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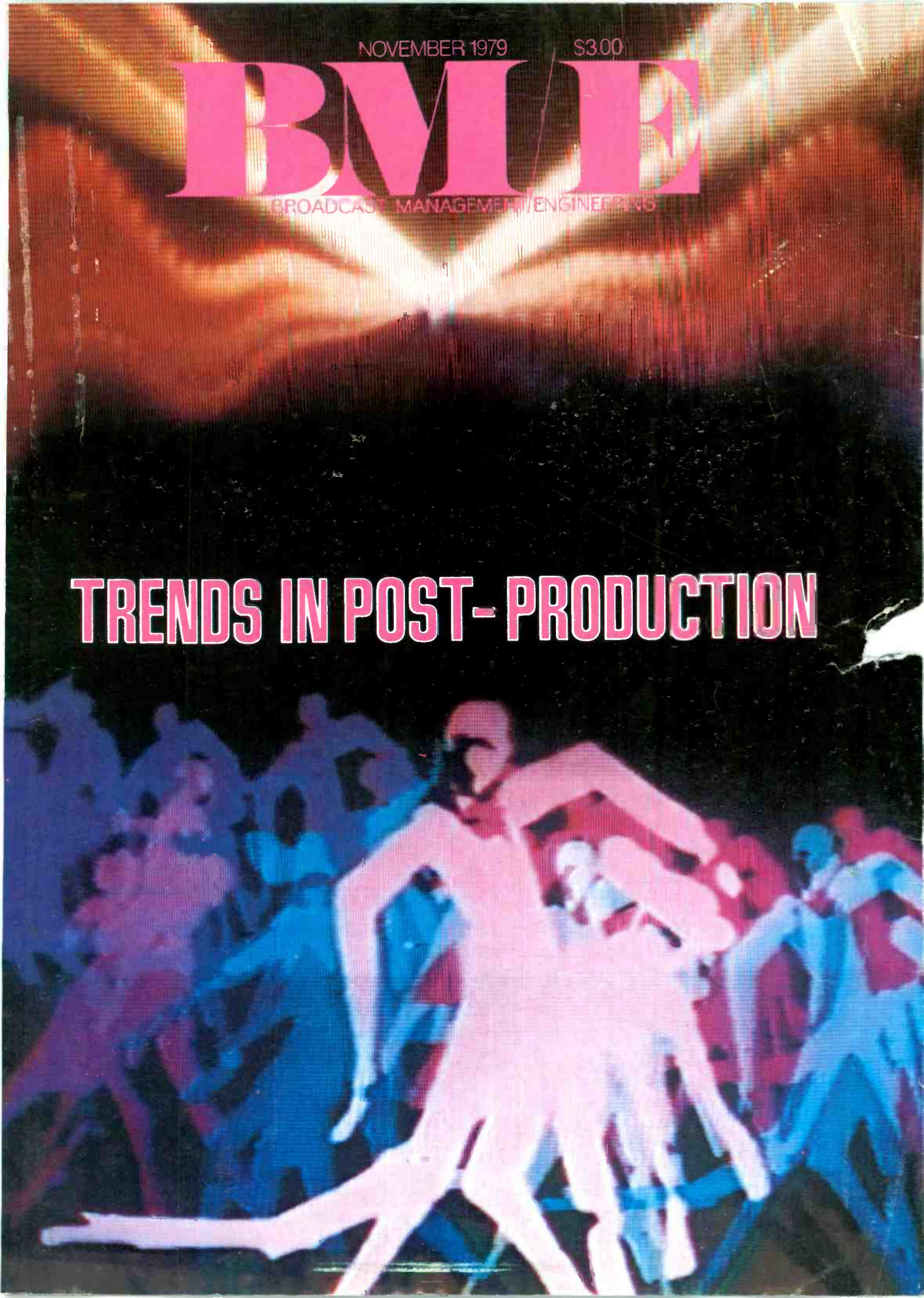

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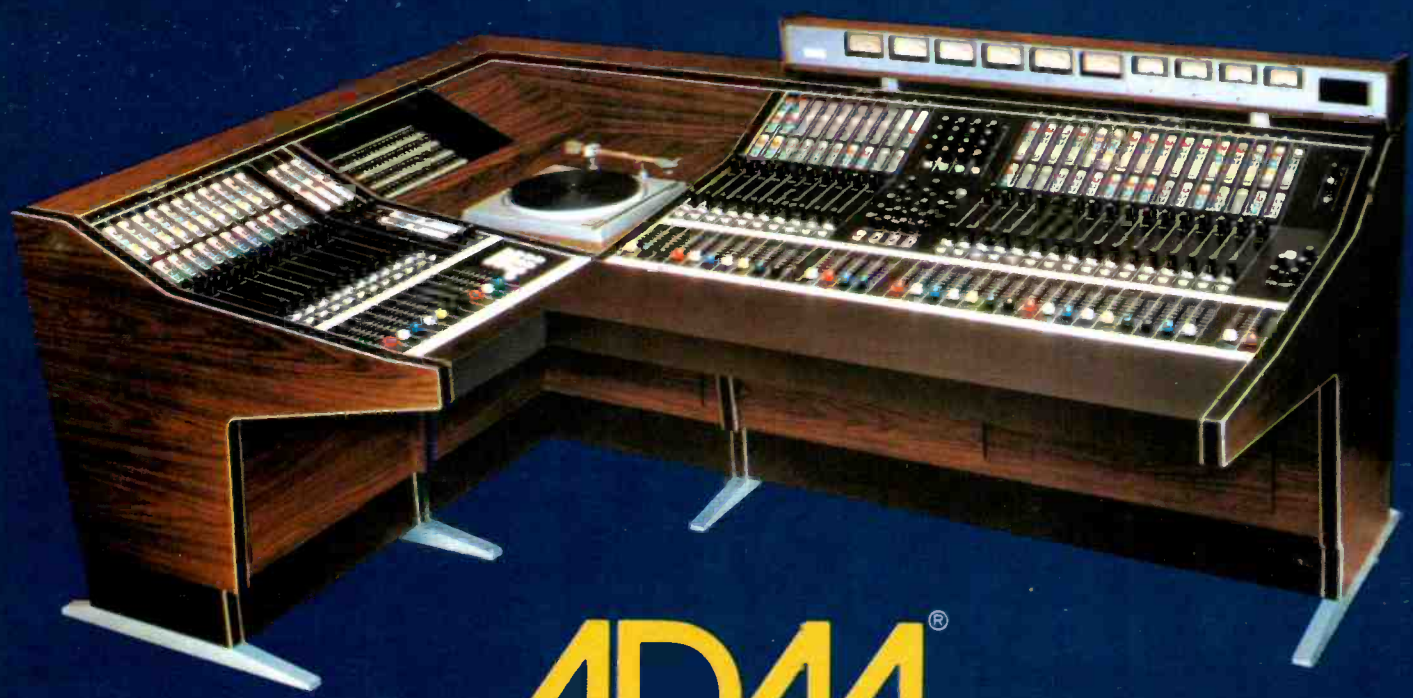

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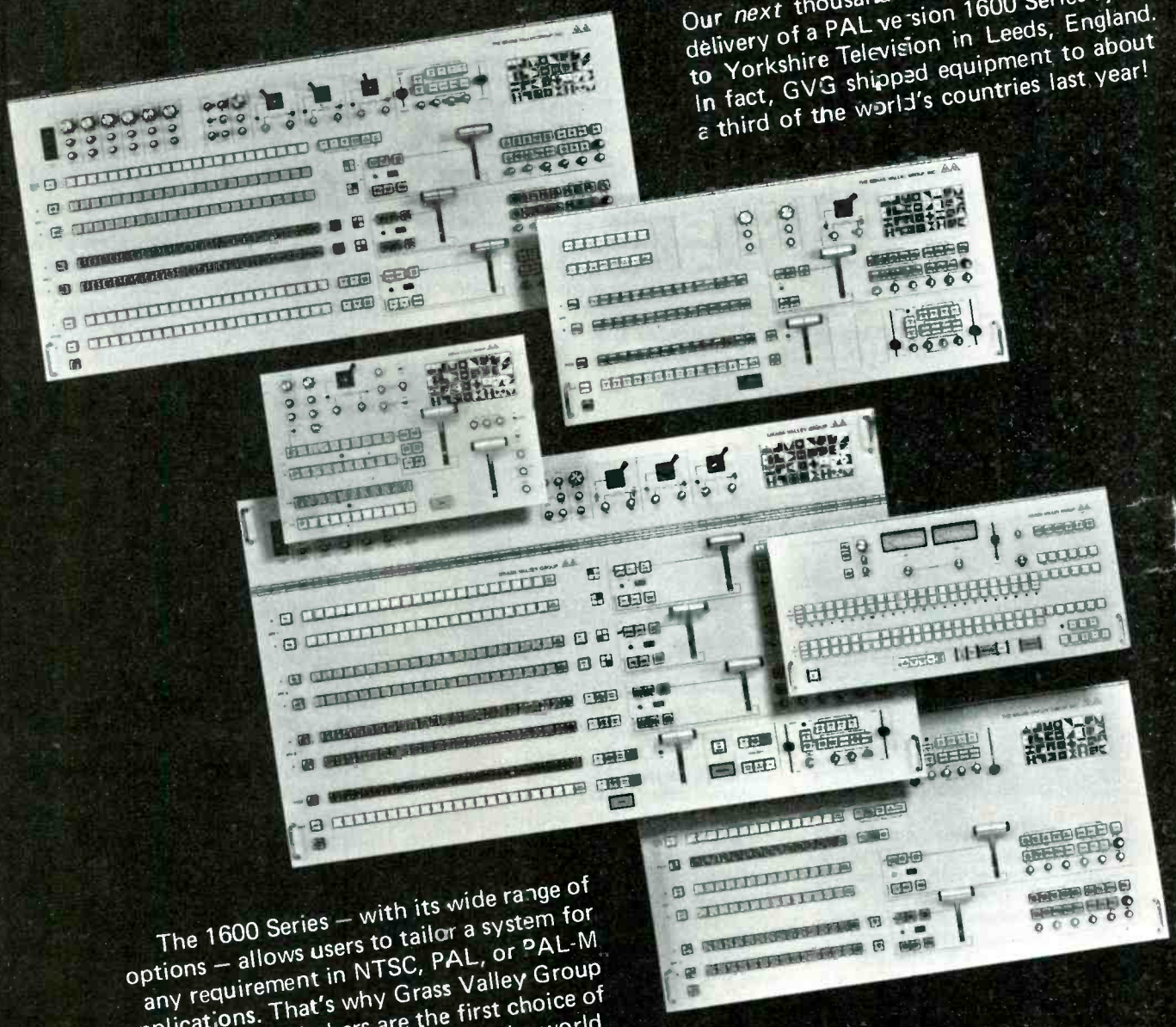

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BROADCAST INDUSTRY NEWS

Special News Bulletin: *FCC opens door on earth stations.* *See story on page 14.*

FCC May Scratch UFH Multiple Ownership Exceptions

The FCC has issued a notice of proposed rulemaking aimed at deleting the UHF exceptions in its rules governing multiple ownership. Originally aimed at fostering the growth of UHF broadcasting, the exceptions allow UHF applications that would otherwise violate the one-to-a-market and regional concentration rules to be heard on a case-by-case basis.

In the notice, the Commission stated that the exceptions had in fact done little to promote UHF television, since only four applications had been processed under the exceptions since 1970. The multiple ownership rules are basic to its regulation of the industry, the Commission noted, since they promote diversity, and a study of the record has shown the benefits of the exceptions to be "illusory in that they decrease the possible number of diverse program sources each time an application is granted" under them.

At the same time, the Commission reaffirmed its commitment to UHF broadcasting, pointing to several recent actions aimed at encouraging UHF development, especially in the area of technical parity.

Comments from concerned parties are due by November 27; replies are due by December 17.

Task Force Describes UHF Handicaps

The FCC's UHF Comparability Task Force has completed a preliminary report that examines three areas in which UHF television suffers in relation to VHF. Because of lack of parity in channel selection mechanism, picture quality, and programming, the report says UHF has been unable to acheive its goal of equality with VHF channels.

One finding of the task force was that for a UHF signal and a VHF signal equally degraded by snow, the cost of transmission and reception is greater for the UHF system than for the VHF system. The increased cost may be borne by the broadcaster (as an increase in transmission power), by the viewer (as an improved, more expensive antenna), or by both. The task force plans to conduct a survey of UHF viewers to discover in which ways picture quality differences between UHF and VHF affect them.

Another survey planned by the task force will focus on how the different channel selection mechanisms in use — detent (click) tuners, pushbutton memory tuners, and digital selectors with keypads — affect viewing.

The report noted that as of December, 1978, 47 percent of available UHF commercial allocations had not been applied for, while only 11 percent of available VHF commercial slots were vacant. Only three percent of UHF stations broadcast at maximum allowed power although 79 percent of VHFers did so. In addition, 92.2 percent of VHF stations reported profits for 1978, as opposed to 74.2 percent of UHR stations.

UHF stations, the report went on, draw smaller audiences than VHF stations in the same market; they do better in each category when received via cable than when received off the air.

FCC chairman Charles Ferris termed the report "an important step" toward UHF comparability. "Only by eliminating its present technical hand-

Sony, Ampex Share Emmy For Type C Development

Ampex VP Donald V. Kleffman (left) accepts Emmy from Robert Wussler, NATAS board chairman, as academy president John Cannon watches. Above, Sony managing director Masahiko Morizono (second from left) and president Koichi Tsunoda hold Sony's trophy

Sony Corporation of America and Ampex Corporation shared a "technical Emmy" for their work in developing the one-inch Type C videotape format at the National Academy of Television Arts and Sciences' awards presentation September 17 in New York. An engineering citation was also presented to the SMPTE, which oversaw the establishment of technical standards for the format.

Both companies introduced their first one-inch broadcast recorders, the Ampex VPR-1 and the Sony BVH-1000, at the 1976 NAB convention. Although the systems had similarities, they were not compatible at that time. Representatives of Ampex and Sony then worked with SMPTE's Committee on Non-Segmented Helical Recording to reach agreement on the standards, which were settled upon in December, 1977.

Just nine days before the Type C Emmy was awarded, Ampex received an Emmy from the Academy of Television Arts and Sciences in Hollywood for its development of Automatic Scan Tracking (AST)™ technology, which provides video playback and editing capabilities for Ampex's Type C VTRs. AST was introduced in 1976 and is available as an option on the VPR-2.

The New York award was Sony's third Emmy and Ampex's fourth. Sony received an Emmy in 1973 for its Trinitron color TV system, and another in 1976 for the U-Matic videocassette concept and design. Ampex's first Emmy came in 1957 for the development of the first practical VTR; the second was bestowed in 1967 for the developmsnt of high-band color videotape recording.

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icaps,'' he continued, ''can UHF broadcasting join with VHF broadcasting to supply the public with a multitude of program choices from a diversity of sources at the lowest possible cost.''

