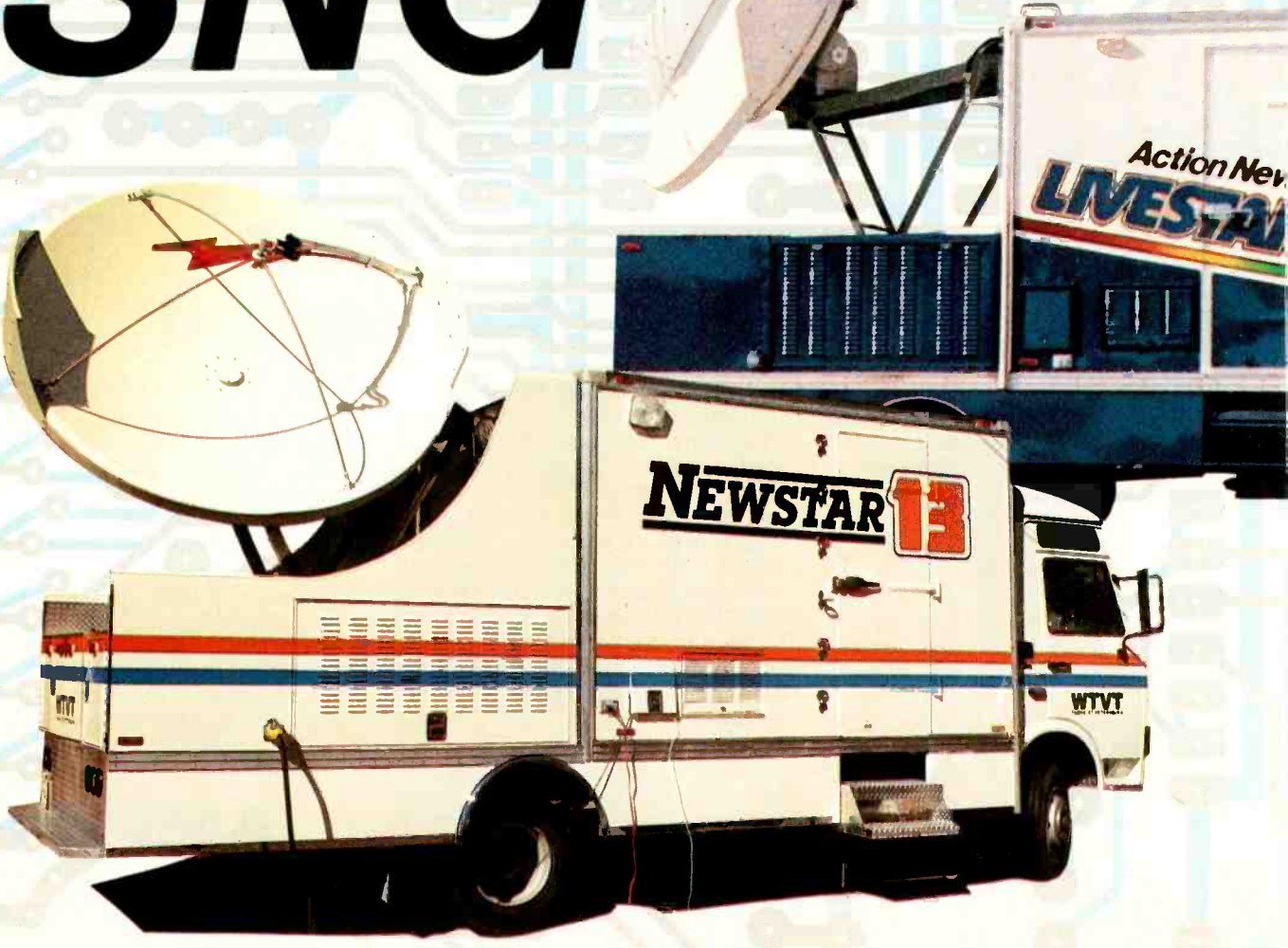

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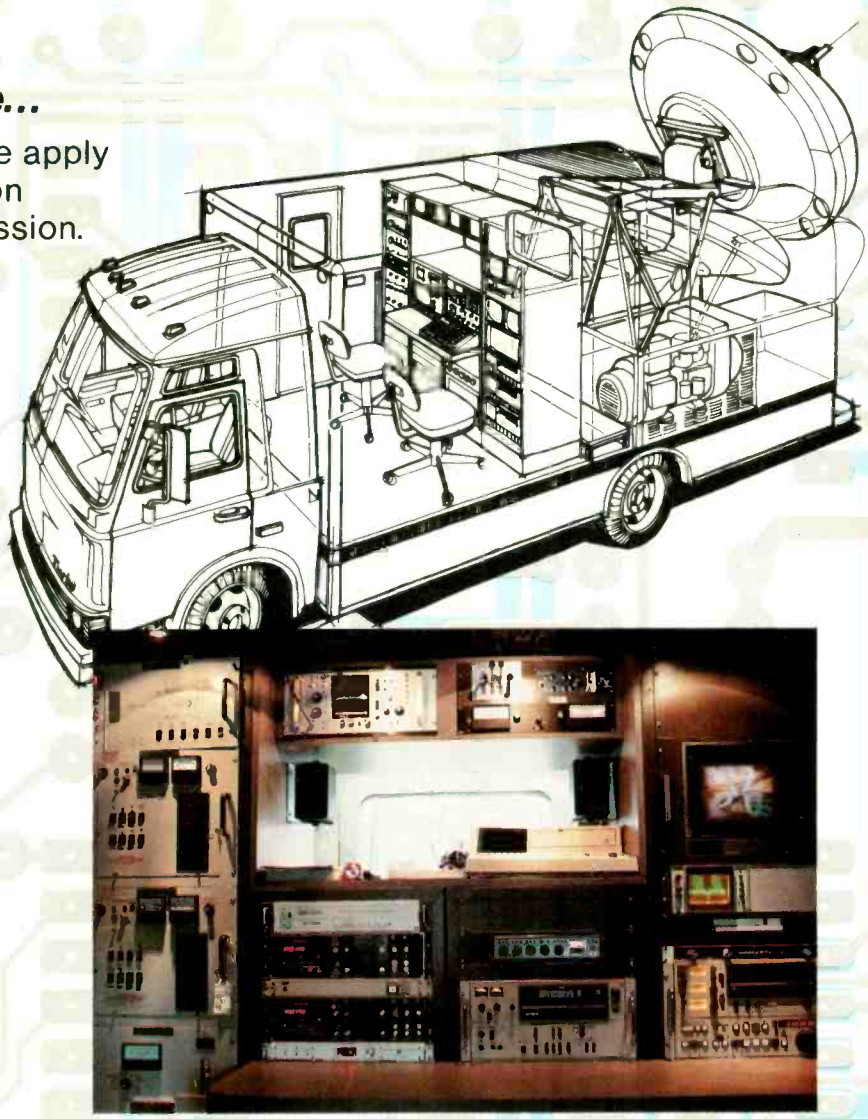
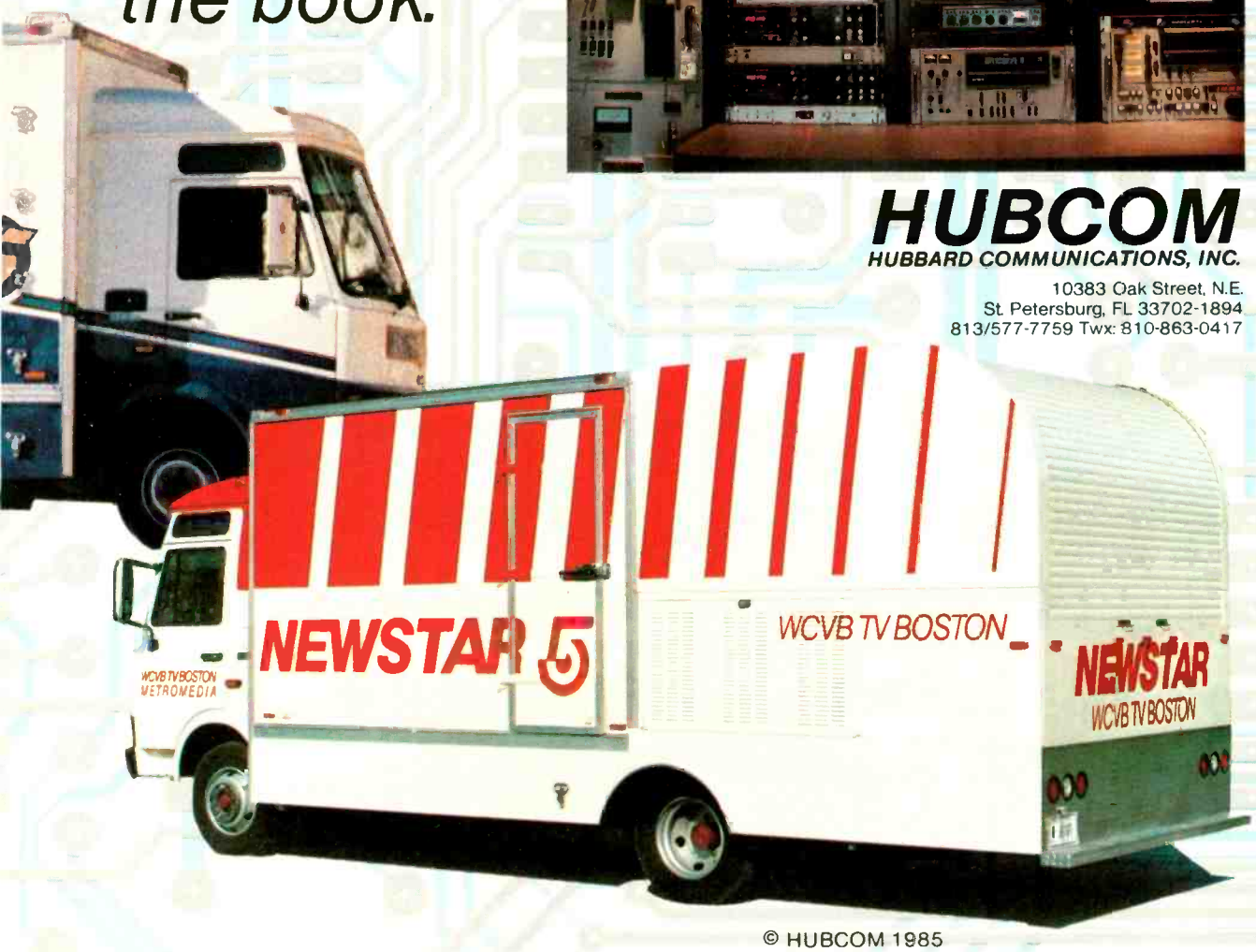


helped write the book.



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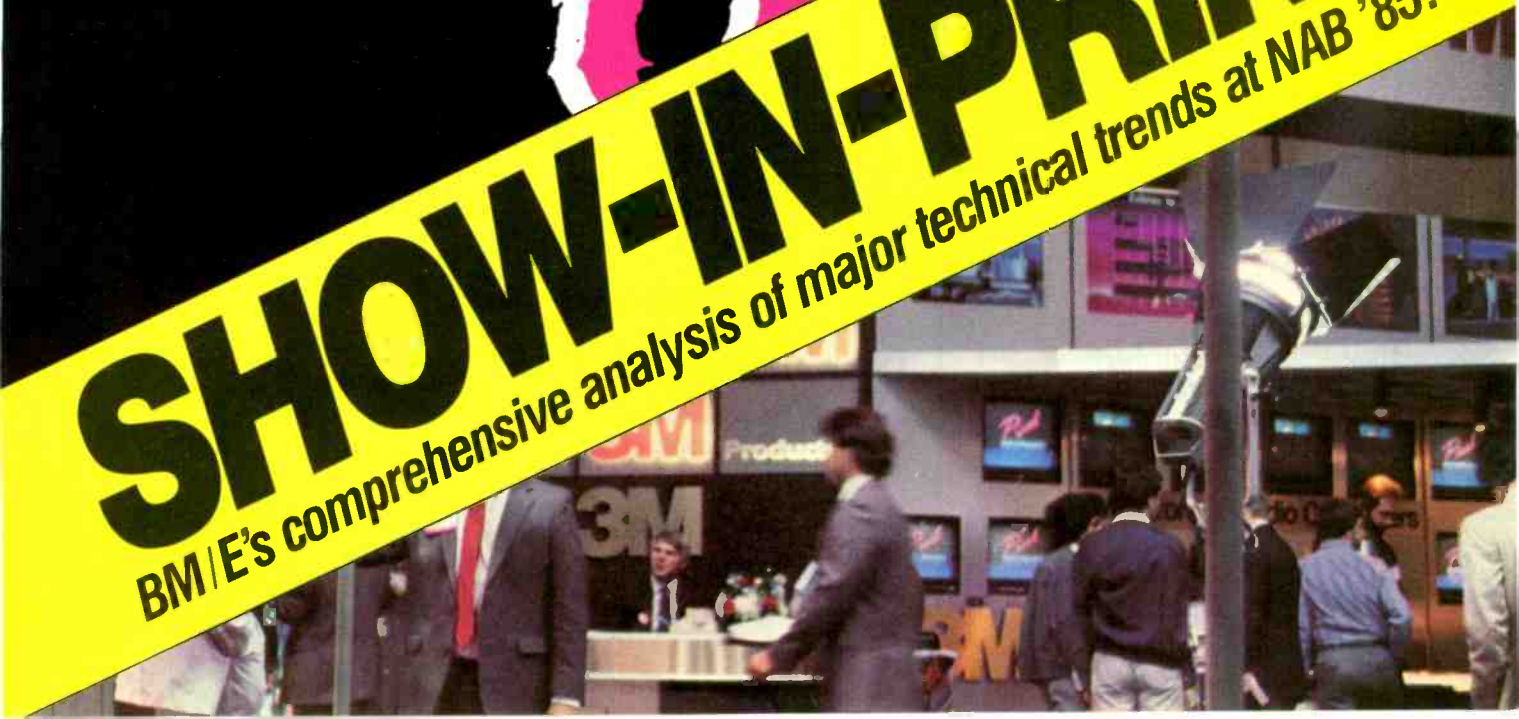
PRESENTS

NAB '85

SHOW-IN-PRINT

BM/E's comprehensive analysis of major technical trends at NAB '85.



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BM/E also wishes to thank the following for having supplied support services for the editors at the show: Mark Wiskoff, Motorola C&E, for two-way radio communications equipment; and Andy Innis, O.G. Innis Corp., for the Otona transportable computer.

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TV & VIDEO DEVELOPMENTS

There was an anxious moment at the beginning of NAB this year. Looking through the NAB's convention guide, Sony wasn't listed. Nor was Montage. Nor Studer, nor Dolby, nor several other major forces in the industry. Had they forgotten to pay their bills and been dropped from the exhibit? But when the show opened, there they all were—Sony in an even-larger version of its flying saucer booth, and the others in their appropriate places, along with a total of 700 exhibitors—the largest NAB show to date. (The missing names in the guide were just an oversight on the part of the NAB show staff.)

Not only was the show the biggest in history, but it was clearly the best—despite what one magazine called, in its one-page rundown of new technology at the show, "no major technological breakthroughs." *BM/E's* editors found plenty of breakthroughs—in every major product area. And we have devoted the *entire* June issue to covering them.

On the TV side (developments in Radio/Audio products and Industry-wide developments are covered elsewhere in the report), there were at least 10 different events of significance, discussed in detail in the individual stories which follow.

VTRs: Yet Another Format Debuts on Way to Digital

A funny thing happened on the way to the all-digital video studio: an analog component half-inch "transition" format popped up. Designated the MII format by Panasonic, this full broadcast quality approach developed in collaboration with NHK of Japan, has a separate luminance (Y) bandwidth of 4.5 MHz and a chrominance (C) bandwidth of 1.5 MHz. Moreover, 65 minutes of recording time is achieved on a conventional-sized VHS cassette. There is one hitch, however. A new half-inch metal powder cassette tape is required. And there is no compatibility with existing M format tapes; the higher performance requires a color time compression multiplexing system (CTCM) with a tape speed of 67.693 mm/sec. But the results are impressive—picture quality is equivalent to that of one- and two-inch VTRs and tenth generation tapes show no degradation. Size, weight and cost is less than that of Type-C machines.

Labeled the Model AU-600, the new format is a here-and-now full featured system (NHK already has over 90 installed and operating). Three speed modes are offered: Shuttle (at 32x), Slow and Jog. Dynamic tracking is incorporated for clear pictures in the Slow and Jog modes. The AU-600 also includes automatic editing features. An interface board connects to one-inch, ¾-inch, M-format (Recam), and Betacam VTRs.

Panasonic's announcement was greeted with some diffidence by other VTR and tape manufacturers who questioned the ready availability of reliable long-life metal powder tape. And if MII caught on, it could upset any orderly march towards the quick replacement of analog VTRs with the anticipated digital versions. But some people, particularly those watching the growth of analog component devices in other are as (switchers, processors, monitors, test equipment—see other sections of

Panasonic MII decks in editing setup.

this show-in-print report) saw it as a "natural development" fully compatible with the evolvement of SMPTE's S-MAC interface standard which is designed to accommodate signal processing in either an analog component format or digital format (in conformance with CCIR 601.) Indeed, Merrill Weiss, in reporting SMPTE's progress towards S-MAC standards (NAB's TV Engineering session and earlier SMPTE meetings), has made NTSC encoding and decoding (particularly encoded chromakey) sound like such an unnecessary horror that many broadcasters are eager to embrace any product that can process R, G and B (or its derivatives) separately. The Betacam and M formats were a step in the right direction, but their limited bandwidth restricts their use to ENG/EFP applications. MII opens the door to any and all broadcast applications.

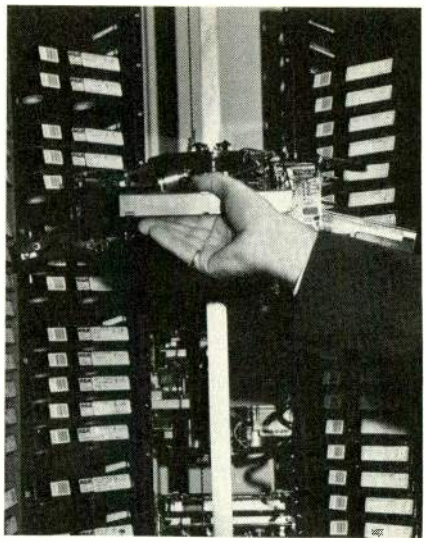
Clouding the picture as to whether the industry should opt for a further improved analog VTR or wait to see how the developments toward a worldwide standard digital VTR pan out, was Sony's showing in a hotel suite of a "nearly there" digital VTR and Ampex's quiet announcement that it would have a digital automatic cassette player replacing the venerable ACR-25 at next year's NAB show. Ampex didn't say, but presumably the cassette would be in conformance with the 19 mm SMPTE D-1.90 and D-1.30 standards shown by Sony. Ampex's statement seemed worded simply to head off any desperate move on the part of broadcasters to buy less than ideal M or Betacart automatic players. In reality, Ampex confirmed what Sony was hinting: the digital VTR will be here in 1986.

The shape that digital VTRs meeting the 4:2:2 CCIR standard are taking was apparent at the Sony demo. The transport accepting the SMPTE D-1 cassette was indeed compact, even though the cassette holding an hours worth of 19 mm tape (which plays at 286.5 mm/sec) was considerably larger than U-matic cassettes. As Sony reported, the tape width (19 mm), material (cobalt doped gamma ferric oxide) and thickness (16 mm) have been set, as have been the cassette dimensions and the mechanical footprint and control track configuration. The only remaining items, which are expected to be finalized by the middle of this year, include channel coding, a shuffling sequence and mechanical tolerances.

Demo of Sony 19 mm DVTR deck.

Digital VTR capability was also shown at NAB '85 by Hitachi, but only as a part of a high-definition TV system and not a 4:2:2 standard cassette DVTR. HDTV, at 1125 scanning lines, requires a bit rate of 460 megabits/sec. Hitachi divided this high data rate into five recording heads using a modified Type-C tape transport. The resulting bandwith is 20 MHz for luminance and 5.5 MHz for line sequential chrominance.

With no automatic cassette player in the offing capable of matching Type-C on-air quality (a MERPS committee wish identified at NAB last year), M and Betacart players got a second hard look at NAB '85. Grabbing the spotlight was RCA, which unveiled Silverlake as a "giant step in TV station automation." The Silverlake TCR-500 coupled a IBM PC/AT as a master controller to a 281 cassette robotic player to come up with a system with considerable on-line capability—93 hours to be exact. The system's database handles a library of 65,000 cassettes (M format) and the programming can manage 21,000 hours of recorded material ranging from five-second spots to complete programs. Silverlake's mechanical portion, built by robotics



Silverlake MERPS deck from RCA.

manufacturer Odetics, was an octagonal tower in which seven sides were used to store 43 individual cassettes each. The eighth bank held the VTR transports which could be four, five or six in number. The computer portion not only controls the play list but keeps track of the cassette's content as well. Cassettes are identifiable by a permanent bar code number which is keyed to the database. Thus, unlike the Betacart, the information is in the system and not on the cassette. Initial delivery will begin in 1986.

Sony enhanced the Betacart this year by adding off-line playlist software, available on a 3.5-inch floppy disk which is compatible with the system's HP-150B microcomputer. Operators can key in an entire day's events, leaving the Betacart free to operate on-air continuously. Another refinement is the ability of the new BVR-20 remote monitoring switcher to call up specific signals for monitoring. Further, a parallel controller, such as a master control switcher, can operate the Betacart through a new IF-10 serial-to-parallel interface card. A manual bar code reader is also now available to enable manual shuffling of cassettes.

Asaca, which last year introduced the ACL-3000 Automatic Random Access Cart system (for either M or Betacart), demonstrated a unit which doubled the capacity to 600 cassettes, the ACL-6000B. The unit uses sophisticated programming and bar code cassette identification to provide continuous control. Panasonic's MVP-200 remained unchanged.

For those who missed the usually-packed demonstrations on the floor, Sony held a one-day intensive seminar on the day following the show in which

TEK'S NEW 1710B: THE BRIGHTEST IDEA IN WAVEFORM MONITORING.

One-of-a-kind capability in a new waveform monitor that's easy to use and afford! The Tek 1710B has all the essentials for reliable, consistent monitoring of your video signal. For example, it includes the first-ever burst phase indicator found in a waveform monitor. This special new color display indicates if burst is properly set: a green light means it's right!

Operating simplicity anyone will appreciate. The front panel controls of the 1710B are logically grouped and labeled for fast, easy handling. And the high quality Tektronix CRT offers a sharp, bright trace so it's easy to see.

You get outstanding versatility and Tek quality in a convenient, compact package that fits in half a rack. DC power operation can be installed and used with a battery pack for fully portable operation in the field.

If you see a place for a cost-effective waveform monitor in your operation, you owe it to yourself to see the 1710B. Available in both NTSC and PAL versions, the 1710B is our most economical answer yet to improving picture quality through video waveform monitoring.

For a look, contact a Tektronix Professional Video Dealer, or your local Tektronix Sales Engineer, listed in major-city directories.

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Newly reconfigured Asaca MERPS transport.

the Betacart system was presented in detail. More important than the product demonstration itself, however, was the detailed presentation of the interface protocol necessary to drive Betacart from a computerized automation system. Since the product is entirely microprocessor-controlled, and all the microprocessor functions are remoted, it is possible to achieve precise, frame-accurate timing and control sequences.

Half-inch expansions

Both Panasonic and Sony unveiled some additional half-inch equipment. For Panasonic, it was a front-loading VTR, the AU-350, which featured six heads. One pair handles Y, another I/Q. There are also two flying erase heads plus control and time code heads. Complete edit control is possible. Sony's new entry was a field recorder/player, the BVW-25, plus a studio player, the BVW-15. The BVW-25 was patterned after the popular portable BVU-110 U-matic.

Last year, speculation was rife that a new 8 mm format might emerge in the integrated cam/recorder market —possibly as an alternative to the proposed compromise ¼-inch format put before the SMPTE Committee on Video Recording. But NAB '85 arrived with no 8 mm in sight—and no resolution of the ¼-inch compromise issue (the compromise product demonstrated to SMPTE revealed performance deficiencies). So there is nothing new to report except that SMPTE has set up some ad hoc groups to further look into the differences between the Bosch Lineplex and the Hitachi proposed compromise. Rumors abounded that Ampex was keenly interested in 8 mm, but they remained unconfirmed. (Two weeks *after* the show, Sony produced a home 8 mm system but gave no hint that a professional version was being considered.) Meanwhile, Bosch came up with a complete editing system for its orginal Lineplex format and was making good-looking fifth generation tapes at NAB. Whether this effort suggested anything to the ad hoc committee remains to be seen.

Type-C advances

Recent developments in Type-C machines were prominently displayed. At Ampex, it was the price/performance mid-ranged VPR-6 (the TH-800 at RCA). Ampex also introduced a new video recorder controller, the VRC-2, which works with the VPR-3, 6, and 80. The controller operates one to four VTRs individually, two to four in a gang roll, and two machines in an editing mode.

Sony highlighted the super slow motion BVH-2700 VTR that drew ABC kudos during the Los Angeles Olympics.

Hitachi's claim to attention was its new HR-230 VTR which features short lockup (0.5 sec on standby), fast loading, and many built-in diagnostics all at a low price. If you've ever wondered what happened to 3M/NEC's Type-C VTR, it was reincarnated at the Merlin exhibit as the ME-8000 "tough bird."

Convinced that there was still a lot of life in the ¾-inch market, JVC announced a major new product, the front-loading CR-850U. Among its principal features are built-in SMPTE time code, built-in editing control functions and new circuits (15) which help produce 47 dB S/N ratio pictures.

Sony, too, offered a new U-matic—a portable recorder, the VO-6800. It is 35 percent smaller and 30 percent lighter than the VO-4800. The unit contains a video confidence head and a remaining tape warning.

New disc developments

In the direct-read-after-write category, Panasonic added an eight-inch 16,000-frame (eight minutes) high-resolution black and white optical memory disc recorder (OMDR), the TQ-2025F, to complement its color unit, the TQ-2023F. At 450 lines of resolution, a sharp picture is formed. OMDR devices are becoming ever-more-popular as a means of reducing editing time when doing commerical insertion and sequence assembling, because of their low access time.

Optical devices (analog) compete with hard magnetic discs (digital) for post-production applications, although the latter have less record time. Abekas featured the A62 Winchester disk drive as a means of storing 50 sec and 100 sec for animation or multilayer matting.

For optical laser disc users who have interactive video applications, both Sony and Pioneer had new systems. Sony's LDP-2000 disc player combined with a microcomputer becomes a nifty interactive system. Pioneer's new LD-V4000 is designed to work with an external PC. As a practical tool, Pioneer showed a new compact eight-inch LaserDisc designed to be lugged around in the field. Presaging the possibility of laser discs becoming broadcastable program players, Pioneer showed a professional LD-V6010 as a top-of-the-line product. And very intriguing was a laser disc autochanger shown as an engineering sample. Mitomo (from Japan) was another exhibitor showing a "disc accessor." Heavily into optical recording technology, 3M showed some of the remarkable marketing possibilities that can be achieved with interactive video discs, and the impressive storage capability (1.2 gigabytes per side) possible with data storage discs.

HITACHI INVENTS THE FIRST 1" VTR THAT WATCHES ITSELF SO YOU DON'T HAVE TO.

The revolutionary Hitachi HR-230 1" VTR has the most advanced real-time, self-diagnostic capabilities ever perfected.

In either the record or playback mode, a computer inside the HR-230 monitors 49 different performance parameters second by second. And then stores this information within the memory for recall at a later time—not just with numbers and symbols, but in words.

This means no more errors slip by when your operator is not there. And there's no more need for hit-or-miss spot checking.

The Hitachi HR-230 has a unique quick-threading tape path, incorporating retracting entrance and exit guides, main erase head, as well as a scanner air system that protects tapes.

It recues a 30-second segment in 3.5 seconds. It has a fast/slow motion range that provides real-time reverse and field/frame still motion. Plus programmable time compression up to 20%, with 0.1% accuracy.

A unique, concealed fold-out control panel groups editing functions and separates edit controls from the main control panel.

In short, it's the ultimate 1" for networks, affiliates or teleproduction companies. Don't consider your next 1" purchase without looking into it. Contact Hitachi Denshi America, Ltd., Broadcast and Professional Division, 175 Crossways Park West, Woodbury, NY 11797. (516) 921-7200 or (800) 645-7510. Hitachi Denshi, Ltd. (Canada), 65 Melford Drive, Scarborough, Ontario M1B 2G6. (416) 299-5900.

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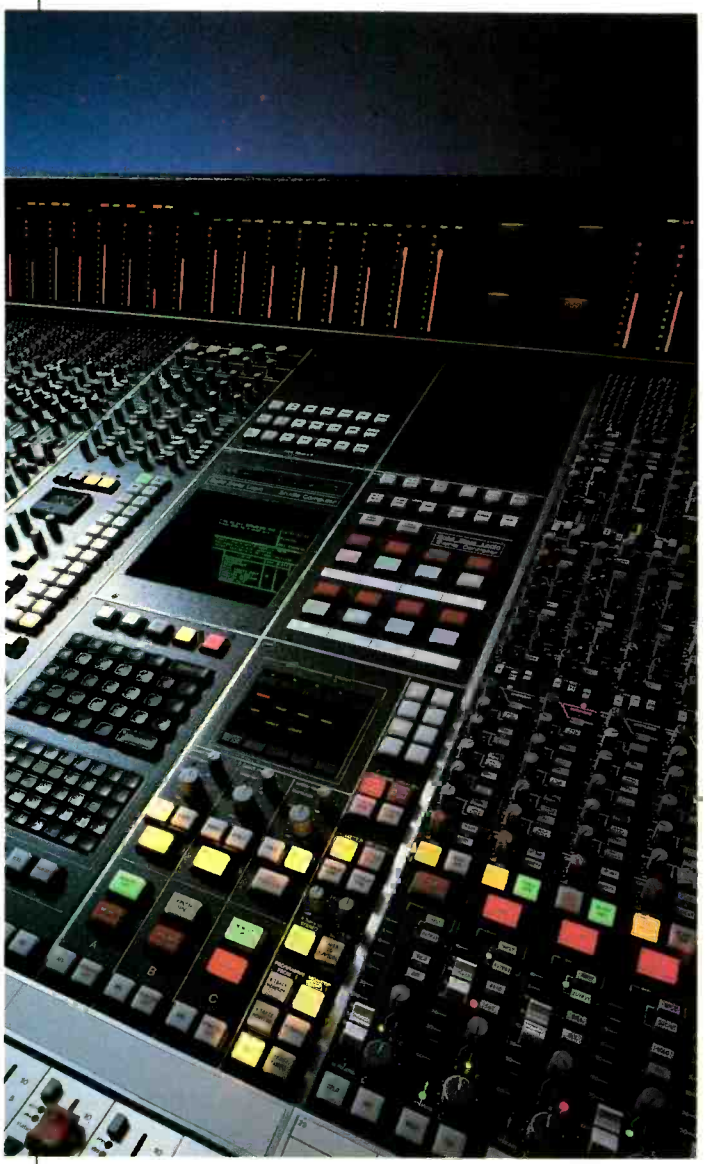
Hitachi

There's more to than meets

Producing effective multichannel sound isn't easy. Though the procedures borrow heavily from recording studio and film sound techniques, audio for video is a specialist art with a unique set of requirements.

As its early practitioners have discovered, the inherently complex process of stereo teleproduction and post-production can be made even more difficult by cobbling together a collection of modified equipment in the hope of serving these advanced needs.



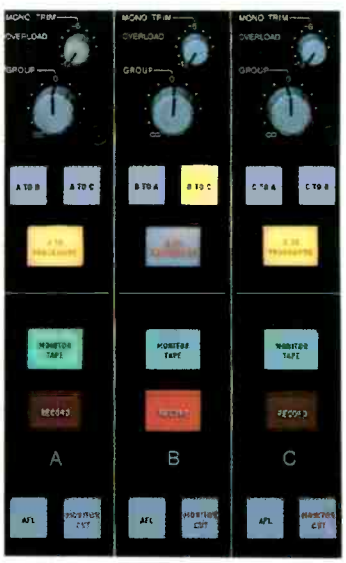
While makeshift arrangements may satisfy the technical minimums of the task, they introduce tradeoffs in operational flexibility and efficiency which can ultimately affect both production quality and costs.

Fortunately there is an alternative, developed for the leading post-production houses and refined in collaboration with major broadcast organizations throughout the world: The SL 6000 E Series Stereo Video System from Solid State Logic.

SSL Puts it all Together

The SL 6000 E Series is a thoroughly integrated system designed specifically for the stereo video environment. Combining the most advanced aspects of multitrack, motion picture and broadcast audio technology, it provides extensive signal processing, routing and mixing capabilities as well as comprehensive machine control and communications—all commanded by a single operator at a logical, unified control panel.

SSL's multichannel mix matrix allows separate stereo music, effects and dialogue mixes to be created at the same time as the stereo program mix. In live production, multiple stereo splits or mix-minuses can be structured at the touch of a button. Mono composites of each mix are always available, and a mono programme feed is provided. Advanced formats such as stereo plus a secondary audio programme or centre-channel dialogue are also supported.



Changeover between live and post-production modes and different output configurations is instantaneous. The rigid architecture of ordinary consoles is replaced with patchfree audio subgrouping and pushbutton signal processor routing, allowing the engineer to customise the signal flow for each project.

Stereo Television the eye.

Meticulous electronic design creates the shortest signal path for each requested function, allowing SSL to maintain a dynamic range and bandwidth that far exceeds the performance of even the best 16-bit digital recorders, converters and routing switchers.

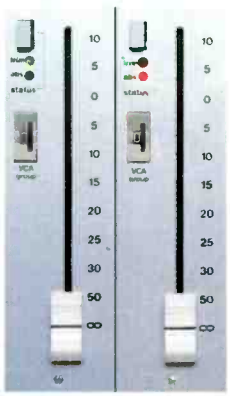
Complete Machine Control

The SSL Stereo Video System also provides the operator with central control of up to five synchronised audio, video and film transports. Cue points are stored and called by timecode, foot/frames or key words.

The SSL Studio Computer provides complete list management with floppy disk storage, video display and hardcopy printouts. Distributed processors ensure rapid search and lock-up. There's even a Sync Preset function which automatically calculates offset values between reels and stores these for subsequent setups.

Dynamic Mixing Automation

The machine control functions are integrated with SSL's audio mixing software to provide powerful, versatile and efficient assistance. Engineers can retain their existing mixing methods, or supplement them with simple yet powerful new routines that allow unlimited frame-accurate mix revisions to be performed with outstanding results and uncanny speed.



SSL's computer assisted rollback and pickup recording enables mixes to be assembled within the automation itself, using traditional techniques. Video layback can then take place in a single first-generation pass, directly from the multitrack!

Beyond fader automation, the SSL System optionally provides programmable parametric equalisation, dynamic stereo panning, and multiple Events Control of up to 32 external devices—each with its own pre-roll memory.

Total Recall™

SSL's Total Recall computer records the settings of every control on each I/O module. A high resolution display of the stored values interacts with the console, allowing fully detailed setups to be restored to a control accuracy of a quarter dB. Total Recall greatly reduces setup time, maximising productivity and creative continuity.

Stereo Perspectives

Not all stereo channels were designed to serve video requirements. Only SSL provides parametric stereo EQ, filters, compressors, gates and expanders on stereo inputs as standard, along with image width and stereo reverse controls. There is no easier or more effective way to match music, ambience and effects perspectives with television images.

Get the Full Picture

As you can see, there is a lot more to producing stereo television than meets the eye. To help you get the full picture, Solid State Logic has published a forty-page colour booklet which thoroughly explains the functions, applications and operation of the SL 6000 E. If you are involved in television production, outside broadcast, video post-production or music video, we'd like to send you a copy. Just drop us a line or give us a call.

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Introducing the Lexicon model 1200C income expander.

Our engineers call it the Lexicon 1200C audio time compressor. But many of our customers call it an income expander.

Working in precise synchronization with your variable-speed VTR, the Lexicon 1200C can shorten any television program for the insertion of extra commercials – without viewer-annoying scene cuts or squeaky voices. The 1200C actually compresses time without changing audio pitch, a technological achievement so significant that we won an Emmy* for it. And it's ready for stereo, too.

How much could your income expand? By adding just 60 seconds of extra commercial time per day, at $600, you'd gain enough revenue in one year to pay for a Lexicon 1200C and still have more than $200,000 in extra income.

And the 1200C can save you additional money when making commercials. If a take is great but it's a few seconds off, the 1200 can adjust it to the exact length needed, eliminating the expense of needless retakes.

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*National Academy of Television Arts and Sciences award for technical achievement, 1983-1984

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Machine Control Bridges Automation Gap

An important but often overlooked factor in the planning of new operations or the upgrade of existing facilities is that of machine control.

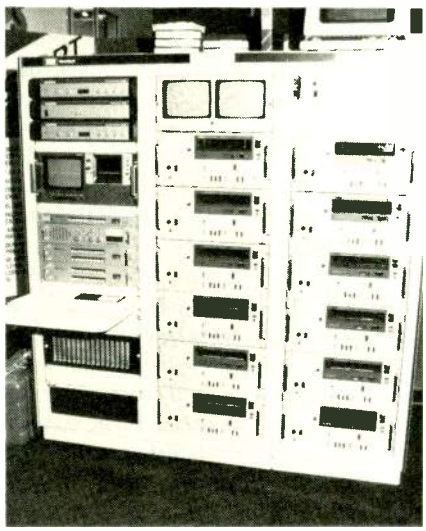
At its most effective, machine control design can actually make an operation more efficient and less costly by reducing, or in some cases completely avoiding, mistakes. In a nutshell, machine control is that subsystem in your plant that is responsible for starting, stopping, checking the status of, and assigning machines to a particular audio and video bus for eventual transmission. In the truest sense of the word, it is the nervous system of the station; and with the tendency towards automated, centralized control, it becomes important to consider its place in the overall scheme of things.

As machine control and technical automation continue to become more important in station operations, there is also the question about which system—microprocessor-controlled routing switcher, automated master control, machine control and assignment, and so forth—should lie at the hub of the station automation project. And, as MERPS systems become more sophisticated and prevalent, they, too begin to claim their place in the overall station technical plan.

The large MERPS systems (Betacart, Silverlake, Asaca, and MVP-100) are covered in the VTRs section of this report. There are also, however, several smaller systems which are enjoying popularity. Of these, perhaps La-Kart from Lake Systems is the most prevalent, capable of controlling 1000 events on any combination of VCR formats including half-inch component. The program is set up with frame-accurate SMPTE time code addressing.

Brand-new at NAB was the NewsCart from BSI—a two-channel, multitransport (24) playback unit designed specifically for TV news operations. Segments as short as three seconds can be handled with ease, allowing bumpers and tags to be inserted, while startup is only two seconds. The two channels of video are fed through two TBC/frame synchronizers. The system also allows for two channels of on-air audio, which can be mixed or dissolved.

New to the broadcast market, but with a well-established reputation as a supplier of automation systems for the cable industry (over 100 cable systems currently use the Stationmaster automation package), CCI managed to attract considerable attention at the NAB despite the location of its booth at the Hilton Center. The Stationmaster that was demonstrated at NAB is actually a highly modular controller, capable of accessing up to nine half-, 2/4-, and one-inch VTRs, and building playlists of just about any length. Several levels of control are offered, including both real-time and SMPTE time code access. A $42,345 version of the system can handle eight VCRs, plus two additional VCRs set up for alternating commercial insertion playback.



BSI two-channel NewsCart automation.

George Cudabac demos CCI Stationmaster automation.

This year's convention also built upon advances made in the past few years in computer technology.

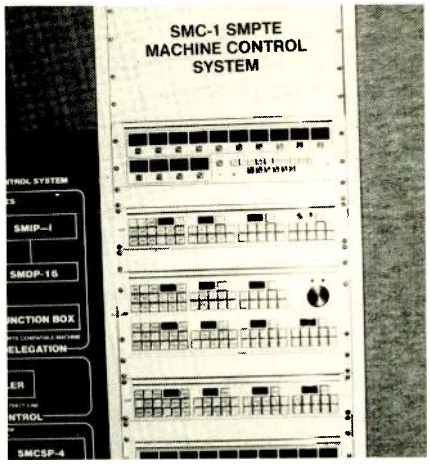
This year's convention built upon advances made in the past few years in computer technology to give the engineer an even wider choice in machine control subsystems.

Utah Scientific, now a part of the Dynatech broadcast group, introduced its Model AVS-1B routing switcher/machine control system. While the great stress has been towards separating the functions of crosspointing and starts in the plant, Utah Scientific has developed a complete, integrated system that can combine the crosspoint area with the machine control needed to get the signal started at the proper time.

The actual machine control portion of the system, the PLMC-1 Party Line Control System, uses a coax network topology in order to allow the stations to communicate with the master controller. A coax network is a single coaxial cable, with the individual control and status units electrically daisy-chained along it. Each control/status/machine interface has a discrete data address assigned either by the factory or the user, that the main process control computer uses to locate and "talk to" a particular unit. The advantages to such a system are basically low wiring costs, both in material and labor, but it's important to note that there is a practical limit as to how long, physically, the cable can be before data errors start impeding the operation of the system.

The PLMC-1 control panels include as part of their design all the necessary tally and control functions for most types of equipment, such as play, stop, fast forward, and all necessary presets such as gang start/record and delegation. These control units then communicate with the MIP machine interfaces, which actually control the mechanical operation of the system; delegation allows for on-the-spot control of a machine normally dealt with by one control to be accessed by another control unit. This adds flexibility to the operation, and eases maintenance concerns should it be necessary to take down a panel without necessarily disabling a machine.

This system is supplemented by a SMPTE standard machine control interface for those that do not need a massive machine control system, such as a



Technical automation based on Utah Scientific machine control.

small video production house or community TV operation.

Grumman Aerospace Corporation was demonstrating a number of systems that are of vital interest to the up-to-date broadcaster: the STARCOMM machine control system, and an automatic commercial insertion system for both the cable and broadcast marketplace.

STARCOMM, an acronym for Studio Telecommunications and Remote Control of Machines/Computerized Online Message Matrix, is a star-cluster network that consists of six integrated modules, which can be mixed and matched in order to custom-design a system.

The heart of the system is a device called COMM, which is the unit that channels commands to a desired destination. It has the capabilities to expand the I/O port, "broadcast address" a group of devices, single device addressing capabilities, and multiple concurrent routing operations.

The COMM communicates with a number of other devices, which include a studio control panel, which forms a "leg" off the main COMM network, and controls the in-studio machines. This unit can duplicate the messages and functions of the main processor via a studio interface control which interprets and distributes commands originating in that particular studio. This device also extracts on-air data from the studio switcher, and acts as the interface from COMM and the machines, routing the necessary information in either direction for action by either the controller or the machine.

Of course, all this is dependent on two other devices, the machine panel and interface, which translate the necessary information from COMM into control that the machine can accept.

The last link in this chain is the computer interface, which translates messages and information from a host computer into the language of the STARCOMM system. In addition, this interface can also store local status for up to 30 devices on the system.

Grumman also provides for control of SMPTE-compatible machines, and this system lends itself very well to computer automation through an RS422 link. STARCOMM provides the necessary "translation" of device action, allowing for greater latitude in developing an on-line, computer-driven, automation system.

Matco Manufacturing and Test Company was also exhibiting a line of machine control units that are suited to production houses and station operation. Its MST-100 Series is the top-of-the-line unit which features control of up to 54 VTRs, up to six switchers either individually or, in the case of VTRs, up to 12 groups for simultaneous action on a single keystroke. In addition, the unit can execute up to 24 sequences of nine events, with start event actuation based on external cueing or tone control from the previous event. Mixed tone and time cues are allowed, which permit the mixing of dissimilar sources to be easily programmed into the system.

At the other end of the controller is the ASTC-2 control module, which is a daisy-chained system that allows up to 63 unique address selections, and status answer back from the controlled device for up to eight different status indications.

Taking the machine control idea one step further, Alamar Electronics was displaying the MC-1000 Automated Sequencer/Controller, which is a combined machine control automation system. While it is possible to talk about machine control without involving automation, the reverse does not hold true. This device is an attempt to address the problem of integrating both the automated development of program schedules and execution of those schedules in a timely manner.

The MC-1000 can control up to six channels of 128 events, cued-on-time, sequence, DTMF (for satellite links), end tone trigger, or (allowing for operator intervention) manual. The system is capable of controlling VTRs, ATRs, switchers, telecines, and other studio equipment. In addition, preroll, cueing, and rewind are also supported.

One feature of the system is the use of a "pseudo-word processing" scheme of manipulating the screen, which, in the case of a new installation, means that the operator can readily adjust to the addition of such a system. Up to five upcoming events are also displayed, so the operator knows exactly what will be going on the air, in order. Because of the interactive editing features, any upcoming event can be changed with a few keystrokes, which makes it easy to both plan for smooth transitions, and recover from problems.

Bosch was back with their TCS-1 system, one of the largest and most complex at the NAB. Some of its salient features are the control of up to 100 machines, dual twisted-pair wiring, full delegation to any one of eight studio control panels, and full interfacing capabilities to the Bosch TVS/TAS-1000 and 2000 distribution switchers.

The network topology can contain up to a maximum of eight control buses, and a number of machine control multiplexers and studio interfaces based on the operational needs of the facility. Up to eight of the multiplexers can be on the system, and each mux can control up to 30 single machine control panels.

The MC-24 single-machine panel is designed to be located adjacent to the machine it is controlling, and can only control one machine at a time. This panel includes the thumbwheel selector to select the address of the machine to control, and the necessary remote indication and control buttons to effectively activate the functioning of that machine. In addition, this single-machine panel can be accessed (with the addition of the CP-1200) by the 1000 or 2000 Series switchers for monitoring of the crosspoint that the machine is feeding.

Walking down the aisles of this year's convention gave the broadcast manager and engineer a good idea of the direction the machine control segment of the industry is taking. Machine control has probably never been the most memorable part of post-NAB discussions, but as evidenced by this year's offerings, and with the prevalence of processor-based technology, "smart" control systems are becoming a major force in this industry, and, when planning for the update of station or production facilities, it's worth the time to take a major look at the many systems, both large and small, that could make a new or existing plant more efficient and more productive.

Sweet 16

Fujinon's brand new A16x9.5RM with macro focusing.

The basic ENG lens has grown up. At 16X, Fujinon's newest zoom is longer without being heavier. It's brighter without being bulkier. The F-stop at the full 152 tele position is better than that of lenses that don't zoom as far. Any way you look at it, it's a better lens and a better value. Here are all the reasons why:

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- Macro focusing
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- Better transmission
- Rugged construction
- Fujinon quality, support and service
- Shorter M. O. D.
- Lighter weight
- Lower distortion
- Higher MTF
- Higher brightness/contrast
- More optional accessories
- A great price

Built to perform better on your camera and budget, the A16x9.5RM comes with auto iris, a smooth servo zoom, and a maximum aperture of F1.7—absolutely flat from 9.5mm to 114mm. At full tele, it only drops to F2.0. It weighs less, too, even though its servo unit is housed in a weather-protected cast aluminum case, not plastic.

The new A16x9.5RM...a better buy by any standard. For more information or a demonstration, contact the Fujinon location nearest you.

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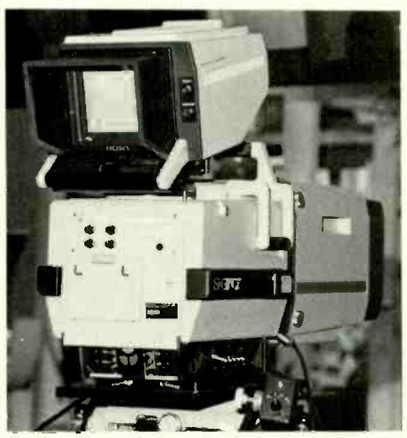
Less Glitter But Lots of Substance in NAB Camera Market

While the camera field didn't lack for new development at NAB '85, the pure excitement seemed somehow less than in previous years. Perhaps one reason for this was that many of the "new" cameras gracing manufacturers' booths had been seen before, in prototype, in previous incarnations, or at SMPTE last fall. Of course, there were several significant all-new cameras, such as Ikegami's HK-323 Series and Hitachi's SK-110D. And many of the "seen-befores"—notably the Sony BVP-360, but including a number of others—mark significant advances in camera technology.



Sony's top-of-the-line BVP 360 with Canon f/1.2 prism.

The BVP-360, by the way, is but one example of a significant trend in the broadcast industry: the ⅔-inch tube studio camera with full auto setup and other features once found only in cameras employing larger tubes. Although the great majority of the full-featured studio cameras presently in the field use large-format tubes, introductions of new ⅔-inch studio cameras outnumber those of large-format cameras, and there's evidence that buying interest in these new systems is high.

One of the best examples of the increasing capabilities of ⅔-inch cameras is the Sony BVP-360, introduced last year as a prototype. Sony showed an enhanced production model this year and announced that deliveries of the triax version would begin next month. (A multicore version will be available in March 1986.) Among the 360's new features is an optional seven-inch *color* viewfinder, the BVF-7000Q, offering a very crisp and clear high-resolution display. The color viewfinder should be a particular boon to camera operators in field applications such as sports.

Additional flexibility is offered by another introduction, the CA-31 portable triax adapter, which integrates the BVP-30 Betacam into the BVP-360 system. The BVP-30, which uses the same mixed field tubes as the 360, can operate on a tether as long as 7200 feet.

Ikegami showed a prototype of an advanced family of ⅔-inch studio/field cameras that includes a model with fiberoptic control. An Ikegami spokesperson estimated that demos of the HK-323 camera would begin early this fall, with deliveries by the end of the year. The company isn't ready to commit itself yet on price. The HK-323 uses LOC diode gun Plumbicons and incorporates much of the software and computerization ideas found in Ikegami's top-of-the-line HK-322, including computer control for automatic setup and a full range of automatic features. Besides studio applications, it is particularly suited to mobile applications because of its very compact head and base station/CCU. It utilizes economical ENG lenses, although it can accept larger studio lenses with an adapter.

A software upgrade on Ikegami's HK-322 now allows the very popular HL-79E ENG/EFP camera to be tied into the 322's control system. With the addition of a camera adapter and a Line Pack, which is inserted between the camera and the CCU, the HL-79E can be set up automatically from the local or remote operator's control panel. The enhancement is available now.

Featured at the Philips booth was the recently introduced LDK 26, a ⅔-inch studio/field camera that is completely compatible with the top-of-the-line LDK 6, also on display. The LDK 26 fully incorporates the 6's computer control and triax technology.

Hitachi's SK-970 auto-setup Computacam, a full-featured studio camera with ⅔-inch tubes, was featured again this year, along with its portable companion, the SK-97.

ENG cameras

Despite last year's excitement over RCA's CCD-1 camera, RCA and NEC remain the only manufacturers showing broadcast-quality cameras with solid-state pickups. While deliveries of the CCD-1 have been delayed longer than originally planned, RCA remains bullish on the camera and at NAB showed a new version designed for sports coverage.

The new camera, the CCD-1S, is identical to the CCD-1 except for the addition of a 1/500-second shutter that improves slow motion and stop-action playback. RCA demonstrated the shutter in a suite last year, and it was expected to become a product soon. NBC had field-tested the camera during the 1984 World Series, and it was also used

RCA CCD-1S shown with variable shutter for real-time slow-mo.

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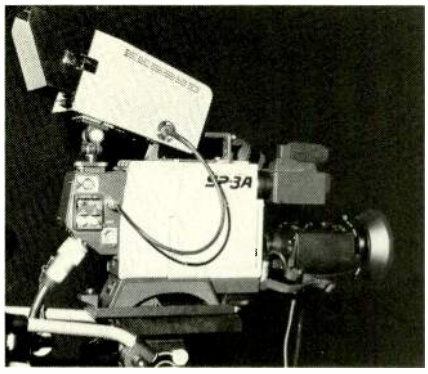


NEC SPC-3A is latest version of CCD camera.

at a variety of other sporting events. According to RCA, the shutter results in extremely clear slow motion playbacks with ordinary VCRs.

The CCD-1, with its 1/98-second shutter, is definitely not being replaced by the new model, and the fast shutter cannot be retrofitted to the CCD-1. RCA says it is now filling back orders on both cameras. Prices, without lens, are $42,500 for the CCD-1S and $37,500 for the CCD-1.

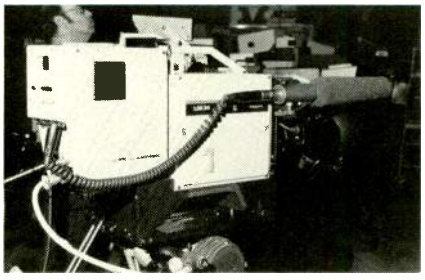
NEC, meanwhile, showed the SP-3A, an upgraded version of last year's SP-3 CCD ENG cameras. According to Jeff White, the new model has 3 dB better S/N (58), better light sensitivity (less than 5 fc at 12 dB gain without black stretch), and a higher quality viewfinder. It uses an entirely new CCD chip, designed specifically for broadcasting, which offers improved light handling and highlight characteristics. (Owners of the SP-3 can have the new chips retrofitted to their cameras.) The camera is available now and costs $17,900 for the head and viewfinder without lens or back; a standard NTSC adapter back is $3100.

Tubes, of course, continue their leadership, and advances in tube technology enhance many newer cameras. Sony boosted its popular Betacam line with two new three-tube cameras, the BVP-3A and BVP-30, which replace the BVP-3. The BVP-30 uses Sony's mixed field pickup tubes and can tie into the BVP-360's CCU via the CA-31 portable triax adapter. Otherwise, the cameras are essentially similar. Improvements include a new high-resolution viewfinder incorporating a channel one audio level indicator and channel one audio level control, as well as an audio monitoring earpiece on the camera door.

Thomson-CSF has introduced a new Plumbicon version of its TTV 1623 French-made Betacam, complementing the previously introduced TTV 1623, with Saticons, and the TTV 1624, with low capacitance, diode gun Plumbicons. The new 1623 has regular (not diode gun) mixed field-type Plumbicons with electrostatic focus and magnetic deflection. It will sell for $22,500, midway between the 1623's price tag of $17,500 and the 1624's $26,500 cost. Thomson is positioning the new camera as a competitor to Sony's BVP-3.

Thomson also unveiled new rear modules for all three cameras—including the CA-33 auto setup module, which, according to the company, makes these the only cameras in the Beta category with automatic setup. (Of course, auto setup isn't available in the one-piece configuration.) Other modules allow interface with Sony CCU and triax operation (with a new Thomson CCU).

Another newcomer to NAB was the LDK 54 camera from Philips, which



Philips LDK 54 in EFP configuration.

the company claims is the first and only portable camera to incorporate a diascope in the camera head. This eliminates the need for lenses with built-in diascopes, saving weight and money in one stroke. The 54 also has an auto setup program that includes registration centering and video black level settings for RGB, along with auto iris, momentary iris, and auto white balance.

Panasonic introduced several new cameras for the professional and industrial markets. One, the NiteHawk, is designed especially for low-light operations; sensitivity is 20 lux at +18 dB gain. The NiteHawk uses three half-inch Newvicon tubes that resist burn-in. Other features are a two-line vertical enhancer and a feedback beam control circuit to reduce blur and comet-tailing. S/N is 57 dB; horizontal resolution (green channel) is over 600 lines. Without lens, the NiteHawk sells for $4995.

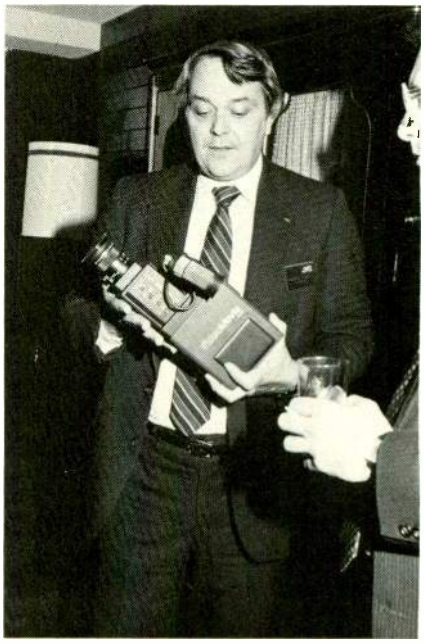
Another entry from Panasonic is the WV-890, designed for ruggedness. It has three ⅔-inch Plumbicons and an eight-bit digital memory to retain images and color balance during long shoots. Other features are f/1.4 prism optics, a built-in RS-189A split-field color bar generator, and a variety of automatics. Price is $9700 without lens.

