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"PRINCESS DAISY"

## SATELLITE FORECAST:

### NEW OPPORTUNITIES ALOFT



**ALSO IN THIS ISSUE:**  
**EDITOR-TO-EDITOR INTERFACE**  
**ABC RADIO NETWORK FACILITY**  
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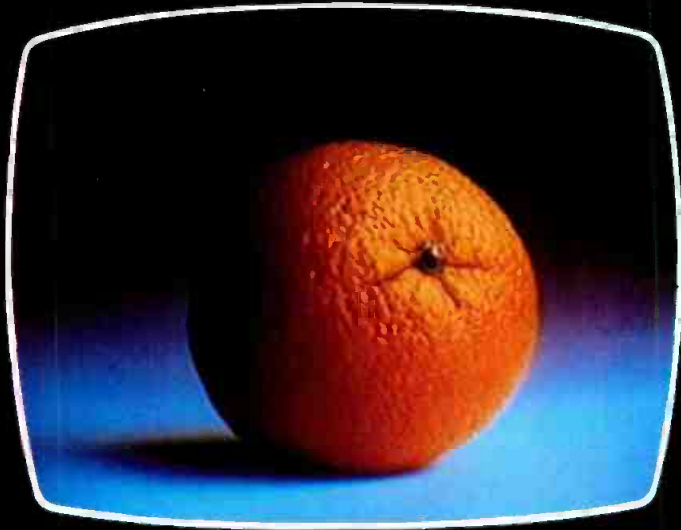
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295 Madison Ave., New York, N.Y. 10017  
212-685-5320, Telex: 64-4001  
Publishers of:  
**BM/E—Broadcast Management/Engineering**  
**BM/E's World Broadcast News**

**★ABP** **BM/E BROADCAST MANAGEMENT ENGINEERING** (ISSN 0005-3201) is published monthly by Broadband Information Services Inc. All notices pertaining to undeliverable mail or subscriptions should be addressed to 295 Madison Ave., New York, NY 10017. BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities in the U.S. and Canada. These facilities include AM, FM and TV broadcast stations, CATV systems, ETV stations, networks and studios, audio and video recording studios, telecine facilities, consultants, etc. Subscription prices to others \$24.00 one year, \$36.00 two years. Foreign \$36.00 one year, \$60.00 two years. Air Mail rates on request. Copyright 1984 by Broadband Information Services, Inc., New York City. Second class postage paid N.Y., N.Y. and additional mailing offices.

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# BM/E

BROADCAST MANAGEMENT/ENGINEERING

FEBRUARY 1984

VOLUME 20/NUMBER 2

## FEATURES

### **SPECIAL REPORT: SATELLITE FORECAST: NEW OPPORTUNITIES ALOFT** 40



The next few years will conclude the first decade of satellite broadcasting. This look ahead spells out changes likely to take place by 1990 and how broadcasters can take advantage of them.

*On the cover: Goonhilly Aerial 1 will transmit and receive signals for the new Brightstar transatlantic video system.*

### **SPECIAL REPORT: IMPROVING THE EDITOR-EDITOR INTERFACE** 53

“User-friendly” has different meanings to different editing system manufacturers—and to different editors.

### **FACILITIES DESIGN AND ENGINEERING, PART 12: THE NETWORK RADIO FACILITY** 65



Theory has evolved into practice at the ABC Radio Network, which will shortly be operating out of a brand-new home in New York City.

### **SMPTTE TV CONFERENCE TO EXAMINE FUTURE OF IMAGING TECHNOLOGY** 73

The meeting will examine topics that were blue-sky just a couple of years back—but are now beginning to emerge into reality.

### **KDOC: SMALL-TOWN STATION IN A LARGE MARKET** 77

Los Angeles’ newest TV station relies on a philosophy of intelligent hardware choices and old-fashioned hard work.

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Price	\$6950							

COMPARE THE IVES EDITING SYSTEM WITH THESE... YOU'LL FIND A LOT OF BLANK SQUARES AND A FEW ADD-ONS.

## What's Your Line?

**T**he scenario for satellites described in the special report on page 40 presents an exciting list of opportunities for broadcasters. In addition, it raises an extremely important issue, namely, what kind of business broadcasters will be in as a result of rapid changes in technology. One industry observer likened the changes taking place now to the changes that overtook livery stables many years ago. Those who saw themselves as being in the transportation business were able to make the transition caused by technology. Those who saw themselves as being in the horse and buggy business were swept aside.

His point was that satellites will force a similar transition on broadcasters. The broad implication is: Are we in the radio and television entertainment business or are we in the information/communications business? The answer to this question will be crucial in the future.

If we are in the information/communications business, then FM radio stations will be exploring the possibilities of SCAs, and indeed, many have. However, it has been pointed out that the innovative ideas for using SCAs generally have not come from the broadcasters, but from entrepreneurs in sync with the information needs of the community.

In we are in the information/communications business, then TV stations will be exploring the possibilities of teleconferencing. Teleconferencing means effective voice, graphics and video pictures. Slow scan TV plays an important role here. Again, others have jumped into teleconferencing, while television stations with the perfect facilities for this service appear to have overlooked it.

In the information overload era that is upon us, people are seeking ways to communicate and to select the information desired when it is desired. Armed with technical and logistical know-how, broadcasters are in a position to participate. If the close ties to the community that localism implies are strong, then at the very least broadcasters should find out the information needs of that community. And in finding out those needs, a means of serving them—viewed from a different perspective—may very well emerge.



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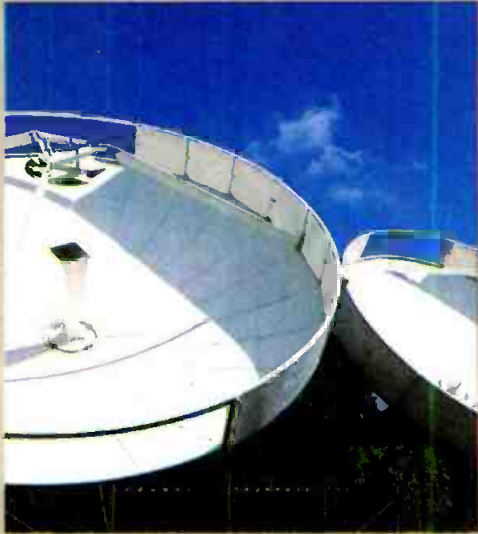
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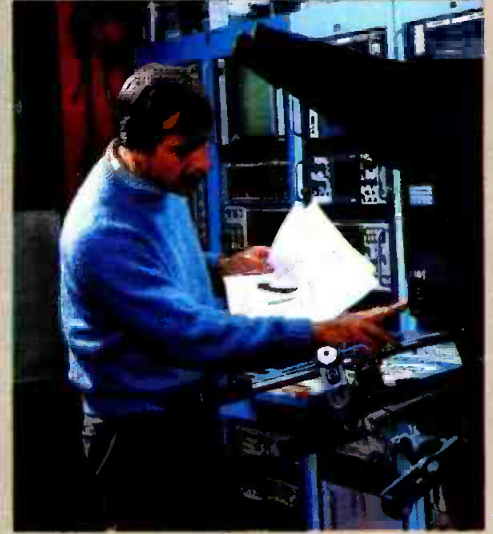
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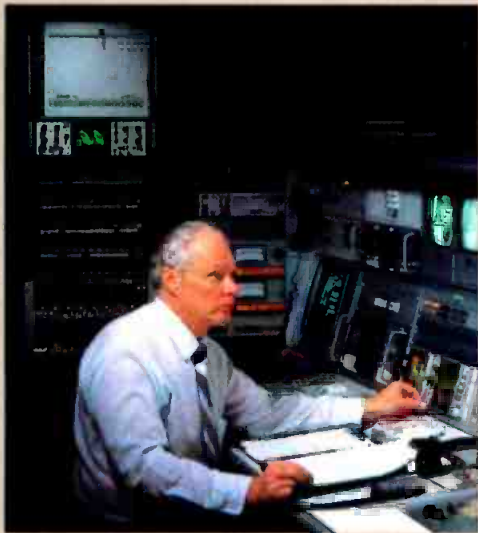
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If you are a broadcaster circle 129

If you are a cable operator circle 130

If you are a common carrier circle 131

If you are a manufacturer circle 132

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## Zenith, dbx Chosen in EIA's TV Stereo Vote

A unanimous vote by the EIA Multichannel TV Sound Subcommittee has recommended the Zenith transmission system and dbx companding as the technology of choice for TV stereo in the U.S. It is widely thought that the EIA's choice of a single standard will be adopted by the FCC, and that actual stereo or dual-language broadcasts may begin sometime during this year. Zenith, which has said it will begin producing TV stereo adaptors and receivers "as soon as the FCC authorizes TV stereo audio broadcasts," plans to grant no-fee licenses to any interested manufacturers. dbx will also license its technology, but will charge "mutually acceptable" fees.

According to some, however, there has been considerable dissention in the industry over the voting procedures on the companding system. There were originally a total of 12 votes on the EIA committee, of which both AMST and PBS abstained on the first round of voting, and CBS disqualified itself since it had a noise reduction system under consideration. Of the remaining nine votes, dbx received three from the collective of TV set manufacturers, a vote from the broadcast equipment manufacturers, and a vote from the NBC network—a total of five. Dolby got one vote each from NAB, the IC chip manufacturers, the ABC network, and NCTA.

In order to present a unanimous decision in its recommendation to the FCC, the EIA committee therefore took a second round of votes. Since, before the voting took place, the representative of the broadcast equipment manufacturers had indicated that he would under no circumstances vote for the Dolby system, it is thought that the representatives who had originally voted for that system saw there was no way to achieve unanimity except to switch their votes.

Despite the apparently unanimous decision that will be carried forward by the EIA, the industry itself is apparently by no means satisfied with the voting or the recommendation on the compander system. This leads to the further speculation that the FCC itself may decline to declare the EIA decision

as a true marketplace decision and may indeed leave the selection of TV stereo standards to a more generalized group of broadcasters and manufacturers.

Telesonics Systems, which kicked up a storm last year when it was passed over in a similar vote, has no plans to challenge this year's vote, based on

more extensive testing of the competing systems. "Obviously we're disappointed," remarks Telesonics president Larry Ocker. "What our future plans are we haven't determined yet. The most positive thing," he adds, "is that we'll have a single system and improved TV sound."

## Kodak Enters Broadcast, Amateur Video Markets

Though there had been speculation for some time that Kodak would shortly enter the video market, few expected the series of announcements made in nationwide press conferences prior to the CES show at the beginning of January. Kodak aims, it seems, to become a major force in both the amateur and professional video markets virtually overnight, marketing not only a complete line of videotape and videocassettes but also an 8 mm recorder/camera—based on the worldwide 8 mm standard and using either evaporated metal or metal particle tape (both of which will also be marketed by Kodak, using its traditional retail store outlets). With either tape, the image quality of the recorder is said to be equal to that of existing half-inch home VCR specifications.

On the professional tape end, Kodak will be shipping, by March, a full line of professional tapes and cassettes under the Eastman name, allowing it to supply current film users with either imaging technology. The 3/4-inch cassettes, available in most common lengths, represent an agreement between TDK and Kodak under which TDK will manufacture 3/4-inch tape exclusively for distribution by Kodak. The same holds true for a line of one-inch tape that will be available later in the year.

The Kodak announcement follows on the heels of the revelation by Polaroid that it will shortly begin distributing both VHS and Beta videocassettes, although it has no plans at this time for professional 3/4-inch distribution. Both film giants are apparently seeking to cash in on the flourishing U.S. cassette sales market, put at 50 million units last year and representing only about 25 percent of worldwide tape sales—also an area of interest for both companies.



*Kodavision Camcorder 2200 and cradle with optional tuner/timer.*



*Eastman professional videocassettes and tapes.*

The significance of the developments to the broadcast market cannot be overemphasized. While there have been continued developments in the professional half-inch M-format and Betacam lines, and more recently in the Bosch Quartercam, many in the industry have felt that these were only interim steps until the 8mm format could "come of age," thus ending forever the competition between Beta and VHS and getting all manufacturers behind a



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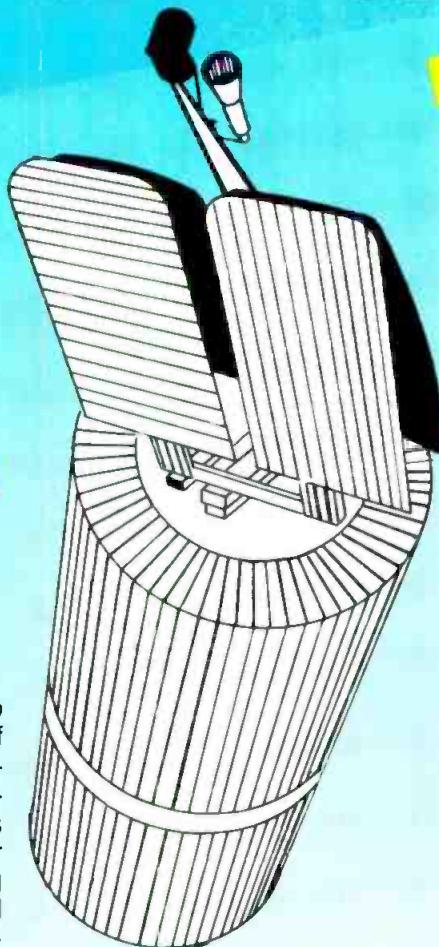
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single worldwide tape format standard. The new 8 mm format was seen as even more powerful if it could be linked with metal tape formulations for even greater recording density. Thus Kodak has become the first, major U.S. manufacturer to endorse the new standard, which may become the de facto home format in less than five years. More important, although neither Kodak nor any other manufacturer has currently announced such plans, it seems only a

matter of time before the 90-minute recording time of the 8 mm cassette is sacrificed for a 20- or 30-minute version, allowing adequate broadcast-quality signals to be recorded on the 8 mm cassette.

## U.K.'s Paltex Acquires Datatron Operation

Datatron, Inc., the Tustin, CA, manufacturer of video editing systems, has

been acquired by Paltex Editing and Production Systems Ltd. of Middlesex, England. Paltex has been Datatron's exclusive international distributor since its inception in 1979.

According to Paltex, the entire Datatron staff will join California Paltex Corp., a new Paltex subsidiary that will manufacture and develop existing and future products, including some "yet-to-be-announced high-technology digital video products." Frank C. Blaha has been named director and chief operations officer in charge of the company's new California facility, and Datatron's Roger L. Bailey has become managing director of Paltex. California Paltex will market its products in North and South America, while Paltex Editing will serve the rest of the world.

## PBS's Grossman Named Head of NBC News

Lawrence K. Grossman, president and chief executive of PBS, has been chosen as the new president of NBC News, effective the end of this month. Grossman succeeds Reuven Frank, 63, who ends his second tour in that capacity. Though Grossman's career had been in advertising, he headed PBS for eight years and leaves with highly favorable reviews.

To ease the transition, Grossman, 52, will have two months of on-the-job training before assuming full duties as president in May, and Frank will handle this year's election coverage.

The decision by NBC chairman Grant Tinker to reach so far afield has surprised many people. However, it duplicates the reasoning of Dallin Oaks, PBS board chairman, when he pulled Grossman from advertising in 1975 and handed him PBS' reins. Last year PBS beat the other networks to running the first hour-long evening news show. Grossman and Tinker also served together as NBC's vice presidents of advertising and programming.

## Metromedia Head Bids \$1.6 Billion for Company

Metromedia has become the target of a proposed \$1.6 billion leveraged buyout led by its president, John W. Kluge. Kluge, who owns 25 percent of Metromedia stock, is supported by three vice presidents and a group of outside backers in his ambitious bid to take

## More Than A Claim! Best By Test

### BE's FS-30 Stereo Generator For FM



### Here's What Customers Say...

- "Best tested out of four!"..... KNIX-Phoenix, AZ
- "Greatest separation ever!"..... WQRS-Detroit, MI
- "People hear sounds never heard before!"..... KLAZ-Little Rock, AR
- "Amazing separation, very happy!"... WCCO-Minneapolis, MN
- "Perfect match with FX-30, very pleased!"..... KEZK-St. Louis, MO
- "Listeners claim noticeable difference"..... Wisc. Ed. Net., Madison
- "Love it. Well built. Easy to install".... WPCH-Atlanta, GA
- "Sound separation best ever!"..... WINQ-Winchendon, MA
- "Sounds exceptionally clean!"..... KIOU-Corpus Christi, TX
- "Fantastic sound!"..... WMEZ-Pensacola, FL
- "We don't want our competitors to know what gives us our new unique sound!"..... *Call letters withheld by request.*

*For more information on the Model FS-30 FM Stereo Generator, call or write Joe Engle at:*

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Lexington, KY  
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Bristol, TN  
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Nashville, TN  
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Charleston, WV  
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Virginia Beach, VA  
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Washington, DC  
301-577-4903  
Charlotte, NC  
704-399-6336  
Atlanta, GA  
404-875-3753  
Miami, FL  
305-592-5355  
Tampa, FL  
813-885-9308  
Clarksburg, WV  
304-624-5459

Metromedia private.

As proposed to Metromedia's directors, stockholders would be offered \$30 in cash and a debenture with \$22.50 face value for each share of Metromedia common stock. Kluge and his three executives—Robert Bennett, formerly of WCVB, George Duncan, and Stuart Subotnick—would supply 4.5 million of their own shares. The outside backers, a new venture capital group composed of media hands such as

Rupert Murdoch and Warner Communications, would contribute some portion of \$72 million. The remaining \$1.45 billion needed to cover stock purchases, debt, and operating expenses would come from a private placement of preferred stock worth \$125 to 150 million, with the balance to come from banks.

Kluge's unanticipated move is probably in response to the low value of Metromedia stock, around 20 at

Thanksgiving after a big run up over 50 last year. In part, Wall Street was disenchanted after a *Barron's* article criticized how Metromedia accounted for \$485 million when it sold an advertising division. Recently it sold and then leased back the real estate on which many of its broadcast stations are located, then used the resulting \$125 million to reduce its debt to \$550 million.

Although analysts note that current profits would allow the buyers to do little more than pay interest on the huge loan, the stock market reacted favorably after the announcement, raising Metromedia's stock 10 points, to \$35 a share. Its seven television and 13 radio stations are an obvious source of cash—WCVB-TV, Boston, set an industry record when Metromedia bought it in 1982 for \$220 million (see *BM/E*, November 1981, p. 53)—but a spokesman denied any intention to sell at this time. Already strong in programming, the new Metromedia could use its connections with members of the venture group backing Kluge, such as Norman Lear and Marvin Davis, owner of Twentieth Century-Fox. Another asset is the company's eight franchises for cellular radio. Behind all this, the reasoning goes that though the prospective owners might be strapped for cash, Metromedia's good prospects are better if it is privately held.

## THE NEW STANDARD FOR TV DEMODULATORS

Model EKF2/D



- 20mV – 1.5V Input for Precision Transmitter-Site Monitoring
- Unique 2-Way Tuning: AFC Tuning across the complete broadcast range (Channels 2-83)

PLUS

One Crystal (any channel) for high-accuracy (All included! No plug-ins or modifications necessary)

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## U.S.-Canadian Accord Starts AM Changes

The FCC has approved a new U.S.-Canadian AM broadcasting agreement that is already affecting thousands of AM stations in the United States. Incorporating a plan from the Regional Administrative Radio Conference (RARC) held in Brazil in 1981, this new agreement supersedes the North American Regional Broadcasting Agreement in effect since 1950. The FCC warns that a similar pact with Mexico is far from completion, and in fact U.S. ambassador Robinson and Canadian communications minister Francis Fox had not signed the agreement as of press time.

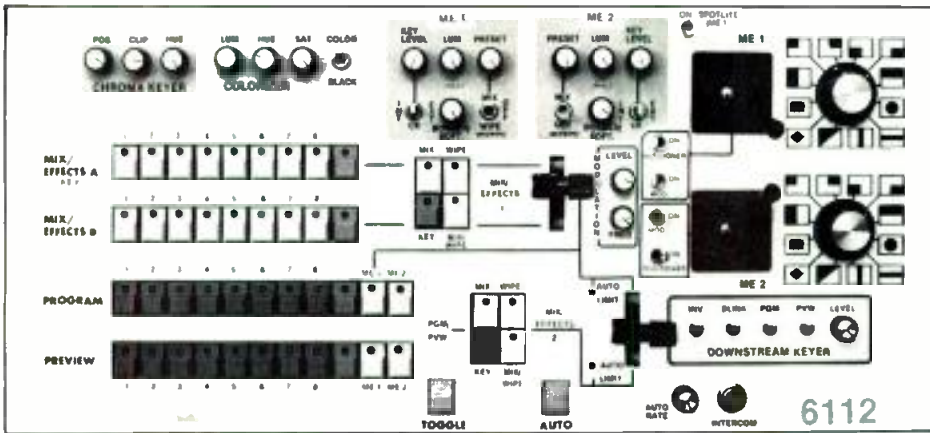
Not to be stopped by formalities, the FCC has mailed out post-sunset authorizations okayed by Canada, and details on pre-sunrise operations are expected soon. The accord also allows for new Class I-A stations with unlimited broadcast time to be set up within 650 miles of the U.S.-Canadian border.

Circle 108 on Reader Service Card

# THE 6112 IS BY FAR THE MOST ADVANCED SWITCHER IN ITS CLASS. NOTHING ELSE EVEN COMES CLOSE

Complete a mix or wipe on a 6112 (or any Crosspoint Latch switcher for that matter) and there is ABSOLUTELY no COLOR CHANGE or HORIZONTAL SHIFT. We mean just that ABSOLUTELY NONE. This is because the 6112 has a BLANKING PROCESSOR which replaces the sync and burst with new internally generated sync and burst. This eliminates the problems caused by small drifts in cameras, time base correctors etc.

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## OPERATE THE 6112 DIRECTLY FROM THE EDITOR KEYBOARD

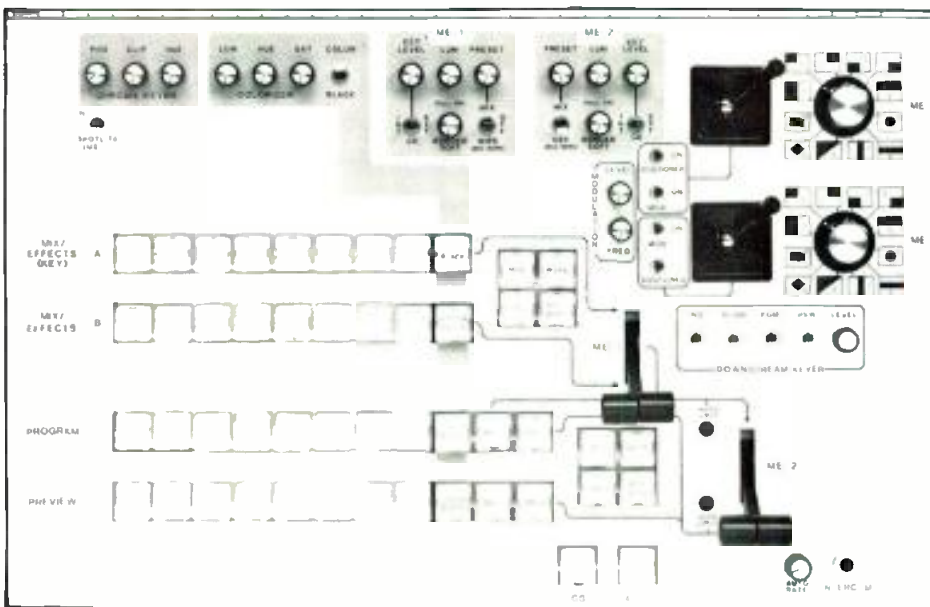
The 6403 allows the 6112 to interface directly with most editors. No modification to the editor is required.

Under 6403 control the 6112 accepts commands such as duration times, pattern type, bus selection etc. directly from the editor keyboard. The 6403 also allows the user to program the start and end points of transitions (such as mix or patterns) permitting frame accurate effects.

Audio follow and split audio capability is provided by the 6800 and the 6803 audio mixers, which can be driven either by the editor or the switcher.

**THE 6112 HAS TREMENDOUS PRODUCTION CAPABILITY.** Using just one Mix-Effects system, it is possible to dissolve a key over a background scene. The key may be masked by one of the patterns, still using no more than one ME system. With the second ME system it is possible to wipe in a second key, either beside or over the first key. The downstream keyer can key over the entire combination. The two mix-effects systems permit a bordered wipe over or behind a chroma keyer. The preview bus is completely free from the PROGRAM system.

**IF YOU HAVE EVER CUT OR ADJUSTED DELAY LINES FOR CHROMA KEYERS,**



you will appreciate the adjustable delay lines (controllable from the front panel) on the 6112. When multiple RGB cameras are used for chroma keying (using the Model 6700 matrix switcher), there is no need to match all the delays. The delays can be adjusted instantly from the control panel, even trimmed 'on air', if necessary.

**Available in PAL**

Price 6112 \$7,950 6112BH \$10,500

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**6112BH HAS ILLUMINATED  
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Additionally, Class IV stations will be able to increase nighttime power from 250 W to 1 kW. The FCC notes that it will not accept station applications under either provision "until the requisite rule amendments have been adopted." Finally, the fate of 16 Alaskan stations that wanted protection for their large listening areas has turned out favorably; they will receive Class I status.

In a separate matter, the FCC maintained that it will not retaliate for Canada's tax on advertising time bought from U.S. stations and intended for Canadian audiences. To counter this, Buffalo Broadcasting Co. had asked the Commission to stop CBS's program delivery to Canadian stations. The Commission agreed that the tax law hurts U.S. stations but says Congress must hand out any punishment.

## Reagan Aide Appointed FCC Commissioner

During Congress's holiday recess, President Reagan appointed Dennis Roy Patrick, until recently a White House aide, to be the FCC's fifth com-

missioner. Due to unrelated infighting, Senator Barry Goldwater had held up confirmation hearings on the president's replacement for Anne Jones, who resigned from the Commission last fall to go into private law practice. With the Congressional recess, however, the president was able to have Patrick

sworn in so that he can hold the Commission seat at least until Congress adjourns at the end of this year. If, as expected, difficulties with Sen. Goldwater are ironed out, Congressional confirmation will allow Commissioner Patrick to fill out Jones's term, which ends June 1985.

## Kidvid Rules Rejected; Rivera, ACT Protest

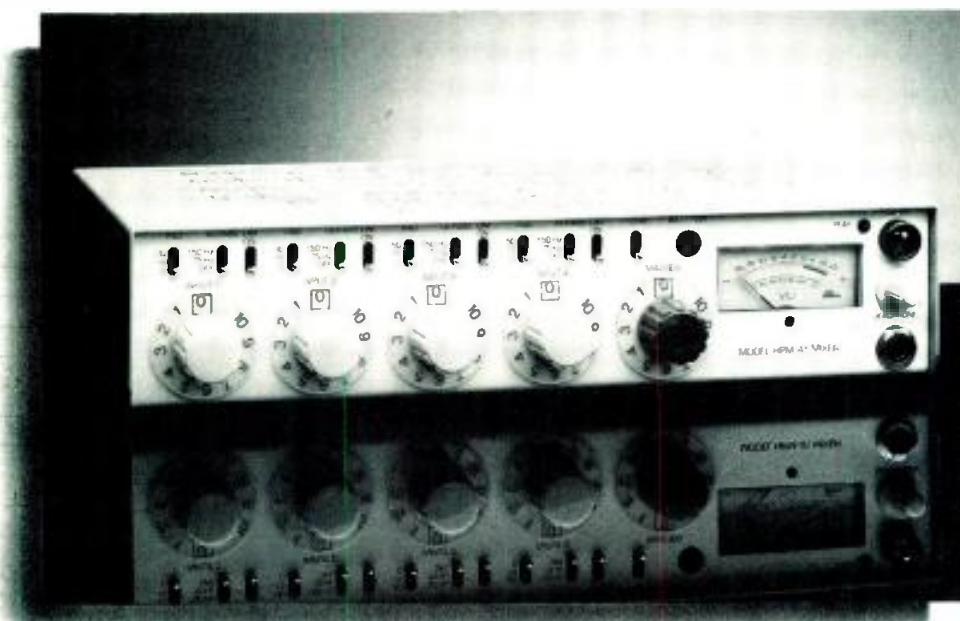
Over the vehement protests of commissioner Henry Rivera, the FCC has voted three to one to end its children's television rulemaking without imposing any guidelines or programming minimums on TV stations. Rivera's dissenting vote came after a lengthy and heated discussion with deputy Mass Media Bureau chief William Johnson and FCC chairman Mark Fowler.

Rivera criticized the majority's finding that cable and independent stations provide sufficient diversity and quality in children's programming. He argued that half of all homes still are not passed by cable, and 22 percent are in markets with no independent TV outlet. He also

expressed doubt that the performance of commercial stations would improve without Commission guidelines.

The three other participating commissioners (Fowler, Quello, and Dawson) prevailed, however, ruling that "the totality of video programming sources and their offerings for children, constitutional concerns regarding interference with the exercise of a licensee's programming discretion, and regulatory anomalies that often result from inflexible standards" made specific quantification rules "undesirable." It asserted, though, that broadcasters remain under "enforceable obligations" to meet the programming needs of children and other groups, adding "A li-

*Sure, it looks like theirs, but there's*  
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It's what's inside that counts. And inside our HPM-41 Microphone Mixer, you'll find the most extraordinary circuitry—the kind you would expect in a major recording console. In the two years we took to develop the HPM-41, we determined every small-format mixing need. And then we condensed them into a super rugged compact package. The results? Check the specs and compare. There's nothing quite like it. On that, you can be sure. Call or write RTS for detailed information.