U.S. Faces Stiff Opposition At WARC

The World Administrative Radio Conference (WARC) opened in late September amid disputes between the U.S. and Canada and the developed and developing nations. This country was seen at the outset as having little support for many of its key proposals.

A report prepared by consulting firm A.D. Little for the Senate Commerce Committee, requested by Sen. Goldwater, gave a gloomy outlook for the U.S. position on a number of issues. According to the report, delivered two weeks before WARC got underway, three of the four major U.S. proposals seemed headed for almost-certain defeat at the conference, while passage of the fourth appeared doubtful.

The U.S.–Canada showdown centers around direct-to-home satellite TV services (DBS) on the 12-GHz band. Canada's stand calls for the retention of an option for ''hybrid'' satellites that would serve either broadcast or common carrier point-to-point uses. The U.S., on the other hand, wants the two uses to be segregated via frequency segmentation of the band. This would eliminate the hybrid option.

Both countries seemed firm in their positions at WARC's opening, even after the July Inter-American Conference on Telecommunications in Bogota, where efforts to reach a compromise proved fruitless. If no agreement is reached on the issue, seen by some as the most controversial in Region II (western hemisphere), U.S. development of a DBS system could be seriously delayed — a major problem with Comsat seriously considering direct-to-home satellite pay TV service (see September, 1979 *BM/E*, p. 8).

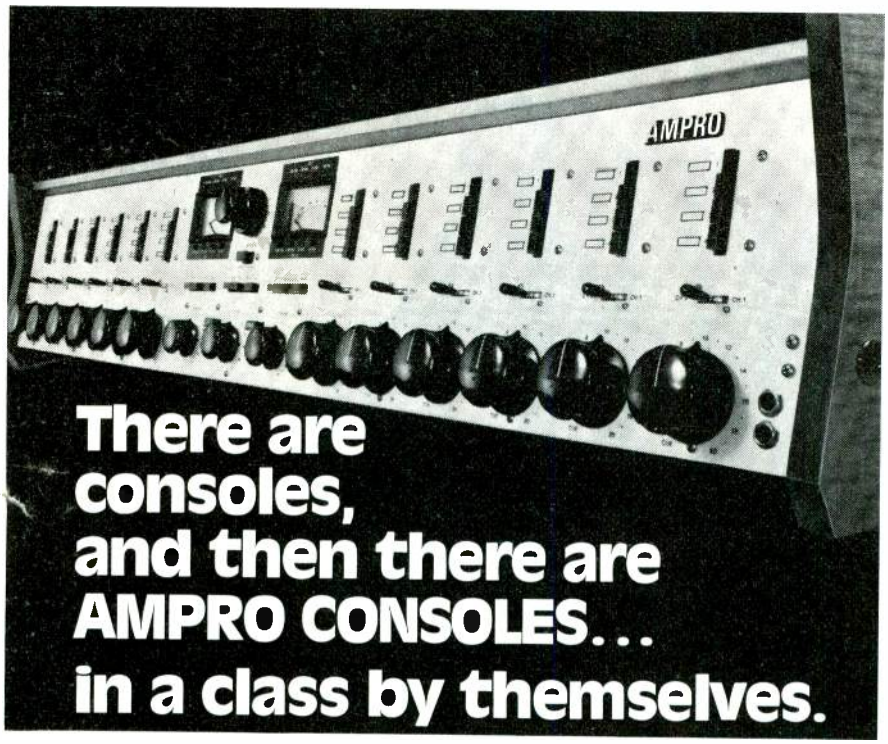
Developing nations are expected to seriously oppose the U.S. plan to expand the shortwave band by some 30 percent to relieve the present overcrowding. Major benefactors of the increase would be the large Western propaganda radio services, such as Radio Free Europe and Radio Liberty. The Third World countries, however, are not noted for their enthusiasm for such broadcasts, and claim that expansion of the shortwave band would encroach on space they need for fixed telecommunications and military use. Most such uses rely on satellite and microwave in developed countries, but many developing nations do not yet have these resources and must rely on shortwave.

Also on the minds of the developing countries is increased access to the spectrum. At present, 10 percent of the world's countries control 90 percent of the radio spectrum; the poorer nations want space reserved for them whether or not they have the technology to utilize it at this time, while the developed countries want space assigned on a first-come, first-served basis.

STV Receives Boost From FCC

Over-the-air subscription television (STV) broadcasting received a boost in late September when the FCC struck down its rule allowing only one such station to a community. Deletion of the rule means that lengthy, expensive comparative hearings are no longer required, paving the way for more rapid expansion of STV.

The action came by a unanimous vote with little discussion. Only token



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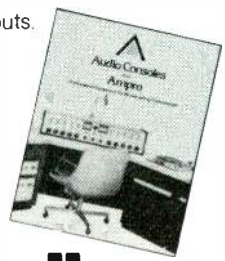

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opposition had been received from broadcasters and the cable industry, despite their initial strong stands against STV.

The Commission is also considering deleting its rule that STV stations are permitted only in markets of at least four stations, but did not take action in that area. The limit was adopted in 1968 to protect commercial TV, but the Broadcast Bureau apparently feels it is no longer necessary, stating that removal of the limit "would not endanger free television, but rather holds the promise of more diversity in the mode and substance of programming."

STV operation is seen by many as favoring UHF broadcasters struggling to compete under unfavorable conditions. Although cable would seem to have a competitive edge because of the large number of channels it can offer, less than 35 percent of television households have a cable system available to them, and only 20 percent actually receive CATV.

Introduced only three years ago, STV is still limited to six stations across the country — KBSC, Corona, Calif., serving the Los Angeles area, WWHT in Newark, N.J., KWHY in Los Angeles, WQTV in Boston, WXON in Detroit, and KNXV in Phoenix. KBSC is the largest of the group with 210,000 subscribers. Nine other STV stations have been authorized, but are not yet in operation. The stations send out a scrambled signal during exclusive programming; subscribers' sets are equipped with decoders to unscramble it.

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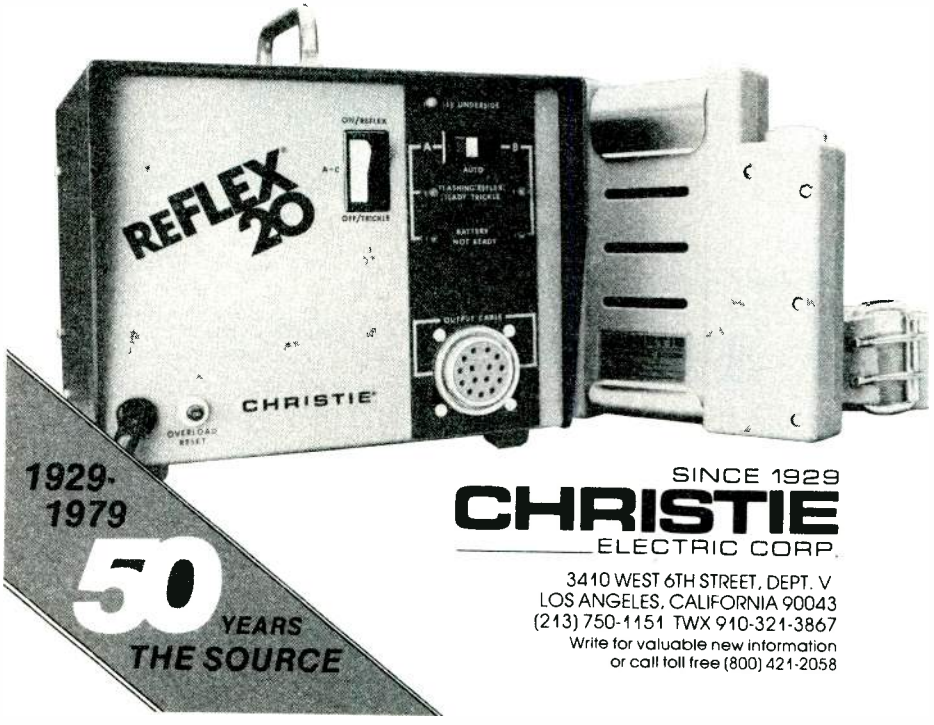

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ABC Lands 1984 Olympics For $225 Million

In what may be the largest single TV contract in history, ABC-TV has won the rights to the 1984 Summer Olympics in Los Angeles. ABC's bid of $225 million surpassed offers from NBC, CBS, Tandem Productions (associated with Norman Lear), and the Entertainment and Sports Programming Network, a Getty Oil Co. subsidiary. The net's total costs for airing the games, figuring in production expenses and services to foreign broadcasters, has been estimated as over $325 million, but ABC-TV president Fred Pierce asserted, "We intend to more than recover our costs."

The agreement includes $100 million for the basic rights to the games, to be divided between the International Olympics Committee and the local organizing committee, and $125 million to be paid to the Los Angeles committee for special transmission facilities, lighting, and other requirements. In addition, the net will provide a broadcasting center and facilities for transmitting the shows abroad. At least 200 hours of programming — most of it live — are expected to be broadcast during the 1984 Olympics.

Canada Tests Home Earth Stations For Remote Areas

In an experiment designed to bring TV viewing to isolated areas, the Canadian government is installing miniature earth stations in northern Ontario homes previously deprived of watchable reception. As reported in the New York *Times*, the program, which began in late September, will continue at least through May and will involve some 80 households and 20 community facilities. Viewers will receive educational TV broadcasts direct from Toronto via satellite.

Because the earth stations pick up the broadcasts directly, there is no need for reception stations or retransmission facilities. British Columbia and perhaps the Yukon and Northwest Ter-

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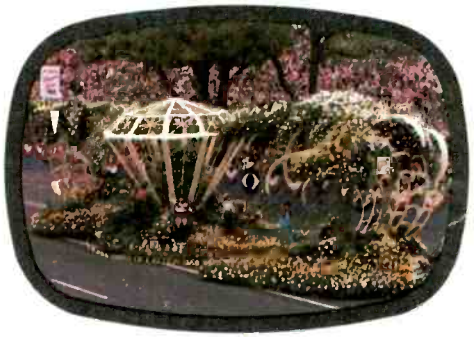

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ritories will also be included. Since present law prohibits private ownership of earth stations, legislative action will be needed to continue the project.

Surge To Satellites: FCC Opens Earth Station Door

The broadcasting industry is gathering forces for a grand leap into the age of the satellite as the result of an FCC decision, announced October 18, that greatly relaxes the licensing requirements for receive-only earth terminals.

The FCC action removes all licensing requirements for receive-only terminals if the user is willing to forego FCC protection from interference. An earth terminal user who wants that protection can still go through the full licensing procedure. But the major industry groups who have long been poised to go into satellite use on a very large scale are almost unanimous in accepting the no-protection condition.

Charles D. Ferris, FCC chairman, pointed out in the decision that with thousands of earth terminals contemplated, there would probably be more economic sense in moving the few that experienced interference than in putting all through the licensing procedure. He noted there had been very little interference reported from the 1300-odd earth stations now in use.

The FCC action also extended the licensing period from the present three years to five years, and removed the requirement for a construction permit in any circumstances.

The result will be a prompt and massive move toward satellite distribution of programming, with Mutual, AP, and UPI leading the way. Mutual, as described often in recent years, is looking toward the furnishing of about 650 terminals to affiliates. AP and UPI, with discussions for joint use of facilities in the works, will also put up hundreds (eventually thousands) of earth terminals. Others planning to move into satellite use on a large scale are the Christian Broadcasting Network, Showtime, and many cable television operators.

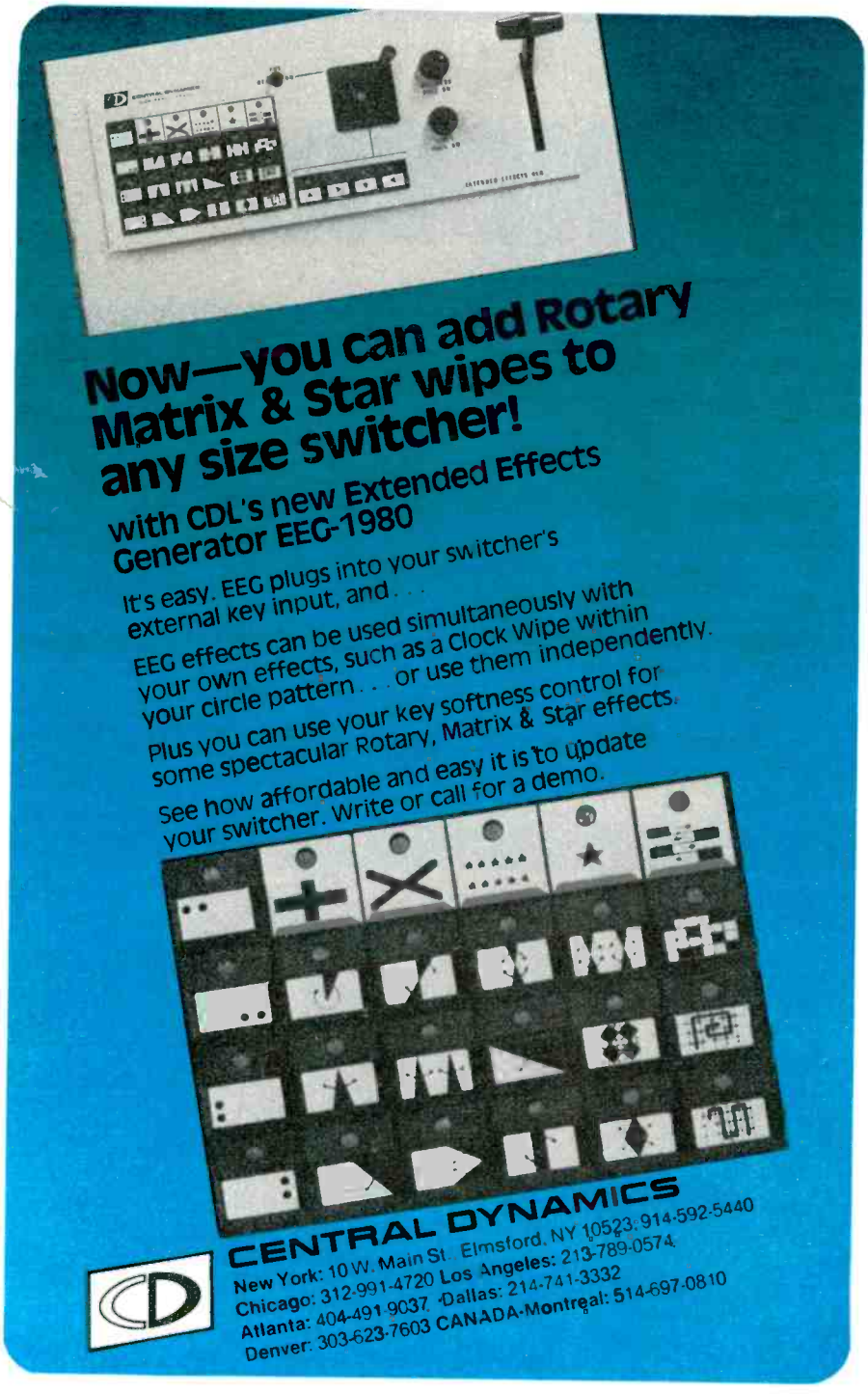
Gary Worth, executive vice president of Mutual, told *BM/E* that the company will start building terminals immediately, concentrating in northern parts of the country to beat the cold weather to some extent. Mutual wants to complete all 650 installations in less than the year originally alloted, if at all possible.