After its aggressive marketing push of a year ago, Harris has been a little quieter of late about its TC-90S camera. The camera was shown at NAB in both ENG and EFP configurations. Its Smart Package microprocessor time code generation feature, which lays down SMPTE and VITC time codes during shooting, is now standard and included in the TC-90S's price, which has been reduced to $19,950.

Sharp showed a new camera for the corporate and industrial markets, the XC-A1, with three LOC/MS diode gun Saticons, S/N of 57 dB, and 750 lines resolution. It features a character display in the viewfinder that prompts camera setup and warns of unusual conditions. The XC-A1 is available now for $6500 without lens. Sharp has also introduced adapters that allow users of its cameras to take advantage of the Betacam and M half-inch recording formats.

Toshiba showed its PK-70 ENG camera, which is not being marketed in the U.S. at this time.

In addition to its established KY-110 and KY-210 professional video cameras, JVC added its super-compact BT-C100U VideoMovie recorder/camera to its professional line. This nifty little camera, which sells for only $1595, incorporates an integral VHS-C recorder with a 20-minute cassette. With its single half-inch Saticon, it weighs just 4.3 pounds. The camera's main market



JVC's Dan Roberts with new pro Video Movie camera.

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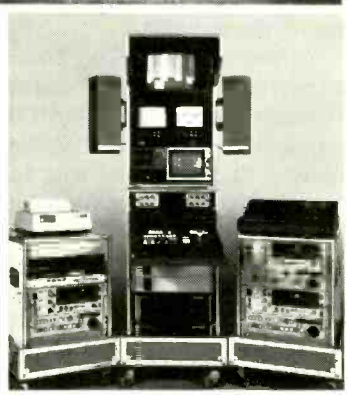

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has been business and education, according to a JVC spokesperson.

HDTV systems

Interest in high-definition television continued at NAB, with HDTV displays at several booths. Given the level of product development, a functional HDTV production system seems well within reach.

Ikegami, one of the leaders in this field, once again showed its 1125-line, NHK-standard HDTV camera and monitors.

Hitachi introduced its new high-definition camera, the SK-1200, with a host of features including shading-free, highly accurate digital registration; real-time dynamic registration for correction of lens-caused errors; and computer-controlled auto setup. The camera has a new high-performance one-inch DIS diode gun Saticon and a high-definition nine-inch viewfinder. Hitachi's digital HDTV VTR also made its NAB debut.

Sony introduced two new HDTV products: the HD1H-120 projection system, with a 40 percent increase in brightness and 15 percent enhancement in resolution over last year's model, and the HDM-2820 28-inch ultra high-resolution monitor.

A feed from the Sony booth fed an experimental HDTV production switcher and an Ultimatte HDTV matting system at the Grass Valley Group booth. The switcher was based on GVG's 300 Series; the feed reached the booth via the Wavelink fiberoptics system.

Other HDTV developments at NAB included Rank Cintel's high-definition flying spot scanner (discussed in the section on post-production, p.TK) and Asaca's HDTV test gear (in the T&M section, p.TK).

Studio cameras

The full-sized studio camera shows no signs of disappearing, but new models were few and far between at this NAB. The major exception was Hitachi, which unveiled a new top-of-the-line, the SK-110D, marrying proven 110 technology with advances taken from Hitachi's HDTV work. New features include: digital registration at over 400 points in the picture; real-time registration correction during zoom and focus to compensate for chromatic abberations in the lens (using follow pots on the lens to track zoom and focus); and a heat sensor in the prism to correct registration errors due to heat buildup. The camera also features a new memory in the viewfinder for graticule markers; electronic zoom indicator in the viewfinder; optional digital shading corrector; and increased resolution of 750 horizontal lines. The user has complete manual access to everything the automatics do, point by point. Tubes are new 30 mm low output capacitance Plumbicons. The camera also has a new SCU (setup control unit) which is more defined in terms of user operations and contains a built-in video switcher and data line switcher for the first six cameras. The 110D is available now.

Hitachi's other new studio camera, the SK-120, has never been shown before in the U.S. but has been available in Europe for about a year. It's an analog auto setup camera, similar to the 110, but with one-inch low output capacitance diode gun Plumbicons or Saticons rather than the 30 mm tubes. It features wide bandwidth and 58 dB S/N. According to Tony Delp, the European market has been more receptive to one-inch tubes than the U.S. market, which still relies on the larger format.

Thomson-CSF's established TTV 1525c was shown in a version substantially the same as last year's, with some additional diagnostics and scene files. Product manager Gerry Brill says the company will soon introduce a "contours out of red" module for the 1525c. The camera, which uses one-inch low capacitance diode gun lead-oxide tubes, features independent microprocessor setup of each camera in a system. A "significant number" have been sold in the Middle East, according to Brill.

In the RCA booth, the well-established TK-47B automatic studio/field camera was exhibited again.

Lenses, pickups

As with cameras, lenses showed increased development in all categories. An unusual entry came from Schwem Technology, which staged a very convincing live demo of its new Gyrozoom 60/300 image-stabilized camera lens. Two ENG cameras, each equipped with a Gyrozoom, were mounted on a base that bounced up and down. With one lens turned on and the other turned off, the video from the cameras was displayed on side-by-side monitors. The stabilized image was absolutely steady; on a tight, close-in zoom, it shook a little, but far less than the nonstabilized image. In addition, Schwem showed a videotape of a bicycle race, with the Gyrozoom on a truck-mounted camera just ahead of the pack, moving at about 25-30 mph. During the taping, the lens was switched on and off with dramatic results: the stabilized image stayed steady as a rock. According to Schwem, five Gyrozooms had been delivered before NAB, with numerous orders taken at the show.

Gyrozoom image stabilizer from Schwem Technology.

The lens, which was 15 years in development and field-tested for six months before marketing, is the brainchild of Dr. Luis Alvarez, 1968 Nobelist in particle physics. Its zoom range is 60-300 mm and maximum aperture is f/6.2. Schwem is asking $12,500 for the lens, which is all U.S.-made, including the glass.

Another unusual device at the show was the Nisus variable speed shutter, shown retrofitted to the Ikegami HL-79E and the Sony DXC-M3A. Shutter speeds range from 1/250 second to 1/4000 second, which a Nisus spokesperson says will stop a golf club in mid-swing. The shutter's single opening completely eliminates lag, the spokesperson said.

Canon made news with a more conventional lens—if "conventional" is the word for a 45X zoom for ⅔-inch cameras. Canon president Jack Keyes reported "tremendous acceptance" of the J45x9.5BIE lens and said several orders had been signed at the show. The lens has a focal range of 9.5-430 mm, plus a built-in 2X extender for a maximum focal length of 860 mm. Maximum aperture is f/1.7 out to 201 mm, f/3.0 at 430 mm. It weighs in at 35 pounds.

Canon's new J8x6B super wide angle lens, another big attraction, provides a whopping 72.5-degree horizontal field of view at its widest position, 6 mm. The company also introduced the J14x8B ENG lens, with maximum aperture of f/1.7 and built-in extender.

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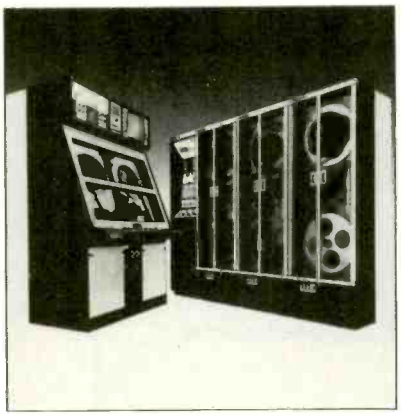

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According to Keyes, Canon received many requests for post-show evaluation of its new shutter speed attachment for Super Slow Mo and similar systems.

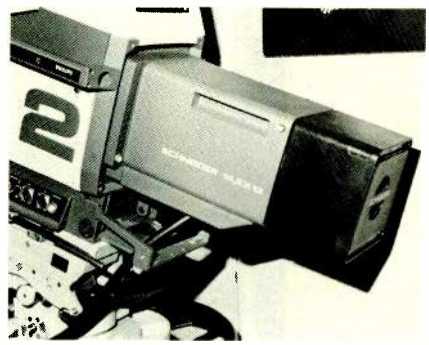
While Canon may have had the longest long lens, Fujinon had the fastest: an f/1.2 version of its A44x9.5ESM 44X zoom for ⅔-inch cameras. The maximum aperture is flat to 247 mm. The lens was also introduced in an f/1.4 version that weighs just 14.6 kg, as opposed to the f/1.2 version's 25 kg. Both lenses have a basic zoom range of 9.5-420 mm and built-in 2X extender, standard auto iris, and optional full servo control.

Other news from Fujinon included a new 16X ENG zoom with wide angle of 9.5 mm and maximum aperture of f/1.8; a new 20X studio zoom for 1 ¼-inch cameras featuring the same "two-door" design as last year's 17X studio lens; and a pair of lenses designed for teleconferencing.

Angenieux unveiled a whole new generation of lenses for all pickup tube sizes, featuring totally redesigned zoom and servo controls using belts instead of gears. The new lenses also share improved internal hood soundproofing, recessed hood handles, and digital readout of iris position, range extender position, and diascope location. In addition, they have an internal heater to maintain normal operating temperature when not in use, a three-lamp diascope, and a new one-person carrying case.

The models in the new series include a 25x8.5 HP lens for EFP CCD cameras; a 24x10 HP lens for ⅔-inch EFP cameras such as the LDK 26, SK-970, and BVP-360; 15x13 HP and 18x12.5 HP lenses for one-inch studio cameras; and 15.17 HP and 18x16.5 HP lenses for 1 ¼-inch studio cameras.

Schneider also covered a range of pickup formats with its new 14.5X zoom lens, which is available for ⅔-inch, one-inch, and 1 ¼-inch cameras from Philips, Ikegami, Sony, Hitachi, RCA, Thomson, and Bosch. It features built-in 2X extender, wide angle of view, short MOD, low distortion, high MTF, and optional diascope. Another new Schneider lens was a 17X zoom for ⅔-inch cameras, with



The Schneider 14.5x13 studio lens.

8.5-150 mm focal range and f/1.4 maximum aperture.

Tamron added two new models to its line of ENG/EFP lenses: a 12X and a 14X zoom, each with fast maximum aperture of f/1.6. The 12X has a focal range of 9.5-114 mm and built-in 2X extender; the 14X, with a range of 9-126 mm, transmits more than 25 percent more light than comparable lenses, according to Tamron, and has an especially high transmittance ratio for blue light. It also has a macro focusing feature.

Century Precision expanded its line of useful lens accessories with a wide angle adapter set that increases angle of view 30 to 50 percent. It lists for $595. A new low angle prism for film and video cameras is, according to Century, the first of its kind to allow the use of extreme wide angle lenses (as wide as 16 mm) without vignetting. Price is $6000. Century also unveiled its latest periscope lens, the V16, for ⅔-inch video and 16 mm film cameras, at $2950.

Amperex addressed the growing interest in solid-state imaging with the introduction of two TV-quality frame transfer CCDs, the NXA1010 monochrome chip with 420-line resolution and the NXA1020 color chip with over 300 lines of resolution. The company has hardly given up on tubes, however, and unveiled three new ⅔-inch Plumbicons: the XQ4187 high-stability diode gun tube, the XQ3457 diode gun tube with a length of only 85 mm, and the economical XQ3467 Plumbicon, which sells for less than $1000.

EEV showed its mixed field and hybrid Leddicons, including the new P8474 ⅔-inch mixed field Leddicon. A brand-new entry was the P8164 hybrid Leddicon for the Hitachi FP-22, JVC KY-320E, and similar cameras, with production expected to begin in September. EEV also introduced a pair of new 30 mm diode gun Leddicons, the P8454 Series and the P8455.

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Two Assignments—use a 13X zoom for ENG, use the J20x8.5BIE for studio or outdoor broadcast assignments—with the same 2/3" camera!
Focal length: 8.5-170mm (17-340mm w/2X extender)
Max. Relative Aperture: 1:1.6 through 130mm
1:2.1 at 170mm

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2/3" Economy—full utility for all studio situations, combining a 15X zoom ratio with an M.O.D. of under two feet, a 54° angle of view and high sensitivity throughout the range.
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*25mm format

PV14x12.5BIE High Resolution Lens for 30mm and 25mm cameras.
A Unique Design—featuring extensive use of Fluorite lens elements, this lightweight, compact 14X studio lens provides high sensitivity and critical sharpness at all focal lengths.

Focal length: 12.5-175mm (1.5X and 2X extenders built-in)
Max. Relative Aperture*: 1:1.6 at all focal lengths

*25mm format

J25x11.5BIE for 2/3" cameras.
Greater Reach—a 25X zoom lens designed specifically for 2/3" cameras. The power and scope of 1" systems, the economy and efficiency of your 2/3" cameras.

Focal length: 11.5-288mm (23-576mm w/2X extender)
Max. Relative Aperture: 1:1.6 through 220mm
1:2.1 at 288mm

J18x9BIE for 2/3" cameras.
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Focal length: 9-162mm (18-324mm w/2X extender)
Max. Relative Aperture: 1:1.7 through 116mm
1:2.4 at 162mm

J13x9BIE for 2/3" cameras.
The Portable Standard—used by cameramen around the world under all conditions, the J13x9BIE is a proven performer with superior sharpness and sensitivity.

Focal length: 9-118mm (18-236mm w/2X extender)
Max. Relative Aperture: 1:1.6 through 99mm
1:1.9 at 118mm

J15x9.5 for 2/3" cameras.
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1:2.3 at 143mm

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Special Effects Steps Closer to the All-Digital Studio

As long ago as the late 1970s, when the first pieces of the latest-generation digital effects and graphics equipment began appearing on the market, there were those who saw the possibility that one day, perhaps, it would be possible to tie all the equipment together into a "mega-system" in which pieces of equipment, though they were each able to operate separately, could also talk freely with one another. Editor, production switcher, digital effects unit, art/graphics system, still store, character generator, etc.

In the intervening years there have, of course, been any number of solutions to the interface problem—some, especially those for the editor/production switcher/digital effects system linkup advanced by the manufacturers, others suggested on a more ad hoc basis by stations and facilities that needed to create more powerful graphics studios. In the past few years, however, various SMPTE standards have, indeed, finally given the industry a common goal to work towards—a studio in which analog component and digital component processing networks are together, communicating over a common digital interface. And the industry, for the first time, is beginning to see its way clear of the digital black box era into a time when the all-digital studio, with A/D and D/A conversion only as the first and last steps, can actually be achieved.

One of the main contributors to this movement continues to be MCI/Quantel, whose booth theme this year was, indeed, "step closer to the digital studio." In terms of digital effects, this meant for Quantel to tie together both multiple Encore effects channels, and Mirages, and Paintboxes, up to a total of 16. Quantel calls the setup an electronic network, and it allows a facility with multiple processors to either split them off into individual control rooms and studios, or to combine them into a single room when necessary. The units interface through the Mirage/Encore floating viewpoint controller, which, besides offering the ability to manipulate a 3D image in true 3D space, also allows the control of all Encores and Mirages assigned to it in the network.

The other big development in the Quantel effects system is the ever-

True 3D perspective created on MCI/Quantel Paintbox.

more-astonishing capabilities of the Morph software package for Mirage. Morph is a menu-prompted software addition to the Mirage composition station that allows the creation of new Mirage shapes by even the most computer-ignorant operator. You simply answer a few questions in response to the menu prompts, and the machine creates a wireframe solid model which can then be animated and mapped with a video image. The Morph solids modeling program was first shown at the winter SMPTE. Since then, it has been provided with even more amazing effects, such as a "tiles" program. The menu asks for the general size of the tiles, their perspective, and how they will move. When mapped with video, which, of course, can be live, the image flies apart, or falls together, or moves about with the pieces of the video image flying around on the individual "tile" elements—that can be as small as a single pixel. A similar set of Morph effects are generated through a "slats" program which creates variations on a venetian blind theme.

Abekas is a young, innovative company with its eye on being able to supply the industry with a range of digital products which can ultimately be tied together as components of a digital studio. One of the most successful of its products has been the A52 digital video effects system, shown this year for the first time with a dual-channel capacity. The effects system can now be configured with up to four control panels and two channels, and a simple assignment

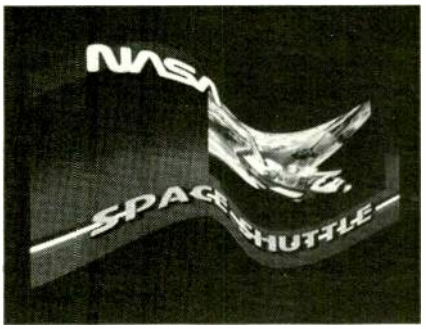
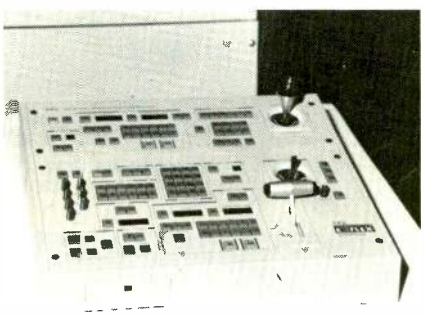


Image manipulation performed on Abekas A52 effects generator.

panel to combine or separate the channels.

Also new from Abekas is a mini control panel for the effects system—four inches high by 8.5 inches wide. The new panel, which fits into the accessory slot available on most production switchers, offers most of the control capabilities found on the full-sized panel.

NEC's DVE has undergone a major transformation during the past year, and is now the DVE System 10. Based on 16-bit processing (the previous DVE was an eight-bit system), only half the size of a combined E-Flex/Optiflex



New E-Flex System 10 from NEC.

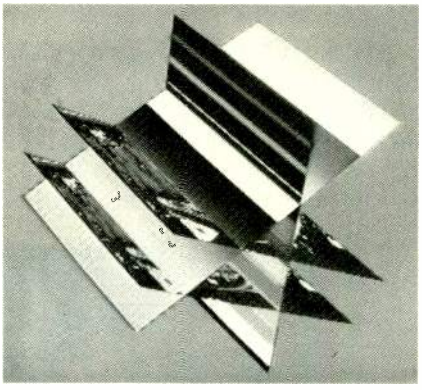
package, the new unit nonetheless offers not only traditional NEC DVE hallmarks—3D rotation and perspective, key tracking, cropping, programmable memory, mosaic tiles, posterization, etc.—but also some brand-new effects and features. For one thing, the operator can program a virtually unlimited number of key frames in a real-time effect, insuring transitions as smooth as the operator wants to make them.

But while real-time effects continue to be a major emphasis in the system, there is increasing importance being placed on off-line, production-oriented effects. System 10 contains a small CRT display panel which provides continuously updated information about the status of the effect—size, position,

etc. And by using the display as a reference, it is possible to make changes in the effect by reprogramming the numbers, precisely adjusting the duration or the appearance to conform with production requirements. The parameters for custom effects such as these can be stored on a new NEC 3.5-inch minifloppy disk drive. When loaded back into the system, soft function keys are automatically set up to execute the effect.

The price for the basic package (DVE, control panel, disk drives) is $79,000; a two-channel version is available for $150,000.

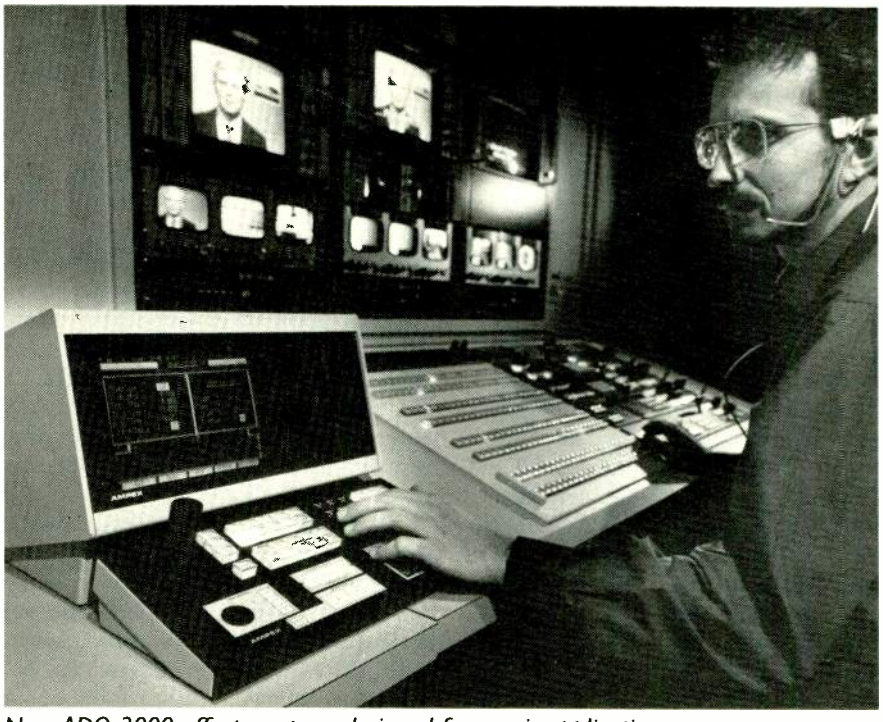
In any account of "most exciting new development at the show," the new Ampex ADO expansion must have a top place. Actually, there are two extensions to the line—a low-end version in the form of ADO 2000, and the exciting new Infinity effect which requires the basic ADO plus the ADO channel combiner. Using a 3D priority system, Infinity keeps track of the x, y, *and* z coordinates of objects or rasters in the effect sequence, and gives the operator independent control of all three axes. Thus, in addition to being able to pass objects and rasters in front of and behind one another—a common effect—Infinity can pass them through one another. The effect is breathtaking, particularly when the effect is done with four channels of ADO, and one sees the planes slicing through one another simultaneously.



Four-channel ADO effect using new Infinity effects package.

(Ampex claimed that this hardware and software addition to the combiner, which also gives the ability to create swirls, variable-length decays, and so forth, was a "first" in the world of digital effects. At the MCI/Quantel booth, however, a very similar pass-through effect was demonstrated with the Encore. A Quantel spokesman pointed out that Encore had always been capable of the effect "although we never considered it particularly important before.")

Nobody quarreled with the concept of the ADO 2000, however, a lower-cost version of ADO designed specifically for broadcast, on-air applications. While preserving the basic architecture and signal quality of the regular ADO, the 2000 provides for 30 regularly-used digital effects which can be activated with either one or two keystrokes—making it quite simple for use in an on-air environment. The basic 2000 comes configured with a single channel, although it can be expanded up to four channels. Other options include Digimatte, the digital keying system for creating key follows. One of the 2000's most significant advantages comes when it is interfaced with the Ampex AVC switcher. The first effects system which is truly integrated with switcher operations, once the interface is performed, every one of ADO's effects can be controlled through the AVC's M/Es. Indeed, the control panel of the ADO need never be touched at all.



New ADO 2000 effects system, designed for on-air applications.

A brand-new digital effects system from PYE-TVT also attracted considerable attention—CVE, for component video effects, although these components are digital and not the analog component scheme which has drawn so much attention. The basic CVE, a two-channel system, costs $165,000, which includes its own digital mixer as well as chromakeyer, adaptive comb filter, and memory presets. The system can be configured up to eight channels, however, and contains an internal priority assignment facility making it easily adapted to large facility use. Besides the obviously superior quality of the 4:2:2 13.5 MHz sampling, the CVE has a host of effects—including rotation, perspective, decay, and "ooze," as well as all standard digital effects—packed into an elegantly small production package.

Shintron, which this year introduced a new 12-input version of its component video switcher, also unveiled Andromeda 3000—a brand-new component-based frame synchronizer/digital effects system. The unit is based on a newly-developed frame grabber, SWIFT, which stores each image in three separate memory planes for the three component signals. Resolution is 765 x 508 pixels per plane, eight bits deep. Effects include freeze, slide, flip, tumble, posterization, compression, and key output generation. Once interfaced with the component switcher, all effects can be controlled through the switcher's control panel.

Meanwhile, Harris continues to market the HVE video effects processor, manufactured for Harris by Toshiba in Japan. The exclusivity period has apparently expired, and Toshiba is once again free to market its special effects product in the U.S.—although there was no sign of it at the booth.

Chroma Digital Systems, which recently named Lyle Keys of Utah Scientific to its Board of Directors, announced it has delivered 80 of its Chromafex 766 frame synchronizer/

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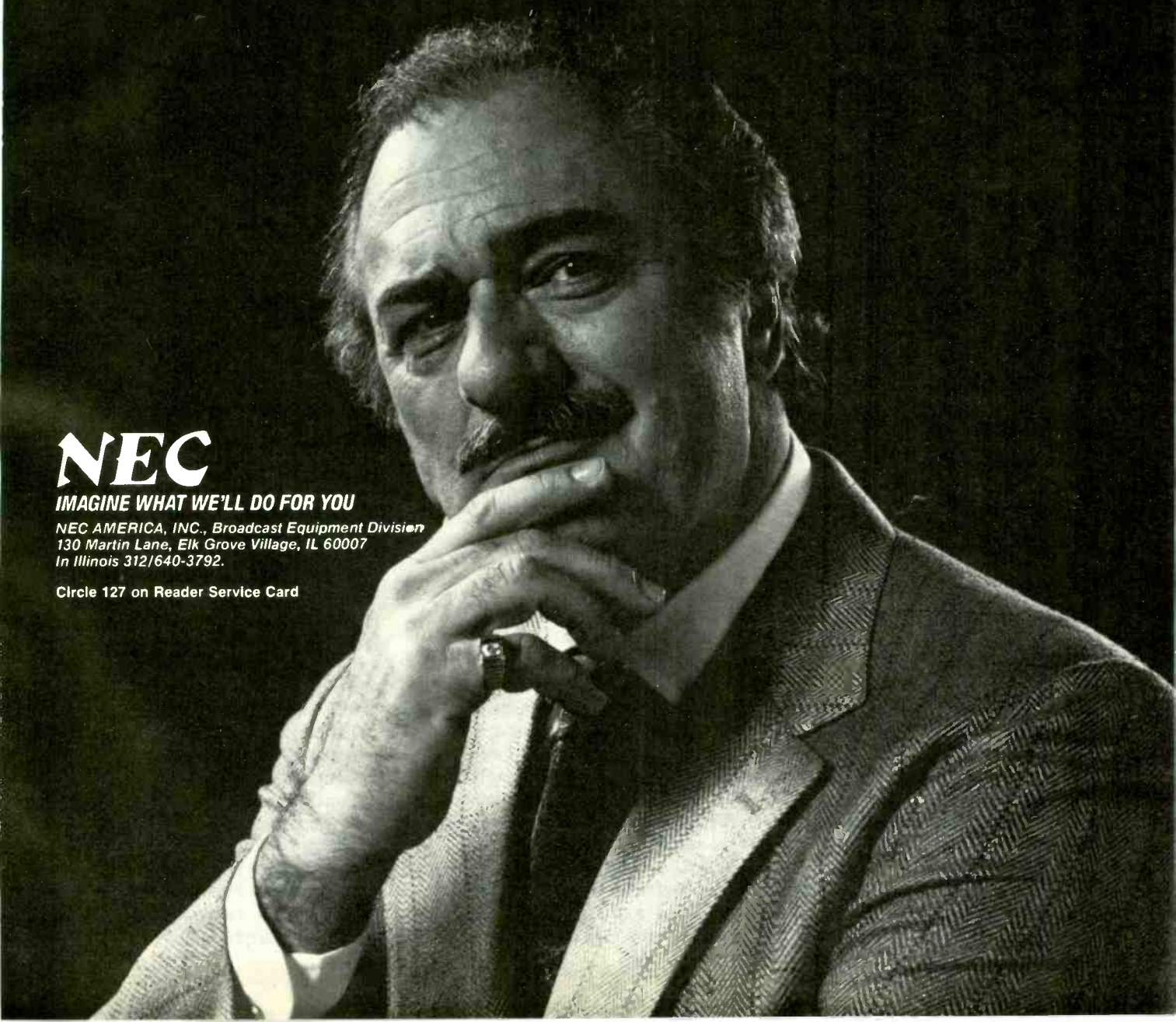

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infinite-window TBC/digital effects units, priced at $14,750.

A somewhat similar approach is taken by For-A with the FA-440 low-cost ($8950) digital TBC/effects processor. Eight-bit component encoding is used to generate an exceptionally transparent image, while the repertoire of effects includes quarter-size compression with five positions, negative and posterization effects, mosaics, and mirroring. The unit includes a built-in keyer.

There was also major product development in Ultimatte's product line. Ultimatte-5 is the latest-generation "big brother" system, priced at $25,000. New features of the digitally-based compositing system are its ability to be remotely controlled, over single coax connection, from four different control panels; analog component input; dynamic background matte tracking as color varies slightly from wall to ceiling to floor; memory presets; choice of soft or hard windows, which can also be used to define a reverse window in the background; and several other features.

Newsmatte-2, the system designed for on-air use, is priced at $7500. It is also being marketed by Harris in conjunction with the IRIS still store (see report elsewhere).

Although Paltex had begun showing its digital video processor at last year's SMPTE, its official introduction of Gemini was at NAB. The eight-bit, 4:2:2 component coded sampling architecture is used throughout the combination dual-channel universal TBC/field store/four-input production switcher/digital effects processor to produce a combination package for $28,000 (a dual-channel/dual-output version is available for $31,000). Switcher and digital effects include pushes, reveals, dissolves, freezes, strobes, mosaic tiles, posterization, inversion, and more, with joystick positioning. Effects can be controlled manually, or activated remotely by an editor or remote-control panel up to 300 feet. Paltex reports shipments of 25 Gemini units since March in the U.S. alone, with 500 delivered worldwide.

From Microtime, there is a new ACT-1 (artistic control terminal) for the Genesis 1 special effects system. The new control panel is designed to offer greater control capabilities over Genesis effects, such as joystick positioning. ACT-1 also allows frame-accurate specification of effect length; the creation of keyframes for an interpolated animation sequence; routing switcher interface so that as a picture is flipped the next image is automatically available—the equivalent of a dual-channel effect; and off-line storage of effects setups. ACT-1 can function either manually or automatically, with either real-time or production-programmed effects. Cost of Genesis 1 is $29,990. Genesis 1 with ACT-1 will sell for $27,990. Microtime announced that, since December, over 100 Genesis units have been shipped.

Demonstration of ACT-1 controller for Microtime Genesis effects processor.

DSC Illusion effects system still store option.

DSC showed its Illusion system in a multichannel configuration. Also introduced was a still store option for the effects system—see description below.

Australia's Fairlight, testing the U.S. market for the first time, attracted considerable attention with its Computer Video Instrument—a PAL- or NTSC-compatible video effects system with an integral field store, 4096-color digitizer, 100-event preset memory, and self-contained chromakeyer and matte/key generator. The interesting feature of the system is that, in addition to manipulating video, the system also has extensive painting and graphics capabilities—that can either be used in conjunction with the video or else to create freehand images. A three-font character generator is also included.

The systems approach to effects and graphics is also being taken by CEL, a British company being marketed in the U.S. by James Grunder & Assoc. Building blocks in the system consist of the P147-20 TBC/framestore synchronizer/effects generator with features such as colorizing, pixelation, posterization, and so forth; the P148 effects controller for the TBC/synchronizer for effects such as zooms, flips, tumbles, montage, and bordering; the P169V 8x4 digitally-controlled routing switcher; the P147-12 NTSC/PAL standards converter; and P154 dual-camera multiplexer which works in conjunction wth the TBC/synchronizer.

Graham-Patten's 1231 standalone downstream keyer, handling up to six key signals and intended for direct interface with a video editing system, was also on display.

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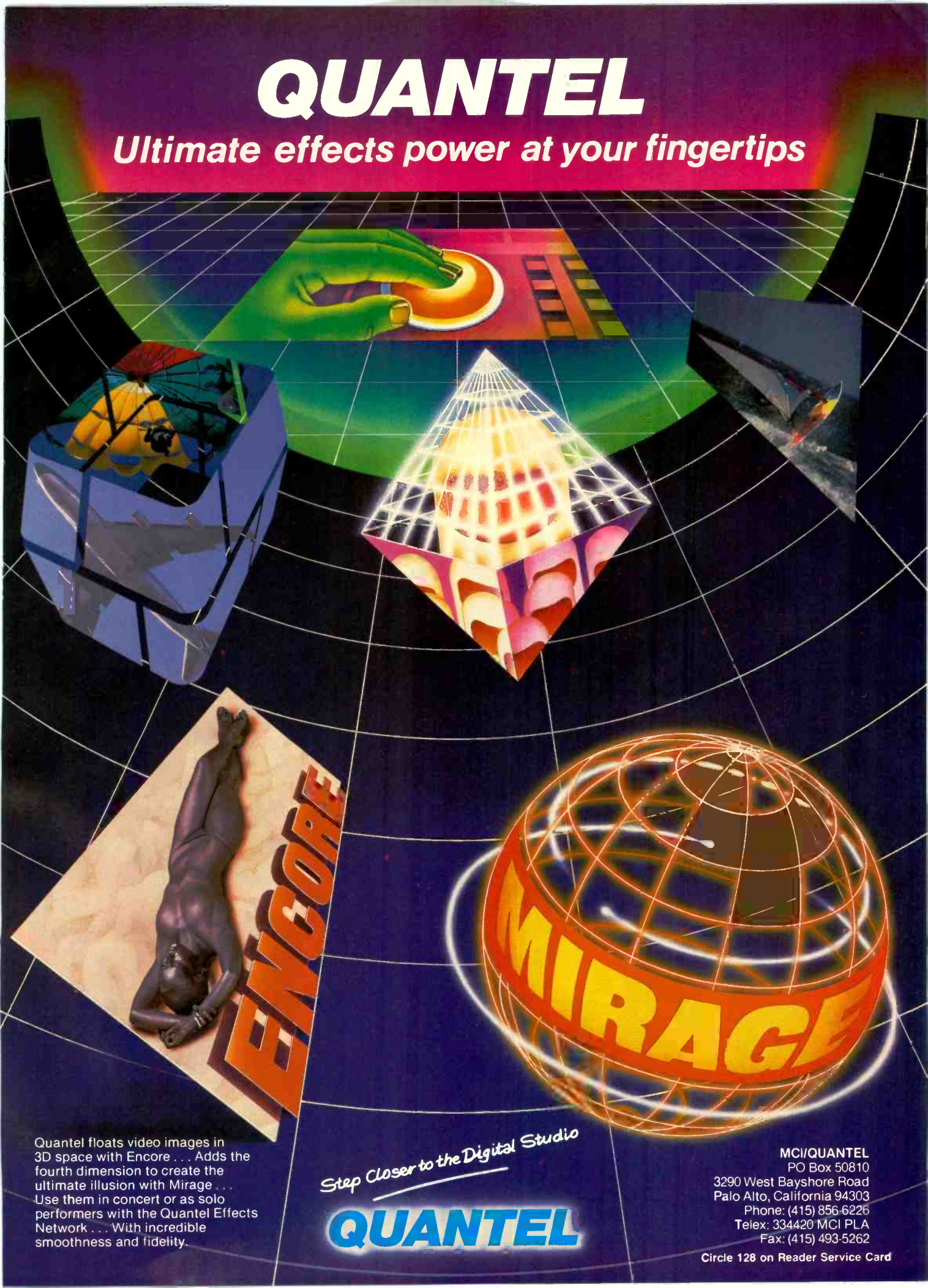

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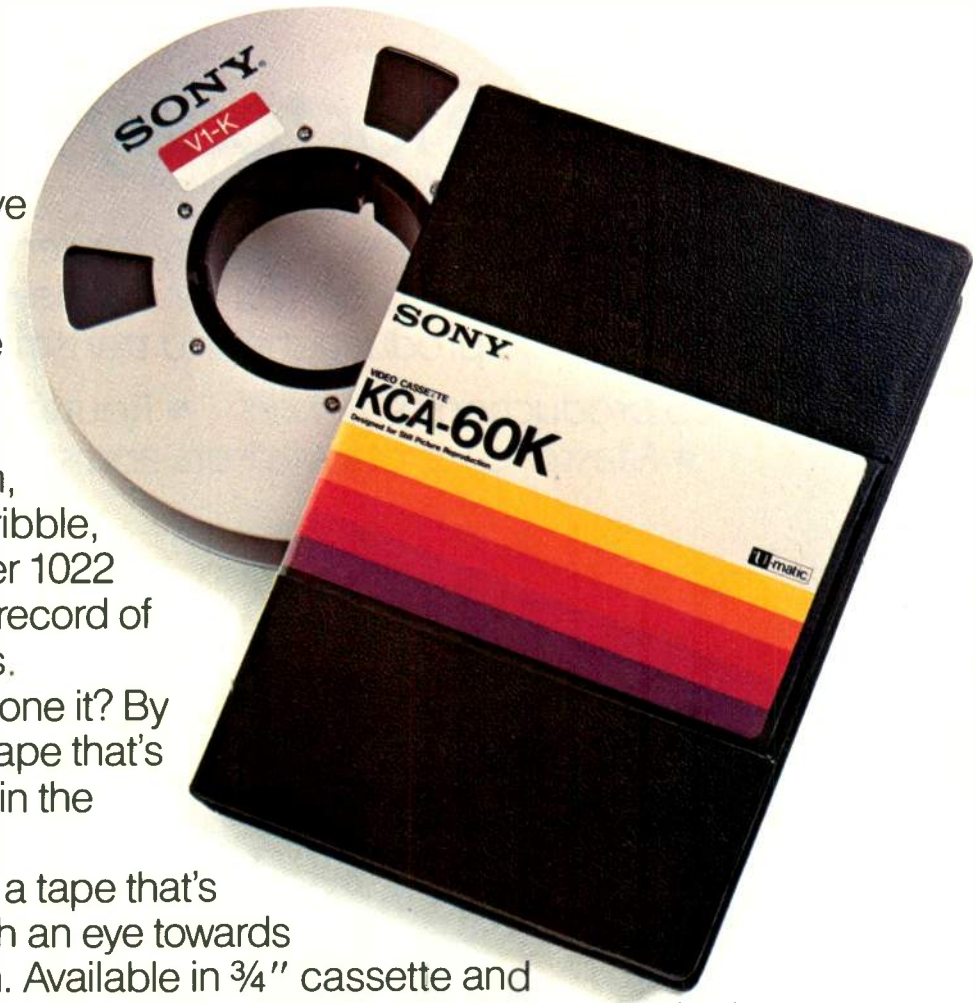

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Digital Graphics and Text Explore the Options

For a station or facility looking for a digital graphics system—either two-dimensional painting or three-dimensional solids modeling and manipulation, or both—NAB was the right place. There were occasional grumblings that the National Computer Graphics Association (NCGA) had scheduled its Dallas show concurrently with NAB, forcing some manufacturers to split their energies. But those who decided on NAB found interest among broadcasters has never been higher.

That is just as well. For once again, there are almost literally dozens of manufacturers in the field, each vying for a relatively small niche in the station and facility market. But at least the market is growing, and so even newcomers may find a place.

Several new entrants are already-familiar names from other product lines. Harris, for example, which has made some intelligent marketing agreements with companies such as Chyron (a character generator option for the IRIS still store), Toshiba (the HVE digital effects system), and DSC (a digital matting system), has now gone into partnership with Aurora. Harris will be the U.S. marketing agent for the brand-new Aurora AU/75 videographics system, a graphics package which incorporates many of the features of the full-blown AU/750 system but is based around an IBM PC or compatible. Besides drawing and painting with menu choices made from a unique icon menu, and easy configuration into a multiuser system, Aurora trademarks such as an extremely well-defined real-time animation program and simple interface for frame-by-frame animation, are also part of the new system. Harris will sell the AU/75 together with the IRIS-C still store for under $100,000.

Another major new entrant into the graphics area is Chyron, which this year introduced Chameleon—a digital paint system priced at only $12,000 in a standalone package (rather than being part of the Chyron IV/MGM line). Resolution is 768 x 482 pixels (768 x 582 in PAL), with 256 colors displayable out of 4096. The system offers both freehand drawing and painting, with user-definable brushes, or computer-assisted drawing with automatic functions such as circle and rectangle drawing. Area fill is included, as is a layout grid which can be used to position images, and a 16x magnification feature. Optional is a 256-level camera-based digitizer for capturing black-and-white images which can be subsequently colorized. The basic system also includes a keyer, which can be configured for either upstream or downstream operation. Also included, in addition to the digitizing tablet and stylus, is a 10 megabyte removable hard disk drive.

New Chyron digital painting system.

Quanta, too, has come out with a brand-new painting system, Quantapaint, offering 256 colors displayable out of over 16 million; resolution is 512 x 512 pixels in NTSC, with a PAL version on the way. The product consists primarily of a high-resolution graphics card designed for use with the PC and compatibles, with the card also supplying sync, genlock, and encoding. The graphics software is as complete as any on the market, and includes both freehand drawing and painting as well as the "connect the lines" technique by which the computer will automatically construct regular geometric forms once the operator has entered the points. There are also a large number of graphics aids, such as cut-and-paste, magnification, rubber-banding which allows a form to be "stretched out," copying and moving windowed portions of the image, and so forth. Again, Quanta is looking for the total systems approach to graphics, and offers simple interface to its Q8 and other character generators. To complete the system, a 256-level digitizer is available, as is a 53 Mb fixed disk to supplement the 3.5-inch mini floppy drives which come as standard hardware.

And then there is Dubner, whose recent acquisition by the Grass Valley Group appears to have resulted in a resurgence of new product development. Dubner has two brand-new digital paint systems scheduled to begin delivery later this year—the DPS-1 NTSC version ($20,000), and the DPS-2 component version ($50,00). Both include standard features such as a real-time frame grabber, a wide range of brushes (from solid to airbrush and transparent, color cycle animation), and full graphics functions (text, automatic shape plotter, cut and paste, and so forth). The component system also offers two-plane cut and paste, key over live video, and 3D modeling and manipulation—similar to features found on the CBG-2.

The paint systems, in fact, arose out of work on The Third Plane, a high-resolution still store option for the CBG-2—a $12,000 add-on that replaces the current CBG digitizer which records and plays back NTSC images from a standard CBG disk. The price includes the DPS-1 paint program described above.

Certainly one of the most significant trends among digital paint systems is the recent arrival of a whole new generation of systems incorporating 24-bit framestores. With this much memory available, each pixel in the display can be set to any of 230,000 colors, meaning that full-color artwork can be created on the system or scanned in through a digitizer. Interestingly, two of the most active companies in the computer graphics world— Artronics and Cromemco— are now battling it out in the broadcast/teleproduction arena through two of the industry's most important players, 3M and Color-Graphics respectively.

The 24-bit 3M/Artronics system, variously called the Artron or the MFA, is an extension of the earlier BFA system, which used an eight-bit framestore. The main difference, of course, is that the expanded system offers so much more in the way of color choices. There is also a color digitizer, and an

3M's MFA 24-bit art/graphics system.

animation stand/camera setup is standard with the Artron package. Also available now from 3M is the Ani-Magic animation package, offering all three types of animation: color map lookup and plane-by-plane for real-time effects, and simple adaptation for frame-by-frame animations. The different types of animation can be combined in the same image to produce highly complex graphics, and they can also be combined with an automatic multiframe zoom and pan program.

Part of a major effort on the part of the company to be recognized as a leader in the graphics market as well as newsroom computers, the ColorGraphics 24-bit system, ArtStar II, is priced at $94,900. Offering substantially the same range of color choices as the Artron—365,000 displayable from a total palette of over 16 million—it also has special anti-aliasing filters delivering the equivalent of 5000 lines of resolution from the 1024 x 1024 pixel display. Since NTSC resolution is considerably less, a 512 x 512 window is defined in the center of the 1024 x 1024 array, with the remaining area used to store graphics elements related to the picture—the palette, special brushes, elements used for animation, and so forth. Thus, when the picture is recalled, the elements used to create it are also recalled. Extra space also allows an image to be created larger than it will actually be seen, and the window moved across the larger image to create scrolls and pans.

Besides the digital artwork capabilities, the system also has 99 fonts on-line internal, so images can be instantly captioned and titled. A worldwide map library is also standard. ArtStar II also includes a camera-based color digitizer, and extensive capabilities for animation, including

The ArtStar graphics system from ColorGraphics.

eight-panel cel animation and color cycle animation of 20 areas simultaneously, each area with its own lookup table and cycling speed. System output is NTSC or RGB.

A new low-cost graphics system was also shown at the United Media booth, the SNV Group's Image Artist package. Color choice is 256 out of 16.7 million, while the software offers the complete range of features associated with modern drawing/painting programs: user-defined brushes, NTSC/RGB/PAL output, integral black-and-white digitizer, a handy business graphics/chart package, and so forth. The system can be networked to provide for multiple users.

Symtec, which entered the market last year with the PGS-III, this year introduced the Super Color version of its professional graphics system. Utilizing an IBM PC as its host computer and its internal 68000 16-bit microprocessor as its controller, the Symtec system provides 1024 on-screen colors from a total palette of 16.7 million, and features an internal 128-level digitizer. The $17,000 system contains extensive text generation capabilities in addition to a full range of graphics processing techniques.

Also of note is the arrival of Digital Techniques into the television market. The company, which manufactures its own microprocessor, based around the Intel 8088 16-bit chip, has a graphics system which operates off of a pressure-sensitive touch screen. Combining both video and text/graphics capabilities, the Touchcom system contains various modules such as an authoring language allowing the user to establish the graphics programming routines, video to provide either RGB or NTSC, and the graphics generator. All together, a system suitable for broadcast or production will run around $20,000.

Of all the new products introduced in the graphics area this year, however, perhaps none is as significant as Cubicomp's PictureMaker. Cubicomp, a force in the computer graphics world for the past several years, has hired on a team of marketing people who know the television business inside-out, and PictureMaker proves it: a computer graphics animation system for under $25,000—with full 3D modeling and manipulation, over 65,000 colors on the screen at once, smooth-shaded solids, fractal surfaces, jaggy-free anti-aliased curves and diagonals, extremely simple operator interface—the works! The system consists of Cubicomp's own 16-bit framebuffer, NTSC or RGB compatible, together with an interface for the IBM PC. Using the Cubicomp software on the PC, the operator or artist creates the models by answering simple menu-prompted questions. The answers be-

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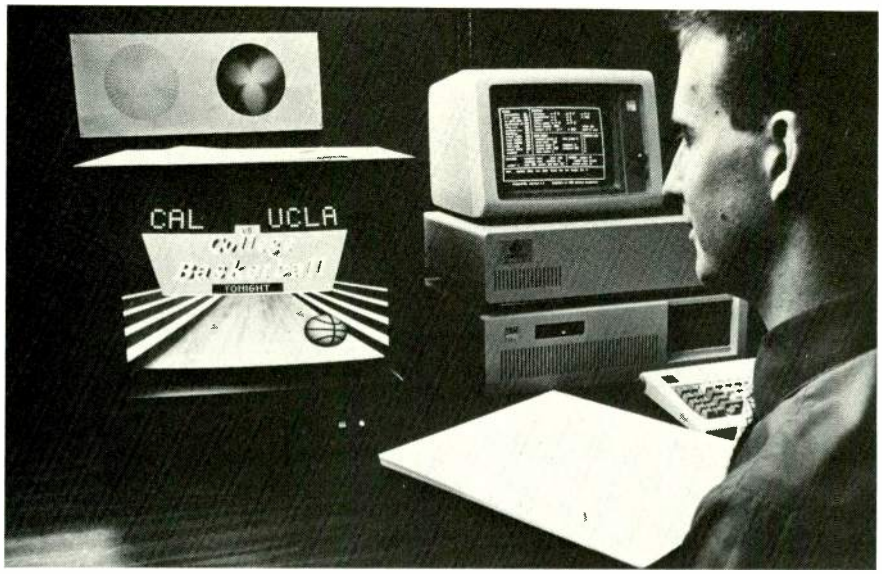

Cubicomp's under-$25,000 PictureMaker 3D graphics.

come the model definition, stored on a PC disk. To render the model in the framebuffer and view it on the graphics screen, the PC is used as a number cruncher, and the results fed through the interface to the Cubicomp unit which performs the various viewing algorithms.

PictureMaker is not, of course, a real-time system. Once the basic model has been defined, and instructions provided about how it is to be viewed, it can take up to two minutes per frame to output the results to the graphics screen or to the animation-capable VTR. But with a $25,000 piece of hardware (excluding the cost of the PC), the station or facility can generate professional-looking promos and IDs at least as good as those produced by the "big guys" who can charge as much as $25,000 for a single spot.

Despite the inroads being made by the newer, lower-cost systems, of course, the market leader in digital art continues to be the MCI/Quantel Paintbox. The product is still undergoing software updating, with this year revealing an exciting new perspective option. True 3D manipulation of the Paintbox-created image is offered, allowing the image to be rotated in 3D space from menu prompts on the Paintbox screen, rather than having to pass the image through a digital effects system.

There has also been considerable new development in what many consider the state of the art in graphics animation systems, the Bosch FGS-4000. What started out several years ago as one of the industry's first real-time manipulators for three-dimensional polygon-based solid models, based on a 68000 microprocessor controller and 15 separate microprocessors in a parallel, pipeline arrangement, has now reached its full maturity. All of the incredible 3D images provided by other computer graphics systems, but not available for use in broadcast because the computer graphics companies do not understand video, can now be achieved on the 4000. The latest effect is the inclusion of a program for fractal landscapes—a technique which generates forms based on the non-Euclidian fractal geometry invented about a decade ago. (The Bosch images were shown in a magnificent theatrical presentation using a GE Talaria projector to provide crystal-clear images on an eight-foot-wide projection screen.)

For those wishing to do it themselves, at extremely low cost, there are a number of new computer graphics peripherals on the market. Biflyx introduced a full-color digitizer board, designed for installation in the IBM PC or compatible. Image resolution is 256 x 256 pixels x 12 bits. Biflyx also introduced a high-speed color thermal printer for full-color hardcopy printouts.

New Media Graphics introduced PC-GraphOver, a two-board set for the PC or compatible. One board provides NTSC video, the other a full graphics overlay capability. The system thus allows the station artist to interact with the video, to add lettering, diagrams, etc.

As digital systems become capable of more and more, and the difference between one unit and another has primarily to do with which generation of microprocessor is used and how the programming is written, ye olde character generator has undergone some major modifications. The addition of graphics modes, camera-based font/logo compose, animation, and so forth have all pushed "character generator" far beyond its original use for writing titles and lower-third IDs.

Now, however, there is a new movement afoot to create machines that will generate extremely-high-resolution characters but without the frills and graphics of the more expensive systems. This is the approach taken in Scribe, Chyron's brand-new ground-up-designed "text generator" (to distinguish it from the more traditional character generator). The system's most special feature is extremely high-quality lettering, achieved through hardware anti-aliasing that delivers "print quality text" by using the equivalent of a framestore (Chyron won't, at this point, quote a nanosecond or pixel resolution). The on-screen characters are derived from a digital font library which contains small pieces of letters each stored in a separate memory location. When the latter is called up, its individual lines and curves are assembled, and letter displayed in any size from 10 scan lines to full screen. With this arrangement, there is a virtually unlimited choice of fonts.

Not only does the software help take care of anti-aliasing, but it also provides for extensive color capabilities—up to 256 per screen. Colors are arranged eight character palettes of 32 colors each, selected from a total of 16.7 million. Background color can be set line-by-line, and a wide variety of character edging styles are available. Besides the basic channel, a second, preview channel is also available—but without the anti-aliasing. Basic price will be around $25,000, although Scribe is still technically in prototype stage.

Meanwhile, Chyron also showed several new features for the Chyron IV and RGU. The most important of these is a third, off-line entry channel for the IV, making it possible to automatically or manually add to preformatted pages while the main system is in operation, then have the new data automatically formatted and displayed when the page is called to air. Chyron has also doubled the number of fonts per page to 12, added "2.5-dimension" perspective (allowing 2D images to be "thickened" into three-dimensional-appearing forms), and added true 3D perspective rotation of images. The RGU can now be interfaced with the Chyron font compose station.

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Dubner, too, has added a text-intensive character generator to its line—Texta, priced at $42 for a single-channel system. Features include extensive border and edging combinations, nine speeds of roll and crawl, slow reveal, proportional spacing, diagonal typing, 3D drop shadows, etc. A preview channel is available for an additional $500, while a fully encoded second channel puts the system price up to $59,000. A major option is Dubner's dial-up weather system, placing the user in communication with various databases and then automatically formatting the maps and charts.

While some character generator manufacturers are just now getting into the video graphics area, Thomson-CSF, whose Vidifont Graphics V has already scored successes in the graphics area, is returning to "basics" with a new, medium-priced (under $40,000) character generator, Viditext II. Incorporating much of the engineering design that went into the Graphics V, and with options for upgrading the basic package with animation effects such as time sequential overlays, frame-by-frame output, and so forth, Viditext II is basically a high-resolution character generator. It uses the same font library as Graphics V, now numbering almost 100, with eight fonts (106) characters on line at once. Backgrounds, composed with 32 colors displayable out of 4096, can be created separately, or linked together with multicolored text faces. One of the system's main advantages is that it can be set up in a multichannel configuration, with channels assigned to compose stations as needed. Thus, in a large plant, those needing a second or even third channel can be assigned temporary use of a channel which might otherwise be inactive. Besides high-resolution characters, Viditext II also offers extensive text editing capabilities (centering, justification, tabbing, etc.), and extensive display dynamics (rippling, flashing, seven roll and crawl speeds, etc.).

Then there is Cypher, MCI/Quantel's ultra-sophisticated "caption generator." It is called a caption generator rather than a character generator "which it far transcends" according to Quantel's president, George Grasso. Now in full production, with the first unit delivered to NBC just weeks prior to NAB, Cypher's main feature is its print-quality characters, in an unlimited number of sizes, with six fonts online and displayable together. It also features complete three-dimensional control over the characters, which can be individually manipulated and animated.

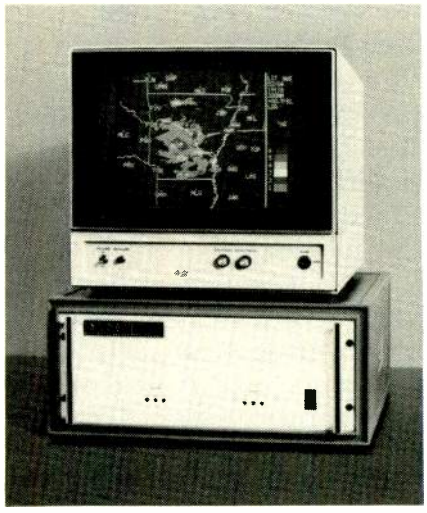
Quanta's new QCG-500, priced at $14,995 (including an encoder), with a second 3.5-inch mini-floppy disk drive extra, is a lower-cost version of the popular Q8, and based on the same technology. The new system has fewer color choices (512), and is only available in a single-channel configuration. But it can be connected with the camera-based font compose, the Quanta paint system described earlier, or Quanta's digital effects package. And like the Q8, it features Font Flex, allowing any character from any font to be instantly resized, extended or condensed, and italicized either left or right. Character resolution is 29 ns.

In the $7000 range, there is the exciting new Laird Model 1500 character generator—a new-generation machine which the company is confident will regain market share lost with the earlier Communicator models. The 1500 boasts 35 ns character resolution, with character height from 7-56 lines. The basic system has 21 fonts (96 characters each), 16 of which can be used simultaneously off a 3.5-inch mini-floppy disk. Text features include proportional spacing, forward and backward italicizing, four degrees of drop shadow and edging, over 65,000 colors available for characters and background, auto centering, underlining, and so forth. Use of color for characters and backgrounds requires an encoder, such as the $995 Laird 1030.

Mycrogen, still trying to determine if there is a broadcast market for its product line, brought Ernie, a $4000 character generator with 70 ns resolution, two resident fonts, eight character and background colors, and three-speed roll and crawl. One possible application is for emergency use, to generate "Please Stand By" or other messages when the main studio is off the air.

Weather systems

Interest in weather systems seems to have reached an all-time high, as does competition among the manufacturers (despite the fact that the market could not support Beston/McInnis-Skinner. That company has gone out of business, although Judy Skinner is now working at the Jet Propulsion Lab, George Elsisser is now at Fortel, and several other members of the group are working for Astin, the British character generator manufacturer. We wish them all well.)



Alden live weather radar display.

The biggest news in weather systems at NAB is that Accu-Weather, already the country's largest private weather forecasting service, (over 200 radio and TV clients currently subscribe), has gone into the weather graphics business. Instead of a station relying on its art/graphics/character generator system to take in the Accu-Weather data and colorize and format it for air, the company itself will now do the service for you—supplying over 50 weather charts and maps a day transmitted to the station in two to three minutes each over high-speed modems. For a minimum commitment of 30 graphics a month, the cost is only $2 per graphic used. Custom maps and charts are available at $2 each for a minimum commitment of 80 graphics per month.