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The Auto Mode switching feature samples incoming signals and automatically

or synchronizer. The 8 bit, 4X subcarrier digital design and microprocessor-directed memory mean high reliability and transparent performance. Full frame memory allows manual selection of Field 1, Field 2 or Full Frame Freeze. Operator-selectable automatic freeze detectors permit controllable response to fading signals. All for only **\$13,450.**



**S-130.** The most full frame synchronizer for the money. Like the S-230, it features a

provides ease of maintenance and confidence testing. The S-130 synchronizes external signals such as network, ENG, microwave, satellite and remote studio feeds, and is ideal for the new Harmonically Related Carrier (HRC) designs in CATV applications. Only **\$10,990.**



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censee who fails to consider those needs . . . will find no refuge in this."

Strong protest to the FCC action came from Peggy Charren of Action for Children's Television, who indicated her group would appeal the action and would also press for congressional legislation. The NAB, on the other hand, praised the order, noting, "To interject federally mandated programming . . . places the government in the role of editor, a most dangerous precedent under

any circumstance . . . What should be analyzed in this situation is not what one individual station is telecasting but what is available to the child in the home on a daily basis."

## Broadcasting Will Boom in '84, Forecasters Say

A general economic resurgence will combine with the presidential election

campaign and the Olympics to make 1984 a banner year for broadcast advertising, according to speakers at the eleventh annual Paine Webber Mitchell Hutchins Conference on the Outlook for the Media, held last December in New York City.

The tone of the meeting was set by McAnn-Erickson's Robert J. Coen, who suggested that 1984 "could be another 1976," when advertising grew at twice the pace of the gross national product. The "pent-up consumer demand" from the recession years will make itself felt, and advertising will rise to attract consumer dollars. Coen (who noted that his forecasts of previous years have been on the conservative side) predicted that advertising expenditures would increase 13.8 percent overall this year, with a 13 percent rise in national broadcast advertising.

The outlook for network television advertising is excellent, according to David F. Poltrack of CBS Broadcasting. Poltrack expects the Olympics to add approximately two percentage points to predicted advertising gains of 12 to 13 percent in 1984, resulting in a jump in the 15 percent range. He expressed optimism on the future of network audiences, saying that 1983 viewing levels in both prime time and daytime would be up over the previous year, with network share leveling off and gradually dropping to 73 percent by 1990. (Poltrack's figures seem optimistic compared to those offered in a recent study by BBDO, Inc., the New York advertising agency, which saw levels falling to 65 percent in prime time by 1990.)

Gary Stevens, president of Doubleday Broadcasting, offered a cheerful outlook for radio, noting that more stations are reporting net profits and that spending on audience promotions seems to be leveling off. Stations targeting the 25-54 "safety zone" are doing best, he said, although the radio networks can offer advertisers cost-effective ways to reach listeners in younger or older groups.

A somewhat less upbeat tone was sounded by John J. McCrory of Times Mirror Broadcasting, who saw slightly lower gains being registered for spot TV advertising. McCrory said the first quarter of 1984 will be especially slow for spot, but predicted a healthy 10 to 11 percent increase in spot revenues overall. "We will have to work harder," he said.

# LOOK INTO LPB

## It's what's inside that counts

LPB's reputation for quality and dependability has been earned by devoting more attention to craftsmanship, components and performance than we do to outside appearance alone. When you are considering the purchase of an audio console, we invite you to examine the meticulous craftsmanship and top notch hardware inside any of our Citation or Signature II models. You will gain an instant appreciation of just how we earned and have maintained our "Best Value in the Industry" status.

### Citation

Our most versatile audio consoles. Available in 8 mixer dual stereo or 10 mixer dual stereo. Options include additional VU meters, linear faders, digital timers and clocks.

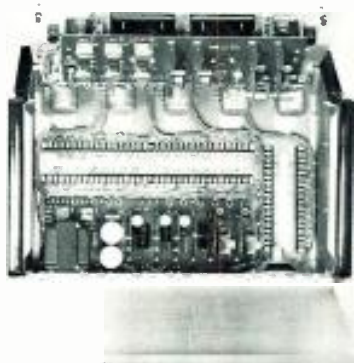
### Signature II

This is our largest and most popular series. Available in 5 mixer stereo or mono, 8 mixer stereo/mono or dual mono and 10 mixer dual stereo or dual mono.

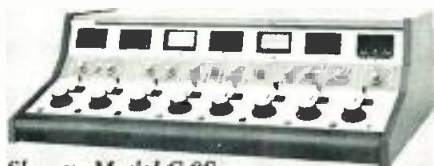
### Monogram II

Our economy series of good, basic, dependable consoles. Available in 5 mixer stereo or mono and 8 mixer stereo with or without linear faders.

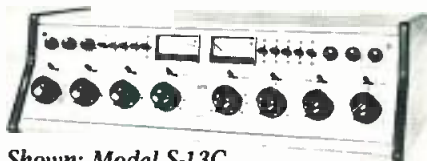
Look into LPB for consoles or complete studio setups. We invite you to write or call.



Shown: Model C-85



Shown: Model S-13C



Shown: Model M-8S



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## ONE OF THE FEW EFFECTS YOU CAN'T DO ON THE EXPANDED E-FLEX SYSTEM.

**YET.** We're working on it, though.

In the meantime, almost anything else you can think of *is* possible. Because we've just expanded the E-FLEX DVE® system with a new Perspective/Rotation accessory. So now, you can rotate images through all three axes. Add depth through perspective. Combine those effects with basic E-FLEX effects including split, compression, mosaic, Multi-move, and trajectory. And store it all on NEC's bubble memory cartridges.

We can't resist noting that our new capabilities make E-FLEX the virtual equivalent of systems costing far more. But more importantly, they make E-FLEX an instrument of almost limitless possibilities. One that takes only a few hours to master—and perhaps a lifetime to fully explore.

What's more, the E-FLEX system is modular. So you can buy it all at once, or start small and add later. And as we develop more capabilities, you'll be able to plug them right in.

To find out what E-FLEX can do now, call NEC at 1-800-323-6656.

By the time you call, we may have perfected the effect in the picture.

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## NEWS BRIEFS

WNEV-TV, Boston, and five regional newspapers have started the **New England News Exchange** in order to extend television coverage beyond the metropolitan area. ENG vans will be assigned and microwave sites constructed at each newspaper. Exchange members hope similar arrangements at several radio and television stations will eventually cover New England.

Partly for better coverage of Latin America, CNN has opened a **Miami news bureau**, its ninth in the U.S., with John Zarrella as bureau chief . . . . Arbitron has instituted its **Television Meter Service in Miami** . . . . CNN Radio rescheduled its live news to the **top of each hour** from 12 noon to 7:00 pm (ET).

UPI now has **its own uplink** in Dallas, replacing land lines to New Jersey . . . . News/Sports Radio Network has started feeding **Audioline actualities** via UPI's satellite system.

Those planning to use **RF equipment at the Summer Olympics** in L.A. must coordinate with the World Broadcasters RF Committee in writing by March 1. ABC has been assigned 482-488 MHz for parcelling out dedi-

cated frequencies. Write ABC-TV, 1313 N. Vine St., Hollywood, CA 90028, Attn: Michael L. LoCollo, Chairman . . . . Similarly, 1984 Democratic and Republican convention broadcasters can alleviate **frequency coordination problems** by contacting Richard Harvey, Chairman, 1984 Political Conventions, Frequency Coordination Committee, CBS, 555 W. 57 St., Tenth floor, New York, NY 10019, phone (212) 975-1784 . . . .

NGN Radio will broadcast from the floor of the Democratic convention, making it the **first gay news network** to cover a presidential convention live.

ELRA's Cablemark survey has found that the number of **non-subscribers desiring cable** increased from 27 to 36 percent in a year's period. **Cancelled subscribers** have increased also from 21 to 27 percent.

Under new FCC rules, broadcasters can identify themselves with **any community name** after giving their community of license . . . . NAB supports an FCC proposal to change its rules for **broadcasting telephone conversations**. NAB wants live conversations with immediate notice to callers, airing

of taped conversations when informed, and taping without broadcasters having to immediately say who they are.

The FCC has proposed allowing existing licensees to upgrade **FM and TV channel assignments** in preference to new applications for new channels . . . . Also the Commission has suggested making "**non-disclosure**" status easier to gain on station filings. The NAB backs this but has urged easier criteria than those proposed.

In U.S. Supreme Court, NAB supported a lower court decision barring Texas from forcing broadcasters to supply **lowest unit rates** to candidates and general "political issue" advertisers year-round . . . . Both the NRBA and NAB have filed comments with the FCC opposing self-regulation by **RF lighting manufacturers**, who, NAB noted, will have "little incentive, if any" for such measures.

For his achievements since joining Edward R. Murrow's London news team in 1941, **Charles Collingwood** has received a special Armstrong Radio Pioneer Award . . . . Douglas Bennett has filled Frank Mankiewicz's former position as **head of NPR**.

From Porta-Brace™, the...

## Quiet Revolution



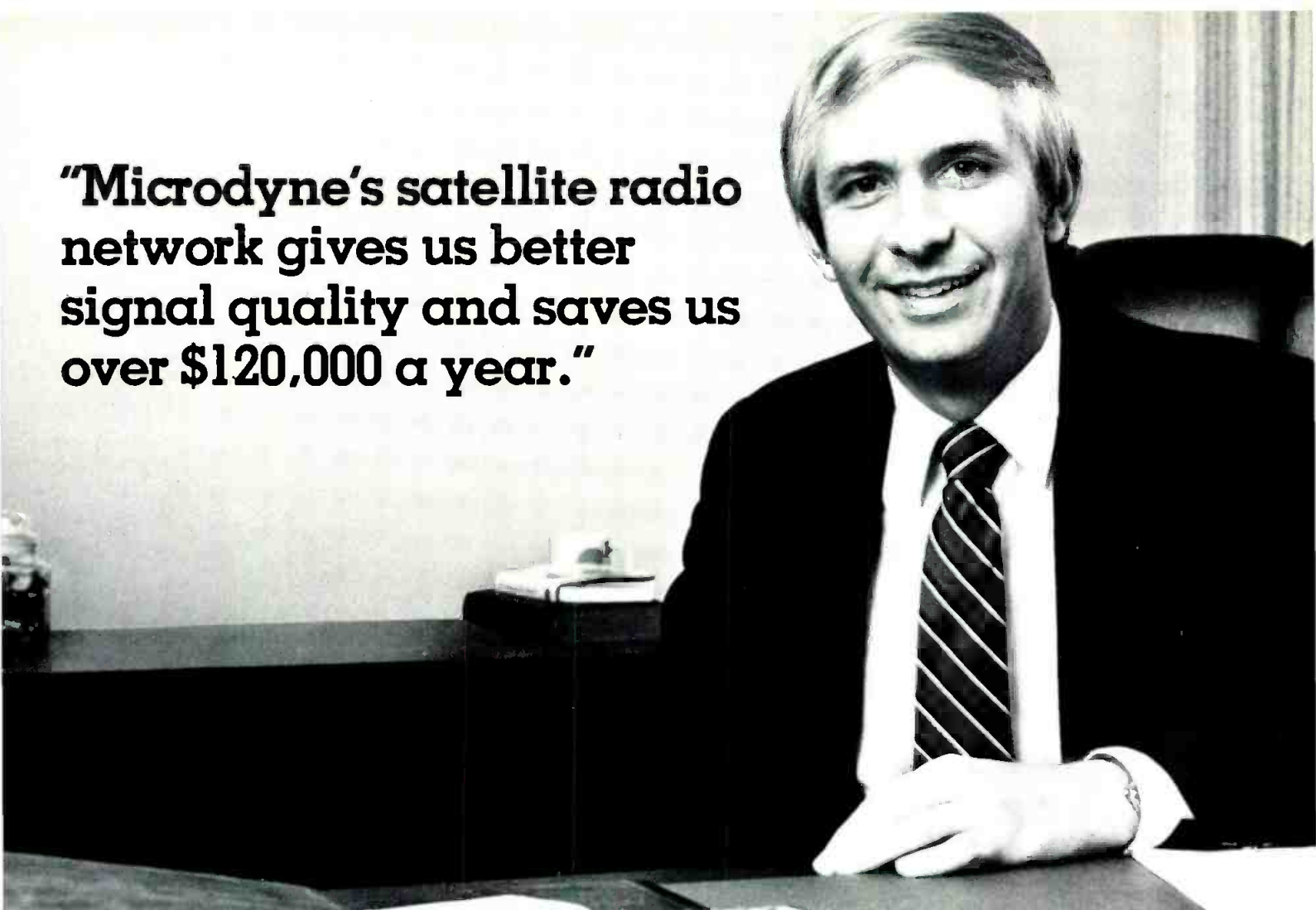
**K and H Products, Ltd.**  
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The Video-Belt shown on this Porta-Brace™ Recorder case may seem insignificant, but it actually has revolutionized the shoulder carrying of video recorders. Ask any professional who owns one or tried it at the NAB Show. It **gets the weight off your shoulder.**

Circle 114 on Reader Service Card



**"Microdyne's satellite radio network gives us better signal quality and saves us over \$120,000 a year."**



*Paul Stone, General Manager, Georgia Radio News Service*

**Reduced costs — fast payback**

State and regional networks need all the money they can save. That's why the Georgia Radio News Service installed a Microdyne SCPC satellite radio network system.

They found that it reduced monthly distribution costs 80% while improving signal quality.



*Microdyne we manufacture nearly everything in the system, from the precision-molded 5-meter link antenna . . .*

Where the network once paid \$12,000 a month for land lines to feed their 105 affiliates, they now lease a 30-dBw carrier on Westar IV for about \$2,000 a month. That results in savings of \$120,000 a year.

"We expect a fast payback on

the equipment," General Manager Paul Stone adds.

**Greater programming flexibility**

But lower costs and superior performance aren't the only advantages of a Microdyne radio network. Our system is frequency agile and has an optional bandwidth selection feature that lets you change formats when you change channels.

That means you can receive any of the many radio programs now being carried on a single satellite. And that gives you more programming options and greater flexibility.

**Turnkey systems**

At Microdyne we manufacture nearly all of the components that make up a satellite radio network, from the uplink antenna to the downlink demodulator. And we not only design and build custom systems, we can also manage the complete instal-

lation. So all you have to do is tell us what you need and when you need it.



*. . . to the rack-mounted downconverter and unique bandwidth selectable, frequency-agile demodulator that lets you change formats when changing channels.*

And of course all of our products are backed by our 48-hour repair or replacement policy and our 24-hour toll-free number for emergency engineering support.

**Let us custom-tailor one for you**

If saving thousands of dollars a month while improving performance appeals to you, call our Marketing Department at the number below. Ask for our free brochure on satellite radio systems. It could brighten your budget for years.



**Microdyne Corporation**

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# ONLY SCOTCH 480 CAN STAND



Every opinion expressed in an editing session adds up to more starting, stopping and rewinding of the tape. And that can lead to reduced picture quality, unless you've got new

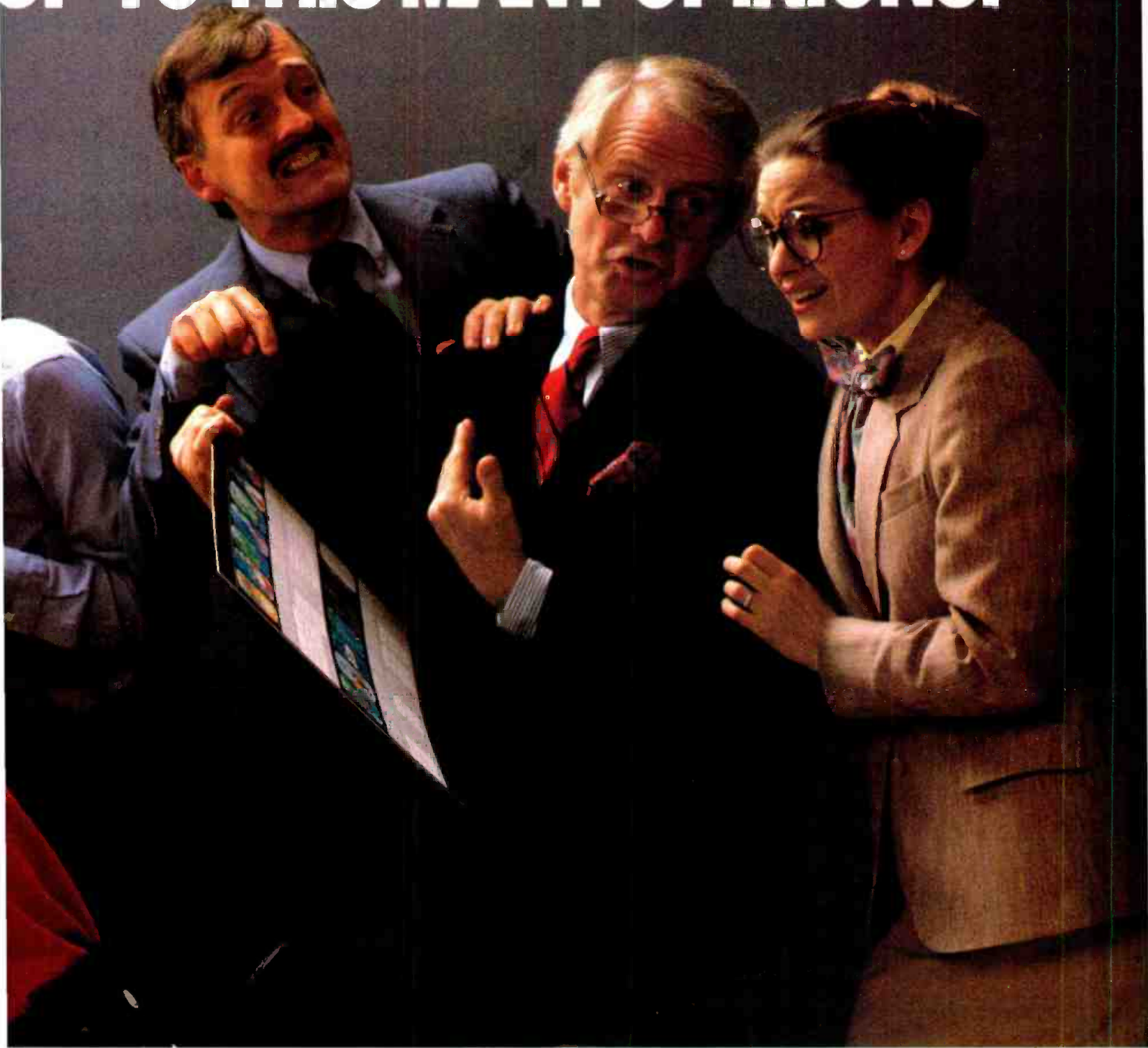
Scotch™ 480 one-inch video tape working for you.

An advanced magnetic dispersion, consisting of a totally new oxide, binder and lubrication system on Scotch 480

video tape keeps your productions looking good through the toughest editing sessions. In fact, 3M lab tests have shown 480 video tape capable of delivering over *1,000 edits from the*

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same preroll point, with no significant reduction in playback picture quality.

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(1-800-792-1072 in Minnesota) for more information about Scotch 480. Your productions will look better and so will you.

Magnetic Audio/Video Products Division/3M.



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1" VIDEO TAPE.  
LASER TESTED  
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3M hears you...

# 3M

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When MCI engineers set out to design the world's finest recording/remixing console, they promised to pack every one with more performance and more features than ever before. And they kept their promise. So well, in fact, that MCI consoles have become the choice of leading recording studios.

Now Sony is making a promise. The same versatile MCI JH-600's that turn out hit after hit can tackle every new mixing and sweetening job you have, head-on. Audio production for broadcast, teleproduction, or wherever your studio is moving,

one of Sony's four flexible MCI JH-600 consoles can move right with you. You have our word on it.

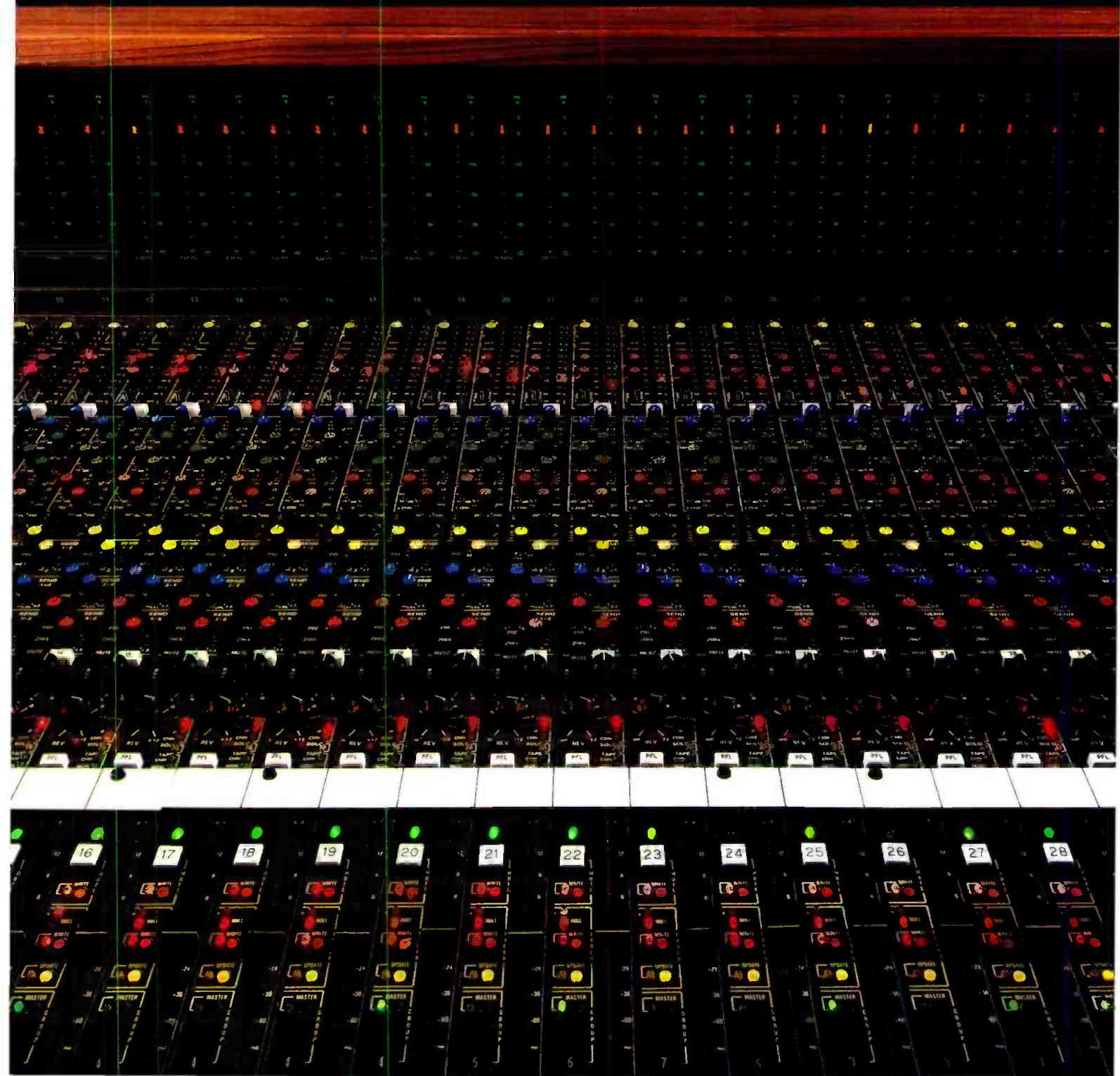
For further information contact:

Professional Audio Products,  
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# RADIO

## programming & production

# WDZ Reels With Success of Cassette Automation

By Tim Wetmore  
Associate Editor

Somehow, given the broadcast industry's predilection for precision and technology, it seems appropriate that something as fanciful as an April fool's joke would propel a station to purchase one of the most state-of-the-art cassette automation systems available today. But this is exactly the kind of thinking that has led to state-of-the-art profits at WDZ and WDZQ of Decatur, IL.

The morning man and general manager of WDZ-AM, Steve Bellinger, had a lot of experience with what he calls "frustration with the inherent difficulties of cart machines." One of these difficulties was entirely personal. In 1967, as the morning man at WDZ, Bellinger played a cart that was labelled for a commercial. It turned out to be an April fool's joke with a comical history of his life playing back over the air. As it turned out, the rest of his show was thrown off-course because none of the carts were properly labelled, each of them containing evidence of the staff's humor. Ever since that time he has been suspicious of carts and their labels.

Beyond the personal experience, Bellinger claims he had other reasons for trying the cassette automation system that eventually helped bring his station greater profits and a simpler operating system. "As far back as the late 1960s," he notes, "we had huge maintenance costs in our playback systems, even when we started working with automated cart systems for both WDZ and WIOY in Centralia, IL. I believe they were the first two AMs in the state to automate. We had constant problems with those multicart machines, so we went to a cassette changer. Much to our dismay, it didn't work either."

Not satisfied with the results he was getting with carts or cassettes, Bellinger continued throughout the '70s to work on alternative methods of



Steve Bellinger, left, owner of Prairieland Broadcasters and WDZ, reviews computer program layout for automated cassette operation.

recording and playback. Eventually, he and his staff came upon a way to get a foot in the automation door by using a cassette machine to record an outside weather service used by the station.

"We installed TTL end-to-end dialing," Bellinger recalls. "Our weather man in Chicago could dial up a number and the cassette machine would record his report. At first we had some difficulties with other callers using the line. So we set up a system whereby the weather man would call with a code, at which point the cassette would record, rewind itself, and cue up, ready for playback upon signal from the computer. It was only a \$280 Sanyo consumer deck, but it's been going for 188,625 plays without failure. All we do is replace the tape every 90 to 120 days and demagnetize the heads."

Another milestone on the road to the station's present computerized cassette system occurred three and a half years ago, in 1979. In an effort to expand the operation to include all of WDZ's

commercial inventory as well as its music programming on automated cassette, Bellinger went looking for sturdy decks. He decided on Eumig. Because of difficulties in its photographic department, Eumig went bankrupt, providing Bellinger with the opportunity to buy out the company's entire cassette deck inventory. With this equipment and a VIC 20 computer, both WDZ and WDZQ were completely automated and fully on-line with the new systems in 1981.

The current system grew out of the station's original need to have an automated tape system with true random-access capability that Bellinger felt would be reliable. The development work proved so successful, and with the incentive of having spent over half a million dollars in research for the stations' own automation system, Prairieland Broadcasters (owner of WDZ, WDZQ, WIZZ, and WLAX, all in Illinois) has branched out to form Systemation, a commercial division

# RADIO PROGRAMMING



*Geoffrey Schubert, left, and Steve Bellinger, Jr. conduct final quality check on Tascam modifications.*

selling the cassette automation systems. All designs in the computerized system were based on the needs and experience at WZD and WZQ.

## Cassette system design

For reasons of cost, availability, and reliability, Bellinger and the original designers of the WZD system decided to use the VIC 20 personal computers. When Bellinger started the new division for marketing the equipment, he made several levels of sophistication available, since he saw how the needs and preferences for software and hardware had changed at WZD. A system based on the Commodore 64 is now available, offering a wider range of features.

A great effort was expended in evaluating several cassette decks. This was deemed necessary to make sure a particular model would stand up to the rigors of constant use. The decks also had to be easy to modify since, for the computer to be able to communicate with the cassette decks, it required the addition of a microprocessor interface right on the chassis.

After looking at many cassette units, Bellinger decided on the Sansui D970 and Studer B710 stereo units, and the

Tascam 234 four-track decks. Bellinger likes the Sansui so much he bought almost all of the company's North American inventory. All cassette decks are coupled with the computers and all software is written by the staff at Systemation. The Tascam, being a four-track professional deck, required the further modifications of changing the speed from  $3\frac{3}{4}$  ips back to  $1\frac{7}{8}$  and the complete reequalization of the electronics.

## Computer enhances success

To satisfy WZD's commercial and music needs, Bellinger realized that the cassettes would have to provide a truly computerized random-access capability. To accomplish this, each cassette is hard-sectored, much like a computer floppy disk, into 76 compartments. Each sector is capable of holding a 30-second spot announcement. What this boils down to is a total of 76 commercial spots on one cassette tape. ASCII data is encoded ahead of each announcement, using up one half-second of tape space.

The 76 ASCII codes are inserted by computer program onto the cassette, which is taken straight out of the box. This ensures cueing accuracy because

the data "notches" are impressed on the tape magnetically by the program. When the labels are ahead of the audio, an English readout of the cued spot is provided.

The ASCII data tells the computer the length of the message, obviating the need for the all-too-familiar end-of-message tone. The data allows the computer to turn on an audio window which prevents the cumulative cueing errors of which broadcasters are also aware.