Roy Steinforth, vice president of AP, said in part, "This is a most welcome and helpful decision. It will speed the delivery of high quality audio and news services to stations in every part of the country." Also praising the decision was James Darr, vice president for communications of UPI: "We are delighted with the FCC's action . . . In cooperation with the news industry, we will implement the system as quickly as we can."

Also naturally pleased were Western Union and RCA, satellite owners. James T. Ragan, WU vice president for broadcast services, told BM/E: "We welcome this FCC action. We believe it will accelerate the growth of satellite communications for radio and television broadcasting, thus affording the public great benefits in program variety and quality of transmission."

CBN Dedicates New Headquarters

Calling it "among the most sophisticated broadcast centers anywhere," the Christian Broadcasting Network an-



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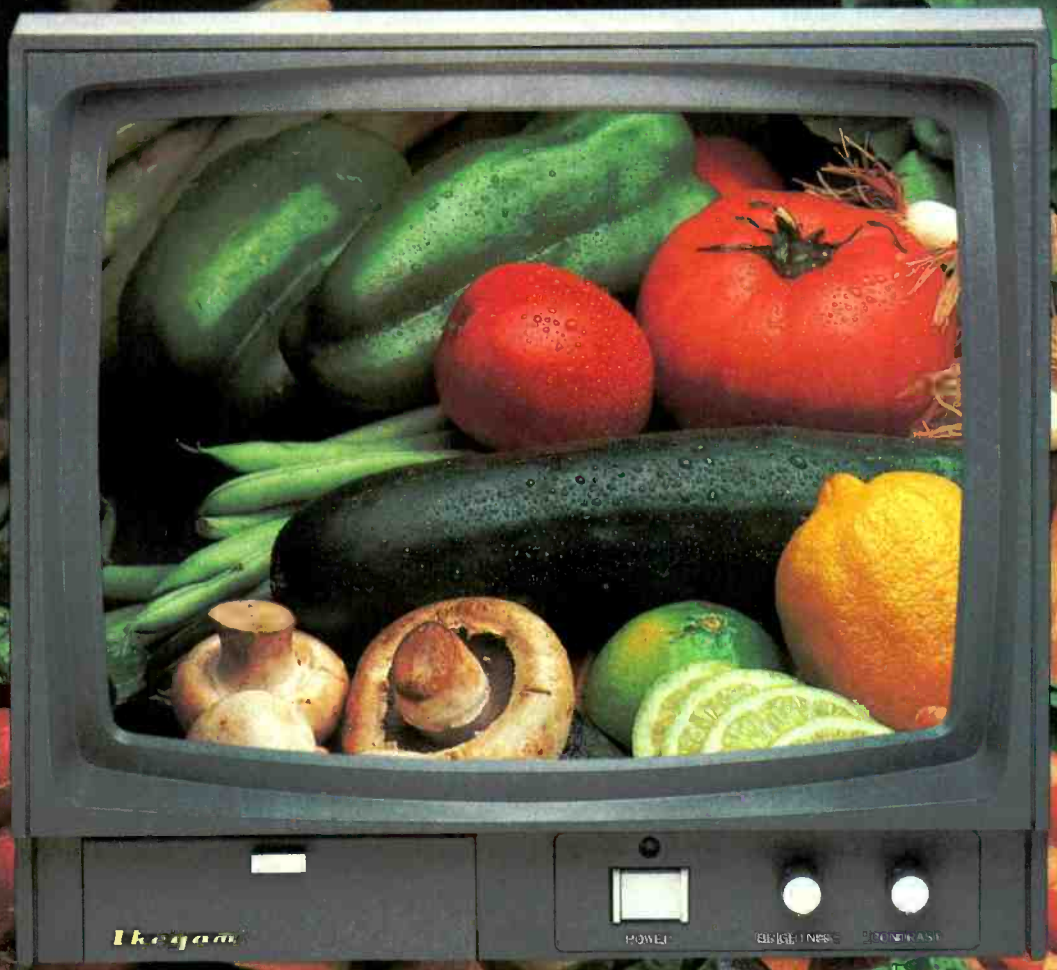

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News

nounced its October 6 dedication of CBN Center, a 170,000 square foot communications facility that took over two years to construct. In addition to producing programming for CBN, the center will be available as a production facility for use by advertising firms, film and television companies, and other producers.

The $20 million center, with 21 one-inch VTRs, is the first broadcast facility in the nation to use entirely one-inch videotape, according to CBN. Fifteen RCA cameras — eight TK-47s and seven TK-760s — will be used for studio and remote work, and the center is also equipped with a mechanized winch system to raise and lower lights, a selectable system routing switcher, and "futuristic" satellite transmission. Twin 10-meter dishes located on the center's site uplink with RCA's Satcom I and Western Union's Westar satellites.

CBN's programs are currently aired on about 150 TV affiliates and 150 radio affiliates in the U.S. and Canada.

Mutual Broadcasting Sells Black Network

Mutual Broadcasting System has sold its majority share of the Mutual Black Network (MBN) to that network's partner, the Sheridan Broadcasting Corporation. The deal, reportedly in the $1 million-plus range, makes Sheridan 100 percent owner of MBN.

Thomas E. McKinney, president of MBN, said that his net would remain at its Washington headquarters and will lease newsroom and studio facilities as well as network lines from MBS. Programming on the Black network will remain the same, McKinney predicted, with the system continuing to report "news of Black America to Black America, along with our hefty schedule of sports and special programming."

MBS, which will retain its name for the present, has 19 affiliates and is seeking more.

"The Source" Reverified

Please make the following changes in your copy of "The Source," *BM/E's* September, 1979, buyers' guide:

Motorola Communications and Electronics, Inc., should be listed in the Instant Source Locator, Category V, RF/Transmitting/Receiving Equipment, under remote pickup equipment and receivers, communications and monitor.

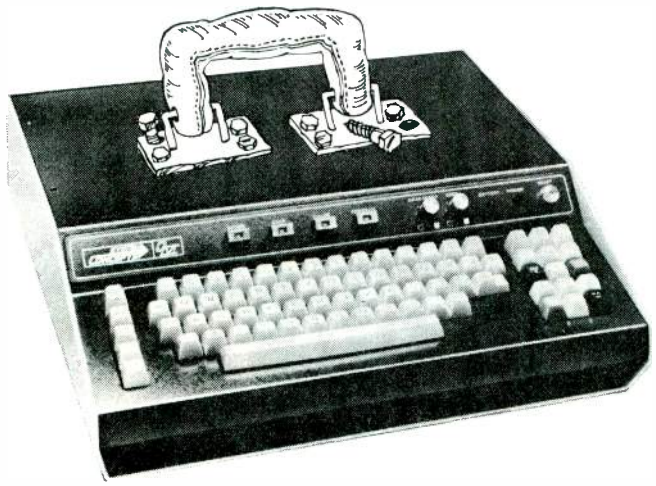
Tweed Audio's correct address and telephone number are 4445 E. Industrial, Ste. 5E, Sini Valley, Calif. 93063, (805) 527-6854.

The telephone number for MXR Innovations, Inc., of Rochester, N.Y., should read (716) 442-5320.

Also in the September issue, a printing error marred the headline of the Television Programming column on page 35. The station's correct call letters are WHIO-TV.

News Briefs

The 17-year-old **TV Code is lawful self-regulation** and does not violate federal anti-trust laws, the NAB asserted in a brief filed with the U.S. Justice Department in mid-September. Earlier in the year, the JD hit NAB with an anti-trust suit that called for the cancellation of those parts of the TV Code that restrict advertising (see *BM/E*, August, 1979, p.8). The association claims that the JD suit "directly conflicts with the public policies and regulatory scheme established by Congress and the FCC" . . . . A proposal by the National Producers' Corp. that the **FCC require TV stations to install,**



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Neve Electronics International, Ltd. - Cambridge House, Melbourn, Royston, Hertfordshire, SG8 6AU England Tel: (0763) 60776
Rupert Neve GmbH - 6100 Darmstadt Bismarckstrasse 114, West Germany Tel: (06151) 81764

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News Briefs

operate and/or control satellite earth stations is "overly intrusive, unnecessary in public interest terms, and costly" to broadcasters, said NAB in comments filed with the Commission. In another filing, NAB lent its support to a request by the World Press Freedom Committee that the **FCC institute an inquiry** of the rates charged for international press services. The WPFC asked that preferential rates be established.

Broadcasters and program suppliers were vocal in **opposing the FCC's proposal to eliminate syndicated exclusivity** and signal carriage rules for CATV as the deadline for comments closed in. The NTIA supported broadcasting's clamor for retransmission consent requirements; the Justice Dept., however, supported cable's demand for the removal of all restrictions. NAB told the FCC that repeal of the rules would be "totally inconsistent" with encouragement of local broadcasting . . . . The FCC is expected to issue **mandatory requirements for children's TV programming**. Proposal calls for five hours weekly, on weekdays, for preschoolers and two and a half hours for older children. . . . The Commission has committed an additional $190-210,000 to expand its study of the **effects of reducing AM spacing** to 9 kHz.

Warner Cable Corp. has acquired Satellite Communications Systems, presently transmitting superstation KTVU, San Francisco, to West Coast cable systems. Price paid to SCS's previous owner, Holiday Inns, Inc., was undisclosed . . . . **Outlet Company** has closed its purchase of **WIOQ-FM,** Philadelphia, its tenth broadcast property and its third radio station in the top six markets . . . . **Group W** will pay $7 million cash for **KOAX**, Dallas-Ft. Worth, its second purchase of an FM station in six months. The group bought Houston's KODA last March.

Mutter Evans' purchase of WAAA, Winston-Salem, N.C., makes her the **first black woman in the U.S. to own a radio station**. She paid $1,040,000 for the black-oriented station, of which she is GM . . . . Teleprompter Corp., the nation's largest cable company, has pledged to **offer a million subscribers** nationwide to the **Black Entertainment Network**, recently formed to offer black-oriented programming to cable systems . . . . Skip Finley has been named executive VP and general manager of the **Mutual Black Network** (see news story in this issue).

Mutual Broadcasting System celebrated its **forty-fifth anniversary** on September 15. The net's latest affiliate is **WINZ**, Miami, a 50,000 W AM all-news station that rates high in the Arbitrons . . . . Peter M. Bloom has been appointed MBS's director of sales administration.

Winners of the **1979 Armstrong Awards** for excellence and originality in radio programming were announced October 8 at the NRBA convention in Washington. First place winners were National Public Radio in creative use of the medium, public service, and music categories; KSFO, San Francisco, for news; KPFA (Pacifica Foundation), Berkeley, Calif., for news documentary; and CBC-FM, Toronto, Canada, for education. This was the first year AM stations were eligible to compete for the prestigious awards. **AP Associates,** Sunnyvale, Calif., has been granted exclusive marketing and selling rights for all **Cezar International, Ltd.,** audio/video products under the terms of a recent agreement between the two firms . . . . A new group of investors has acquired **VAMCO** of Tulsa, Okla., from **Dytek Industries.** Donald L. Maly is new president of the company.

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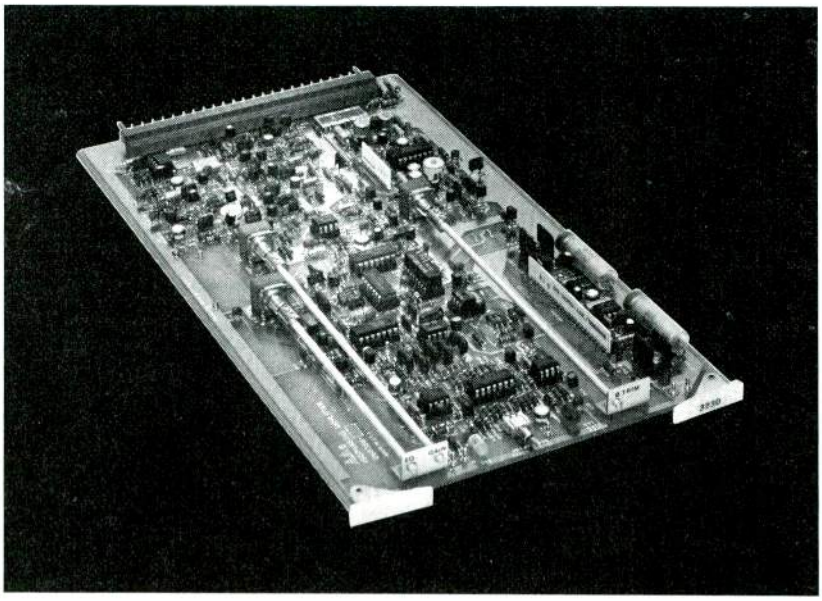

End color phase error problems forever with the GVG *fully automatic* Isophasing system. No more green faces or washed out colors as a result of timing errors between VTRs—or other sources—and switcher inputs.

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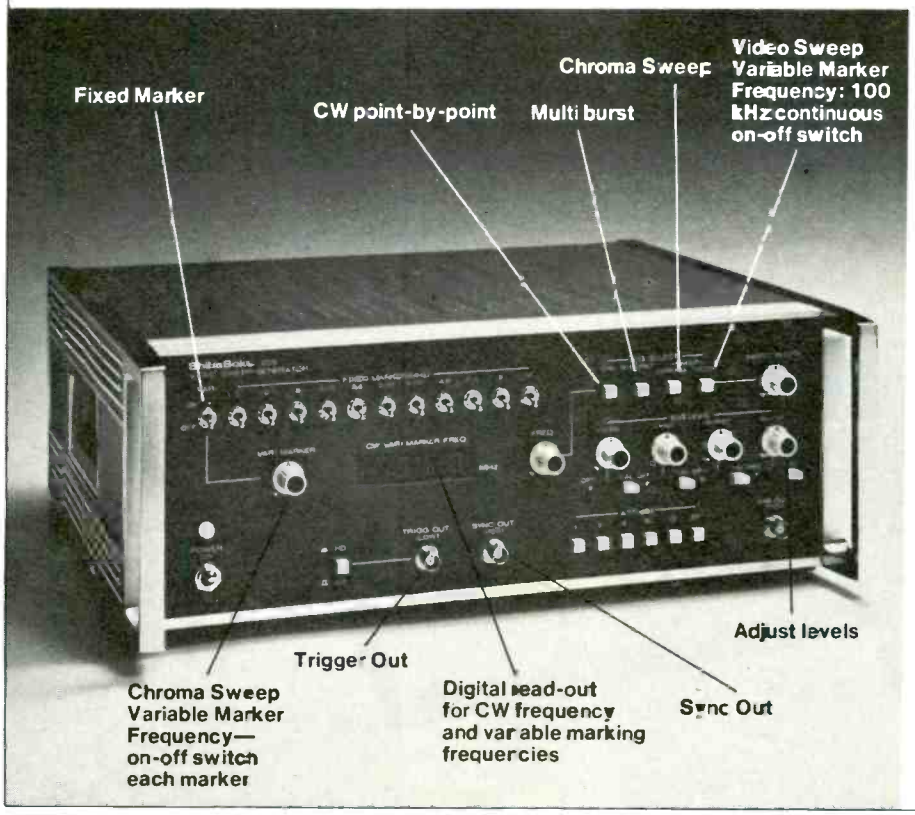

AND MAINTAIN IT!! Measures frequency response on TVs, VTRs and other video equipment.