WSI, too, has expanded its operation and is now offering the ASTRO-WX service for only $795 per month. The automatic satellite transmission receive-only weather system allows the station to receive the more then 400 NWS maps and charts WSI will be transmitting via satellite to ASTRO-WX two-foot receive dishes. The local subscriber's receiver, programmed to take in only those charts and maps needed by the station, feeds the data directly to a high-speed color printer which uses ordinary computer paper and ribbons (no chart wrinkling or fading). Thus, by using the satellite, most of the problems with FAX circuits are completely eliminated.

A brand-new company in the weather graphics business is Integrated Technologies, headed by Anthony (Willard) Watts. Watts took the ideas which had been developed at Vectrix and spun them off into a separate company more familiar with the needs of broadcasters. The Whirlwind system

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comes in several configurations, with database access, weather map and weather symbol library, digitizing tablet, and the Vectrix two-card high-resolution graphics set for IBM-compatible computers all packaged with an AT or XT computer, or supplied as a set of boards that you can install on your own computer. Price of the AT version is less than $25,000 including the computer itself. Graphics capability of this system is superb—with 512 colors out of over 16 million displayable per screen, an internal 500-frame still store and digitizer for weather map animation, and 672 x 480 pixel resolution. The whole system fits on a desktop.

Another company just coming into its own in the broadcast market is 3M Stormscope, whose real-time detection system provides instant information on thunderstorms as far away as 220 miles. The WX-120 displays the data on a circular display, indicating distance away from the station. Numerical callouts also indicate the storm's status. As the storm moves closer, the system automatically tracks it and determines its intensity, velocity of movement, and so forth. It is also equipped with an alarm which can be set to go off depending on the station's own parameters.

Alden, meanwhile, is receiving great interest in its C2000 system, which offers the unique advantage of allowing the station access to either RRWDS radar (the government-sponsored live weather radar displays distributed free through National Weather Service centers), or satellite weather maps from WSI and ESD/Accu-Weather, or both. The Alden system comes complete with the graphics terminal for displaying the images, enough RAM memory to permit capture of several successive images for animation effects, and the requisite modems and telephone interface to allow connection with whichever database the user chooses.

Weather radar display on Kavouras Triton hardware.

Alden also introduced the C2000M, a low-cost color weather radar display monitor. The unit receives and stores a single real-time precipitation image from any of the RRWDS sites using an auto dialer/modem supplied with the system. The image consists of up to six precipitation levels displayed in the NWS colors, and a county/state or FAA air route background.

Also involved in the total system approach is Kavouras, whose Triton line forms the basis for a total package including Doppler radar displays, the RAM satellite images, and RADAC satellite system which provides weather data to subscriber stations without going through the National Weather Service network. New from the company this year is Image-Lock, a 64-level digitizer which works in conjunction with the Triton graphics processor to grab and store successive weather images. By using a combination of an extensive RAM and disk storage, long animation sequences can be acquired from the satellite and played back at the touch of a button.

ColorGraphics, too, is promoting the multiformat capabilities of its LiveLine IV system, which can be configured to include the graphics processing of the ArtStar II described above. Capabilities now include Doppler radar displays, dial-up weather radar, WSI-supplied weather satellite and surface weather access, the FLASH lightning strike display, and several other features.

Editing Excitement Continues

The excitement and ferment in the video editing business that has marked the last two years shows no signs of abating—and if NAB '85 is any indication, things are heating up even more. Especially in large and mid-sized systems, activity is intense, with introductions abounding from both established makers and mavericks.

CMX, which made waves two years ago with its innovative 3400 editor, has continued to refine the system and this year showed it in a new edition, the 3400A. Three major new features set the 3400A apart from the 3400: Dynamic Motion Memory, GISMO II, and expanded GPI.

According to CMX's Christin Hardman, Dynamic Motion Memory is a unique feature that can match-frame within an event at any speed. Up to six machines can be controlled at any speed from -30 to +90 fps, with all information going into the EDL and onto floppy disk. The user can program triggers dynamically from the shuttle knob or from the keyboard, and can also trigger speed changes—i.e. tell the system to go to a certain speed at a certain frame. Part of Dynamic Motion Memory is a "fit and fill" video expansion scheme that will automatically fit video to specific time slots.

GISMO II (an acronym for ganged or individual speed and motion option) features new software allowing remote machine control, either parallel with the main keyboard or breakaway; the original GISMO was just breakaway.

The expanded GPI now controls 16 relays as standard, expandable to 64, and has a one page Relay/Trigger screen. According to Hardman, all these changes are made possible with CMX's new multi IT^2, also the basis for the new 330XL editor. The multi IT^2 is a lower-cost intelligent interface that allows four IT^2s to be housed in a single chassis and yet takes only about one-eighth the rack space of the previous IT^2.

Hardman adds that CMX is now focusing on expanded control of the post-production suite. Because of its new relationship with Chyron, the company plans to offer control of some functions of the Chyron IV from the CMX keyboard at an unspecified date later this year. The user-definable 3400— keyboard shown two years ago, by the way, has not been produced due to lack of market interest; it seems people are just too satisfied with that good ol' CMX keyboard.

The new 330XL is a medium-scale editing system positioned above The Edge and just below the 340. It controls a maximum of four VTRs and a switcher and offers many of the features of its larger siblings: eight-inch CMX floppy disk drive, list management, auto assembly, and more. Its keyboard is simi-

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lar to the 340 or 3400, but without the tier of special function keys at top. GPI and GISMO are available as options, and the system is totally upgradeable all the way to a 3400A. The basic package, including the 330XL keyboard and processor, three I^2s, switcher interface, and disk drive, comes to under $30,000. Stressing its theme, "CMX delivers," CMX promises to deliver both the 330XL and the 3400 in 35 to 40 days.

The two new-age editing systems that caused such a stir at NAB '84, EditDroid and Montage, were back again, both with corporate and system changes. Montage, which had faced some hard times a few months ago, has been acquired by Interscope Investments, Inc., of Los Angeles, which is heavily involved in motion picture and television production and development, and owns a controlling interest in Panavision. The new ownership is expected to provide a firmer economic base for Montage, along with new management direction, including more R&D and a widened client base. Dom Saccacio has been named president and chief executive officer; founder Ron Barker will work on "evaluating opportunities for new applications."

Montage is presently marketing only its Picture Cutter system, introduced last year at SMPTE and demonstrated to steady audiences at the Hilton Center in April. The system includes all the controls and most of the software of the original Picture Processor, and in fact, a user can specify all the Picture Processor's features with the single exception of the top monitor bridge, which has been discontinued. Montage's characteristic 14-scene digital display remains unchanged, however. The Picture Cutter starts at $125,000 and goes up to around $200,000 for a fully loaded system; according to Montage, over 22 systems have been sold so far nationwide.

The corporate news about EditDroid is that The Droid Works, until April a joint venture of Convergence Corp. and Lucasfilm, has now emerged as a separate company. Its parents still retain ownership interest in it, however, and the three companies will continue to work closely together. Bob Doris of Lucasfilm has become president and CEO of The Droid Works.

EditDroid's main new feature since last year is an "electronic trimbin" that allows the user to create an unlimited number of groups of clips, with any number of clips per group. These clips

Now merged, the ISC/Grass Valley video editor.

may then be identified on the system's Electronic Logbook by digitized color sample frames, with eight displayable at one time. The system also interfaces fully with SoundDroid, the innovative audio editor/mixer introduced this year by The Droid Works. (For a full description of SoundDroid, see related story on audio editing in this issue.)

The basic EditDroid system controls four playback devices, a recorder, and a switching system, and can be expanded to control up to nine playback devices, or more with additional planet controllers. According to The Droid Works, EditDroid's beta test period is complete and regular product shipments have begun.

Ampex brought its editing system within the reach of smaller broadcast facilities with its introduction of the new ACEμ system, a smaller version of ACE that still runs full ACE software. Actually, almost the only difference between the two systems is that ACEμ controls only four VTRs, plus a switcher. Ampex's intended market for ACEμ is as a supplemental off-line system for larger post-production houses or as an on-line editor for smaller applications. It is completely disk compatible with the larger ACE and with CMX editors, allowing its eight-inch disks to be plugged into a compatible on-line system for conforming. A particularly attractive feature is its direct interface to ADO, allowing the ADO to be controlled from the editing keyboard. It also allows a high degree of switcher control, including setting and previewing events, with EDL storage of effect parameters. Other ACE features shared by ACEμ include multitasking, which allows the editor to complete one chore while the user initiates another, and auto-assemble with lookahead, by which ACEμ lays down one edit while readying the machine for the next, including preroll. The editor will work with VTRs of almost any format. The basic keyboard-based system sells for $29,500; with the ACE touchscreen, the price is $37,000.

Convergence Corp., long known for its small and mid-sized editors, has expanded its 200 Series with the introduction of the top-of-the-line 205, an eight-VTR controller. With the 205, the eight VTRs—which may be mixed among one-inch, ¾-inch, M-format, Betacam, or VHS—can be assigned as source or record machines in any combination. (The company is presently working on an interface for videodisc players.) The system offers full auto assembly with no operator intervention, and automatically selects the proper switcher crosspoints for source VTRs. An external switcher may be controlled from the editing console, with effect information entered into the EDL. The 205 has a 1000-line EDL memory. During an edit cycle, VTRs not involved can be used for other functions, such as layback recording, search,

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striping, or reviewing. Any current model in the 200 Series can be upgraded to the 205, which is aimed at high-end production houses and broadcasters. Fully loaded, the 205 will sell for $40,000; deliveries are slated for the fall.

The other new entry from Convergence was the 195, a low-cost A/B roll editor with auto transitions, designed as a midway step between simple cuts-only editors and more advanced systems with multisource list management. The 195 allows manual effects, wipes, and dissolves on an external switcher. It has a 50-line edit memory with limited list management, serial I/O port for listing to memory storage devices, and the customer's choice of three VTR interfaces. Optional "Edit-Power Packs" include the TCRG Pack, which reads time code from three VTRs and generates drop or nondrop frame time code; the Switcher Effects Pack, which allows programmable control of an external switcher with full effects notation in the EDL; and the EDL pack, which increases the edit list memory to 200 lines and gives additional list management and sequential auto-assembly capability.

The recent corporate marriage between Grass Valley Group and Interactive Systems Co. has deleted the ISC name from the editing roster, but added a variety of new features, including (what else?) greatly expanded interface with GVG's 300 and 100 production switchers. A variety of new VTR serial interfaces are offered, too, including control of the Ampex VPR-6 and VPR-80, Sony BVW-10/40 Betacam recorders, and Hitachi HR-230 (demonstrated at the Hitachi booth). Also new is the ability to control simultaneously Ampex RS-422, Sony RS-422, and RS-232 protocol devices.

Other new GVG editing system features include: APL (animation picture lock), which forces the desired color frame of source tape material and is standard with the System 51; and PEGS multifunction tool, which stores variable speed programmed motion, E-MEM functions, GPI contact closures, and command strings to auxiliary devices such as the Dubner CBG-2 or Texta. The exact configuration of PEGS will vary with each editing system; current users will receive software updates.

The GVG-300 switcher control now available with the editors includes storing of E-MEM register data in the edit decision list, with the ability to restore the information to the switcher; execution of 20 E-MEM registers on each of three M/Es; addressing of Master E-MEM register functions and of the most-used fuctions on the DVE E-MEM register; and auto-transition execution on each of three M/Es.

The brand-new Horizon video editing system.

An entirely new mid-sized editing system was demonstrated by Horizon International, a newcomer to NAB associated with group owner Arlington Broadcast Group. The VE8-800 System Four, a four-VTR controller, features a similar keyboard and edit list to the CMX 340 and is what the company calls "editor-compatible" with CMX, ISC, Mach One editors. The system's EDL, stored on an eight-inch disk drive, is fully CMX compatible. In addition, the System Four has a nonvolatile memory that allows the user to turn the machine off at night without loading onto disk. Other features include playback ripple, list track, delete buffer, auto assemble, match locate, slave VTRs, timer or user bits, and list management. The editor is directly interfaceable to Sony and Ampex VTRs via RS-422, as well as to many switchers, including the GVG 100 and the Crosspoint Latch 6109/7209. Complete with printer, five-year warranty, and 850-event edit list memory, the system sells for $19,200.

An unusual feature of the System Four is that it comes with either English or Spanish-language text—important because the Phoenix-based Horizon is targeting Latin America as an important market. The editor can also be supplied in German or French editions. According to a spokesperson, the System Four and Horizon's other products—a machine control system and a transmitter remote-control and diagnostic package—have been extensively tested at the Arlington TV stations.

Like Convergence, Videomedia had news at both the top and the bottom of the editing scale. At the top, the new Magnum editor is a six-machine controller with dual eight-inch disk operating system with CMX translation. Version 2 software allows block edit moves and provides the ability to delegate the record machine from the keyboard. The Magnum also has an initialization program that allows the system to be configured to any of several switchers, letting the user change switchers easily if desired with no additional software. Standard features include true A/B roll editing with serial switcher interface, distributed intelligence, software assignable transports, animation, up to 250 separate lists with 250 events each, five GPSI interfaces, slow motion learn, dynamic four-field color framing, and many more. With three VTR interfaces, the system sells for $25,000.

Also new from Videomedia was the Eagle XR, latest in the Eagle line, a low-cost editor available in a two-machine, cuts-only version for $6500 and in an A/B-roll version for $9000. The system features a 150-event memory, built-in sync and black burst generators, Micro-Loc or SMPTE time code, and a variety of other features. It is upgradeable to the Eagle I, II, or III.

Videomedia also introduced the VSIO, a compact computer that is slightly off the beaten track. It weighs less than a pound and is designed to receive power directly from the device it is to control. Suggested applications for the $750 device include: distributed intelligent transport controllers for editing systems; machine controllers for sequencing devices; distributed intelligence for station automation systems; animation systems; automated movie playback channels; and more.

The Esprit editor, which Paltex unveiled for the first time at SMPTE last fall, made its NAB debut. This system replaces the old Datatron Vanguard and offers a variety of new features. For example, 10 user-definable soft keys allow the programming of 20-keystroke sequences, with all keystrokes displayed in English and storable on disk. All sources used are listed in the EDL, with fourth and fifth VTRs and external

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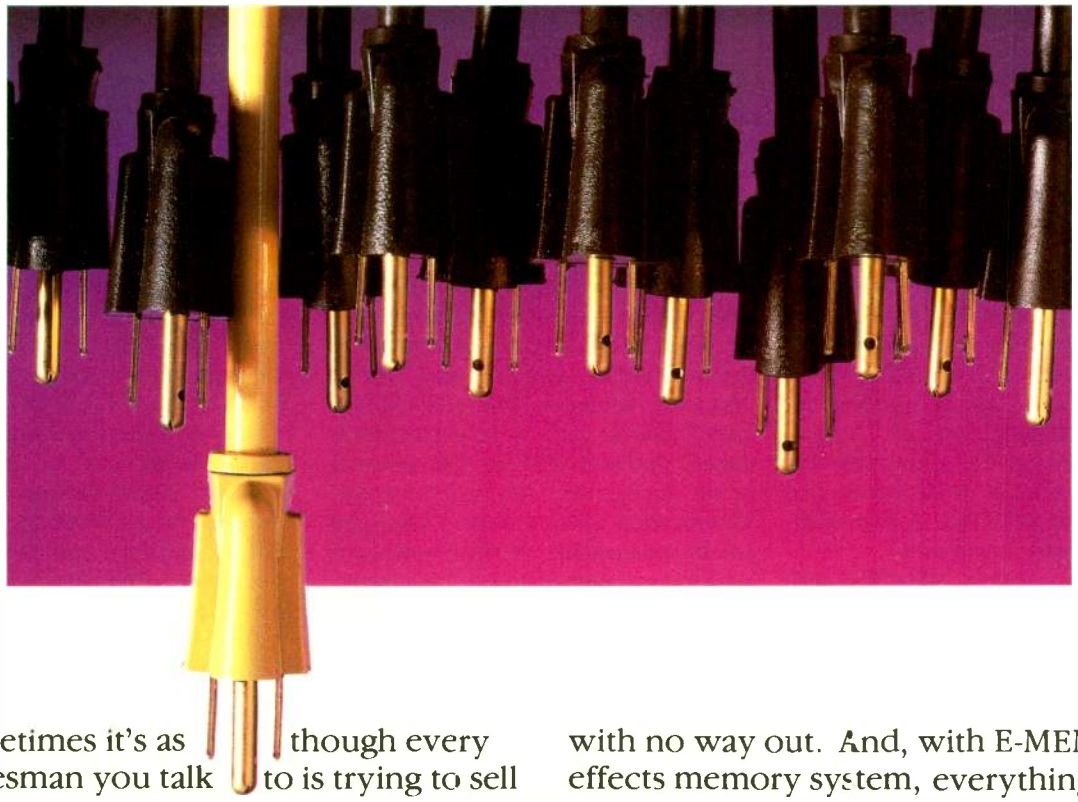

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Computer-controlled switcher effects with Videomedia editor.

sources automatically entered into comments. In addition, 20 "special function cells" (SFCs) allow the editor to address external devices and E-MEM registers; 10 SFCs can be used in any one event, and all pertinent information is listed in the EDL. Other new features include serial switcher crosspoint reassignment, an "effects rehearse" function that allows switcher and digital effects to be previewed without rolling the VTRs, and new dedicated keyboard functions.

According to Paltex, all current serial RS-422 VTRs and switchers have been interfaced to Esprit and can be controlled on a dedicated or distributed processing basis.

Paltex's smaller system, Edit-Star, also had new capabilities, particularly an edit list cleaning program that eliminates overrecords and unused events. Edit-Star also has a new software interface port that allows it to interface to RS-422 serial-controlled VTRs and switchers, and to communicate with the GVG 100's 16 E-MEM controls with no additional GVG equipment.

Paltex was also showing its ABR-1A editing system and Gemini digital video effects and switching system packaged together as a "gourmet" editing system—just add VTRs and serve. The two machines together offer A/B-roll editing with dual TBCs, production switcher, and digital effects, all with an integrated, desk-mounted control panel.

Elecon, a Japanese company looking to duplicate its successes on home turf here in the U.S., brought its EM-7100 SMPTE videotape editing system, which the company says accounts for over 60 percent of market sales in the Japanese high-end post-production market. The EM-7100 is a compact system capable of A or A/B roll editing and control of four VTRs and a switcher. It has VITC, drop frame or nondrop frame modes; optional nonvolatile memory; automatic color framing reference; a wide variety of switcher interfaces; optional 128 or 192 internal event storage; sync roll option for synchronization of up to four VTRs; and intelligent machine interface with serial data transmission up to 1500 feet away. A typical A/B roll system with three U-Matic interfaces, floppy disk, E-MEM interface, monitor, and preview switcher would cost $30,050.

An interesting application of the IBM PC or Compaq computers was shown by Calaway Engineering, which introduced software to turn either of the systems into a simple videotape editor. With the Compaq, the package results in a small-sized, portable editor. Called the CED system, the package consists of two printed circuit cards that can be added to either computer, plus basic editing software and an instruction manual. Options include machine control, motion control, disk interchange, and video or audio switching. CED provides direct interface of Sony BVW-10/40, BVU-800/820, and BVH-2000 VTRs; interfaces are available for other machines. The user also can choose between Calaway's upSC cuts-only switcher or direct control of the Graham-Patten 612 audio mixer and/or GVG 100 production switcher. IBM PC can accept additional hardware and software that allow it to produce GVG- and CMX-compatible eight-inch floppies. A typical system would cost $40,685, including the IBM PC; CED software, keyboard, and motion controller; eight-inch disk format option and eight-inch drive with cabinet; Panasonic monitor; Sony BVU-800 recorder and three Panasonic AG-6800 players with interface; upSC switcher, pulse DA, and audio oscillator.

EECO's EMME system, introduced last year, was displayed again with both the Video Editing Workstation and the Cinemagraphic Workstation. The company announced sales of three EMME systems, as well as an OEM contract with RCA Broadcast Systems by which RCA will supply both EMME and the new IVES II editor as part of its own systems. Also new for EMME is an interface for the Hitach HR-230 one-inch Type-C VTR. Interfaces for Ampex, Sony, and RCA VTRs are already available.

The IVES II, latest in EECO's IVES series, is intended primarily for industrial applications and has a newly designed control panel and optional A/B roll capability with control of three VTRs and a special effects generator. It offers SMPTE time code or control track editing, an internal routing switcher, programmable GPI, and an optional interface to the Edit Lister EDL management program for personal computers. With the A/B roll option, IVES II sells for under $9500; the basic system is under $7000.

Edit Lister, featured by Comprehensive Video Supply, is available for Apple and IBM personal computers. It can store up to 995 events, reedit with ripple, automatically clean lists, add post-production notes, program effects, calculate time code in several modes, sort by record in time or event number, transmit lists directly to and from high-level on- and off-line editing systems, offset source time codes, and transfer EDLs to a CMX-format diskette. Prices range from $750 to $850, depending on version, plus options.

Laumic Co. once again showed its portable CMX Edge edit system, complete with three VTRs, TBC, efx, monitors, and test equipment and available for rental. The company also introduced Benchmark, an edit system evaluator consisting of three videotapes and an industry-standard EDL on floppy disk or paper tape. It tests the edit system for a variety of video and EDL parameters and is compatible with most popular editing systems, large and small. Benchmark is available in

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¾-inch and one-inch versions.

United Media showed enhanced versions of its Commander II and Mini-Comm video editing systems.

PEP, primarily a power company, has moved into video editing with the introduction of an interface that allows an editor to edit VHS tape directly onto a Sony U-Matic edit controller. The company's NAB demonstration showed the output from JVC and Panasonic half-inch VTRs going into a Sony ¾-inch editing system. The devices eliminates the need to dub VHS up to ¾-inch, thereby saving a generation. Price is $1800.

Finally, Centro Corp., famous for its teleproduction vehicles but also a well-established builder of studio systems, introduced "The Editainer," an integrated standalone post-production system that can be installed in any 15 by 15-foot room. Equipment includes several Sony Betacam videocassette decks, an automated Graham-Patten 12-input audio mixer, and a Grass Valley 1600-IXCV switcher, all controlled by a GVG/ISC editor. The turnkey system can be customized for individual users. An Editainer suite will be installed shortly at Paramount Pictures.

Telecines, color correction

The telecine field has shown few radical developments over the past couple of years, but a prototype at the Rank Cintel booth gave a hint of one possible future direction. The Mk IIIHD, a high-definition version of Rank's popular Mk IIIC flying spot scanner, operates on the 1125-line, 60-field standard and features 20 MHz bandwidth and digital RGB store. According to a spokesperson, Rank displayed the HDTV telecine in order to demonstrate its ability to meet this sort of bandwidth requirement, and also to test market reaction to such a product.

Rank also showed its new anti-weave film gate, first seen at SMPTE. The ADS 1 multiplexed solid-state on-air telecine, which has now been delivered to users, was also on view, along with the Amigo scene-by-scene telecine programmer.

Bosch, which showed its FDL-60 CCD telecine with Varispeed, color correction, and optional built-in digital gain reducer, announced a couple of important U.S. sales at the show. KBHK-TV, San Francisco, plans to use its FDL-60B2 for direct on-air broadcasting of movies and syndicated series, an unusual application for the device. Another FDL-60 has been delivered to TSC Video, Nashville. Bosch's FRP-60 color corrector was on display at NAB, but minus luminance control due to a patent dispute in the color correction industry.

The Marconi CCD telecine was on view at the A.F. Associates booth.

Ikegami, which has made telecine cameras for several years, this year showed a complete telecine system consisting of the TKC-990 or TKC-970 telecine cameras, the FPH-16 self-threading 16 mm telecine projector, the SPR-35 professional 35 mm telecine slide projector, and the MPK-3V three-input, one-output optical multiplexer.

Hubcom once again featured its HCF-One telecine camera, a direct replacement for the TK-27, TK-28, or PE-240 telecine cameras.

L-W International showed a new multiplex system based on the Athena 16 mm telecine projector. Besides the Athena, the system includes two 35 mm slide projectors that can be programmed for continuous operation and predetermined intervals, plus an optical multiplexer with three inputs and an Ikegami 730A camera (other cameras could be used). Including the camera, the system sells for around $30,000. The Athena 6000 professional film chain projector was also shown.

New from Magnasync/Moviola was the Plus Video module, which replaces the picture box from Moviola flatbed film editors to allow simple, in-house film-to-videotape transfers. Including camera, the module sells for $4950. The Videola film-to-tape transfer system was also on view in 16 mm, 35 mm, and combination versions.

Corporate Communications Consultants had several new component color correctors, including the Simplex IIXL, described as a complete "one light" color correction system for component video. Also shown was the Simplex I-C, for component or encoded video, intended for small post-production facilities. The latest model in CCC's The System line of color correctors, The System BM, is a three-channel system also designed for component work.

Time code

With so many video tasks dependent upon time code, new products are always to be expected in this area. No disappointments at the Gray Engineering booth, where the DT-213 data transmitter and the FC-142 film counter/character generator made their debut. The DT-213 is designed as a master time code generator with advanced slave decoding, and also contains a character generator to display simultaneously both time and user bit characters. It will transmit in three basic modes—NTSC 30-frame, PAL 25-frame, and film 24-frame—in the absence of sync using an internal crystal source, and offers a choice between SMPTE frame rate code or Gray field code. Price is $3495.

Gray's FC-142 counts film feet and frames from a film projector or telecine to identify precisely all film frames in a 3/2 scan transfer. It does this by inserting information in a window dub for completely field-accurate viewing. Information may be feet and frames or edge numbers and frames for either 16 or 35 mm. The FC-142 sells for $2995.

Amtel Systems introduced an interesting item: ScriptEase, a software program that turns a Radio Shack (Tandy) Model 100 computer into a portable SMPTE time code reader and script/edit note keeper. It reads SMPTE code to 10x play speed, forward and reverse. An eight-digit LCD display on the Model 100 includes drop/nondrop and color/noncolor frame indications; ScriptEase will freeze the display for quick logging of edit points. It will also decode and display user bits. Interface is by standard audio cable, with no additional hardware or modifications to the computer. The note keeper functions include a real-time stopwatch, among others.

Datum's featured product was the 5302 intelligent time processor, which was offered for a reduced price at the show. The 5302 features color-framed time code and a clean character inserter for viewing time code in the video raster. It conforms to RS-170A specs in NTSC and EBU 3079-E in PAL, and will change between reading or generating NTSC or EBU standard time code with the flip of a switch. Other featured items included the 5300 intelligent time processor, 5350 SMPTE time code generator, 5360 SMPTE reader, and 5370 SMPTE time code character generator, along with the line of VBI video data encoders and readers.

Skotel enhanced its established product line with the announcement that it has lowered prices since last year. A new time code monitor didn't make it to NAB but was expected to be released within two weeks of the show's closing. Visitors to Montreux should find several new Skotel products there, according to a spokesperson.

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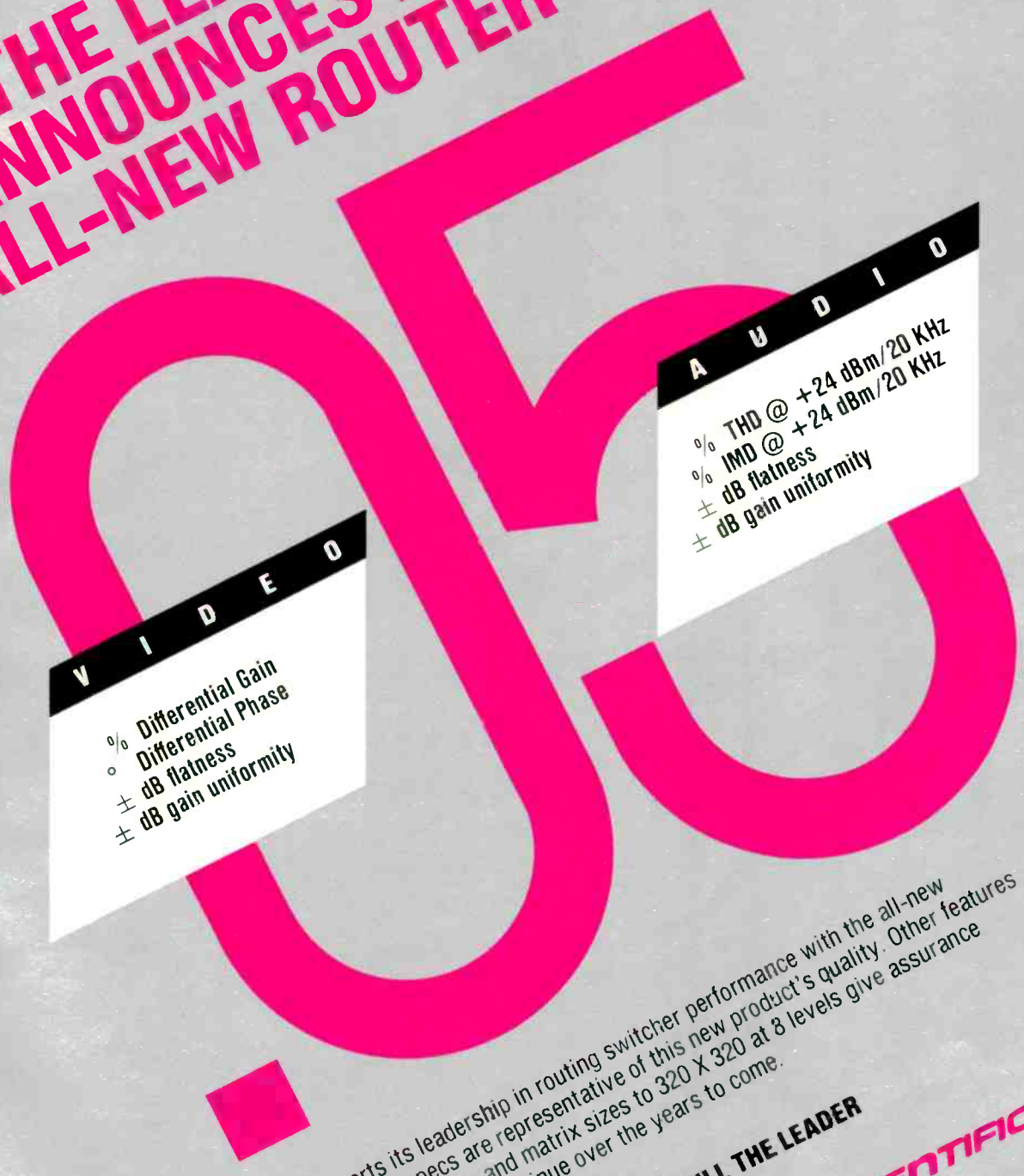

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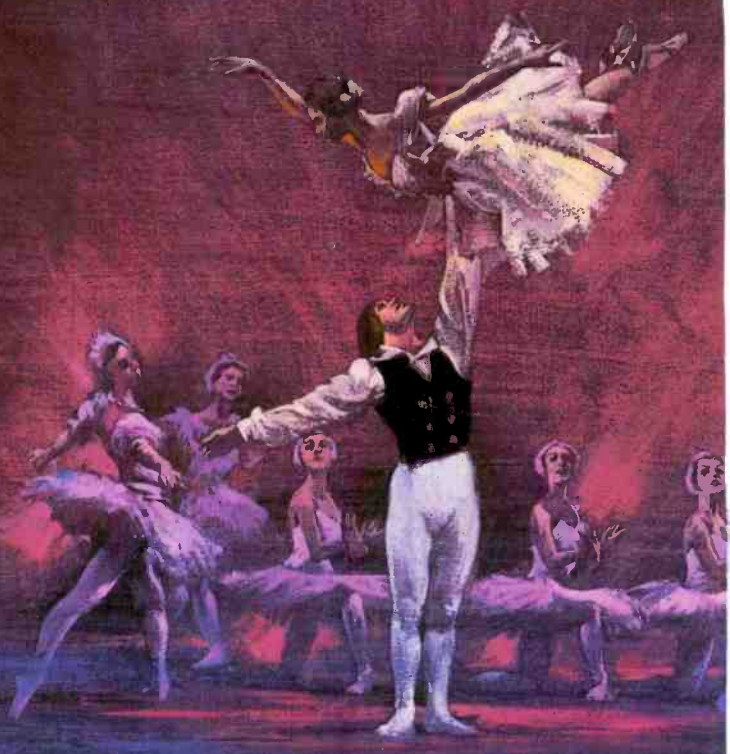

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Circle 141 on Reader Service Card

Image Processing Mirrors Other Industry Developments

Since there is a continuum of technology from digital TBC to frame/field synchronizer to digital effects processor, and since most companies who make digital TBCs almost always end up in the effects business (Microtime, Fortel, and ADDA to name just three), it is sometimes hard to separate one product from another. There have been, nonetheless, some major new developments in digital image processing, which are reported separately here. Special effects developments are covered elsewhere in this report.

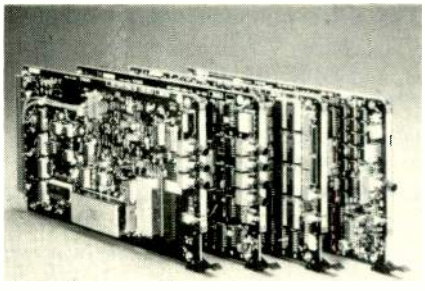
Crosspoint Latch announced an exciting new concept in editing with its Model 8000 TBC, claimed to be the first single-channel TBC capable of locking two VTRs to one another for A/B roll editing. Thus it is possible, with the 8000's virtual infinite window error correction, to have an edit suite with only a single TBC. Its true capacity can be judged when watching the two source VTRs shuttling at high speed in opposite directions with a visible picture from each on the monitors. Deliveries are expected later this month, at $6995.

A major new product introduction is the Fortel TBC3^2, which Fortel claims will meet or exceed performance specs of all other Type-C, ¾-, and half-inch composite heterodyne TBCs— for only $13,000. What may well be the industry's most advanced digital TBC offers eight- or nine-bit digitizing at 14.3 MHz, with a 30-line correction window capable of handling the most difficult problems. With the nine-bit option, the unit achieves a 60 dB S/N. Dynamic tracking capability extends from -2 to +4 times play speed, with visible picture to 50 times normal. Velcomp and DOC are also included. All this is packaged into a small, compact size, ideal for almost every application.

In another major Fortel development, the company announced it has received a major order for video processors from General Electric, which will be installing them as part of its Comband system. Comband combines two video signals into a single-cable TV channel, and is expected to increase cable delivery capability in areas where current channel capacity is limited.

At a Fortel hospitality suite, and carefully identified as "not a product quite yet," the company also showed the DP/G Corrector for differential phase/gain monitoring. The unit will feature a diff. gain range of ± 15 percent, a phase range of ± 15 degrees, and S/N of better than 60 dB. The unit consumes only 10 W of power.

Both Sony and Ampex have been hard at work developing new TBCs to accompany their VTRs. From Ampex, there is the TBC-40, which works with both Type-C and U-matic decks. Sampling is eight-bit, 4 xfsc, and the unit offers a 16-line correction window and built-in analog DOC and velcomp. The basic price of the TBC-40, configured to work with the VPR-80, is $8500. There is also a low-cost upgrade kit available, expanding the memory and therefore allowing the addition of some special effects capabilities such as still frame and slow motion.



Plug-in TBC module for BVH VTRs from Sony.

Sony's contribution is an exciting new plug-in TBC card for the BVH-2000 and family—a full-function TBC with 16-line correction window and Dynamic Tracking functions for $9950, competitive with standard TBCs. Sampling is 4 xfsc with nine-bit resolution. The EKH-2150 performs Dynamic Tracking playback from -1 to 3x play speed, with visible color during search up to 8x forward and reverse and black-and-white up to 50x normal. The most significant advantage, of course, is the tremendous reduction of power requirements, size, and weight of the new plug-in card, whose four LSI circuit boards operate with far less power than the existing standalone TBCs designed for the BVH VTRs.

New Vision Series low-cost TBC from ADDA.

ADDA made several new TBC introductions, the most exciting of which was the first in the Vision Series—low-cost TBCs based on eight-bit component processing. The first model, designed for heterodyne-only use, is priced at only $5850, and is compatible with half- and ¾-inch VCRs (including the BVU-820 with Dynamic Tracking). The unit contains a built-in DOC and sync generator, yet is small and compact enough for EFP applications.

This NAB also marked the introduction of ADDA's latest-generation VW TBC/synchronizer, the VW-3. One of its most important improvements over its predecessors is the 58 dB S/N, plus its compact 1.75-inch rack height design. Other major features include infinite window TBC; frame or field freeze; direct or heterodyne operation; switch-selectable vertical blanking; and DOC and velcomp. In heterodyne mode, the unit delivers better than 2.4 MHz bandwidth, and has an adjustable ± 200 nsec chrominance/luminance delay. The VW-3 is priced at $14,500.

ADDA also announced the delivery of its one-thousandth AC-20A TBC/processor, priced at $8000. A new TB-2 board now permits both heterodyne and direct processing.

Steve Kreinik's nova systems, less than two-years-old, continues its careful but definitely active expansion into the digital TBC market. The company's nova 500, a direct color unit with 32-line correction window and full-bandwidth signal handling, is already feature-for-feature the lowest-cost TBC on the market. It has now been joined by the 490, which corrects heterodyne signals, and the 510, which corrects both direct and heterodyne signals.

For-A introduced the FA-450, a component-based digital TBC which should find use in the increasing num-

Full line of nova digital TBCs.

ber of transcoding applications since it is compatible with all current half- and ¾-inch tape formats: RGB, YIQ, Y, R-Y, B-Y, Y/C dub, and NTSC on a full cross-matrix basis. Eight-bit encoding at 4:2:2 is used, producing an infinite correction window.

Fortel also had its FA-430 digital TBC with digital image processing, compatible with both half- and ¾-inch VCRs.

An exciting new development in digital TBCs is the ICON from AEI (Amherst Electronic Industries). ICON is not so much a new TBC as a new intelligent control for the AEI TBC-1—an 8088-based controller which allows every function of the TBC to be programmed using an 8088-based computer such as the IBM PC and compatibles. The ICON comes equipped with a 1.5-inch LCD video display built into the unit—the first TBC to be thus equipped—providing continuous monitoring of the unit's status, video, or graphics. ICON can also show TBC status, as well as waveform and vector displays, on the monitor screen of a PC. At this point, AEI is welcoming those with applications programs to write software for the unit, which also has several expansion card slots permitting new circuit boards to be simply installed. Immediate plans are for AEI itself to add freeze-frame capabilities, with more digital effects on the way. The ICON/TBC-1 package is currently priced at $6950.

A major force in the digital processing area, Digital Video Systems, has begun to apply some of the advanced technology developed for projects such as the B-MAC multiplexed analog component transmission scheme to more everyday applications. Leading the way here is the DPS-130 Four-Matte, which accepts four synchronous NTSC signals and compresses them into a single image which can be freeze-framed. Applications of the $28,000 unit include simultaneous monitoring of competitive stations' signals, reduction of monitor bank size in large field production operations, remote feed site monitoring, and so forth. DVS also continues to enjoy good sales of its Phaser V framestore synchronizer, and DPS-103 digital TBC.

The idea of displaying multiple signals in the same raster was also demonstrated by Videoplex, whose system was used by ABC during Olympics coverage last year to handle the massive number of feeds coming into the broadcast center. The Videoplex multiplexer accepts 16 asynchronous feeds and displays them in a checkerboard arrangement with each element 118 lines high. Each picture can have a caption up to 128 characters long. Although the system used by ABC was black-and-white, a brand-new Videoplex product introduced at NAB this year displays 16 color signals, and is priced at $44,5000. Other Videoplex products are available for four, nine, or 13 monochrome images.

Transimage, which last year began showing its TBC time sharing system (allowing entry of presets for audio and video for audio and video from four VTRs, with automatic switching to the preselected functions when the VTR is called into play) has now expanded the system by linking Transimage units together into systems that will support eight, 12, or 16 VTRs.

Hotronic introduced the ADS-1 TBC/frame synchronizer. An interesting concept is the pixel-by-pixel dropout compensator. Also new was the AE61 TBC with color bar generator.

French company Matra, at its first NAB, had an exciting frame synchronizer/digital standards converter/color video processor combination package. The system is PAL/SECAM/NTSC compatible, and can also be equipped with multiformat encoder/decoders.

Leitch had a new NTSC digital frame processor, available in both two- and four-field versions (no H shift in the four-field model). Digital processing is used throughout with RS-170A output and RS-232C port for remote control. An adaptive video clamp is used for improved signal handling, while freeze field or frame capability is available and can be remotely controlled.

Others with existing digital processing products included Tektronix, Harris, MCI/Quantel, Microtime, and NEC.

Producing in the Component Environment

As had been predicted by *BM/E* and other industry watchers, the ability to produce material in the analog component format is about to take off like wildfire. Analog component technology —whether applied to on-air automation systems or to signal processing (see reports elsewhere) is going to be *the* way to go for at least the next five to 10 years. Eventually it may give way to digital recording and production; but because of the forward-thinking presence of mind on the part of SMPTE and others in the standards business, analog component and digital components will be completely compatible—will, in fact, be able to talk with one another over a common interface bus.

There are, of course, still some pieces missing in the all-analog-component-studio. But NAB demonstrated that it is practically around the corner.

On a gigantic screen in its two-story

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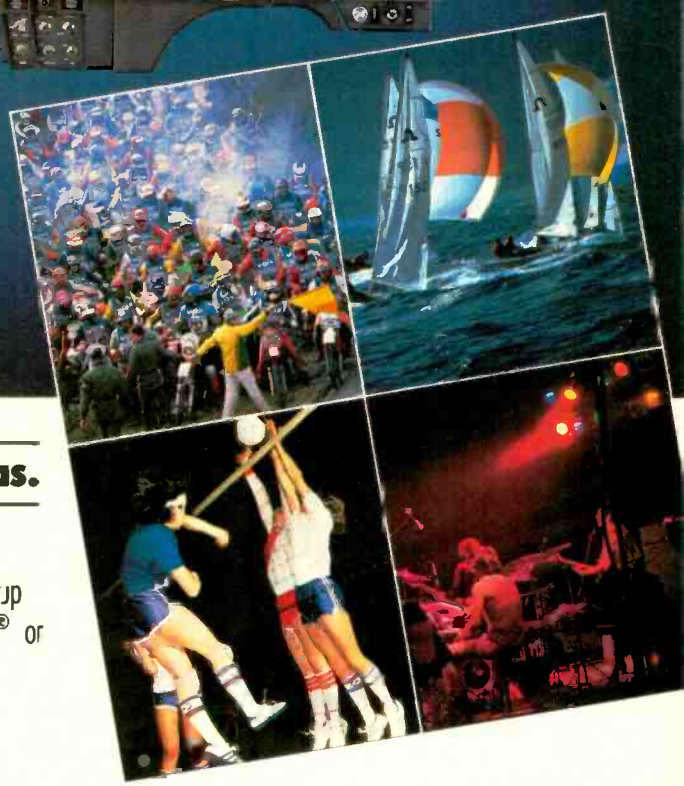

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New Grass Valley HDTV production switcher.

booth, Grass Valley projected the results of its Model 100CV component production switcher—based on the same architecture and control panel as used in the standard Model 100. In a word, the results were awesome. With either RGB or Y, R-Y, B-Y inputs (eight total), the switcher produces effects with 10 basic wipe patterns and six pattern modifiers that are the rival of any video production standard in current use. Besides its effects, the new switcher features an auto transition (up to 999 frames), a separate preview channel, serial interface, pulse regenerator, and chromakeyer. Bordering is an option, as is the AMX100 post-production audio mixer (see the mixers and consoles section). Also optional is Grass Valley's Key-Mem effects memory system, which stores the switcher setup on an E^2 PROM built into a key-shaped holder. The computer peripheral allows the user to simply insert the key and automatically program the switcher within seconds.

Grass Valley is not alone, of course, in pursuing the component switcher market. For-A made the NAB debut of its CVM-500 component switcher, priced at $17,900 with deliveries scheduled to begin in September. The six-input switcher which used Y, R-Y, B-Y processing, will accept all types of component inputs, with automatic transcoding to its internal processing scheme. The fully-equipped switcher includes a joystick positioner; background, border, and keyer colorizers; downstream keyer; and automatic effect transition timer. A serial interface for editor control, and an RGB chromakeyer are also available.

The new analog component switchers join several that are already available. One of the most popular has proven to be Shintron's, which this year was available in a brand-new 12-input configuration. Shintron's investment in the new component technology does not end there, however. Also brand-new this year is the Andromeda 3000—a component frame synchronizer/digital effects generator described in the accompanying report on effects.

Shintron also introduced DUBYC 392, a switcher/editor interface specifically designed for the Y/C dub mode signal. The new unit, based on the Model 390 component production switcher, is a dual video channel switcher with RS-422 editor interface. It is thus possible to introduce effects into recorded tapes as they are being dubbed without having to enter the color-under environment.

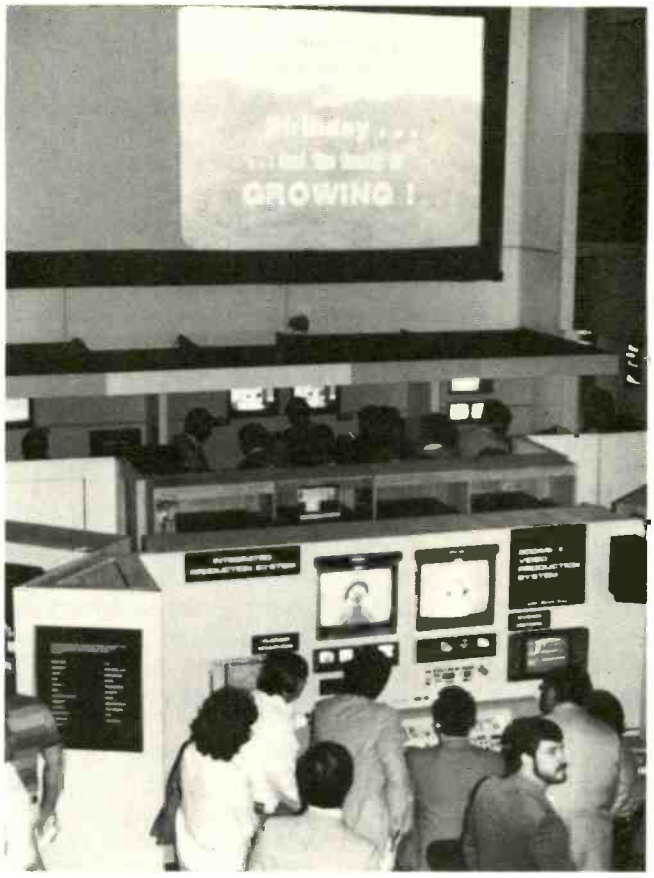
Also new is the Crosspoint Latch Model 6116 switcher. Four inputs are dedicated to analog component inputs (any type of component, including RGB) while three inputs are dedicated to composite sources; the switcher can thus work in either component or composite. It has 32 wipe patterns, internal colorizer, border generator, and variable soft edges. An RGB chromakeyer is optional. Another important option is that the switcher can be controlled by Crosspoint Latch's new 7209 computer controller, which allows the 6119 and its memory registers to be accessed directly by the Sony BVE-800 editor and decision lister.

Serious competition for the standard Model 100 arose for the first time this year in the form of the Ross Model 210 switcher, incorporating the MLE multilevel effects M/E. The under-$10,000 switcher has 12 wipe patterns with positioner, three separate auto transition units, three color generators, extensive effects keying capabilities, a downstream keyer with fade-to-black, and next event preview output. Options include an RGB chromakeyer, serial interface, key border generator, and a 12-event memory system.

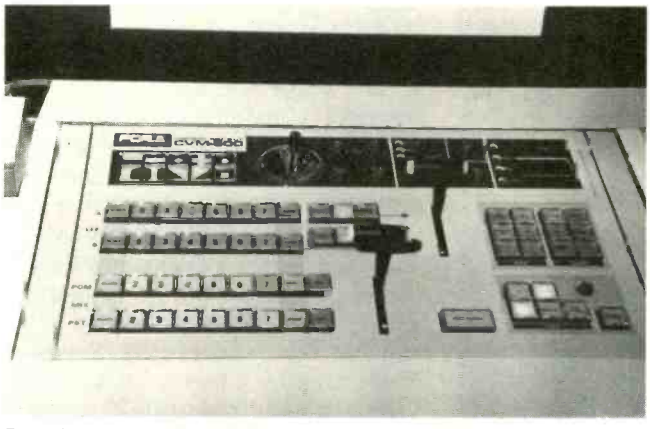
Also likely to take up the Model 100 challenge shortly is Intergroup Video (the reorganized ISI), whose VP of product development Craig Birkmaier was formerly small and medium switcher product manager at GVG. Right now, Intergroup is working on consolidating and refining its existing product line —the 903 and 904 production switcher lines, event memory box, master control switchers, routing switchers, wipe generators, keyers, etc. All Intergroup products are now offered with a five-year limited warranty and a no-questions-asked 30-day return policy. But it is almost certain that the company will shortly begin exploring new product development—especially in the automation area. Already it has introduced a prototype of the 8001 mini-master control switcher—a self-contained AFV design with eight inputs designed to be controlled by an external computer. Its compact size should not be confused with extremely good signal handling specs, including a timing lock which eliminates the kinds of errors found in many other MC switchers.

Another switcher company which has reorganized somewhat during the past year is Central Dynamics, now headed by president Peter Brackett. Although new product development has been somewhat slowed during the past year while the company consolidates and strengthens existing products in the 80 Series production switcher line, MC-990 master control switcher, routing switchers, DAs, and various other product lines, Central Dynamics has a brand-new company logo. And with it goes a commitment to full, active support of existing and future switching products.

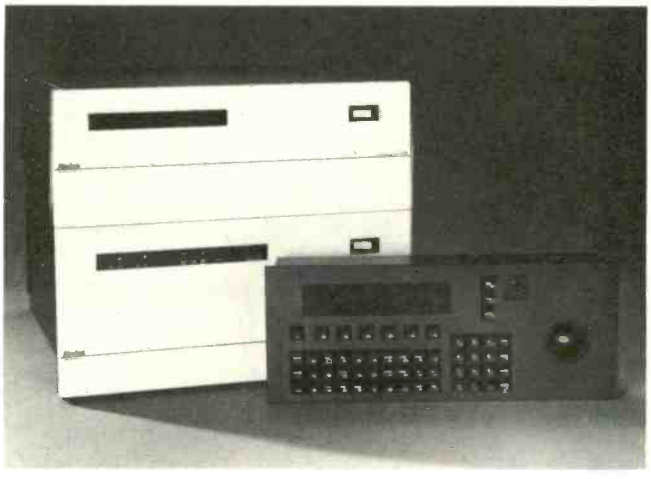
But the real surprise from Grass Valley, completely unexpected by most (the CV switcher project had been known about for some time), was GVG's showing of an experimental HDTV production switcher, based on the Model 300. Using a Wavelink fiberoptic feed to carry HDTV signals from the Sony to the GVG booth, the



Demo of component switching at GVG.



For-A's new CVM-500 CAV production switcher.



Abekas A62 digital disk recorder.

experiment demonstrated that the three-channel RGB switcher can, indeed, now be considered part of the growing family of HDTV products.

On the more practical side for the American broadcaster, Grass Valley also introduced Omni-Key, an enhancement product for the standard 300 switcher. The retrofit extends the keying capabilities of the 300 in four areas. First, it provides a linear key mode on both the video keyer and title keyer of each M/E, enabling key signals from various digital effects systems to make perfect transitions between background and key insert with no edge degradation. There is a key invert on each M/E. An external key input can be associated with any primary video input plus any title video input. Omni-Key also extends the Key-Mem function to allow the chromakey level settings to be stored with the rest of the switcher setup.

In another switcher development, ECHOlab showed the new SE-6, a $24,000 big brother to the SE-3 (the SE-3 can be upgraded to the larger unit). The SE-6 is a two-M/E, 12-input switcher with an extensive (2000 effects and transitions) memory preset system that allows simple front-panel programmability and also full remote control from a video editor (a two-wire serial interface). The switcher also has several options, including RGB or encoded chromakeyer, border generator, off-line event storage on an Apple II computer, an AFV audio switcher, and several others.

JVC introduced the KM-12000, a four-input/three-bus switcher with chromakeyer and built-in genlock. The ac/dc-powered low-cost system features six wipe patterns, an auto-take button, allowing the preselection of next cut, an eight-color color background generator, and an integral RGB chromakeyer.

Still stores, digital animation

Perhaps because of the sudden emergence of digital recorders for animation—such as the Abekas and Quantel units discussed below—activity in the still store market appears to have slowed somewhat.

There were, of course, some new products. ADDA, which last year introduced the ESP-II medium-priced still store, this year had a single-channel version available. The price is only $19,500 (including a frame grabber), although the user must add his/her own disk drives for storage. To lower the cost of storage, however, ADDA has also introduced a new fixed disk drive, priced at $5500. It stores 200 stills.

DSC, which until now has been concentrating on the effects capabilities of its Illusion digital effects system, this year introduced a brand-new Illusion still store option. Priced at under $14,000, the Frame File package consists of a black-and-white CRT status monitor, a disk drive, and new boards for the Illusion electronics package (no additional rack space is required). Capable of storing either fields or frames, the system can be extended to handle up to several thousand stills. Recalled images can, of course, be fully manipulated with the Illusion effects.

Harris had the IRIS-C, a compact still store which fits into less than 24 inches of rack space. The Harris/Aurora agreement has already been described. Harris will now also market the Newsmatte-2 as an option for the IRIS system, allowing high-quality chromakey mattes.

MCI/Quantel featured the Lending Library, which digitizes and stores up to 100,000 stills from either live sources or other digital equipment (no A/D, D/A conversion), and allows users to put "private" designations on stills not yet ready for access by other system users.

The Abekas A42 "video slide projector" was shown with an exciting new library system. Without sacrificing speed, the library's search function will compare the operator's input with the titles and descriptions of stored images word by word, and will generate a list of stills even if the operator's input is abbreviated or misspelled. The library works in conjunction with existing A42s, and all title and descriptive information already entered instantly becomes part of the library database.

But it was the digital recorders which really stole the heart of the crowd. Their use is best explained by Junaid Sheikh, Abekas's VP of marketing, when referring to the production of the opening title sequence for *Saturday Night Live* by Charlex, New York. "It's a matting nightmare," explains Sheikh, "with layer upon layer upon layer of digital effects and graphics. Right now, so as to not lose generations each time an effect layer is added, they roll dozens of VTRs together in sync and live mix them onto a master. But with a digital recorder, that would become a thing of the past. Layers and layers of effects could be added using an internal matting system in combination with a digital effects/graphics system, so that the whole composite could be done with only a singe A/D and D/A conversion.

"Video graphics can finally achieve the same complexity as optical effects for films. The film frame can show a matte painting of an alien planet with a model of a spaceship hovering over the

Ampex AVC production switcher with ADO interface.

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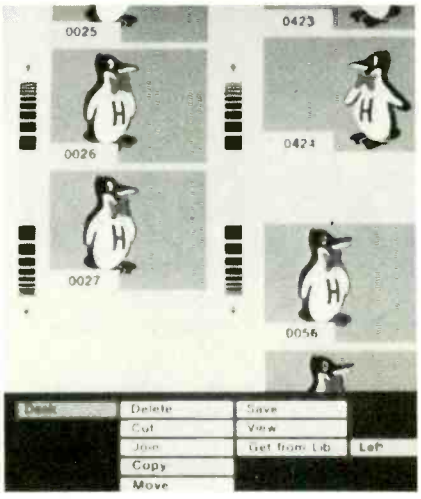
surface, and in the window of the spaceship you can see the crew moving about. And some of the crew are watching TV monitors on which you can see images of the planet. With digital animation recorders, it's now possible to achieve that with video."

The Abekas contribution to this technology is the A62 digital disk recorder, shown in prototype at SMPTE. Basically a single (50-second capacity) or dual (100-second capacity) Winchester disk pack, the unit records video a frame at a time, either from a camera input or from a graphics generator. Once stored, the digitized frames can then be read out randomly, in any sequence, and at any rate. The system also contains an internal digital matting device. It is thus possible to record a sequence, read it out from an edit decision list access that never makes a cut, add a matted-in effect, and ship the matted frame back to storage without causing any degradation in signal quality. Not only is this useful for recording and sequencing animation moves, but it is also an extremely fast editing system, allowing a final cut to be created and output to video without needing to roll a VTR except to originally input the frames.