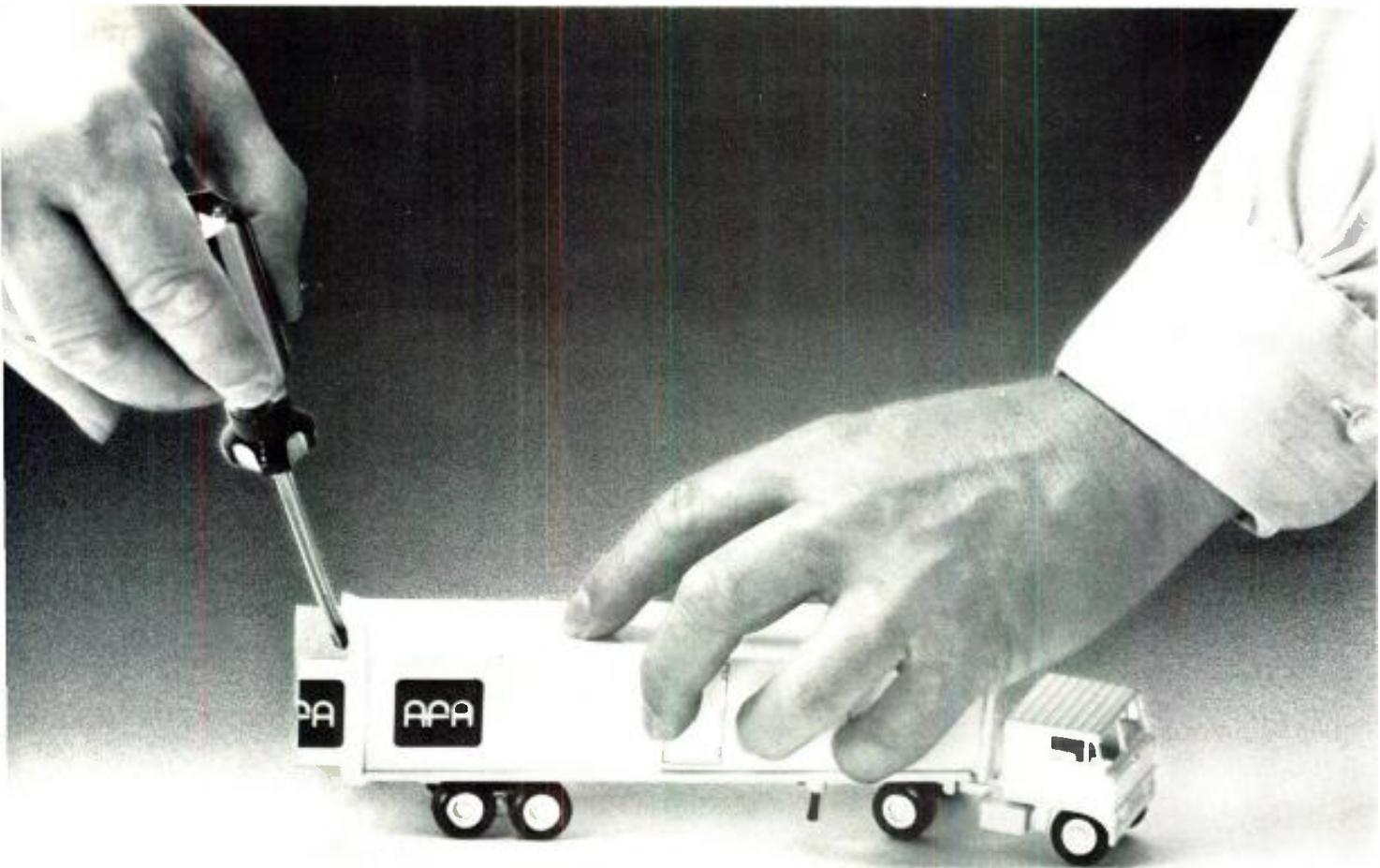
For music, different programs and sectoring are employed, but the principles remain the same. With the Tascam 234, 48 songs in mono or 24 in stereo can be stored and accessed randomly by sector number, with the title of the selected song in that sector appearing on the screen.



*Systemation cassette automation menu shows seven available functions for programming the station using Commodore 64.*

Further hardware features include the standard 16K memory of the VIC 20 (or the 64K of the Commodore 64), in addition to 48K of extra storage contained in the system rack. The VIC 20, which originally came to WZD from a robotics study being done in Detroit, can operate 63 decks. A higher-priced system can operate more. With the Commodore 64, a real-time clock is available, along with other features, and allows the user to draw a clock hour on the computer screen to help with time allotments for program planning throughout a given day.

Another advantage of the computerized cassette system is that any information stored in the computer can be easily printed out on any number of



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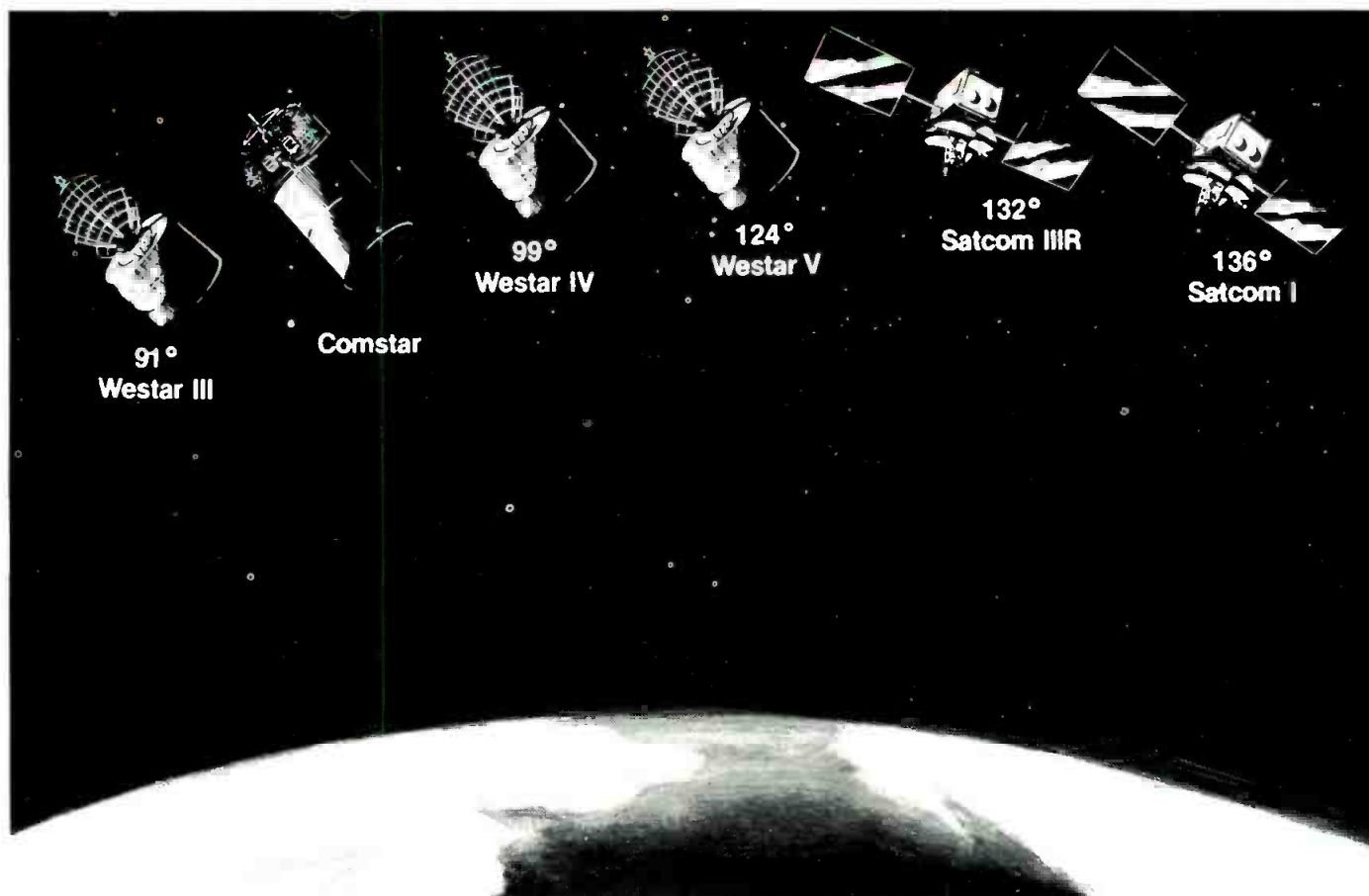
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WDZ/WDZQ studios and offices. Both stations provide music and news via cassette automation, programmed in house.

compatible printers. The computer can also run constant checks to ensure proper operation, to tell the operator what music or commercials are coming up next, and to indicate the dates of commercials. Such a feature allows any out-of-date commercials to be removed before they are played on the air.

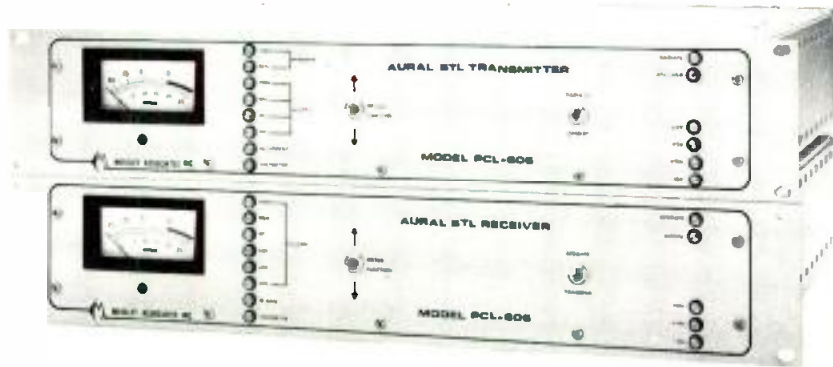
The high level of technical efficiency offered by the cassette and the programmability and diagnostics offered by the computer have made a happy marriage. According to Bellinger, WDZ and WDZQ now have fully electronic production rooms, which make for fewer mistakes, more efficiency, and thus greater profits. Systemation has proved so attractive that Bonneville's Transtar decided to make it the basis for the only direct satellite interface to station automation and, in the process, borrowed part of the name. Transtarmation is now in over 100 radio stations in the U.S. Radio New Zealand has contracted to install the cassette automation system in all 31 of its radio stations.

The WDZ story shows that if broadcasters exercise their creative side, their business side will profit. This doesn't mean every radio station has to go into the manufacturing business; it just points up the possibilities available for radio stations to help themselves.

PrairieLand Broadcasters, with Steve Bellinger at the helm, has begun a new era in station automation. Not afraid of being creative, and being unwilling to accept what he considered inferior systems, Bellinger experimented until he found a system that would help his broadcast operation. He took a marginally successful, small-market station and turned it into a profitable force to be reckoned with.

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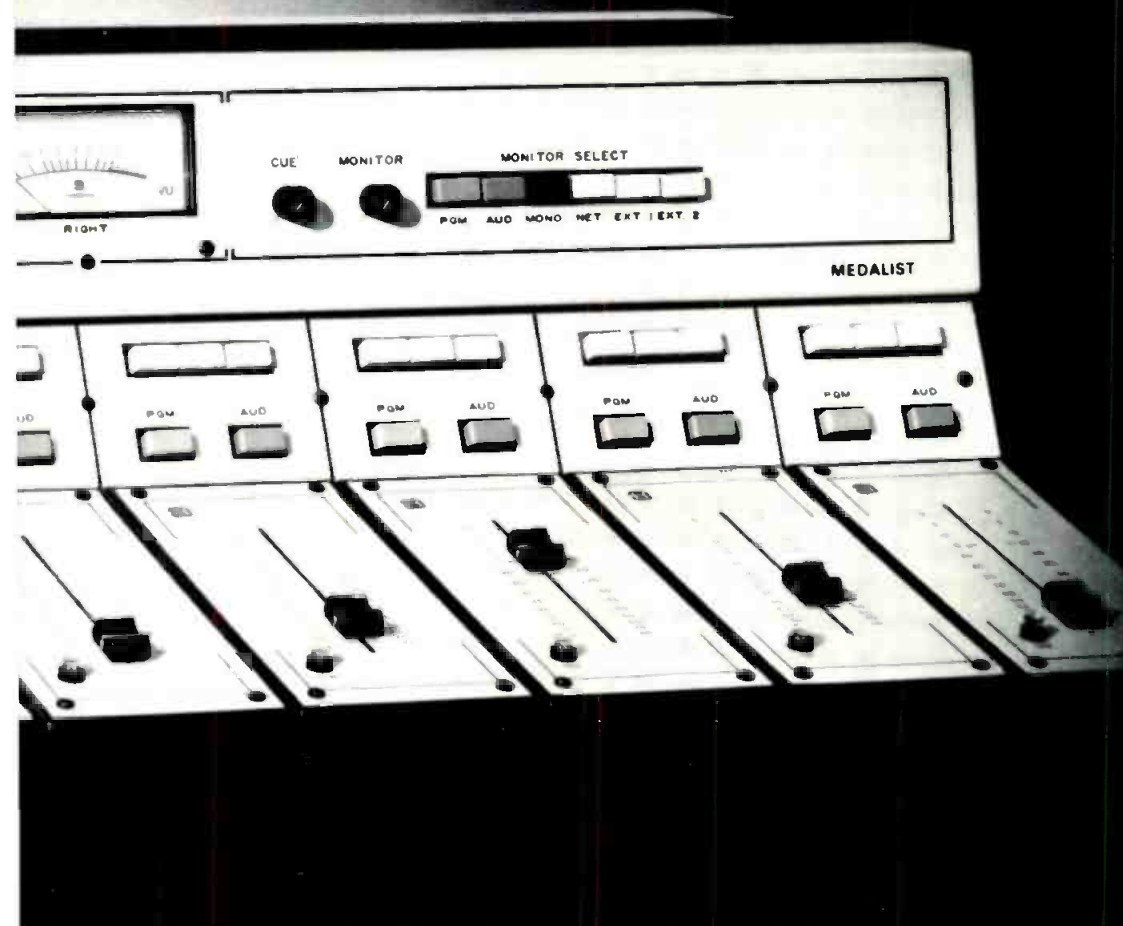
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# NBC Miniseries Uses New Low-Contrast Print Stock

By Robert Rivlin, Editor

The problem of airing color film prints of either program material or commercials on television is probably the most frustrating problem still confronting TV engineering. Even using the latest-generation telecines, with variable luminance gamma controls, it is difficult to pull detail out of shadow areas when transferring from a color positive. The reason is simply that the video signal amplitude in dark areas is close to the system noise level. If the engineer performing the transfer alters the telecine gamma to increase gain at the black end of the scale, he or she cannot avoid increasing system noise as well. In addition, when blacks are stretched, whites are compressed. The gain in detail in black areas such as shadows or dark paneling is balanced by a loss in detail in lighter areas, including faces.

One way to deal with the telecine's contrast limitations is to transfer to videotape from a color reversal intermediate film, commonly called a CRI. Until recent years, this has also been the typical practice for post-production and distribution. More recently, thanks to the gentle film handling characteristics of modern continuous motion telecines, a growing number of directors and producers have been transferring their original negatives directly to videotape and doing all their editing and color balancing electronically.

The latter practice has resulted in some extraordinary high-quality results on the television screen. In the case of a lengthier production, however, it is more practical to deal with editing and scene-to-scene color correction on the editing table and at the film lab than it is to perform these operations electronically.

Hence the need for a positive film with a lower upper-scale contrast range than the print film used for theatrical releases. Generally, such a film would be

processed so that the blackest blacks (those at setup level on the waveform monitor) are slightly transparent, as seen in direct projection. Obviously, such blacks give the telecine pickup device more to work with (and consequently produce a better signal-to-noise ratio) than the visually opaque blacks of a theatrical release print. At the same time, the lower contrast print preserves highlight detail so that subtleties in facial makeup and in light-colored wardrobes are reproduced.

This was the solution required in the production of NBC Television's made-for-TV miniseries *Princess Daisy*, a four-hour film produced on location in Europe and the U.S. that aired in early November. Shadow tones in the sumptuous but dark interior scenes were in danger of being lost in telecine transfer.

According to Edward P. Ancona, NBC Entertainment's director of film/tape post-production, *Princess Daisy* was an ideal candidate for a lower-contrast print stock. "When I saw the original print projected in the screening room," Ancona recalls, "I knew this was going to be a challenging film to transfer to video. The photography was excellent, of course. But many of the interiors were filmed in Europe at actual locations. A good deal of the film work was done at posh settings where there was dark wood paneling, softly lighted. To a great extent, those interiors determined the mood of the film, but preserving that mood in the transfer to video was not going to be easy."

When Ancona explained what he was up against, Russ McMurtray, a film/video specialist at the Kodak office in Hollywood, was able to arrange for the delivery of a sufficient quantity of Eastman color LC print film 5380/7380 ahead of its scheduled release date to make a low-contrast print of *Princess Daisy*.

The new lower-contrast print film is



*Outdoor and indoor scenes in Princess Daisy both achieved better results with new print film.*

very similar in emulsion characteristics to Eastman color print film 5384/7384. Both films share common image characteristics such as low granularity, excellent sharpness and color reproduction, and extended dye stability, and both are designed for use with process ECP-2A. The main difference, McMurtray explains, is that the LC print film has approximately 15 percent less contrast in the upper-scale range.

"The fact that the two print films are process-compatible is important," Ancona points out, "since it means there are no price or time premiums required of a producer who wants to pull a low-contrast print."

The program was transferred to one-inch videotape at CFI on a Rank-Cintel Mark III flying spot telecine.

## TELEVISION PROGRAMMING

It is the new generation of telecines, typified by the Rank, that has made the pursuit of a low-contrast print film worthwhile, says Ancona. During the early days of color television, it was common practice for engineers to encourage directors and cinematographers to limit the contrast range in scenes they were shooting. There was even an SMPTE recommended procedure, RP 46, specifying that lighting ratios for fully lighted daylight interior scenes should be held to 2-to-1 and that a reference white and a reference black be included in each scene. The maximum and minimum reflectances of fully illuminated objects which were to be reproduced in good detail were limited to 60 percent for whites and three percent for blacks.

"During the early days of *Bonanza*," Ancona reminisces, "the director and I would meet with the wardrobe people and the art director before each week's episode was filmed and try to adjust the contrast of the material that would be before the camera. I would also work as much as possible with the director of photography to help him understand the technical limitations of the

television medium. I don't mean to imply that we engineers tried to get directors to shoot a "flat" picture. They were still able to use key and fill lights for good modeling, and they obviously used high-contrast lighting in 'night' scenes. But we did try to get them to throw more light into shadow areas."

As more television production was done on film, much of it away from sound stages where it had been comparatively easy to work within the parameters of RP 46, it became both less possible and less desirable for engineers such as Ancona to have regular and frequent contact with directors and cinematographers.

Ancona also points to another factor. Many films originally produced for theatrical distribution are also shown on TV. Also, *Princess Daisy*, along with many if not most other made-for-television films, are likely to be distributed for theatrical release overseas.

"The creative team must shoot for maximum production values on a theatrical screen," he explains. "Now, by making low-contrast prints for television, we can also get a better-quality look for the video screen."



Edward P. Ancona, director of film and tape post-production for NBC Entertainment.

Ancona stresses, "It's important that we not appear to be specifying that someone's photography shall inhabit a certain range of densities or shall possess a certain color balance.

Ancona also points out that the lower-contrast print film can also be used as a medium for distributing film directly to TV stations, such as PSAs, locally made commercials, and syndicated shows. "This is just one more sign of the growing synergy between film and video media," he concludes. **BM/E**

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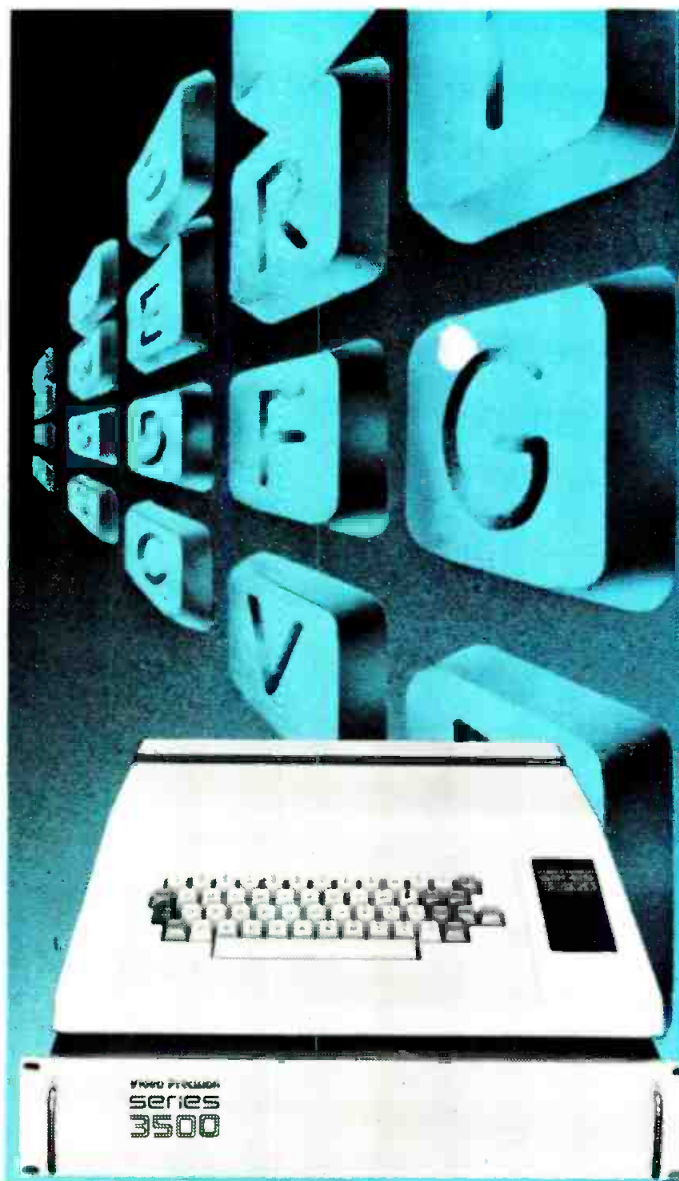
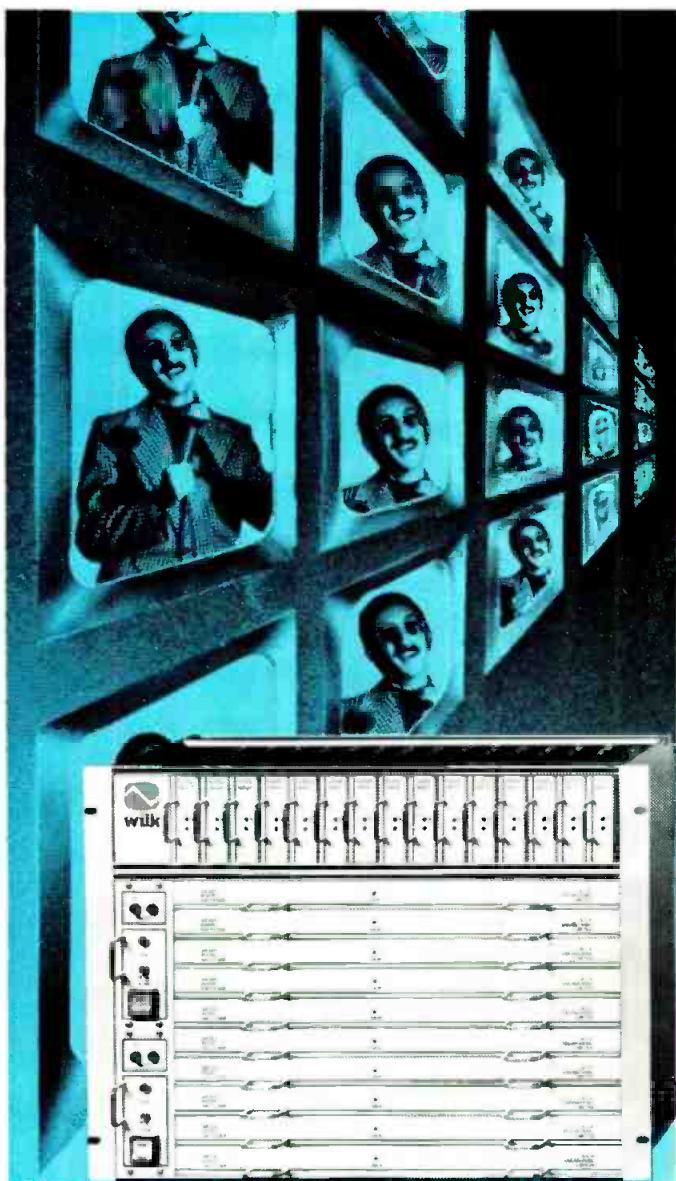
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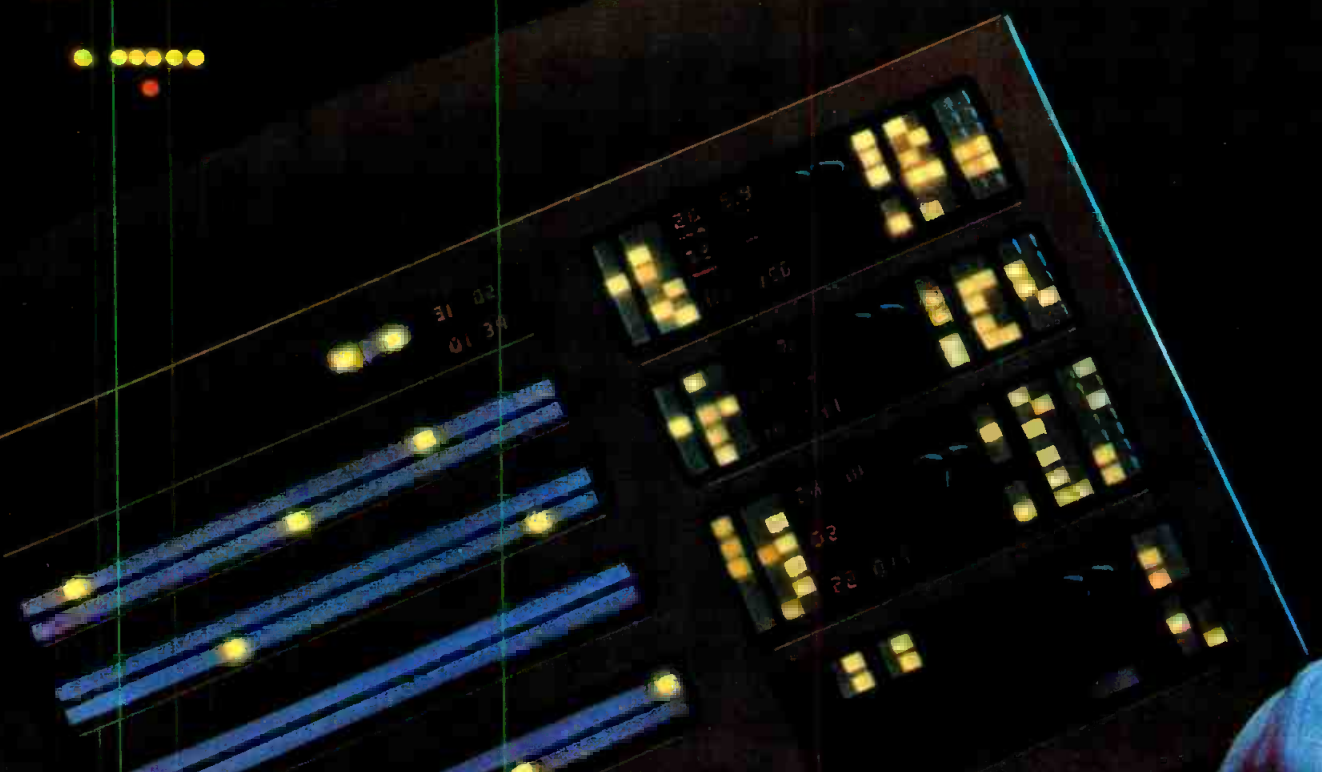
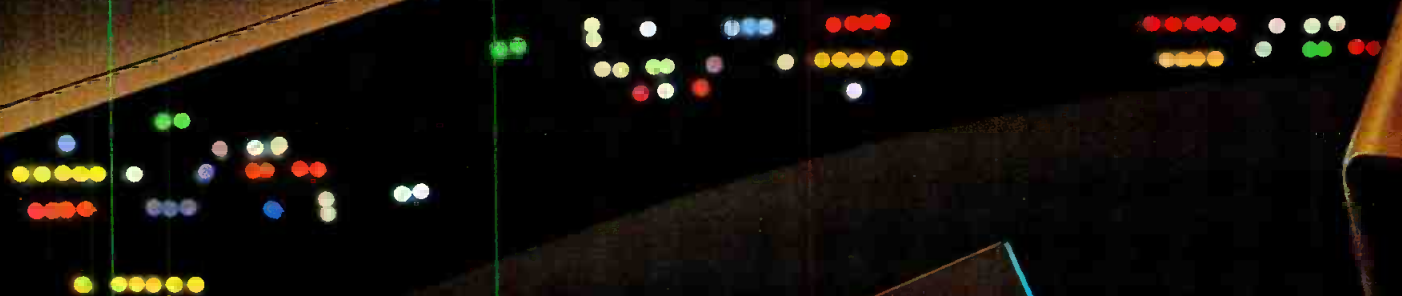
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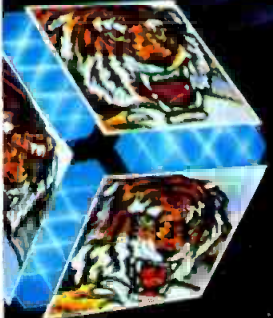
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# SATELLITE FORECAST:

The next few years will conclude the first decade of satellite broadcasting. This look ahead spells out for broadcasters the changes likely to take place by 1990 and what can be done to take advantage of the opportunities provided by the new satellite technology.