The Asaca Video Sweep Generator 205 contains a built-in standard color sync signal generator. The color burst can be switched on and off so the 205 is ideal for oscillator comparisons to measure frequency response of color equipment.

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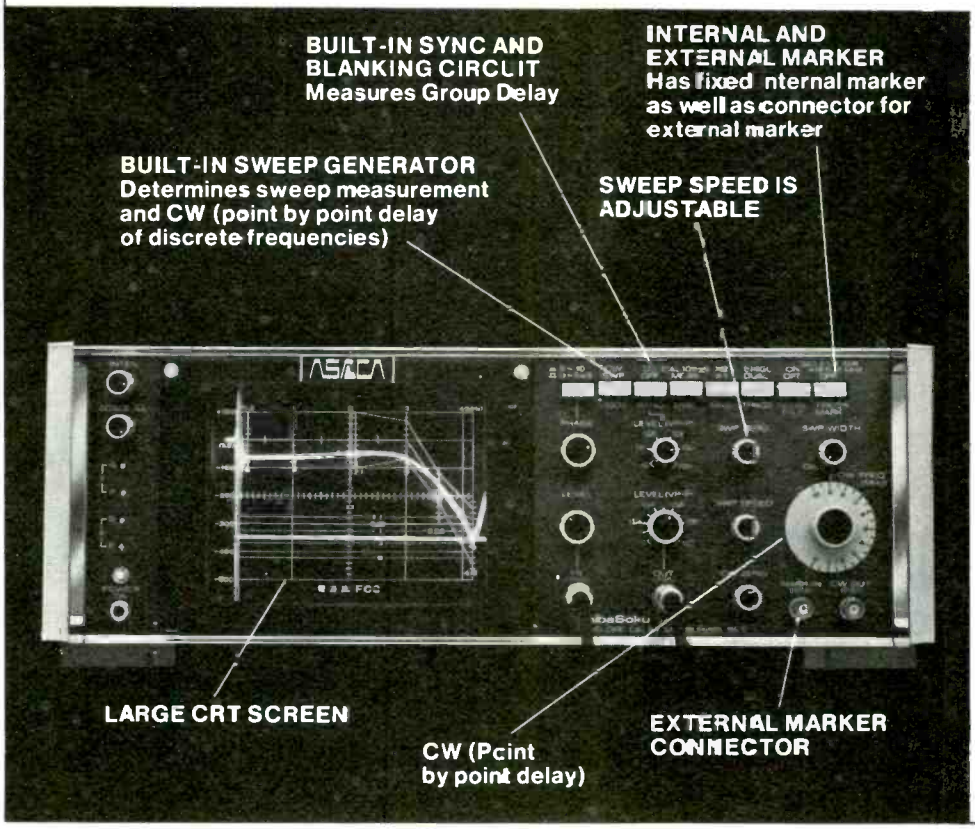

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DC-12: Remote control; up to 12 mixers (expandable to 20) with 2 inputs each: $4,200 tc $5,200.

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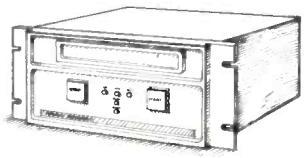

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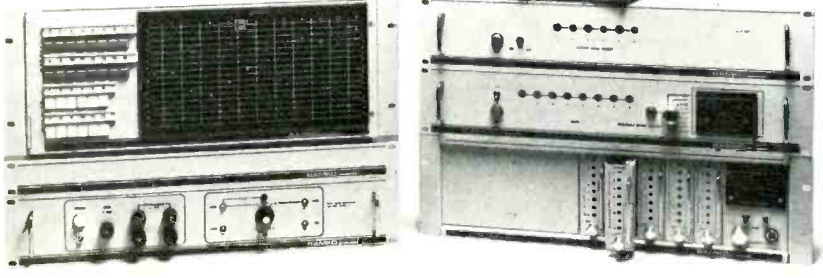

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Play with the cart/cassette record/playback/duplication center that eliminates stereo phase shift error once and for all. The most advanced turntable preamp in captivity. Consoles so advanced, so silent you're not going to believe them until you try them. Or an audio router that makes whatever you've got now look—and sound—like so much spaghetti.

Then, if it's not for you, just ship it back.

But in all fairness, we have to warn you—once you've tried Ramko, chances are you're hooked for life.

Phase shift doesn't matter in mono.

So instead of adding failure-prone electro-mechanical components or re-inventing the cartridge, in the Ramko PhaseMaster Cart/Cassette Duplicating Center, we simply encode the stereo before it ever sees the heads or tape, then decode the signal after it leaves these two major sources of stereo phase shift error.

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Look at what one user wrote:

"Three days ago I replaced the (brand name) preamps in our studio with your ESP-38 preamps."

"The result was astounding. The next day we had six unsolicited calls from local stereo stores. All commented on our improved disk reproduction and wanted to know what we had done."

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For AM stereo, or an FM station upgrade.

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Total dc control of all mixing and switching function means no more noisy pots and switches, no stereo tracking error, and much more resistance to RFI.

We've developed solid-state *balanced* inputs for better sound. Added gain select on each input. Included switch-programmable cue and monitor mute selection. Provided mono, stereo and phase meters as standard features.

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Because with the Ramko ARA-1612 Audio Router/Amplifier you use front panel pushbuttons to route 16 inputs to any of 12 outputs, simultaneously or individually, with an instant LED display of what is going where. You've never seen anything like it.

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And all this is yours at the lowest cost per crosspoint in the industry.

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For moving sound around, we offer more different kinds of amplifiers than anybody.

Ten models of Audio Distribution Amplifiers, each with 10 Hz–20 kHz±0.5 dB frequency response, less than 0.1% distortion, and more inputs and outputs for the size and price than any other comparable ADA.

Four different Line Amplifiers with 20 Hz–50 kHz+0, −1 dB frequency response, 0.008% distortion, balanced in and out, and +21 dBm max out.

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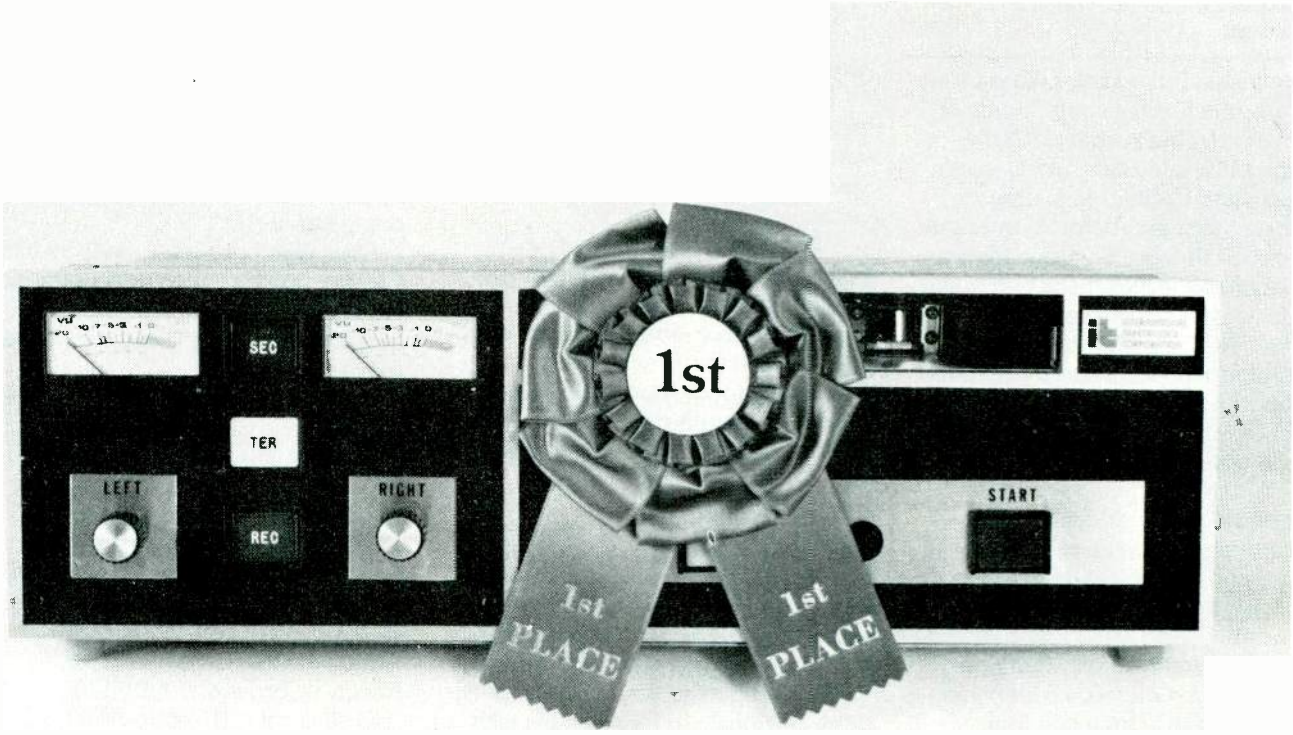

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RADIO
PROGRAMMING & PRODUCTION FOR PROFIT

Second Programming Conference Shows NAB On The Right Course

WITH MORE THAN 1200 registrants, up from the 835 of last year's first National Association of Broadcasters radio programming conference, the second conference, running September 9 through 12 in St. Louis, proved industry acceptance and solidified the NAB decision to make the conference a yearly affair.

Moreover, the planning of the meeting and the responses of both leaders and registrants were in line with an important fact of radio broadcasting today: the emerging realization that radio must move on to material that is valuable to listeners and unique to the medium. While maintaining a position as a great entertainment resource, radio has to add information programming that listeners want and need. Progressive stations are already capitalizing on this fact (see paragraphs on WHO in this column last month).

William O'Shaughnessy, chairman of the NAB Public Affairs Committee and president of WVOX-WRTN in suburban New York, touched on this idea in his opening remarks. "[This is] . . . a venture run by the *broadcasting* industry, not the *record* industry. We will treat with music, all kinds of it . . . but we will also discuss scores of other important matters."

The meetings were organized for strong emphasis on interchange among panelists and participants. There were nine "format rooms," in which producers and users of each of the popular formats could meet continuously for discussion — there were no set addresses or presentations.

The format rooms were comfortably filled a large proportion of the time, and those present seemed to be, on repeated quick checks, about equally divided among big-station programmers, format producers, and small-station executives. O'Shaughnessy told *BM/E* that those who visited the format rooms testified many times to the value of the free interchanges of ideas, and especially to the discovery that many problems in the use of particular formats are common to stations large and small.

Each day of the conference there were four or five concurrent workshops running, each considering a basic area of radio programming, with a panel of experts on hand. The workshops were also a great success with participants, and *BM/E* will take up in future columns here the material developed in several of them: many highly interesting and valuable ideas and prescriptions emerged.

An event that was both entertaining and instructive was the creation of a jingle, carried out at the luncheon session on the first day, with a full orchestra on hand to play the music, singers to chant the words, and leaders in jingle production to comment.

The event was made possible in part by Drake-Chenault Productions, Inc. The panel included Carl Venters, president of Durham Life Broadcasting Service; Otis Conner, president of Otis Conner Productions; Bo Donovan, vice president of Tuesday Productions; Jerry Atchley, vice president of TM Productions; and Jon Wolfert, president of JAM Creative Productions. The burden of demonstration was the creation of a jingle that gives an "audio image" of the station, one that reinforces the station's character in the

improves antenna stability for AM directionals.

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"Several broadcasters improved antenna stability for AM directionals by replacing steel guys with PHILLYSTRAN."

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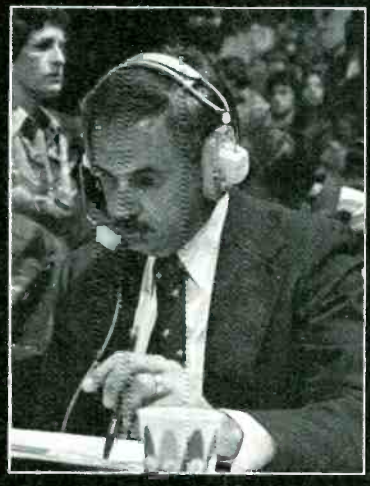
BM/E

Thanks KSDO
in San Diego

KSDO was the first station to use the Comrex Low Frequency Extender regularly in their play-by-play pro-sports programming. Steve Jacobs, General Manager estimates that in the past 12 months, KSDO has saved over $30,000 in line charges, airing the Clippers and Chargers games.



When Ralph Lawler & Ron Reina deliver the Clippers and Tom Kelly & John Demott call the Chargers, they sound great no matter how far away they are. Thanks, KSDO, for taking Comrex along. For more information, call or write:

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Radio Programming

minds of listeners. The jingle, as Conner explained, is more and more stretching record length and becoming an active part of station programming (just as commercial spots are — see article in this issue on radio post-production trends).

The keynote speaker, writer and raconteur George Plimpton, underlined the theme of "more solid material" when he advised radio broadcasters to become "communicasters," exercising the brains of their listeners with material that is instructive as well as entertaining. Don't be totally subservient to public taste, he urged.

The spirit of the conference got a summing from Dwight Case, president of RKO and one of the meeting's principal organizers. He said that participants were uniformly serious and on hand to learn how to improve their programming. "No one pushed a job resume at me," he noted.

In only one respect did the meeting not show tremendous growth over 1978. There was not a substantial increase in the number of program syndicators with exhibits or hospitality suites, with about 15 such firms on hand. This leaves open the question of how the software industry will finally get its major showcase to attract radio programmers. More than 30 syndicators are slated to appear at the National Radio Broadcasters Association meeting in Washington (taking place after this is written). But the relations among all the main industry organizations and meetings seem to be in a period of reassessment. *BM/E* will return to this theme in the report on the NRBA, due in December. **BM/E**

BM/E's Program Marketplace

Syndicators For Radio

Watermark, Inc.
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Tel.: (213) 980-9490

THE MUSIC SPECTRUM of rock-pop is, we all know, a programming major for radio stations aiming at young adults. It has been the initial basis for success of one of the most progressive syndication operations, Watermark, Inc., of North Hollywood. But Watermark is justifying "progressive" further by adding new kinds of programming that benefit from using rock-pop music and production expertise in new ways.