Harry animation sequence on MCI/ Quantel digital recorder.

MCI/Quantel has struck gold once again in the digital graphics area with its brand-new Henry digital animation recorder. This is a scaled-down version of Harry, which was planned for a Hilton suite demo but could not be shown because the Hilton apparently couldn't supply the 90 A service required to run it. Instead, it was Harry that drew crowds to the booth, its main function promoted as being a means to store up to 2700 frames created on the Paintbox, and then play them back in any order at any speed. This completely eliminates the need for time-consuming frame-by-frame animation on a VTR. Harry also has the ability to capture 90 seconds of video, store the frames in random access memory, and display them one at a time for retouching, keying, and other effects. Keying is done through an internal keyer, allowing virtually unlimited generations of matting and keying with no loss of signal quality.

Sales of the new digital recorders were reported as brisk, both to networks and to teleproduction facilities. NBC News VP of special productions Tom Wolzien revealed that he was getting considerable internal pressure from his news graphics department to buy one of the new machines, although for the meantime NBC is enjoying considerable success using a Lyon Lamb VAS-IV video animation controller with a Sony BVH-2500 animation-capable VTR.

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ANOTHER BROADCAST INNOVATION

dead issue.

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Tape Inches Toward New Dimensions

The half-inch and ¼-inch video formats may be newsmakers on the new equipment front, but tape sales and marketing provide a more accurate arbiter of where the industry is at present. A look from that viewpoint makes it clear that ¾-inch and one-inch tape are still the industry standards.

Tape manufacturers are especially bullish on one-inch tape, despite the half-inch challenge. This was evidenced at April's NAB convention by a spate of new one-inch tape introductions, including two by tape makers new to the one-inch field, Agfa-Gevaert and Maxell. In addition, long-awaited five- and 30-minute half-inch cassettes appeared at NAB, answering the needs of the new multicassette automation systems.

In an aggressive marketing stance, Maxell is pitting its new Master Broadcast CV Series one-inch tape against other makers' top tapes. The company claims that its own tests have shown the CV tape to have more consistent RF output, higher chroma S/N, and fewer dropouts than its competitors. Reels of 34, 66, and 96 minutes are expected to be available this month; 126- and 157-minute reels should be available in the fall.

In contrast, Agfa made it clear that its new Broadcast Plus Type-C videotape was a prototype currently undergoing field tests. Actual introduction is slated for the fall. Although the company has manufactured a Type-B videotape since the late '70s, this is its first entry into the Type-C market. The tape will be "extremely competitive" with those of Fuji, 3M, and Sony, according to Agfa national marketing manager Ken Wiedeman.

The main feature of Sony's new V1-K Series one-inch tape is greatly reduced head wear, achieved by several refinements: smaller magnetic particles, a special new lubricant, a new binder system, and a much smoother surface finish. The tape also uses a refined back coating process for increased durability. According to a Sony spokesman, these improvements have been managed with no loss in quality, especially of still-framing characteristics. To its HG Series Beta line, Sony added cassettes with play lengths of five and 30 minutes for commercials and feature-length programming.

New configurations for Ampex 197 videocassettes.

Although Ampex didn't introduce a completely new one-inch tape, a spokesman for the company said the 196 videotape shown at the show was "totally different" from the 196 tape of 18 months back due to continuing R&D. Ampex emphasized 196's consistency and submitted it to a heat-and-humidity "torture test" which it withstood with no dropouts and unimpaired RF output. Ampex's 197 ¾-inch tape endured similar torture, including repeated dropping, shuttling, and long still framing, with similar aplomb. Four new 197 configurations include three five-minute cassettes and a 45-minute length for news editing and archiving.

Fuji stressed its four major lines of broadcast videotape, including the H621 one-inch helical tape for B and C formats. Other featured Fuji tapes were H521 ¾-inch videocassettes in two grades; H451 and H351 Super XG broadcast-quality half-inch cassettes with new binder and new coating; and H421/H321 Super HG half-inch cassettes for ENG and EFP use.

New from 3M was a five-minute Beta cassette for commercial playback systems such as Betacart. The cassette has a removable, reuseable record lockout tab. In addition, the company introduced improved PB and PV half-inch cassettes for ENG/EFP, with improved oxide formulation, available in 10- and 20-minute lengths. A new ¾-inch cassette, Master Broadcast MBR, has a thicker, more durable backing and comes in five- and 20-minute minicassettes and 30- and 50-minute cassettes.

Eastman Kodak announced "substantially improved" coercivity (680 oersteds) and retentivity (1300 gauss) in its EB-930 broadcast and EP-930 professional ¾-inch videotapes. The tapes also have a new, dropout-reducing back coating. The company, which also showed its one-inch and half-inch tapes, is optimistic about its prospects in the broadcast market.

In tape accessories, RTI introduced the Tapechek 6120 one-inch evaluator/cleaner, which identifies tape defects at over 20 times play speed with color CRT display. It is also available in a VHS version, Tapechek 320.

CMC unveiled the Videomax TD-600, a high volume bulk eraser for all audio and video formats, with deep erasure and choice of cycles. Garner Industries displayed its high-energy, high-speed conveyer belt erasers for one-inch C format videotape.

Featured by Elcon was its line of tape cleaner/profilers, including the EA 254 for one-inch tape and the EA 750 for ¾-inch tape.

Audico offered several new accessories: a tape length verifier for U-Matic, VHS, and Beta cassette loaders; a cue-tone video loader that allows a program to be recorded several times on a full-length cassette, then automatically loaded into separate housings; and a line of cassette labels.

Always on guard against dirty tapes, Allsop introduced new cleaners for U-Matic, VHS, and Beta formats.

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Circle 148 on Reader Service Card

Production Essentials Head for the Field

Christie CASP microprocessor-based charger.

"Smart" has become the name of the power game, judging by this year's power and battery equipment showings. No longer limited to recharging batteries, smart chargers are programmable to charge fast, slow, in sequence, simultaneously and give a history of the battey while they recondition.

In battery belts, the trend is for longer life, while battery packs, increasingly aimed at the ENG/EFP market, are more portable than ever.

Christie introduced its smart charger, CASP—charger, analyzer, sequencer and power supply. Christie has dubbed it "the sleuth" and gave out Sherlock Holmes hats to make its point.

CASP charges any rechargeable battery with Christie's reflex charging, handles up to six assorted batteries or power supply outlets, and is programmable for each battery. It puts the battery through a reconditioning cycle where it analyzes it, gives an LED readout to show status, drain, charge, and history. A printer can be added. It charges fully ultrafast—15 to 20 minutes, or fast—40 minutes to two hours, or slowly as per battery. It uses power of 90 to 265 volts, 47 to 440 Hz, or it can work on an input of 12 to 28 V dc with optional plug-in module. Cost $3800.

PAG America just started its own marketing in the U.S. Brand-new from PAG this year is Master Charger, a "smart charger," which charges 2-12 amp hours, 10-14 V. An LED readout four-channel status indicator shows the status of the battery. The charger can sequentially fast charge a four-amp 12 V in one hour, or switch to four-channel simultaneously. Betacam NP-1 adapter is also available.

New in U.S. is PAG's SpeedCharge and Sequencer 6000. A microprocessor-controlled battery charger, it will set charging parameters for many batteries for two to 12 amp hours, 10-14 V. Eight-channel sequencer is also microprocessor-controlled, and charges batteries sequentially. SpeedCharge costs $1095, and the Sequencer $825.

PAG also has a new Betacam battery, 13.2V, providing four amp hours. Many NP-1 are 1.5 amp hours, so this can extend the life of the battery by 3x. Price is $350.

Another smart charger at the show was the Alexander Triplex Smart Char-

320.

The ProCam™ Video Camera with Plumbicon* tubes at Saticon** price.

JVC's experience—and success—in designing the highest quality and reliability into compact video production cameras is unmatched. Now, continuing this tradition of high performance at an affordable price, JVC has brought a "high-end" teleproduction camera within the financial reach of production people often victimized by modest budgets. This time, it's ProCam 320.

What a package!

SENSITIVITY. ProCam 320 features three, 2/3" Plumbicon pick-up tubes for incomparable picture quality. A refined f/1.4 prism optics system provides horizontal resolution of better than 600 lines at center. A 2H vertical contour correction circuit further assures image clarity. And minimum illumination measures only 38 lux (3.6 fc) at f/1.7, permitting shooting even in limited or artificial light.

A video S/N ratio of 57 dB. Color framing output signal (RS-170A). A split field color bar generator for consistent color reference. A genlock circuit for maintaining a stable picture while switching or mixing with other signals locked on the same source.

EASY OPERATION. Several 8-bit data memory chips offer operator conveniences for quick set-up and consistent performance. These include: Auto centering, auto-black balance and auto-white balance, auto black level stabilization and auto beam control circuits. Matrix masking for true color reproduction and automatic protection for the pick-up tubes are a few of the many features standard on this new camera.

VERSATILITY. Easy portability. Outstanding performance in low-level lighting. High degree of automation. An extensive selection of options and accessories combine to make the ProCam 320 suitable for both studio production, EFP, or ENG; or, indeed, to any application, anywhere, that calls for top quality video production while staying within a tight budget.

PROCAM TECHNICAL SUPPORT. Your ProCam sales representative will be happy to explain the availability and calibre of the ProCam technical support program.

For a demonstration of the ProCam 320 Video Camera, a 320 Spec Sheet, or JVC's complete catalog, call, toll-free:

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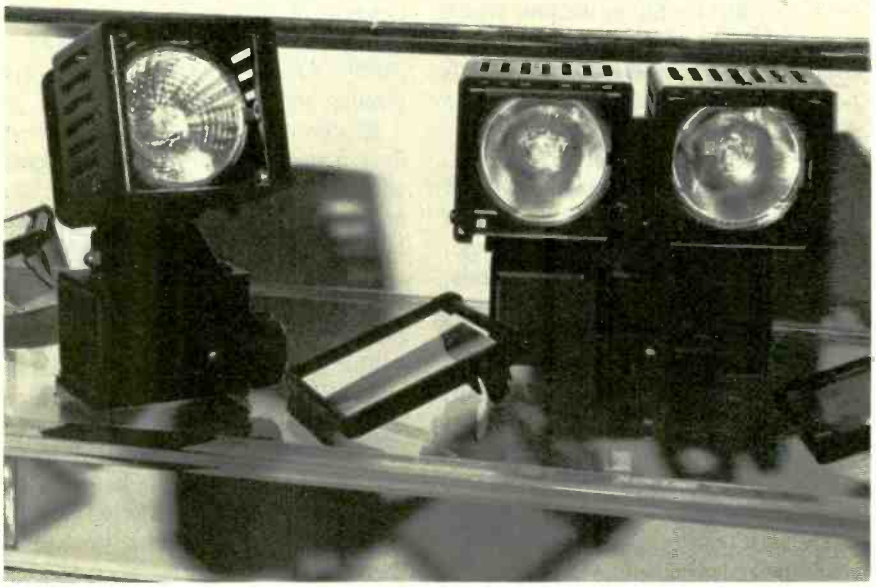
ger, which uses a microprocessor to sense the full-charge point of a nicad battery, at which point it reduces its charge to a trickle. It works with up to three packs in the 12-14, four-volt range, fully charging each pack in less than two hours.

In other power products, Anton/Bauer introduced a new Mobile Fast Charger. A 12 volt nicad battery can be charged through a car battery, in one, eight, or 16 hours. A protection circuit disconnects the charger from the car battery if the voltage drops below 10.5 V dc. The charger accepts all Anton/Bauer 12-14 V Snap-on and VTR nicad batteries. The price is $495.

Anton/Bauer also has a new power pack, the LPS-4 linear power pack with snap-on mount to standard camera, powers camera and lights. It has four amps maximum continuous output, and weighs only slightly more than a four-amp-hour nicad battery. Price is $495.

Also new is the UltraKit, a complete 12 V lighting system with the UltraLight Single the company introduced last year. It has a clip-on fast charge, 12 V four-amp-hour nicad battery pack with belt clip and power cable, miniature wall-type Micro Charger and 50 watt, 12 V EYS dual-purpose bulb, all housed in foam-fitted shipping case. It is priced at $495.



New portable Light Kit from Anton/Bauer.

Also new from Anton/Bauer is a Dual Battery Holder, capable of switching from one battery to another when one runs out of power, for camera and lights. The holder accepts two snap-on Nicad batteries of any type in back-to-back configuration. Provides eight amp hours of continous power to a typical camera for about four hours. Price is $245.

Frezzolini Electronics has a new 40 W 13.5-volt 110-220 ac adaptor which weighs about one pound and is about half the size of an on-board battery. Fits on the back of most cameras with an Anton/Bauer plate. Cost is $545.

In another new development, Frezzolini's battery-operated Minifil light now has a battery incorporated into the light head, at least in prototype. It's cordless, weighs under 1.5 pounds, will run 15 min. at 50 W, and can be recharged. It can be mounted on a camera. Eventually the company hopes to have a model which runs 30 min. at 50 W.

Also from Frezzolini is a dual HM 90 double battery pack, for the BP-90.

Cine 60, meanwhile, has modified its OB 514 battery, with a digital connection replacing the cable so it can be used with other chargers (Frezzolini and Anton/Bauer). Same price as previous OB 514, $435.

Also new from the Cine 60 is an ac power supply, 14 V for video, $545.

Perrott Engineering Labs introduced a double version of its 500 mini silver-zinc battery charger, the Double Mini. It safely charges two silver-zinc batteries simultaneously with two independent chargers which each run on 115/230 V ac and are switchable to 50/60 Hz. It weighs less than five pounds and is priced at $895.

Elecon's new Elepack 90 is a heavy-duty battery pack for ENG equipment with a high capacity of 12 V/four amp hours and fast charger. The Elepack NP-1 rechargeable nicad battery designed as replacement pack for Betacam is compatible with NP-1 charger and is also new.

The KD-220 portable quick battery charger with carry-handle for nicad batteries is new from Paco Electronics. It provides simultaneous fast charge of two battery packs in one hour for size C, 2.5 and five hours for sizes D and F. A timer control allows for slower charging times. And Paco's new nicad battery pack for ENG/EFP cameras and VTRs, is a replacement for the Sony BP-90. A built-in thermal protector will protect the fuse in a short circuit situation.

Cool Lux has two new battery belts, the L-13 and the L-20, which provide 13 and 20 amp hours respectively. The new belts have a built-in charger. The L-13 is $279.95; the L-20 is $329.95.

Also new from Cool Lux is the L-6 half-hour amp battery pack, a small power source for lights.

Swintek introduced the NB-D rechargeable nicad belt power pack, which uses a replaceable nicad battery. It's available in 10 V dc, 12 V dc, or 15 V dc. There is a four-hour recharge time or optional discardable alkaline. Priced at $350.

G&M Power Products showed several new products. The Superblock is a single pack with two 12 V or two 14 V seven-amp-hour batteries, which can power two separate pieces of equipment or be used to power one for twice as long. The Dual 12 is $930, the Dual 14 is $970. Also new from G&M is the BP holder, a Betacam mount. The BP slips into the holder and runs a Betacam three times longer, with, instead of 1.5 amp hours, four amp hours. Its cost is $99. G&M also has a new metal case for its on-board 12-14 V battery which is stronger, lighter and smaller. With a charger, a 14 V unit is $495.

Lighting

New offerings in lighting supplies

COMPONENT PICTURE QUALITY FOR LESS

Until recently, the cost of component video quality limited its use to high end professional teleproducers. Now, the CCD Y/C from FORTEL gives affordable component quality to all professional teleproducers. Better pictures for under $9,000.

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UHF Television Transmitters

The LDM 1790 Series is a new range of high power (60–120 kW) UHF television transmitters. The first of the third generation from Pye TVT. Incorporating the latest Amperex compact klystrons, which give more power from smaller tubes. Allowing Pye TVT to build smaller and more cost-effective transmitters.

Designed specifically to suit United States requ rements, these transmitters comply with FCC (CCIR 'M') transmission standards with NTSC color. They are suitable for stereo/multi-channel sound.

Pye TVT is the transmitter manufacturing center for Philips, with 40 years product development and manufacturing experience. Success has been proven in the field of UHF television and FM radio transmitters with over 2000 installed in 74 countries worldwide.

New Generation

New Generation

New Generation

PHILIPS

PHILIPS

Reliability through Quality

ran the gamut this year from the very large to the very small. On one end, lighting equipment is offering more portability, and on the large end, more powerful lights for the greater emphasis on elaborate video productions such as music videos.

Reflecting this trend toward powerful yet portable lighting for more complex productions, Arriflex introduced a new 12 kW HMI fresnel light, with same size head as Arri 6 kW. It is light and compact, made of ribbed aluminum, has a safety cutoff switch, and is specially designed for on-location ballasts.

Also new are the Arrisun 5 and 12 lighting fixtures, 575 W and 1200 W respectively. These use new sealed-beam PAR lamps from Sylvania and Thorn. Thermoplastic housings rotate 360 degrees for precise positioning. The Arrisun 5 is $2325, and the Arrisun 12 is $2885.

Mole-Richardson also showed several new powerful lights: a new 650 W mini-softlight, 1000 W par light, a theatrical-type light with long front end for color mounts, with a rear knob to turn light beam, and toggle switch. Also a new are a 6000 W Molelectric dimmer, a 2.4 kW light with Molelectric Dimmer, a new 12 kW ac-dc, which eliminates the hum that ac sometimes causes while it plus provides a longer lamp life, and finally, an HMI mole solar ARC spot light, in 12 kW or 6000 W with a new lighter, smaller ballast for each.

New from LTM is the LT 500/1000 set light, for key light, back light and special effects. Price is $332.

B&W introduced a new 8K softlight weighing 39 pounds for field or studio. Its major innovation is in cooling. There is a horizontal mount system for grid, and a vertical mount for out in the field. There are latches for easy lamp replacement, it's constructed from aluminum, and is priced at $1595.

Also from B&W, is a double-track rotary switch which glides backdrop curtains onto secondary track for easy background changes. It could be useful for chromakey curtains. Priced at $515.

Comprehensive Video Supply introduced a whole new line of lighting equipment, a new field for them, and the new line includes versatile lights, modular mounts and tailored kits, along with a new catalog. New entries include the rugged V-10/6 focusing spotlight, with either 600 or 1000 W lamps. Also MF-10 floodlight with a variety of lamps and accessories for both lights.

Variable focusing VM-300 light, with flip-up accessory system for news and documentaries, allows use of diffusor, dichroic filter or unique reflex plate; and a nonfocusing M-250 uses mirror lamps for varying types of coverage. The new K-600 from Comprehensive is a 600 W focusing spot.

In other new lighting products: Strand Century showed a new Shaulea 575 W HMI open-faced fixture and a new 12K HMI fresnel, also a new line of softlights.

Keylight introduced its Modulight range of folding softlights.

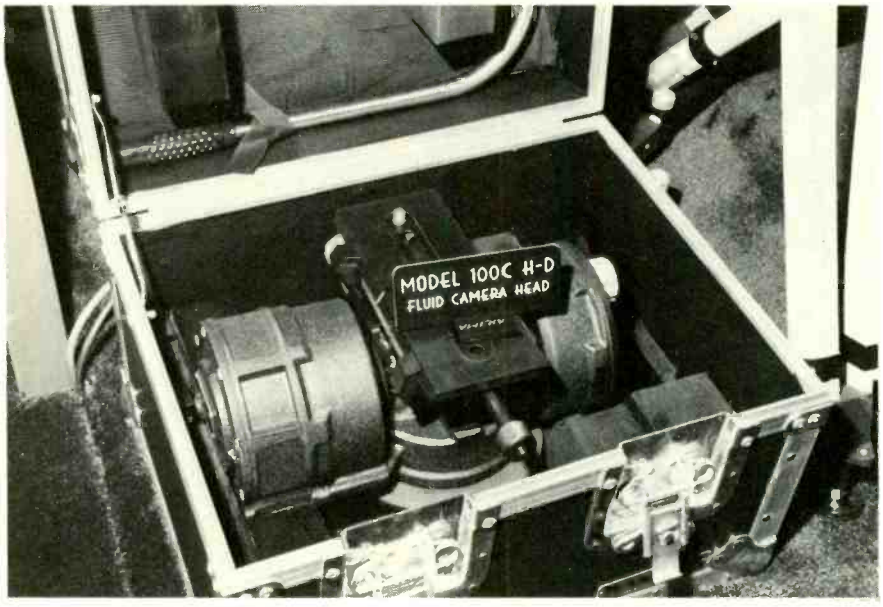
Kliegl showed newly designed fresnels with fast, precise-focusing that locks the lamp-holder.

Lighting Methods had a new RD digital dimming system and PD portable dimmer packs.

The Great American Market introduced ShowPlot, a computer-aided drafting software system for lighting design with voice command.

Alan Gordon Enterprises had new lightweight HMI lamp heads and a new Cinemeter light meter.

And AVO Lights, Olesen, and Theater Service and Supply all exhibited their existing lines of lighting and lighting support equipment.



O'Connor's Model 100C fluid head.

Finally, not a light but a lighting product, the Bowens Hi-Glide Light Track System was introduced by Bogen Photo Corp. It allows for easy push or pull-positioning of lights and reduces the amount of lighting support gear so shooting can be done from a greater variety of angles. The system includes a set of gliding tracks, scissor-action suspension units and related gear.

Support

No major innovations in support equipment were evident at this year's

The MC-200 Pedestal highlights Canon's new support line.

show, but there are more offerings geared towards ENG/EFP, a general industrywide trend. This has meant greater portability and more lightweight support products.

Along this line, O'Connor introduced a new Model 100C-HD heavy-duty fluid head, for studio and ENG/EFP cameras with long lenses and prompters, supporting a total weight of up to 100 pounds. The head includes O'Connor side-loading platform and handle which extends out to 26 inches and a wide choice of mounting bases.

Also new from O'Connor are extendable handles and side-loading platform on 150-B fluid camera head.

In addition, O'Connor's Model 53 dolly can now be used with any type of tripod. It has the special O'Connor-developed inclined wheel.

The company also introduced a new monitor side-mount for cameras. Model 21 does not obstruct over-the-camera view, can be mounted on left or right side of camera and used with several different types of monitors, including color.

Also new from O'Connor this year are five sizes of molded cases, all new, to transport the complete O'Connor line.

A new name in the out-and-out support field is Canon, who introduced an entire new support line. Two pedestals, the MC-200 which holds up to 286 pounds, and the MC-300 which holds up to 242 pounds each feature Canon's Modular Cassette Counterbalance (MCC) system for lightweight maneuvering.

Also new from Canon are two tripods, the TR-90 with 198 pound capacity and TR-60 with 132 pound capacity. The new Canon CD-10 tripod has a 198 pound capacity, while the new SC-15 Cam Head features 360 degree panning capability with a number of accessories, including pan bars in various sizes.

Listec introduced several new Vinten products. The Avocet ENG fluid head is a lightweight unit with 180 degree tilt, 140 degree pan, and 30 pound capacity.

The Cormorant spring-balanced head from Listec has EFP applications with 180 degree tilt, and can support four times its 22 pound weight. Listec's new 3201 ENG Tripod with spreader is capable of handling up to 45 pounds, and the 3257 Merlin Arm offers flexibility of movement from a height of up to nine feet via pan/tilt controls at rear of arm.

Also new at the Listec booth was the 3741 Tern Pneumatic Pedastel, a mid-sized pedastel featuring single column elevation, with steering control from

center ring. It has a 140 pound capacity. Listec also showed the 3267 Pneumatic Full production pedastel, the Hawk. Designed for ENG/EFP, it travels higher and lower than typical studio pedestals, and also has a 140 pound capacity.

At the Karl Heitz booth, a wide array of new Gitzo equipment was introduced. New are three mono-tripods with incorporated monopods. The 122 Sport Luxe supports seven pounds, and the 222 Reporter Luxe supports 15 pounds.

Also introduced were three lightweight monopods: The 0056 Loisir supporting up to three pounds, the 560B Mono Weekend B supporting up to five pounds, each monopod comes in three sections, and the 560L Mono Weekend Luxe with four sections supporting up to five pounds. Also new are six Gitzo microphone fishpoles/booms, in two-, three-, five-, and six-section poles supporting up to three pounds, and four- and six-section poles supporting 1.5 pounds.

Ultimate Support Systems' new offering was the Sound Boom SB-08P, consisting of two four-foot-long sections of tubing, an adapter base, and ⅝-inch mic adapter. Sawtooth design on the swivel fitted T-joint on top of the tripod allows boom adjustment in five degree increments with positive, nonslip locking. The package includes a 10 pound counterweight for balancing, velcro straps to keep equipment cables fastened to the boom arm, and optional carrying case. Cost is $298 w/o case, $319 with.

Listec introduced a new monitor prompter.

Also new from USS was the VB 12PB boom package, with large black aluminum tripod and 12-foot boom in three four-foot sections, plus 25-pound counterweight.

Innovative Television Equipment introduced its new 30 Series and 490 Series low-cost fluid heads, tripods, and dollies for ENG/EFP. Also new is the H100 camera head and H17 ENG/EFP fluid head and P1A pneumatic pedestal.

Cinema Products showed a new Steadicam adjustable load capacity arm and Mini-Worral geared head with 360 degree continous pan.

Sachtler has a new Video 20 studio and OB pedestal for use with its Video 20 steerable dolly. Also Hot Pod tripod with central locking and self-locking center column, and a Semi Dolly, a lightweight rolling triangle with independent brakes. The rest of the Sachtler support line was also on display.

Arriflex introduced its Hot Dog dolly, designed to carry the CineJib Camera Crane System, but it can also be a regular camera dolly. Has crab or two-wheel steering with a special steering link rod.

THE NEW NAME IN VIDEO WON'T DISTORT THE NEWS.

The new three-quarter-inch EASTMAN Professional Video Tape gives your news crews the reliability needed to deliver the story accurately every time. With high signal-to-noise ratio and the lowest of dropouts. With consistency, cassette after cassette.

This broadcast-quality video tape is designed to work with today's state-of-the-art recording and editing equipment. It's available in all popular sizes of standard and mini cassettes.

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Kodak

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LTM showed its new Nine-Footer, a collapsible microphone pole in four sections which extends to nine feet, retracts to 32 and inches weighs only 15 ounces.

Lowell has a new air-cushion at the connecting points of its collapsable grandstands, for smoother assembly and disassembly. And, all of its cases are now molded.

Matthews Studio Equipment has new lighting stands, a single operator dolly, and new features for its Tulip crane.

Omnimount showed its unique line of wall, ceiling and other mounting equipment for cameras, monitors and speakers. All feature Omnimount's "ball and socket" assemblies. Also new was a a special quick-release interface for cameras, the 50 QCM and 51 QCM Series.

Unicol introduced a line of trollies, stands, and bases, many with telescopic columns. Also in its line were trollies with multiple equipment trays.

Bogen Photo introduced a Mini Clamp for many uses. It opens to 1

Sachtler's new tripod is aimed at the ENG/EFP market.

⅛-inches, and is also available with double-ended ⅝-inch stud.

Remote-control pan/tilt

This was the year remote camera controls for pan/tilt, zoom/focus and the like made their comeback into the broadcast world. Most are microprocessor-based and offer improved, and in some cases digital, servo mechanisms, and the demand for greater portability of ENG/EFP cameras promises to give the introduced systems a hearty welcome in sports and other active applications.

TSM (Total Spectrum Mfg.) not only showed its new HS-100P High Speed Preset Servo Pan/Tilt system, but introduced a four-camera controller for the system. The HS-100P is microprocessor-controlled and can preset up to 100 pan/tilt/zoom/focusing positions. The TSM MultiController is capable of controlling up to four cameras remotely and in addition to 100 preset positions for each camera, each camera is also allowed five special motion memories, capable of storing up to two minutes of creative moves per memory, a total of 10 minutes of stored sequences per camera. Timed-rate motions insure smooth pan/ tilting, and corrections can be made in mid-motion and stored.

For lower-cost applications, TSM introduced the VS-200M variable speed motorized pan/tilt system for ENG/EFP cameras. It was a system originally designed for surveillance uses but is finding acceptance in stations where there is a need for lower-cost remote camera control.

Also new from TSM was the addi-

tion of Sony cameras to its mono brace line, and the FCS-20, a font compose and titling stand, developed and designed for NBC, now being introduced onto the market.

Anton/Bauer introduced a prototype fiberoptic camera control system, a new technology for this type of operation. It's called LightLink, and it provides complete remote camera control operation, including video transmission, genlock, intercom, auxiliary audio channel and camera control data over distances of one mile. Features include Automatic Gain control circuit which stabilizes system gain independent of video or sync level. A front panel LED monitors the received optical power and self-tests the system. Camera interface attaches to the side of camera.

Matthews Studio Equipment showed its Cam Remote, new ENG/EFP version of remote-control pan/tilt head, motor-driven, with motorized servo loop. It's available in a sports version, and also a periscope version that allows probing of miniature scenes to scale.

Cinema Products displayed its Mini-Mote, a Matthews/Nettman- designed remote pan/tilt control for ENG/EFP cameras. Also new was a camera/lens control system and new CP Co-Ax Digital Remote- Control system for the Ikegami HL-79E.

Collapsible mic poles were among new offerings from Gitzo at the Karl Heitz booth.

Quickset introduced a prototype of its remote pan tilt controller geared toward the LPTV market. It's powered by any ac 115 V, is microprocessor-based and mechanical (not servo) controlled, and a touch-tone panel generates low-frequency voice-grade signals to control pan/tilt, zoom/lens, and preset up to 100 positions and simultaneous functions. There is an on-screen menu, manual preset, random preset

one to 99 positions, and EPROM memory. It includes a character/title generator, and needs a separate pan/tilt head.

At the Listec booth, Vinten's Microswift 200, a microprocessor-driven, remote pan/tilt head was exhibited, but this year it has been positioned for ENG/EFP cameras. The Microswift 200 is priced at $35,000 per channel. It includes choice of analog or digital servos, and can operate up to nine cameras with additions to the system.

Skycam, the "flying" camera, attracted a lot of interest in the Panasonic booth, where recently-shot footage was also on display. The gyro-stabilized camera head, which is suspended from a system of motorized, computer-controlled pulleys, features remote control of pan/tilt/zoom/focus functions via microwave signals, but is in a class by itself in remote equipment. Inventor Garret Brown of Steadicam fame, through his company Skyworks, is still demonstrating Skycam to network sports departments and the baseball commissioner, and the swooping, soaring footage for which the system is known may yet become commonplace in play-by-play.

TSM's HS-100P Remote Pan/Tilt head.

Self-Contained Electronic Aqua Media, the underwater housing for cameras, is not exactly new, but what is different this year is that it is now fitted for Betacam and Ikegami ENG cameras. It has remote panning and tilting, zoom and focus, and was used in the Olympics. It's cast aluminum, with an audio system included if needed, and costs $10,000.

Canon was one of the first to venture into the remote camera control arena, but it was at a time when there was little interest in such equipment. Canon still manufactures a remote pan tilt head system which has been selling in Japan and which the company demonstrates to interested broadcasters. Canon does market a zoom/focus lens drive servo, and a conversion device which allows zoom/focus functions to be worked from the pan bar.

Cases

No sooner does new video equipment appear on the market than the case manufacturers introduce new carrying cases for it. This year they are more rugged than ever, directed more at ENG/EFP equipment, and in some cases are fungus and bulletproof. The availability of cases featuring rackmounting for editing equipment also reflects the growing emphasis on field production.

Kangaroo had several new products. The company introduced the KVP-1 carrying case for the Sony BVV-1 Betacam recorder, and a rain cover for the Sony BVW-3 Betacam recorder/camera and standalone camera. The case is priced at $100.

Calzone's new cases feature rack mounting of equipment, rack mount enclosures for portable editing systems. Slide-out trays serve the function

of racks for easy set-up in field production setting. The new cases have an inner and outer shell of foam cushioning for extra protection.

William Bal had a new line of survivor shipping cases featuring new styling and new sizes. Also new sizes in Silverline case family, and new tube cases.

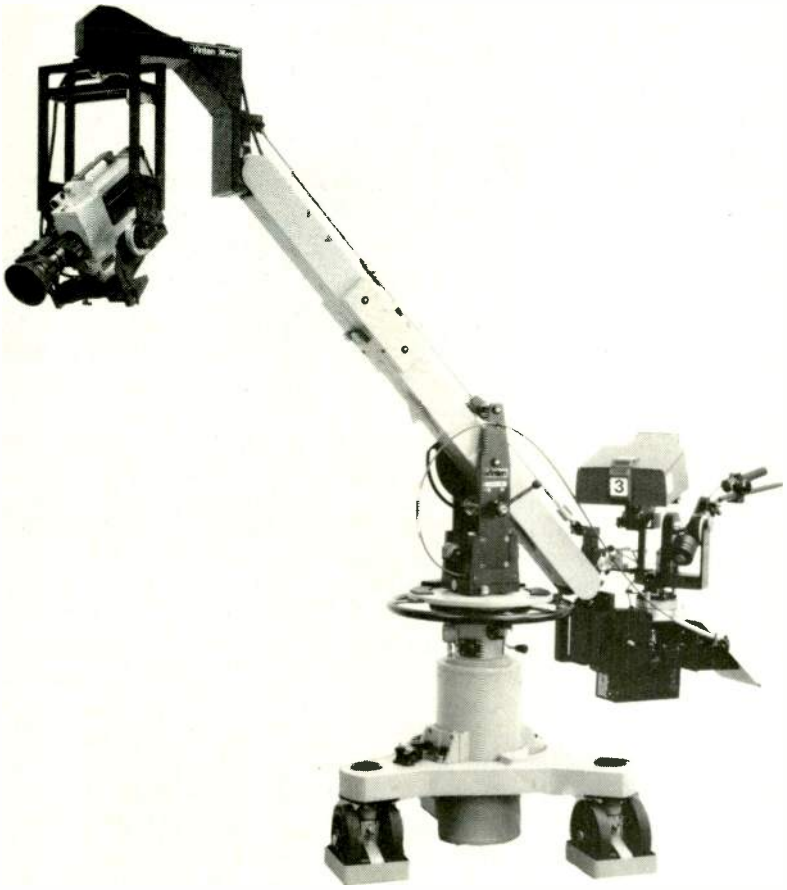
Star Case featured additions to its line of Super Star and Ultra Star shipping cases, and new stucco/fiberglass-laminated plywood transport and moving cases.

K&H Products had new nylon cases for all Betacam systems, and a new recorder case for Sony VO-6800, along with the Quick-Draw Professional, an easy-out case from Porta-Brace.

Fiberbilt introduced its new "high-tech" design 707 Series molded plastic cases providing better moisture protection and durability.

Excalibur showed a new 19-inch rackmount case with Star-Lok option for modular usage in the field.

Viking displayed its usual line of shipping and carrying cases including EIA shockmounted rack cases, Carrylite carrying cases, and ATA-type shipping cases.



Vinten Merlin crane arm with remote control.

Anvil had new MACC cases, which are designed to military standard, and are cadmium plated, have black anodized aluminum, are more rugged, and come with guarantees that the surface can't be ruined by the environment.

Studio cabinets

More flexibility in smaller spaces seems to be the main objective of cabinet manufacturers. There are new storage spaces geared to new equipment on the market, and at least one company is gearing itself towards the lower end of the market.

Stantron featured a complete "video center" of storage units, including VTR racks, cabinet consoles and dubbing racks, along with modular desk consoles that could serve for editing suites or computer terminals alike.

Winsted showed additions to its line of videotape editing consoles, storage units and equipment cabinets.

Arrakis Systems had low-cost additions to its BXC Series of studio furniture. They are all hardwood plywood with solid oak trim. Items include table assembly with left and right pedestals with tabletop, single and double pedestals, tabletop 19-inch equipment racks and wall storage racks.

Telescript demonstrated new computer prompting systems.

Storeel introduced a high-density Room Stretcher for Sony Betacam storage.

Prompters

Computer-controlled entries continue to grow, but a notable direction is toward smaller and more portable products, again aimed at ENG/EFP. There are also prompters with more flexibility, allowing for different kinds of lettering and more color backgrounds.

Listec, still a relative newcomer in the prompting arena, introduced a new 19-inch on-camera field prompter, the A-2019W, which is battery-driven with wide-angle hood. Text can be typed or written on the A-2019W.

Also new from the company is the A-2015EFP, a 15-inch on-camera monitor prompter with a standard hood, for above or below lens mounting, lightweight and rugged for ENG/EFP applications. Listec also showed the A-3300, a Universal Prompting Support System with hood assembly and trapezoidal mirror, and a cradle for a 17-inch monitor.

Also new from Listec was its A-2100 Scriptwriter, an electronic prompting system keyboard with rack-mountable

disk drive and a remote-control module, which allows two hours, or more than 6000 lines of text to be stored.

Compu=Prompt, a well-known name in computer prompters, introduced CP-Micro, a miniature four-inch screen videoprompter for mounting onto handheld-type ENG/EFP cameras. It can be used as a prompter monitor or as line monitor for live remotes. A clipboard holds printed script above lens of camera, and the monitor plays a live VHF transmission from the studio as a video line for cueing or live question and answer, without the need for a separate monitor. If not used as a line monitor, the unit can act as a regular prompter. Camera attachment includes four-inch monitor, mounting and clipboard, and video input, and allows for connection to computer prompter or video line, or switches between the two with the addition of a switch. The CP-Micro runs on internal or external battery or external ac, and is priced at $499.95.

Compu=Prompt also has new software for its CP-1000. This new prompting software allows uploadable fonts, variable font styles, and user created fonts. Can change fonts while text is in (but not while scrolling). New utility software allows for use with word processors, and automatically converts to correct prompter formatting, color coded, over the phone or computer to computer.

Q-TV, having joined with Autocue to advance its prompting systems into the computer age, introduced the VPS-500 computer prompting systems, with disk drives. Features include various color backgrounds and lettering and variable speed controls.

Also new from Q-TV is the MVP-706 mini video prompter for ENG/EFP with high-brightness monitor and camera mount, and the Mini Q Prompter II.

British Co. Autocue showed the Autocue 1000 standalone computer script-creater prompter. It holds text on disk, with each disk holding three hours of script. An option for a second drive machine will automatically switch from one drive to another for longer scripts. It is priced at $6950.

Comprehensive Video Supply is carrying Cinema Products' Camera prompter.

Telescript has a new computer prompting program for the Commodore C-64 and Smart Prompter, a computer prompting program for IBM and compatible PCs.

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THE BANDWAGON'S HEADED FOR THE WINNER'S CIRCLE.

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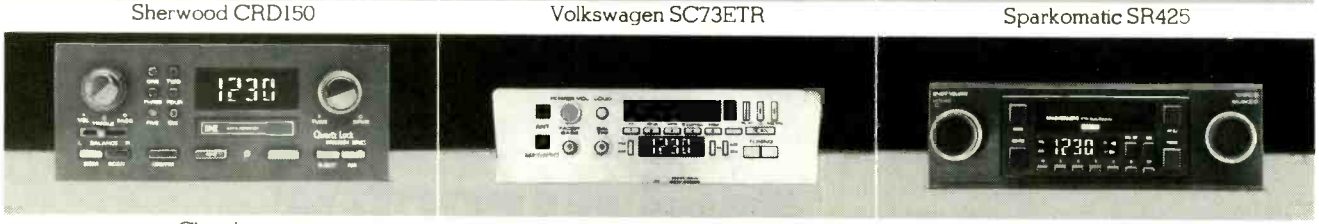

Chrysler | Nissan Maxima | Sparkomatic SR420

Sparkomatic SR430 | Concord HPL550 | Volkswagen SC99ETR

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Circle 163 on Reader Service Card

RADIO & AUDIO DEVELOPMENTS

Never have radio broadcasters returning from the NAB convention had more reason to be excited about the future. The push toward new technologies of the past few years has finally settled down and taken form as new equipment that not only lives up to some of the lofty expectations but takes into account many of radio's more pragmatic concerns. What this means is an actual product that is tailored to address hands-on problems at the same time it reaches toward performance perfection.

Radio and audio equipment has benefitted from the intelligence revolution and everything is "smarter" than ever, from on-air consoles right down to processors. This year saw the emergence of editors exclusively for audio—audio signal processors that perform a host of functions including recording, mixing and equalization.

New radio/audio consoles on the market are designed to serve double-duty, with on-air units doubling as production models thanks to logic-controlled switching and sequencing features. Added improvements in sound quality have been incorporated into new equipment, along with the precision-control of functions.

In mixing, multifunction systems were prevalent, offering mixing, routing, processing and other functions all in one unit. There was a distinct move toward smaller and more portable mixers.

Time base correction, which used to lie in the exclusive domain of video editing, has now entered audio production, with an innovative machine from Harris called the "Phase Fixer." It corrects phasing problems and problems caused by delay, and is the first piece of equipment to face the reality of stereo sound that is received in mono, a growing phenomenon now that stereo TV and AM stereo is a reality on the transmission—but not necessarily the reception—end.

Still another sign that the line between audio and video continues to blur was the availability of A/V synchronization equipment. And digital design has taken over in that area as well.

However, radio and audio production attendees could take heart at another area where digital improvements have left their mark, and that is in processing. The new offerings feature more thrilling special effects, more choices and versatility of functions, and more accuracy of sound with greater noise reduction/supression.

AM Stereo Targets Listener Support

There's a new direction in a field that has been marked by nothing short of a battle akin to civil war for the past few years. The vociferous war over which AM stereo system to support has been replaced by the realization that if AM stereo is to go anywhere at all, the emphasis must shift away from the internal squabbles toward listener education and awareness.

According to the best estimates, AM stereo is on the air in slightly more than eight percent of the 4500 stations in this country. Growth beyond this hinges on a new awareness of AM stereo, similar to what happened with FM a decade or so ago, according to Ron Jones, chairman of the board of CRL, which manufactures an AM stereo processor. Jones says that public awareness and public acceptance must swing AM stereo over and allow it to grow.

"Right now, the public thinks AM and FM stereo not AM stereo and

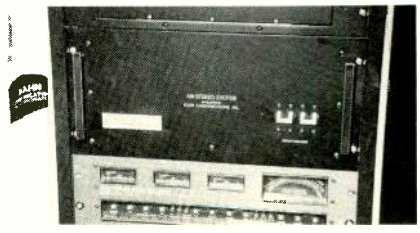
Motorola C-QUAM receiver-equipped automobiles.

FM stereo," Jones notes. He thinks that eventually 75 percent of AM stations will go stereo, and the others will be news/talk format, who may make the switch just to light the pilot beacon on the receiver to let the listener know he's tuned in.

Jones sees three elements for a successful, industrywide AM stereo marketing push. One is a concerted effort on the part of receiver manufacturers to tell the public that stereo is available, and create a consumer demand. Secondly, the broadcasters themselves have to keep pushing and promoting AM stereo, and finally, there has to be a concerted public relations campaign in the media explaining what AM stereo is all about.

The battle lines over the two remaining AM stereo systems are still firmly drawn, but a defection into Motorola's C-Quam camp this year has pushed the momentum firmly in their favor. Harris, which at last year's NAB switched its stereo pilot tone to C-Quam, has now abandoned its own system and has become, in effect, a C-Quam system dealer.

Harris received FCC type acceptance on its new C-Quam exciter one week prior to NAB, and is now offering an optional conversion program for AM stereo stations with Harris exciters starting June 1, with conversion for monitors to be offered in the near future. Converting the Harris exciter is relatively simple, requiring only some wire jumpers and minor realignment, along with a proof. There will be a monitor exchange fee of $950, according to Harris' product manager Joe De Angelo, who says the charge basically covers the cost of the new PC board required in the monitor. This allows Harris to maintain that it is not making any profit on the monitor but sharing



New STR-84 Kahn Communications AM stereo exciter.

the cost with broadcasters. De Angelo says that 15 stations have agreed to the conversion, and that Harris is marketing C-Quam exciters to new stations as well.

At Motorola's booth were AM stereo-receivable car radios from 14 manufacturers, with more in cars displayed outside the convention center. Representatives of some of those companies were on hand, which is somewhat unique in a trade-oriented convention. Delco, however, did not send anyone to this year's NAB, after being lambasted by broadcasters so heartily last year.

One development on the receiver end of the picture which should appease broadcasters is the increase to dual bandwidth receivers. Most of the early radios were single bandwidth. Motorola itself had no new product offerings, but there has been an increase in the price of its C-Quam exciter and modulation monitor package to $12,870. There seemed to be little, if any, interest or discussion at NAB about the Sony multichip, which was promoted earlier this year. Receiver manufacturers believe that the addition of the multichip to radios would cost considerable time and expense and would drive receiver prices up.

On display at Leonard Kahn's booth was the new Kahn AM stereo exciter, the STR-84, an FCC type accepted exciter with improvements over his STR-77. In full accordance with Kahn's system, the new exciter allows for sum and difference stereo processing, has transformerless audio circuitry, and promises full modulation without fear of interference, a problem that Kahn has long maintained exists with Motorola exciters. Also on display was "The Secret," which Kahn introduced earlier this year as a multisystem converter for C-Quam-only receivers. He says it takes a mere 15 minutes to install the converter, and that it optimizes the sound for Kahn stations. Put another way, C-Quam stations heard through "The Secret" don't have as good a sound as might be expected, a fact which has lead Motorola to the conclusion that the company will take some sort of action against Kahn's Secret—if the device ever gains widespread acceptance.

Also new at Kahn's booth was a data text system for AM stereo stations. It looks to be an SCA-based unit, similar to those in use at FM stations for text transmission, but Kahn is not saying much about it, just that it's "proprietary, with a patent."

There were other new AM stereo products on exhibit at the NAB. Broadcast Electronics showed its C-Quam AM stereo generator AX-10, which is now type accepted. BE was the first C-Quam licensee, and the exciter uses the company's own design.

TFT showed its Model 840 exciter. Its Model 841 modulation monitor is still in prototype, but was not demonstrated at the show.

Delta displayed its C-Quam exciter the, ASE-1, and modulation monitor ASM-1, with some performance improvement as the result of internal changes. Also on display was CRL's AM stereo processor. Sales engineer Bob Bousman agrees that it's up to receiver manufacturers to help AM stereo grow. He says they need to be convinced to start promoting the receivers, by combining new products with the natural advertising medium of radio.

Circuit Research Labs (CRL), showed its matrix processor for AM stereo, the AMS4, with some improvements, including modifications that allow it to be used for Kahn's newest exciter. CRL reports that AM stations not yet converted to stereo also use the processor, and the company's motto is "use it today, ready for stereo tomorrow."

Advanced Design Group Ltd. introduced a multimode AM stereo personal receiver for use as a promotional tool

Stations that want to be #1 don't gamble with their sound,

The choice of an on-air console is the most critical equipment decision you can make. If your present console isn't in top condition or you find yourself forced into making more compromises with your operations than you'd like, then chances are you're seriously reading this ad to find out what to do about it.

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☐ The BMX-III has three main stereo mix busses, each with distribution line amplifiers. For more flexibility, there's two telephone mix-minus feeds plus a headphone monitor mix. There's monitor facilities for two studios, and independent outputs for the console, host, co-host and guest telephone feeds.

☐ The stereo cue systems has automatic headphone monitor switching.

☐ Each mic and line input has full, independent remote control logic.

☐ All BMX-III's have multi-function metering with automatic cue and solo level display and a built-in test oscillator.

☐ The mainframes are available from 10 to 34 inputs.

☐ The audio and logic control systems are fully compatible with our new AMX and ABX consoles.

☐ A multi-way intercom system and a voice slating I.D. tone are just two examples of useful options that can be easily added to your BMX-III.

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by AM stereo broadcasters. The AMS-10 has 7 kHz fidelity response, uses three AA batteries, and receives all existing AM stereo transmission modes. The cost is just $22, which includes imprinting of station call letters.

At least one AM stereo manufacturer present at Motorola's booth says a major promotion of AM stereo is about to get underway. Chuck Harper of Sherwood, the first receiver manufacturer to go all C-Quam, says AM stereo car radios are selling well, with the first four months of production for the new model coming out this month already presold. He says Sherwood is now beginning to work with broadcasters to promote it.

"We want to get to every AM station broadcasting in stereo," Harper explains, and to that end, Sherwood will make several thousand extra radios to distribute through C-Quam stations with the cooperation of local dealers, as part of a "new aggressive attitude" in the marketing of AM stereo. Sherwood's sales of AM stereo receivers compared with nonAM stereo have been booming, according to Harper. He says the first year of production, nonAM stereo outsold AM stereo four to one. Last year, it was down to two to one.

Whether or not the other receiver manufacturers are as quick to join in the promotion of AM stereo right away, and whether or not the "war" is truly over, there are two major ways AM broadcasters have benefitted from the push toward stereo in the last few years. One is in improved transmission quality and better fidelity of their air sound, and the second is in better performing and sounding AM radios overall. What they choose to do with these plusses, and whether it can restore AM's eroding listener base, however, still remains to be seen.

Center Track Time Code Takes Center Stage

Browsing through the audio recording products introduced at this year's show, an NAB attendee would have been hard-pressed to find one that did not offer center-track time code recording, a feature especially in demand for the sophisticated needs of TV audio production. Still another clue that audio recording is focusing on the needs of video is the portability of open-reel machines, evidenced with an offering by Nagra with a similar product introduced as well by Sony.

Sony's product is the APR 5000 Series ¼-inch analog recorder. It's an intelligent recorder, 16-bit microprocessor-controlled with constant tension transport, both serial and parallel control interfaces, and center-track time code, for sync master, for broadcast and audio and video production. It also features automated control of record and playback alignment parameters, placing alignment at the call of a computer keyboard control panel.

Also from Sony are three 5000 Series recorders: Model 5001 with full track mono; Model 5002 with half-track stereo; and Model 5003 with half-track stereo with center time code track, sync lock. The latter provides for SMPTE and EBU standards of synchronization controlled both locally and remotely. All three models are available in console, desktop and 19-inch rack versions.

Otari's MTR-20, a two-channel master recorder aimed at recording studios, is microprocessor-controlled. A top-of-the-line analog, it holds a 14-inch reel, and at a speed of 30 ips offers longer program length capability. It is available in ¼-inch two-track, and two-track with IEC center-track time code, half-inch two-track and four-track. Its extensively used functions can be programmed for both transport and electronics.

The EC-101 plug-in synchronizer for the MTR-90 from Otari, provides two-inch recording capabilities in eight, 16, and 24 tracks. A retrofit is offered for those who already own the MTR-90 or as an option to the MTR-90. Its price is $3495.

Otari also exhibited the MX-70 multichannel recorder, a one-inch, 16-track which is perfect for audio for video. Previously shown in prototype, it is now a production model, and costs $1495.

Tandem Sony CD decks and controller.

Tascam introduced the M-16 one-inch 16-track recorder, with the option of assigning track 16 to be a dedicated time code track, at an additional cost. It includes a 10-point autolocater with a remote package as an extra option, and features a micro-radii head design to eliminate head bumps and Omega drive transport to eliminate interference. The M-16 is available as a separate unit or a console option.

Another new recorder was introduced by Tascam. The 225 Syncaset is a four-track, two-channel simulsync cassette recorder with synchronized overdubbing. An input mix switch allows mixing of inputs to record on a single track or on both tracks. It accepts both line and mic sources, and provides Dolby B noise reduction. It is priced at $350.


Tascam 16-track master recorder with auto locator.

Nagra showed the T-Audio TC, a transportable studio recorder with full SMPTE/EBU time code record and sync. It features a wideband predistortion system, and accepts up to 11.5-inch reels. Just starting production, it is priced at $12,000. Its tapes are interchangeable with the Nagra IV-S TC, a portable stereophonic recorder with time code, now in production.

Center-track time code is also a feature of the A820 Analog Mastering Recorder introduced by Studer Revox America. A microprocessor-controlled unit, it's available in mono and stereo with center track time code now, and half-inch two-track later this year. It accommodates reels up to 14 inches. There are 40 different user-programmable functions that can be assigned to various keys. A two-track stereo unit with console and meter costs $9900.

Also from Studer Revox is the B215

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With speaker and amplifier in one compact, rack-mountable package, this monitor system solves problems like limited rack space, equipment transport on remotes or cramped spaces in video editing booths.

Also, by requiring less hardware—fewer cables and connectors—the 100EL keeps setup simple and reduces potential interconnect problems. And there's no possibility of power loss caused by resistance from a lengthy speaker cable.

The on-board amplifier in the 100EL makes it ideal for single-channel monitoring. Why buy one speaker and an extra amplifier channel, when the Sentry 100EL does the job all by itself? And because amplifier power is perfectly matched to the speaker system, there's no chance of damage from inadvertent signal overload.

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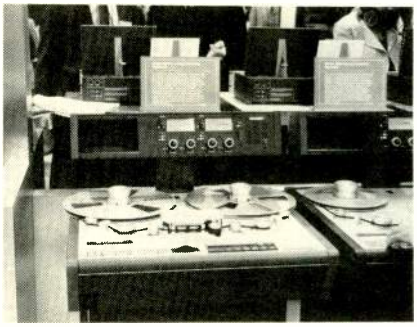


Studer A820 master recorder.

cassette deck, also microprocessor-controlled, with an automatic alignment system to set bias and equalization. Two channels are aligned independently. It has settings for up to six different tape formulations, and record levels may be manual or automatic. Other features include Dolby B and C noise reduction.

The new Studer A80VU-3 LB video layback recorder, provides for recording of audio tracks on one-inch videotapes, and can easily convert from Type-B to Type-C videotapes. It has erase, record and reproduce heads for three audio channels, and is compatible with audio/video sync and editing systems. Cost is $13,500.

Tandberg's new TCD 900 Series cassette decks are equipped with an eight-bit microprocessor with EPROM memory, and offer Dolby B and C noise reduction in a three-head system with four servo controls, phase corrective circuitry in the recorder and front panel adjustments in the playback unit which allow correct playback of tapes recorded on other units. The TCD 910 Master Cassette Recorder is $1995; the TCD 911 Playback Cassette Deck is $1795.

Also from Tandberg is the TD 20A-L Logging Recorder, with up to 25 hours of continuous low-speed voice and tape recording. Cost is $1995.

A new recorder/mixer from Audio-Technica, the AT-RMX64, is a full-featured six-input mixer coupled with a three-motor direct-drive cassette recorder. It can accommodate a mic or direct line input, and is capable of making four-track tapes at 3 ¾ ips or two-track tapes at 1 ⅞ ips. Features include variable pitch control, Dolby B and C type noise reduction and individual track recording and the cost is $1495.

Soundcraft also introduced a microprocessor-controlled recorder. The 20 Series two-track recorder-reproducer was shown, along with an updated SCM Series 760 MKIII.

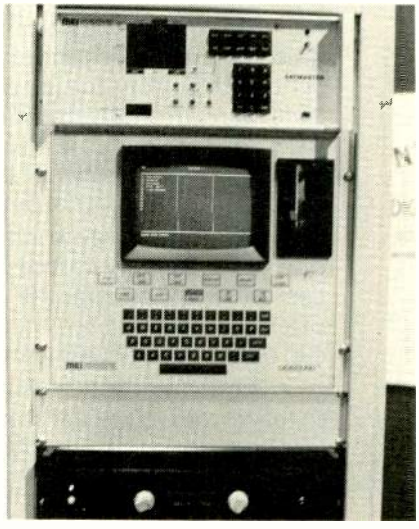
New products aimed at interfacing professional to consumer recording equipment were introduced by ATI-Audio Technologies. ATI showed its MM100 Matchmaker, for matching consumer recorders into professional systems. It's a bidirectional IFH to 600 ohm level and impedance matching interface which can be used with reel-to-reels, cassette recorders, graphic equalizers and processing equipment, and costs $239. The DP100 Disc-Patcher, to match compact digital audio disc players into broadcast systems, was also introduced. It is a unidirectional IFH to 600 ohm interface, also for ENG cassette dubbing, and is priced at $189.

Meanwhile, United Research Lab showed a new ASC reel-to-reel and ASC cassette recorder.

Cart machines

Will anything ever replace the old reliable audio cart machine? Digital recording is starting to show itself in new cart machine technology, and there's even talk that one day, CDs or digital memory machines will do away with the old dependable mechanical units that have become the mainstay of radio. But new offerings this year are more of a blend of the new and old rather than an abandonment of what has worked so well for so many years.

Although many classical or "concert" stations are programming extensively with compact disc recordings, and CD players are beginning to find acceptance on the consumer side of things, digital recording has yet to make the inroads in audio that it has begun to make in video. And nowhere was that more evident than at this year's NAB. There were, however, a few innovations that may foretell the future.



MEI Digisound digital record/playback.