By Tim Wetmore  
Associate Editor

1990. Millimeter wave technology is common now that the industry has reached the end of the latest engineering decade. Satellite spacing is now a mere two degrees and there is talk that administrators are thinking of reducing the spacing even more, perhaps adding parking attendants to the recently launched satellite maintenance and repair tech-center (SMART). Still, spectrum crowding is no longer expected to be a problem with the use of millimeter wave transmission methods. Also helpful is the technology that permits multiple channels of video and audio to be handled through single transponders.

One of the most interesting developments during the 1980s was the use of the moon to locate microwave transceivers. Further, because of the crowding of geosynchronous orbits, multiple, nonsynchronous satellite broadcast systems can be used to reduce reliance on crowded stationary orbits.

Many other developments have taken place in the last decade. In 1987 Ford launched three hybrid communications satellites combining C- and Ku-band payloads. American Satellite launched a tri-brid C/Ku/Ka satellite.

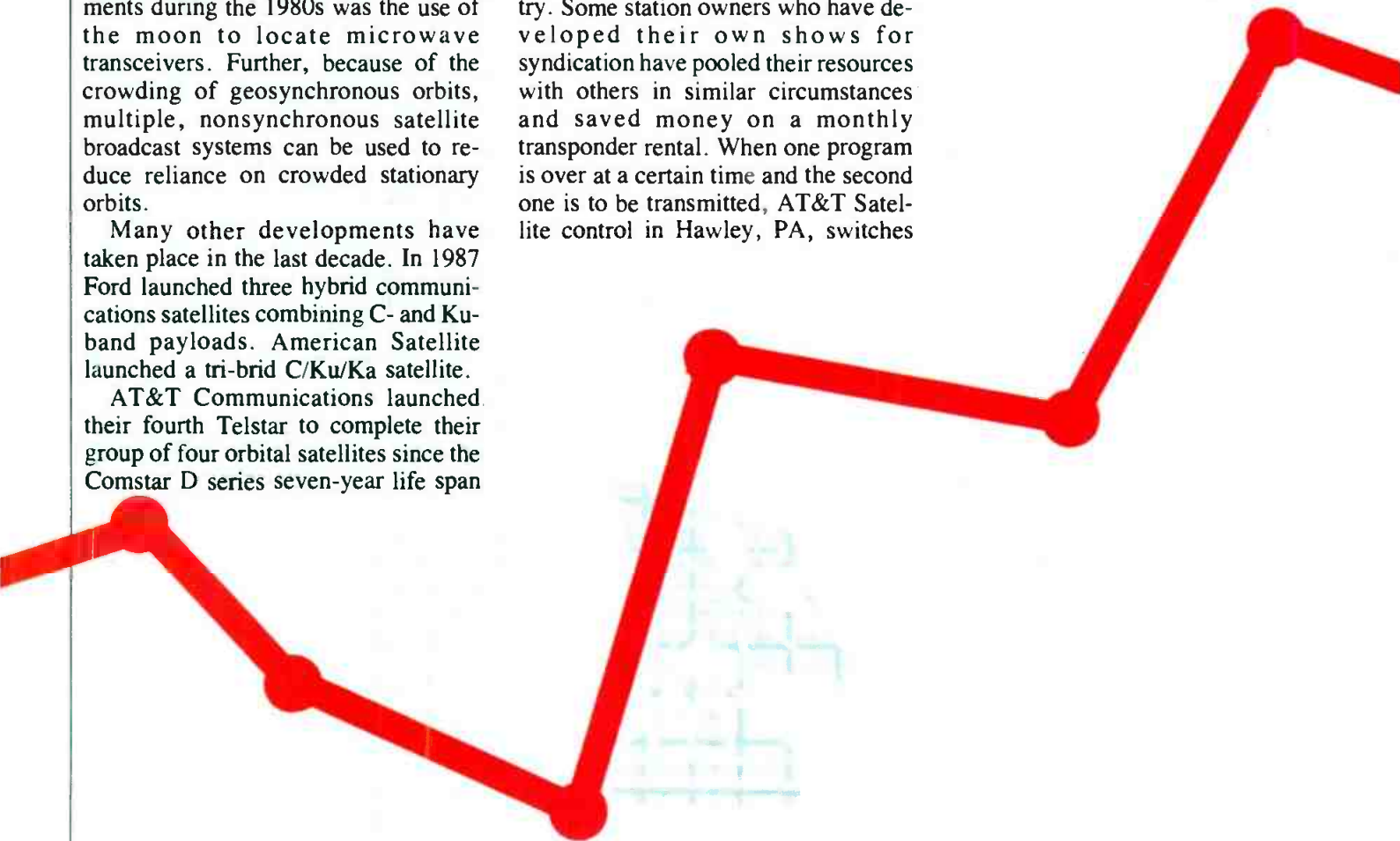
AT&T Communications launched their fourth Telstar to complete their group of four orbital satellites since the Comstar D series seven-year life span

ended. Telstar 301 has proved popular with broadcasters interested in the Skynet transponder service. This has allowed clients to lease various levels of transponders on a monthly, five-year, or 10-year basis. Implemented back in 1983 with ABC as the first customer of the service, the system attracted broadcasters eager to lease a platinum level transponder which is not preemptable, or to save money on a bronze level which is more preemptable than the mid-level gold transponders.

Also popular with broadcasters since 1983 has been the remote switching service provided by AT&T. This system permits switching between earth stations in different parts of the country. Some station owners who have developed their own shows for syndication have pooled their resources with others in similar circumstances and saved money on a monthly transponder rental. When one program is over at a certain time and the second one is to be transmitted, AT&T Satellite control in Hawley, PA, switches

the transponder service from one dish to another. One of the attractive features of this capability is that it is part of the overall service and price of the leasing arrangement.

In 1985 RCA launched two Ku-band satellites and a third in 1987 as an in-orbit spare. In 1989, RCA launched a C/Ku hybrid with the belief that C-band will remain a viable technology, as it has all through the 1980s. The company also wanted to get in on the popularity of Ku-band, since it needed to replace Satcom IIIIR, an eight-year bird that went up 'way back in 1981. Throughout the decade RCA has found that syndicators and LPTV operators, in addition to broadcasters, have been the most active in seeking out satellite



# NEW OPPORTUNITIES ALOFT

opportunities. In the last few years of the decade, SMATV systems have been gaining in satellite transponder leasing time.

First launched at the end of 1988, the Hughes satellites operating on the recently developed Ka-band (millimeter wave) system have drawn much attention. For the uninitiated, the Ka-band is designed to operate in the 20-30 GHz range of frequencies and, in order to eliminate any potential weather problems, the satellite will focus its energy into 16 spot beams directed at major population centers. A two-meter dish will handle the task of receiving the digital signal.

Originally thought not suitable for

broadcasting as it exists in 1990. With satellite technology having an impact even before 1980 on such broadcast staples as syndication, news, and sports programs, it became clear which broadcasters were not afraid to step forward and meet the future.

As Bill Craig, general manager for

the SNC network, it probably would not have purchased the equipment which is now a source of substantial revenue.

What Craig proceeded to do after the demise of the Satellite News Channel regional network was to license the WCCO facility as a common carrier, allowing it to provide uplink services of all kinds. Craig found that, once under way as a common carrier, his equipment was bringing in five times the revenue volume of the advertising on SNC. Later, the station began to do CBS and NBC news feeds from that part of the country, as well as providing a facility for teleconferencing.

The hardware which at first put WCCO in a bind and which now is a profit center consists of two, steerable 10-meter dishes on a remote site, 15 miles from Minneapolis, with a pad for a third dish poured for a 1984 installation. The new communications center built to house the radio and television stations owned by Midwest also acts as a satellite receive center providing, among other services, return feeds from the uplinks with six TVROs installed on the roof. Craig says that the facility is the only one with this kind of C-band capacity in the region.

WCCO broadcasts 5, 6, and 10 o'clock news shows with an anchor from Washington DC. Since the networks left Washington, the station is the only one to do this, and it helps them maintain their long-standing number one rating in the area. Without the satellite facility none of the station's innovative ideas can take form.

There are additional opportunities

cable/satellite at Midwest Communications said back in 1983, "It reminds me of the people at the turn of the twentieth century who owned livery stables. Those who thought they were in the transportation business and planned for that were smart. Those who thought they were in the horse business went bankrupt after a few years. People at the end of this decade who think they are in the radio business, or the TV business, may be in trouble because they are really in the communications business. And right now that means getting into satellites."

Which brings us back to 1984, where the 1990 scenario is yet to be played out. Craig spoke from his vantage point at Midwest, a communications company that owns WCCO-TV. A CBS affiliate in Minneapolis, WCCO is one of the original members of the now-defunct SNC. When the satellite news network went under, WCCO found itself in a tough situation: It had invested in a lot of satellite uplinking and downlinking equipment and the function for which the equipment was intended no longer existed. As it turned out, if the station had not entered into

broadcasting since it was limited to only 16 locations, millimeter wave technology has recently shown broadcasters that for events such as sports the signal can be sent from the site of the game to the city of the visiting team, or sent back to a network headquarters and subsequently sent out over the network by C-band or by local transmission methods. The cost of an uplink for the Ka-band system can be expected to run about \$200,000 for broadcast quality (less for those broadcasters wishing to send data, or engage in remote-printing-type functions) with the receive-only system going for less than \$50,000.

## Successful in satellites

Looking back to 1984 is a good way of discovering the genesis of satellite

## NETWORK TV SATELLITE PLANS FIRING UP

Satellite distribution of network television signals is nearing as the three major networks finalize their plans and start installing earth stations.

As of the first of the year, CBS had installed nine receiving stations at affiliates in the Southwest for tests of its C-band satellite distribution system. At press time, the satellite contract had not yet been awarded, but was due imminently. (For the test, CBS used the two transponders it leases on AT&T's Comstar D-3). According to CBS's Dwight Morss, the network chose the C-band because "we felt it was more reliable at this time." The earth stations, to be purchased by the affiliates, will each have two Scientific-Atlanta antennas, a seven-meter primary and four- to six-meter backup.

Once the testing is complete in the Southwest, CBS will move on to the Mountain time zone, and then complete earth station installations for the remaining Southwestern affiliates. David White, vice president of administration for the network's Operations and Engineering Division, says the process should be complete for the entire country by 1986. "We are planning for a slow and hopefully graceful transition," he says wryly.

ABC is also using the C-band for its foray into satellite programming, beginning with the area east of Dallas, including Louisiana, Arkansas, Tennessee, Mississippi, and Alabama. The next area to be covered will include Oklahoma, Kansas, Iowa, and part of Missouri. According to Brent Stranathan, manager of telecommunications planning, the network so far has been able to colocate the earth stations at most affiliates in these areas, and feels confident it will be able to colocate most earth stations in the Central and Mountain time zones. Transponders will be leased from AT&T, and the systems contractor for the earth stations will be Andrews Corp. (with electronics from Avanteq). Each installation will have two antennas, a 7.3-meter primary (9.3 meters in some cases) and a 4.5-meter secondary—both purchased by the affiliates, who will be paid back by the network over a five-year period. The signal will not be scrambled initially, although ABC may consider scrambling in the future.

ABC's plans differ from the other networks' in that it may not use satellites to distribute its programming in all areas of the country. Stranathan explains that because of economics and technical quality considerations, the network is considering fiber optics or other alternatives for the East and West Coasts. "When we recently test-

ed satellite distribution on the West Coast, we found we were unable to colocate 11 out of 13 cities," Stranathan adds. "This made the plan very uneconomical." In addition, he notes, East Coast stations tend to be much closer together, so fiber optics "makes a lot of sense." Satellite distribution is still a possibility, but ABC is covering all the bases at this time. The network expects to have the Central and Mountain time zones completely on the satellite by the end of this year.

NBC stands apart from the other two networks in its decision to use the Ku-band for satellite distribution. "It was Ku-band or nothing," asserts Robert J. Butler, director of engineering planning for broadcast operations. While the network is aware of the rain attenuation problems inherent in Ku-band transmission, it has found the problems faced by the C-band to be far worse. According to Butler, those problems include interference from terrestrial microwave, need for a much larger antenna, and the much lower power of C-band satellites. In addition, Butler warns, "When the FCC goes to two-degree satellite spacing, many C-band antennas below 10 meters will be picking up two satellites at one time"—a problem the Ku-band will avoid. The rain attenuation problem is not nearly as bad as it is for 13 GHz terrestrial microwave, Butler adds, and can be largely controlled with a large enough fade margin.

The network signed a contract with Comsat General Corp. last October for a 10-year lease of all equipment necessary for the conversion. The agreement calls for a total of 175 earth stations across the country, plus six transportable earth stations, eight transmit/receive ground stations, and master stations in New York and Burbank, CA. NBC will lease four full-time transponders plus one occasional transponder on SBS-3; five additional transponders may be available for weekend sports needs. Comsat's subcontractor for the earth stations is Harris Corp., which will be installing the two-antenna systems. About 60 percent will have a six-meter primary antenna; the remaining stations will have eight-meter primaries, except for two which will have 11-meter primaries. Secondaries will be three meters at all locations. NBC has already laid the groundwork for scrambling at least part of its signal. The entire system should be on air by January 1, 1985. A small number of stations in remote areas will continue to receive their signals from privately owned microwave or from repeater stations, as they do now.

for broadcasters with vision and a little capital. Craig claims that "If SNC hadn't happened we wouldn't have gotten into this. Now, it's a money-maker for us. It has also opened our eyes to new possibilities. Soon we will be specializing in local loop video. We were the first to use 23 GHz band video transmitters."

The transmitters cost approximately \$5000 each and broadcast a signal about 15 miles. A community antenna relay system (CARS) is the result of this local loop video which, in addition to other functions, allows the facility to hook to 22 cable headends in the area together with WCCO's television capability. Craig says they will be doing some data and voice transmission but will concentrate on video because it's what they know best.

The uplinking capability allows WCCO, which now has at least one person on the staff just for satellite sales and traffic separate from TV operations, to do more than handle network news feeds and local video loops. Any sports teams playing at the University of Minnesota who want the game to be broadcast back home use the uplinking dishes at WCCO. Another application Craig has found comes in the form of news. There is a medical center in town which is well known for its heart transplants in infants. Many of the innovative procedures which have been used at the medical facility have been uplinked to news organizations, individual stations, and networks.

Regional exclusivity of this type is possible for many stations in all parts of the country since many industries tend to congregate in geographic areas. Detroit has cars, there is the silicon valley in California, insurance and banking in the northeast. The list of regional concentration of industries is long and varied and provides not only news uplinking but teleconferencing possibilities to open-minded broadcasters.

Another station, also a former SNC member, which found many opportunities in its own region was WRAL-TV of Raleigh, NC. Nearby is a huge corporate research and development park, which gives WRAL an advantage with any news coming from that high tech center. Corporate concentration in these kinds of industrial parks also provides a rich source of clients for teleconferencing.

Steve Grissam, VP of a new unit within WRAL, Capital Satellite, contends. "News feeds and teleconferencing currently have about an equal ability to generate revenue. We do a lot

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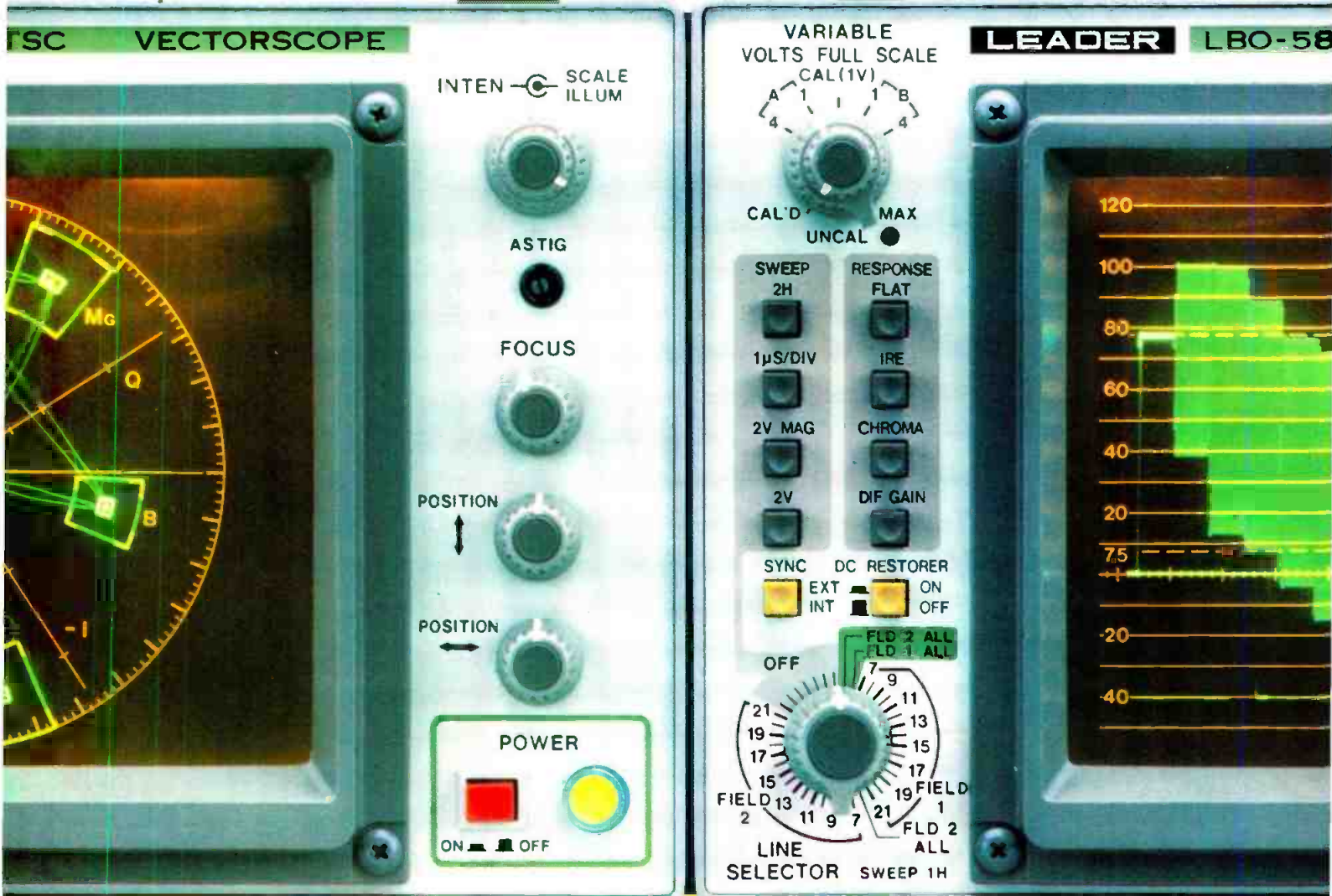
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of news feeds to the networks and to independents. We also feel that an audio system that is a dedicated network and data transmission system for corporations is a possibility and we will be doing more as time goes by."

Another way in which WRAL has used its satellite services to enhance its geographical advantage is with news reports from the many military bases in the southeast which played so big a part in recent international developments. Fort Bragg and Camp LeJeune were jumping-off points for troupes leaving for Grenada and Beirut. There is a large naval base in Florida from which information flows through WRAL uplinks.

The station is also geographically well-suited for sports. The Atlantic Coast Conference is a particularly strong one in college basketball with people all over the country interested in viewing the games. With Raleigh-Durham being right in the heart of the conference, they have a lock on national champion NC State, Duke, and University of Virginia broadcasts.

Sports are not the only way that WRAL has found to draw revenue from its uplink. Teleconferencing has looked good, with most of the business coming to them without any kind of sales effort from the station. John Greene, senior VP/GM, has assessed the situation. "We still don't know what kind of a base is there for teleconferencing, we don't know how large it is or can be, but it is there. It's expanding every day and we are now using the old SNC studio as a teleconferencing facility. It's booked."

Other possibilities have presented themselves to the station, with a regional news effort in conjunction with some cable operators still looming as a viable opportunity. In addition, the station uses its audio uplink to provide background music.

After all of the ways of using the hardware were considered, the station's parent company, Capital Broadcasting, decided to form a new unit, Capital Satellite. This unit maintains the only uplink between Atlanta, GA, and Washington, DC. The regional, North Carolina, and Virginia news networks for radio are controlled by Capital Satellite with uplinks in Richmond and Raleigh and 105 receive stations spread throughout the area. Capital installed the receive stations at its own cost to establish the network and to avoid the expense of the phone lines.

The system has proved efficient, since it cost the same as phone lines while being much easier to maintain the

## DBS PLAYERS JOCKEY FOR POSITION

Once a fantasy, direct broadcast by satellite has become a reality—a new and potentially powerful competitor for broadcasters. The first, albeit medium-power, DBS service went on the air last November 15, when United Satellite Communications, Inc., began offering three channels of movies and sports via Canada's ANIK C-2 satellite. USCI plans to switch to GTE's GSTAR satellite, scheduled for April launch, this year, and will increase its program offerings to six channels.

Although it is the only one already on the air, USCI is not the only DBS operator looking for an early start. Satellite Television Corp., the Comsat subsidiary that was the first to file a DBS application, has moved up its starting date from 1986 to the fall of this year. At that time, it plans to offer a five-channel pay TV service to the northeastern U.S. over SBS-4, upgrading the service to six channels covering the eastern half of the country when it launches the first two of its four high-powered satellites. In December Comsat announced an agreement with another DBS licensee, CBS, to explore the formation of a DBS venture with other partners. CBS has been particularly interested in using DBS as a vehicle for high-definition television, and recently filed patents for a two-channel, NTSC-compatible HDTV system (see *BM/E*, December 1983, p. 17).

The other companies who had hoped for early medium-powered DBS services have had more trouble. Skyband, the company owned by Rupert Murdoch's News America Publishing Co., shelved plans to begin operations late last year and will instead wait for the launch of more powerful (45–50 W) satellites by RCA or Hughes next year. The service, which is now scheduled to start late in 1985, will offer eight channels in the eastern and western U.S. and will not confine itself to serving rural areas, as in the original plan.

Even more dramatic was the departure of Oak Industries, one of the original DBS applicants. Oak, suffering from financial difficulties, not only dropped its planned early DBS service (over ANIK-C), but also pulled the plug on its entire application. The company is still actively interested in DBS but says it will hold off from any action for several years, and probably will lease satellite space, rather than build its own birds.

Most other DBS applicants are continuing with their plans more or less as originally filed. RCA Americom, Western Union, and the Direct Broadcasting Satellite Corp. each plan to

build common-carrier DBS systems; RCA will have four six-channel satellites, Western Union four four-channel satellites, and DBSC three 14-channel birds. Hubbard Broadcasting subsidiary United States Satellite Broadcasting plans to launch a non-scrambled, advertiser-supported system over two satellites, offering its signal free to local and low-power television stations as well as individuals. USSB plans three program channels plus an access channel for station affiliates. Another license holder, Graphic Scanning Corp., has as yet taken no action.

More competition for DBS may come from a recent proposal from Home Box Office and other cable programmers. HBO has suggested that cabling scheduled to switch to Hughes' Galaxy 1 satellite this year offer their scrambled signals to individual subscribers in areas not served by cable. Since the satellite will carry CNN, CNN Headline News, and Cinemax, along with the very popular HBO, the service could take a sizeable bite out of the other operators' business. HBO further clinched matters by announcing it had reached agreement with four of the six major movie producers to include DBS rights in 1984 pay-TV negotiations.

DBS's regulatory and technical worries are gradually clearing up as the FCC prepares for the advent of the new service. The original license grants were made on an interim basis until orbital slots could be assigned by the Regional Administrative Radio Conference, held last summer; the U.S. came away from RARC with eight orbital slots, each with 32 channels, which U.S. delegate Abbott Washburn called adequate, but not luxurious. A sticky point was the power level adopted, which was significantly lower than this country's proposal. The U.S. took a reservation on that issue, allowing it to raise the power with the consent of its immediate neighbors, Mexico and Canada.

Last spring the FCC removed all doubts about the legitimacy of low- and medium-power DBS services by ruling that it was permissible to use the Ku-band (11.7–12.2 GHz) for DBS, in addition to the already defined 12.2–12.7 GHz DBS band. An industry advisory committee on technical standards for DBS has already begun meeting under the leadership of former commissioner Stephen A. Sharp; its report is due in June. And a group hoping to represent the fledgling industry, the Direct Broadcast Satellite Association, began organizational procedures last spring.

quality from end to end. Currently the system contains three channels in each state with the capability of going to eight.

### Hardware and services

Satellite technology took great leaps forward in the early 1980s. Scientific Atlanta supplied three of the major networks with the receive dishes for signal distribution of their radio programs.

Antenna Technology, noticing the trend of programmers switching satellites more than ever before, designed Simulsat, which received signals from five different satellites. In 1983 it was predicted the company would come out with uplink capability on the three- and five-meter versions of Simulsat. The three-meter version would be intended for data only and the five-meter for both video and data, meant primarily as an adjunct to a station's other capabilities.

The smart broadcasters will notice in 1984 that with a change in satellite spacing, and with a greater amount of programming becoming available by satellite, an increase in a station's ability to deal with nonterrestrial broadcasting was essential. Of course, terrestrial signal distribution was, and is, an important means of broadcasting.

There are certain types of programs that can only be distributed in this manner and, until something new comes up, will continue to be part of terrestrial-only networks.

One example of such a problem is evident with WTHI-AM/FM and WTHI-TV in Terre Haute, IN. WTHI is owned by Wabash Valley Broadcast Corp., which is owned by the same family that owns the Indianapolis Speedway. The stations were obvious choices for the headquarters for the Indy 500 radio network.

Once a year, this network reforms itself to broadcast four half-hour and one four-and-a-half-hour programs covering the qualifying runs and the Indy 500 itself. The problem with satellite logistics for WTHI comes when it tries to find a transponder. If it leases time on any single transponder, say, for example, on Westar V, many of the 700 stations in the Indy network may not be able to receive the signal, since there are stations from all networks in addition to many independents with receive dishes pointing at different birds. So far the solution has been to retain the terrestrial base of the Indy 500 radio network.

Even WTHI, though, has made use

of satellite capability with other portions of its programming. It is geographically well-placed to keep tabs on agribusiness and it takes advantage of this opportunity. It sends agriculture reports to subscriber stations via satellite, often 10 to 15 features, along with timely weather and market information. The subscribers can split the features and use them in various ways in their own news or farm programs.

Often, to handle this kind of distribution, WTHI will use an uplink owned by an educational channel in Indianapolis or the uplink at KPLR in St. Louis, MO. Uplinks in Washington, DC, are also used where agricultural stories from reporters and contacts in the capital originate.

Not only are the large cable and broadcast network systems clamoring for transponder time, but local affiliates and independent stations are searching for available satellite systems. This condition has brought a rapid change in the amount and type of hardware available. As the hardware changes, many new service companies spring up to make use of the new technology and to provide those "part-time users," like small broadcast stations, with satellite uplinking capability.

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Naturally, the service companies are eager and willing to have full-time multiple-transponder giants like any of the major networks, for clients. In this category Dalsat provides a mobile uplinking service, which includes frequency coordination, downlinking, and backup. Wold Communications has been in the transponder leasing, brokerage, and satellite antenna service business for several years and has been expanding its client list.

A new company which has signed several major league baseball teams to satellite uplinking service contracts is Meadowlands Communications. Using MA/COM hardware, Meadowlands will be doing the uplinking for all broadcasting of the 11 teams it has signed, as well as handling data, voice, and visual transferral services for the corporate world.

### Many services mean profits

It is, of course, easy to look from the vantage point of 1990 to criticize those who missed out on the action taking place in the early '80s. How could they have known of all the income possibilities from uplink and downlink services? How could they have known about the distribution of software as a

good source of ancillary income? How could they have foreseen the amount of money to be made from video game, newspaper, and magazine distribution via satellite? Then there was the potential for income to be had by using their uplinks for sending computer information as well as broadcast programs. What those who profitted foresaw was that only those stations with the facilities would be able to get in on the satellite action.

Other developments which helped satellite facility owners capitalize on their foresight included inter-satellite communication. This technology permitted satellites to communicate with each other, which, in effect, expanded the footprint of a satellite by shooting the signal to another satellite that covers a different territory.

There were, of course, negative voices predicting problems in the industry as early as 1983. Living with the restrictions of technology, spacing can only get so small, the number of transponders can only grow so big, and the number of channels that can be fitted into the spectrum is finite. All this added up to the realization that soon there would be a demand for transponder capacity that was greater than the

supply. In turn, transponder pricing was expected to rise more than 30 percent above the levels of 1983.

This supply/demand/pricing situation was predicted to hold true for transponder capacity planned into the 1990s. Predictions were also made that once video teleconferencing and DBS got into full swing, transponder capacity would dwindle very rapidly.

The positive side of the predictions was that revenues from transponder rentals would rise from the 1983 level of \$400 million to above the \$1 billion mark by 1988. And the only reason transponder leasing revenue could rise is that communications people were selling services.