The 10-year-old success for Watermark is *American Top 40,* which has managed to dramatize the *Billboard* weekly best-seller chart, grabbing teenagers and young adults in very large numbers. The program is a regular, four hours a week, on 514 stations as this is written. It reaches audiences in Japan, in Latin America, in other foreign countries, with each voice track in the local language.

Watermark is planning an expansion of the program and may offer stations a longer weekly program if they want it. Some other attempts to win big audiences by playing the chart tunes have foundered after a while. Many radio managements have discovered that the chart tunes played straight week after week become tiresome for the young audience.

Watermark has grown big by putting the tunes in an attractive dramatic framework with an expert voice track. The cost of the program to radio stations is negotiated based on market size and other factors. The program includes availabilities for local sponsorship.

The requirements for dramatic voicing and editing imply flexible production equipment. President Tom Rounds of Watermark told *BM/E* that 10 years ago, when the firm launched its operation, it could not find a studio in the Los Angeles area that met its needs. So Watermark built its own, and has expanded the facilities over the years. The biggest expansion to date is now underway — the construction of a million-dollar production complex with four separate studios. The need for multiple production units arises in part because Watermark now leases production equipment to other syndicators who come in to make and duplicate their programs.

Some highlights of the production equipment will be two Ampex 16-track 440-type recorders, two MCI 32-in/16-out consoles, an Automated Processes multi-channel board, some 16 two-track recorders including Studer and MCI models, the Eventide Harmonizer for special effects, and a Vocoder (leased at present). Tom Rounds

also notes that Watermark has accumulated a vast library of special effects recordings which are used liberally in program production.

This equipment expansion will also give Watermark plenty of production room for newer programs now underway and others planned for the future. The *Robert W. Morgan Special* is a one-hour-a-week show, 52 a year, consisting of interviews with top popular-music persons, with a "documentary" feel. Again, a strong element of drama is created, with the lives, feelings, and experiences of the musicians organized into something approaching soap opera. Another success for Watermark, it is sponsored by Michelob and is bartered to the radio station.

Watermark's equipment, resources, and dramatic creativity are also thrown into the latest program, *Alien Worlds*, a successful science fiction series. So far 26 half-hour stories have been produced since January 1. The series will be expanded to 52 programs next year.

Each story is written originally for Watermark, with all available sound effects and special effects in mind. According to Rounds, the idea was to create radio drama with a fully contemporary feel, making use of current music in a way to engage total acceptance by young adults. Rounds says that simply dramatizing famous sci-fi stories does not make use of the full capabilities of radio; to do that, each story must be written by an expert in modern radio production.

Each program is produced on 16 tracks for flexible use of all sources of special effects, voicing, etc. The opening and closing music were recorded especially for Watermark by a British symphony orchestra.

Alien Worlds is another bartered program, with Cadbury (the chocolate maker) as sponsor. It is on 140 stations at this time.

Watermark's creativity and sharp sense of current trends in taste have come from long seasoning in radio. Rounds admits to 25 years in radio broadcasting, including a stint as an associate of Alan Freed at WINS in the '50s. Later he was program director of several stations, in Hawaii and in California. At KFRC he organized many successful promotions.

Other members of the Watermark team have similar "front line" background in their various specialties. Watermark's service extends to helping chose the particular group of stations that each program should be "pitched" to, taking into account demographics, local competition and other factors. This "ad hoc net" approach is more evidence that Watermark is on top of highly significant trends in today's radio programming. **BM/E**

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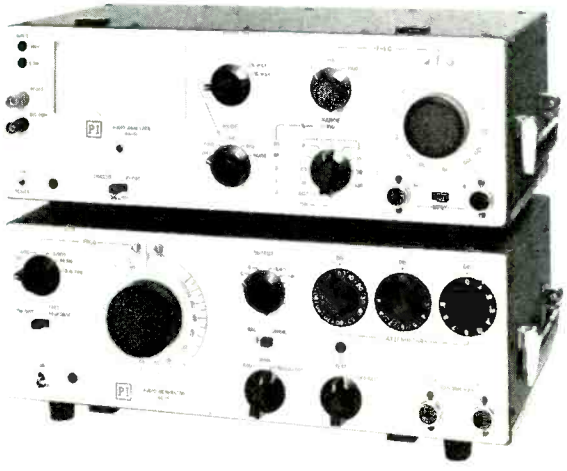
Wow & Flutter test signal	No	No	Yes
Simultaneous L&R Outputs	No	No	Yes
600 ohms and 150 ohms Source	No	Yes	Yes
Stereo Matrix Switch (L,R, L+R, L-R)	No	No	Yes
Switch to remove signal and terminate line for S+N/N	No	Yes	Yes
10 dB, 1.0 dB, 0.1 dB Step Attenuators	No	Yes	Yes
AUDIO ANALYZER	**Combined with Generator**	**Combined with Generator**	**Separate Unit**
Harmonic Distortion Mode	Yes	Yes	Yes
Automatic Nulling	Yes	Yes	Yes
Automatic Set Level	Yes*	Option*	Yes
Intermodulation Distortion Mode	No	Option	Yes
AC Voltmeter Mode	Yes	Yes	Yes
Stereo Phase Meter Mode	No	No	Yes
L/R Amplitude Ratio Mode	No	No	Yes
Wow & Flutter Meter Mode	No	No	Yes

*Limited to 10 dB capture range.



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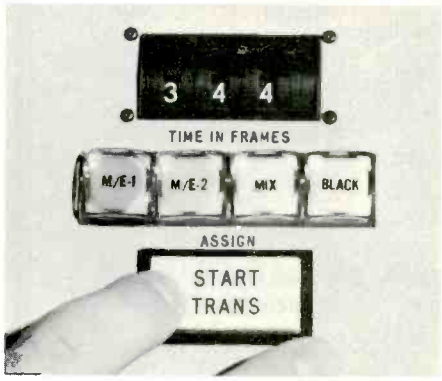

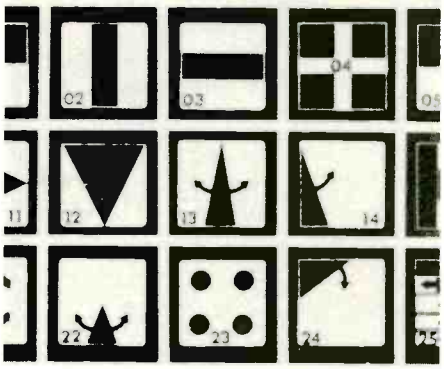

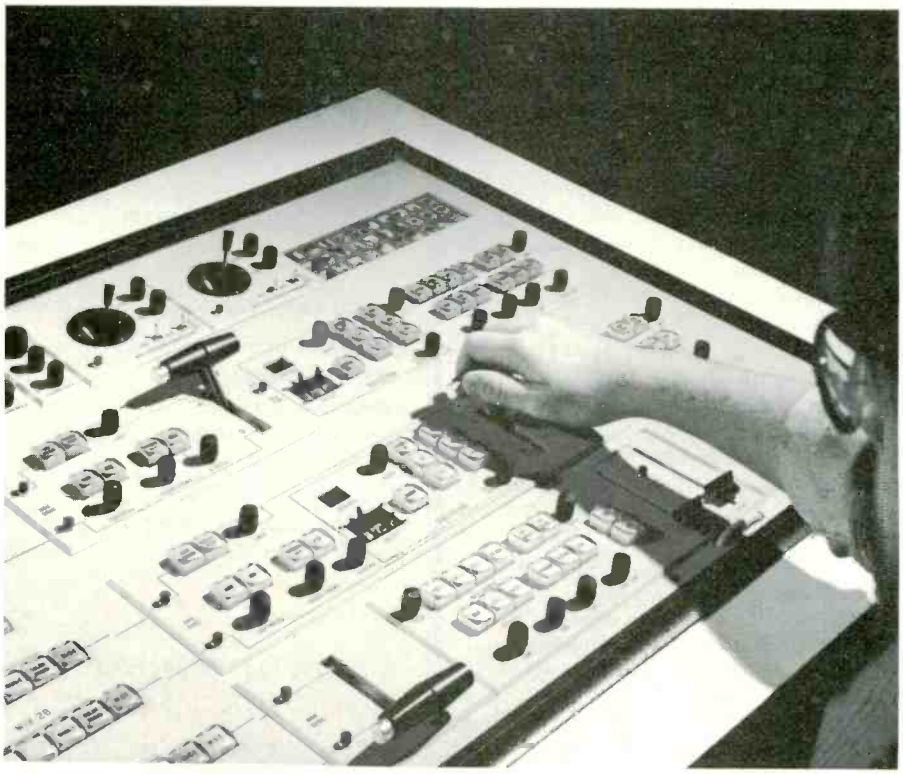

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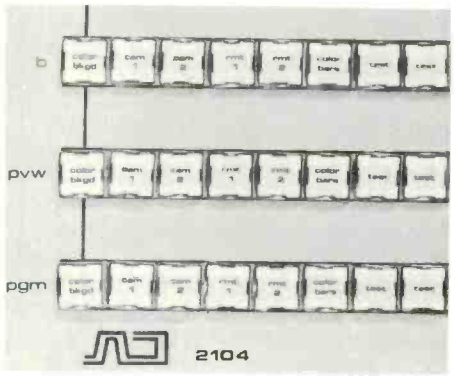

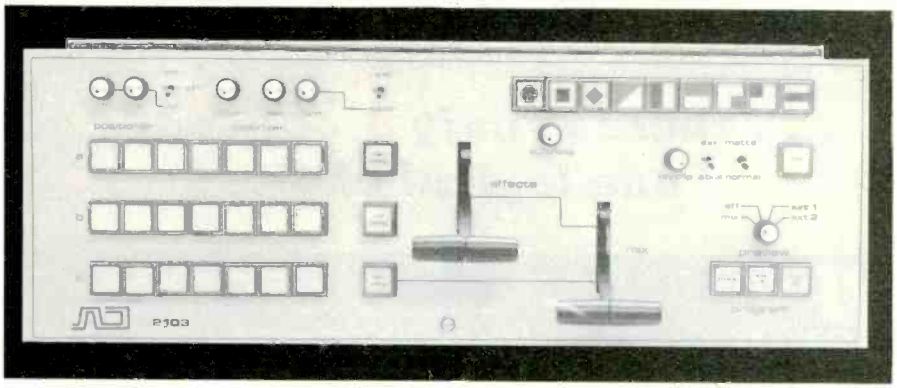

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TELEVISION

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The Real Story Behind Producing *Real People*

"PRODUCING SEGMENTS for *Real People* has forced us to come up with a set of highly streamlined production techniques," observes Tom Fraser. "Otherwise we couldn't possibly be in Louisville today, Oshkosh tomorrow, and Long Island the day after and still maintain our sense of humor about the show." Fraser is a New York City-based director and cameraman who is the major East Coast packager of feature material for NBC's new magazine-format comedy show, *Real People*.

The actual telecast of the show, in prime time on Wednesday evenings, originates from NBC's studios in Burbank with on-air talent live. Overall creation and production of the show is the responsibility of executive producer George Schlatter, whose George Schlatter Productions also brought us *Laugh-In*. During the telecast, however, some 10 segments ranging in length from one or two minutes to five or six minutes are rolled in from quad tape. The production of these segments, from all around the country, is shared by George Schlatter Productions, augmented by stringers such as Fraser.

Preproduction a critical factor

"The preproduction on a show like this is at least as important as the production itself," says Fraser. "When we arrive to begin shooting, we know exactly what to expect, who we'll be talking to, how long we'll spend at each location, what flight we have to make to get to our next location, etc."

Preproduction begins with the development of a segment "idea" — either by Schlatter's large research staff, which constantly scans newspapers, press releases, and other media for unusual people and events, or by Fraser himself. The idea, no matter what its source, is immediately "qualified" by researchers who call the people or organizations involved to determine the idea's authenticity, responsibility of the people involved, potential problems, and also potential for humor and a good segment.

The ideas are worked up on a standard form developed by Schlatter that details locations, key contacts, observations of the researcher, and other information. Schlatter and his staff then evaluate the ideas and determine which they will produce. Assignments are then distributed, with those occurring east of the Mississippi falling into Fraser's territory.

Once Fraser has gotten the assignment, his own staff goes to work to prepare a detailed production plan. Time permitting (sometimes he hears about events happening so soon there is barely enough time to assemble a crew), the staff compiles a complete dossier on the event including press clippings, videotape of local news coverage, and extensive phone conversations. If there is a public relations or press representative available, Fraser will normally work with the person. "They can open a lot of doors," he says. "But you have to be careful. Sometimes they will direct you towards something for political reasons, whereas they might cause you to overlook a person or event that would make better feature material."

Fraser's production coordinator will

A small, tightly knit crew and streamlined production techniques are essential for the "on-the-go" production style evolved by Tom Fraser for Real People

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usually arrive at the location a day or two in advance of the rest of the crew. The coordinator's responsibility is to insure that things will run as smoothly as possible once Fraser and his camera crew arrive. The coordinator also attempts to get as many releases as possible signed in advance so that Fraser knows exactly whom he can talk to.

Mobile, flexible crew structure

Once Fraser arrives with the camera crew, the production coordinator immediately hands him a detailed production schedule. "When you're doing three or four of these shows one right after the other," says Fraser, "it is very important to be able to get filled in on what is going on quickly and efficiently." When shows are ganged up but widely spaced geographically, two production coordinators will leapfrog from one event to the other: one goes on ahead to do advance work at location two while the first remains at location one. When production is completed at location one, that production coordinator flies on to location three while the crew shoots at location two with its production coordinator, and so on.

Fraser (in Real People T-shirt) consults monitor behind cameraman's legs to check framing of shot during national Yo-Yo Championship. Soundman holds ¼-inch Nagra recorder for protection track

The actual production skillfully blends a documentary, freewheeling shooting style with carefully preplanned shots. The finished product must convey an impression that the people and events covered are alive and spontaneous; but the coverage must also compete technically with expensively produced prime-time programming. This demands that Fraser, like the other line producers, must work smoothly and efficiently.

The technical crew consists of a camera person, an audio person, a combination gaffer/grip/production assistant, and a VTR operator. There is always at least one member of the crew who is technically competent enough to "take the panel off the camera, get in there, and fix it." Sometimes this task falls to the video operator/recordist, sometimes to the camera person.

Fraser has worked with crews using a variety of ENG-type cameras, including the Ikegami HL-77, Thomson-CSF Minicam, and Bosch Fernseh KCA. Now he almost always uses the Ikegami HL-79A.

All material is recorded on a Sony BVU-100 3/4-inch videocassette recorder, with time code run in on one of the audio tracks. Fraser observes that many more people in the New York area record time code on an audio track than on the cue track since there are occasional problems with the sound of the code bleeding through to the aduio track. People on the West Coast, on the other hand, appear to prefer using the cue track.