For one thing, there was Microprobe Electronics' Digisound unit. According to the company's guidelines, completely using up the system's 350 megabyte disc yields 44 minutes of stored audio, in any combination of times. This unit features 16-bit resolution, and includes the first disc drive, and a standard typewriter keyboard on the front panel, along with the necessary operating controls.

In the same vein of disc-based storage systems, Gotham Audio introduced the EMT448 digital audio spot recorder, which uses Winchester removable hard disk technology, and the Systex digital audio storage system for commercial spots, news actualities, and music libraries using host computer control.

Broadcast Electronics, which has been in the cart machine business ever since the first Spotmaster rolled off the assembly line, is looking toward the future with Digitalk, a new digital voice recorder. It digitally records and plays back, on a memory comprised of RAM chips. There are no moving parts, no tape, and up to three minutes and 12 seconds of random-access memory. This is a prototype machine, and BE wants to get broadcasters' input. President Larry Cervon says right now the cost is too prohibitive because memory chips are still too expensive, but he envisions acceptance five or 10 years down the road. A three-minute memory could accommodate a commercial cluster, IDs, and the like, and Cervon thinks this is the "wave of the future," eventually replacing cart machines entirely.

BE also showed the new Model 5400, a three-deck cart machine, which accommodates A-sized carts only, matching recording amp to record on the bottom deck. The recording amp is new, and there are two configurations of playback and record units, each stereo or mono.

In a vein similar to Broadcast Electronics' concept of digital units eventually replacing cart machines, Compusonics showed the DSP-2000 computerized audio system at the Allied Broadcast Equipment booth. The 2000 is based around the DSP-2002 computer audio console for radio and TV broadcasting. It performs the functions of a cart machine but features digital sound quality, random access and interactive editing. Its storage time ranges from 30 to 960 minutes in stereo, depending on the number of storage modules added.

In the tape realm, Sony was exhib-

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iting, under its own label, its DASH recorder line. These machines are designed to operate in a similar configuration as their analog twins. Features of the DASH recorders include dual 44¼ 8 KHz sampling rates for CD compatibility, advanced error correction techniques to correct for dropout conditions, compatibility with SMPTE/EBU networking protocols and synchronization, including chase lock, and frequency response/signal-to-noise ratios that are still being sought in the analog realm.

Sony also had CD players on display, but in separate units, having come to the conclusion that stacking CD players in the same way as cart decks is an idea whose time has not yet come.

Although not digital record and store systems, several new cart machines, some incorporating digital circuitry, were introduced at the show as well.

The Omega cart machine, shown by International Tapetronics Corp./3M in prototype last year, was present again this year. The company has plans to start production soon. It comes in a stereo series, and mono which can be upgraded to stereo. The Omega is designed to replace the PD-II Series, and has a compact modular design with dual overhead cart hold-down mechanism. The mono reproducer is $1050, the stereo reproducer $1195, and the mono recorder/reproducer $1575.

Pacific Recorders introduced its Micromax cart machine, in a playback-only unit with record to come later. It delivers a half-track signal without ¼-track noise, thus offering twice as much track width to improve sound quality over ¼-inch tracks. An optional set of stereo heads can be ordered for those with ¼-track libraries. The capstan is driven by a servo-belt system developed from computer disk drives. The cost is $1445.

Fidelipac, the cartridge makers, now have the Dynamax CRT100 Series, a production model cart machine. A cart scan system allows mono and stereo carts to be intermixed in playing. Coded labels on the carts are picked up by the machine's sensors, which automatically switch over from stereo to mono when needed, and also detect elevated level format and switch. A variable speed selector allows carts to be shortened or lengthened. The record/play unit costs $3465.

In other new cart machine developments, Audi-Cord introduced the new E Series cart machines, an extensive redesign and upgrade of its A Series.

Straight Wire Audio introduced its Stereo Sentinel automatic stereo synthesizer, and 3D/RP high-tech playback amp for ITC cart machines.

Auditronics announced that it has bought Tapecaster TCM, which marks its entry into the cart machine field, adding Tapecaster TCM line to its line of consoles.

Studer Revox America displayed its professional CD player, the A725, with multiple disc cueing modes and three pairs of stereo outputs. A four-mode display shows disc time elapsed, disc time remaining, track time elapsed or track time remaining. Other features include pause, skip, repeat, loop and autostop, and the player may be programmed while a disc is playing, with up to 19 steps able to be programmed at a time. The system is priced at $1550.

Audio Editors Emerge

Although their paths of necessity cross at some point, audio and video post-production have tended to go their separate ways: video editing based around the editor, which more or less functions as the central "brain" controlling switcher, VTRs, and peripherals; audio post-production based around the audio console, often with automation and machine control capabilities. While the console can in some ways be seen as analagous to the video production switcher, audio has never had anything that corresponded to the video editor—until now, that is. This NAB saw the introduction of no less than three unusual systems designed expressly for audio post-production, each different from the other but all proposing radical change to the audio sweetening process.

Attracting the most attention was SoundDroid, the latest product line from the Droid Works, newly spun off from Lucasfilm and Convergence Corp. (See story on video post-production for details about EditDroid.) SoundDroid is difficult to describe because it does so many things: sound editing, multitrack recording, mixing, equalizing, panning, dynamic range control (including compression, expansion, and hard and soft limiting), reverb, delay, flanging, and special effects. The system shown at NAB, described by Droid Works as an "advanced prototype," is controlled primarily through a touchscreen and a mouse. It's built around the proprietary Audio Signal Processor, which contains one or more digital signal processing boards (DSPs). The basic system, with one DSP, can handle eight to 16 channels of digital audio, which it stores, retrieves, and processes on magnetic disks.

Of course, the entire process is automated, with resettable motorized faders. The user has a great degree of freedom in selecting and moving around chunks of sound in a mix.

The large magnetic computer disks that store sound for on-line use can accommodate about two hours of track time, according to the company, and allow virtually instant access to any sound in the system. Off-line storage is on high-density optical disks. SoundDroid is designed as an audio companion to EditDroid and shares the same "electronic logbook," allowing ease in conforming sound to an edited picture. In addition, a CRT display on the SoundDroid console gives a visual representation of audio tracks, allowing for very precise cuts.

New DroidWorks SoundDroid audio editor.

Patterned more closely after the video editor was the Soundmaster audio editing system, developed by Master's Workshop Corp. of Toronto and shown at NAB by Amtel Systems, which is marketing it in the U.S. The device shown was described by Bob Predovich of Master's Workshop as the first building block of the system. It provides SMPTE time code-based control of up to four tape machines (typically a VTR and three multitrack ATRs) using synchronizers as intelligent interfaces for the machines. (The system was originally designed to work with the BTX Shadow synchronizer.) At some point in the future, Soundmaster may be able to address an audio console.

The Soundmaster software generates a trio of display screens to assist in the

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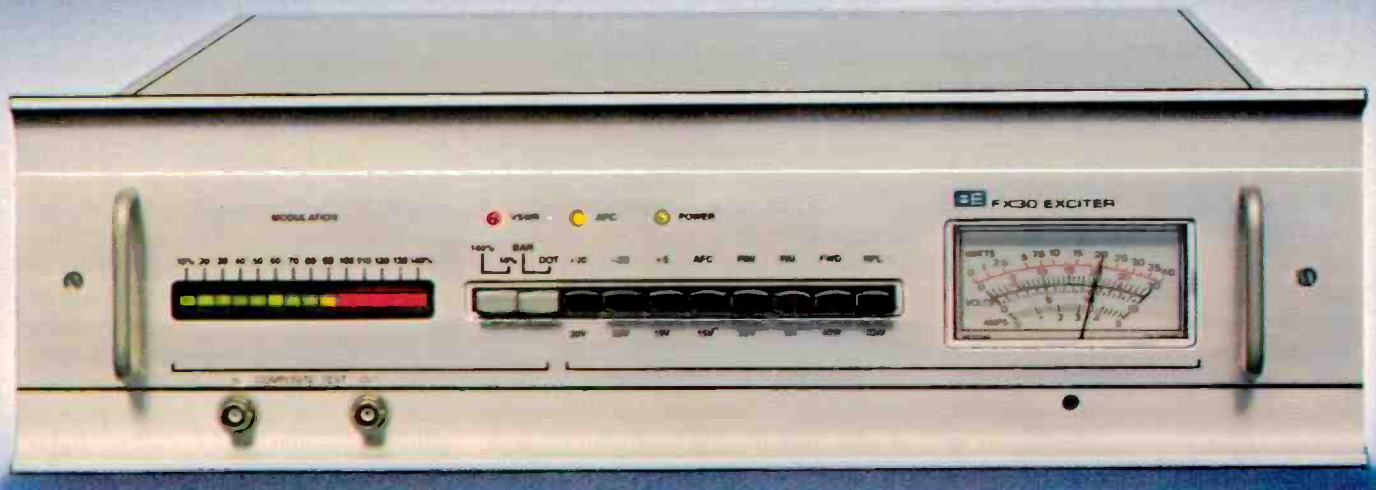

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editing process, providing real-time status monitoring of all tape transports, an edit decision list with true list management, and a setup screen to preset system parameters for each transport. The 2550-event edit list memory can be stored to disk. Including the IBM PC that runs the software, Soundmaster sells for $9950; it is available now.

At least as intriguing, although definitely not available, was the CASS 1 computer-aided sound sweetener, shown as a "preliminary engineering model" by CMX. CASS 1 is an audio editor that previews, records, and trims—and allows automatic control of an audio console (the NAB demonstration showed it controlling a Harrison PRO-7) from the CMX keyboard. The real-time, edit list-oriented device is designed to dramatically ease the audio mixing stage through precise control of the equipment. Its 64x16 audio routing switcher controls ATRs and other sources with better than field accuracy. Sixteen fader channel levels can be controlled from zero to 100.

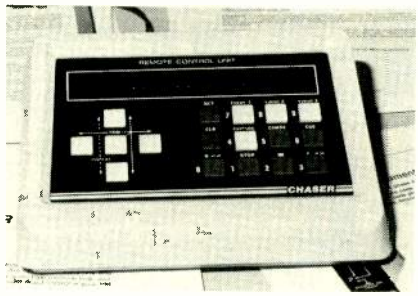
The basic unit has two channels of automated four-band semi-parametric EQ; as many as 16 channels can be added optionally. CASS 1 also has 16 GPI relays, with pulse duration from one frame to five minutes. Other features include on-line Help facility, list management, hard copy output, software calibration for virtually any VCA console, and display pages for edit list/event summary, audio fader motion memory, GPI, crosspoint, and EQ.

It's not a product yet, and CMX isn't hazarding a guess at when it will be one. But the company is reviewing response from the show, and a spokesperson suggests that if there's adequate interest in CASS 1 at the projected $25,000-$30,000 price range, it will be produced.

Audio/video synchronizers

Although the new audio editors drew a lot of attention, more traditional audio editing equipment—synchronizing systems—was also on display at the show.

Evertz introduced several new products. The Phaser is a new microprocessor-based capstan speed resolver and time code system for audio transports, incorporating the functions of both master time code system and audio transport resolver into a compact, rackmountable unit. The Phaser locks a pilot tone or SMPTE/EBU LTC to a master video reference, and the ATR time code is preserved on video by transference to either the time or user



Evertz Emulator time code synchronizer.

bits of the LTC and VITC time code generators. It can be color-framed to follow the SMPTE/EBU color frame sequence, making color edits possible. The Phaser can be configured to many different kinds of ATRs and is expandable.

The Emulator, also from Evertz, completely integrates ATRs into a video editing suite by causing the ATR to function as a video transport with only audio tracks under control of the edit controller. Emulator receives commands from the edit controller through its RS-422 serial port, which is compatible with the SMPTE/EBU standard for digital remote control. It controls cueing, preroll sync, record in/out and other functions, and requires one extra channel of control.

Evertz also introduced the Chaser, a chase synchronizer for audio and video transports. In addition to ATR integration into video editing, the Chaser can also synchronize ATRs to increase the number of available audio tracks. Chaser's intelligent transport interface can control most transports with a simple cable change, and advanced software algorithms allow Chaser to learn machine ballistics for precise cueing and fast lockups. The Evertz products were on display at Amtel's NAB booth.

At its first NAB, TimeLine introduced Lynx, a second-generation time code system with a modular synchronizer which includes wideband readers and a time code generator contained in a half-rack form factor. Lynx modules are configured together, and up to 32 may be connected together, with each module having its own independent time code generator. Each module may thus be used independently of the sync function to generate a separate frame rate and time code type. The system reference for synchronization is supplied from the Lynx module designated as master.

Elecon's newest product was the US-5500 Series Universal Video and Audio Synchronizer, or UVAS. In the 5500 Series are the US-5510 ATR module, the US-5520 VTR module and the US-5530 keyboard display. The ATR module has a SMPTE time code reader for master equipment, and provides slave ATR/SMPTE time code sync and slave ATR/video signal sync. The VTR module is a VTR control device that can be integrated into multiaudio editing systems or employed as a VTR controller. Three software packages provide the SMPTE time code reader and generator, the interfacing board and the output terminal. By combining the ATR/VTR modules with the keyboard display, up to 10 ATR/VTR cue points and up to four sound effect cue points can be registered for smooth and precise editing. Prices are $8850 for the ATR module, $7380 for the VTR module, and $2455 for the keyboard display.

Adams-Smith unveiled several additions to its 2600 audio/video editor. The first allows for double-system editing, off-line video, on-line audio mastering. It controls the audio independently of, but parallel to and in sync with video and allows for high quality multitrack audio editing. Choice of playback and record ATRs is varied, and the audio editing is accurate to 1/100 of a TV frame.

A second new item from Adams-Smith was the Model 2600 RG reference generator, an alternative to a video sync pulse generator. The RG outputs NTSC and PAL composite sync, and can be used by itself or as part of a System 2600 time code or tape sync installation. In addition to A/V sync, the RG can input and output signals over the 2600 data bus to and from other system 2600 modules on the bus.

Geise Electronic introduced its Lock System 3 and Lock System 3/2, along with its Taker A/B. The Lock System 3 is a SMPTE/EBU synchronizer for film and video. A 19-inch rackmount version also can be used on a desktop. The standard configuration combines one master with one slave, although the system can be expanded. There is also an optional remote control.

Geise's Lock System 3/2 SMPTE/EBU synchronizer synchronizes audio, video, or film machines. The standard configuration is one master and two slaves with standard remote control, but the system can be expanded for multislave configurations.

Other established synchronization systems were also displayed. Audio Kinetics brought its Q.Lock system, complete with the Q.Soft option for audio

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Studer's TLS 4000 synchronizer, introduced last year, is a modular system made up of a "black box" unit that functions as a chase lock synchronizer for one tape transport; and a local control unit, or LCU, available in basic and extended versions. The extended LCU offers enhanced display capabilities and operating features. The units will fit in the extended console overbridge of a Studer A810 ATR.

Sony featured its Sync Master synchronizer, which has edit list capability of up to 200 edit points and adheres to SMPTE's recommended practice for digitally controlled equipment.

Enormous Activity in Stereo TV

With 33 television stations already transmitting multichannel sound despite the lack of test gear to verify signal performance, and another 200 or so purportedly racing to be stereo-ready before the end of the year, one might have anticipated seeing a lot of TV stereo activity at NAB '85. Your expectations were more than fulfilled. There was a veritable gold mine of MTS (Multichannel Television Sound) information at this year's NAB. Not only were there live or simulated stereo demonstrations of complete systems, but dozens upon dozens of exhibitors were showing products of one sort or another aimed at helping the TV broadcaster go stereo.

The NAB itself issued a 24-page report on "Managing Multichannel Sound" (distributed at a management session) and some six technical papers were delivered discussing test results so far, including the importance of such topics as decoder tracking, circuit linearity, and broadbanding diplexers and antennas.

All in all, NAB '85 left no doubt that the MTS bandwagon was rolling. While more than half of the 33 stations broadcasting in stereo thus far have been independents (11) or part of the PBS network (eight), NBC's announcement that it will regularly broadcast the Johnny Carson *Tonight Show* and *Friday Night Videos* (plus perhaps *Miami Vice*) in stereo beginning July 1 signifies that the commerical networks are not holding back. ABC has been doing a considerable amount of stereo experimentation, and reports it will step up its amount of stereo programming. It is only CBS that has not declared its intentions publicly. Admittedly, NBC is perhaps best positioned to network stereo because of its in-place Ku-band satellite distribution system.

While most of the audience within the range of a TV stereo signal (estimated to be 34 million by *Television Digest*) may not have a stereo set, the growth of such sets is expected to follow or even exceed that of color TV and VCRs.

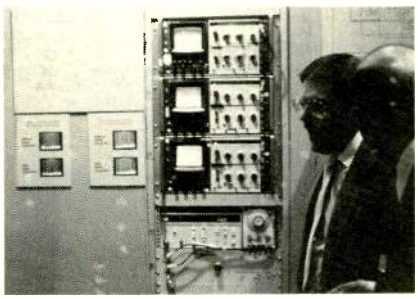
Thus, by 1990, as many as 40 percent of all receivers may be capable of receiving MTS. Zenith currently makes five sets with built-in decoders, and as many as four million Zenith sets are in homes that can accept a plug-in TV adapter. RCA is backing stereo wholeheartedly and the importers are expected to follow suit.

Technical aspects

The technical concerns that have existed following the endorsement of a BTSC system based on the Zenith/dbx approach were exhaustively treated in the technical papers at NAB—and literally demolished on the exhibit floor. The concerns are legitimate, but the solutions are plentiful. Most agree there is little problem in transmitting simple stereo with reasonable separation. But if you want to include a second audio channel for foreign languages (the SAP channel) and a third professional (PROF) channel for data, in addition to the main channel (L + R) and the stereo channel (L-R), aural modulating frequency components extend out to 105 kHz—a range broadcasters have not had to contend with.

Model 850 TV stereo monitor from TFT.

Verne Mattison of RCA described the problem. With a maximum permissible peak deviation of the aural carrier with the combined MTS modulating signals at ± 75 kHz, the transmitter should handle a frequency deviation of ± 100 kHz to provide ample headroom with low distortion. The passband of the aural RF signal should have a bandwidth of 400 kHz between 3 dB points. The slope of the group delay



RCA's demo of TV stereo-capable transmitters.

including the notch diplexer should be within 50 ns at frequencies out to 200 kHz above and below the carrier. Symmetrical variations in group delay should be less than 400 ns within the 400 kHz band. Further, the visual carrier incidental phase modulation (ICPM) should be within a maximum of 3 degrees (TFT says 2 degrees) to prevent an audio buzz. Signal components of the visual output should be attenuated by 30 dB within ± 0.12 MHz of the aural carrier frequency.

At the RCA exhibit, a modification kit was offered which met these specs. The only requirement was that the UHF transmitter needed a solid-state exciter.

Sam Zborowski of Information Transmission Systems reported that the most critical section of the multichannel sound transmitter is the voltage-controlled oscillator and the multiplier chain or heterodyne frequency conversion section which generates the FM on-channel aural signal. Limited bandwidth amplifiers and diplexers affect quality less, he said. The ITS booth offered a very linear exciter, the Model ITS-20 for UHF stereo transmitters. This unit included ICPM correction circuitry, since induced crosstalk of video into recovered audio within quasi-parallel receivers can be a problem.

The importance of a linear exciter was highlighted by Larcan, which had a setup showing how it achieved 44 dB separation at KERA-TV, Dallas, on Larcan TTC-30LH high-band transmitters. "It's all in the FMO (frequency-modulator oscillator)," said Larcan, which did not modify its notch diplexer in any way to get the impressive separation. Larcan used a Modulation Sciences STV 784 stereo generator in its

setup. Results were shown on a Tektronix spectrum analyzer (7L5) using Modulation Sciences' new precision SRD decoder for showing results with and without companding.

Good separation was highlighted at the Comark exhibit, which dared to show plots of separation comparing its transmitters with others. Comark stands well because of the linearity of Marconi amplifiers and drivers and its own CAM-100S aural modulator.

Studio Technologies AN-2 stereo simulator and RCU-1 recognition control.

Although both ITS and Larcan minimized the affect of the diplexer on quality, single-cavity types may be inadequate for full MTS bandwidths. Micro Communications advised visitors to its booth that dual-cavity constant impedance notch diplexers offer a flatter response in the extended aural frequency range without adversely affecting video. This advise stems from considerable calculations made for UHF diplexers and actual experience at KTLA, Ch.5, Los Angeles.

The relationship of good stereo separation to undeviating amplitude response and phase response (group delay) was underscored by Geof Mendenhall of Broadcast Electronics, who outlined some tests that could be made. The need for correct phasing and equal group delay of the pilot tone (Fh) was also stressed. Because of the possibility of clippers and limiters introducing intermodulation and harmonic distortion (affecting crosstalk and separation), Broadcast Electronics does not feel composite processing should be incorporated into TV stereo generators. It argues that since maximum loudness is not important in TV as it is in FM, modulation densities can be lower, thus obviating the need for heavy processing. To provide what it considers to be the best in TV stereo generators, Broadcast Electronics unveiled the TZ-30 at the show. It uses a digital modulator and pilot generator design to ensure "absolute" pilot phase stability. The frequency response specs are exceptional and flat within ± 0.5 dB, 50 to 15,000 Hz no dbx encoding, and 1 dB with encoding. The TZ-30 includes dbx encoder boards for companding the L-R channel.

Broadcast Electronics' approach to stereo generator design sets it apart from the approach taken by Orban and Modulation Sciences, since both of the latter incorporate integrated processing. Orban's approach to the BTSC system, in fact, starts with a stereo processor, the Optimod-TV 8182A box, and the stereo generator is called an Accessory Chassis. (If the customer wants a SAP generator, that is a third box; a PROF channel is an option of the stereo generator chassis.) Orban says the 8182A processor gain rides (over 25 dB) and compresses in a "virtually undetectable" fashion using the advanced techniques incorporated in its FM processor, the 8100A. Included are dual-band compressors, the CBS Loudness Controller, the Hilbert-Transform clipper, and FCC band-limiting overshoot correctors—for a "natural" sound. A built-in monitor circuit uses dbx decoder cards. The baseband generator uses a servo-stabilized matrix, which Orban claims is better than some digital synthesizers (used by most other manufacturers).

Modulation Sciences' TSG is an integrated system (in one box, although the SAP generator is a separate unit) with full audio processing plus loudness control. MSI offers three loudness possibilities including the CBS Loudness Controller. Its built-in monitoring facilities "eliminate the need for expensive modulation monitors." A built-in precise comparator allows matching the dbx encoder's reference level to 100 percent modulation, thus assuring that the receiver's decoder tracks accurately for proper separation. At the show, Modulation Sciences introduced a MTS Stereo Reference Decoder to facilitate setup, calibration (to BTSC standards) and off-air monitoring.

Circuit Research Labs' approach to handling the stereo TV signal falls somewhat in between the no-processing Broadcast Electronics approach and the extensive processing practiced by Orban and Modulation Sciences. CRL showed two complimentary units—the TVS-3001 studio processor and the TVS-3002 limiter generator. The former included built-in features specifically desirable in the television environment. One such feature was an input gain adjusting element to automatically compensate for long term studio/transmitter path gain drifts. The TVS-3002 includes only small amounts of "preliminary" audio limiting at the left and right channel inputs and small amounts of final limiting action. A digital generator design eliminates the need for critical pilot phase adjustments, since both the pilot and subcarrier are obtained from the same frequency source. If sync input is lost, the unit switches to a mono mode.

Marcom has taken the "no processing" approach to its generator. Processing is available, of course, from its associate company, Inovonics. Using a digital Sinusample generator circuit, Marcom claims high performance at a low price. The Eiden/Elecon 475A-S MTS stereo generator offers no processing but has extended specs and built-in peak meters and flashers.

Given a good stereo generator, a quality exciter, a flat transmitter (or a means of compensating it), and a dual-cavity diplexer, broadcasters can be fairly assured that their signal will be of good quality. Nonetheless, stereo TV modulation monitors are most desirable. Both Belar and TFT talked about monitors, but neither was ready to deliver. TFT was quite close, however, and did announce the price of the TFT Model 850 MTS Monitor—$15,000 complete with a Tek distortion analyzer, $12,000 sans the analyzer.

As important, or more so in terms of getting a signal on the air, was TFT's introduction of a Composite Subcarrier Generator Package complete with a demodulator as an efficient means of getting from the studio to the transmitter without using four separate audio subcarriers. This 8500 Series was priced at $6000, and TFT announced a joint marketing agreement whereby M/A Com would sell the composite carrier as part of its STL microwave package.

Belar's forthcoming TVM-200 TV Stereo Modulation Monitor is designed to work with Belar's TVM-100 TV Baseband Modulation Monitor to provide "complete monitoring" of BTSC stereo transmission systems. Two autoranging voltmeters allow automatic measurement of channel separation, crosstalk, pilot phase, and level.

Two meters indicate L+R and stereo composite modulation levels. PPM and peak metering of mono is read and digitally set peak indicators are incorporated.

Although modulation monitors appear to be the last vital part of the MTS

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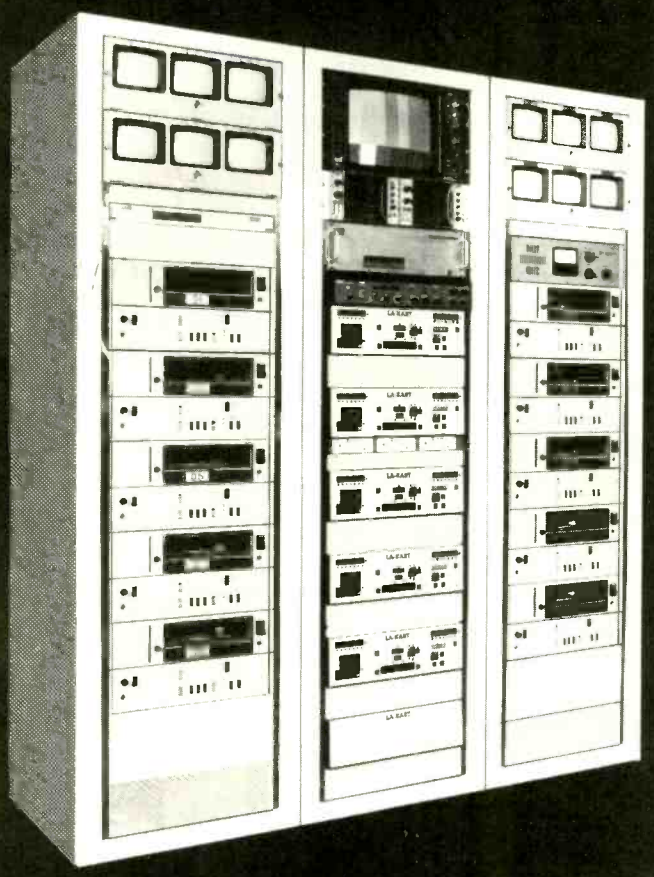

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chain to make the scene, measurements can be made now. Tektronix showed how, using its enhanced demodulator, the 1450-1, with a widened (150 kHz) audio bandwidth. Because of its distortion and linearity characteristics, it is "transparent," according to Tek. In conjunction with the company's 7L5 spectrum analyzer, AA5001 audio distortion analyzer, and Modulation Science's precision decoder, a station's performance can be ascertained. Wideband demodulators were prevalent at the show as indicated by the Telemet (Model 4501), Rohde & Schwarz, and Elecon units. The latter's 466B MTS includes two built-in dbx cards, one for stereo and one for SAP. It is described as a suitable reference demodulator. Telemet reminded visitors that its synchronous detector (Model 4504) is available as a means of measuring incidental phase modulation.

Yet another useful instrument for stereo broadcasters was the AM-3 stereoscope introduced by B&B Systems, Inc. The AM-3 verifies stereo separation on a scope display, checks the phase, reads levels (L, R, and SAP) and monitors peaks on LED displays, showing remaining headroom. B&B also displayed a prototype stereo "vectorscope," which it called an Imagescope, that showed separation graphically. Merlin's ME-158S stereo audio monitoring system included a CRT display to show the channels' characteristics, plus three color-coded LED bargraph displays to show the levels of the stereo audio channels plus time code.

The stereo synthesizers at the show received close scrutiny. Challenging Orban were Studio Technologies and Kintek. Studio Technologies' AN-2 creates two incoherent signals and simulates stereo perception by varying phase, intensity and time relationships, which creates the impression of space and depth. The core of the Kintek KT-903 is a phase and amplitude modifier, but the unit also includes "intelligent" speech recognition circuitry, which isolates and steers dialog. Both products are mono compatible.

The schemes for recording stereo sound onto mono carts (ACR-25 or TCR-100 types) shown by Merlin and Pinzone involve multiplexing the two stereo signals into the vertical blanking interval of the video signal (with an encoder) while recording, and then using a decoder to separate them upon playback. Merlin's approach is called VISA (Vertical Interval Stereo Audio) and the Pinzone import from Australia is known as VIMACS (Vertical Interval Multichannel Audio). Pinzone reports three lines are needed in the vertical interval for each channel.

One half of the Zenith/dbx team which contributed the technology to the BTSC MTS system was an exhibitor: dbx. Offered for sale were the 525 Series TV Noise Reduction cards: a 525CH high-spec compressor and the complementary 525EH expander for decoding.

Variety Spices Up Console Market

Many things illustrate the ferment in the audio side of the broadcast business: the new audio ATRs, the rise of compact disc players, and, not least, the continual striving for perfection of the audio console manufacturers. The array of medium-sized and small mixers at NAB '85 almost (but not quite) defies description, with most makers finding a way to improve on last year's offerings. Many of these boards are not confined to the radio studio, but frequently find their way into the small television station and often into teleproduction vehicles. Their variety reflects an industry never satisfied with the state of the art where audio is concerned.

McCurdy, long a mainstay of radio, introduced the SS8800 E Series console, an enhanced version of the company's 8800 board. Available with eight to 24 inputs in mono, stereo, and four-track designs, the board has an impressive array of features: full solid-state switching, digital logic control, active balanced line inputs, active balanced and isolated mic inputs, active balanced, multiple isolated output splits, and comprehensive standard remote-control and tally facilities. Both on-air and production configurations are offered. Options include equalization, compression, oscillators, monitoring systems, clocks, timers, and more.

Also new to NAB were Yamaha's MC Series boards, available with 12, 16, or 24 input channels and all under $4000. All models offer four program buses, two effects buses, and two monitor buses, plus cue. An expanded version of the MC Series, the MC1608M/2408M monitor mixing console, was also introduced, offering eight different monitor mixes via eight buses controlled by compact rotary faders. The M Series post-production and mobile console was also featured.

An interesting new item from Yamaha was a four-track cassette system consisting of the MT44D multitrack cassette recorder with the RM602 6x2 mixer, both mounted in a stand with all inputs and outputs up front. The package costs $1100.

Three new Ramsa stereo mixing consoles were introduced by Panasonic: Models WR-S208, WR-S212, and WR-S216, with eight, 12, and 16 inputs. These inexpensive boards are intended for broadcast, production, and post-production applications and can accommodate a wide variety of input sources. Two channels on each board have stereo inputs for both line and phone; all mono inputs are electronically balanced for mic and line. Each also has three send circuits—prefader foldback, post-fader effect send, and switchable pre/post-fader send—and three selectable main outputs, A, B, and main mono. The WR-S208 lists for $1295, the WR-S212 for $1795, and the WR-S216 for $2095.

Tascam introduced its 300 Series mixing consoles to NAB for the first time. Shown were the M-308, smallest of the line with eight inputs, and the 12-input M-312; the 20-input M-320 was not shown. According to the company, these boards can serve a wide range of applications, including broadcast audio production, video post-production, live sound reinforcement, and small recording studios. They feature two-band parametric equalization, effect send, Aux 1, and Aux 2 sends on each channel, and inputs switch-selectable with independent trim controls for mic and line. Also new was the M-106, a very small rack-mountable and tabletop 6x4 mixer for small off-line or sweetening systems, priced at $600.

A very classy mid-sized mixer was displayed by PPS Electronics Corp. in the Hilton Center. The Swiss-made Sonosax SX-T is available in a 10-input rackmount version or in tabletop versions with 12, 16, or 24 inputs with

Discover a high-performance mixer with a personality all your own.

The Ramsa WR-8616.

Inside every recording engineer is the desire for more creative control at the board.

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What's more, this high-performance mixer gives you two discrete mixes. This allows for full monitoring capability, which can be independent from the control room's mix.

And in the mixdown, you'll have access to all 16 inputs without having to repatch or reset the board.

You'll also find the 3-band continuously variable input EQ will give you more precise control over the highs, midrange and lows. And the six-channel remote start/stop capability lets you program materials using turntables, or tape and cart machines.

To make the WR-8616 even more compatible, we've given it a dual set of meters. Eight LED bar graphs will monitor the 16 input signals. While the six VU meters handle the Master, Group, Send, Echo outputs and Solo level.

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SPECIFICATIONS:

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- Frequency Response: 20-20,000Hz; $^{+0.5}_{-2.0}$dB
- Noise: −128dB (IHF "A" WTD. 150 Ohm)
- THD: 0.05% typical at 1kHz, +20dBM
- CMRR: Greater than 80dB typical

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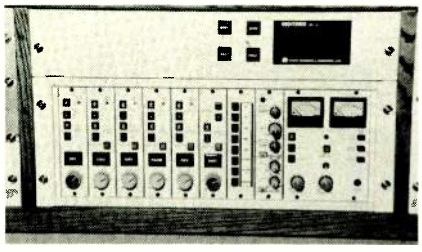
Several other well-made portable mixers made their appearance at NAB as well. The compact Seck 62 (six-input) and 122 (12-input) mixers, at the booth of U.S. distributor Connectronics, are designed for live stereo mixing. All electronics are on circuit boards, with no wires inside the consoles, and the housings are of tough fiberglass. Channel controls are staggered so that high knob density can coexist with ease of operation. Each input channel features four auxiliaries, two before the fader and two after.

The SAM 82, SAM 42, and SAM 31 portable mixers from Satt Electronics were featured by Auditronics, which also showed its own 200 Series on-air consoles and 300 Series audio production consoles. The Satt mixers, designed for ENG/EFP use, offer rugged construction and ac or battery-powered operation.

In addition to its ESA-10 console, introduced last year, Radio Systems unveiled a new line of components, including the DC-X range of inexpensive, high-quality studio amps, all using external dc power supply, for $100 each; the RMS (remote modular switch) panels; and the company's stereo LED meters, a feature of the console now packaged separately.



New Pacific Recorders NewsMixer rack-mounted mixer.

Wheatstone also showed its line of stereo production consoles, along with the A500 on-air console, introduced last year. "Quite a few" have been sold, according to the company.

Is it a mixer? A router? The new Newsmixer from Pacific Recorders & Engineering is difficult to classify. Basically a production tool for the radio newsroom, it performs audio mixing, monitoring, and routing functions and can double as an on-air console. The seven-inch-high mainframe, which mounts in a rack or sits on a desk, accepts up to eight plug-in input modules, and additional mainframes may be cascaded for more inputs. It features dual-bus design that lets the user perform more than one task at a time; for example, recording a voice track and dubbing an actuality. It can record from a booth mic, select remote sources, and handle any combination of tape recorders. The simple-to-operate unit should be available this month. PR&E also featured its recently introduced BMX 3 Series console.

A variety of new small mixers appeared in several booths this year. Electronic Systems Lab, Inc., for example, showed a new 4x1 mono ENG mixer from Eela Audio, available with VCA control and break jack on the back for AFV switching. Eela also makes a line of larger mixers, ranging from small portables to the S 3000 true in-line multitrack console.

JVC showed a new rack-mountable mixer, the MI-2000, with up to eight inputs. Its mic inputs feature a transformer balancing circuit with excellent common mode rejection, suiting the mixer to on-location use. In addition, the mixer features full monitoring including PFL, monitor out with level, and auxiliary out with level.

Elecon introduced the Elemix 401, a portable four-channel mono output audio mixer that sells for $2000. A rugged aluminum case helps the mixer withstand the rigors of ENG use, and a built-in dc-dc converter assures high dynamic range headroom.

Calrec also had a new minimixer for OB use, the M Series, with up to 16 channels and two group or stereo A and B faders with PFL. This sophisticated mixer also features three-band EQ on each channel.

On-air boards

As many radio on-air consoles take on production-oriented features, the line between on-air and production boards continues to blur. A good example of this trend is the new entry by Harris, the Gold Medalist, an upgraded version of Harris's successful Medalist line. The 12-channel Gold Medalist, with mic capability on each input channel, is suited to production as well as on-air applications and offers 36 inputs with logic-controlled switching for audio-follow and remote start/stop control.

Soundcraft's SAC 2000 stereo on-air console, previously seen in prototype, is now a "production prototype" available for purchase. Its sophisticated features include a built-in sequencer that allows any combination of cart decks to be started in sequence; remote-control inputs that let a broadcaster start music and commercials in the field via a keypad; and an air control module for profanity editing.

ROH has also introduced a console for both production and on-air use, the 2000 Series. It is presently available with 14 channels, although eight- and 20-channel models are expected to be available soon. The console features dc-coupled circuitry using servo amplifiers, three stereo buses, three mono outputs, durable high grade components, and fully modular design. The 2000 Series sells for $12,500.

Another board for both on-air and production applications is LPB's new Alpha Series, shown in prototype, with deliveries expected for September 1. This all-solid-state stereo board uses top-of-the-line noise-free VCAs and is controlled with digital logic techniques, allowing an engineer to troubleshoot it with a simple digital logic probe. It handles three inputs per mixer and is a completely transformerless design, although output transformers may be specified. The 10-channel version, the largest, is $4795.

Logitek's Perfectionist on-air board, shown last year as an eight-channel prototype, was back in production versions with both eight and 12 channels. The new Perfectionist-12, which handles up to 48 inputs, lists for $10,995 with either slide or rotary faders and offers full metering and prewired punch blocks for input and output.

Howe Audio's 9000 Series modular console, introduced last year, was featured at this NAB in a 22-input version. The board's latest feature is optional three-band equalization with pushbutton adjustment. According to Lee Edwards, industry response has been excellent to the 9000, which is set apart by its unusual sealed membrane switches. Howe also featured its 7500 and 7000 Series boards.

Although Autogram didn't show any brand-new consoles, it introduced an automatic clock for its consoles that shows elapsed time, real-time, temperature (F and C), date, plus high and low temperatures of day and the times they occurred—a good item for DJs.

Broadcast Audio Corp. has upgraded its System 8, System 12, and System 16 consoles into the new-generation IV Series, with a number of enhancements. The boards utilize a new ultra-low-noise IC specifically designed for use as a mic preamp and now feature P&G 4000 audio faders with cue detent and externally mounted cue switch. All PC boards are solder-masked and have

The purr-fect match...CATS and Vega.

Cetec Vega wireless equipment plays a prominent role in the sound production of the famous musical, CATS.* Jess Heimlich, sound engineer for the touring company, says, "Cetec Vega wireless systems are workhorses. They make my job a lot easier, and, more importantly, give me a feeling of security. They are subjected to the most unimaginable workout I have ever seen."

Cetec Vega wireless microphones have helped CATS in the winning of seven Tony Awards (including Best Musical, 1983) and the Outer Critics' Circle Award—Best Musical (1983).

The road company of CATS uses 14 Cetec Vega Model R-42 dual-diversity wireless receivers with Model 77/DII bodypack transmitters. The system features DYNEX®II, Cetec Vega's new standard in audio processing. Jess also has two backup Vega systems on standby. "These 16 systems have been on the road for over a year now, providing about 95% reliability. When you put your reputation on the line eight times a week, you want equipment that'll back you up. Vega's do. And, more importantly, when there is a problem, you want a company and its representatives to provide you with immediate service. Vega has given me both. Typically, repair turnaround time has been 36 hours!"

The road company's stage managers also use the Cetec Vega "Q" System full-duplex wireless intercom system, which interfaces to their Clear-Com wired intercom system.

In all, between 15 and 17 wireless microphone and intercom systems are used simultaneously on stage, without a trace of interference between systems.

Cetec Vega wireless systems are also in use at the newly opened CATS productions in Los Angeles, Toronto, and Chicago, and on Broadway. Jess says, "In the last three years, I have used more than 30 Vega systems on four different Broadway Productions. The plain and simple truth is: they work...MORE RELIABLY, MORE CONSISTENTLY, AND MORE OFTEN than any other wireless I've ever used."

If you must equip your performers with the most dependable, highest quality wireless microphones, remember the words of CATS' Jess Heimlich: "Cetec Vega wireless are the best I have ever used."

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"Vega's top-of-the-line wireless systems are great!" says Jess Heimlich, CATS' sound engineer, standing next to their rack full of Cetec Vega R-42 dual-diversity wireless receivers.

New Soundcraft on-air board.

computer-designed ground planes for RFI rejection and reduced noise and crosstalk. The system 16-IV stereo console, with eight mixers (expandable to 16), lists for $10,950.

A pair of new consoles were unveiled by Arrakis. The 2100SC is a 12-channel board with 34 balanced inputs, Penny & Giles slide faders, ITT shadow switches, built-in monitor, earphone, and cue, and remote start on A or B inputs (sustained or momentary). It sells for $5695. The 150SC, at $1995, is a six-channel mixer with a total of 18 inputs. Each channel has an individual stereo trim pot, with master trim pots for program left, program right, and program mono mix.

Schafer highlighted its 8000 console line, previously shown, with eight channels standard (expandable to 16).

Automation Takes Control of TV Consoles

Assignability and automation: the two terms are buzzing around the audio console industry as never before, as any visitor to NAB can testify. At this year's show, several relative newcomers joined the ranks of Neve and SSL in offering full computer-based automation, and more manufacturers offered optional automation packages and automation-ready consoles. And the assignable board, with its compact, computer-based design, made its appearance at more than one booth.

Two new stereo consoles from Amek amply illustrate this trend. Both the M1000 2 Series assignable broadcast console and the M6500 stereo teleproduction console can be supplied with a choice of external automation systems: Amek/GML moving fader automation, Amek/GML VCA control system with hard disk-based editing computer, or Audio Kinetics Master-mix digital fader automation.

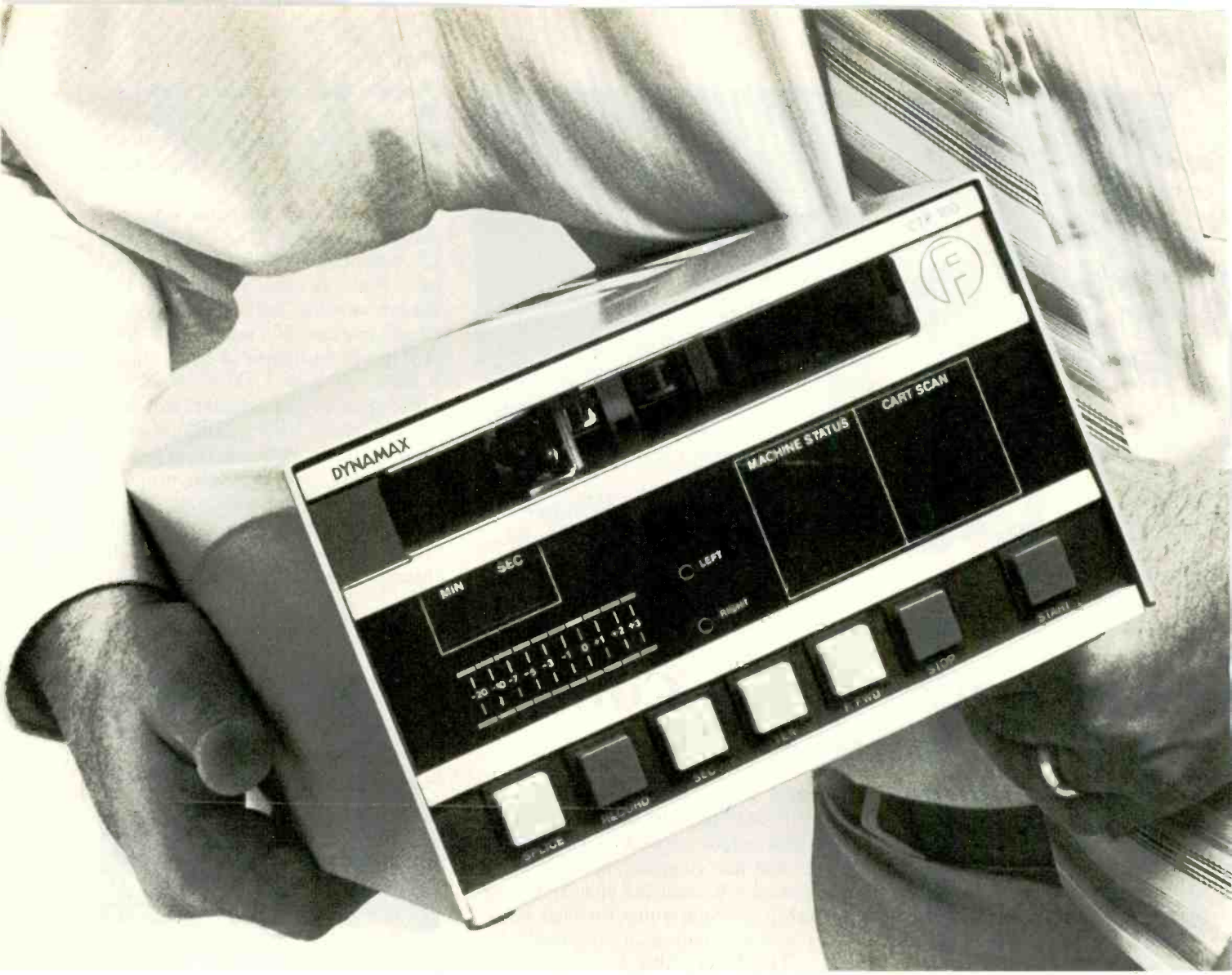
Besides automation, the most significant feature of the M1000 2 Series is its assignable structure. (A similar philosophy is employed in the Audix board described below.) This configuration has evolved as an answer to the ever-increasing complexity of full-featured consoles. Essentially, all module switching functions except PFL, Solo, Mute, and Remote Start are assigned through a central microprocessor-controlled keyboard, or digital assignment panel. This allows them to be removed from the individual channel strips, which can then be made narrower and less complex. In addition, the system will remember up to 16 separate setup configurations for later recall, resetting, and manipulation.

The 6500, "big brother" of the M1000, is aimed to compete with the SSL 6000, according to Amek's Tim Mungovan. It has two mic and two line amps per input and a chassis that is, like the M1000, completely field expandable to 120 inputs (i.e., 240 mic amps). Features include full digital routing assignments to 32 multitrack buses, eight mono (four stereo) VCA subgroups, 32 audio subgroups, input panning across any even/odd buses, full dynamic section on each I/O module, and four-band full parametric EQ. Prices range from $150,000 to $450,000.

The Massenburg/Amek moving fader automation computer that controls the boards is designed by George Massenburg Ltd. of England and manufactured by Amek, the only company with a license to do so. This powerful system uses four Motorola 32-bit processors plus a 20 Mbyte Winchester disk, 650K on-board RAM, and a dual floppy disk drive for transfer and backup. Working with the SMPTE time code tracks of ATRs or VTRs it remembers fader and switch changes, with highly accurate and almost instantaneous resetting of Penny & Giles motorized faders. Information is stored in RAM during a mix, and later copied onto hard disk; floppies are used for archiving.

Amek M100 stereo-capable production console.

At the A.F. Associates booth, another assignable console was shown by Audix of the U.K., a first viewing for U.S. broadcasters. The Audix board, which is installed at the BBC and at Tyne Tees Television Centre in London, is compact and easy to use because of the assignable configuration, with per-channel EQ and most other controls on an assignment panel. Pushing an "assign input" button on any channel will assign the panel controls to that channel. This saves time and makes it very easy to duplicate settings—for each channel in a group, for example. In addition, the console has memory facilities for up to 20 full desk settings, digitally "remembering" gain, EQ, filtering balance, aux sends, routing, and more—basically, everything on the board. Resetting is automatic, but not mechanical; mark-



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er lights on the faders allow the operator to move them back to preset position. Another feature is "limited free grouping," meaning that certain inputs can be designated as stereo groups as needed, further reducing the size of the board and eliminating the need for dedicated groups.

Another company entering the external automation fray was Harrison, which introduced hard-disk automation for its automated PP-1 console, a film and video post-production workhorse for the past five years. The automation system, which Dave Harrison says has received "rave reviews" from film people, has 13 functions on each module. Besides level and mute, the VCA-based system controls group assignment, EQ in/out, insert patch point in/out, input select, input gain, high-pass and low-pass filter in/out, input pad, input phase control, and reassign source. It is hard disk-based and resets all functions. Harrison asserts, "To my knowledge, this is the most automated post-production console presently available."

Harrison also reports "tremendous activity" in company's 4 and 7 Series consoles, which can handle a variety of needs from local radio to network teleproduction, as well as in the recently introduced TV-3 board.

Massenburg and Audio Kinetics automation are available as factory-installed options for the new Elite console from Neotek, which takes an unusual "dual-channel" design stance that makes it essentially two consoles superimposed one on the other. Neither a split monitoring nor an in-line monitoring console, the Elite has entirely separate signal paths for fader channels and monitor channels.

The new MX-P3000 studio mixing console from Sony Professional Audio, unveiled at NAB, is described by the company as its "ready-for-digital" analog console. Advanced design techniques used in the board include linear-crystal, oxygen-free copper audio cable throughout, low-noise hybrid technology in all appropriate signal processing areas, and unipoint grounding methods. The board incorporates a frame-accurate hard disk automation system employing addressable faders. A wireless infrared keyboard on the front of the console transmits fader assignment and fader commands to the automation system, which stores the data on hard disk.

The new automated console at the Audio & Design booth was so new it wasn't even at the show. A representative one-channel strip of the Calrec UA8000 was on-hand, however, to illustrate the board's capabilities. Designed for TV production, high-end recording studios, and film scoring, the UA8000 features full automation, along with four-band parametric EQ, compressor/limiter/expander, and filtering on each channel. Although the console is available in standard configurations of 32 or 48 inputs, the company is more than willing to customize and has sold two 56-input models.

Calrec was also featuring a new digitally assignable TV production console with ITR (instantaneous total reset) of every control on the board from up to 30 memories. Controls are resettable within seconds, according to Audio & Design. Another unusual feature is that the console addresses its audio racks through a fiberoptic link, allowing up to three control units to timeshare the audio racks.

Automation pioneer Rupert Neve showed NECAM 96, the latest version of its powerful moving fader automation system, to NAB for the first time. (The system was described but not shown last year.) Shown installed in a 5116/36 console, NECAM 96 features up to 128 fader position "scene sets" with automatic or manual crossfade between sets, comprehensive muting, and labelling and events function switching. Color monitoring and a simple, plain English keyboard make the system straightforward to use and keep the operator posted on the status of the mix. As the name implies, the system will control up to 96 moving faders, enough for all but the most mammoth installations.

Other Neve consoles on display included a new model in the 81 Series, the 8128TV, with four stereo buses and 24 tracks. The 51 Series teleproduction and post-production boards were also shown. In addition, the company introduced optional VCA automation for its 542 Series video post-production consoles.

Of course, no discussion of console automation is complete without reference to Solid State Logic, which continues to refine the dynamic mixing automation and mix editing capabilities of its sophisticated SSL Studio Computer System. This year's additions included a new integral synchronizer and master transport selector, plus a programmable equalizer. The former is a five-machine synchronizer, for ATRs and/or VTRs, combining central and distributed processing technology and controlled by a keyboard built into the console. The system operates in any time code or foot/frames standard, but cue points may also be designated by key words, allowing the operator to ignore time code numbers. Also interfacing with the Studio Computer is the new programmable equalizer package, which provides two channels of three-band parametric EQ and stereo panning, controlled by a console-mounted panel.

SSL's biggest console news, however, was its introduction of the brand-new SL 5000 M Series, an innovative console providing the ultimate in system flexibility. Designed specifically for live stereo and MTS audio production, the 5000 can have as few as eight or as many as 64 input channels in any desired combination of mono and stereo mic and line inputs. Other features include up to 12 stereo mix buses plus main stereo program output and 10 auxiliary sends, eight of which may serve as stereo aux sends with individual stereo level and panning controls. In addition, the console's totally electronic digital switching matrix can be controlled by SSL's new Instant Reset computer, which stores all switching details in on-board RAM and instantly recalls and resets them when activated.

Despite the increasing popularity of automation, the nonautomated television console continues to be an industry staple. One of the leaders in this field, Ward-Beck Systems, introduced a pair of new true stereo TV consoles, the 24-channel ST2442 and the 36-channel ST3642. Both boards have 12 stereo line input channels, four stereo submasters, two stereo masters, and two independent mono masters; the ST2442 has 12 mono mic/line inputs while the ST3642 has 24.

According to Ward-Beck, the consoles incorporate a completely new family of modular components developed especially for sophisticated stereo consoles. Input, submaster, master, and monitor modules are all under microprocessor control, as are on-air logic and tally, machine remote control, and input routing switcher control/display functions. All balanced circuitry is employed. The optional machine remote control is provided per customer specifications for each console and can control such functions as tape, cart, cassette, and TT. A varied range of options allows for customization to user requirements.

Another maker of high-end televi-

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sion consoles, ADM, has come out with an "economy" line designed especially for stereo television, with models ranging in price from $25,000 to $45,000. According to Rich Hajdu, ADM has not compromised on construction or electrical quality in these boards. The display model at NAB, the S/TV-24, was on its way to WTVO-

ADM's S/TV-24 24-input stereo TV console.

TV, Rockford, IL, after the show closed. The S/TV comes in 16- and 24-inputs sizes and features in-line EQ or preselect, fully stereo line inputs, subs, and masters, plus a mono master for SAP. It has machine control and AFV capabilities.

Also new from ADM was the Post-Pro 12 post-production console, which interfaces with CMX, ISC, Paltex, Ampex, and other video editors and is controllable from the editor through a built-in parallel interface. The board can have eight to 12 inputs and features optional in-line EQ, stereo monitoring, and VCA control. Prices range from $9500 to $15,000 for a fully loaded console with EQ.

New from Wheatstone was the TV-80 production console, a modular design in which the input modules mix down to stereo subgroups, which mix down to master L and R out, and finally to derived mono (L—R mono sum) and SAP. Designed for TV stereo, the board has VCA subgrouping and input preselect switching. It is available with 12 to 50 inputs, four send buses, and as many monitor modules as desired. The VCA subgrouping has provisions for external ports, allowing the console to be controlled by an external editor or switcher. In addition, the upper portion of the console can include built-in signal processing.

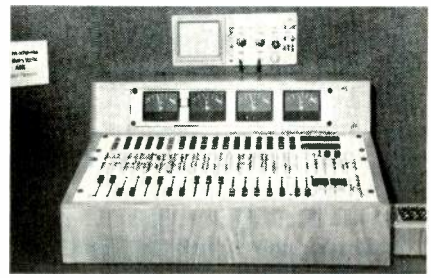
Trident also introduced a new console aimed at both the video post-production and multitrack recording markets. A special feature of the 65 Series, "Group Assign," effectively turns the four- or eight-output board into a true eight- or 16-track mixer. The Group Assign button, located on each output/monitor module, eliminates the need to cross-plug, repatch, or parallel outputs when the 65 Series is used with a multitrack recorder.

Studer Revox highlighted its Series 900 production console, which is available in frame sizes from 12 inputs to over 50. The 900 offers a high degree of customization, with many choices of metering modules, monitor options, faders, subgroups, and interfaces to ATRs and video switchers. Basic input modules feature three- or four-band EQ, mic/line inputs, five pre/post-fade auxiliary sends, and channel overload indicators, plus a variety of options. Automation-compatible VCA groups are available.

Graham-Patten Systems introduced two companions to its previously shown 612 ESAM post-production audio mixer. Models 616 and 620, with 16 and 20 inputs respectively, offer additional monitor controls, expanded external control capabilities, and a tone input. First developed for ABC for the 1984 Winter Olympics, the 600 Series boards are designed to operate in a preset/transition-to-program manner, similar to a video switcher. They may be operated manually, in AFV mode, or fully integrated with an editing system.

Graham-Patten also introduced the 700 Series programmable equalizer systems and the 500 Series peak program meters.

Another switcher manufacturer, Grass Valley Group, introduced the AMX-100 stereo audio system, shown as part of a post-production package



New Graham-Patten AFV post-production mixer with EQ.

with the KEY-MEM effects memory system and a Model 100 switcher. The device is designed for three applications, three categories of use: to provide an audio companion to the Model 100 in small master control situations; as an audio companion to the Model 100 when used with simple editing systems offering contact closure control; and for more sophisticated post-production in which the editing system addresses the AMX-100 and the Model 100 individually. In the first two cases, the AMX-100 can be tied to the Model 100; in the third, audio follow becomes a function of the editor. The device has line output (to transmitter or recorder) and monitor output for audition independent of other inputs. All inputs are balanced, high impedance; outputs are balanced, low impedance.