After all is said and done, those broadcasters who survived the satellite wars of the early 1980s and who form a profitable communications industry today, in 1990, are those who realized that satellite operations could be a profit center for any television or radio station.

Those broadcasters who thrived during the last turbulent decade are those who were aware enough to realize the potential of satellite technology and who left their friends in the horse and buggy business behind. **BM/E**

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## **SPECIAL REPORT:**

“User-friendly” has different meanings to different editing system manufacturers—and to different editors.

# Improving the Editor- Editor Interface

By Eva J. Blinder  
Senior Associate Editor

Taken as a group, editors seem to want the same few, simple things from an editing system: speed and efficiency, with the least possible interference from the system's hardware. How those goals are achieved is another matter, however.

Today's editor can choose from a variety of differently configured keyboards, offering shuttle controls ranging from rotary knobs to joysticks to levers. If keyboards seem too mundane, there are touch screen or, just over the horizon, voice-activated systems. Are these systems really more user-friendly than their predecessors, or do they merely replace well-accepted and familiar processes with gimmickry? The answer lies not only in a look at the systems themselves, but at their actual or intended users. In this case, what's perfect for the film editor may send the video editor up the wall.

Companies that make editing systems aimed primarily at editors coming from film, or with little video experience, talk a lot about “transparency”—the system's ability to interfere as little as possible with the creative process. For those used to film editing techniques, the computer-style keyboard of the CMX 340X can be intimidating and hard to learn, so systems



*Bob Head at Henderson-Crowe's LightFinger Plus. Operator can interface system through screen, keyboard, or directly through tributaries (to right of program monitor).*

targeted for them may use touch screens or light pens (as do Control Video's LightFinger and the CBS/Sony system). Of course, not all such systems are targeted at the less-exper-

enced user—witness LightFinger Plus and the Ampex ACE.

As far as actual keyboards are concerned, the philosophical battle lines up between proponents of the computer-

WTVJ's Don Murray looks up from an edit at the station's ACE system.



style keyboard (with CMX in the vanguard) and those of the dedicated keyboard, which seems most popular among manufacturers. Manufacturers such as Bosch, Convergence, United Media, Videomedia, and Datatron have widely differing versions of the dedicated keyboard, which attempts to save keystrokes by assigning each key a discrete function. Sony apparently is not taking sides in the issue, using a computer-style keyboard for its BVE-5000 and a dedicated keyboard for the 3000.

Attendees at last year's NAB will remember the fanfare with which CMX/Orrox introduced its latest upgraded editing systems, the 3400 and the 3400+. According to company officials, both systems represent significant advances in user-friendliness. Of the two, it is the 3400 that appears the most familiar, with a keyboard very like that of the 340X, which it succeeds. The first and most obvious difference is the addition of four "learn keys," each user-programmable to perform at a single keystroke a sequence that otherwise would require up to 80. (Similar keys have already appeared on the keyboards of several other editing systems).

According to Orrox president Philip B. Arenson, "The 'user-friendly' features of the 3400 are primarily provided through radically new software design, which allows the editor more ease and efficiency to perform his art. The software provides the human interface, and the better it's designed, the more efficient it is to get the end result. The various kinds of physical interfaces are all well and good, but software is the key to a better human interface."

### Total redesign

That philosophy hasn't stopped CMX from introducing radical changes in its interface hardware for the 3400+. This system—which probably will not be in users' hands before the end of March—offers the editor a choice of interface modes: voice activation; touch screen; and a 40-key, totally user-definable keyboard. Arenson recognizes a certain irony in this new approach. As he puts it, "We are the people who really created editing through the utilization of numbers . . . . Now, we are working diligently to supplant those numbers with words and phrases."

That happens in part through the 3400+'s "keyword" function, which allows the editor to replace scene numbers with any words or phrases of his choosing. These scene names may then be selected by touching the screen or by speaking the keyword.

CMX is quick to differentiate its touch screen system from other touch screen editors. Arenson explains: "If an editor's main focus is on the picture he's editing, and secondly on the editing system's CRT, we believe—because we were told so by hundreds of editors—that his main focus is on the monitor. We don't want to put a keyboard up on the screen or replicate machine controls by touching the screen. We feel that's not an effective use of touch screen control . . . . Touch is a vehicle for transferring information that already exists into the system." The touch screen functions of the 3400+ allow the editor to move time code numbers or select scenes without using the keyboard.

The real sci-fi aspect of the 3400+, however, is its voice recognition capability. Ed Bolger, product manager for CMX's large editing systems, explains, "We use voice as an extension of the keyboard to allow the editor to do his creative thing—extending his arms, so to speak, with voice." Arenson concurs, and dismisses some users' concerns that the computer may be confused by a room full of voices, or that it may refuse to recognize a voice if the editor has a bad cold.

Recognition is performed digitally and is based on tone and inflection, he explains, resulting in over 98 percent accuracy. To use the voice activation capability, an editor must first record his voice commands on a disc, which he then loads into the computer when he's ready to work. A heavy cold should not interfere with the computer's ability to recognize an editor's voice, Arenson claims; if it does, he can easily record a new disc or simply bypass the voice activation.

In designing the 3400+ keyboard, CMX kept in mind what Arenson calls the "revolutionary quality" of the system. "This type of keyboard has never been used by any technology before," he asserts, likening the change to AT&T's switchover to Touch-Tone. Arenson additionally notes that an entirely user-definable keyboard was the only possible answer to the editing system's increasing complexity.

"When users tell us they'd like different features, we have our engineers design those that seem most appropriate—but each time we do that, it seems to require more buttons. It seemed very obvious that as the system became more sophisticated and more





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flexible, if we continued we could end up with a very large and inefficient keyboard . . . . So we're letting the computer use some of its power to allow us to have only those keys that are necessary."

### User's choice

While the new keyboard at first glance seems to bear almost no relationship to the familiar and much-copied CMX keyboard for the 340X, in actuality it can be as similar or as different as the user desires. An editor who finds that the current CMX keyboard suits his working style well can use the CMX-proposed designations for the keys, which are similar to the 340X keyboard; any other desired configuration is possible. The drastic reduction in number of keys—from over 160 to a mere 40—is possible because each key can assume up to 50 functions. To keep the arrangement logical, the functions are arranged in levels according to a user-defined "template": the first level will contain the broadest, most abstract functions, and higher levels—revealed by pushing a button—will have more and more specific versions of the same function. "When you consider the greater versatility of having one device able to serve both simple and complex editing situations, the value of the templates becomes obvious," says CMX executive vice president and general manager Al Behr. "The device can be tailor-made to suit the facility."

Deliveries of the 3400 and 3400+ are still pending, but CMX has already updated software for several 340Xs to an intermediate point between the 340X and the 3400. One facility that has received the new software is Editel New York. Maintenance supervisor Tom Eyring says that three of the facility's seven 340X systems will be converted to the interim system; one had already been upgraded at press time.

Eyring predicts the 3400 will gain quick acceptance by the industry but admits to some doubts about the 3400+ (although he notes that Editel will get "at least one" 3400+ system). "The 3400+ keyboard is an interesting approach," he says, "but I can't predict how popular it'll be. Editors are so familiar with the 340X keyboard that they almost don't look at it for routine edits. CMX has built up a lot of momentum with that system, which they'll have to fight to introduce a totally new keyboard." Despite CMX assurances, he remains a skeptic on the voice activation capability. "The touch screen could be useful in addition to a key-

board," he adds. "but when you're jabbing your finger at the screen for 12 or 16 hours, it gets old very fast." Editel's editors gave Eyring mixed opinions on the new systems; as a group, they were pretty satisfied with the current CMX keyboard. "Most regard the speech recognition capability as a toy, unless it gets very sophisticated," he reports. "One thought the touch screen was a neat idea when used



*CMX 3400+ with touch screen and completely user-definable keyboard.*

in conjunction with the keyboard, and a couple wanted more user-programmable sequence keys." Whether the reservations of Eyring and his staff will drop away remains to be seen. The proof of the system, after all, is in the editing.

### Touch screens

A number of editors and manufacturers question the ergonomics of touch screen systems, suggesting it could be excessively tiring to keep an arm extended during a long editing session. Manufacturers and users of the two touch system screens currently in operation—Control Video's LightFinger and Ampex's ACE—disagree. Editor interaction with the LightFinger is entirely through the screen, according to Control Video's vice president for research and design, Larry Seehorn. A full typewriter-style keyboard is provided with the system, but it is used only for entering numbers and notes.

One of the common complaints about touch screen systems is that they are slow to use. Seehorn admits that to completely rewrite the LightFinger screen takes two seconds, but says that partial rewrites—a more common situation—can take less than half a second. "Rewriting screens all the time

upsets the editor," says Seehorn. "He needs to keep some familiarity. Therefore, we keep functions in the same place as much as possible."

A user, Bob Head of Henderson-Crowe Productions in Atlanta, finds his LightFinger Plus system "pretty quick once you adapt to it. Once you get used to the box telling you how to do it, it's quite pleasureable." While he found it initially slower than other editors, he says that the system is especially good at helping out an operator who's made an error. Also, the system's ease of use makes it safe to allow clients to "push the buttons" if they have a yen to do so. "My clients really enjoy that," Head says. "A lot of people may be intimidated by the Finger because it's such an unorthodox approach," he adds. "My clients love being able to understand what's going on. They can get involved with the process, which makes them happy with the house."

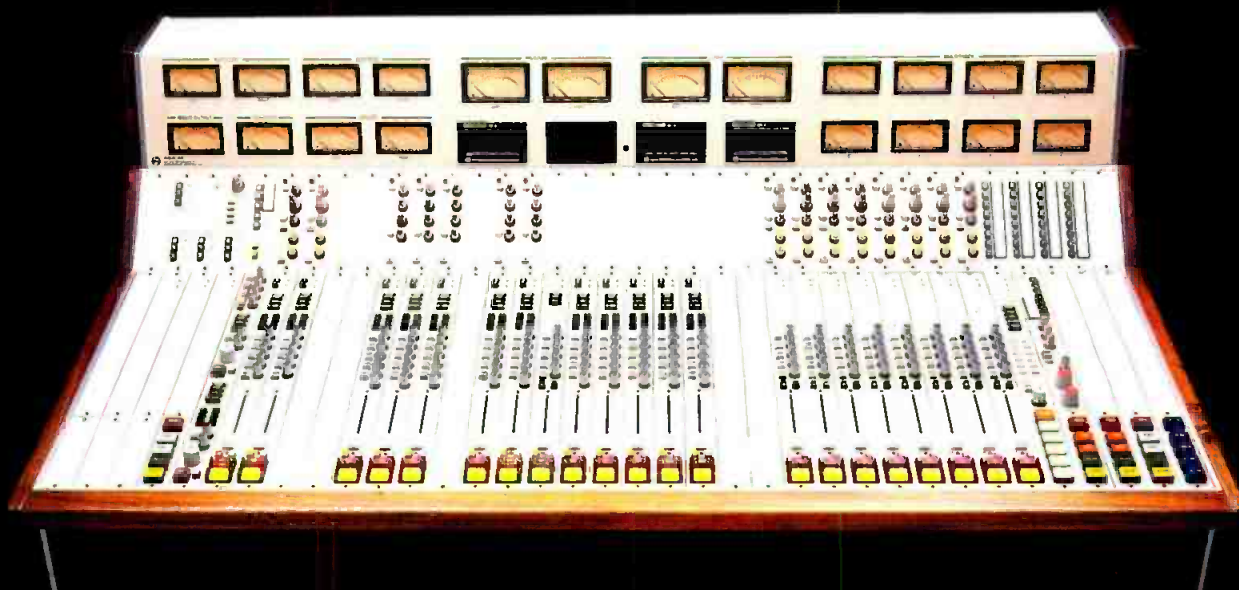
Head admits he "had a time convincing people in the marketplace the LightFinger was as efficient as the CMX," but says acceptance problems have been resolved. His main complaint with the system is that the VTR shuttle control—a strip at the bottom of the screen—is less responsive than he'd like, and he would like to see a standard rotary knob as an option.

The other touch screen system presently on the market is Ampex's ACE editor. Unlike LightFinger—which is aimed more at the industrial market, although capable of high-end applications in its most sophisticated configuration—ACE is designed for broadcasters and production houses. WTVJ-TV in Miami, FL, has had an ACE system installed in its one-inch editing suite since April 1982, and the station's Don Murray has found adaptation to the touch screen easy. As he describes it, ACE is available with three interface options: a standard ASCII keyboard; a dedicated keyboard; or the screen.

"We have just the touch screen," Murray says. "The only time we need anything else is for entering file numbers, and for that there's a small, typewriter-style pullout keyboard at the bottom of the screen." The main pages used in the ACE system include the edit decision list itself; a construction page, where all actual editing is performed; a systems page for choosing assemble or insert modes, color frame editing, and similar functions; an effects page; and a hardware page for assigning transport numbers and other information. A feature Murray particularly likes is the

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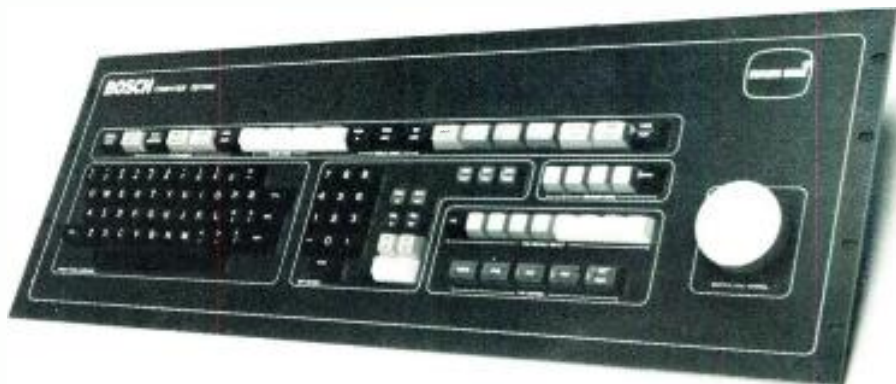
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Light-colored keys (except numerical keypad) on Commander II keyboard (below) light up during operation. Mach One dedicated keyboard (at right) includes a full typewriter-style section.



ability to arrange the construction page according to user preference; the edit decision list will then follow the construction page in format. "With this system," he explains, "you can take all the extra stuff you don't need off the screen. Once you're familiar with the system, you can start adding it back in."

According to Murray, changing pages is not a drawback because most editing is done on the construction pages; changing, when necessary, is rapid. "Once you build up speed on the system, it's a tossup as to whether a fully dedicated keyboard is slower or faster," he states. "With this kind of system, you don't have to take your eyes off the screen to go to the keyboard." Shuttling is controlled from the screen or from a joystick, which can also mark entry and exit points.

### User keys

User demands for more flexibility have led other manufacturers to modify their systems for additional leeway. User-programmable sequence keys, for example, are beginning to appear on editing system keyboards, including those of United Media's Commander II and Videomedia's Vanguard. And users contacted by *BM/E* agreed that such "soft" keys are an especially helpful feature.

Not all manufacturers have come around to that way of thinking, however. One example is Bosch, whose Mach One has a dedicated keyboard, with

keys arranged in color-coded groups according to function. "We have no user-definable keys because each key has a dedicated function," explains Mach One applications engineer Norman R. Burraston. "Our customers haven't requested it. We know the competition has it, but we haven't received that kind of response." One modification customers did request, and which Bosch supplied about two years ago, was a rotary shuttle control knob.

The Mach One dedicated keyboard, one of the most extensive of its kind, has been modified several times since its introduction in 1976 or 1977. As it is now configured, it provides a top row with 32 key functions (12 shift and 20 nonshift), a standard typewriter keyboard plus numeric keypad, and an edit control section for selection of edit mode, source, and edit point, and VTR control. "We have a completely different philosophy of editing from CMX and other companies," explains Burraston. "Instead of working on a scratch pad list, where everything has to be perfect before you store it, you always work on an active edit decision list. It's much more efficient." To modify a record out time, for example, the editor simply goes to the correct line on the EDL, pushes the update button, and adds or trims out the desired number of frames. The computer automatically updates and ripples the list, with no further action by the editor.

Another advocate of the dedicated

keyboard—the most common kind of user interface—is United Media, whose Commander II is now offering keys that light up when used. "The lighted keys offer more direct operator feedback," says United Media's Bob Ricci. "All the major functions—for example, whether the editor is in the insert or assemble edit mode—are lit. We tried to use the CRT for operator feedback, but often editors don't look at it.

### Direct approach

"So much lip service is given to 'user-friendliness' these days," Ricci continues. "My personal feeling is that nothing is more user-friendly than the direct pushbutton approach." He suggests that a touch screen display, which changes during use, may slow an editor down, although it may be good for novices. "Any time you have to reorient an operator you run into a detriment," he adds. "We're creatures of habit." The ideal situation, in Ricci's view, would be for each key to have only one function, but that would obviously result in an impractically large number of keys. The Commander II does offer two user-programmable keys, each capable of handling up to 120 events.

"Most of our end users will admit that we're at least twice as fast in operation as a computer-type keyboard," boasts Hank Wilks, national sales manager for Videomedia. An unusual feature of the dedicated keyboard of the Z6000 editing system is its arrangement into separate source and record sides, each with its own shuttle lever. The levers, which move only in a side-to-side direction (not in four directions like a joystick), allow both transports to be manipulated separately. A "cruise control" button allows the editor to set the lever at the desired shuttle speed; he needs only to touch the lever to stop the machine.

According to Wilks, Videomedia has tried to forestall one of the drawbacks of the dedicated-keyboard approach by constructing the keyboard with several unused keys—providing

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for future expansion without total redesign. (The system's upgrade from the Z6 to the Z6000 included a partial change in keyboard layout, with list management functions added.) The system is designed to allow the editor to ignore numbers as much as possible; scene numbers may be entered by the keypad, but the machine will load the numbers by itself if the editor finds the scene with the levers and hits Perform Edit. Prompting messages on the CRT help the editor remember the correct sequence.

Alan Miller, director of post-production at Rebo Associates in New York City, says he finds the dedicated keyboard of the Z6000 convenient in use. "It saves you the problem of hav-

that's most accepted by the high-end production house market."

Datatron's latest software additions to its Vanguard system include five user-programmable keys, each of which can store up to 20 keystrokes; the keystrokes can include a pause for entry of additional information or even other user keys. Another addition is a rotary shuttle control knob, which can be positioned on the right or left side of the keyboard at the editor's discretion. The company has also added a "help" feature that functions as a built-in user manual; by pressing Help and any specific key, the operator gets a CRT display of all that key's functions, along with the necessary keystrokes. Datatron's video operation was ac-

control are essential. In addition, the joystick's functions are not limited simply to shuttling a VTR that's already been called up; it can call up VTRs and perform a number of editing functions, aided by three buttons to its left (replay, perform edit, and preview edit) and in and out buttons above it.

"We see the 200 Series as a 'work-horse,'" Harter continues. "There are lots of exotic things that people want to do five percent of the time. We dedicate ourselves to the editor who's spending hours and hours doing simple edits." To make it easy for the editor to change his mind, the 200 Series has an exchange register that can store two alternate versions of an edit, allowing the editor to switch back and forth between them and decide. In addition, a pending list management function lets deleted edits remain noted in the list until final cleaning; they will be ignored during auto assembly, but the editor has a record of them if needed.

## Star Wars

Another example of user-friendliness is EditDroid, the video editing system Lucasfilm has developed and is now preparing to market in conjunction with Convergence. Designed for use primarily by film editors—who are notoriously intolerant of the more technical aspects of video editing—EditDroid interfaces with the editor entirely in English, with no need for computer syntax, according to Moscarello. To make this possible, the computer needs the power of five Motorola 68000 microprocessors—a very fast, 16-bit chip. Moscarello estimates that the system can probably store between 100,000 and 150,000 edits. "At that level, numbers become meaningless," he says. "Essentially there's no limit.

"Our number one principle," he continues, "is to have the computer become completely transparent to the aesthetic function. EditDroid has an extremely simple keyboard—the editor needs to make no concessions to the computer." Both Lucasfilm and Convergence are coy about what the system will actually look like, although Moscarello suggests it will resemble something out of *Star Wars*. At any rate, Convergence promises to have two EditDroids in its booth at this spring's NAB show, plus a third in a suite.

Although the initial market for EditDroid will probably be feature film producers, Moscarello sees the system eventually finding a home in the video market. "EditDroid is so radical and



ESC-204 editor, with characteristic Convergence joystick.

ing to change menus or go through complicated routines," he notes. As far as "feel" is concerned, he sees little difference between a rotary shuttle knob and Videomedia's lever controls; an advantage to the levers is that they can bring the VTR up into search automatically from stop, saving a keystroke. Miller feels the lack of user-programmable sequence keys, but believes Videomedia is planning to add them.

Sony, which uses a computer-style keyboard for its BVE-5000 editor, uses a dedicated keyboard for the BVE-3000. "It's much easier for the beginner to learn," says Sony's Attila C. Bitto, "but once they learn it they think things could be done with fewer keystrokes." The computer-style keyboard may be more difficult to learn, Bitto suggests, but it pays off in increased flexibility. Besides, he adds, "At present, it's this kind of keyboard

quired by Paltex Editing and Production Systems of the U.K. at the close of last year.

"Keystrokes are a real issue with us," states Convergence Corp. marketing manager Debra Harter. "We're constantly trying to find ways to eliminate keystrokes." Even so, Convergence's new 200 Series, introduced at the 1983 NAB show, incorporates a full alphanumeric keyboard for the first time in company history. "We want to give the editor whatever configuration he needs," Harter explains, adding that the main use of the keyboard will be for adding comments to the edit decision list.

The main job of editing on the Convergence system is done with the joystick, which Harter and marketing VP Richard Moscarello say is faster than a rotary shuttle knob. Moscarello points out that the joystick is widely used in video games, where speed and



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flexible that it will reeducate the video market to a large extent," he asserts. "Film people will fall into it naturally, but for video people there will have to be a process of education. They will have to learn they can do everything they can do with present video editors and more."

Another system initially designed to appeal to film editors is the CBS/Sony half-inch editing system installed in the CBS Studio Center in Los Angeles, (*BM/E*, July 1980, p. 26). Operator interface with this system is by a light pen touched to the screen; unlike Light-Finger and ACE, it is a menu-based system. "The operator is only confronted with those specific instructions he needs at any one time in the editing process," explains CBS's Dwight Morss. "Film editors are put off by the complexity of video editing, so we tried to make the process as analogous to film editing as possible."

The most unusual aspect of the CBS/Sony editor, which uses modified Beta decks for both record and playback, is its checkerboarding capability. The off-line system never makes an actual copy of the final edit; rather, it records successive scenes alternately on the record VCRs (the system can handle up to



*Datatron's Vanguard editor has a new rotary VARASCAN™ control (not shown).*

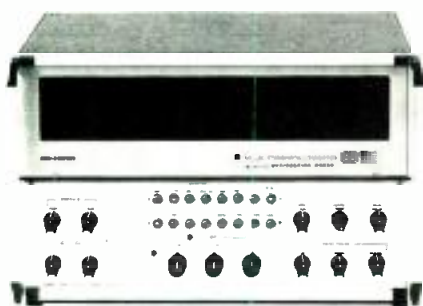
six) and simulates playback in a manner transparent to the user. This allows the editor to change scene length independently, with no effect on any other edit—a feature that brings the process much closer to film editing. Although CBS has licensed the technology to Sony for manufacture, Sony at present has no plans to market the editor as a product, according to a Sony spokesperson.

With so many diverse definitions of "user-friendliness," what's an editor

to do? The first, and most obvious, answer is to form a clear picture of his own—and his client's—needs and abilities. The very experienced editor may hardly look at the keyboard or CRT display during a routine edit on a system he's familiar with; such an editor needs relatively little in the way of CRT feedback or instructions. Users with somewhat less experience or expertise probably will welcome a little more "interference," however. For a user who relies heavily on CRT feedback, a touch screen system may be ideal. A current or former film editor may want video hardware and time code numbers to stay as far in the background as possible, while a more video-oriented person may want to be aware of every step in the process.

There's no doubt that the keyboard—dedicated or computer-style—remains the prime choice of most editors and system manufacturers, and probably will for some time to come. Change in human interface has mostly been of an evolutionary nature—but both CMX and Convergence/Lucasfilm are betting heavily on revolutionary systems. Are they headed in the right direction? That decision can only come from the editors. **BM/E**

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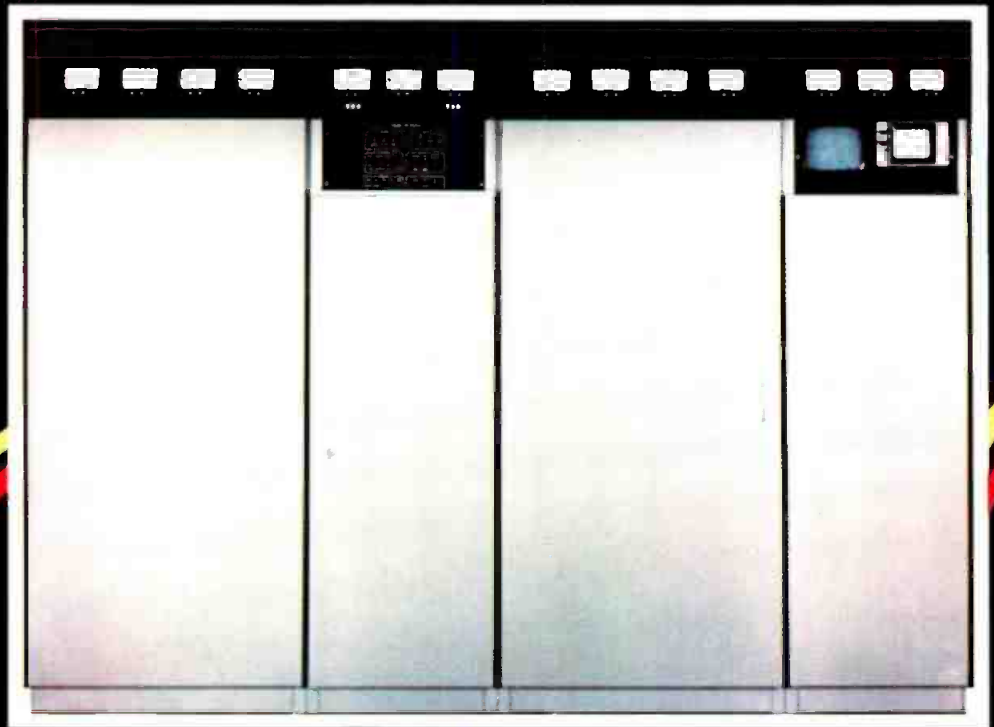
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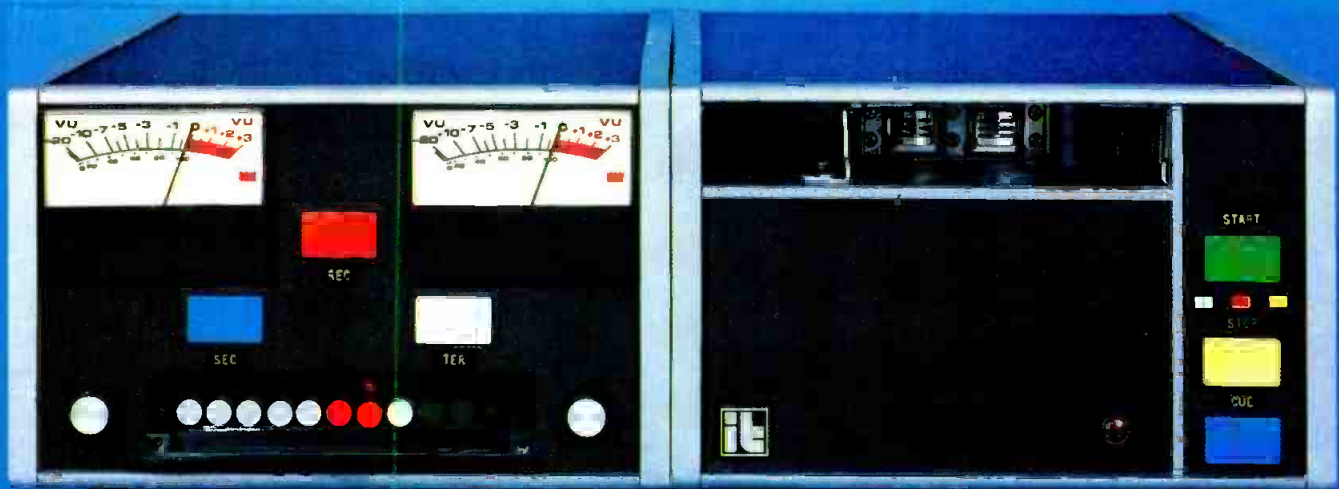
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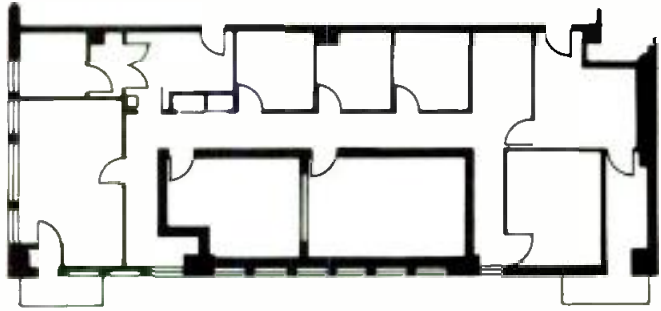
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# 3M

# FACILITIES DESIGN AND ENGINEERING

## PART 12



# THE NETWORK RADIO FACILITY

BY BRYAN D. BOYLE

*Some of the theories of facility design and engineering contained in other parts of this series have been put into practice by the ABC Radio Network, which will shortly be operating out of a brand-new home in New York City. Bryan D. Boyle, radio master control/computer system manager for the network, describes some of the planning that went into the new design—Ed.*

What do you do when you are the largest single provider of network-originated programming and the facility you are operating in is 15 years old? The first thought that comes to mind is to build a new shop. But defining the specific needs of such a new facility can be quite complex. For when you are a 24-hour-a-day, seven-day-a-week operation, whose newsroom beat is the world, who must provide, for some affiliates, the only source of international news, and who must deliver that news by a digital satellite system, your new facility must make room for it all. Add in the requirements of covering major national events, Olympic Games, and providing quality stereo programming at the same time, and it is obvious that a lot of advance planning and work has to go into the design, construction, and operation of a network facility.