In all cases, however, the sound person carries a Nagra 1/4-inch recorder — both for a protection track and because the 1/4-inch tapes are dubbed to audiocassettes so that a transcript can be made and a rough "paper" cut of the segment prepared by the editor and producer.

All the equipment is as lightweight and portable as possible, very much resembling an ENG operation. Artificial lighting, for instance, is kept to an absolute minimum. When it is neces-

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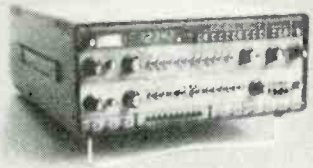

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Fraser prepares to shoot waterside footage. Only equipment that will actually be used during shoot is shipped to the location. Production assistant carries a Motorola walkie-talkie for ship-to-shore conversations

sary, battery-operated lights are used, with heavy diffusion to provide a more natural look.

Fraser insists on having a monitor on all shoots, considering it too risky to be without one. In some instances his gaffer will carry a nine-inch battery-powered b&w unit; at other times, Fraser himself will carry the British-made Sinclair micro monitor. Though there is rarely time to check playback, the monitors are frequently used so that Fraser can check his cameraperson's framing.

Also as in ENG-style shooting, a shotgun mic is often used for sound. Fraser admits that he is not altogether pleased with the results produced by a shotgun, nor, for that matter, by lavalier mics which must either be buried under so much clothing that the sound is severly clipped or allowed to show, producing a somewhat non-aesthetic look. Fraser's preference, where there is time to set up the shot, is to use a cardioid mic on a fishpole boom.

On location, Fraser acts as both interviewer, assisted by his producer or production manager and production coordinator, and director. In his role as interviewer, he has developed a style that permits him to get his subjects to talk in complete thoughts and sentences; Fraser's own voice is cut out during post-production since he is not an on-air personality. Part of the secret, says Fraser, is to make his own face as communicative as possible so that he can express his feelings while a subject is talking without interrupting the track. To this end, he removes his sunglasses before an interview, allowing an unobstructed view of his face.

Fraser also believes that subjects should not be talked to too much before the actual interview — to catch their spontaneity. He likes to have the tape rolling even before the subject realizes what's going on; when using cameras with tally lights, he will either defeat the camera's tally system or tape off the light. Though the first two minutes of an interview are generally unusable, the tape is rolling to capture any and all dialog.

Each subject must sign a carefully worded release before the interview begins, releasing the production company, the network, and everyone else involved in the production from threats of lawsuits for invasion of privacy, etc. None of the subjects is paid for any appearance. Almost everyone Fraser wants to interview turns out to be cooperative — in some cases, too cooperative. Fraser explains that people love to perform in front of the

Fraser walks ahead of crew during taping of segment on wheelchair athletics. Soundman carries a shotgun mic mounted on a boom, though standard boomed cardioid mics are Fraser's preferred method

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Interview with 94-year-old lifeguard Charlie Diuguid and his "girlfriend." ENG-style shooting enables Fraser to capture spontaneous moments which might be lost if crew and equipment were intimidating

camera and are sometimes willing to do things for television that they might not ordinarily want to. "I am conscious at all times," explains Fraser, "of my basic responsibility to not present people in a compromising way. I will never sacrifice one of my subjects' personal dignity."

Fraser as director realizes that in this documentary shooting style, he must be open to any input he can get from his crew. Sometimes while he is setting up to do his next interview, his camera person will be cut loose to shoot whatever catches the eye. Throughout the whole production, however, Fraser is keenly conscious of the general nature of the program — that it is a prime-time comedy show.

"My cameraman was once shooting something," says Fraser, "and I told him to stop, that it wasn't important. He said that it was really interesting. I reminded him of what George Schlatter had said — it's like a dictum for the whole production: 'Interesting is for Sunday afternoons; this is for Wednesday evenings.'"

Of all the things Fraser has learned from having produced and directed episodes from a 94-year old, 100-pound lifeguard on Long Island to a convention of 250 ventriloquists in Michigan ("they don't talk much to each other, but their dummies certainly do"), it is the lesson of self-reliance. "Our advance people know exactly how we go about shooting and they prepare a schedule that is exactly tailored to us," says Fraser. "Our team knows how to work together — we have no prima donnas, no idle PAs sitting around with nothing to do. Each function on the production has a specific person to carry it out, and they don't have to wait for orders to do it. We have even, on occasion, had to run together to get something that was breaking fast — all six or seven of us, in one coordinated whole." Self-reliance also means having everything they will need with them — from the releases to a first aid kit and miniature makeup kit.

Post-production on a key element

The documentary shooting style, even though it is as carefully preplanned as possible, usually generates a high shooting ratio. Four 20-minute videocassettes is the least Fraser has ever shot for a segment; the number can rise as high as 10 or 11.

Shot cassettes are brought back to New York (carried by hand on the airplane to prevent accidental loss), where they are supplemented with a shot log, Fraser's suggestions for the cut, etc., then sent to George Schlatter Productions in California for post-production at The Editing Company.

In one room at Schlatter's offices a giant board tracks the progress of ideas for future segments, the status of ideas already in production, and which segments are ready for airing; a similar board at The Editing Company keeps tabs on the status of the dozens of segments in post-production at any given time.

Incoming tapes are immediately dubbed to audiocassettes for a transcription. A staff member also views the videocassettes for general content and begins formulating a plan about how the segment can be cut together.

The 3/4-inch masters are bumped up to quad and at the same time dubbed to 3/4-inch editing copies. Working with a small Convergence Corp. two-machine editor/controller, the editor then views all the material in detail and assembles a rough cut. Shifting to on-line editing, a CMX 340X is used to create the fine cut, complete with narration, sound effects, and music. Finally, the fine cut is sent to Vidtronics, a post-production facility, for conforming.

Two to three days are spent editing each segment — a luxurious figure for those used to working in the panicked situation of a newsroom, but necessary if the segments are to keep viewers tuned in during prime-time hours.

Magazine-format shows are continuing to prove their popularity, both on a local level and as network shows such as *20/20, Prime Time Sunday,* and *60 Minutes. Real People,* though not as serious and weighty as the others, is showing by its ratings that documentary production and the magazine format can compete seriously in any time slot. And though the economics of producing *Real People* may be a little beyond that experienced at the local level (its budget more closely approximates programming than news), Fraser's techniques provide a valuable lesson for all involved in producing magazine-format shows. **BM/E**

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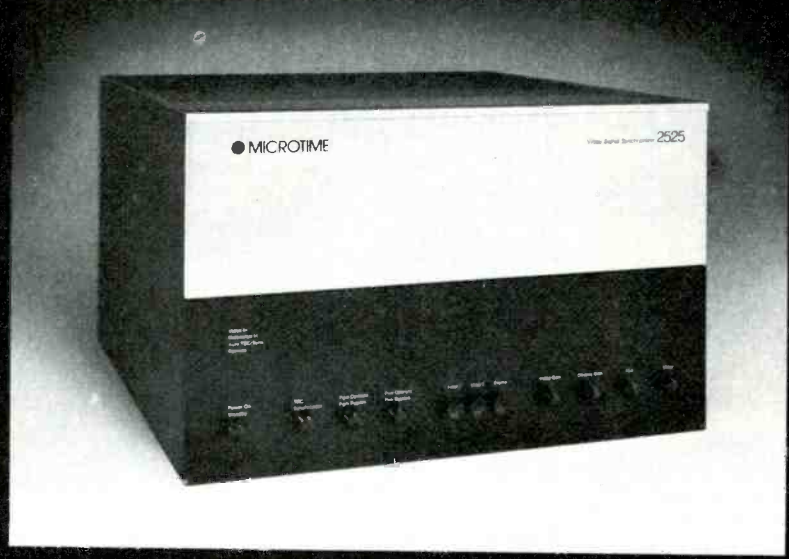

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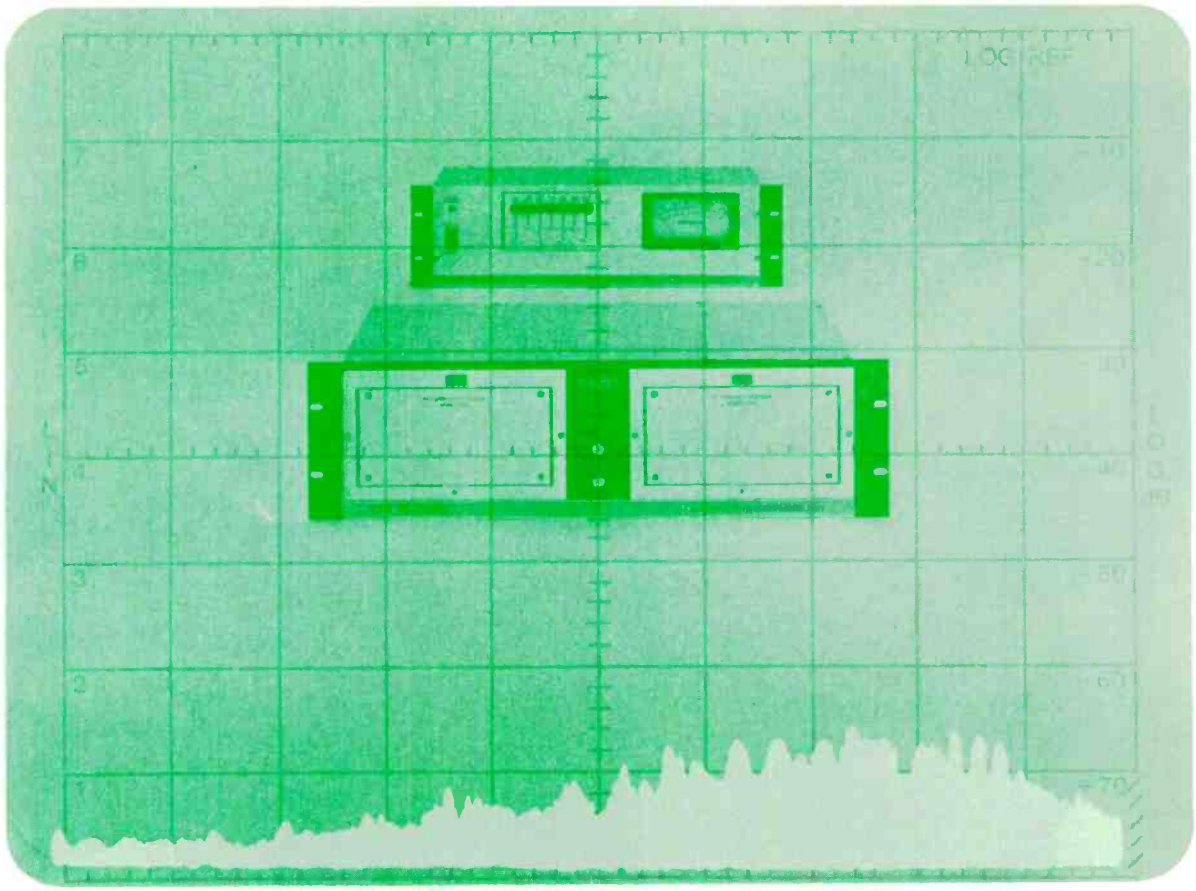

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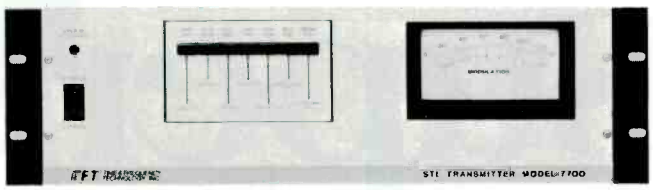

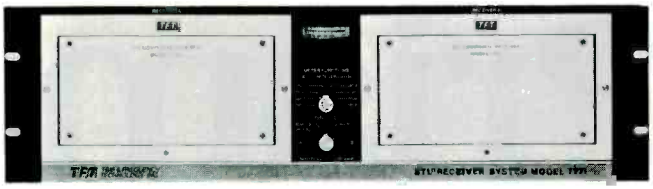

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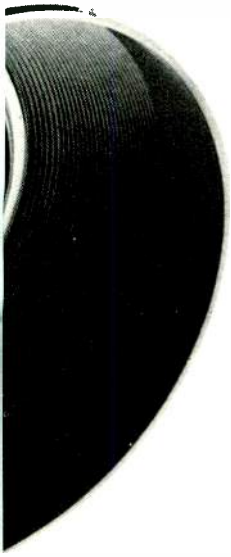

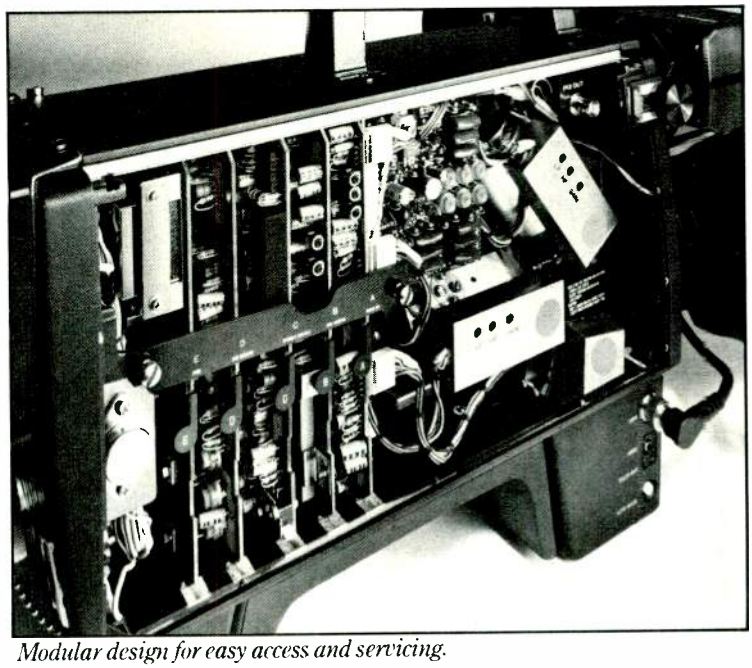

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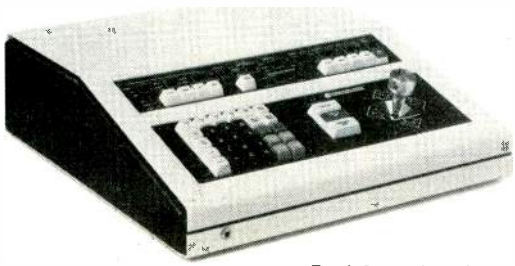

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COMMERCIALS: THE LEADING EDGE OF SPECIAL EFFECTS AND ELECTRONIC ANIMATION

Television commercials have traditionally led the way with innovative production and post-production techniques. Major teleproduction facilities around the country are now beginning to use digital effects generators, digitial animation, and electronic animation to impart a "something special" look to the products and services whose ads they create.

THE PRODUCTION AND POST-PRODUCTION of television commercials offer some major challenges. There are only 60 seconds (or, more commonly these days, 30 seconds) to tell a whole story and get a message across. The commercial competes for attention with a restless audience which would probably rather get up and go to the kitchen. And the commercial is surrounded by high-quality, well-produced programming which it must either equal or surpass in production value to position the product in the viewer's mind.