Quantum Audio again showed its 22 Series console, available with eight to 28 inputs. Nineteen of these boards were supplied to ABC last summer for the Olympics; according to a Quantum Audio spokesman, their failure rate was zero.

Intelligent Intercoms and RF Systems Speed Communications

Digital intercom systems that provide flexibility and expansive capacity made a strong showing this year. The key factor is programmability, the ability to accomplish almost any activity from any station, and such systems should find acceptance in applications such as talk shows, which have a heavy need for communications management.

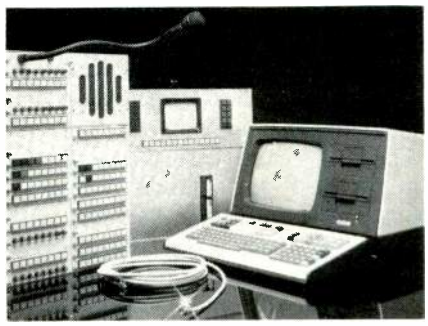
Three companies introduced fully-digital intercom systems. British-based Audix Ltd. featured Access, an all-digital talkback/communication system. Time division multiplexing and digital audio allows up to 60 simultaneous audio channels, all carried by a single coaxial loop within the system. There is also a fiberoptic link option. Sixty interactive stations can be supplemented with an equivalent number of "listen-only" stations for a maximum of 120 terminals. Any outstation can be programmed to receive all the others, and interactive stations can be programmed to speak to all others.

Also fully digital is McCurdy's CS 9400 Digital Intercom which features solid-state switching, and uses advanced digital and microprocessor architecture to provide instantaneous

access between stations. The system can be custom-configured in sizes up to 480x480. System accessories include standard and custom keypanels, headsets, microphones, speakers and auxiliary equipment, including IFB connections.

Southlake Technologies, formerly Datatronix, introduced the digital Intelligent Intercom System, an expandable central matrix system totally software-configured from a master console. The system combines point-to-point interphone, party line intercom and IFB functions. It also interfaces with two-way radio and other outside lines.

Not a new product, but present at the show was the Ward Beck Minicom, a microprocessor-based matrix intercom system.



Audix Access 60-channel all-digital intercom IFB system.

In the area of intercoms and wireless equipment, Telex had many new offerings this year. The Telex IC-2M/A two-channel master station intercom will be available in late August. There is also a two-channel master station with built-in IFB offering two-channel flexibility in a single line. Two additional new products introduced by Telex were a two-channel belt-pack, IC-2A, for use with the two-channel station, and a two-channel binaural, IC-2B, offering one channel in each earphone.

New Telex headsets include the PH-1 new single muff with mic, PH-2 dual muff headset with muff, PH-3 binaural dual muff with mic, and HS-6A telephone handset.

Telex also introduced a new wireless mic system which includes the FMR-50 receiver, and WT-50 belt pack transmitter. It operates in TV channel 7 and 8, and sells for under $1000 with a choice of three types of new mics. The new wireless mics are the WLM-50 lavalier, $875; the WHM-410 dynamic element transmitter handheld mic, $875; and the WHM-500 condenser transmitter and handheld mic, $980.

Sennheiser also had new product introductions in the area of wireless equipment. The Sennheiser SK 2012-TVH wireless pocket transmitter is powered by a AAA battery or a dc converter. There is a choice of UHF or VHF signal, and its cost is $930. To go along with the wireless transmitter, the EK 2012-TVH receiver is a two-channel wireless receiver, with adjustable audio level and a dc converter, and it costs $1000.

Also from Sennheiser, the handheld wireless RF mic SK 4031 is for use with UHF and VHF frequencies. It has a uniform cardiod directional pattern, comes with a dc converter, and costs $830. And two new Sennheiser receivers, the EM 1001-9H, a basic single-channel wireless, and a narrowband, operate in ac or dc with three-color RF LED. They sell for $800. The EM 2003-9H, a narrowband VHF diversity with diversity antenna, has two antennas. A switcher selects the stronger signal of the two. Its cost is $1190.

Marti's new AR-10 portable or mobile repeat receiver replaces its previous base-station RR-50 models, with better specs and compact design. Cost is $1045 for the single-channel, $1075 for dual-channel.

Also new from Marti are the RPT-25 UHF and RPT-40 VHF RPU wireless transmitters, each with four audio inputs, and mixing-like controls.

Coherent Communications has new RF mics, plus a frame, one rack-unit-high, that holds six receivers. Also introduced was a small receiver for field applications, in single- and dual-channel, and a diversity receiver, along with a UHF transmitter the size of a cigarette pack.

Nady introduced an infrared wireless monitor, a system for the studio, with the strength of an infrared signal. The system includes IRT-200 M(master) S (slave) stereo transmitters, and IRT-210 M, and a headset receiver with antenna IRT-210 M. The headset has volume controls, and any number of slave units can be connected to the master unit. The infrared monitor requires line of site, and the system is operational up to 35 feet.

Cetec Vega showed its new R-31A Dynex II wireless receiver, with dynamic noise reduction expansion. It features front panel LED bargraphs, and a rear panel XLR connector with a mic/line audio output switch. Also new is the T-37 Dynex II wireless microphone transmitter, with advanced audio processor for low noise and improved dynamic range. It has an LED readout, and uses a 9 V battery.

The new Cetec Vega T-84 handheld wireless microphone transmitter, with Beyer M 500 ribbon microphone element, is unidirectional, with hypercardiod pickup. It also features a Dynex II audio processor. The Cetec Vega T-87 handheld transmitter with Shure SM87 condenser element is a new, highly directional mic with supercardiod polar pattern which also features the Dynex II audio processor.

Also new from Cetec Vega the 192E wireless ENG kit contains the Model 66A/DII wireless receiver, the Model 77/DII wireless bodypack transmitter, Model 114 mic/XLR-to-transmitter LEMO adapter cable, with room for one more of each, and a canvas bag for the receiver. Also included are a lavalier mic and accessories, batteries, antennas and extra compartments in a compact case.

Micron Audio introduced several new products, all available with its complementary noise suppression featuring 115 dB s/n ratio. The new CTR 501 mobile wireless system including compact TX-501 pocket transmitter and MR-510 mobile receiver, has a multipin input for use with any mic, antenna, and two LEDs allowing visual adjustment of levels. Cost is $2580 for the system with noise suppression included.

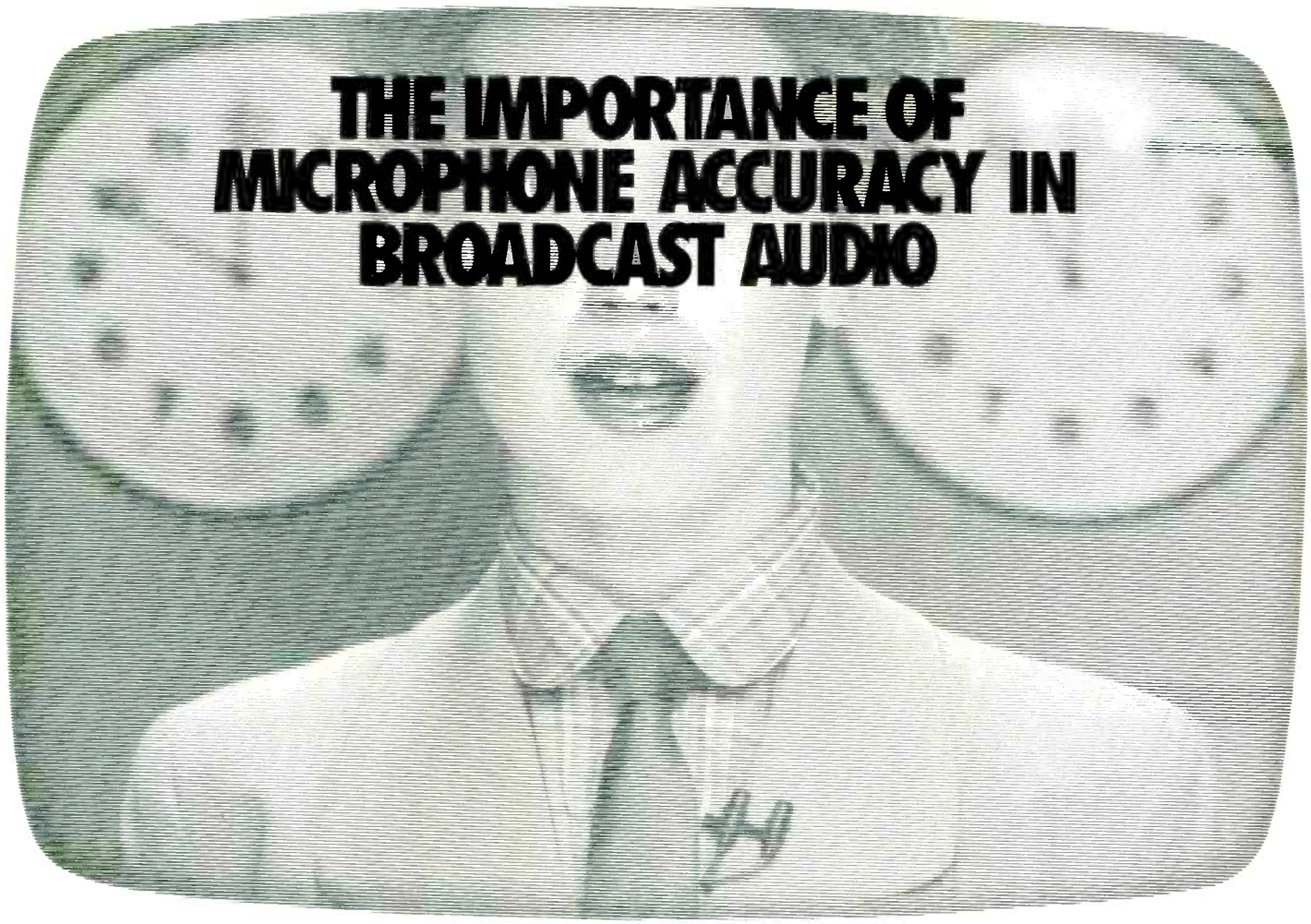
HM Electronics' new System 87 is a handheld wireless mic with Shure SM 87 Element. It is similar to HME's system 85, and features Dynamic Expansion II and mute capability. The new System 820, a wireless mic for ENG/EFP and film, has a battery-operated receiver, and a flat pac receiver with detachable belt clip.

Swintek also had several new wireless products. The company introduced the Mark QDC wireless pocket-sized VHF receiver for minicam. It can be mounted to a camera or worn, and comes with minimized interference possibility, low or high level audio output, and headset monitoring plug. It is battery-or power pack-powered, and is priced at $780.

The new Swintek Mark 200D wireless intercom system converts any wired base station to wireless, and interfaces with Clear Com, RTS, and ROH. It has a high-band UHF/VHF frequency. The complete system includes two Mark 200D wireless transceivers, and costs $1995.

Also new from Swintek is the Mark 2L/RFSD Diversity receiver, where a switch selects one of two antennas to insure the strongest signal.

THE IMPORTANCE OF MICROPHONE ACCURACY IN BROADCAST AUDIO



A distinctive voice remains as important to a successful broadcast announcer as a recognizable visual presence. *Microphones are the critical first step in the broadcast audio chain. Acting as a highly accurate sound "lens," they must be sensitive enough to faithfully transmit* all *of the subtle personal nuances and inflections that distinguish one announcer's voice from another.*

Today's sophisticated broadcast productions demand more from microphones. Differences in relative mic performance are more readily apparent, and an inferior microphone stands out like the proverbial sore thumb.

In the most basic sense, any microphone need only capture the sound source exactly and convert it to electrical energy — no more, no less. *Obviously, microphones necessarily have different characteristics based on differing transduction technologies and designs. But at Beyer, we believe that the superiority of a microphone is in large part based on how accurately it transduces the source material — with no excuses based on size or applications.*

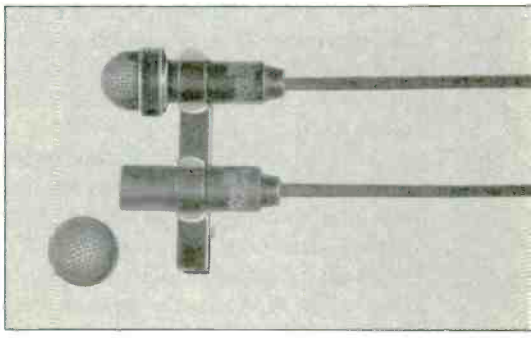
In broadcast, Beyer's concept of "accuracy" means the difference between a microphone that can focus in on a specific voice and produce a totally realistic, professionally acceptable performance, and a mic that simulates *a performance by only capturing the bare outline or "silhouette" of an announcer's voice. We've dedicated the most complex and sophisticated technology in existence to reinforce the truth of this basic premise.*

Sensitive and natural-sounding, the MCE5 picks up the "whole truth" of audio broadcast sound because of an unusually wide frequency range (20Hz to 20kHz) and exceptionally fast transient response for any mic, let alone one that is virtually invisible on camera. Because the MCE5 has a uniform omnidirectional pickup pattern, mic placement is not critical and the announcer's head can move without going "off mic." Handling noise is kept to an absolute minimum so the MCE5 picks up the voice, *not the rustling sounds of the announcer's expensive silk tie.*

The MCE5 is available in various terminations for the widest range of broadcast applications including wireless. Underscoring our longterm commitment to the broadcast industry, the MCE5 is one of a family of reliable Beyer broadcast products designed for ENG, EFP and Film/Radio/Video studio production. It has been widely adopted by discerning broadcast engineers in the U.S. and Europe.

For those engineers who feel that announcers' voices should be as recognizable as their faces, the Beyer MCE5 proves that this level of accuracy exists in a lavalier design.

Beyer Dynamic Inc., 5-05 Burns Avenue, Hicksville, NY 11801.



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ACCURACY IN AUDIO **beyerbroadcast**

Clear Com also introduced new wireless equipment, including headsets. The CC-25 comes with and the CC-25NS without in-line ON/OFF switch. These lightweight headsets feature dynamic mic, no headband, and are worn behind the ear. There is a separate enclosure for the locking mic ON/OFF switch in a plastic belt enclosure. There is also a thin, inconspicuous voice tube. The headsets connect to a Clear Com main or remote station. Prices are: CC-25 $185, CC-25NS $125.

Also from Clear Com are several improvements to existing products, including a four-channel main switchboard station, the SB-412A, which now features stage announce, all-page, and balanced input. Special functions include ISO and IFB, and the price is $1400. Clear Com is also featuring an improved version of its four-channel speaker intercom main station, the MS-400A. It has versatile channel access arrangement, its regulated power supply operates up to 100 belt pack or 20 speaker stations, and it is priced at $800. An improved version of the four-channel remote speaker station is the RM-400A. It features versatile channel access arrangement, and talk/listen and mic line auxiliary input. Cost is $600.

Two-channel remote station for Clear-Com intercom.

ROH's new products include 302-01, a one-channel intercom, two-channel party line, which costs $780, and the 303-TM portable speaker station without mic or headset, which costs $520.

Also new from ROH are audio line monitors, the 192 dual-channel, and 191 single-channel, with VU and PPM meters. Extended range from -50 to + 30 dB. Also, the audio distribution amplifiers (DA) in the system have been upgraded. ROH will design a DA system customized to particular applications, including switching and patch panels. A portable DA, the same as the others only portable, with its own power supply, can put two in a rack.

RTS introduced the Model 810 master station, a multipurpose user station which features four different modes of operation. All lines are balanced line level, operating in a full-duplex mode. Four configurations include the 810 10x10 point-to-point, 810-AA 10x10 matrix intercom, 810-CL with 10-channel conference line intercom, and 810-5CTL five-channel conference line intercom.

Also from RTS is the new 17 Series low-cost intercom system. Simple and lightweight, it uses telephone modular cable assemblies with flat wire cable and pinch plugs. It's small and light enough to fit into a shirt pocket.

Gentner showed its production model of the IC-20 Intercom System, designed for radio. It features simultaneous, independent capability, and conferencing and party line. It is expandable to 20 stations.

R-Columbia introduced two-channel FM wireless intercom headphones. The TR-50/PRO, features two-way communication over 150 yards, channel selection of two noninterfering networks, built-in receiver transmitter, antenna and 9 V battery supply. Five channels are available for operations. Cost is $497.

Comprehensive Video Supply has a new booster for carbon intercom headsets. The CHA-1 Booster One reduces ambient noise, allowing incoming signals to be heard eight times louder. There's a multifunction talk switch, independent volume control, no batteries, and a metal belt clip. The more boosters added to a carbon system, the more the overall levels will increase. Cost is $79.

RF Technology introduced its TX-100, a new 950 MHz RF mic transmitter, with three diversity mating receivers.

Sampson Music Products showed the TH-1 body pack wireless transmitter.

For the first time, Farrtronics is offering its standalone IFB system in packages, instead of concentrating only on large, custom-designed systems. Four packages are designed for one studio control room, master control and related areas, and custom systems can be engineered. The Mini Package offers total communications between five stations; Package One between 11 stations, Package Two between 14 stations and Package Three between 22 stations. All packages include party line with user belt packs, IFB circuits, two-way radio interface, shipping charges and 25 pairs of cable for station to matrix interface. All systems are expandable.

Also from Farrtronics are IFB packages, standalone or intercom integratable. The Model M-85-IFB-8 has eight IFB circuits, and is priced at $7900. The Model M-85-IFB-12, with 12 IFB circuits, costs $8900. Both include four control stations, rack frame and necessary modules, redundant power supplies and individual program sound select for each IFB circuit. Custom IFB systems are also available.

Normex introduced the Telnox L-O, a digital telephone interface, which is microprocessor-based with plug-in cards. It features 10-line capacity, eight lines conference, with expansion capabilities and a "smart," self-programmable console. Other features include priority designation, auto-hold, recorded answers, line level adjust, automatic on-air with no operator needed, or skip, which blocks the call from air. The system is completely modular.

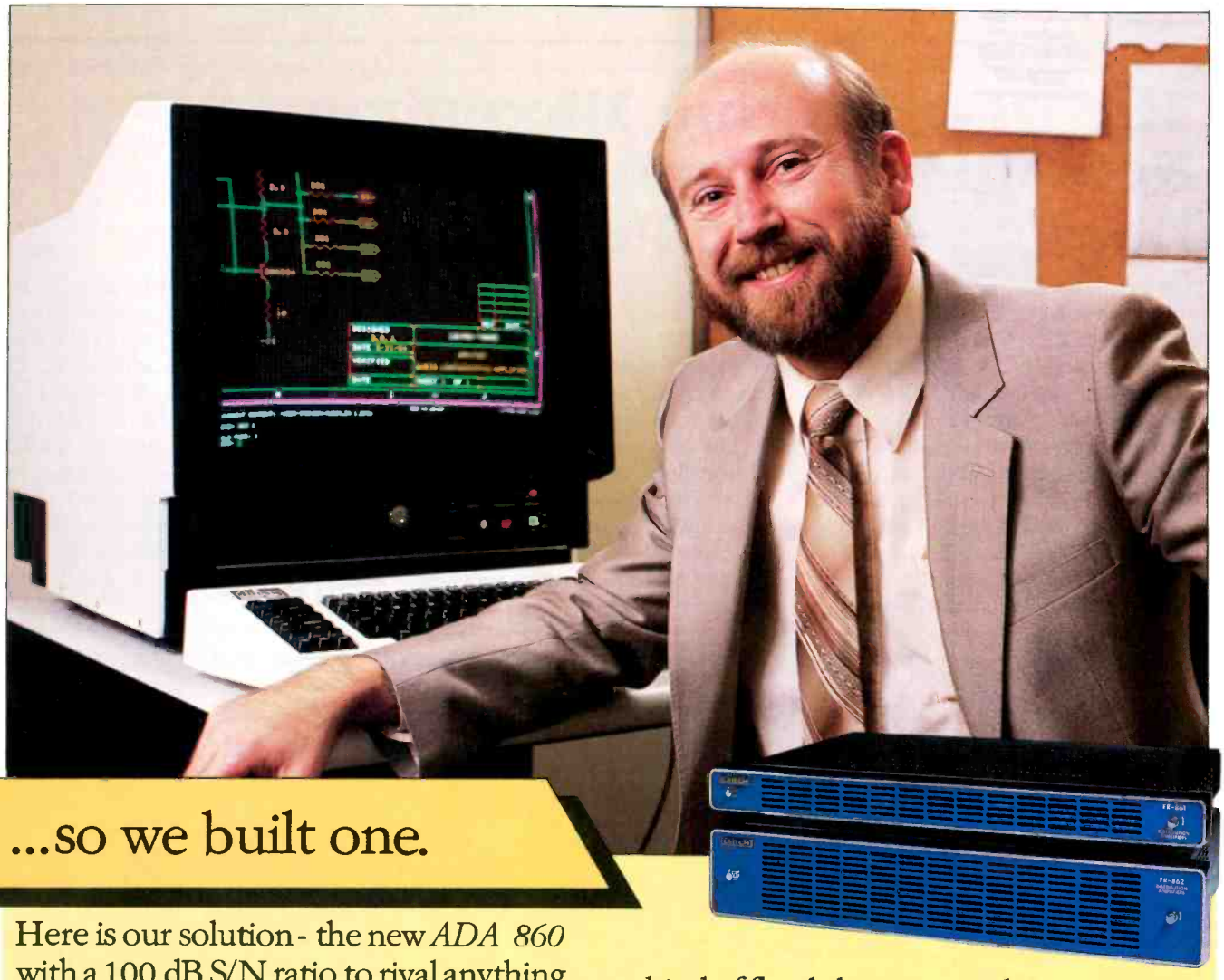
Symetrix also had a microprocessor-based telephone interface, the Model 108, in prototype at the show. Production is scheduled for August. The Model 108 allows connection of on-air mixing consoles to up to eight incoming lines for talk shows. It's a standalone system, with modular connectors, FCC-approved. Included are a rackmount controller and a remote desk module, with a second desk module possible.

Comrex has a new line of telephone couplers, all FCC-registered. The TCB-2A Auto-answer coupler for listen lines has modular jacks and XLR input. Calls are answered on the first ring and connected to the program source until caller hangs up. Price is $195. The TCB-1A Broadcast coupler, a compact manual coupler powered by the phone line, is for sending or receiving live or taped material, and costs $99.

Also from Comrex are a complete line of frequency extenders, encode/decode systems which restore the low frequency response of phone lines, microwaves and satellites and reduce low frequency noises such as hums, clicks and pops by shifting frequencies.

ITC-3M introduced the FB-1 Telephone Interface. It provides "answer only" access by connecting callers to a cart machine, then starting a prerecorded tape. When the message is over, it hangs up and recues the tape. It does

Our customers told us finding an audio distribution amplifier to match the excellence of our video was tough



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12520 Loma Rica Drive, P.O. Box 1985
Grass Valley, CA 95945
(916) 273-7541

not answer if there is no cart in the machine or if the tape is running. A modular plug connects to the phone line, and the interface is ideal for sponsored promos.

Gentner Engineering's new EFT-1000 Extended Frequency Transceiver improves the quality of remote broadcasts through frequency extension, restoring low frequencies lost on phone lines. The Aphex XBH-1 feature restores high frequencies. It can be used with two separate lines, or a single line for both transmit and receive. The transceiver sets itself up in the correct mode by determining whether encoded audio is being sent from the other end. There are connections for mic/mic mixer, mic or line input, headset or headset amp and an LED level indicator.

Finally, Russco introduced a new dial-up remote amplifier with two mic channels and one high-level channel, all powered from a phone line.

The Disappearing Microphone, New Modular Equipment Dominate Audio Production

Ultra-mini lavaliers and an abundance of surface mount mics were introduced by a number of well-known companies whose primary concern seems to be making the omnipresent microphone less obtrusive than ever. Sony and Sennheiser seemed to be having a battle of "who's got the smallest mic?" with similar looking mini-lavaliers. Sennheiser's looked smaller but stated dimensions show that Sony's is actually .3 mm smaller in diameter.

Surface mount mics take advantage of the acoustic principle of boundary effect, allowing mics to offer as much as 6 dB higher sensitivity and about 3 dB greater rejection of background noise. These, too, seem directed at making mics appear invisible in both live and televised settings.

Meanwhile, when it comes to amps and preamps, the word is modular, with an eye toward easier add-on of features and expandable systems, as well as time and cost savings in maintenance and repair.

Sony's new line of lavaliers all feature black satin or nickel-plated finish. The smallest ECM-77 has up to 20k frequency range, is omnidirectional, and Sony claims it's the smallest mic in existence. It costs $290. The Sony ECM-66 unidirectional is slightly larger, has 16k response, and a frequency range of 70 to 14,000 Hz. It has an LED showing battery condition and battery on/off switch and costs $275. The ECM-55 mic is an update to the widely used ECM-50 and fits ECM-30

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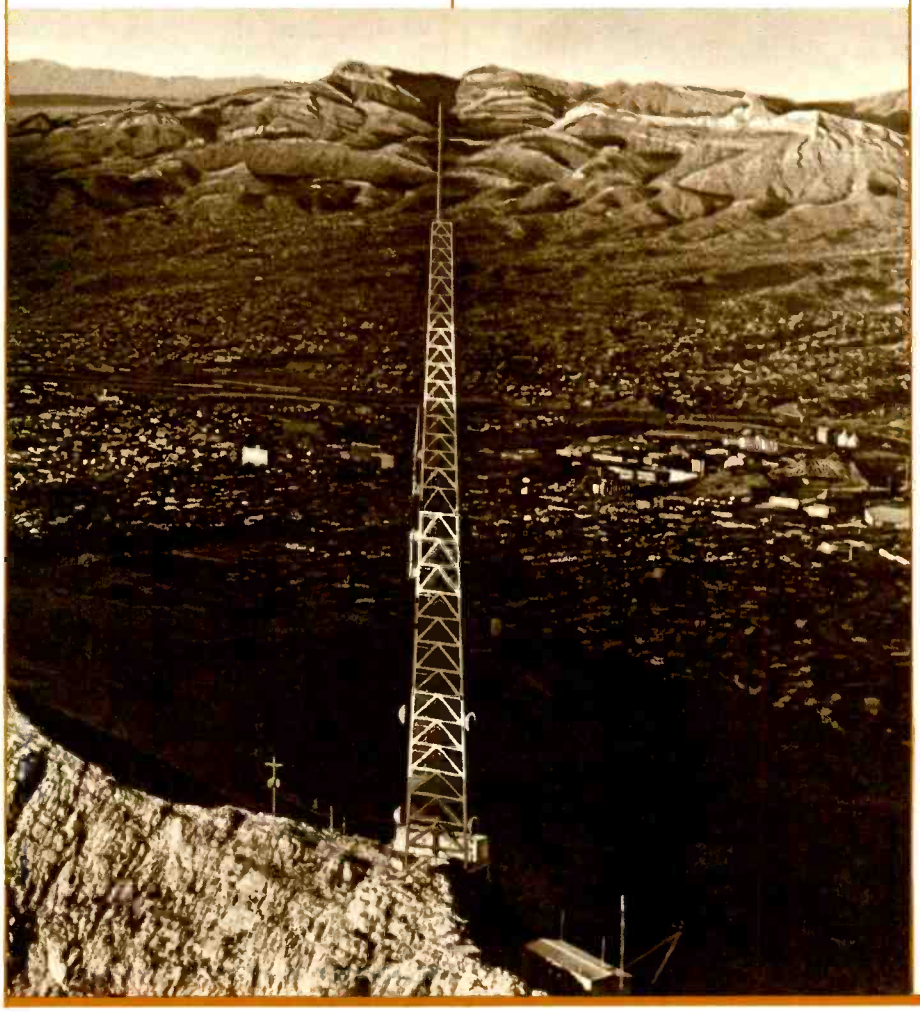

Whichever model you choose, your CELWAVE antenna arrives complete, ready for installation, with a tunable input transformer to match the antenna to the location. Deicer kits and radomes are optional.

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hardware. It features improved construction, a frequency range of 30 to 18,000 Hz, can be battery- or phantom-powered, and costs $235.

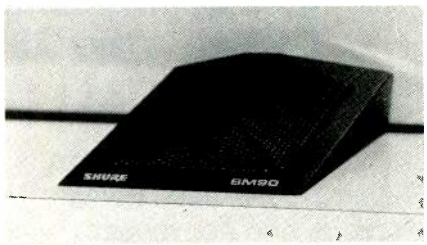
Sony also has new condenser mics for multimic reading of musical instruments. The unidirectional slim body C-535P is for on-axis sound pickup. The C-536P pencil condenser's axial pattern mic is designed for minimum clearance and right angle pickup.

Sennheiser's smallest mic, the MKE-2, like Sony's, is also omnidirectional with a frequency range of 20 kHz. A tie clip is available, in single form or double when a backup mic is desired.

In surface mount mics, Crown introduced the PCC-160, a phase coherent cardioid desktop that cuts lows and shifts the frequency at which comb filters occur. Direct and reflected sounds reach the mic's diaphragm in-phase. There is a bass-tilt switch for low-end response tailoring and the cost is $249.

Shure also showed two surface mount mics, the SM-90 omnidirectional and SM91 unidirectional condenser mics. Each has a low profile and features low distortion, and a high clipping level preamp unit containing a low frequency cutoff switch. Both are available with a matte black finish for $300 each.

Also new from Shure is the SM98 mini unidirectional condenser mic. Designed for instrument and amplifier miking, it comes with a windscreen, preamp, and swivel adaptor for use with many types of stands, and costs $250.



Shure SM90 surface-mount microphone.

Shure also has two new headset mics, the SM-1 and SM-2, with all-metal headbands and mic booms. The mic itself is a close-talking unidirectional dynamic with frequency response of 50 to 15,000 Hz, tailored for voice. Detachable cables allow the headsets to be used with various types of equipment. The SM-1 has one ear pad, while the SM-2 has two.

Other new products shown by Shure included the FP-16 Field Production Distribution Amplifier with one input, a six-output compact distribution amp for routing multiple audio feeds. Also the FP-11 mic-to-line amp, for TV sports and radio, which boosts the gain up to 84 dB so mic and auxiliary levels can be boosted to line levels. It can be used with phone lines or for ENG. Finally, the Shure FP-12 headphone bridging amp accepts mic or line level signal, bridges it, and produces a signal powerful enough to drive headphones at loud levels.

Countryman introduced a new headset-mounted mic as well, and also announced that gooseneck versions and wireless transmitter versions of all Countryman microphones are available.

The new Countryman Isomax headset-mounted mic (without earphones) features hi-fidelity response, and noise cancelling aimed at traffic-watch helicopters and sports applications. It's cost is $225.

Audio Technica had four new studio headphones. The ATH-M7/250, closed-back 250 ohm model reproduces sound over 20-20,000 Hz has a self-supporting voice coil and coiled

SURVIVAL RADIO

It really *is* a jungle out there. And in that jungle, Otari's MTR-10 audio machine gives you the ammunition you need to stay alive—like three speeds, microprocessor control, a built-in cue speaker, and an optional ten-memory autolocator.

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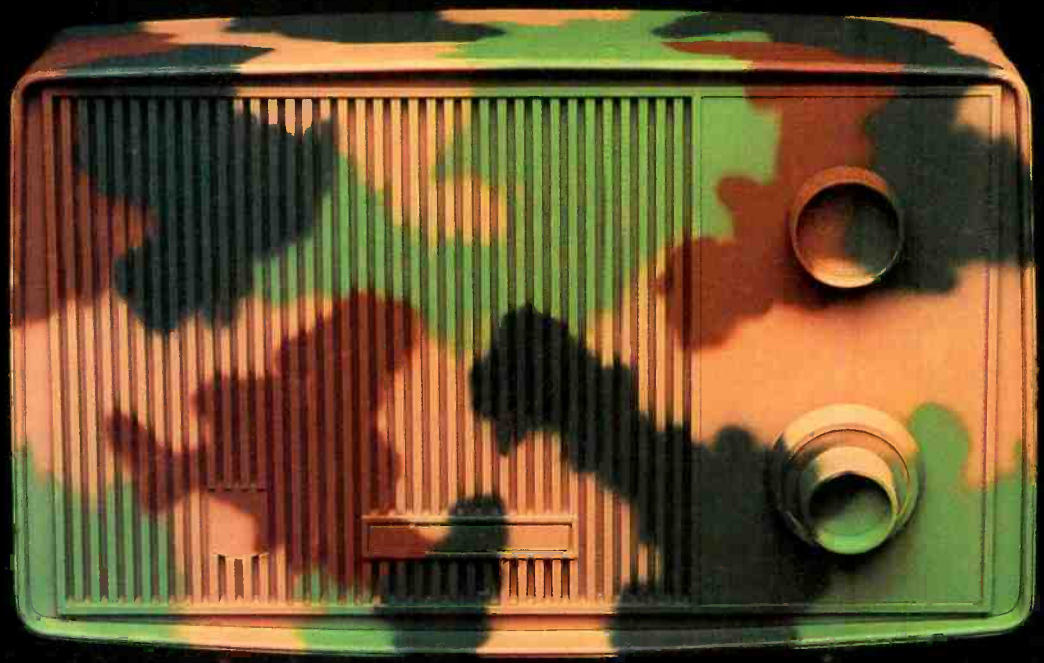

midsection cord and costs $47. The company's ATH-V7/250 open-back 250 ohm dynamic headphone costs $42. A similar model, the ATH-V7, is an eight ohm open-back costing $36. And the ATH-M2/150 is an open-back, 150 ohm model with a straight cord for $29.95.

Also new from Audio Technica were two XFMR-isolated direct boxes, allowing direct connection of musical instruments to mixing consoles. The AT8512 features ground lift, and the AT8511 is an active direct box which uses either batteries or phantom power.

Another new headset mic, this one from Beyer, was introduced at the show. Beyer showed its new HM 560 headset mic, a broadcast-quality ribbon mic with headband. It is also available without headband as the M 560 boom.

R-Columbia introduced SB-700 and SB-700/2 single- or double-ear headphones with an ultra-small noise cancelling electret mic, stainless boom, and headband. Both feature foam ear cushions, XLR connection, lock-on feature and belt clip. The cost is $199.95 for the single ear, $249.95 for the double.

Stanton Magnetics introduced the Dynaphase 30M single-sided headphone which is available in three versions, all three in 100 ohm or 600 ohm versions.

In preamps, Logitek introduced the BPA-200, a balanced input phono preamp which eliminates hum and RFI. It features passive equalization for clean transient response and switch-selectable input capacitance for accurate cartridge matching.

Harrison Systems showed its M-8 mic preamp system, the latest in the 8 Series line of 19-inch rackmount products. The system's modular construction can accommodate up to 10 mic input cards and each card has two mic inputs selectable by a front panel A-B switch. The preamp is transformerless and it can handle a maximum input level of 30 dB. Front panel controls include ground-lift, active phase reverse, phantom switch and rotary gain control pot and there is also a four-step LED.

Bryston has a new model 0.5B preamp, a more compact and lower cost preamp designed to conserve on rack space. It's a stereo phono preamp in a new 1.75-inch rackmount package. The new broadcast model preamp is available in a variety of configurations, including phono-only with electronic balancing and XLR-type output connectors, also as an unbalanced unit with either XLR or RCA outputs. Bryston will also have a preamp with more extensive switching capabilities.

ROH showed several new products in the area of audio line monitors and distribution amplifiers.

The ROH Model 192 dual-channel and Model 191 single-channel audio line monitors both have VU and PPM meters, while the Model 190 single-channel audio line monitor has a large extended range VU meter, -50 to +30 dB. For each monitor, the line signal is passed through upgraded audio distribution amplifiers.

ROH also showed a new portable DA, which is the same as its previous models only portable and designed so that two can fit in a single rack mount.

Also rack-mountable is the new Marti MA 25-25 Dual-Channel Audio Amplifier, a stereo amp which drives two speakers to monitor stereo programming. It can fit into 1 ¾-inch standard rack mounting. The construction of the new amp is especially durable for a rugged radio station environment, with metal casing and input and output

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filters to keep out RF interference, plus separate channel gain controls, all at a cost of $349.

More compact design was in evidence at the RTS booth, where the company showed its 2500 Series high-performance audio amplifiers designed to fit into a space-saving card frame package. They are modular plug-in amplifiers with high-density circuitry.

There were a few new audio monitors introduced at the show. Panasonic showed two high-power Ramsa speakers. The Ramsa WS-A70 is a near-field studio monitor with built-in auto gain control, balanced sound at low and high volumes, and sharp mic input reproduction. Anti-magnetic devices guard against magnetic leakage, and the cost is $250. The Ramsa WS-A200 is a compact, high-power twin-Bessel-horn speaker for larger applications that has a wide frequency range of 70 to 20,000 Hz. Maximum allowable continuous power input is 250 W, and the cost is $475.

Tascam also had new audio monitors. The company introduced its CM-10 monitors featuring three-way control for $149.

And Electro-Voice showed its Sentry 100EL powered monitor system, a monitor speaker that provides its own power with a 50 W amp in a single, compact, rack-mountable package.

Lenco also has a new power amplifier. The PPA-100 stereo power amp delivers 100 W per channel into eight ohm loads up to 200 kHz. The output will drive speaker loads of four ohms impedance or above.

Leitch, a manufacturer of quality video products, showed the new ADA 860, an audio distribution amplifier offering a 100 dB S/N ratio and low distortion level. It features a six-output DA and a modular design which allows the system to be customized.

Ward-Beck had its M600 Series line of distribution amplifiers, a family of modular, self-powered units which can be arranged in a variety of rack-mountable positions. Each unit has a front panel LED level and status indicators.

Farrtronics, long noted for large, custom-designed systems, introduced distribution amps in packages. The M-76-24 is a 24-DA package, while the M-76-48 is a 48-DA package. Both are prewired and connectorized with one-day installation.

Also new from Farrtronics are audio patch fields in many new formats, and mini jacks with steel (not cast) frames introduced into prewired mini patch fields.

Audio Processing Strives for Perfection

Time base correction is fast making inroads into the audio processing arena. As one company spokesman pointed out, "Soon, when you talk about TBCs, you'll have to specify audio or video." Audio TBCs process audio for video but they do more. Many are starting to address the quality of the sound of stereo through mono equipment. At first glance, the demand for such equipment seems small, but NAB figures report that as much as 60 percent of all

It's no wonder 5 out of 6 cartridge tapes sound bad. Phase Fixer makes them sound good.

Even the best tape machines... even the finest cartridge tapes fall prey to sound-robbing phase error and flutter. Carts are dropped. Pressure rollers wear. Playback heads get dirty. But now the revolutionary Harris Phase Fixer audio time base corrector virtually eliminates phase error and flutter. The Phase Fixer is a twin pilot tone system employing high quality 16-bit digital audio.

Why mechanical solutions have failed

Extremely critical tolerances are essential to keep phase error in check. Visualize your cart playback head being expanded to 300 feet high—as tall as a football field is long. Even on this greatly exaggerated scale, tape path errors of as little as two inches will cause signal cancellation within the audio passband for the mono listeners of your stereo programming! Obviously, these close tolerances in the tape heads and moving tape paths cannot be maintained mechanically. And a tape cartridge that is acceptable one day can be made a dud the next... simply by being dropped.

How Phase Fixer works

The Harris Phase Fixer consists of two compact rack-mounted units. The first, a pilot encoder, injects an inaudible pilot signal on the audio as it is recorded onto tape. The second unit is the time base corrector. When an encoded tape is played, the time base corrector is automatically enabled, *electronically* reducing stereo phase error and flutter to insignificant levels. Tapes that are not encoded will play normally.

What's in it for you

The Phase Fixer dramatically cleans up your air sound, eliminates annoying cancellation drop-outs and retrieves missing musical notes. In fact, your source material can sound five to ten times better. And you can use existing cart record and playback equipment—as well as existing carts—*without modification*. Just one Harris Phase Fixer system can accommodate all the tape source machines at your station.

Take charge

Don't accept substandard performance as the inevitable trade-off of cartridge tapes. Eliminate it with a Harris Phase Fixer audio time base corrector. Contact Harris Corporation, Studio Division, P.O. Box 4290, Quincy, Illinois 62305. 217/222-8200.

HARRIS

For your information, our name is Harris.

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stereo sound is listened to in mono, a number which rises when AM stereo and TV stereo, for which there are still few receivers, are included.

Processing for mono to stereo and stereo to mono seems to be more available than ever. In the area of special effects, fuller sounds and more complex effects have been added to digital processors, changes which are simply accomplished with software additions. In many cases, the line between audio

The Phase Fixer "audio TBC" from Harris.

sound effects and music processing has been blurred, with companies addressing both markets simultaneously and newer processors serving many varied functions.

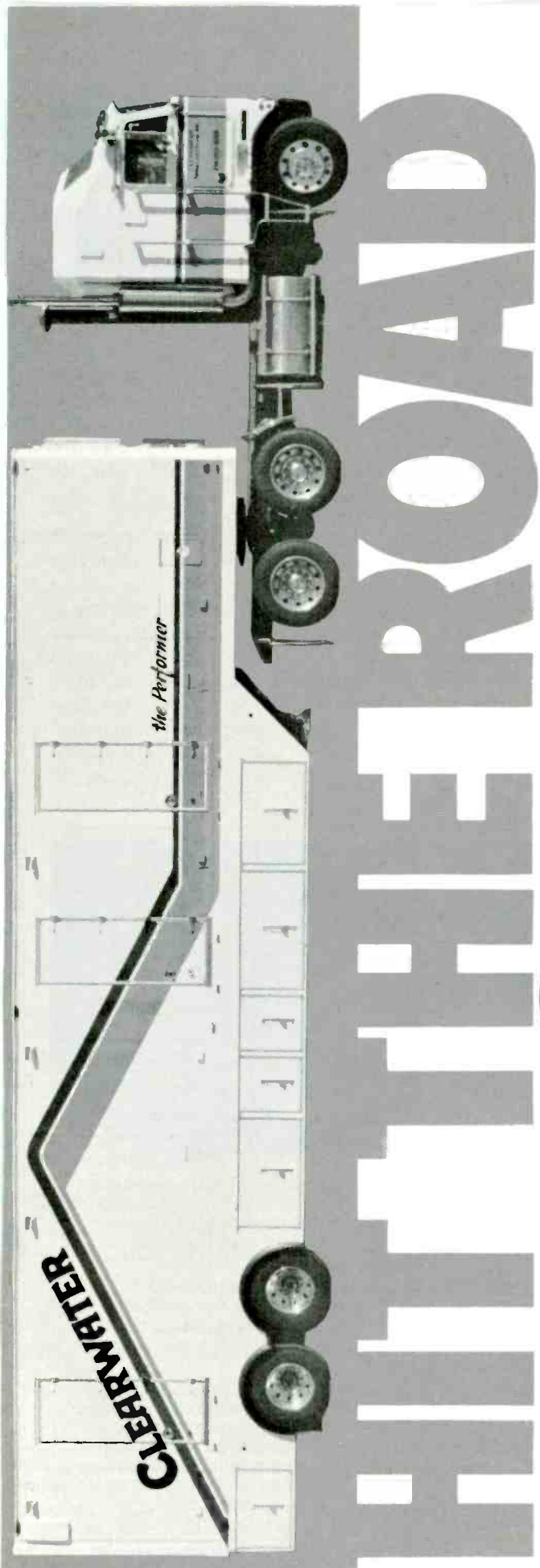
In one innovative processing development, Harris aroused quite a bit of interest with its new Phase Fixer, a patented, exclusive audio time base corrector for audio. It corrects the time delay that causes stereo phase error, wow and flutter, and also alleviates loss of high frequencies when the stereo sound is listened to in mono. It features 16-bit digital audio delay for low-noise and high-fidelity audio time base correction. Each stereo track is encoded with a precision 19 kHz pilot tone that generates the delay control signal to make the time corrections. On tapes without a pilot tone, the decoder passes the signal through with no action or delay. The Phase Fixer costs $5475; the encoder is $875.

Harris also featured a new compressor/limiter, the Ulti-Mate 91 tri-band AGC, with a dynamic range of 110 dB, a wide compression range (up to 40 dB), and true linear VCA gain control for consistent sound. Front panel bargraph meters show the amount of compression and limiting in each of three audio bands, while two-color LEDs display input and output overload. The setup controls are contained in a sliding drawer mechanism for easy maintenance and repair. The Ulti-Mate 91 can function as a final broadband limiter, or be used in front of other processing systems for sound improvement. It costs $1250 in mono or $2450 in stereo.

To address completely different processing needs, Eventide introduced the H-969 Harmonizer which changes the pitch of a signal yet maintains clean sound results. The Harmonizer brings out sound in either a higher or lower pitch, and can be used for time compression, to change the pitch so "faster" doesn't sound "higher." It features delay settings of up to three seconds and delay presets, and also removes companding, replacing it with 16-bit audio for cleaner sound. The H-969 sells for $4500.

Eventide also added several new features to its digital processor, the SP-2016 "audio computer." New Generation II software customizes effects that already exist, including digital reverb, and adds many new kinds of reverb, loop editing, and flanging—all for $9500.

From Ursa Major comes the new MSP-126 Multitap Stereo Processor, a stereo-tapped digital delay line with 20 kHz bandwidth and eight preprogrammed processing modes that creates a range of new effects. The unit is switchable to accommodate mono or stereo applications. Some examples of



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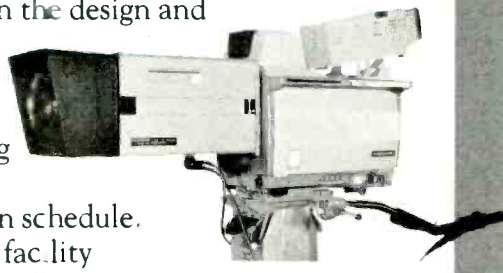
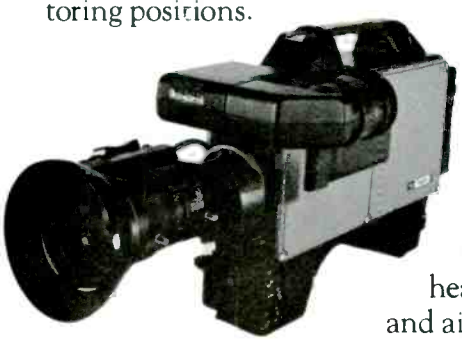


This striking remote facility features Ikegami HK-357AT microprocessor controlled cameras, and Ikegami HL-79EAL's, the industry's finest EFP camera. Ikegami high-resolution color monitors were used throughout at critical monitoring positions.



Like every vehicle in Roscor's Elite Fleet, the Performer received careful attention in the areas of human engineering, power regulation and distribution, heating and ventilation and air-conditioning, signal distribution, and interconnect flexibility. "The Performer" is engineered to live up to its name.

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its effects are forward and backwards discrete repetitions, comb filter stereo synthesis, delay based panning, delay clusters, and new room sizes, and it carries a price of $2500.

Ursa Major also updated its Stargate 626 with reverb and three new room sizes, plus five new effects, including reverse reverb, and digital delay.

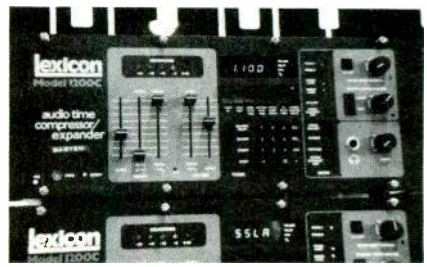
Orban Associates, highlighting its new Optimod stereo TV generator also had the 9100A Optimod-AM mono or stereo, and 8100A Optimod-FM with six-band limiter and XT upgrade along with the 111B Dual-Spring Reverb, and 245F stereo synthesizer.

Lexicon showed its new 1200C stereo time compressor, an upgrade to existing 1200 stereo units, with new software for better long-term accuracy. It automatically controls the speed of playback equipment and preserves broadcast-quality audio, with improved machine control for on-air applications. The system consists of two 1200 Cs with matrix interface cable, and at $9500, it costs less than buying two single units for the same results. Lexicon is offering a retrofit to existing 1200s.

Also from Lexicon is new software for the 224 XL digital reverb machine, and Model 200, which creates room simulation. The new software makes both units more accurate and allows the "freezing" of room tone or ambience. A single control varies the room size, and upgrades to existing models are offered. The additions to the 224 XL cost $95, and to the Model 200, $240.

Although the company didn't introduce new products at this year's show, Dolby Laboratories continues to do well with its noise reduction systems for Sony and Ampex C-format one-inch VTRs. Included in this line are the CN 226 for Ampex VPR-2, the CN 221B for Sony BVH 1000/1100, and the CN 234 for Sony BVH 2000. Dolby is also doing well with the rest of its noise reduction products such as the SP Series for multitrack recording and the 360 Single-track Series for other outboard applications.

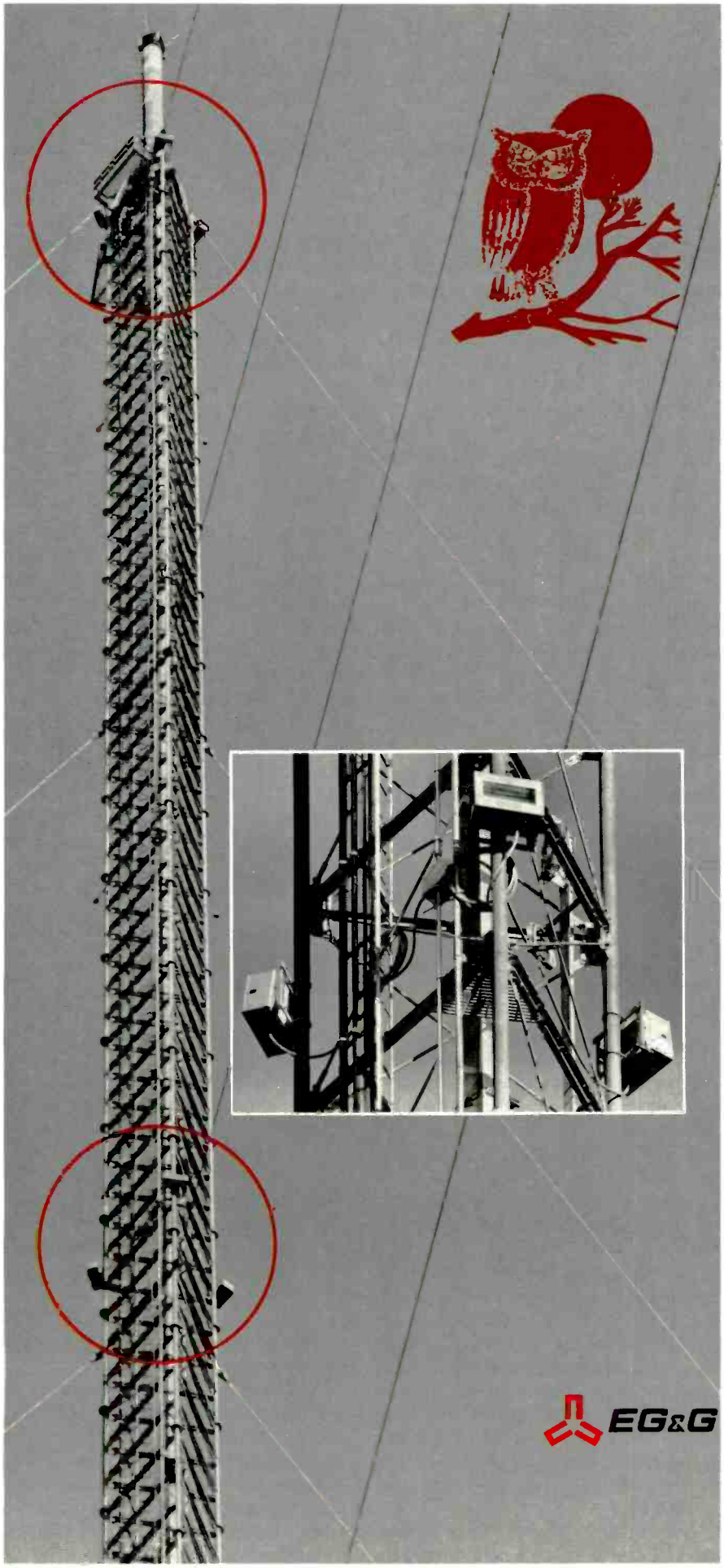
In the realm of stereo processing, CRL introduced the SEP 800 Stereo Spectral Energy Processor to replace the mono SEP 400. The new model is a multiband processor which can be used with other CRL processing equipment.



Updated Lexicon time compression/ expansion system.

The compressor part of the processor divides the audio signal into four bands, and filters maintain the signal's quality while increasing loudness. The unit has two switches, one for wideband/multiband and one for limit/compress and it costs $2250.

Audio Engineering Associates also had new stereo processing products at its booth. One item on display was the AES-MS 38 stereo box with MS stereo, XXY stereo and dimension variable control. Also at the AEA booth, Studio Technologies introduced the SMPL low-cost sync system and showed its AN-2 Stereo Simulator, which synthesizes stereo sound from mono sources. The stereo signal produced from the



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AN-2 is completely mono-compatible, and a filtering process eliminates the harshness that can result from stereo simulation with delay lines.

A large number of audio processing products could actually fall under the heading "intelligent," but two companies which actually called their processors "intelligent" are Aphex and Audio&Design/Calrec.

Aphex introduced the Dominator, an intelligent multiband audio processor, and the Compellor, Model 301, a single-channel version of the Compellor. Also new at NAB was the Aphex Model 9001 aural exciter, a dbx rack modular version of its existing aural exciter.

Audio&Design/Calrec introduced Filmex, an intelligent noise expansion system to eliminate noise in audio tracks of old movies at TV station film islands or videocassette duplicators. Although designed to handle problems that are prevalent with old films, the new machine is not actually limited to film applications. With four-band processing, it cleans up the speech track and also increases separation of foreground against background noise on ENG and other tapes.

In the area of digital delay processing, McCurdy introduced the ADU-10 Audio digital delay, a 16-bit linear audio-to-digital conversion. The delay is adjustable from zero to seven seconds in one millisecond steps up to a half second, and 10 millisecond steps up to seven seconds. An LED readout shows delay and there is a bargraph monitor. The machine can be expanded for stereo capability.

Roland, meanwhile, introduced the SDE-2500 Digital Delay, an MIDI-compatible machine which produces a delay of up to 750 ohms. Up to 64 front panel programs can be assigned to any of 128 MIDI program locations through the machine, and effects such as flanging, chorus, doubling and echo can be accurately produced. It's cost is $795.

Also new from Roland is the JX-8P synthesizer, which acts as an MIDI master controller and an analog/digital hybrid synthesizer to create sounds based on complex waveforms, even cross-modulated sounds. It's cost is $1695. Roland also showed the new TR-707 Rhythm Composer which offers digital sounds, and digital display in a percussion producing instrument for $595.

And from Fairlight comes a new product aimed towards electronic music production and voice synthesis, the Fairlight Computer Musical Instrument. The CMI Series III provides 16 simultaneous channels of audio, each with independent and grouped outputs. It contains 12 microprocessors and offers state of the art digital sound quality with a 16-bit random access waveform storage and converters. There are 16 output channels to which any of 16 voices can be routed, and off-line synthesis is another available feature.

There were some of the more traditional forms of processing present at the show as well. Valley People showed its Model 440 limiter/compresser/de-esser, a single-channel processor with the company's exclusive Linear Integration Detector in the limiter/compresser section, which has been downward expanded to compensate for "heavy" compression.

Electronic Systems Laboratories made its first showing at this year's NAB with two audio processing products from other manufacturers. From Geise Electronic, ESL featured the ADR Taker 1000, a dialog replacement device. And from Barth, the company showed the Dynaset U311 compressor. It features two thresholds, one for upper band and a second for lower band functions. One of its key functions is better differentiation from background noise.

Another processor designed to help differentiate foreground from background noise is the BBE 202 Series from Barcus Berry. It's a multiband, program-controlled signal processor, with high-speed dynamic gain control circuitry to add brightness and presence. The BBE 202 also increases voice intelligibility for both mono and stereo signals.

Rounding out the diverse field of audio processing equipment was Connectronics, which introduced the Accessit, a compressor and noise gate. The compressor maintains a constant volume, and the noise gate shuts down open mics or can be used to create effects. Stereo sweep equalizer and miniature reverb unit are also part of the system which has mic and line level connections.

And new in processing equipment from White Instruments was the Model 4500, an active ⅓-octave graphic equalizer which was shown along with the company's line of active and passive equalizers, audio real-time analyzers, crossover networks and filters for audio applications.