ABC decided to upgrade the facilities for its successful

radio network division because the plant it was operating in, while state-of-the-art when it went back on the air in 1968, was not capable of efficiently handling the needs of the expanded six network broadcast hour, along with the increased production and diversified programming that is evolving for the future. In conjunction with this, when the decision was made to enter the satellite age with the transmission of network programming via the RCA Digital Audio Transmission System (DATS), the need became apparent for the highest-quality audio chain that ABC was capable of designing and placing in operation.

## DESIGN CRITERIA

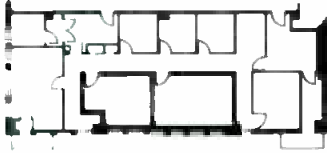
The most critical stage in the construction of any new facility is planning. It is here that the possible problems that could compromise the operation should be considered and worked out of the plans. According to Richard Martinez, director of technical operations for the network, the foremost thought in designing the new facility was "to get down to the basics of our operation: What it is that we are trying to do, and why we do it that way. Often when designing a new facility, the idea is to take what you have and improve on it. But we decided to start at the baseline and go from there, with no preconceived notions as to how the plant should be designed."

In the past, ABC Radio had a special studio area that was set up as needs arose for such special events as national elections and the like. One of the major design criteria was that the new operation be able to handle the increased workload presented by such events without building or modifying existing studios to allow for such increased coverage.

Another agreed-upon standard was that the studios should be designed and equipped identically, so that an engineer could walk into any studio (the two multitrack studios being the exception) and get right to work without having to readjust his/her operating technique. All incoming audio sources would be at the same routing switcher assignment position, the tape machines and cart rack would be in the same place, and even the audio consoles would be as identical as possible from room to room.



Rows of Ward-Beck consoles await installation at new ABC Radio Network facility in New York City.



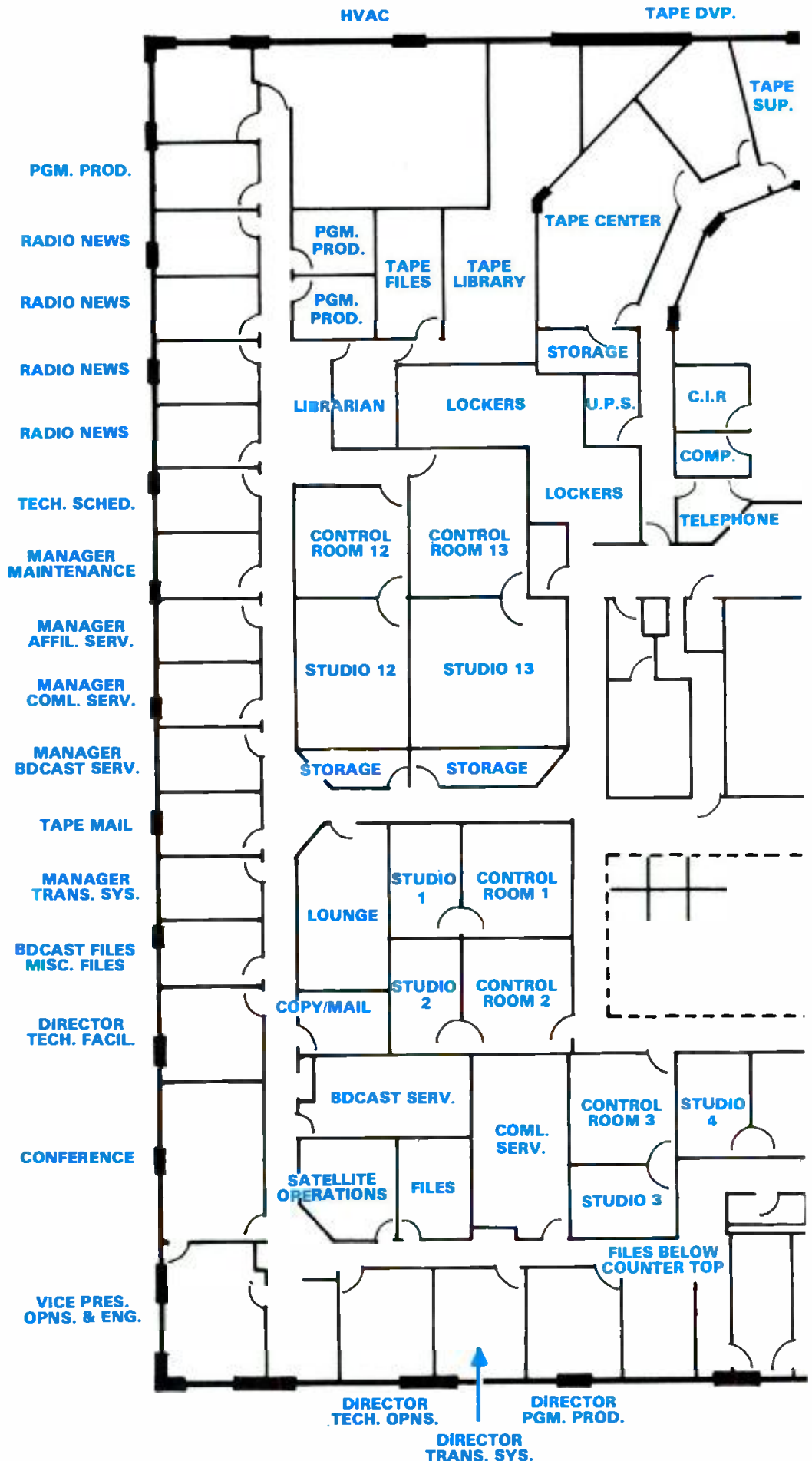
# FACILITIES DESIGN AND ENGINEERING

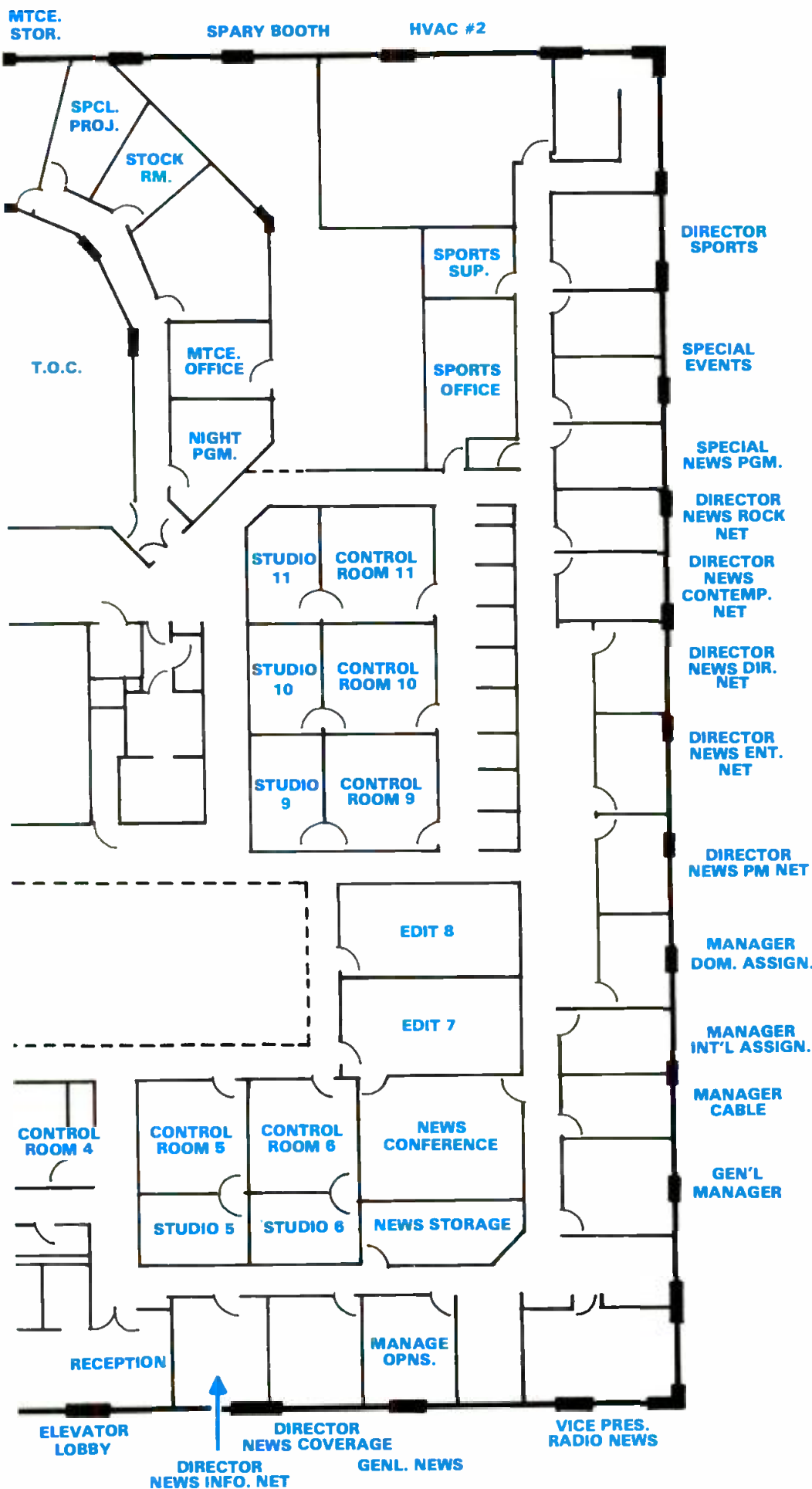
## STARTING AT THE BOTTOM

In line with this philosophy, the ideal path would, of course, have been to build a new facility from the ground up. That way, the building would be designed with the broadcast facility in mind, and there would not have been any of the inevitable compromises made between reality and what a broadcast facility demands. New York City being what it is, however, short on land and long on construction costs, meant that ABC felt that a build-from-scratch approach would not be a cost-effective solution to the problem of where to locate the new facility, and how long it would take to place the new plant on line.

One type of building that seems to be favored as the potential site of a broadcast plant in an urban environment is a parking garage. The floor and frame of the building is constructed to support the weight of any number of automobiles, the ceiling is usually high enough to allow for overhead cable trays, and, if the building was constructed to provide a large parking area, the floor space is great enough to allow the entire operation to be placed in the same area. Add to this the fact that, because it is a garage, the area is open, with no load-bearing walls to remove, and you have close to the ideal area in which to construct a station or network operation—in essence, a large box in which to locate a new facility.

ABC purchased a former parking garage at 125 West End Avenue. After a survey of other buildings in the Lincoln Center area in Manhattan, it was decided to locate the net operation in that



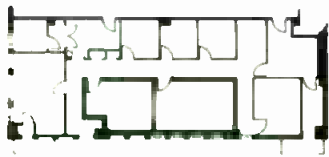


building. The floor plan was carefully designed so that the existing support beams were integrated into the proposed walls of the new facility—so successfully, in fact, that there are only two exposed columns, and they are in nonoperations areas. In all, the new building provides for over 40,000 square feet of floor space.

## ACTIVITY LEVEL PLAN

One major improvement in the new network facility over the existing one is that the center of the floor, which comprises the newsroom and on-air studios, was intentionally designed as the busiest area, with activity level cleansing as one moves away from the central hub. This was decided on so that the busiest areas were not subject to walk-through traffic, which would disturb the normal flow of work. Also, the news correspondents would be close to their respective air studios, allowing them to get into their studio without having to walk through the entire newsroom to get on the air. This segregation of work areas, all radiating from the center, adds to the efficiency of the work environment, and provides for a smooth flow of people, from on-air to support and management personnel.

Obviously, in the design and construction of a major project of this type, there are a lot of equipment and supplies that must be specified and ordered, and the arrival of the equipment must be scheduled so that the cables don't arrive after the consoles, which arrived before the walls were put up. Along



## FACILITIES DESIGN AND ENGINEERING

with this, the decisions as to what the manufacturer should supply what piece of equipment, based on availability and suitability in the operation, were made early in the design process so that possible difficulties were able to be planned around.

The major question was what group of vendors should be chosen, or should one vendor be picked to do the entire plant? Could ABC, because of the amount of equipment to be ordered and installed, essentially ask one vendor to close down its operation for a year or more to construct the equipment? Even for the largest of our vendors, such a decision would strain their resources. The design team, also responsible for writing the bid specifications, decided to break the proposed technical equipment into bite-sized chunks, so that one vendor would not be responsible for the entire plant, and could give the maximum effort to its part of the equipment design.

Because of the long lead time needed for the design and production of equipment, ABC also spent much time looking into existing systems that could be used either off the shelf or with minor custom modifications to fine-tune them for our type of operation. Most of the vendors supplying the equipment were happy to comply with the request, since because of the volume of the modifications, such changes are cost-effective for a manufacturer to perform as long as they do not require major equipment redesign. As an example, some line amplifiers were to be provided by McCurdy, but ABC's design called for even more stringent performance specifications than were called for in normal facilities. McCurdy made these modifications, which yielded amps with less than 0.01 percent distortion, headroom of +20 dBm, and signal-to-noise figures of better than -80dB.

Also very important in the final decision were the obvious specifications of the quality of the equipment, and whether the delivery date could be met. Since this facility was designed on a two-year construction cycle, rather than the normal four-year process, this last consideration loomed as one of the major points that had to be considered.

### ERGONOMIC DESIGN

Another factor in the choice of equipment was the ergonomic design. Taking into account the differing skill levels of the engineers that would have to operate the fa-



**Workers install wallboard in offices that surround central working areas and studios.**

cility, and the press of time that occurs in high-pressure situations, complicated consoles and nonergonomic control positions were eliminated early on in the design process. The final design made for a very flexible operation

that could be mastered in the short cutover time from the old facility to the new.

Each piece of equipment was chosen on its own merits, based on its projected use in the new facility. Major amplifiers in the chain were chosen from McCurdy. Consoles were designed and produced by Ward-Beck. And a computer controlled routing switcher, reconfigurable by plugging in EPROMS at the control end, were designed and produced by AVL in Toronto, Canada. If a desired piece of equipment was to be included and was able to meet the ABC specs, ABC Broadcast Operations and Engineering worked with the vendor to make sure the design of the equipment was as state-of-the-art as possible.

The audio chain in the new facility is entirely analog until it reaches the DATS system. ABC did consider the digital audio recorders that were available, but since they would be used for commercial integration into existing programs, it was decided that Instacart machines from IGM would be better suited to our operation. This was not to denigrate the advances in digital technology; because the design involved the lifeblood of the operation, we went with the reliability of analog systems. Otari provided the MTR-10 series of stereo tape machines, modified to ABC specs, and ITC provided the bulk of the studio cartridge equipment.



**Each Ward-Beck unit seen here will connect an ABC studio with the computer-controlled intercom.**

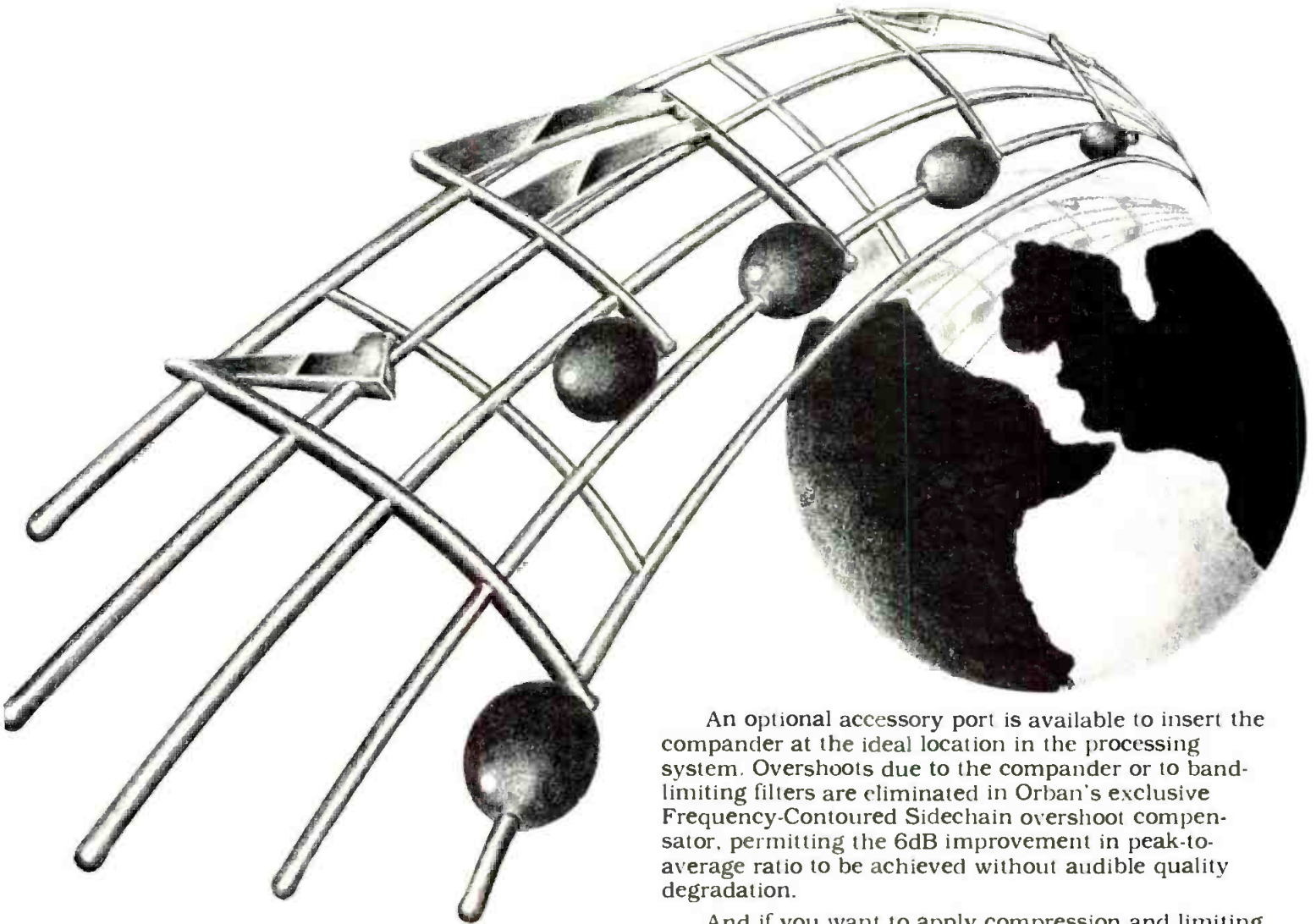
### COMPUTER CONTROL

As must be true in any plant of this size designed around state-of-the-art equipment, computer control and record-keeping were designed in early to replace the huge bulk of paper that is generated in the course of a day. The commercial automation system was designed around a pair of Data General Eclipse S/140 minicomputers, running custom switching software under the RDOS operating system, and obtaining the traffic information from a dedicated Compuro 8/16 micro under MP/M. Backup storage for the traffic computer, and ultimately the Data Generals, is an Industrial Micro Systems 8000S multiuser micro, operating off-the-shelf software and custom programs designed in-house by the author.

Considering the advances in the state of the art, the question will invariably arise: How many "smart," or microprocessor-controlled, pieces of equipment will be installed in the new plant? Considering the routing switcher (which will assist the operator in deciding which program will go on which of the 19 satellite channels), the IFB/intercom system (which can be field-configured by changing the programming in its EPROM), the consoles, the commercial automation system, the tape machines and so forth, perhaps the more pertinent question would be "what equipment doesn't have the microprocessor control?"

### NEW AUDIO CHAIN

Currently, ABC Radio is providing programming to its affiliates through an old audio chain. With the demands of



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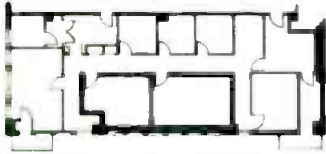


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## FACILITIES DESIGN AND ENGINEERING

the DATS system, such as compressors, equalization, and bandpass filters, necessary because of the restrictions of the existing land line network, had to be rethought in light of the "transparent" transmission possible with the satellite technology. Instead of this overhead of equipment, a new path was taken in the design of the audio chain, eliminating any equipment that either added or subtracted from the quality of the signal: when the bottom line was reached, it was decided to eliminate everything except for a peak limiter to protect the satellite channels. This leaves the decision of whether to process or not to process entirely up to the affiliate station. ABC's task is to provide the cleanest signal possible to those affiliates, in line with the transmission techniques employed.

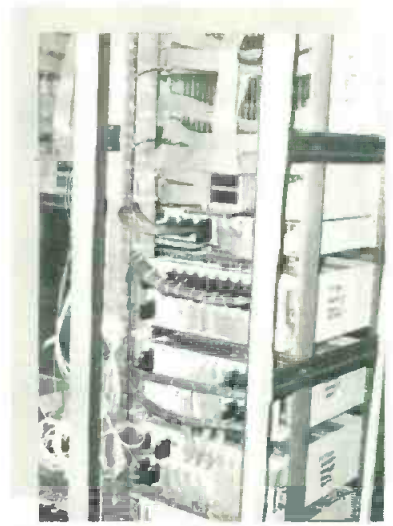
### YEAR OF ACTIVITY: 1984

Perhaps the greatest test of the validity of the design process will be in 1984—the year of the Yugoslavia-hosted Winter Olympics and ABC-hosted Summer Games. Add in the demands of covering the quadrennial nominating conventions, at about the same time as the Summer Games, and the decision to place the new plant on line at this time is a monumental undertaking.

(To reduce the double burden of major events coverage and getting the facility operational, the technical management of the Radio Network made a concerted effort to cut

down on the constant shipping and setup of the remote equipment that will be used at the events. Sixteen-input, four-channel Yamaha mixing consoles, ITC cart equipment, Otari tape machines, and other high-quality equipment was purchased during 1983, and complete remote packages were constructed in cases specially designed by Calzone. All the wiring was previewed in New York prior to shipment, to the remote sites, allowing potential problems with the design to be worked out with our larger staff of design engineers than would be available at the remote site.)

ABC has made a major commitment to providing the highest-quality programming available to its affiliates, and the decision to go on line with the RCA DATS system, the design and construction of the new network facility at 125 West End Avenue, and the complete range of program services for all the special events during 1984 promise to add up to a banner year for the technical operations of the ABC Radio Network. **BM/E**



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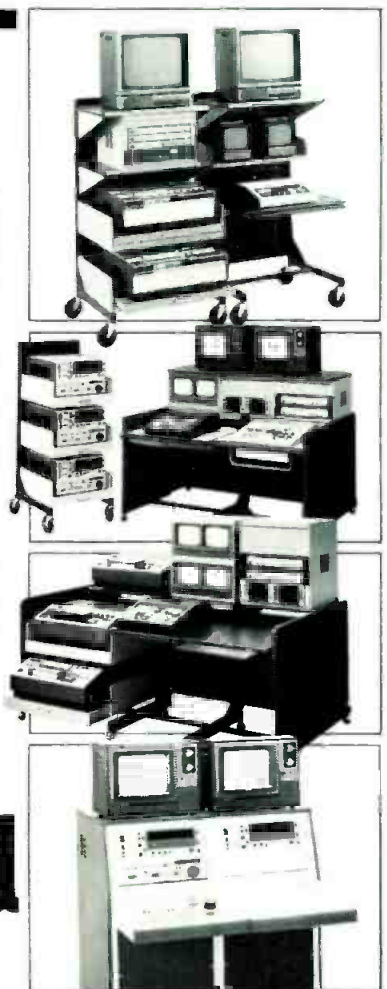
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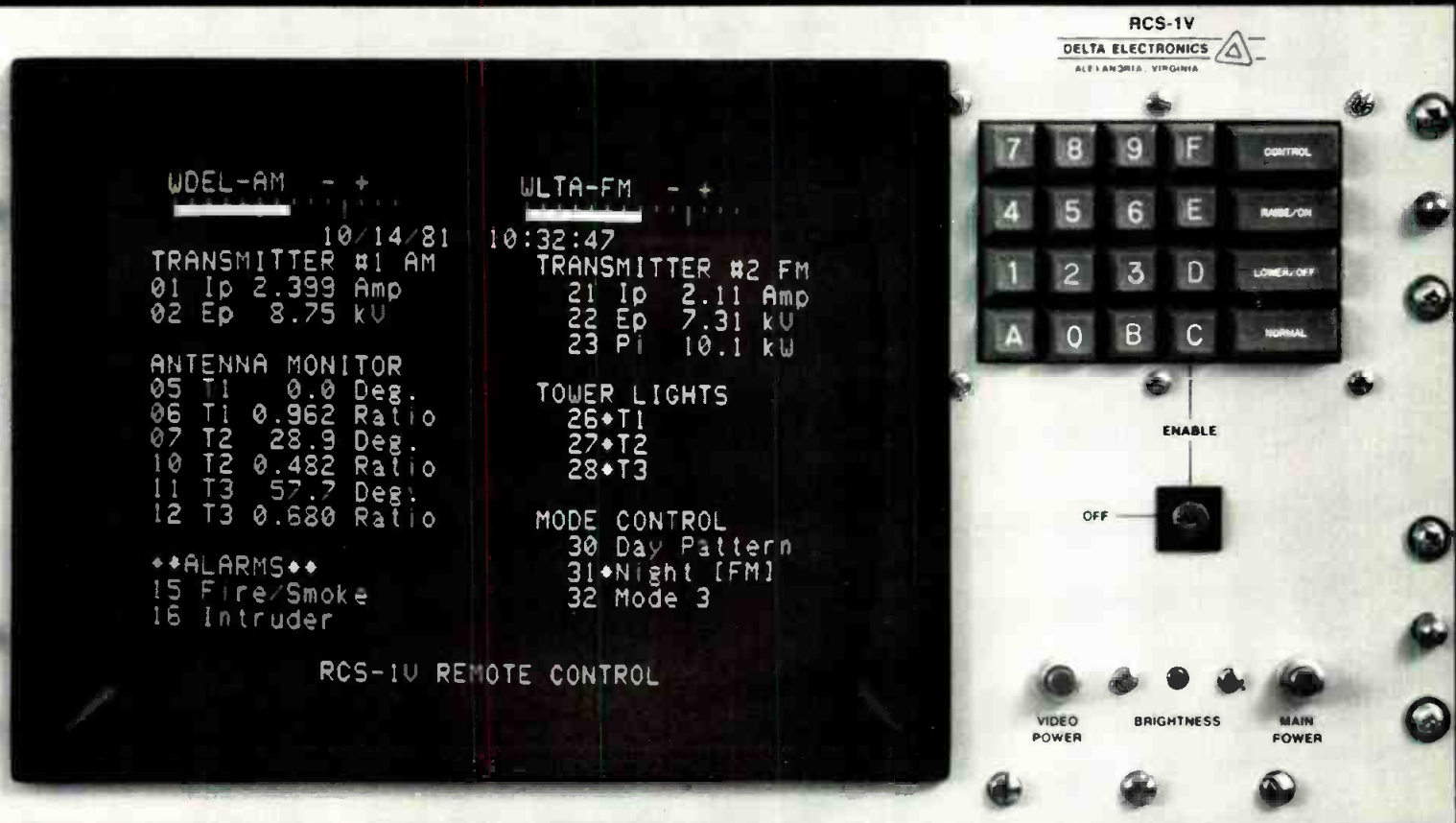
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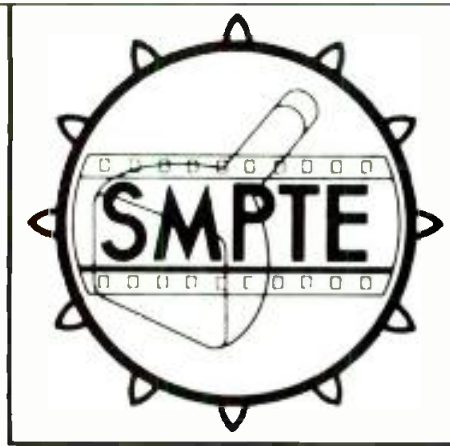
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roadcast technology progresses so fast that the future never seems very far off. For this reason, the papers to be presented at SMPTE's eighteenth annual television conference cover topics that were blue-sky just a couple of years ago—but are now beginning to emerge into reality. Meeting February 10 and 11 at the Queen Elizabeth Hotel in Montreal, Canada, the conference will address the theme, "Image Quality—A Time for Decisions," with sessions devoted to various aspects of the burgeoning technologies.