Television commercials have therefore traditionally led the way in making use of advanced techniques that will give a product that "special something" to make it stand out. Quick cutting is an example of a style that was first introduced in commercials, then found its way into programming and feature films.

Today, with more and more teleproduction and post-production facilities taking delivery of their digital effects units, and the widespread availability of digital and electronic animation, commercial producers and editors are increasingly taking advantage of the systems in their work.

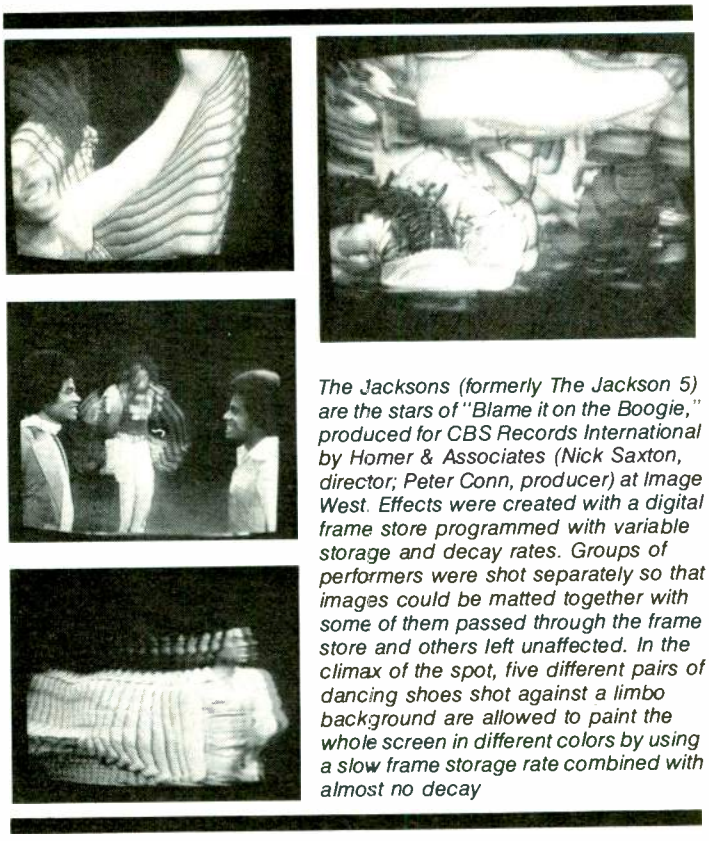
Jerry Eisenberg, an editor at CFI Video in Hollywood who has been working with an MCI/Quantel DPE 5000 in conjunction with a CDL 480 switcher for the past six months, cites some outstanding examples of what can be done with the new digital effects devices. In a 30-second promotional spot for Los Angeles radio station KPOL, for instance, a three-dimensional faceted diamond-shaped object was shot revolving in front of a black background, strongly lighted so that as the shape revolved the facets flared, then subsided. Using the DPE's key tracking feature, still photographs alternating with the station's logo were keyed into the flares. As the flare grew larger, the keyed image grew with it until it almost filled the screen, then subsided again as the diamond continued to rotate.

In another case, the client wanted to simulate a "matter transporter." A microwave oven-like device was shot in the studio with an object visible inside. One of the CDL's random box wipe patterns was then fed into the Quantel, compressed and repositioned so that the entire wipe fell only on the object inside the oven. When the effect was activated, the object in the "matter transporter" appeared to break up and then disappear, leaving the oven itself intact.

Digital effects devices such as the DPE 5000, Vital's SqueeZoom, and Grass Valley/NEC's DVE systems have been in most user's hands for well under a year, so it is still much too early to predict their ultimate impact on the world of special effects. Also unknown at this time is the impact of several new digital effects devices, such as NEC's Digital Strobe Action unit with its ability to create stunning multiple-image effects. The unit was first unveiled at the 1979 NAB show and has not yet seen actual field use.

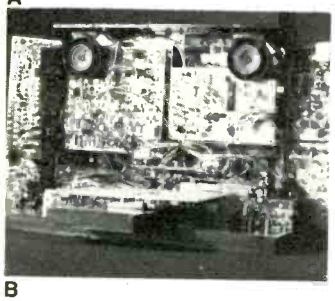
The availability of digital effects systems at post-production facilities is already having a major impact, however, on producers and editors who have been accustomed to having their special effects created on film whether or not the film was ultimately to be dubbed to tape for post-production. Teleproduction facilities and stations finally have special effects systems that mirror the speed and sophistication of today's computer-assisted editors.

Apart from the "dazzlingly different" effects created by editors such as Eisenberg and others, there is another class of effects which, though not apparent to viewers, has increased enormously the flexibility editors have to work with materials. Will Roth, VP and general manager of



The Jacksons (formerly The Jackson 5) are the stars of "Blame it on the Boogie," produced for CBS Records International by Homer & Associates (Nick Saxton, director; Peter Conn, producer) at Image West. Effects were created with a digital frame store programmed with variable storage and decay rates. Groups of performers were shot separately so that images could be matted together with some of them passed through the frame store and others left unaffected. In the climax of the spot, five different pairs of dancing shoes shot against a limbo background are allowed to paint the whole screen in different colors by using a slow frame storage rate combined with almost no decay

A



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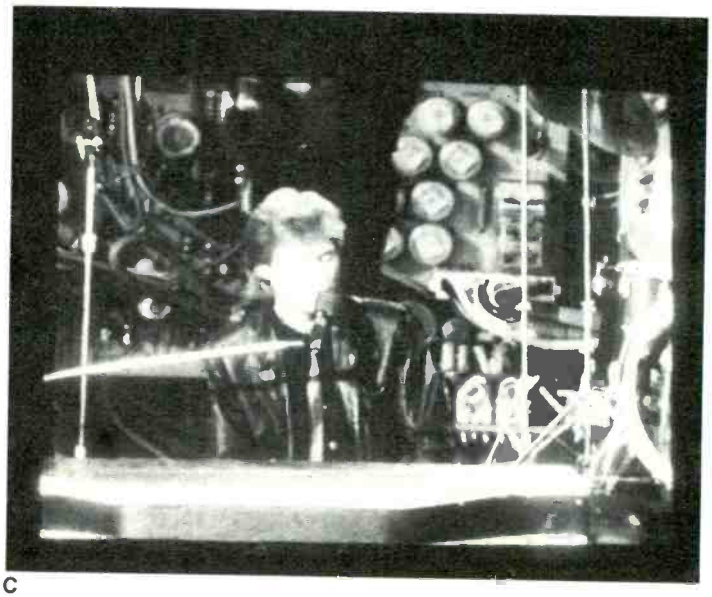
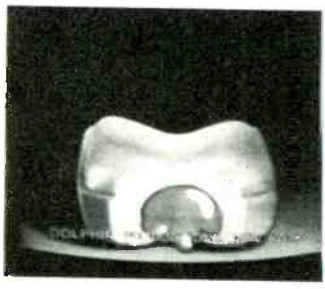
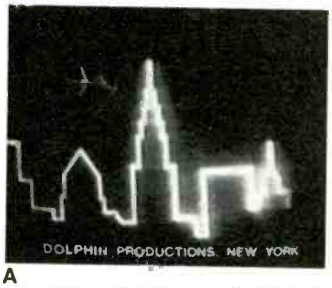


C

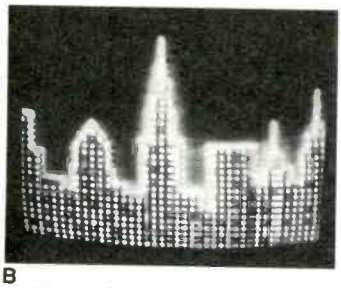
Promotional spot and commercial for a new Hall & Oats rock group album, produced at the facilities of Modern Telecommunications, Inc. (MTI), New York City, on Ultimatte. Foreground image (A) was shot against blue background; DP David Schweitzer was able to use lighting as low as 2:1. Background image (B) was close-ups of the transistor boards of a discarded tape recorder. Finished matte shot (C), created by engineer in charge Brian Keen, presents the group as if it were playing inside a transistor radio. Ultimatte, available from distributors such as Camera Mart, uses a non-additive mixing process to combine foregrounds and backgrounds with no edge fringing



Complex electronic animation sequence produced by Dolphin Productions, New York City, for Freshen Up Gum on Scanimate. Original reflective art input consisted of four drawings:



A



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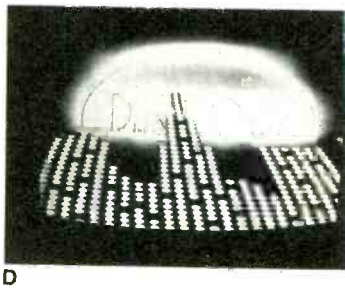

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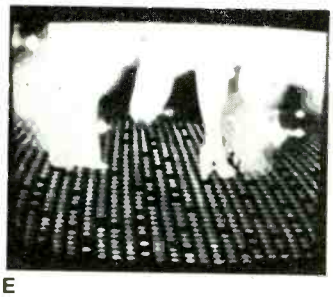

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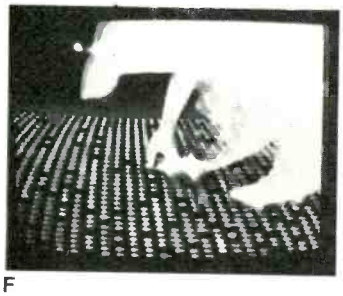
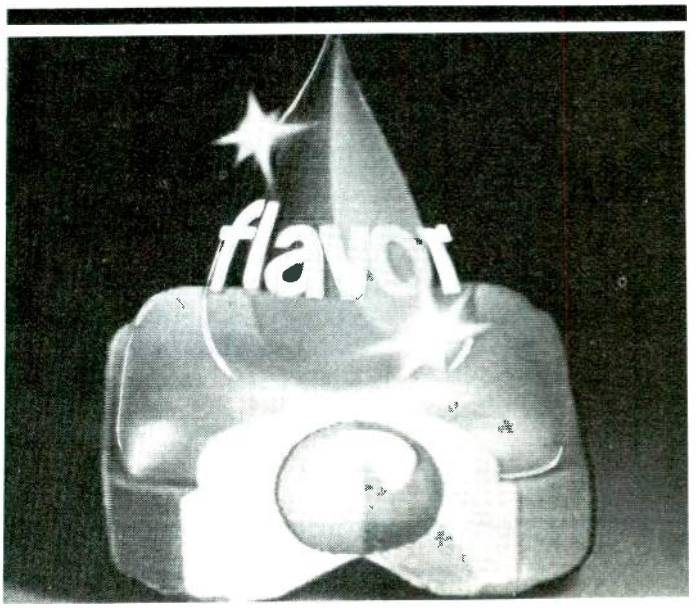


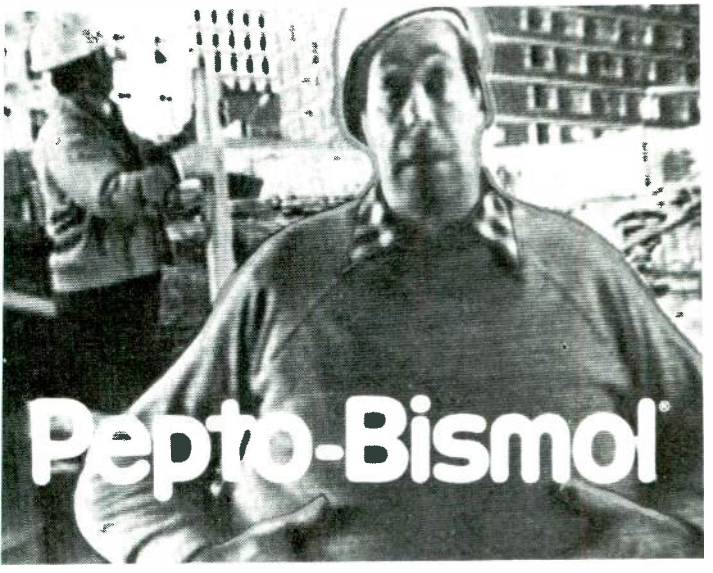
F

Dolphin spot for WKTU Disco 92. "Neon" line traces outline of New York skyline (A). Skyline fills in with rows of strobing lights (B). Neon effect dissolves away and strobing skyline begins to extend backwards as WKTU logo appears (C,D). Logo dissolves away to reveal dancers (shot in the studio against a black background and then reversed) dancing on a floor composed of the strobing dots (E, F). Scanimate system created all images except for the dancers

Two station promos created by electronic animation on Scanimate at Computer Image Corp., Denver, Col. Designer/operator David Small in each case started with plain reflective black & white artwork of the letters. Scanimate is then used to manipulate an analog raster to achieve the desired three-dimensional, metalic-looking letters, streaks, etc., and to move the image on any three-dimensional axis. A computer remembers the analog settings for precise repeatability. After the moves and basic forms have been created, the image is colorized



e gum, the flavor drop, the word "flavor," and the sparkles. First e drop shape was manipulated so that it would flow from the top the screen and melt into the piece of gum. Then the word lavor" was precisely matched to the movement of the drop. The ece of gum itself was manipulated so that it would bend to ceive the flavor drop and absorb it. Finally, the sparkles were dded at strategic points



Dolphin's creation for Pepto-Bismol. Actor in foreground was shot separately from background against black limbo screen. During first part of scene, his normal image is matted in. When he begins talking about indigestion, there is a perfectly matched dissolve to the special effect which shows the actor's stomach swelling and undulating while the whole image goes "off color." With Pepto-Bismol to the rescue, the distended form returns to its normal state

Commercials

Teletronics/Video Corporation of America, New York City, tells of a recent Procter & Gamble spot where the client was dissatisfied with the framing of the commercial as it had been shot. The image was blown up seven fields when the original film was dubbed to quad for post-production, then an additional seven fields on the facility's two-channel Vital SqueeZoom. (Teletronics has developed its own computer interface for its SqueeZoom, Grass Valley 1600 switcher, and CMX editor.)

Other instances of this kind of "cosmetic surgery" are seen at facilities such as Reeves Teletape, also in New York City. Joe DiBuono, VP of marketing, feels that the availability of digital effects devices such as his DPE 5000 is changing the very way that commercials are shot. "When we used to set up to do a mortise shot," he explains, "we would have to change the lighting and reposition the camera precisely where we wanted the product to appear in the matte Now, of course, we simply light for full-frame — which gives the best results anyway — then compress the frame with the DPE and position it wherever we want to. Before digital effects, if the client didn't like the position of the mortise we would have to go back and shoot it all over again."

Another frequently encountered situation is the lack of good cuts in original material, particularly in hidden camera commercials where the tape or film is simply allowed to roll without changing lens focal length. Here, digital effects units can be used to actually create reverse-angle matched cuts by blowing up the original image, then flopping it so that it looks as if the spot was shot with at least two cameras.