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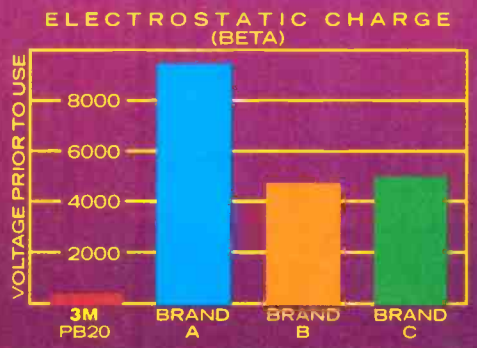

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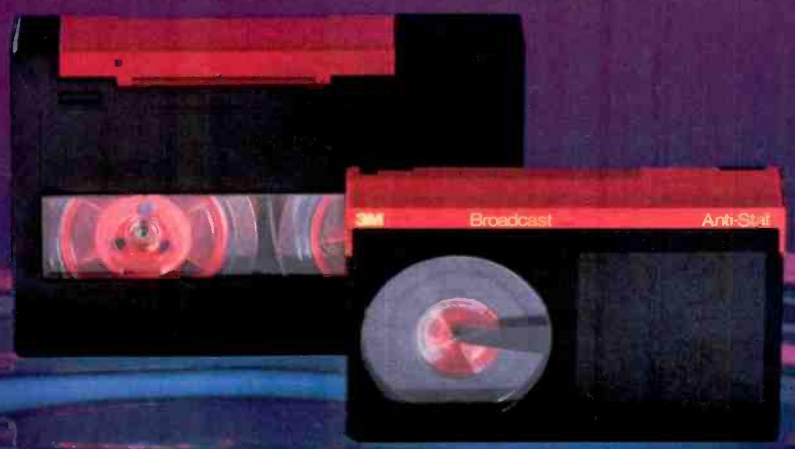

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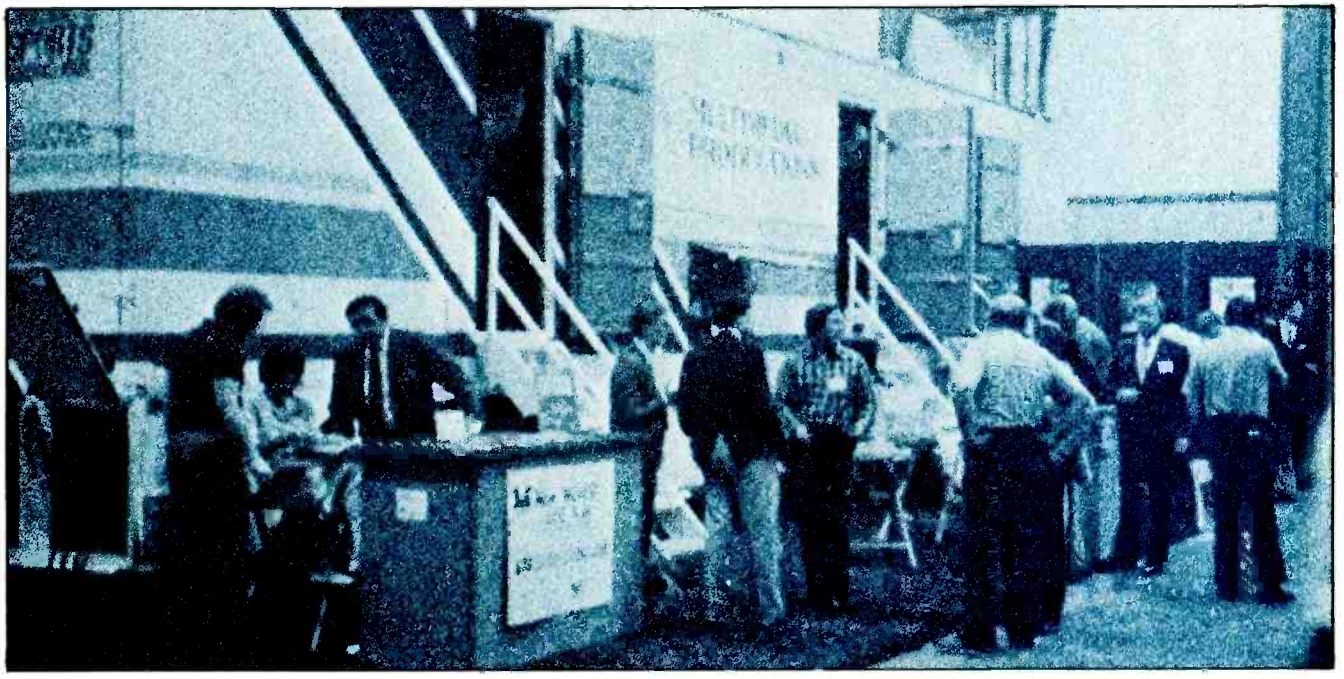


INDUSTRY-WIDE DEVELOPMENTS

New Suppliers Emerge to Fill Broadcast Airwaves

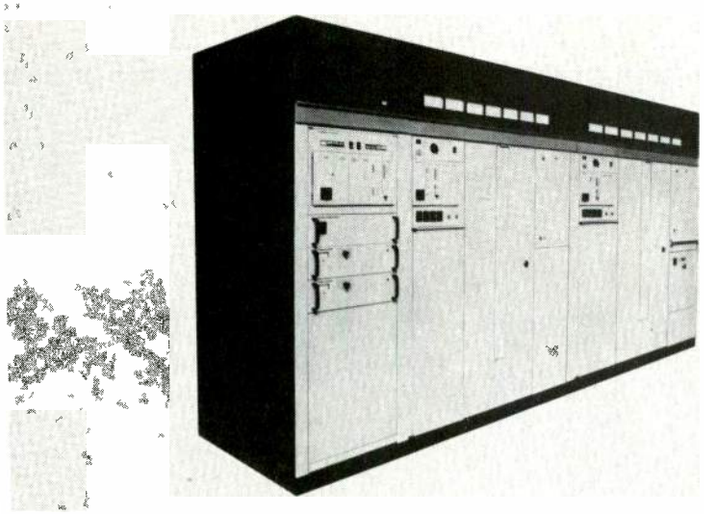
In one sense, NAB '85 was the year of the transmitter import. With the dollar so high in value, both European and Japanese descended on NAB with vigor hoping to penetrate the American transmitter market. NEC, for one, was much more aggressive having recently revamped its marketing organization. Toshiba, for the first time, brought a transmitter to the show. And Marconi's alliance with Comark put it in a strong position for the first time in years. Piher Electronics of Spain (Pesa) made an impressive showing simply by having a remarkably large exhibit that included VHF transmitters and translators. Itelco, making inroads in Latin America from its Florida office (TV exciters, transmitters and translators), turned its attention north. Rohde & Schwarz gave over more of its booth to transmitters (TV and FM). Thomson-CSF came on more aggressively than before (in the high-power area) and Philips, which has had a good foothold in the U.S., had two exhibits this year—one in the TV area, another in the radio area. AEG's presence was felt via its Canadian associate, Bayly Engineering.

In TV transmitters, two trends were obvious. First was the capability of transmitting multichannel sound; second was the smaller size of transmitters. Comark, Harris, ITS, Larcan, Philips, RCA and Townsend as reported elsewhere in this report all stressed stereo. The reduced size of transmitters was particularly noticeable in the UHF band, whenever one high-power tube replaced two lower power types. Immediately power supplies were halved in size. It is no longer possible to report a "trend" to higher efficiency—as it is now a *fact* with specs pushing the theoretical physical limits. Last year the big news was high-power (and high efficiency) five-cavity klystrons with RCA showing a 100 kW model and Harris 60 kW units. This year RCA added a 60 kW version, the TTG-60U, to its line using the Varian "efficiency-tuned" S Series (VKP-7553S) that boosts efficiency by another 10 percent.

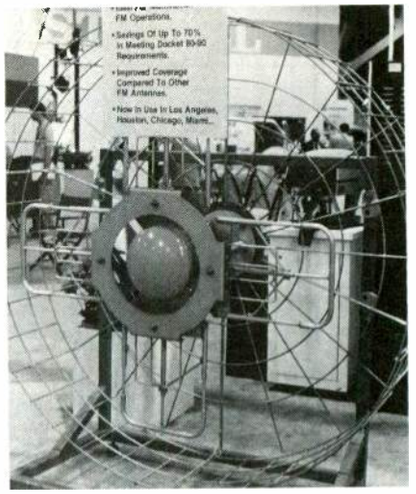
Another highlight at the RCA exhibit was the new OPTO-SX "switchless" system for mode switching of parallel VHF transmitters. There are no vacuum capacitors in the system and no metal-to-metal contacts in the RF path. Four hybrid couplers and two variable phase shifters are the primary components in the system. A coaxial changeover system for radio was highlighted by Bayly. The unit switched not only the antenna but controlled transmitters as well.

The main feature at Philips was a brand-new UHF transmitter, the LDM 1791. Using the latest Amperex (Philips Valvo) external cavity klystron, the YK 1265 (shown last year at NAB), the transmitter boasted not only high efficiency (a super pulser beam controller reduces beam power 25 percent) but volume reduction of 60 percent over its predecessor. Incorporating a late model exciter, the transmitter can handle MTS sound with "minimal" distortion.

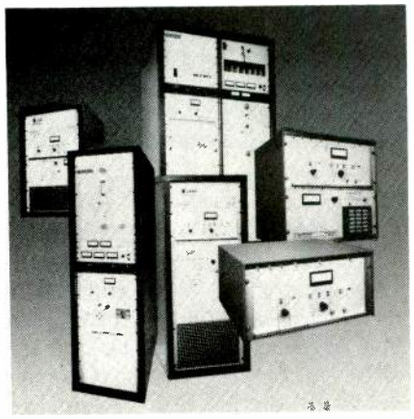
NEC's new PCN-1400 Series transmitters which are MTS ready (Japan has been broadcasting stereo since 1977) reflected some new designs. Its 35 kW model boasted an all-solid-state aural section (the visual has a single RCA 8984 grounded-grid triode). Special hybrid integrated circuits are used extensively. High-power transistor amplifiers reduce the number of stages (using broadband strip line circuits) to a minimum. An all-new exciter is a solid-state frequency synthesized type. A distortion corrector is built-in.



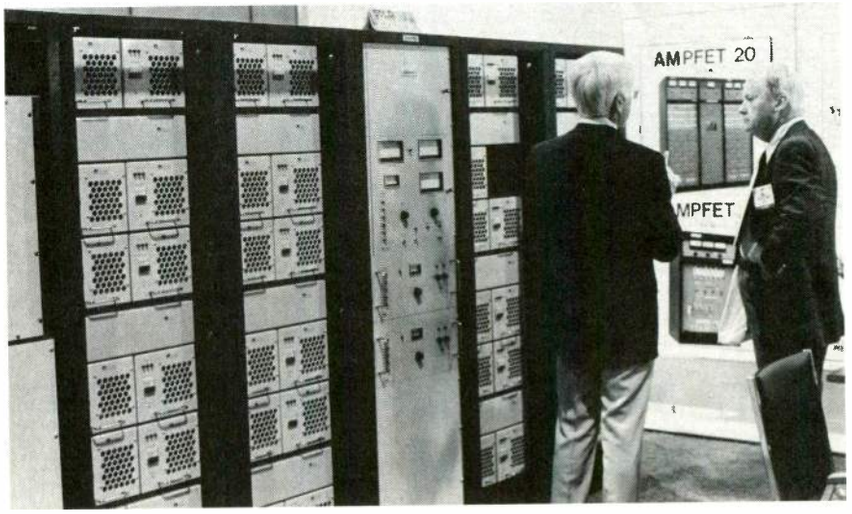
RCA high-efficiency 60 kW UHF transmitter.



Harris multistation FM antenna, 80-90 compatible.



Display of Philips/Pye-TVT radio transmitters.



Nautel 50 kW solid-state AM transmitter.

NEC's UHF line, the PCU-900, was described as a fourth generation design incorporating latest technology features, including hybrid ICs. Amperex, EEV or NEC klystrons can be used. EEV, incidentally, broadened its line, introducing the K3672BCD to compete with the YK1265, rated to 60 kW.

Toshiba's point of distinction was all-solid-state design. Although it displayed only a single unit, a 5 kW UHF type, literature and pictures were on hand showing a 30 kW UHF solid-state transmitter made up of 1 kW PAs, a 50 kW VHF s-s transmitter using 1.5 kW PAs and a 50 kW s-s AM radio transmitter made up of 24 3 kW PAs. Needless to say, solid-state transmitters are not as compact as the tube types mentioned earlier.

Actually exhibiting a 50 kW solid-state AM radio was Nautel. But solid-state by itself did not steal the show. Having the lowest distortion transmitters on the market was Harris's claim for its new SX (solid-state) Soundstar AM line. Harmonic distortion is down to 1.0 percent, and intermodulation to 1.5 percent for 95 percent modulation as a result of "enhancements" to its patented Polyphase Pulse Duration Modulation (PPDM) System. The new SX line also features an Automatic Multipower Switching Option for daytime operators on a tiered power level schedule. While Harris's 50 kW biggie is still a tube type, the MW-50C3 boasts a new solid-state MOSFET modulator driver stage which has lowered its distortion specs to 2.4 percent, a feat not claimed by other power transmitter manufacturers.

Continental had the distinction of having the largest number of transmitters on the floor—all of them tube types including the 1 kW AM "Power Rock." In view of the confirmation at the show that Varian is purchasing Continental, one can not predict the demise of tube transmitters any time soon. All of Continental's AM transmitters were "stereo ready"; in the FM category, an 816R 20 kW was demonstrating both stereo and SCA with the latter operating at both 67 kHz and 92 kHz.

Claiming absolute reliability through "solid-state technology coupled with classical vacuum tube design" was Elcom Bauer with six FM transmitters on display along with several AMs.

Among the first-time-shown radio transmitter products at NAB '85 were a new Model X FM exciter with five subcarrier inputs from Wilkinson/TTC, an exciter/transmitter from Rohde & Schwarz that included a stereocoder option for both traffic radio and SCA signals, a 25 kW AMer from CSI, and a 30 kW FM amplifier from QEI. A new CCA Electronics, headquartered in Fairburn, GA, (exhibiting in Singer Broadcast's booth), boasted new AM (stereo) and FM exciters.

In some respects, NAB '85 looked like an LPTV show. Practically all of the importers, and particulary

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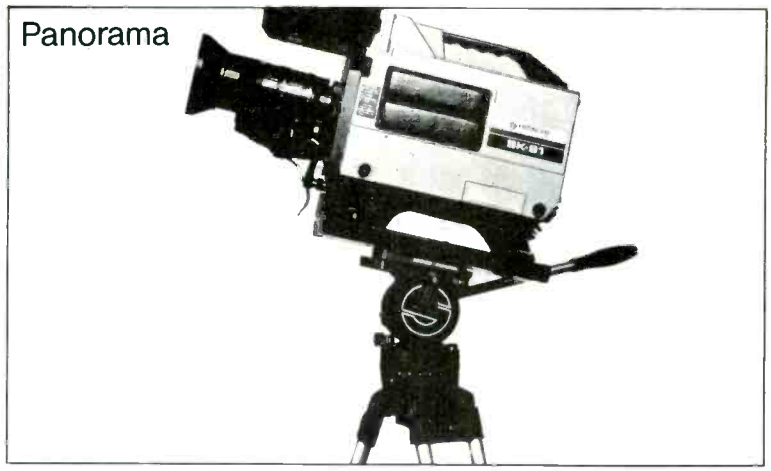

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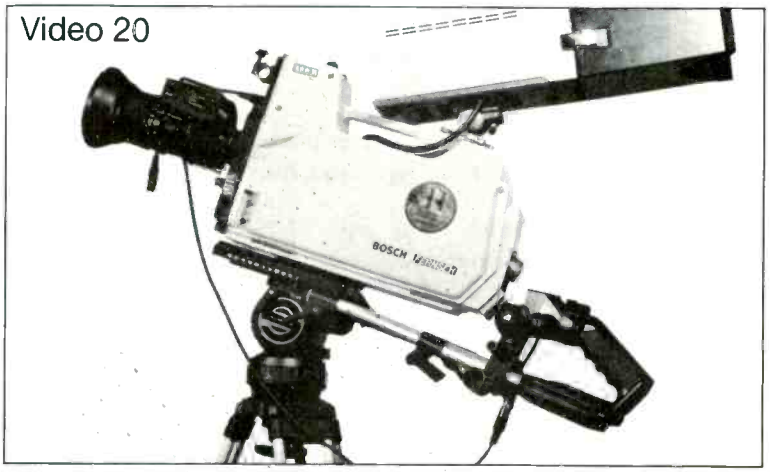

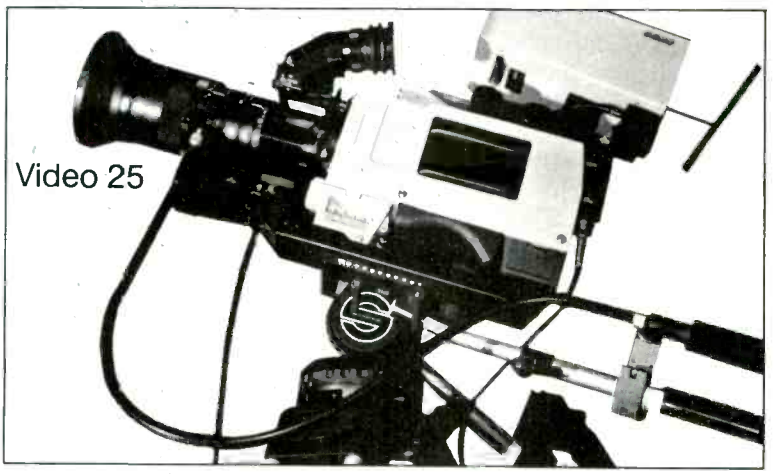

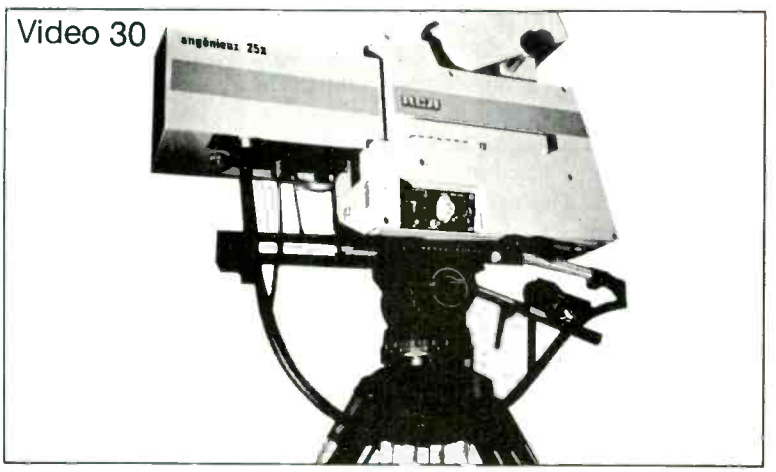

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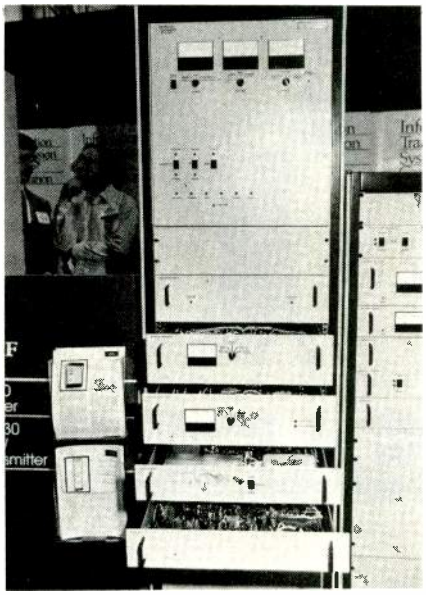

ITS linear exciter for stereo TV.

Thomson-CSF, featured low-power models. Add to that list Acrodyne, Emcee, ITS, TTC and Townsend plus Comwave, which came with MDS gear. Emcee introduced several new products in the 2.5-2.7 GHz (MDS) band—a 10 W GaAsFET repeater and a 100 W amplifier. Acrodyne had a new low-power unit and, in effect, introduced itself as a new company now owned and operated by its current management.

While apparently little was new in TV antennas, Andrew Corp. highlighted several transmission line advances including a bellows-type inner conductor to handle contraction and expansion without metal wear and circular waveguides with 90 degree bends.

In the STL-TSL category of products, Itelco showed an FM type with considerable range; Micro Controls showed a new TSL MCI 2001 Series with intercom, fire and burglar alarm inputs. Horizon International, a first time exhibitor from Phoenix, showed a new transmitter diagnostic and remote-control system. The unit can monitor over 300 points. Harris introduced the Sentinel 16 as a versatile remote-control unit with features normally found only in higher priced units. The unit is programmable so that power levels are automatically adjusted when readings exceed limits. Any change in status can initiate operation of a control function.

While the number of tube suppliers remains the same, the offerings increase. Thomson-CSF, RCA, Varian, and Varian/EIMAC (as well as EEV already mentioned) added a number of tubes. Among the Varian/EIMAC offerings was a new triode, the 3CX12-000U7, for use in cathode-driven circuitry (related cavities), a compact power tetrode and a new line of compact power triodes. Thomson-CSF's star product was a 50 kW UHF TV tetrode. Matching this feat was a 500 kW unit for shortwave broadcasting in the 30 MHz band. Other new entries were a 160 W TWT for Ku-band uplink transmitters and a 3.35 kW klystron for 6 GHz uplinks, the TH 563.

As reported in the story on enormous TV stereo activity, both M/A Com and Harris showed STL microwave capable of handling stereo subcarriers. Harris units, known as MICROSTAR systems, are available in 2, 7 and 13 GHz models. New portable equipment in the 2 GHz band was shown by Harris, M/A Com, Nurad and RF Technology. Each boasts compactness, high performance and new operating convenience features. Nurad and RF Technology portables also operated in the 13 GHz band.

BMS helicopter-mounted microwave antenna.

Both Broadcast Microwave Services Inc. and Nurad stressed more simple operation of helicopter-mounted ENG systems. BMS's new GCA-1 Gyro-controlled antenna hones in on the receive site(s) quickly through the use of a thumb wheel adjustment and remains locked to it regardless of helicopter activity through the use of Loran signals. Nurad's Logic Track also uses Loran-C to calculate correct rotation of the transmit antenna as a function of the helicopter heading. BMS reports 180-mile transmissions have been achieved because of easier tracking.

Some dual-band antennas for operation in the 2-2.5 and 7 GHz band were introduced by M/A Com and BMS.

Fiberoptic systems

At least four NAB exhibitors were attesting to the increased interest in fiberoptics. Artel demonstrated for the first time a single optical fiber that transmitted video and two wideband aural and data channels over 20 miles exceeding RS-250B short haul standards. Single mode fibers minimize optical dispersion, thereby increasing bandwidth. Belden, a cable supplier, said the demand is enormous. Grass Valley Group's Wavelink Fiberoptics operation showed some five systems approaches for short and long hauls plus wideband (20 MHz) links. Optical cables are a natural replacement for microwave links for covering sporting events said Telemet, which exhibited the Model 4201-C1 transmission system.

Sophistication Becomes Standard in Audio and Video Routing

Always essential to broadcast operations, the routing switcher has moved from a fairly simple piece of equipment into the realm of computer control. Top-of-the-line units offer sophisticated control of potentially thousands of crosspoints, with an array of features that present broadcasters with some real choices in designing a routing system. The importance of routing was emphasized by several significant developments at NAB '85.

Utah Scientific introduced a new routing switcher, the AVS-1B, architecturally similar to the company's AVS-1 but a totally new design, offering eight individually addressable switching levels with sizes to 320 inputs by unlimited outputs per level. Besides excellent specs, the AVS-1B features control panels that are reprogrammable from a simple computer terminal with no system or panel downtime. Control circuitry is redun-

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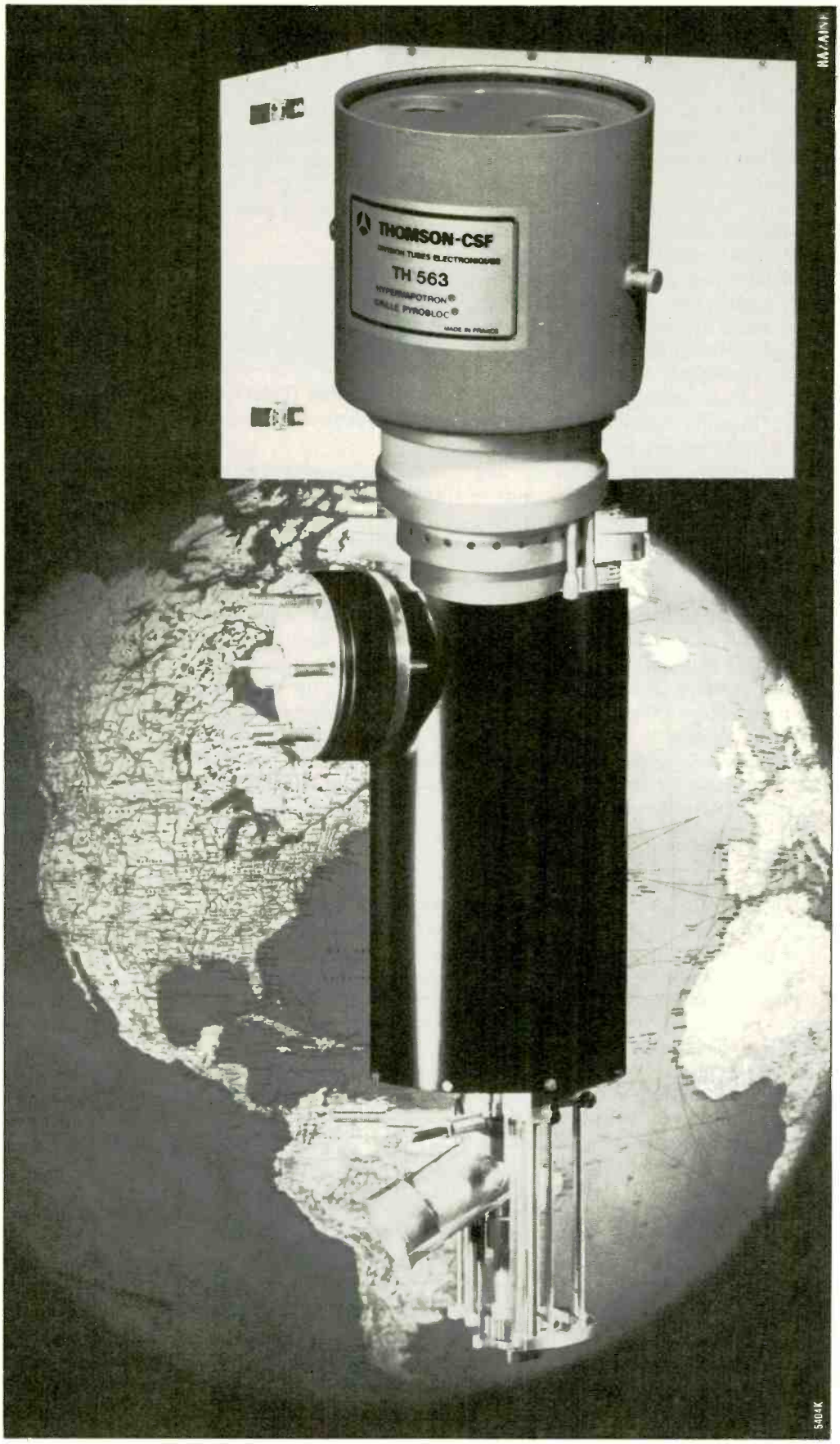

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dant with automatic switchover. The switcher's 60 MHz video bandwidth will accommodate digital television and MAC technologies.

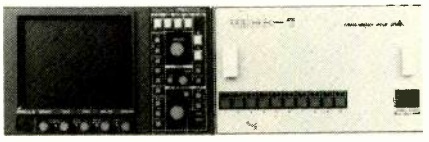
Utah also supplemented its PLMC-1 party line machine control system with the introduction of a new SMPTE standard MC system. The new system uses redundant microprocessors with automatic failure detection and switchover. Control panel interconnection is by four high-speed coaxial loops, with connection to controlled machines by either parallel interfaces or standard SMPTE protocol.

Stereo television systems got a boost with Bosch's introduction of the MCS-2000 master control switcher, which can be added onto an existing TVS/TAS-2000 house distribution switcher or configured with its own switching matrix. The MCS-2000 can be used with up to four audio levels for a second stereo feed or SAP feed. Key audio parameters are metered for quality performance. The switcher can be used with the Bosch TCS-1 machine control system; at the show, it was demonstrated with the DDC BIAS automation system.

Bosch also introduced a range of new control panels for its TVS-TAS-1000 and 2000 distribution switcher line, ranging from single-bus 10-key control panels to full matrix microprocessor-based panels.

Grass Valley Group's field-programmable Horizon switcher line had some interesting new wrinkles this year. The HX-16 is a 16x16 switcher with two levels for audio and one of video in a single box containing controller, changeover, and redundant controller, plus redundant power supplies. This is made possible in part by a new smaller power supply that allows both power supplies to fit in the same box, keeping the unit compact. Also new are a video status display, controllable from any UCP (universal control panel); a new GPI that allows user to control Horizon from any personal computer (demonstrated at NAB with an IBM PC); and a new eight-bus multibus controller that stores up to 10 four-level breakaway events.

Also new was the Ten-XL, an updated version of GVG's economical Ten-X routing system, with two channels of audio and one of video in a one rack unit system. Circuit boards are removable through the front of the rack for easy maintenance. The XL's built-in nonvolatile crosspoint memory is guaranteed for one hour, but has held in lab for as long as 12 hours, according to a spokesperson. In addition, the price has been made "more attractive." A companion unit is the Ten-XT monitoring station, which combines the XL's capabilities with the Tektronix 1740 or 1750 waveform/vector monitors, as well as the 528 and 1420.

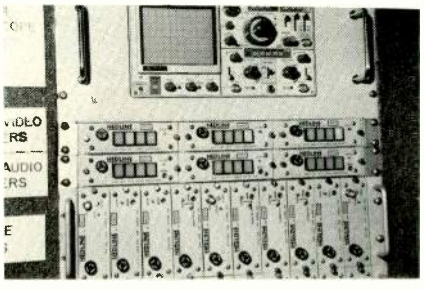


Grass Valley's new TEN-XT router mounted with Tek waveform/vector display.

GVG also announced a new range of video and audio DAs, the 8500 Series.

New from 3M is a two-level audio switcher with stereo capability, introduced as a companion to the state of the art H Series. Like the Model 128x32 which it is designed to complement, the new stereo, audio-only switcher uses hybrid circuit technology. The compact unit provides up to 160 inputs by 32 outputs with two levels of audio in 19 ¼ inches of rack space and offers the same features and specifications as the audio channel of the Model 128x32. It can also function as a standalone audio switching system.

3M also featured its Model 6600 microprocessor-based routing switcher controller, which allows the customer to use alphanumeric data entered from panels or from a terminal. It uses a new Manchester encoded data addressing system with a data rate of 62,500 bits per second, and will handle 128 panels

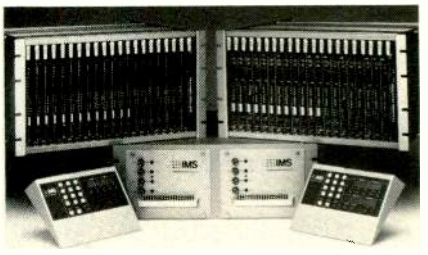


HEDCO Hedline modular routing switcher.

for switching control. Available control panels include a 16-pushbutton unit, one with 64 pushbuttons, and a universal alphanumeric control panel.

HEDCO premiered a pair of new routing switchers in its Hedline Series, the SVS-340 4x1 video switcher and the SAS-341 4x1 audio switcher. Both feature electronic latching, active circuitry with broadcast-quality specs. They incorporate self-powered, attached power cords and illuminated, relegendable, momentary pushbuttons. Each standalone switcher can be supplied with three units in a one RU frame or 10 units in a three RU frame. The video switcher offers vertical interval switching; the audio unit boasts a wide dynamic range and a headphone monitoring jack on the front panel. Also new in the Hedline Series is the SAA-320 six-output audio DA, a self-powered, self-contained unit with balanced outputs.

Dynair, meanwhile, continues to make advances with its modular routing switcher/DA, which can be set up for both small- and large-scale operations, or interfaced with Dynair's System 23 machine control system as the basis for a station automation package. New control panel options were shown at NAB, complementing the CRT-based master controller which forms the hub of the microprocessor-controlled switching.



The IMS large-frame "intelligent" audio routing system.

Two new series of intelligent audio switchers were introduced by Integrated Media Systems (IMS) at the show. The Smart Switcher 200, ideal for ENG mobile applications as well as studios, can contain up to 256 summing crosspoints configured in groups of eight. It features four on-board memories, with local or remote X-Y or destination-oriented control panels available in up to 32 remote locations via a party line control system.

The 200's big brother is the 400 Series Smart Switcher, which can comprise 256 to 16,000 crosspoints. Besides its audio routing applications, it can be used as a large electronic patch bay, an expansion router for add-on stereo applications, a multilevel router, or an automatable summing audio distribution switcher. Power supplies are modular and redundant. The 400 costs $11,900 and up.

Another intelligent routing system was introduced by Amherst Electronic Instruments. The IDAC Series (for In-

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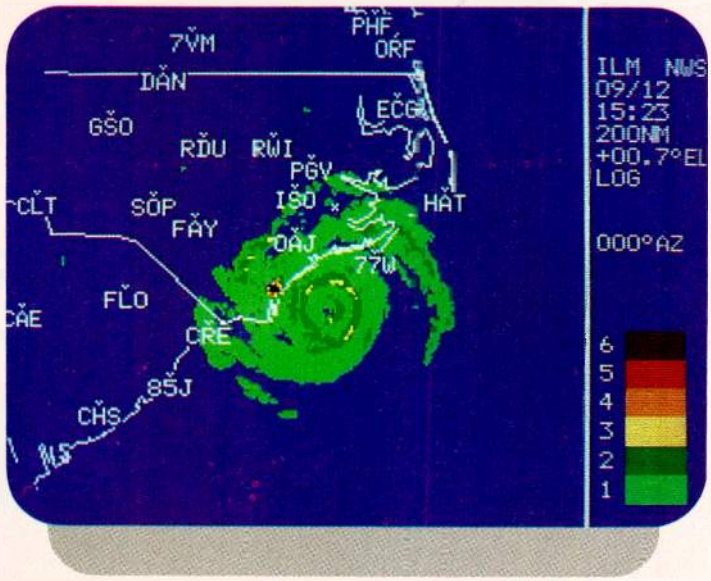

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With the Alden system, there's no need to pay for access to the whole country if you only need data from a few radars. You specify the sites you want, and we program your auto-dialer phone to receive these sites. You pay only for the sites you need.

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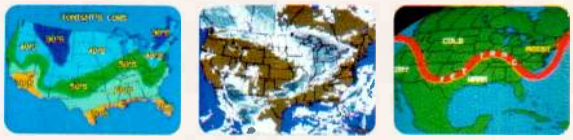

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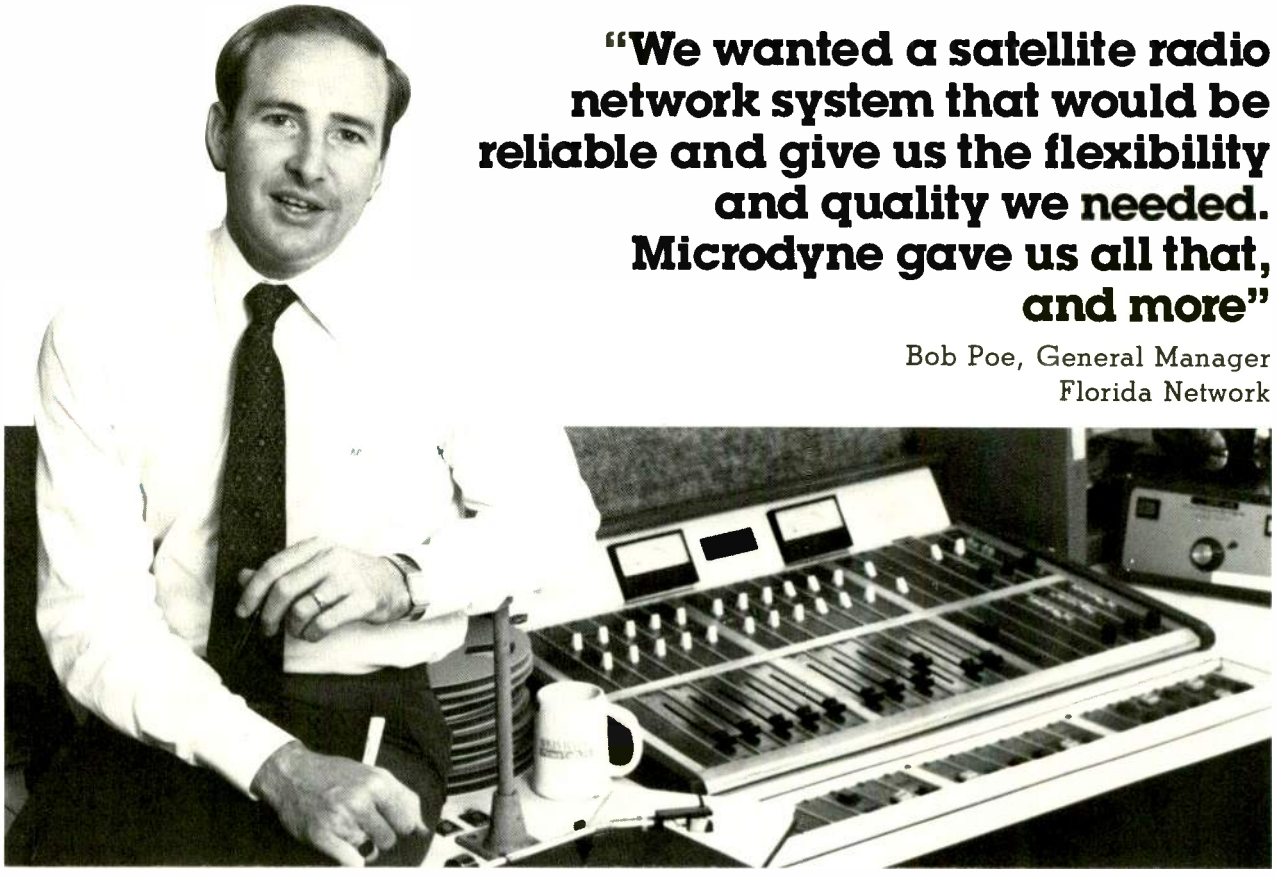
Florida Network



"We're a regional radio network distributing news, sports and information to nearly sixty affiliates throughout Florida.

"We switched to satellite distribution for the same reasons so many others have: It costs less, is more reliable, and provides higher quality than land lines.

The Microdyne equipment sold itself

"When it came time to buy the hardware, we chose Microdyne over all the others because they understood our problems and offered the best solutions. Their equipment sold itself, really. It's the most flexible system available. The downlink demodulator can accommodate any transmission format currently in use.

The Florida Network's permanent uplink in Orlando distributes programming via two SCPC carriers on Westar III.

"That's a big plus to us, and to our affiliates, because it means greater programming flexibility.

Turn-key system put us on the air in less than three months

"Another point in Microdyne's favor was their ability to provide a complete turn-key system in a minimum amount of time. They had us on the air in less than three months. Some of the other companies were giving us lead times of 180 days and more.

Engineers praise the system

"Of course our engineers were heavily involved in the decision to buy. They're aware of Microdyne's reputation and they highly recommended the system. And I guess the true test is that after nearly a year of hard use, they still praise the equipment.

Expands our broadcasting opportunities

"As I said, we went to satellite distribution for the cost, reliability and quality. But we've found that it has really expanded our opportunities as well. The transportable uplink was intended to serve just as a backup, but it has been kept in constant use uplinking special events over our second transponder channel. We get inquiries from broadcasters all over the country who want to lease it from us. That's providing extra income.

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telligent Distribution Amplifier Controller) is an 8088 microprocessor-based device that controls up to three interchangeable DA modules, each with eight outputs. The video DA module can display video levels on a computer CRT, perform cable equalization, and interactively reroute inputs and outputs. It can also perform some of the functions of a proc amp. Amherst also introduced the IDAC-BBDA, an intelligent device that automatically adjusts subcarrier phase, horizontal phase, and video level gain on up to five genlocked video products. It is available in manual and automatic versions.

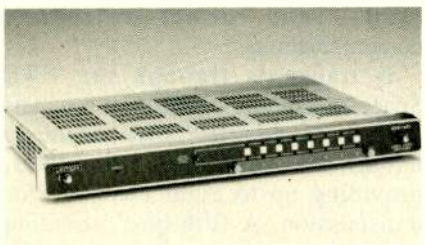
Central Dynamics featured its SDS-2 signal distribution system, which packs 2048 crosspoints into only eight rack units. The system is field-expandable from 32x32 up to 512x512. It uses hybrid circuits for all video crosspoints, and all audio processing is fully balanced. A standard feature is CDL's MicroPatch software, which includes breakaway, status display, I/O locks, and real-time salvos.

McCurdy introduced a line of 10x1 A/V switchers, one rack unit-high, offering one level of video and two of audio with breakaway. Also new was a compact 64x64 audio/video switcher using 8x8 video modules and 16x8 audio modules, offered with a full range of control panels.

As part of a new line of vertical interval switching devices, Leitch Video introduced the AVS-481 audio/video switcher, intended for demanding applications such as program monitoring, picture matching, and test signal switching. The one RU mounting frame houses one 8x1 video switching matrix, one or two 8x1 audio switching matrices, and one power supply. Remote control is available via a three-conductor cable; multiple control panels, all providing active crosspoint indication, are allowed. Also featured was the ADA-860 audio DA, a very low noise unit boasting virtually transparent operation.

In designing its new modular routing switcher system, BSM Broadcast Systems built an entirely new system from the ground up. Modular features complete total shielding of all components and signal traces; direct coupled signal paths to eliminate dc restoration circuitry and associated dc offset adjustments; four independent effectivity levels for all possible combinations of video and audio switching; and effectivity "jumpers" that permit the programming of special configurations. The switcher can be programmed with a variety of I/O devices, including microcomputers, and can be configured to handle any audio, video, or AFV requirements from 8x8 to 256x256. It boasts excellent specs with no signal degradation.

The newest item from Image Video was the Model 9600 high-density routing switcher, based not on hybrids but using a monolithic chip for the crosspoint. According to the company, this structure gives the compact unit greater reliability and stability and superior specifications. A 40x40 video system with two channels of audio takes up 16 rack units; 80x80 video and two audio channels fit in 48 units. The switcher is completely compatible with existing Image Video control panels and operates in conjunction with the company's 10K control system. Also



Leitch AVS-481 audio/video router.

new was the 6030 10x1 broadcast routing switcher with full three-level breakaway.

New from Di-Tech was the SE high-speed serial control system, which allows Di-Tech control panels and routing switchers to be connected with coax or twisted pair. The system controller requires one RU of space and can be up to 100 feet from the switcher. The SE constantly sends tally status to all control panels and checks for new switch requests. It also does an auto-configure on power up to locate all connected control panels to provide optimum speed.

The SE is compatible with Di-Tech's new 5850 AFV switching system, field-expandable with up to three levels of audio per input. Frame capacity is 40x20. It can operate with parallel BCD or serial-type control panels. Computer control can be serial or parallel.

Console manufacturer Harrison Systems introduced the ARS-9 intelligent, microprocessor-controlled audio routing switcher system available in from 64x32 to 256x256 crosspoints. According to Harrison, the ARS-9 is the only audio routing system with audio signal specs equal to its range of console systems. A variety of user-friendly control interfaces will be offered, using SMPTE serial bus control. Deliveries are slated for this month.

Two useful audio routing items from Logitek are the PRE-10 input expander and the MON-10 multisource meter/monitor. The PRE-10 is a passive routing switcher that feeds any of 10 mono inputs to either of two outputs and is designed for situations where audio sources outnumber available inputs. The MON-10 feeds any of 10 stereo inputs into a single stereo output, and also feeds the selected input to a multirange meter, a 6 W speaker, and a front-panel headphone jack.

Ramko showed a production model of its RS-1616 router/switcher control system, shown last year as an engineering prototype. The system, which provides switching, amplifying, routing, and mixing with paging/call override, has new remote controls and an improved memory. Part of Ramko's Primus Series, the RS-1616 can be configured from eight mono/four stereo in by two out to 128 mono/64 stereo by 64. A special feature in the output section allows the user to switch the output to another source for paging or program override; removal of this command causes the output to revert automatically to the previously selected source.

Gentner Engineering introduced two audio switchers, a 10x2 stereo and a 20x1 mono. These passive routing switchers use dependable magnetic latching relays for routing of sources, and may be used for control voltages as well as sources. They cost $849 each.

Dynair highlighted its established System 21 matrix routing switcher and the 25 Series video and audio switching systems, introduced two years ago and built with hybrid technology and microprocessor-controlled circuitry. The 20x20 system is expandable to 1000x1000.

Graham-Patten, which unveiled a new audio mixer at this year's show (see section on TV consoles), announced that it has completed shipment of a 160-channel, remotely-controlled audio DA system to the NBC Television Network in New York.

Key Video featured its established line of custom-built medium to large routing switchers, the AVS-100 Series, based typically on a 20-input module. Designed for the high-quality broadcast market, the system features ease of expansion and on-air maintenance.

Several companies brought new DAs, including ESE, which introduced

the ES 208 1x12 video DA, economical at only $300. Also new were the 720 Series programmable comparators.

Omicron Video unveiled the Model 200/210 universal video/data DA, a modular, self-powered design with eight outputs per amplifier and looped-through differential inputs.

Allen Avionics introduced the VAR256 video delay line, which features infinitely small delay adjustments (from 0 to 256 ns), no video distortion, and insertion loss of less than 15 dB.

Microsonics, Inc., also showed a line of discrete delay lines boasting wide bandwidth and excellent phase characteristics. They are compact, low-power, and temperature stable.

Ku-band Hits the Road and a New Buzzword is Born

Satellite Newsgathering (SNG) was not actually born at NAB'85, but it certainly was baptized. Hubbard Communications' HUBCOM NewStar linked to the birds through Conus was joined by a host of other SNG backers, all using Ku-band systems.

Thus, within a year the concept of taking a dish out into the field and using the previously suspect Ku-band to bounce signals back to a station or stations has become an accepted technique. Little wonder there's now more competition on the SNG roads. Not only are the satellite equipment and satellite service companies joining the parade, but the established ENG truck designers are hitching a ride.

There are still some unresolved issues. These include: the optimum size of the dish, wind load capability, sidelobe performance, foldable antenna or not, best means of intercommunications, and assemble-disassemble times (you get some tricky quotes on this point). Operating costs is another hazy issue at this point. Competitors are already bad-mouthing each other's pricing statements.

One of the SNG pioneers at NAB did not have a truck. GEC McMichael unveiled its NewsHawk satellite earth terminal which is designed to fly away rather than drive away. First shown at the International Broadcast Convention in Brighton, U.K., last fall, NewsHawk features a 2m x 1m elliptical antenna which has a transmit gain of 45 dBi and a receive gain of 43.5 dBi. The antenna complies with the 29-25 logΘ sidelobe specifications.

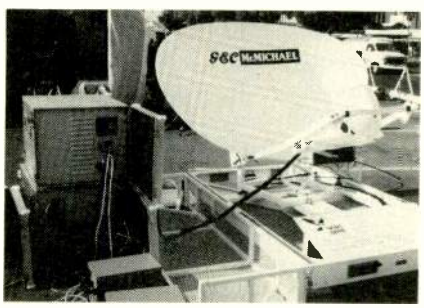
The antenna is the key element of the GEC McMichael system. It had to be small enough to be carried in a light aircraft such as a Lear jet or station wagon, but large enough to provide an aperture able to comply with two-degree satellite spacing. According to McMichael, the elliptical aperture meets these two requirements.

The entire system can be packed in three flight cases when configured for conventional analog transmission.

A new entry in the truck-based SNG was Dalsat, which introduced the SNG-25 transportable uplink in a self-contained 28-foot-long vehicle. It features a collapsible dish antenna (4.5 meters), on-site editing capabilities, satellite-linked interrupt feedback (IFB), and direct telephone communications.

It transmits through the GTE Spacenet Satellite System. Two signals can be transmitted simultaneously through any one of four GTE satellites, providing up to eight channels for transmission. A fifth bird providing two additional channels is set to be launched early next year.

Each mobile unit features two Dalsat proprietary single-channel-per-carrier (SCPC) circuits, which allows station-based producers to give off-air instructions to crews in the field using IFB. One of the SCPC circuits can also



Sky-Pack from GEC/McMichael.

be used by a news anchor to interact with a field reporter during a live remote. The SCPC permits two-way field-to-station communications via satellite, eliminating the need for conventional surface-level telephone service.

At a joint press conference, Wold Communications and Microdyne both announced that they were going into Ku-band efforts, each in its own way. Wold will have full operation of an SNG system by March, 1986. It is a specially designed delivery service for satellite newsgathering throughout the continental U.S.

Wold transmission services will be on the RCA "K-2" satellite scheduled to be launched in December. NBC Television Network is to use K-2 to deliver network programming to its affiliates.

Microdyne's side of the coin is QuickLink, a new Ku-band transportable uplink. You don't fly QuickLink and you don't drive it—you tow it. QuickLink, a self-contained unit, is designed to be hooked to the back of an existing ENG truck, making it possible to keep present ENG equipment and get the benefits of SNG. The system is designed to make it easy for an ENG crew to set up the satellite feed. A key feature is completely automatic acquisition of the desired satellite using a calibrated satellite location memory which is on target in 10 minutes. Moreover, QuickLink has a two-way voice-grade communications link with Wold's 24-hour network operations center via SCPC.

Part of extensive satellite system from Microdyne.

Clearly, the Ku-bandwagon is rolling. MicroLink Systems introduced its SNG Series mobile, self-contained vehicle. It's equipped with a 2.3-meter parabolic antenna and a 600 W TWT amplifier.

A synthesized video exciter allows frequency selection of all satellite transponder plans, including all full and half transponder formats. An audio subcarrier modulator is included, with room to add more.

A much larger transportable rig was shown by VideoStar, which also produces transportable C-band equipment. The Ku SNG units feature five-meter folding antennas that can be set up in 30

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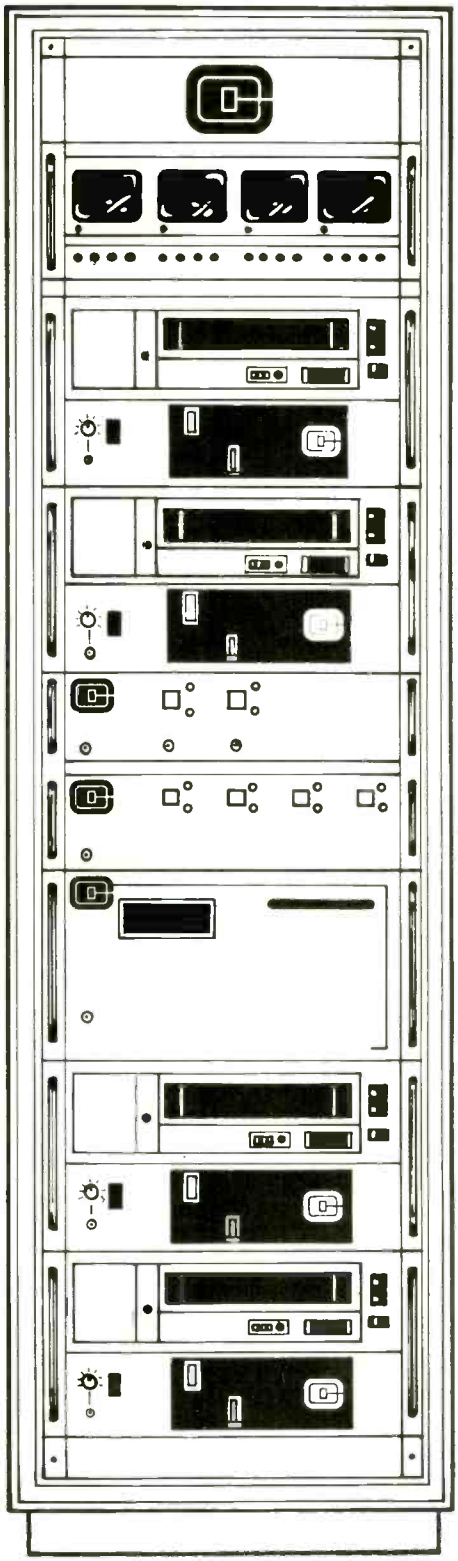

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minutes by a one-person crew. VideoStar also maintains an inventory of satellite time.

As mentioned above, the mobile broadcast truck suppliers are getting into the SNG act too. Midwest has the S-20 Ku uplink system with a 3.5-meter antenna mounted on a 22-foot trailer that also has a control room. The antenna, low noise converter, video receiver full and half transponder, and video filter full and half transponder are all from Harris. The Varian 300 TWT amplifier is used. Test and monitoring equipment is from Tektronix and Videotek respectively.

LB Telesystems is making an SNG truck for Comsat General, which will be leased. It has both a 2.4-meter dish and a microwave mast for terrestrial communications. It can be configured from simple newsgathering to full production with on-board editing and production switching.

What about Hubbard's NewStar? It has not been sitting in the garage. The key to winning in SNG, says Charles Dutcher, vice president and general manager for Conus, will be service. That's why he is banking on the Conus connection above for the satellite service and the HUBCOM connection below for reliable vehicle service to keep NewStar ahead. And it is also the reason that Dutcher is already predicting a shakeout among the would-be SNG suppliers.

SNG was not the only news at NAB'85. One new development since the last NAB was the name Vertex at the Harris booth. Vertex, in the words of one of its executives, is a new old company. The roots of Vertex go back to Radio Mechanical Structures, founded in 1973 and acquired by Harris in 1977 to become Harris Antenna Operations. Last December, the original RMS team purchased the Harris Antenna Operations and set up shop in Kilgore, TX.

Vertex is off to a running start since it has nearly 700 C-band satellite earth station antennas and about 400 Ku-band antennas installed. Its C-band dish line ranges from 3.5 meters all the way to 32 meters. Design and redesign as well as manufacture are done in Texas.

Ku-band demonstration from Scientific-Atlanta.

A wider-known name, Scientific-Atlanta, was at NAB with a wide range of satellite equipment. Featured was the DAT-32 digital audio terminal designed for the reception of media information broadcast via satellite using digital data techniques. The system has digital program audio channels (15 kHz or 7.5 kHz), voice cue channel (32 kb/s) and data channels (32 kb/s).