This theme will extend into the concurrent equipment exhibition as well, with the floor limited to equipment that relates directly to the technical papers. Exhibits will be open both days from 8:00 a.m. to 6:00 p.m. In addition, the conference will feature the Technology Demonstration Center, described by SMPTE as "a special engineering-type exhibition of advanced television systems."

Exhibitors in the Technology Demonstration Center will be RCA Laboratories, Philips Laboratories, Bell Northern Research, and the Institut für Rundfunktechnik (Munich). Exhibiting in the regular hall will be Ampex, Hitachi, Grass Valley, ColorGraphics, Sony, NEC America, Fortel, Cinema Products, 3M, Broadcast Video, Solutec, Electro & Optical Systems, Leitch Video, MSC Electronics, and Video International.

Friday morning's session, "Basic Concepts and Perspectives," will include technical and nontechnical looks at the concept of image quality,



including two papers dealing directly with the psychodynamics of image perception. Also of interest will be a paper on the scanning process, presented by Gary Tonge of Britain's Independent Broadcasting Authority.

The afternoon session Friday will focus on new recording technologies and will cover both digital and analog formats. Three Canadian Broadcasting Corp. engineers, Marcel Auclair, Ken Davies, and T. Cavanagh, will present a paper entitled, "The New Generation Television Recorder—A Broadcaster's Perspective." Both Takeo Eguchi of Sony and Seiichi Mita of Hitachi will read papers dealing with digital video recording, and a paper from Matsushita will describe an erasable optical laser disc.

Saturday morning will see a session on new distribution technologies, with papers on DBS, HDTV, fiber optics, cable TV, and scrambling/encryption, among others. The afternoon session on new display technologies will echo some of the morning's concerns, with looks at DBS and HDTV reception, image and signal processing, and stereoscopic television.

A welcoming luncheon on Friday, complete with guest speaker, will provide an additional chance for attendees to share ideas.

Visitors to the convention may con-

sider arriving a day early to participate in a tutorial on digital processing of video signals sponsored by the CBC on February 9. Cosponsors of the seminar are Bell Northern Research and INRS Telecommunications. The program, which will begin at 10:00 a.m. at Maison Radio-Canada on Dorchester Blvd. in Montreal, will cover sampling and quantization, digital television systems, digital transmission and distribution of video signals, and digital video processing hardware systems. Presentations will be in English, with simultaneous French translation available.

A full report from the SMPTE Television Conference will appear in the April issue.

#### **Friday Morning, February 10: Basic Concepts and Perspectives**

- "Image Quality from a Nonengineering Viewpoint," Harry Mathias, Panavision
- "Perceptual Considerations for HDTV Systems," Curt Carlson, RCA
- "Psychophysics and the Improvement of TV Image Quality," William Schrieber, MIT
- "The Scanning Process," Gary Tonge, IBA
- "Some Factors in the Evaluation of Image Quality: A British View," C. Daubney, IBA
- "Why Better Pictures?" John Lowry, Digital Video Systems

#### **Friday Afternoon, February 10: New Recording Technologies**

- "The New Generation Television Recorder," M. Auclair, T.

*program continues on next page*

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continued from previous page

### Friday Afternoon, February 10:

- Cavanagh, K.P. Davies, CBC
- "Digital Video Recording," Takeo Eguchi, Sony
- "Experimental DVTR Using Half-Inch Cassettes," Seiichi Mita, Hitachi
- "Technical Choices," John Watney, Ampex
- "Perpendicular Magnetic Recording Technology," Dr. Michael P. Sharrock, 3M
- "Consumer VTRs," Matsushita Electric
- "Erasable Optical Laser Disc," Matsushita Electric

### Saturday Morning, February 11: New Distribution Technologies

- "From Studio to Home—How Good is the Electronic Highway?" Alexander G. Day, CAB
- "A Signal Format for U.S. DBS Broadcasting," Dr. Richard Gibbons, STC
- "A Programmable Video Coder," Ulf Lombrink, Bell Northern Research
- "Fiber Optic HDTV Transmission," Toshinori Tsuboi, Yokosuka Electrical Communications
- "High Quality on Cable TV," Israel Switzer, Cablecasting, Inc.
- "Scrambling/Encryption," Keith Lucas, Digital Video Systems
- "MAC-TV Signals in an Interference Environment," G. Chouinard, Dept. of Communications
- "Distribution and Broadcasting Satellites: European Projects," Rudi Gressman, EBU

### Saturday Afternoon, February 11: New Display Technologies

- "Image Processing for Quality," William M. Webster, RCA
- "DBS Home Terminals," Dennis Fraser, NEC
- "Signal Processing for Consumer Display," R.N. Jackson, Philips
- "Display Devices," Matsushita Electric
- "Signal Processing for new HDTV Systems," Prof. B. Wendland, Dortmund University
- "Wide-Screen Approach," Dr. Joe Nadan, Philips
- "HDTV Fully Compatible with Existing Standards," T. Fukinuki, Hitachi
- "Stereoscopic Television," Rudiger Sand, IBA
- "How Do We Get There? From Here to Eternity," Renville McMann, CBS

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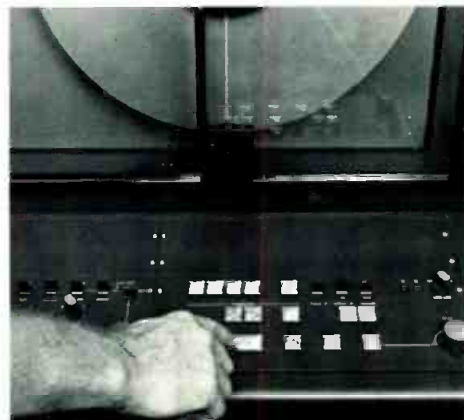
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Los Angeles' newest TV station was founded with a philosophy that intelligent hardware choices and old-fashioned hard work could enable a small station to make good in a large-station market.

# KDOC:

## Small-Town Station in a Large Market

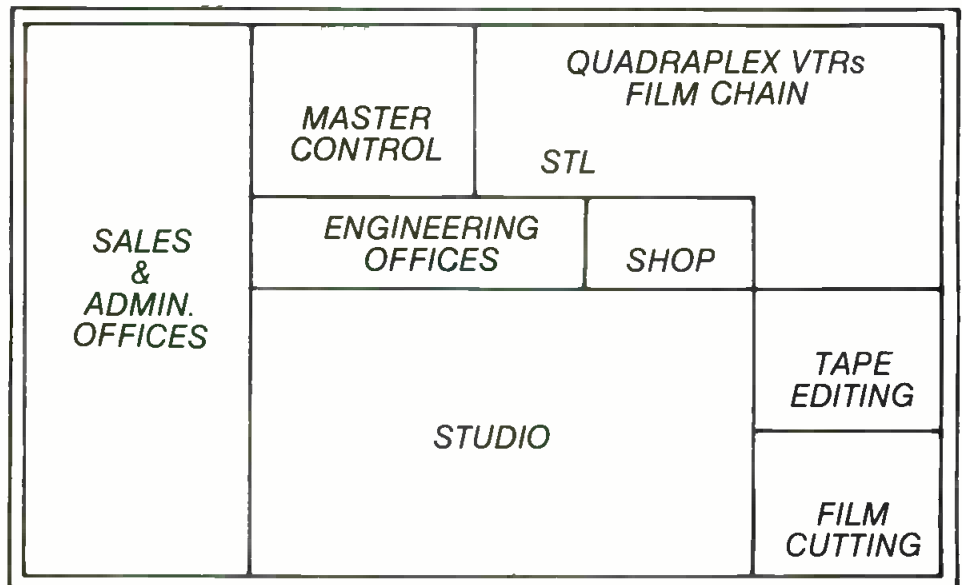
By Glenn Calderone

"We are a small-town station in a large market," says chief engineer William C. Welty of the creation of KDOC-TV, the Los Angeles area's newest television station. KDOC Anaheim signed on the air one year ago October 1—to serve sprawling Orange County as its only commercial station.

This is a story of small-town budgets, last-minute decisions, and state-of-the-art technology, making possible the existence of L.A.'s seventeenth broadcast television station. This is how KDOC evolved, from construction permit to transmitter, studio, and remote van.

The year was 1968. Entertainers Pat Boone, Jimmy Durante, and several local businessmen applied to the FCC for Channel 56. As expected, there were many competing applications. To simplify the evaluation process, applicants agreed upon one transmitter site, Sierra Peak. Los Angeles already had a dozen television stations sharing mile-high Mount Wilson (along with the 100-inch refracting telescope at the Observatory). It was clearly NO VACANCY. Sierra Peak, in eastern Orange County,

*Glenn Calderone is an independent writer and TV/radio engineer residing in Fountain Valley, CA.*



*Floor plan of KDOC-TV.*

seemed to meet all the normal requirements (such as 20 miles away from second-adjacent Channel 58) and, although not exactly towering above Anaheim, its 2000-foot elevation looked as if it would work.

The license was granted to Golden Orange Broadcasting in 1975, and the search was begun for a new antenna site—one more in line with the millions of roof antennas already aimed towards Los Angeles. About that time, two other UHF stations appeared—Channels 18 and 30. Both were licensed to San

Bernardino and decided to put up their towers on Sunset Ridge. Looking north from Anaheim, Sunset Ridge is only 40 degrees to the right of Mount Wilson. It was not the ideal location, but it was workable, so KDOC engineered plans to locate alongside Channel 18.

The first antenna site was rejected after the tower contractor and a consulting geologist agreed it was too close to the edge, where strong winds or a mild earthquake could send it sliding down. Again they re-engineered, this time for the opposite side of the ridge. Building

plans were approved by Los Angeles County in late 1981. Since it "never snows in L.A.," Welty and his crew were ready to break ground immediately.

A moderate snowfall delayed construction, but Welty decided to build the station himself rather than to hire an outside firm. "We had enough time to build it the way we wanted to," he says. "We actually started the building for the transmitter long before we figured a studio site." Assistant chief Ralph Ortiz shared the workload and the credit. Both engineers worked together previously at KOCE-TV, Orange County's educational station.

### Limited access

Access to Sunset Ridge is via a narrow, sometimes steep and winding dirt road. Even with California's mild winters, there is constant erosion from rain, causing rock and mudslides. Lightning-struck trees sometimes block the road, and it does occasionally snow. Winter storms have left some engineers stranded for days, trucks abandoned on the road or lost over the edge. When this happens, rescue can be made only by helicopter. Two of the three forest-service roads have been variously closed and rerouted over the years. The best route today is still a rugged six miles off the paved road.

The lower section of KDOC's 220-foot tower was installed with the aid of a crane, but for the most part,



*Simusat antenna is located in parking lot behind the station.*

heavy equipment was not available to the construction crew. For example, tower footings (13 feet deep) had to be dug by hand. Three days were consumed just unloading the transmitter components and heat exchanger. And getting concrete deliveries proved to be both difficult and very expensive.

The Harris TT-55 transmitter, Andrews antenna, and the concrete-block building were completed in July 1982. Proofs were finished in August, and another 16 hours of tests run on the transmitter. Their measured power consumption for the plant was 168 KVA, including an estimated 20 percent savings attributed to the transmitter's pulsar design. As expected, there were some hardware casualties early on. The first was nonelectronic: The crane operator, returning down the mountain upon completing the antenna job, found his path partially blocked by some freshly cut wood, and was forced to drive on the soft-dirt edge of the road. The dirt gave way, and the crane plunged 200 feet over the cliff.

### Studio site selection

Regular broadcasting was scheduled to begin October 1; the STL was on order, but a good studio site still had to be found. Early in the idea phase (when it was known as KGOF), KDOC had hoped to have its studio and offices custom-built.

The studio location chosen was a building virtually across the street from Disneyland. Formerly a publishing house and then a school library, the warehouse-style, single-story structure covers 10,000 square feet plus a backyard big enough for a satellite downlink and remote van. Without major remodeling, the building provided

sufficient space for the sales and administration people, engineering, and a 30x40-foot studio.

Two and a half weeks before the October 1 air date, KDOC moved into its still unfinished building. The first priority was to assemble an operational master control and STL. Production



*Master control hardware includes EBS receiver, demod, audio processor, frequency monitor, waveform monitor, vectorscope, and digital remote control.*

would come later.

Requests for studio equipment bids had gone out in August, and vendors given just one week to come back with their best prices. Bids were very competitive, with six companies in the race. Average delivery time was quoted at six weeks. Most of the equipment arrived on time, with a few exceptions:

The CDL on-air switcher had been sent from Canada to L.A. without clearing customs, and was returned to Canada. It was shipped a second time to L.A. and sat another four weeks in customs. Standing by just in case was a 3M 10x1 switcher (audio-follow-video). The CDL unit finally arrived four days before air date.

Racks and cabinets couldn't be delivered on time, so Welty and his staff built their own. Rack rails from Stantron were integrated into the frames, which were welded on-site.

When the 7 GHz STL arrived, the tower people were booked up on other projects. For KDOC's engineers, this meant more (unexpected) work: The receiving dish had to be installed the evening of September 30. The crew worked at the transmitter until 3 a.m.; sign-on was at 6.

### Post-production system

Two Sony BVU-800s (and ADDA framestore TBC) made up the entire post-production system for the first locally produced programs, as the production switcher (also a CDL) was not available until three days before air.



# “The Electro-Voice Sentry<sup>®</sup> 500 is a monitor by design.”

## Greg Silsby talks about the New Sentry<sup>®</sup> 500 studio monitor...

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### What's a “studio monitor?”

The term “studio monitor” is often a misnomer. It's easy to tack a label on a box and call it a “studio monitor” without including the best precision engineering available, and careful attention to application design. Too often, these all-important considerations are traded-off for such marketing reasons as high cosmetic appeal, a particular type of popular sound, and low component manufacturing cost. While all of this may translate into high profit margins for the manufacturer it does nothing to produce a reliable standard for audio testing and evaluation.

### Linear frequency response

The Sentry 500 follows the well-established Electro-Voice tradition of combining the most advanced engineering and manufacturing technology available. The Sentry 500 has been carefully thought-out and built to meet the specific needs of the audio professional. Like the smaller Sentry 100A, the Sentry 500 provides linear response throughout its range (40-18,000 Hz  $\pm$  3dB). In fact, because the two systems share this linearity, program material may be mixed on one, sweetened on the other, with



complete confidence in quality. Acoustic “Time Coherence” (the synchronous arrival of acoustic wave fronts from both high and low-frequency drivers) has been maintained through careful crossover design and driver positioning.

### Constant Directivity

The Sentry 500 is a Constant Directivity System, benefitting from years of E-V experience in the design and application of constant directivity devices. Utilizing a unique E-V-exclusive high-frequency “Director”, the Sentry 500 provides essentially uniform coverage over a 110° angle from 250 Hz on up to 10 kHz and 60° dispersion from 10 kHz clear out to 18,000 Hz! And it does this on both the vertical and horizontal axes. This means the “sweet spot”, once a tightly restricted area large enough for only one set of ears, has been broadened to allow accurate monitoring by the engineer, producer, and talent—all at the same time. That's what we call Constant Directivity.

### A monitor by design

To qualify as a truly accurate test device, a monitor speaker system must faithfully reproduce the wide dynamic range required by today's music and current digital recording techniques, and do it with low distortion. This is no problem for the Sentry 500 which combines the high efficiency of an optimally-tuned Thiele-aligned cabinet to the brute power handling of Electro-Voice Sentry components. Consider what you get with proven

E-V components in the Sentry 500: the Sentry 500 will deliver 96 dB at one meter with only one watt and yet will handle 100 watts continuous program material with 6 dB of headroom. That's 400 watts on peaks! The same Super-Dome<sup>®</sup>/Director combination which maintains uniform dispersion of linear response out to 18 kHz also handles a full 25 watts of program power or 5 times the power handling capacity of most “high powered” tweeters. After all, tweeters should convert electrical energy to acoustic energy—not to smoke and fire.

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Also in use was the backup editing system, Sony VO-5850s with RM-440. Both systems allowed cuts-only editing. Two slightly used VR-2000 quads were to come from Ampex's training facility. As these were delayed, the station had to rent one and eventually bought the rental.

The 30x40-foot room earmarked for the production studio went through a minimal remodeling program. Ceiling height was increased from 10 to 12 feet by raising the suspended acoustic tiles, and a pipe grid was hung for lights. Power for lights comes from a breaker panel on the back wall. Neutral gray

carpet covers the walls, making an attractive background and absorbing sound. Set and prop storage is along the wall.

There is no separate control room for the production studio—the remote van system does it all. The design calls for a permanent camera and audio link through the studio wall, patched directly into the truck. Set-up time can be as little as 10 minutes.

Racks and electronics for the van (containing production and editing) were fabricated and used inside the station while awaiting delivery of the empty truck shell. The switcher, tape

decks, and audio equipment already had hundreds of hours of use and were showing signs of wear by the time the truck was ready to accept its permanent payload.

One of the last items to be installed was the station's 5 m Simulcast TVRO. (Programs distributed via satellite were being dubbed to quad by a cooperative local cable operator and the station wanted to remain competitive.)

Finally, there was the transmitter-studio link, using a modified RCA tube-type unit with Harris microwave audio components. Combined with the remote-controlled 3M switcher, the TSL will be used to view the transmitter meter panel and other parts of the operation via several surveillance-type cameras.

Most of the households served by KDOC are without cable, and even with three million watts (visual ERP), getting to them all can be a problem. KDOC, at 720 MHz, does not take kindly to VHF monopole antennas and 300 ohm twin leads often observed on sets in Southern California, and has evolved a game plan calling for a public relations campaign to teach the "secrets" of good UHF reception.

### Tape format decisions

The choice of studio equipment was not nearly as clear-cut as for the transmitter. Viewers in the Los Angeles market are accustomed to consistent, network-quality pictures, so KDOC planned to buy three Type C one-inch and two quad VTRs. The two-inch machines would not have been considered except for the fact that some syndicated programs are available only on Quad.

When it came time to buy, however, there were second thoughts. Welty toured several smaller-market stations, looking for ideas. One thing he kept seeing was the growing use of 3/4-inch recorders and automated sequencers for regular on-air programming. U-Matics were coming out of the ENG truck and making good pictures.

KDOC decided to go with a semi-automated system based on six Sony VO-5600s for playback, and a Micro-time microprocessor-controlled sequencer. Each program, commercial, ID or promo is recorded on a separate cassette with audio cue tones. The operator punches in the sequence one break in advance, pulling and changing tapes as necessary. Rather than a time base corrector for each VTR, the 5600s are locked vertically to black-burst, and the switched sequencer output feeds an ADDA framestore. This eliminates

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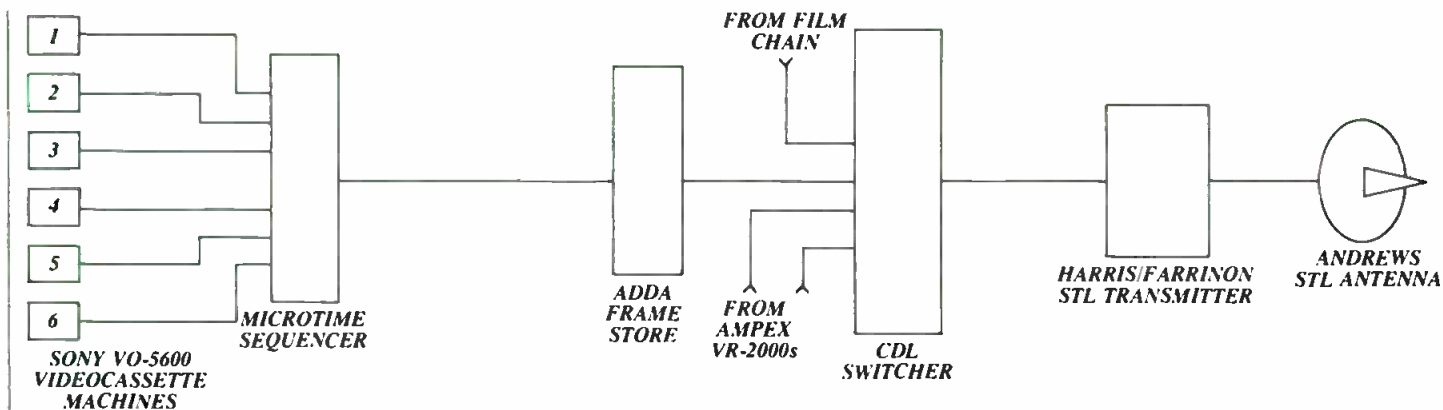
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KDOC master control

sync and burst timing problems, and handles both large time-base errors and dropouts.

The ADDA framestore feeds the CDL on-air switcher, which also handles video from the RCA TK-28 film chain (Plumbicon-equipped) and the two Ampex VR-2000 quads. Soon all of the station's 16 mm films will be dubbed to videocassette, eliminating much of the film cutting for commercial breaks.

Two or three years from now, when the long broadcast days have taken their

toll on the U-Matics, Welty will be looking at the alternatives. "I am hoping technology will be at a point to enable us to use half-inch M format . . . We can live with the 20-minute length," he observes. If nothing satisfactory is available, then it will be back to 3/4-inch.

The quad VTRs are a link to the outside world, both for incoming syndicated programs, and for sending dubs to other stations.

KDOC's remote van is their control room for production and post-

production. Three Ikegami ITC-730 cameras (with studio viewfinders, 12:1 zoom lenses and full CCUs) are used with the CDL effects/switcher and two Sony BVU-820 recorders. The Ikegamis were chosen after holding a seven-camera "shoot-off" with invited guest engineers judging. A close second was the Sharp XC-800, but at the time there was not suitable CCU. In the field, one of the cameras is teamed with a Sony BVU-110 portable recorder, while the other two remain tied to their 100 m cables. A 3M D-8800 character

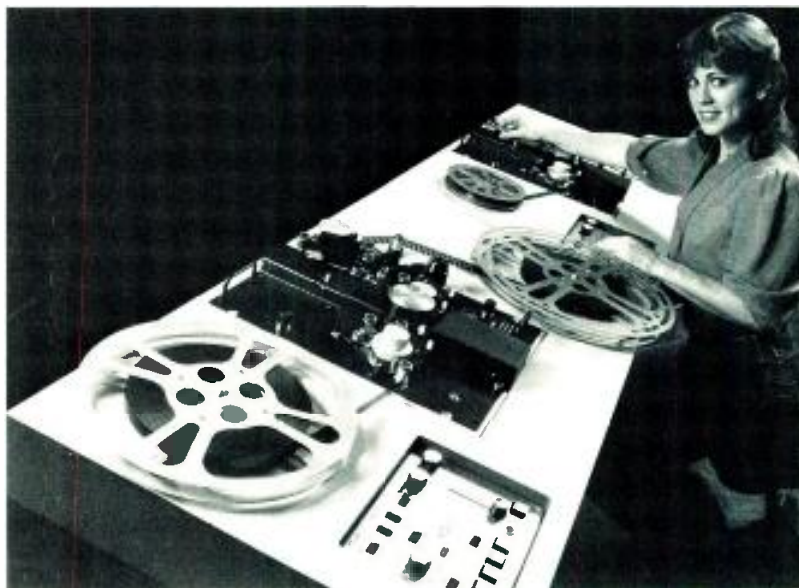
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In master control, six U-Matics under microprocessor control provide majority of on-air signal.

generator and Ikegami color monitors complete the list of major components.

Audio is handled by a 16x4 Ramsa mixer, Technics turntable, and both cart and reel-to-reel recorders. Is KDOC ready for stereo sound? Welty says no. "Television needs to look at the total quality of audio before they

start looking at stereo." Synchronized multitrack and stereo recording is possible with the remote van when the need arises. Back in master control, everything's mono.

The station's second ADDA frame store is used as a TBC and for grabbing stills during production and editing.

They do not use slides, but rather prefer to keep a consistent "video" look to their still images.

Coming some day will be a microwave system for live remotes. For now, everything on location is tape-delayed. Coverage of local college sports, mostly football and basketball, relies on volunteer production crews from the schools' TV classes. The on-air look is usually quite good, and consistent from week to week.

All technical operations are handled by a crew of 13, divided between on-air and production, with some of the field shoots done entirely by outside crews. Simultaneous taping of two or more local events are not uncommon, and outside companies often prove to be more cost-effective than dedicating staff technicians and a second EFP system.

Keeping the quality acceptable on 3/4-inch means airing only first- or second-generation tapes, not recycling, and keeping an eye on the hardware. A firm no smoking and no food and drink policy is maintained, as Welty puts it, "to provide an isolated and sterile environment."

Is it all worth it? Welty smiles. "On our budget, we can't compete with L.A. . . . but we do." **BM/E**

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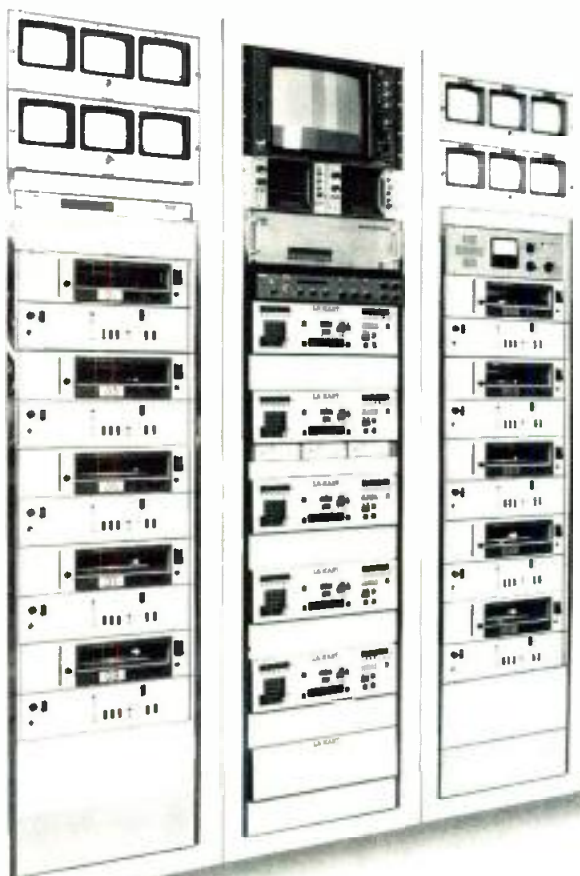
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Circle 158 on Reader Service Card

# interpreting the FCC rules & regulations

## Year of the Lottery

By Harry Cole, FCC Counsel

The beginning of the new year brings out the prognosticator in just about everyone. In that vein, we'd like to predict that 1984 will be the Year of the Lottery. This does not refer, of course, to games of chance (like bingo evenings at church) which cannot be advertised by broadcasters. Rather, it refers to the means by which new broadcast authorizations may be doled out by the FCC.

If adopted, a lottery system would replace the time-honored comparative hearing which has been around for more than 40 years. Its longevity, however, is not a measure of its popularity. The comparative hearing process has consistently been criticized as a time-consuming, expensive, and ultimately wasteful means of selection. Even a streamlined hearing involving two or three applicants can, with preliminary work and the follow-up appeal process, stretch out over two years or more, with each applicant's costs running anywhere from \$25,000, at a minimum, to somewhere in the six-figure range. Ironically, it appears that, in many cases, all that time and money provide no compensation reward: The applicant selected through the hearing process is frequently not measurably superior, in real life terms, to some (if not all) of its competitors. In that respect, then, the comparative hearing process falls somewhere between a charade and a hazing exercise—a charade because it purports to be something that it might not be, and a hazing exercise because it forces applicants to undergo substantial aggravation (financial and otherwise) to demonstrate that they are truly interested in joining the fraternity, or sorority, of broadcasters.

Even though it has been aware of these problems, the Commission has not been inclined to turn away from the tried-and-relatively-true hearing process in favor of something new. Not, that is, until the tsunami of low-power television came crashing ashore a couple of years ago. Faced with a huge, and ever-increasing, backlog of competing applications, the FCC soon realized that reliance on the hearing process to resolve the LPTV crisis would simply not work. Accordingly, working with Congress, the Commission succeeded in having the Communications Act rewritten to permit the FCC to utilize a lottery procedure in some broadcast and private radio situations. While the new law itself is fairly nonspecific with respect to the situations Congress may have had in mind, it is clear from the various committee reports accompanying the legislation that LPTV was a primary consideration.

Once it got the OK from Congress, the FCC immediately adopted a lottery system for selection from among competing LPTV applicants and, by September 1983, LPTV lotteries were indeed being conducted with no apparent problems. In fact, the Commission seemed so pleased with its lottery mechanism that, in the fall of

1983, it proposed adoption of similar procedures for licensee selection in the multipoint distribution service (MDS) and the cellular radiotelephone service.

MDS and cellular, of course, were not among the services which had led to the FCC's interest in finding an alternative to the comparative hearing process: Normally, MDS proceedings tended to be limited both in number and in scope, and cellular proceedings in the top-30 markets had proven to be quite streamlined indeed. What had happened, however, was a tremendous influx of interest in both services. The adoption, in early summer 1983, of rules making more spectrum available for MDS operations, coupled with the development of multichannel MDS technology, generated phenomenal enthusiasm among those who wanted to obtain authority to provide television programming without having to buy an existing television station at astronomical cost. The enthusiasm was such that some 15,000 to 20,000 applications were filed by the deadline in early September 1983. Similarly, the apparent likely success of cellular telephone service, and the substantial profits thought to be available therefrom, inspired more applicants to file for system licenses in markets 31-60 than had filed in markets 1-30, and still *more* to file in markets 61-90.