Not overlooking Ku-band, S-A had the RFT-1200 Ku-band integrated RF terminal. It is flexible enough to accommodate a wide range of satellite

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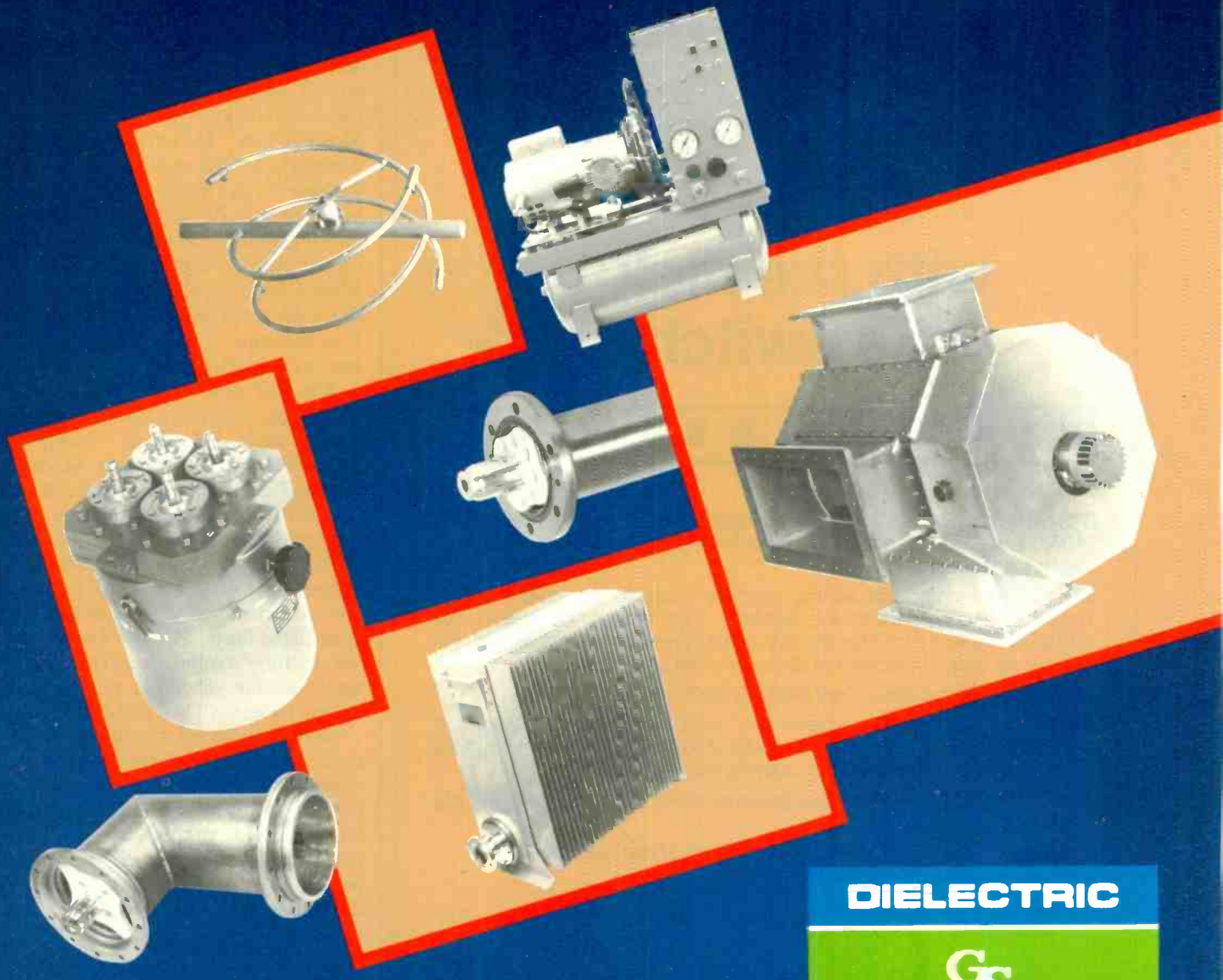

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communications needs. The RFT-1200 can be configured for redundant or nonredundant, transmit/receive, transmit-only, or receive-only operation.

Another very flexible satellite design was the 4.5-meter receive-only earth station antenna from Andrew. This unit is available for C-, Ku- and dual C/Ku-band operation, in manual and motorized versions. Also available with this antenna is a motorized mount with remote microprocessor controller. According to Andrew specs, there is a slight drop in gain in the dual-band mode from 55.3 dBi at 12 GHz to 52.2 dBi for Ku and from 44.2 dBi at 4 GHz to 43.8 dBi for C.

Available in either C- or Ku-band, but not in dual-band, was the Miralite five-meter clear aperture antenna. Sidelobe improvement is achieved through use of the clear aperture and advanced corrugated feed designs ranges from 15 dB to 30 dB, in which the 15 dB refers to improvement in the first sidelobe level and 30 dB refers to a majority of the wide angle lobes.

On-hand in the Pinzone entourage was the Comtech five-meter C-band antenna. It has programmable remote, console or rack mounted mount controls.

C-band transportables were still in evidence, though not as dominant as last year. Starshooter, a 48-foot-long rig, was a quite-noticeable participant. The trailer has a modified Andrew 4.5-meter antenna with electric drive (hydraulics is out for reliability reasons) and Scientific-Atlanta 600 Series receivers.

Satellite components

As networking via satellite has grown, so has the concern with matching the uplink components with the downlink components. That is the approach that Modulation Associates is taking. In its line is N-SAT, a new SCPC receiver specifically designed for affiliates of national radio networks. "Because the MA modulators and audio processors are used by virtually all national satellite FM SCPC radio networks, the companion Modulation Associates receive demodulators and audio processors in the new N-SAT receiver are precisely matched to the network uplink—insuring national network affiliates the highest possible audio quality, and the N-SAT demodulator is plug-in compatible with over 2200 downlinks currently in operation," a Modulation Associates spokesperson explains.

The system is two-channel switchable including remote, is frequency agile and includes multiplex port and loss of carrier alarm. MA also had the T-Series frequency-agile SCPC demodulator designed to interface with its multichannel MC-SAT receiver shelf. It will also plug into other radio network systems, including those of Mutual Broadcasting System and The Associated Press. MA also had its new SR-13 fully synthesized, frequency-agile satellite subcarrier demodulator system for stereo TV sound distribution.

Digital audio by satellite is a hot topic for Dolby, since the company introduced Adaptive Delta Modulation (ADM). Dolby claims that delta modulation, an old concept now in a new garb, has superior qualities when compared with PCM. In the ADM concept, the complex circuitry is designed into the encoder while the decoder at the receiving end is simple and inexpensive.

Featured by Microdyne were its frequency-agile SCPC demodulator and an LNC-type satellite receiver for C-band and Ku-band. Harris returned with the 9134 and 9135 satellite control

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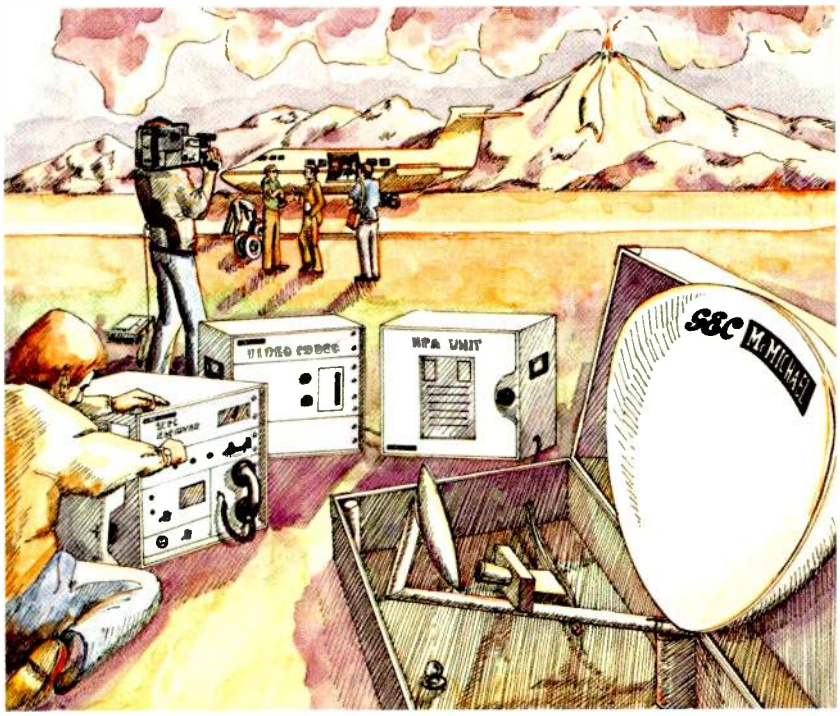
The entire FLY-AWAY system is compact and lightweight enough to be flown to remote locations in a private plane as well as by regularly scheduled airlines. Once on location, the SNG terminal can be quickly set up by as few as two men in ½ hour and powered by a hand-carried portable generator.

The entire FLY-AWAY system is compact and lightweight enough to be flown to remote locations in a private plane as well as by regularly scheduled airlines.

The SNG terminal equipment is packaged in three shock-mounted aircraft enclosures. The majority of which weigh no more than 80 pounds. Since the weight and size of the system are so attractive, it can easily fit into an econoline-type van, allowing rapid deployment for live satellite coverage of local events.

Designed for portability and quick, efficient set-up, the FLY-AWAY is composed of GEC-McMichael's unique elliptical Ku band antenna, uplink Ku band electronics and McMichael's own video compression bandwidth electronics.



Each of the three shock-mounted containers which make up the SNG system measures 27" x 24" x 21". The total system including uplink/receive electronics, antenna and portable generator weigh no more than 500 pounds total. The one-piece offset gregorian-fed antenna measures 2 x 1 x .5 meters and weighs 90 lbs packaged. In order to ensure quick set-up time and retain critical surface tolerance enroute and during operation, the antenna reflector will remain in one piece.

The McMichael Ku band antenna is the heart of the FLY-AWAY system since it allows real-time transmission from anywhere in the world.

In the event of signal loss due to severe weather conditions or poor footprint locations, the GEC McMichael CODEC makes it possible for the operator to reduce the bandwidth. As a result, the system permits live video transmissions from any global location under practically any weather conditions.

GEC McMichael, a leader in Ku band satellite transportable technology in the United Kingdom and Europe for over 6 years, just recently introduced its line of broadcast products to the United States. The development of the portable SNG system resulted from the company's expertise in Ku band transportable terminals, ACE standards conversion equipment and video bandwidth compression teleconferencing equipment.

To date, there is absolutely no better way to beat the competition to the scene than with the new FLY-AWAY Satellite News/Data Gathering System. For more information about this exciting live/remote transmission breakthrough, please contact GEC McMichael 8260 East Raintree Drive, Scottsdale, Arizona 85260. Phone: 602/948-7255 TLX: 6502246202

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systems. In the 9135 a computer carries out 50 preprogrammed functions including a series of diagnostics, to operate the antenna and display the status.

Oak Satellite Systems division featured its Orion encryption system, control computers and decoders.

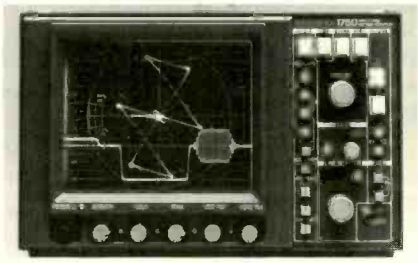
Satellite service companies were onhand. Conus announced that it had reached agreement with United States Satellite Broadcasting Inc. (USSB) to handle sales of time on all USSB Ku-band broadcast satellite transponders. GTE Spacenet touted its SNG Ku-band services. New for Wold was a facilities catalog, *The Wold Communications Facilities Guide* which categorizes everything from fixed uplinks to the 24-hour Network Control Center. British Aerospace was on hand to promote Olympus, the "condiminium satellite."

Complex Designs Keep Equipment Simple

While broadcasters assessing NAB'85 might recall such trends as stereo for TV, component video, or digital ATRs, they would probably be hard-pressed to think of anything as dramatic in test and measurement. Yet what station or facility could operate without testing and monitoring?

Once again the NAB witnessed T&M companies straining to keep up with the rush of developments in the equipment to be tested and/or monitored. Sure, stereo TV will be great for the station. How ya gonna measure the signal? Component video is an elegant way to handle the signal around the plant. Got your component video test gear all set?

The point is that test gear today has to be every bit as sophisticated as the "show stoppers." Take the Tektronix booth, for example. You find an enhancement to the 1750 Series Waveform/Vector Monitor—a new simultaneous waveform and vector display mode plus a dual-filter mode. This was an extremely difficult function to design, but the end result is an easier-to-use instrument. In addition, the simultaneous display mode will allow the user to also have the SCH phase indicator on the screen at the same time. With these simultaneous displays, system timing and color frame matching will be simplified.



Tek 1750 simultaneous-display waveform/vector readings.

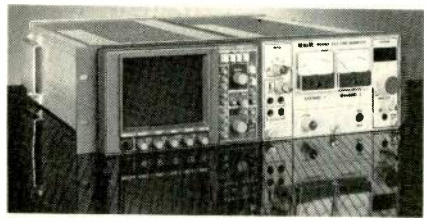
In another portion of the Tek display was the prototype of "Lightning," a component analog waveform monitor that can simultaneously display all three CAV signals. Named for the display that looks like a lightning bolt,

it takes the two color components and displays them against the luminance component, allowing the operator to measure and monitor the relative amplitude and timing of the three. Again, a rather complex design task done to make the user's life easier.

A Tek instrument designed to make the user's life even easier is the 1710B waveform monitor. At $1890, the 1710B provides system timing in an instrument that nontechnical operators can use. It features burst phasing capability as well.

As another example of how T&M companies are quietly keeping up with the times, you could have checked out Audio Precision's System One. It is a comprehensive audio test system linked to an IBM PC or compatible personal computer to provide all the data manipulation, graphics, and procedure storage functions. The idea behind using the IBM PC is to avoid building a dedicated computer into the test gear when the processing can be done less expensively by a standard personal computer. And the personal computer can be used for other engineering tasks when not running the test system.

ROH, a name not often associated with T&M, is stepping forward in this market with the introduction of its 100 Series Extended Range Audio Line Monitor in a 5.25-inch-high, half-rack chassis. The self-powered instruments are designed to measure audio input levels over an 80 dB range from one continuous-action control and to display audio signals on a choice of VU, VU/PPM or dual VU meters. In addition, electronic switching circuitry allows the monitors to accommodate range sensitivity from -50 dBm to +30 dBm, in 2 dB steps, for a "zero" meter reading. It's priced under $2500.

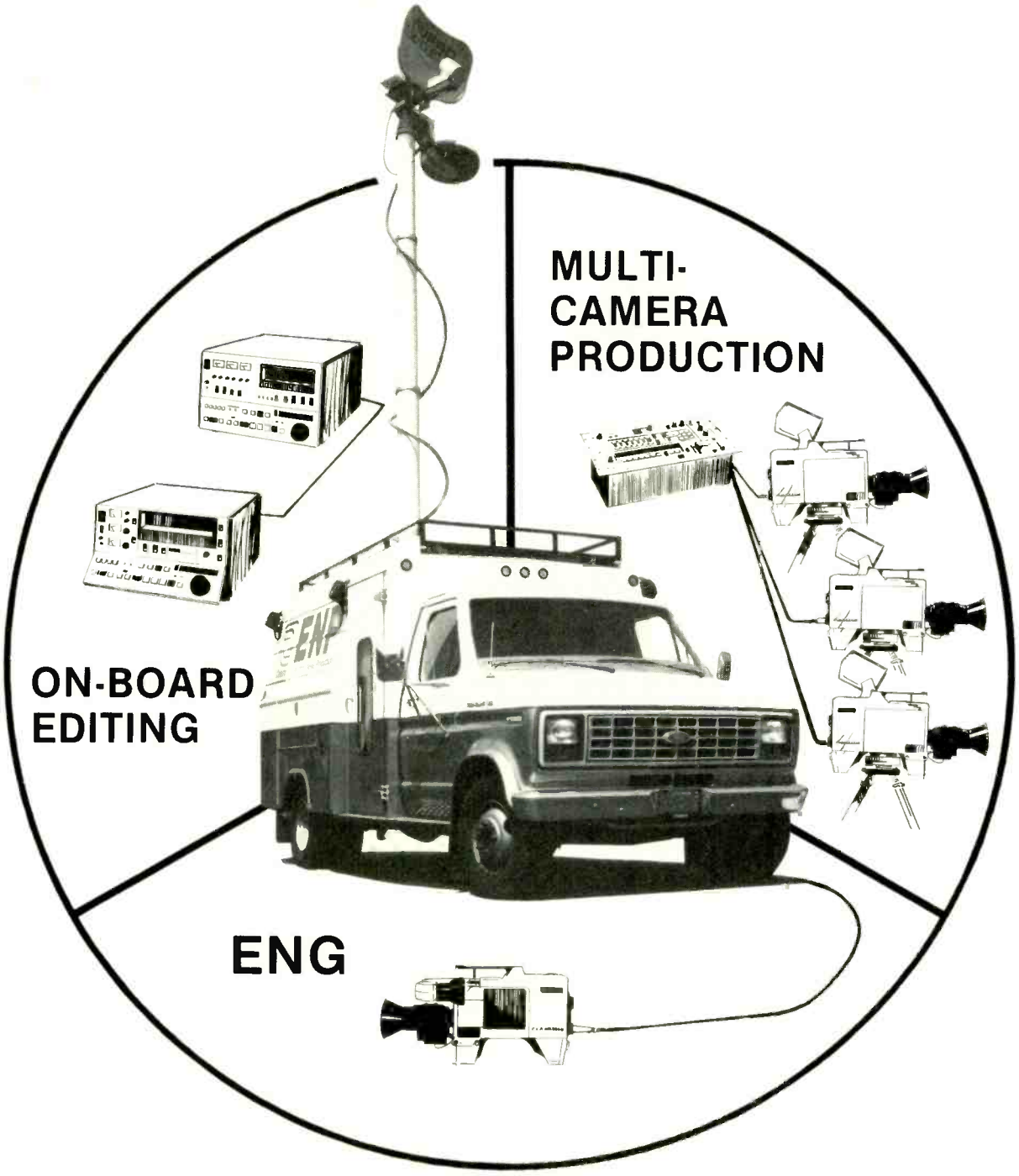


The new Model 102 two-channel audio line monitor from ROH.

Amber had its new Model 5500 Programmable Distortion and Noise Measuring System. It can be controlled using the 10 nonvolatile user-defined instrument setups, the front panel, or externally via RS232 and IEEE-488 interfaces. The 5500 measures signal level to over 100 V (+40 dBm) noise to below -120 dBM, total harmonic distortion to as low as 0.003 percent (-90 dB) and, optionally, intermodulation distortion.

Featured by Sound Technology was the 3000 Series transmission/audio test system. Aside from being "self-programmable," a key feature of the 3000 is that the generator and analyzer are separate units that could function at separate locations. Depending on the needs of the station, the system can be ordered in one mainframe (3000A) or in separate mainframes (3100A programmable audio generator and 3200A programmable transmission/audio analyzer). Supported by a 64K memory, the internal microprocessor handles 40 steps per sequence, 10 sequences per minute. Similarly designed was the 2000A programmable distortion measurement system which can be split into the 2100A signal generator and the 2200A distortion analyzer.

New at Potomac Instruments was the QuantAural QA100 audio program analyzer designed to provide a quantitative analysis of the entire broadcast



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audio signal. The audio input signal may be mono or stereo; from a receiver, tape recorder, modulation monitor, production studio output, or audio processing equipment. The measurements, displayed on a meter and on four multifunction LED bargraphs, include the maximum peak level, overall audio processing effectiveness, tightness of sound and processing control (peak density), tonal balance and consistency, stereo image width (L-R to L+R ratio), preemphasis, and the punch or "special aural intensity."

Getting ready for stereo on TV, Belar introduced the TVM-100 Modulation Monitor which may be used for current mono monitoring, as well as providing a demodulated composite signal to the TVM-200 Stereo Monitor and TVM-300 SAP/PRO Monitor. The monitors offer automatic modulation calibration for mono and stereo modes, PPM and standard semi-peak metering characteristics, split and quasi-parallel RF inputs and a digital deviation display.

Also ready to talk stereo TV was Videotek, and its talk was about the APM-2RS stereo audio program monitor. The APM-2RS permits the operator to listen to either the left, right or both channels simultaneously via the internal three inch by five inch speaker or stereo headphone. Left and right channel VU levels are shown on horizontal LED displays for accurate, efficient observation of the input signals, and either of two display sensitivity ranges may be selected. Price is $493.

The innovative audio peak meter from Dorrough.

Lighting up the Dorrough booth was the Model 40-A Program Level Meter. It consists of 40 LEDs mounted in a single arched scale, easily related to existing metering forms. Starting from the left side of the meter, levels -25 dB to -12 dB below reference level are displayed by green LEDs; -11 dB to -2 dB are displayed by yellow LEDs; -1 through 0 to +1 dB are displayed in red; +2 dB to +11 dB are yellow, with +12 dB to +14 dB above reference indicated with red LEDs.

Torpey had a new audio multiburst device that continuously cycles through six audio tones, while displaying their frequency on the accompanying video test signal. It selects frequencies of 100 Hz, 400 Hz, 1 kHz, 5 kHz, 10 kHz and 15 kHz, staying on each for about 2.2 seconds so that the entire sequence is completed in under 15 seconds. Torpey also introduced the PC-18 analog clock with digital temperature display. It runs from a master clock and is good for radio stations to display time and temperature.

Johnson Electronics unveiled the STS-2 synthesized front end test set for antennas, 67 kHz switchable to 92 kHz. Mark Electronics added a new radio monitoring system and mini master control system to its line of rack equipment.

Seiko's Sound Producer, a precise digital timer, was unveiled for timing recordings.

The major new entry into the large Rohde & Schwarz lineup was the Video Analyzer UVF. The UVF is suitable for all standard insertion test signal meas-

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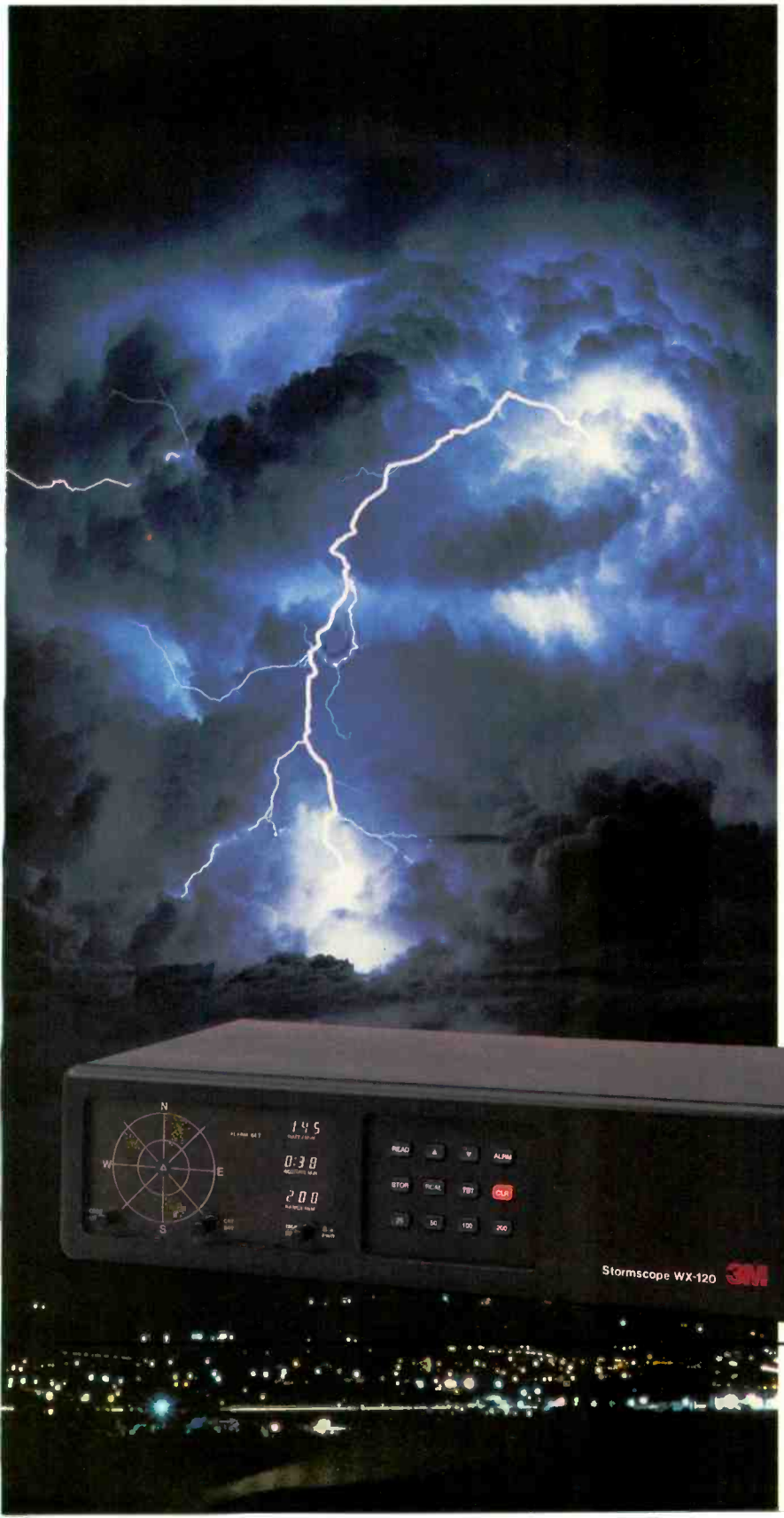

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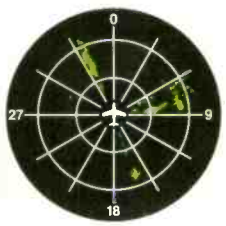

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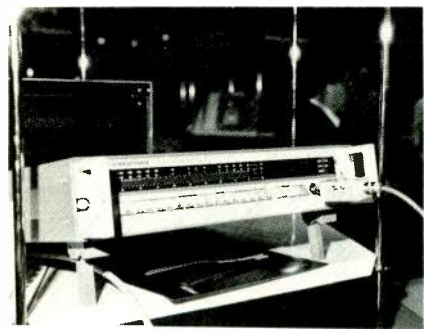
urements. It is small and lightweight, making it suitable for mobile vehicle use. Interfaced to a printer, the UVF produces a quasi-analog print out of measured values along with a limit scale.

"At $3950 it's a giant," says Marconi Instruments about its new 2022 signal generator with a frequency range from 10 kHz to 1 GHz. It stores up to 100 measurement settings and is fully programmable. The instrument measures six inches high by 10 ¼ inches wide and weighs 16.5 pounds.



From Rohde & Schwarz, the UVF automatic video analyzer.

Marconi also debuted the 2923 television signal generator inserter, the 2914A insertion signal analyzer and the 2955 mobile radio communications test set.

There were many new items emanating from the Leader booth. The company entered the digital storage oscilloscope market with the introduction of the LBO-5825, a 35 MHz, two-channel unit. It's equipped with a 2 Kb memory, has a 5 MHz maximum sampling rate and pretrigger view capability.

side by side to simplify channel to channel amplitude comparisons.

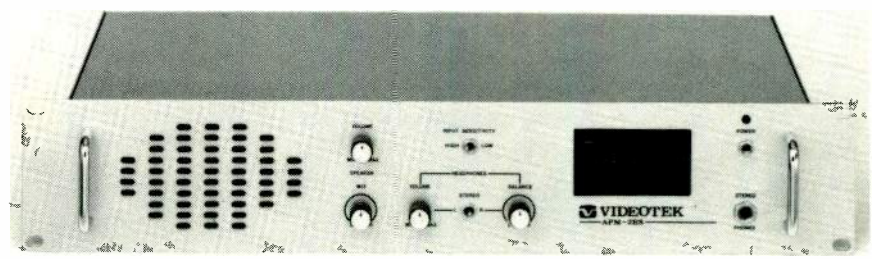
In Asaka/Shibasoku's broad line there was the TG/7 video test signal generator with seven interchangeable modules to provide up to 48 different test signals. Also shown was the TG91A6 high-definition TV test signal generator for use with 1125-scan systems. It produces zone plate, multiburst, stairstep, ramp, $\sin^2$ and bar, crosshatch and color bars for HDTV.

Philips brought along an NTSC video test signal generator, the PM5570M, which generates a wide variety of test signals necessary for measuring system parameters of all kinds of video transmission equipment. The generator has its own standard SPG built-in, which can be genlocked to an external composite video or black burst signal.

Featuring 32 selectable signals available on two independent, buffered outputs, the Digital Video Systems' DPS-185 test generator attracted a lot of attention. Other features: Seven auxiliary outputs, genlockable, one dedicated color black output. The auxiliary outputs are composite blanking, composite sync, composite burst flag, horizontal and vertical drive, subcarriers, and black burst.

Not to be overlooked, Fortel had the Digitest digital test signal generator for audio and video applications.

Waveform monitors and vectorscopes were prominent again this year. Videotek had its TSM-5A half-rack waveform monitor and VSM-5A half-rack vectorscope designed to be mounted side-by-side on a 19-inch rack. Both are available in NTSC, PAL and PAL-M standards.



Videotek's APM-2RS stereo audio program monitor.

Leader also introduced the LCG-420 test pattern/signal generator and the LAG-126S low distortion audio signal generator. In addition, there was the LBO-552BH1 stereoscope which displays left and right channel traces

Philips Test & Measurement had the PM5565 waveform monitor and the PM5567 vectorscope which come either 19-inch rack-mountable side by side or in table cabinets. Standard fea-

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GEC McMichaels' unrivalled expertise in advanced antenna design capabilities has made this breakthrough in technology possible.

A complete satellite broadcast system consisting of a compact lightweight satellite earth terminal which is small enough to be deployed rapidly, and two flight cases (or three if video compression codec is used) containing the electronics package may be easily transported to any of the environments and conditions that give rise to a NewsHawk situation.

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tures include two inputs selectable by front panel switch, two fixed sensitivities plus variable sensitivity, luminance/chrominance/differential gain modes (5565), and internal illuminated graticules.

The Electronic Visuals EV4061 combination waveform/vector monitor was on display at the Broadcast Video Systems launch site. The display is switchable between waveform and vector modes. It's half-rack width, 5 ¼-inches high. EV also has Waveform EV4041 and Vector EV4021 for seperate, side by side configurations.

Among the Lenco lines were a pair of videoscopes, PVS-435 NTSC and PVS-435P for PAL. The 435 measures the SC/H condition of any standard video signal and displays the results, horizontal timing and subcarrier phase, on a monochrome or color monitor. The visual display occupies the lower half of the CRT. The upper half shows the reference or compare video, depending on the mode of operation.

A different concept in clocks was unveiled by Leitch Video with the CSD-5300N clock system driver and the DAC-5012N digital analog clock. The driver is designed to be a central source of time for any broadcast facility and will automatically update its time from a central standard. The main output of the unit is time coded to SMPTE Time Code Standards which consists of a serial bit stream repeated 30 times per second or once per video frame. This is a balanced 600 ohm output that provides hours, minutes, seconds, and an arbitrary frame count acceptable to most clocks including the above-mentioned digital analog clock.

New from True Time Instruments was a universal clock driver featuring several different analog and digital displays. Beaveronics introduced new timing products from Favag, including the 2QMS-2 dual master clock system with automatic pulse sensing and changeover and the PR-80 seven-day microprocessor-controlled programmer.

PESA's ASC-4652-B digital color sync analyzer is a microprocessor-controlled instrument designed to monitor each of the sync parameters, including number of lines, field period, horizontal sync width, number of vertical sync pulses, and burst start time.

Although Fluke once again demonstrated its microprocessor trouble-shooting system, its multimeters got as much attention. Included in the line are the 70 Series featuring analog and digital displays, and the rugged 20 Series designed for extremes in environment.

Was Porta-Pattern at NAB'85? The test chart company was not only there, it came loaded with new art. Featured was the BBC Line Zone Plate test pattern image available as a nine inch by 12 inch chart and as an eight inch by 10 inch transparency.

Minolta had its TV Color Analyzer II and a line of luminance meters and chroma meters.

The feature in the QSI booth was the continuation of its established lineup of color bar generators with source IDs. Introduced were the BG-308, PSF-777, and VSID-1611V.

Tentel told attendees of three ways to gauge video recorders—with three of its products, of course. These are the HPG Series head protrusion and eccentricity gauge, T2 Series tape tension gauges, and the TSH Series videocassette spindle height gauges.

Sigma Electronics induced the SCH-385 sch phase meter. And a new sch phase meter made its debut at the Evertz Microsystems booth as well.

Meanwhile, Holaday Industries showed its isotropic broadband field strength meters featuring fiberoptic links.

Monitors

News on the video monitor front came in the form of a Barco Industries announcement that the Belgian company would begin selling its products directly on the American market. Its U.S. office is in Charlotte, NC, with sales and service offices in California and New Hampshire. (First thing they have to do is take the "u" out of color in their American literature.)

At NAB, Barco showed standard and high-definition monitors. Featured was the CM 22/AKB nine-inch high-resolution monitor. The AKB stands for Automatic Kinescope Biasing, which results in improvement in the optical black level and color temperature stability as a function of time and temperature changes, short warmup time, and reduction in aging effects.

Sony demonstrated a prototype of a means to save time in broadcast monitor setup. The new device calibrates white balance, and has an eight-inch color monitor for ENG/EFP applications. The unit features a new black face high-resolution Trinitron (R) CRT with super fine pitch of 0.25 mm and a luminance resolution of 400 TV lines.

In the muted light of the Conrac booth could be seen the 6200 Series 19- and 13-inch color monitors featuring NTSC/RGB switchable inputs and Conrac's proprietary phosphors. Also on-hand was the QQA Series high-resolution picture monitors designed for both television and computer image applications. These 15-, 17- and 21-inch units have three switch-selectable preset line rates, from 500 to 1225 lines internally adjustable.

Videotek introduced a new 17-inch professional rackmount color monitor, the VM-17PRO. Users can select from three composite video input sources. In addition, the monitor features preset control for chroma, phase, brightness, contrast, individual R-G-B gun switches, switchable internal/external sync, tally light, pulse cross, underscan and color/monochrome mode, all selectable via front panel pushbutton switches.

The Videotek HR-130 high-resolution color monitor features a precision in-line gun, dot matrix CRT with 0.311 dot pitch. Horizontal resolution is better than 600 lines.

Improved versions of Ikegami's 9 Series color monitors were introduced at NAB. The 14-inch and 20-inch sizes have higher resolution than previous models plus the 20-inch has greater brightness. These use in-line gun shadow-mask picture tubes.

Philips, which also uses the "u" in color, brought to these shores the new 20-inch color monitor, the LDK 7020. It uses a dot-type shadow mask tube with a dot-type black matrix, in-line gun and self-converging system. Also in the Philips line are the 14-inch LDH 6200 and 20-inch LDH 6220.

Shibasoku has a complete range of monitors including the new CM65A/CM22A high-definition models. These models, 26-inch and 20-inch respectively, are designed for displaying images of 1125-scan high-definition television. Its video input operating mode handles R, G and B inputs. As an option, Y, CW and CN inputs are also acceptable.

The XM-900 nine-inch color monitor was introduced by Sharp as part of its extensive line. It's intended for studio or field use and can be rack-mounted with a rack adaptor.

In the now-popular-size 13-inch line, Panasonic (Matsushita) had the CT-130V self-contained VCR and monitor TV. The front-loading VCR comes with a 10-function wired remote-control keypad and a locking front panel cover for tamper-free operation.

Electrohome had both color and monochrome monitors. The ECD Series 19- and 25-inch color units feature plug-in modules that allow the user to custom-design the monitors to meet their own specific requirements. Modules to accept RGBRS170, NTSC/RGB RS170 switchable and IBMPC will be available.

On the audio side, Westlake Audio introduced the BBSM-4 and BBSM-5 for small-sized stations and facilities. They feature a combination of drivers, crossover, and mounting configurations which combined provide unusually fine performance with a coherent wavefront even as close as 18 inches. Prices range from $495 to $695.

Other speaker monitors were heard coming from the booths of Anchor Systems (new Anchor 101); Studer (Studio 3 compact, two-way, close reference monitor); Yamaha (S3208H Sound Reinforcement Speaker); Electro-Voice (Sentry Series); and Logitek (Monitor-10 line).

At JBL, the major announcement was that Ron Means will now become president of a newly-formed professional products division. JBL Professional, one of four new units formed because of JBL's overall growth, will be responsible for development of new JBL professional products, as well as UREI products.

Mobile Vehicles on New Routes

New technology is changing the shape, content and mission of mobile vans and NAB'85 was a showcase for these changes. The first trend of note was the near-gridlock of satellite newsgathering trucks parked in and out of the Convention Center. (See Satellite section for particulars.) Whereas there was just one SNG truck a year ago, the Conus/Hubbard Newstar, this year a half-dozen more joined the caravan.

Another change was the obvious new emphasis on audio in the big television production rigs typified by the Colonial Williamsburg double trucks supplied by Midwest. And who could not notice that AF Associates, known for its big trucks, was showing the broadcast folks through a "Mini Mobile."

A favorite buzzword in the mobile world is modular, usually preceded by versatile, or perhaps versatile modified by modular. There was a lot of versatile and/or modular talk at NAB. For instance, Centro showed off its versatility by displaying one of two ENG trucks specially designed for NBC as a communication system and its own closely related ENP (Electronic News Production) version for in-field editing and transmission of news and public affairs events. Both have the same basic vehicle specifications with a 10-foot custom body carrying a 460-cubic-inch V-8 engine and the usual heavy duty engine and transmission cooling, suspension and alternator packages. Both also have the same microwave transmitter with the Nurad Silhouette antenna sitting atop a 42-foot pneumatic mast system.

"Put an end to ENG replacement worries with the Omega Van Model No. 10-20," touted Shook at its NAB indoor location. The unit features an interchangeable housing (read modular) and thus permits continuous use of the

ENG shell.

For AFA to make a Mini-Mobile is like Boeing coming out with a two-seater. But there it was at NAB, something of a new direction for the video systems company. On the show floor was the C-2 EFP/ENG unit, a 22-foot Gerstenslager vehicle configured for the medium-scale user. It's a two-camera vehicle with a choice of Ikegami HL 79 or HL95 or ITC-730 or Sharp XC-800 or XC-900. Also included is a Grass Valley 100 video switch-

One of new NBC News mobile fleet built by Centro.

er. It will hold two videotape recorders either ¾- or one-inch, plus color and monochrome monitors. There is a Yamaha stereo audio console, time base correctors, Tektronix test gear, GVG distribution and RTS intercom. A Chyron VP2 character generator is optional.

The B-2 is a two- to four-camera EFP unit built into a Wolf Coach 23-foot body on an Iveco chassis with diesel engine. The A-2 ENG/EFP two-camera system is a 19-foot supervan-type Wolf Coach design. The basic mobile van is priced under $250,000, according to AFA.

Wolf Coach, meanwhile, has put its toe (or paw) into the SNG water. The company has worked out a couple of vehicle designs to accommodate different satellite dish and voice communications configurations. DalSat (see Satellite section) is a possible customer for these trucks.

More down to earth, Wolf Coach featured its VC201N supervan which provides the user a long list of components from which to choose in a kind of do-it-yourself equipment process. Starting with the basic Ford E 350 vehicle, the user can pick a wide variety of components to design the van.

For broadcasters determined to get a news team almost anywhere, ENG Corp. had two small vehicles. They featured a backpack monitor and transmitter option so that the team can take the antenna off the top of the station wagon and walk or crawl to the news site if necessary. To keep things small, the company uses the new Shure portable mixer as well.

Television Engineering Corp.'s ENG van, Model 119, is a one-camera (Ikegami HL-79D), one-VTR (Sony BVU-110) unit. The usual 42-foot mast is provided and a pan tilt unit is provided with remote control.

There were no tires to kick at the Gerstenslager booth, but there was a

Midwest-built audio/video production vehicle for Multimedia.

detailed description of a new mini-mobile TV van. Based on a Chevrolet, the overall dimensions of the vehicle would be 21 feet by 7 feet 6 inches by 9 feet 10 inches. At the other end of the scale, Gerstenslager also had plans for

a semi-trailer-style unit with expandable side.

Another smaller sized mobile was featured by MZB & Associates. The MZB/ENG-4X4 is built on a panel truck but has many features of a larger vehicle such as three roof-mounted antennas. The larger of the two models has a shooting platform as well.

HUBCOM is not solely an SNG van builder. It introduced a new ENG Mobile News Bureau van designed to include a work space with typewriter or computer terminal for a field reporter. It has a 42-foot pneumatic mast and two 59-inch racks for monitors and other equipment inside a Ford E-350 Super Van.

No NAB would be complete without the big mobile production trucks. At the Midwest booth was a sight similar to two whales mating. But in fact, it was the unique two-trailer production units assembled by Midwest for Colonial Willamsburg. One truck was designed for video production and post-production and the other for audio production such as concerts. The two can be used independently (the video trailer has audio capability) or can be linked side-by-side to form a super audio-video production and editing facility.

Midwest's other big truck was the Multimedia Entertainment 47-footer, Eagle 1. It's loaded with five Ikegami HK-357AT automatic color cameras with Triax and Canon 40:1 lenses; two Ikegami HL-79EAL handhelds with Canon 13:1 lenses; Grass Valley 300/3A production switcher; four Ampex VPR-2B one-inch VTRs; a Sony BVU-800 ¾-inch VTR with Slo-Mo; a Beta VTR; a Harris HDE-200 digital effects system; an Adda ESP II still store; Chyron 4100 graphics generator; and two Adda VW2 frame synchronizers. Stereo-ready, the Eagle 1 has the Auditronics 36-input stereo audio console. (An erroneously captioned photo of the audio compartment of this truck appeared in *BM/E*, April 1985, p. 54—bottom picture.)

Another "supertruck," the Roscor Elite Fleet TV-45, was on display. This remote production vehicle, dubbed "The Performer," was designed for Clearwater Teleproductions. It's divided into five work areas: Production, Audio Room, Video Shading, Graphics/Font Room and Videotape Room. The idea is to eliminate so-called dead space created by hallways in the traditional walk-through trucks. Equipment aboard includes four Ikegami HK-357AT cameras, three

Ikegami HL-79EAL handhelds, Grass Valley 1680-24KN video switcher, Soundcraft 32x16 audio console, a two-channel Chyron 4100, Abekas A52 DVE and A42 still store, Ampex VPR-B one-inch VTRs, and RTS intercom and IFB.

Newsroom Computer Systems

If there was one word to describe the happenings at the 1985 NAB show in the area of newsroom computers, that word would have to be consolidation. This includes not only the consolidation of ideas culled from the minds of news directors and vendors, but also the consolidation of original equipment design with updates now available from manufacturers.

The main factor behind the emergence of this trend is that the installed base of systems is a lot larger (recent network announcements aside) than it was a year or so ago. Last year saw the widespread use of computer systems in political reporting, in numeric projections that make election night so interesting, and in the field as reporters discovered a multitude of uses.

What this means for those in the process of making a purchase decision this year or early next year is that the hardware has reached a certain point of maturity, both in terms of design and reliability. Because of this, systems are experiencing longer times between failures, and fears that the system would break down as soon as the warranty expired have proven groundless. Also, improvements and modifications to the original systems such as those recently developed by Basys and ColorGraphics have been able to be economically included in systems available now, and, in many cases, are available for a nominal charge when upgrading existing systems.

Basys, one of the earliest entrants in the newsroom computer arena, exhibited its new computer system hardware from Parallel Computers, the Parallel 300 system. This system features the Unix (AT&T Technologies) operating system, and, as an attempt to eliminate any downtime, completely redundant processors, memory, and input/output channels. This is a technology that is

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just now being explored, as it differs from multiprocessor-based systems in that, instead of a single CPU servicing many processes, there are now dual processors running parallel programs; each processor is capable of taking over from a failed brother system. This allows the newsroom to be relatively immune from power, data, or hardware glitches that plague many computer systems, since there are essentially two systems performing the same task.

In addition, Basys hasn't stopped its development of the software that makes this system one of the leaders in the newsroom computer field. Its user interface to the system is an ergonometrically-designed terminal, with clearly labeled function keys that allow the newsperson to interact with the system from start to finish. The software features full wire capture of any number of incoming feeds, sorted by user-defined keywords into easily accessible files. These files can be global in nature, or each user can scan the wires for stories of particular interest, placing those stories in private file areas, in addition to storage in the common database. Electronic mail and modem access by reporters in the field, are just some of the highlights of this complete newsroom computer system.

At the NAB, Basys announced that CNN was the first purchaser of its Parallel 300/Basys computer system, using the added capabilities to expand CNN's 110 existing terminals in its Atlanta headquarters to a news computer system numbering over 250 terminals, plus over 300 other devices in CNN bureaus across the country.

ColorGraphics, now a part of the Dynatech Broadcast Group, along with Utah Scientific, demonstrated its NewStar computer system, first installed at KCBS on the west coast a few years ago. Unlike the Basys system, NewStar features distributed processors, which means that each user station has a dedicated computer chip that handles its own tasks, on its own time, and only accesses the master processor for disk accesses and tasks that utilize the common peripherals, such as printers and the like. Basys claims an up-time of 99.7 percent, based on the fact that it is redundant hardware, and because of the multiprocessor arrangement.

The NewStar terminals differ from other systems in that they are not off-

the-shelf modifications to existing hardware. In any computer system, there is a tradeoff in deciding where to keep the software that runs the system. Some manufacturers prefer to load programs and overlays from disk, others prefer to keep such programs as bootstrap routines, keyboard control programs, and screen display routines in nonvolatile memory. ColorGraphics has taken the latter approach, and hard-coded many of the necessary video display terminal routines in nonerasable memory on-board the terminal logic board. This means that recovery from a problem with a terminal does not mean rebooting the processor card (unless the problem was with the card itself) to reload the software you need to work. In addition, the NewStar terminals feature a natural vertical split-screen display, with dual cursors, that allow the placement of wire copy, scripts, assignment sheets, or electronic mail messages on either of the screens, with the capability of moving back and forth between the two screens at will.

Because ColorGraphics is also heavily involved in graphic display systems, the NewStar can also work with the company's ArtStar system, and can produce videoprompter output, to totally automate the news operation from wire input to talent on live.

The big announcement by ColorGraphics at the NAB is that CBS Radio announced, just before the show, that it was committed to completely automate the radio network, O&Os and news bureaus with the NewStar system by the end of 1985, based on the results with the original KCBS system.

Noticed by their absence at the show was Beston/McInnis-Skinner of Olathe, KS. Word is that the company is in reorganization, and some information should be forthcoming in the months ahead.

With consolidation, flexibility and speed all key factors, the decision on a newsroom system purchase should be easier than ever in the wake of this year's NAB. The technology has matured from the groundwork done by the early station entrants in newsroom computerization who have enabled manufacturers to include those features most needed in the competitive atmosphere of news operations. The final decision comes down to researching the newsroom operation, finding the needs that a computer would fill, and designing a system, with the manufacturer's help, that can consolidate into the entire operation. **BM/E**

Governing Standards for FM Channels

By Harry Cole, FCC Counsel

Docket No. 80-90 has struck again. Dormant for approximately four months, the five-year-old proceeding surged back to life in April, when the Commission took yet another step aimed at implementing new technical standards governing the allocation of FM channels. Having already established the new technical standards and adopted almost 700 new channel allocations pursuant to those standards, the Commission's recent action focused primarily on the application process.

The changes already effected in connection with Docket No. 80-90 have been chronicled in these pages—for example, in the October, 1984, May, 1984 and September, 1983 issues of *BM/E*. The changes include the creation of new classes of FM stations and new minimum mileage separations, all intended to permit the FCC to "shoe-horn in" new FM allocations which would not have been possible under the old rules. The prospect of some 700 new stations has in turn given rise to much interest in the possibility of obtaining a new FM station in one of several reasonably-sized markets. This growing interest has in turn given rise to speculation that as many as 100 or more applications may be filed for each newly-available channel. With that spectre looming in the not-too-distant future, the Commission has now taken steps in an effort to reduce the chaos that could easily result from such a massive filing.

The window approach

Previously, once an FM channel was included in the Table of Allotments (*i.e.*, the table in the FCC's rules which lists all FM channel allocations by city and state), anybody could simply file an application for it at any time. Once an application was filed for a given channel in a given community, the Commission would give notice of its acceptance of that application and, at the same time, would designate a cutoff date by which any applications mutually exclusive with that application would have to be filed. Anyone who filed an acceptable application on or before the cutoff date was entitled to consideration in a comparative hearing.

The trouble with this approach was that, by issuing a cutoff list of applications against which would-be applicants could file their own applications, the Commission was setting up the first applicants (i.e., the ones on the cutoff list) as sitting ducks for everybody else. Increasingly, as cutoff dates would arrive, the Commission found more and more competing applications being filed. This tended to slow down the processing line and seemed, in some senses, to be unfair to the first applicant to file for any given channel. This appearance of unfairness was increased by the fact that, in a number of instances, it appeared that some of the later-filed applications may have been filed not with the intention of prosecuting the application, but with the intention of entering into a settlement agreement pursuant to which some other applicant (including the first applicant to file) would pay the latecomer a premium to go away.

In view of these factors—and particularly in view of the fact that a virtually unregulated flood of applications could wreak havoc with the Commission's orderly processes—the FCC decided to revise its applications process.

The new process substitutes a "window" process for the former cutoff system. We discussed the "window" approach in the November, 1984 issue of *BM/E*, when it was first proposed by the Commission. It is important to note that each window will apply to one or more channels, and not to specific allocations. Thus, for example, the Commission has proposed to allocate Channel 223 to 17 different communities; by contrast, the Commission has proposed to allocate Channels 244, 252, 257, 265, 280 and 296 each to only one community. Thus, anyone interested in filing for a specific community should be sure to double-check which (if any) channels have been allocated to that community.

One interesting aspect of the "window" approach is that, if no applications for a particular allocation are received by the applicable "window" date, then the first acceptable application filed after that "window" date will be accepted and (if no problems with the application are found) granted without affording to others the opportunity to file competing applications. The theory, of course, is that anyone who might have been interested in filing for the allocation had an opportunity to do so when

the "window" was opened, and thus no one will be unfairly prejudiced.

Hearing or no hearing

One of the more persistent rumors swirling around the FCC's Docket No. 80-90 deliberations was that the FCC was set to adopt a lottery mechanism, similar to that used with respect to low-power television applications, to resolve situations involving multiple, mutually exclusive applications. The theories underlying the rumor were clear: it is expected that many, many competing applications will be filed; full comparative hearings with respect to all such applications would be an administrative nightmare; faced with a similar situation in connection with cellular telephone applications, the Commission chose a lottery mechanism over a comparative hearing approach.

The rumor proved to be wrong (at least temporarily). The Commission has decided to process the initial series of FM applications pursuant to the traditional process, which calls for a full comparative hearing between or among the various competing applicants. Although the Commission did not articulate this rationale, a number of observers believe that, in taking this approach, the Commission was hoping to discourage frivolous applications filed solely for the purpose of securing a seat. The thinking is that, if a lottery mechanism had been adopted, the Commission may have feared that many applicants would be willing to spend the $1000 or so to file an application, knowing that the filing of the application would secure them at least a chance at securing a station; if an applicant might have to go through a full comparative hearing, however, the applicant might be less willing to file in the first place.

While the Commission has passed on the lottery option for the time being, it has not permanently foreclosed that option. Recognizing the possibility of hundreds (or thousands) of applications, the FCC acknowledged that some alternative system, including possibly a lottery system, might ultimately be adopted. However, the Commission was clear to state that potential applicants would be notified as to whether applications for a particular channel will be granted on the basis of a hearing or a lottery before applications for that channel are filed. There is, however, no absolute assurance that the Commission will in fact provide that kind of notice and, on the basis of past experience with respect to cellular telephone applications, it is entirely possible that no such notice will be provided.

The daytimer preference

On the assumption that it would be utilizing comparative hearings, the Commission also addressed the "daytimer" question. Normally in a comparative proceeding, an incumbent daytime-only AM licensee would have been entitled to little if any preference based on its past broadcast experience, and only if it agreed to divest itself of its AM license before commencing operation of the FM station. The Commission is, however, sensitive to the difficulties historically encountered by daytime-only operators, and has decided that daytimers should be rewarded for their dedication and hard work. Hence, the FCC has decided to accord them a "daytime preference."

In order to qualify for the "daytimer preference," a daytime-only licensee must have owned the AM station for at least three years before its FM application is designated for comparative hearing. The proposed FM station must be located in the AM station's city of license, and the licensee must propose to be integrated into the day-to-day operation of the FM station. Finally, the applicant must agree to divest itself of the AM station within three years of commencement of program test operation on the FM.

If an applicant can, by meeting these standards, demonstrate that it is qualified for a "daytimer preference," it will receive a substantial boost in a comparative hearing as against other competing applicants. That boost would be the equivalent of the comparative preference presently awarded for minority ownership of an applicant. It is not clear what, if any, preference would be awarded to daytime-only licensees in the context of a lottery if FM licenses are ultimately awarded in that manner.

Disincentives against filing

As indicated, the Commission is extremely concerned about the possibility that an outrageously high number of applications may be filed. Because of that, the Commission has changed some of its other rules and policies in an effort to discourage "frivolous" filings which might otherwise frustrate the application process. Those changes include the following steps:

- Applicants will be required to certify specifically that they have reasonable assurance that the transmitter site they are proposing is available. This will, in theory, discourage applicants from simply picking a site off a map (or from someone else's application) without doing anything to assure that the site is actually available.
- Applicants will be limited in the number of applications they will be permitted to prosecute at any one time. The limit will be derived from the existing limitation of 12 FM stations which can be owned or controlled by a single entity.
- Construction permits will be strictly enforced, which means that a failure to construct within the designated time frame (usually one year) could result in loss of the permit (absent some reasonably compelling showing that the failure was beyond the applicant's control).

The final chapter in the Docket No. 80-90 saga has not yet been written. It remains to be seen how many applications are filed, how they will be processed, and precisely what criteria will be applied in assessing their various comparative strengths and weaknesses. If you are interested in any of the Docket No. 80-90 allocations, you should be sure to obtain advice from reputable communications counsel before you take any steps. Too often ill-advised (or nonadvised) applicants jeopardize their own chances by failing to secure, in advance, the expert advice which is usually necessary to avoid the pitfalls lurking for the unwary in the FCC's processes. **BM/E**

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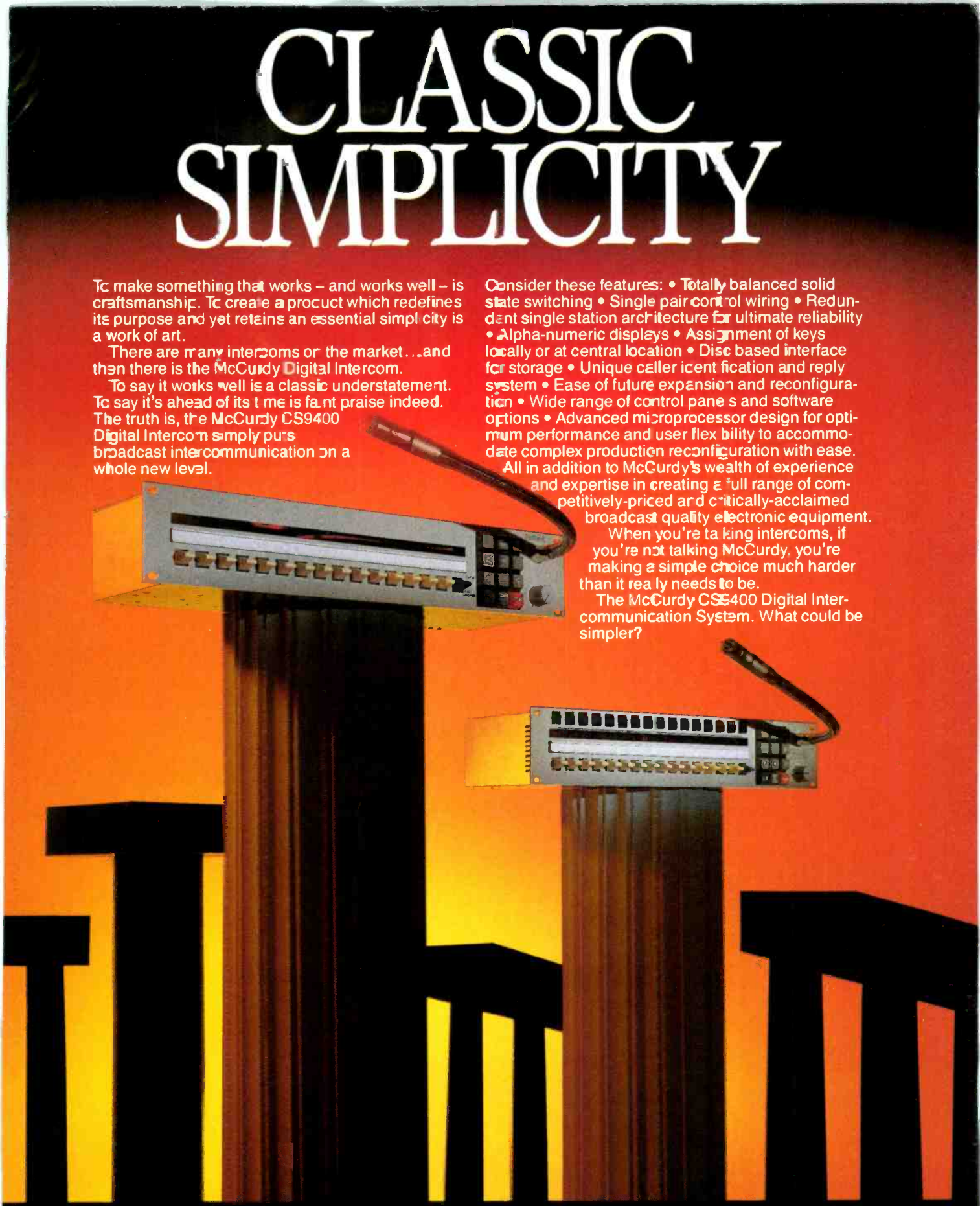

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