Thus, applicant interest in MDS and cellular had created a situation remarkably similar to the LPTV crisis. And the Commission felt that the best way out might be the institution of a lottery selection process in both services.

But what, you may ask, does this have to do with full-service broadcasting, an area where even Congress suggested lotteries would be inappropriate? Simply this. Even though the Congress, the Commission, the communications bar, and others may believe that the comparative hearing process affords some benefits, marginal though they may be, the continuing crunch of multiple applications for a single frequency is likely to strain the existing system to the breaking point. Obviously there have not yet been any mass filings in full-service AM, FM or TV akin to those in LPTV or MDS. But already, in the full-service FM area, it is not uncommon to find as many as 15 or even 20 competing applicants filing for a single new station.

Where the LPTV, MDS and cellular situations involved completely new services capable of generating a "land rush" mentality, full-service broadcasting is not likely to give rise to a huge, instant backlog of thousands of applications. But the backlog is nonetheless there, and it does not appear to be improving significantly. The FCC itself has contributed to this problem through its deregulation efforts. By streamlining the application form for a construction permit to a few "yes/no" questions, by eliminating the need to provide a detailed documentary showing of financial qualifications, by removing the as-

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## FCC RULES & REGULATIONS

certainment obligation in its entirety from the initial authorization process, the Commission has made it incredibly cheap and simple to file for a new station.

Thus, like it or not, there is good reason for the FCC to believe that its broadcast backlog, particularly in FM, is going to get bigger and bigger. This is especially true in light of the new FM allocations to be made available as a result of BC Docket No. 80-90 (which we discussed in the September 1983 issue of *BM/E*).

What we think might happen is this: The backlog in full-service broadcasting will continue to grow, although, with the exception of FM applications, it may not reach crisis proportions. Meanwhile, lotteries will continue to work smoothly in the LPTV area, and they will probably be phased into the MDS and cellular areas. As the FCC becomes increasingly comfortable with the concept of lottery selection, and as its experience in LPTV and elsewhere helps it to work out any problems with the system which might arise, the Commission may very well decide that its aversion to the use of a lottery in the full-service broadcast area may have been unfounded. This is particularly likely if the Commission's deregulatory juggernaut continues to pare down the factors to be considered relative to new broadcast applicants. In other words, the FCC may come to a point where it decides that a lottery will still permit it to be appropriately sensitive to certain factors (e.g., minority ownership, diversification of media control) while streamlining its processes substantially.

The Commission's desire to streamline its processes is not wholly altruistic. Delays arising from procedural backlogs tend to generate irate letters from Congress. More importantly, though, the Commission itself has suffered substantial budgetary cutbacks under the Reagan administration. FCC resources spent in the comparative hearing process—including staff attorneys, engineers, administrative law judges, and support personnel—cannot, obviously, be spent elsewhere. As a result, it is in the Commission's own interest to scrutinize that process and determine if it is, in fact, cost-efficient. We think that there is a good chance that the reevaluation could occur in the foreseeable future.

A final note somewhat related to the discussion of lotteries: While formal action has not been taken as of this writing (mid-December 1983), sources at the Commission indicate that work is proceeding on a notice of proposed rulemaking which would result in the conversion of FM translators into low-power FM broadcast stations. We reported that this was in the works some time ago, and present indications are that the notice may be ready for consideration in January-February 1984. Even though no formal announcement has been made of this likely change, applications for new FM translators have been streaming into the FCC for several months. While all propose standard translator operations, as required by existing rules, at least one applicant may have tipped its hand with respect to its intentions—its corporate name is "Low Power FM Radio, Inc."

If the Commission ultimately creates a form of low-power FM service, and if, as the current application flow already suggests, a tidal wave of applications floods the Commission, the FCC will have yet another area in which to utilize its lottery procedures. This, in turn, may provide further impetus toward use of lotteries in full-service proceedings.

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## AMPLITUDE COMPANDORED SIDEBAND FOR RENG

By Richard F. Rudman, Engineering Manager,  
KFWB-AM, Los Angeles, CA

Congestion of the RPU bands has become a way of life in most larger urban areas of the U.S., making frequency coordination a must for reliable service. This coordination effort can be made simpler, however, with a few engineering tricks. One state-of-the-art item that is really a throwback to proven past technology is something called Amplitude Compandored Sideband (ACSB). Single-sided amplitude modulation has been around for a long time. Its most famous characteristic is the Donald Duck-like quality it can give to voices when things are not tuned optimally. With phase-locked loops, and ultra-stable frequency determining components, sideband can be tamed. With the added enhancement of audio companding to provide complementary compression and expansion to improve signal-to-noise, you have a transmission medium that, for voice communications, rivals FM.

ACSB has a technology dear to the hearts of the FCC. In fact, the Commission, back in 1976, had Dr. Raymond Wilmotte of the Office of Science and Technology look at various means to achieve better spectrum efficiency to alleviate the coming shortfall in voice channels many people are now facing in major metropolitan areas in a number of communications services. Wilmotte's group studied a number of approaches, including spread spectrum (frequency hopping) techniques now used in military systems, digital voice coding to pare bandwidth requirements, and enhancements to narrowband FM. The FCC ultimately asked Stamford University to do a study on ACSB. The Stamford study found ACSB had characteristics similar to FM, but required only 5 kHz for channel bandwidth, compared to 20–30 kHz for a narrowband FM voice channel.

An ACSB voice channel has no car-

rier. A 3.1 kHz reference tone is added to the audio modulation to help eliminate the Donald Duck effect. As stated, the whole works can fit easily in 5 kHz.

How does ACSB help our channel scarcity problems in Part 74? Right now we have to confine ourselves to looking at VHF channels in the 160 MHz region because ACSB equipment has not yet been built for UHF. There, each of our channels is 30 kHz wide. An FM signal in the center of one such channel needs a guard band to protect it from adjacent channel interference. In a market where all Part 74 VHF channels are used, two ACSB channels will fit between each pair of 30 kHz channels. These interleaved ACSB channels are 12.5 kHz removed from their FM neighbors and 5 kHz apart from each other. Where geography permits, ACSB channels can fit as closely as 7.5 kHz to an adjacent FM channel. These interleaved ACSB channels have proved to be relatively immune to adjacent channel FM interference, and FM, likewise, seems to ignore ACSB if everyone sticks to the rules.

The "C" in ACSB refers to a 2:1 ratio compandor that packs the normal 56 dB voice range into a compact 28 dB, a feat the sardine industry must envy. The compandor mimics the well-known FM advantage by expanding compressed audio at the receiver without expanding receiver noise. This holds as long as the receiver is held to what is still called its quieting range.

ACSB exhibits an FM-like capture effect, and an improved signal-to-noise ratio over FM through use of the above-mentioned compandor circuitry. This holds except at fringe areas of reception. Field tests by companies like the Canadian Pacific Railroad and Standard Oil showed the approach was practical. The FCC is now issuing developmental licenses in many services.

Two companies—Sideband Technology, Scottsville, NY and Stevens Engineering Associates, Mountlake Terrace, WA—say they can deliver ACSB radio systems. Mobile, repeater, base and FM crossband interfaces are available. One major broadcast group has purchased an ACSB system for use in the congested Washington, DC region, where all Part 74 voice channels are completely occupied. Other broadcasters in markets like Los Angeles and New York are not far behind. Field tests in several RF-saturated regions have shown this technology works at places like infamous Mt. Wilson, near Los Angeles.

Since potential users are asking the FCC to support a concept the Commission itself fostered, ACSB pioneers have reason to expect their existing developmental licenses will achieve permanent status.

On a similar tack, who now needs more N2 and R channels in the 450 MHz band? ACSB equipment won't be ready for UHF for several years. Advances in good-quality narrowband FM now mean you can get as much as 6 kHz of flat, clean audio in a 25 kHz N2 channel. If your region is short on UHF FM channels and asks the FCC to grant a waiver to split N1 and S channels, as did the Southern California region, the impossible suddenly becomes possible. Regions like New York City and San Francisco are in the process of asking for such waivers.

All in all, there is some technological hope on the horizon for spectrum scarcity. What we must remember as these changes come into play is that good old-fashioned common sense, old-fashioned rigorous engineering practices, and old-fashioned "Golden Rule" treatment of your fellow broadcasters are now just as important (if not more so) than any new technology. **BME**

# broadcast EQUIPMENT

## R-Scan Unveils Lightning Tracker

A new lightning position and tracking system (LPATS) has been introduced by R-Scan for locating lightning strikes with an accuracy of less than one mile.

The manufacturer installs, calibrates, and maintains all networks of the LPATS data service, operating like a dialup color radar. Lightning data are put on-air via a dedicated video information system which provides NTSC output direct, or by interfacing lightning data via an RS-232 cable into the station's existing weather graphics computer. LPATS tracks storms over a region 700 miles in diameter without ground clutter, while a display zoom allows a small part of the viewing area to be shown. Lightning strikes can also be overlaid onto a radar display screen.

Custom graphics can be provided, designed to show cities, roads, lakes, counties, and so on. The most recent 300 ground strikes are stored in RAM.



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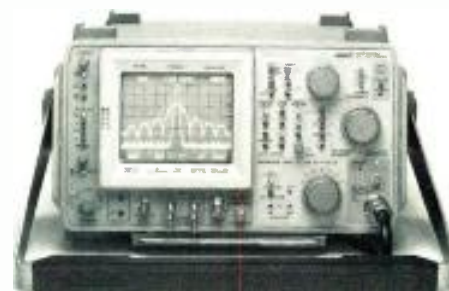
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## Tektronix Adds Storage Spectrum Analyzer

Touting a wide frequency range and counter frequency accuracy, the TEK 494/494P spectrum analyzer features an exclusive help mode that guides the user, via CRT-displayed messages, through the instrument's functions.

The 494 and 494P (a programmable model with digital waveform storage) cover the frequency range from 10 kHz to 325 GHz. Their portable units are priced at \$40,950 and \$45,950, respectively.

With the storage capability, it is possible to take the spectrum analyzer into the field to a TV transmitter and store waveforms for analysis at the engineering shop. The readings can also be printed out on a plotter for more careful study or for FCC records.



The unique help mode is also intended to ease use by inexperienced technicians. When a user pushes the help mode button in combination with various front-panel control switches, a series of prompts appears on the unit's CRT screen describing the function of that control. The portables also feature semiautomatic calibration. It corrects for some amplitude and measurement errors, improving measurement accuracy. In addition, 10 on-board registers for presetting instrument control settings saves setup time and improves measurement repeatability.

For More Information  
Circle 201 on Reader Service Card

## Sony Unveils CD Controller

The CD Modular System, a control unit and CD player designed for broadcast use, has been introduced by Sony. Designated Model CDS-3000 the controller is capable of controlling two disc drives by program or by hand operation. A 10-key pad and a rotational search dial cue the programs. Up to eight programs can be handled simultaneously and then played back consecutively with one-frame accuracy at start-stop points.



A variation on the CDP-500, the 3000 sports a minimum access time of 13.3 ms. permitting accurate and quick access to audio signals on the disc. A newly designed mechanism using LSIs accesses any music selection in a maximum of two seconds. As part of the CD line, 3000 player uses laser pickup and 16-bit linear quantization with a frequency range of 20-20,000 Hz. Harmonic distortion is less than 0.01 percent, and dynamic range is greater than 90 dB. Both controller and player are rack-mountable.

**For More Information**  
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## Calrec Launches Soundfield Microphone

The Mark 4 soundfield microphone has been introduced by Calrec. The radical design of the Mark 4 is based on the theory of sampling on the surface of a receiving sphere which allows reconstitution of signals present at the center of the sphere when the outputs are summed. This achieves true coincidence and eliminates phase errors.

The microphone head of the Mark 4 incorporates four condenser capsules mounted in a regular tetrahedon and individually matched to the control unit. This is achieved because the pressure and gradient components of the diaphragm are presented as separate electrical signals which may be optimized independently. An additional advantage of the soundfield design is that the microphone can be steered in all directions and zoomed in or out.

The so-called B-format output of the microphone may be encoded for ambisonic surround sound reproduc-

tion or, in conventional stereo reproduction, the unit's stereo output may be used either at the time of recording or during post-production. Microphone front sensitivity at 0 db gain is 105 db, while maximum input for less than 0.05 percent THD is 140 db. Other specifi-

cations include a frequency response of 20 Hz to 20 kHz. Self noise, depending on pattern, is 16 to 18 phons, while source impedance is 100 ohms. Suggested price of the Mark 4 is \$4880.

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# BROADCAST EQUIPMENT

## Digital Sequencer From United Media



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The computer-controlled, solid-state sequencer can sort and store 320 commands in internal memory while a built-in time code reader enables the selection of either 24, 25 or 30 fps operation. The sequencer also works on a real-time clock at 0.01-second intervals and has built-in registers for start time, stop time, event channel, tape time display, and frame indicators. Timing accuracy is 0.01 second in real time and to the frame in other modes.

Programming commands can be entered from the front panel, paper tape, RS-232 input equipment, or from the company's Commander II video

editing system. Each command can then be recalled via the front panel scroll controls, by a printer, or by a RS-232 mini floppy disk drive.

The sequencer is 3.5-inches high and features event stacking, editing look-ahead, and a full range of controls for external devices.

**For More Information**  
Circle 204 on Reader Service Card

## Standard Reveals New Handhelds



The HX 100 and 500 Series of handhelds were recently introduced by Standard Communications. The 300 Series, available in VHF and UHF, is economically priced and features two-channel

operation, four watts RF power VHF, three watts UHF. Both series come with flexible antenna, 500 mAH rechargeable nicad battery pack and

charger. Options include throw-away battery tray, continuous tone coded squelch service, belt clips and chargers.

The HX 500 handhelds are rated safe for use in hazardous environments. The 500s are lighter than the 300s and feature six-channel operation. Power for this series is two-watt RF or both VHF and UHF, also featuring a twist-off nicad battery pack rated at 500 mAH.

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## Scientific-Atlanta Feeds Dual-Beam

Scientific-Atlanta announced a dual-beam prime focus feed assembly to receive signals simultaneously from two adjacent C-band satellites separated by a three- or four-degree geosynchronous arc. The new dual-beam feed will permit reception of Satcom IIR and Galaxy I, as well as other satellite combinations.

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- Encodes VITC on any combination of vertical interval lines from 10 through 20 on either or both fields.
- Two separate modular instruments for maximum flexibility and economy.
- Works in conjunction with your existing SMPTE longitudinal code equipment.



GRAY ENGINEERING LABORATORIES

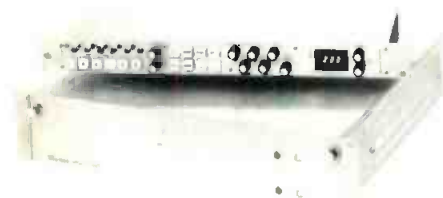
504 W. Chapman Ave. Suite P  
Orange, Ca. 92668 714-997-4151

Circle 164 on Reader Service Card

three or four degrees, or it can be used with the 7m. antenna for reception from satellites spaced at three degrees only.

**For More Information**  
Circle 206 on Reader Service Card.

## Graham-Patten Offers Downstream Keyer



A downstream keying system, Model 1231, providing a range of features including six keys, bordering, and masking, is now available from Graham-Patten Systems. The Model 1231 keys up to six signals simultaneously in analog, and provides an adjustable matte signal.

The key signals are mixed nonadditively, so that overlaps do not create excessively high output signals. Key

transitions have a continuously variable rate, and the output signal can be switched or faded to black. The masking window adjusts to any size and turns "inside out" to block keying. With the border option, drop-shadow and outline borders are possible.

Other features of the 1231 include previews of both the inserted composite

key signal and the output when the keyer is faded up from black. Editor control can be set up over key, black, mix, and cut functions. Signal-to-noise is greater than 70 dB to 10 MHz; crosstalk is greater than 56 dB to 5 MHz. The 1231 costs \$8500.

**For More Information**  
Circle 207 on Reader Service Card

## Carter Develops ENG Cartop Platform

Carter Manufacturing has introduced the Carter cartop platform for remote camera work. The unit is available for almost any sedan or van. The platform is constructed of a heavy-duty nonskid flooring with patented self-adjusting rubber pads.

The roof-mounted platform is held securely in place by stainless steel clips and turnbuckles. The cartop rack can be conformed for film or video shooting, can adapt to luggage or equipment carrying purposes, or can be used as an observa-



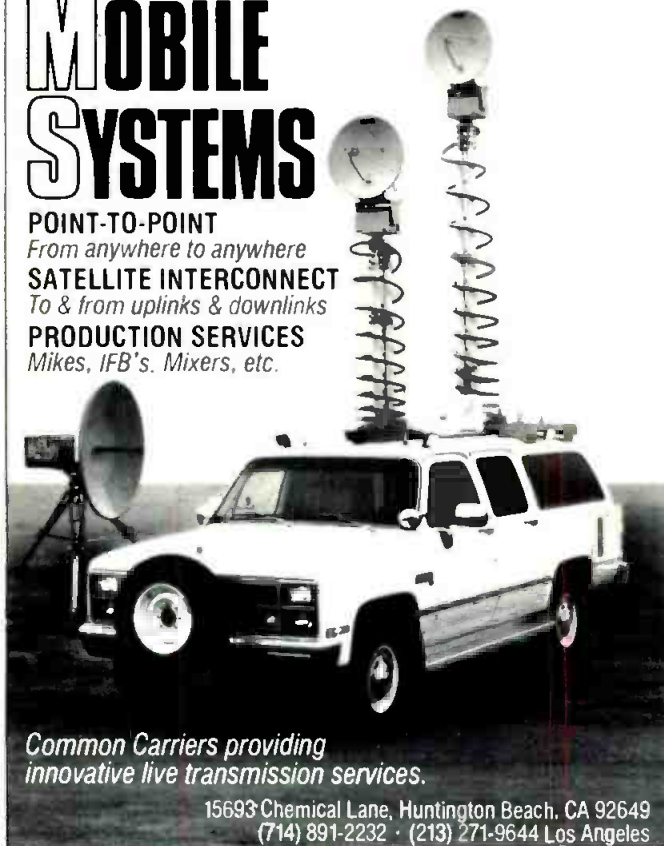
tion platform. The unit comes with many options and prices begin at \$350.

**For More Information**  
Circle 208 on Reader Service Card

# MICROWAVE MOBILE SYSTEMS

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The STANTRON VIDEO CENTER series modular "add-on" features allow for maximum flexibility in designing console arrangements for professional, educational, industrial and communication VIDEO CENTERS.

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TWX: 910-499-2177

factory:  
6900-6918 Beck Ave., No. Hollywood, CA 91605

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## The Beyer MCE 5 sounds so transparent, it often goes unnoticed.



The exceedingly small and unobtrusive Beyer MCE 5 lavalier mic tends to disappear from view in front of any camera. And its natural, uncolored sound is so transparent, you tend to forget there's a microphone between you and your audience. Quiet and sensitive, with a frequency response of 20 to 20,000 Hz, the MCE 5 features a matte-black finish which makes it even harder to spot. The MCE 5 is available with XLR, 1/4" Phone, Lemo and open-ended versions (for wireless) to meet all broadcast applications.

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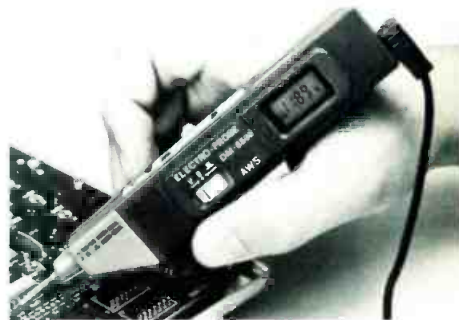
**Sales • Design • Installation  
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## EQUIPMENT

### Digital Probe Multimeter From A.W. Sperry

New from A.W. Sperry, the AWS DM-6590 Electro-Probe is a digital probe multimeter with autoranging



function. At less than 6.5 inches long, the unit is one of the smallest DMMs on the market. It is designed for reading ac and dc voltage, and resistance in hard-to-reach areas such as crowded circuit boards.

The unit's probe tip is built in, allowing for simple one-hand operation. Among the features of this new device are: autoranging, large 3.5 digit display, buzzer warning system, 500 hours of continuous operation, data hold button, and autozeroing. Ranges of the meter are 2/20/200/500 Vac/dc and 2/20/200/500 kohms. The 6590 comes packed with one TL-40 test lead, one AG-940 detachable insulated alligator clip, two B-6 batteries, carrying case, and operating instructions.

**For More Information**  
Circle 209 on Reader Service Card

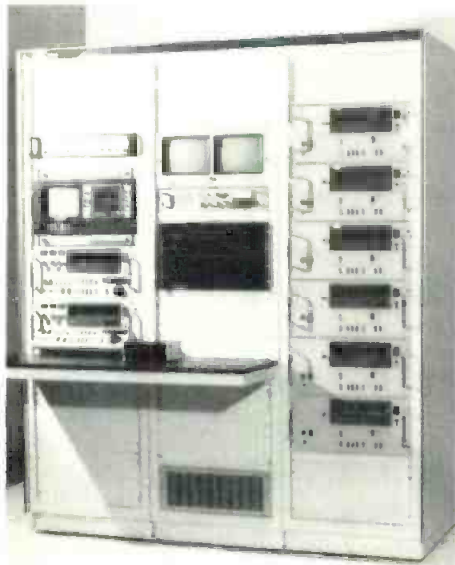
### Broadcast Systems Designs Video Carts

The DC-8 is a newly designed, prepackaged video cart system developed for automated playback of prerecorded video carts, commercials, and programs. Microprocessor-controlled, the system provides frame-accurate, vertical interval switching between carts.

Two record/playback transports are provided to facilitate transfer of other prerecorded material to carts. The unit's controller is prompted by use of audio cue tones at the beginning and end of a recorded segment. Recording of the prompting cues is automated.

The DC-8 has five modes of operation, including automated playback of as many as eight different carts in a single sequence without reloading.





Other functions include preview, with video and audio displayed as in play-back; test, with any transport placed in the test mode at the controller; and auxiliary and record modes.

The DC-8 also offers running of 10-second segments, back-to-back segments, or spots sandwiched between longer spots. The unit also has an audio/video input switcher.

**For More Information**  
Circle 210 on Reader Service Card

## Global Systems Expands Repeater Distance

Four new solid-state color television repeater transmitters for extending signal range in the 2.5 to 2.7 GHz ITFS frequency band have been added to the Micro-Link product line by Global Systems. The repeater transmitters incorporate pull-out racks and plug-in modules.



Four transmitters can be mounted in a single 19-inch cabinet, requiring only half the floor area of previous transmitters. In the series, output ratings are 1W and 10W, and 100 and 200 mW, with all systems FCC type accepted. The combined 32 W output of four, 8 W microwave power amplifiers allows the 10 W transmitter to provide exceptional linearity.

**For More Information**  
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# Sign on with NEC UHF Transmitters.

NEC is the world leader in UHF-TV transmitter technology. Reason enough to sign on with NEC...but not the only reason.

Other reasons include more than 55 years of proven reliability. Excellent color performance. High efficiency klystron power amplifiers for low power consumption. Not to mention ready availability, competitive pricing and unsurpassed service capabilities.

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## AM BROADCASTING - HIGH FIDELITY Are these terms mutually exclusive?

YES  NO  DON'T KNOW

Surprisingly, many broadcasters may not know that the correct answer to this question is no. Large sums of money are spent each year to purchase new transmitters, new studio equipment, new audio processing equipment and to modify antenna systems for improved AM sound. Unfortunately, until now, there has been no such thing as a professional quality AM monitor receiver. As a result, the perceived fidelity of an AM signal has been severely restricted by receiver performance.

Potomac has developed the SMR-II Synthesized Monitor Receiver which will let you hear and measure the quality of your transmitted AM signal ... perhaps for the first time. Features include: Crystal Stability; 60 dB Signal to Noise Ratio; Audio Frequency Response  $\pm 0.5$  dB, 20 Hz to 8 kHz; Total Harmonic Distortion less than 0.2% (95% Modulation) at audio frequencies above 40 Hz ... please write for complete descriptive brochure.



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# BUSINESS BRIEFS



Northwest Mobile Television has put into service a new 40 foot mobile production unit. The new truck contains six Ikegami cameras, six Ampex VTRs, and Grass Valley production and routing switchers. The audio system is built around a Yamaha PM-2000 32x8 console. Intercom and IFB are handled by RTS.

**Media General, Inc.** has announced a name change for its wholly owned subsidiary, the William B. Tanner Co., to Media General Broadcast Services . . . **CCR Video** has completed its westward expansion with the takeover of **Prime Time Post**, a Hollywood videotape facility.

The **CBS** Radio network has signed an extension of its rights to broadcast Major League baseball for five years, beginning in 1985.

**Chyron** announced that under a letter of intent, it has agreed with **Digital Services Corp.** to extend the exclusive license granted under a 1982 agreement to manufacture and sell Digiflex polychromatic generators. The amount of payment by Chyron to Digital Services could exceed \$1 million . . . In its yearly financial report, Chyron revealed a net sales increase from \$12.8 million in 1982 to \$16.9 million in 1983.

**Microdyne** has reached an agreement to supply a new \$1 million, two-channel satellite radio distribution system for **Florida Network, Inc.** The initial agreement calls for a permanent SCPC uplink to be installed at station **WKIS** in Orlando, FL, and for 50 downlinks statewide . . . As part of its "Fund for the Eighties" program, **GTE** has donated a 10m. C-band satellite earth station to Boston's **WGBH-TV**. **CBS/Fox Video** in Farmington Hills, MI, has acquired a new **MCI/Quantel** Mirage digital video effects system . . . Communications Concepts of Cape Canaveral, FL, has added a Quantel DPE 5000 digital effects.

Culminating a four-year project, nine Class C Houston, TX FM stations are now broadcasting through a shared

multi-million-dollar **Harris** antenna facility. The facility consists of a 12-bay cavity backed radiator antenna atop a 200-foot tower . . . **McMartin** has shipped its first production model of the new 30 kW FM transmitter to radio station **KQLH** in San Bernadino, CA.

Strong first-year sales of **Sony's** PCM-3324 digital multitrack recorder are evident, with orders for 14 machines having been received in 1983 . . . New Orleans' **WLAR-TV**, a new educational system, has begun operating with two BVW-3 Betacams . . . San Antonio's **KENS-TV** is also using two new Betacams for news production.

**CCR Video's** TV Ten, a 46-foot mobile bile production unit, videotaped the "Penthouse Pageant" from the Sands Hotel in Atlantic City, NJ.

**MZB Associates** has contracted to furnish **KFDA-TV** with three **Ikegami** HK-357 studio cameras and three **ITC-730** ENG cameras . . . **Kavco** has completed a 600,000 production and transmission control center for **Home Sports Entertainment** in Pittsburgh. HSE is a division of **Warner Amex** . . . **Nurad** has installed an **ITFS** video transmitter at George Washington University, broadcasting at 2.6 GHz . . . **Intercontinental Televideo, Inc.** (ITI), a standards conversion facility in New York City, has installed an additional **Ampex** VPR-80 one-inch VTR to augment the existing complement of VPR-80s already in operation.

**Alpha Video Productions** has announced its affiliation with the **Focus Group** of Dallas, TX, and the acquisition of a **Quantafont** Q-7 character generator as an addition to its 3/4-inch video editing suite . . . **Victor**

**Duncan** has been appointed the sole central distributor for **Spectra** light products . . . Additional sales of its Video Transmission Link has been announced by **Video Data Systems** to the **Spanish International Network**.

**Panavision** has selected **LRP Video** of New York to be its first authorized **Panacam II** East Coast video facility . . . **ABC** recently used the **Shure** Automatic Microphone System to record a news special on Harvard University's Kennedy Institute of Government . . . **Bogner** high-power antenna installations for television stations include Channel 23 of Decatur, IL, and Channel 52 of Oklahoma City, OK.

**Midwest Corp.** is constructing a 44-foot trailer for **WTBS**. It will carry five **Ikegami** HK-357s, two **HL-79s**, **Ampex** VTRs, and an **ADO**, and will be used for political, entertainment, and sports events.

## SALES OFFICES

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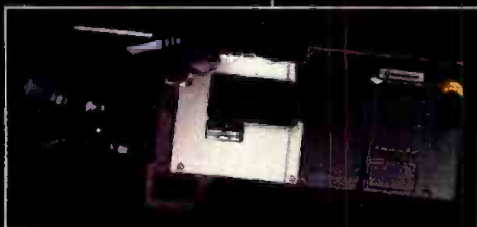
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# Eloquent Audio!

Custom designed production facilities make a substantial contribution to overall program quality. This is particularly true with the CBC French network's new daily TV news magazine, "Le Point".

The ability to combine voice inputs from numerous local and remote locations with studio originated sound effects and "color" is essential to the program environment.

For this custom console, Ward-Beck collaborated with CBC engineers to design a producer's dream in which one operator controls 24 inputs with submasters on the left, while another handles the 8 effects inputs and submaster on the right. A centrally located illuminated 24 x 6 integral switch panel assures clean, unambiguous switching from either station.

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