Low-budgeted commercial producers are also common users of digital special effects. Despite the high cost of using a digital system at a post-production facility, these producers find that, with a few simple pictures and graphic elements, they can create "a commercial that moves" for about one-quarter of what it would have cost to go out and shoot original videotape or film.

Though digital effects in commercials are still in their infancy, electronically animated commercials are in their heyday. Interestingly enough, David Small, an animator at Computer Image Corp. in Dever, Colo., observes that clients and agencies are increasingly seeking a "digital, electronics" look for their animated spots; the Computer Image Scanimate system, also used at Dolphin Productions in New York City and at Image West in Hollywood, uses an *analog* computer.

Small explains that the main input into the Scanimate is flat, high-contrast negative artwork rather than digitized points created by a computer. The artwork is scanned by a high resolution 945-line camera, then fed through a series of computerized analog circuits to manipulate the raster. Filters, delay and timing circuits, and a variety of other signal processing devices are at the disposal of the Scanimate operator, who uses a series of dials and slide levers to achieve the desired moves. Each of the 945 lines, or any combination, can be moved and shaped accordingly. The image is displayed on a high resolution monitor which is rescanned by a standard 525-line camera, then fed into a colorizer and production switcher for further effects work.

Small is particularly proud of the three-dimensional, metallic-looking letter effect he created recently for use with station logos and commercials.

Commercials

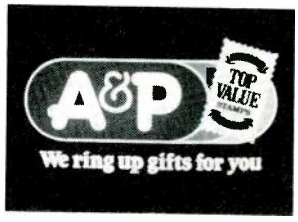
At Dolphin Productions in New York City, on the other hand, considerable work has been done on Scanimate recently with live or videotaped images as the source for the effects. The Pepto-Bismol spot currently playing on national television was created at Dolphin using Scanimate, as were spots for Freshen Up gum and WKTU Disco 92 (see accompanying illustrations).

It should be noted that the Scanimate system is not the only analog manipulation system available. Even before Scanimate's first appearance, video artists Mark Rudd and Bill Etra designed a system to manipulate the TV raster through a series of voltage controls, though not computer-assisted. The Rudd/Etra synthesizer, designed to mimic the capabilities of an electronic music synthesizer, can either work with completely abstract forms created by simply feeding in sync and black signals, or manipulate images from a camera or VTR. The manipulated raster is then rescanned by a conventional color camera.

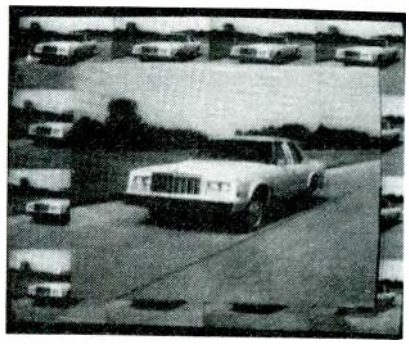
At A&G Video in New York City, partners Alan Meislin and Arnold Mintz have been working with graphic artist Norman Pollack to create low-cost effects on the system for a variety of commercial clients. One of the simplest yet most effective moves is a roll and flip in which a logo rotates three-dimensionally, then comes to a stop in any position. The roll can be combined with a three-dimensional move that takes the logo from one part of the screen to another. The animated logo can then be combined with an animated background on another pass through the system.

The output of the camera is then fed into a production switcher/colorizer where other effects can be achieved and the output of the synthesizer mixed with other signals.

Digital animation systems also continue to make advances. In effect, a character generator is a digital animation device; its ability to digitize forms, however, is limited to the shapes of the letters and numbers. It is not surprising, therefore, that manufacturers of the more sophisticated graphics systems have expanded their



Computer Creations, South Bend, Ind., used its VideoCel digital computer system for these two spots. Original outline artwork is traced over on a bit pad, with operator-selectable styles such as airbrushing and shading; infinitely variable colors are selected at the same time. Initial position and final position of the moves is entered through a dedicated keyboard that instructs the "camera" to move left or right, up or down, in or out, etc. The computer then creates the move by interpolating the data from the start and end points of the move. The image is recorded frame by frame on a slow motion machine, then played back at the correct rate. Length of time to create each frame depends on the complexity of the move and number of elements the computer must manipulate



16-way split screen with frame that expands to fill screen created for Chrysler Plymouth at Reeves Teletape, New York City. MCI/Quantel DPE 5000 is used either interfaced with CDL 480 switcher or outboard with a Grass Valley switcher. Image is created as four quad splits, then mixed with frame expansion capability in the DPE

software to be able to handle more sophisticated shapes. Generally this takes the form of a bit pad (a "writing tablet" on which the artist draws a shape that is then translated by the computer into a series of digitized points) or a tablet that scans a piece of artwork and enters it into the memory as a series of pixels. The operator positions the form in its start position by manipulating the logic circuits of the computer. The next position is also entered into the memory, and the computer is then used to move the form from its initial position to the next position by interpolating the digitized points or pixels through the in-between points.

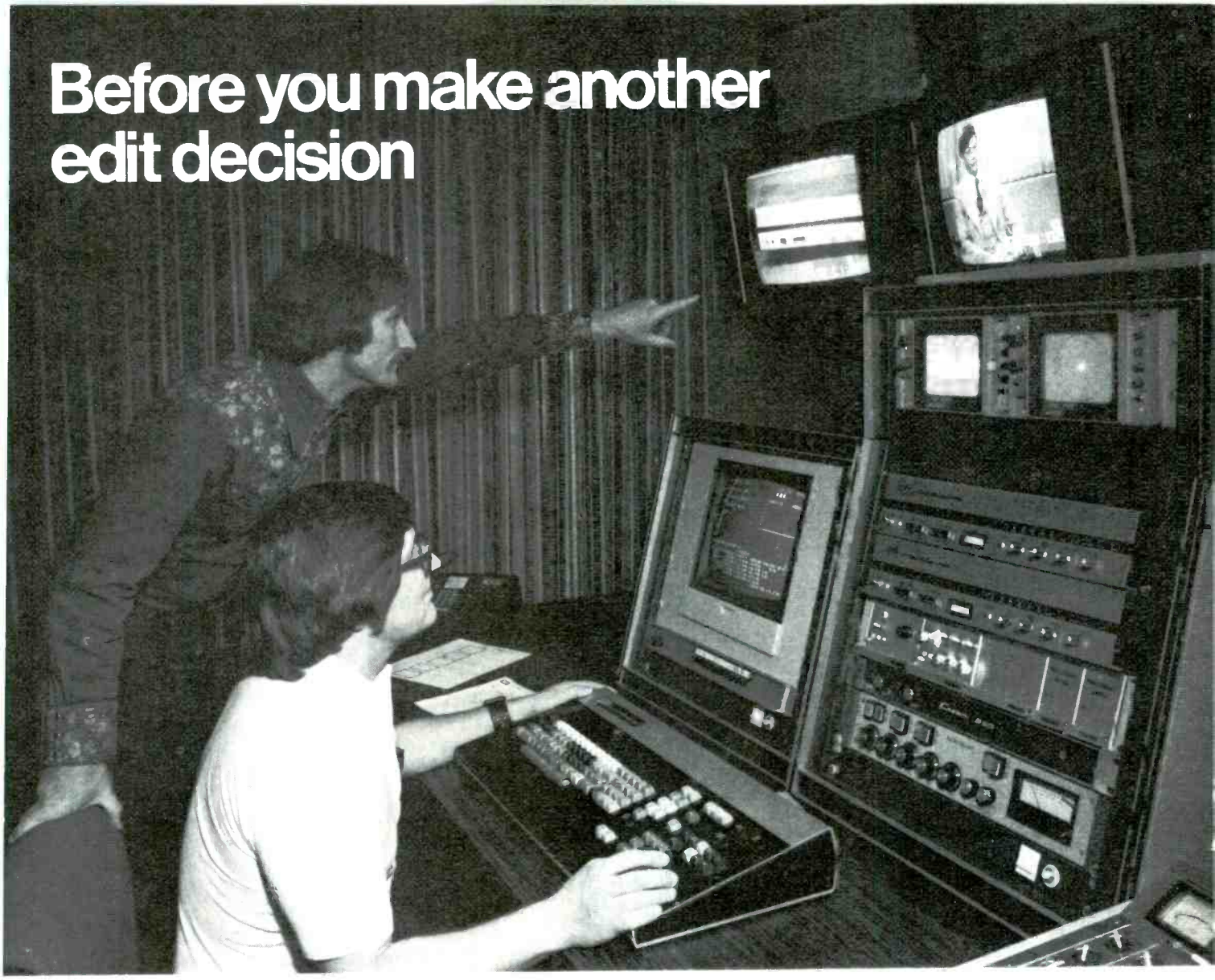
Character generators with special software programs to permit creation of graphics are comparatively new, however, and are being used primarily for station logos, animated scoreboards, and other relatively simple applications. As software is developed by users, these systems will undoubtedly find their way into commercial usage.

Recently, companies such as Computer Creations in South Bend, Ind., have evolved graphic systems that make full use of modern computer systems. Though still not working in real time as the analog Scanimate and Rudd/Etra systems do (the length of time required to animate a move depends on its complexity and the number of variables), systems like that of Computer Creations rely increasingly on highly evolved software rather than complex programming.

The basic input into the Computer Creations VideoCel animation system is the familiar animation cels used in conventional film animation — ink drawings on clear acetate sheets. Unlike film animation, however, the artist need not color in the forms; VideoCel presents an almost unlimited number of electronically generated colors. Nor need the artist prepare the hundreds of in-between drawings normally associated with frame-by-frame film animation. Instead, the artist at the agency simply makes nine or 10 drawings that indicate the basic stages of the move.

At the VideoCel computer, the artist uses a bit pad to trace over the drawings and enter them into the computer, selecting at the same time a variety of shading and airbrushing styles that also rely on the computer's software. Color is selected at the same time. By using a keyboard that is dedicated to the art program, the animator then moves the "camera" left or right, up or down, in or out, etc. Depending on the complexity of the moves, the computer shows the move on a monitor almost immediately or a short while later.

Before you make another edit decision



see the CVS EPIC

EPIC is a computer-aided editing system designed by professional video editors for just one purpose—to turn editing decisions into action. Fast. Without a lot of steps in between. And without tying up a lot of capital.

The key to EPIC's speed and cost effectiveness is a fully developed software package. It has just about every function needed for on-line or off-line editing with multiple format video and audio recorders. Full switcher control is also available.

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In short, the CVS EPIC is the best editing decision you can make. For complete details and user references, call or write today!

Photo courtesy of Television Associates, Mountain View, California.

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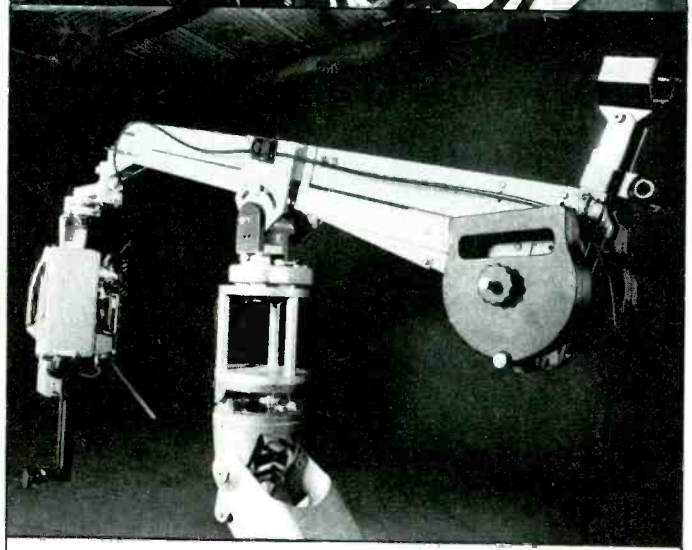

*See what we mean. Now you can handle long focal length zoom lenses on remotes without compromising.

Stills, courtesy Videography Studios, Bob Kiger Directing.

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Circle 129 on Reader Service Card

Commercials

Several outstanding commercials have been achieved on the system so far. Perhaps the best was a Christmas message from United Airlines. The 30-second spot shows Santa Claus and his reindeer flying through the moonlit heavens. For the eight reindeer, only a single outline form had to be created by graphic artist Pete Drakis of Freese & Friends, a Chicago-based animation company. The single form was traced over on the bit pad, then brightly colored. The form was repeated in diminishing perspective until the whole team was formed. Santa and his sled were then positioned behind the reindeer, and a "moon" and "stars" added in the background. The team and movement were then animated so that Santa comes from infinity, flies in front of the moon, and exits to the right while the words "Merry Christmas from the friendly skies" appear in his wake. A total of 12 original drawings were used to create over 700 in-between animation stages.

Special effects can be costly. In the case of digital effects in a post-production facility, the editor is faced with costs of from $100 to $300 an hour for the digital effects generator in addition to the rental of the switcher, VTRs, and editing suite that go with it. In the case of electronic and computer animation, one is talking about 30-second spots which can cost anywhere from $10,000 to $100,000, depending on the complexity.

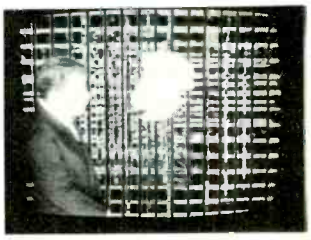
There are some new developments in low-cost special effects, however, which should not be overlooked. One of the most successful in recent years is the Ultimatte system from Vlahos-Gottschalk Research. Ultimatte is a device that creates virtually perfect chroma key-like effects with none of the problems normally encountered with traditional chroma keys, such as difficulty in reproducing transparent objects and edge flares.

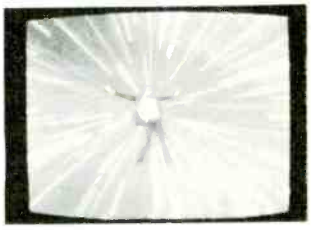
Rather than inserting background video wherever the

A

B

Logos for Atlantic Records (A) and Scotco Products (B) created on the Rudd/Etra video synthesizer at A&G Video in New York City. The synthesizer manipulates various parameters of the signal (bias, voltage, waveform, etc.); the manipulated raster is then rescanned by a conventional color camera and fed through a colorizer and production switcher for additional effects. The synthesizer can also create totally abstract forms by inputting simple sync and black signals





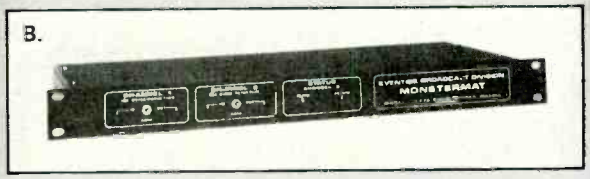
Low-cost video effects created for director/cameraman Victor Milt and producer Stuart Goodman's industrial short "Digital Dataphone Service" for AT&T (Trio Productions). Puppet and actor are chroma-keyed into various backgrounds: top, "star field," created by placing pinholes in a sheet of cardboard and defocusing camera; center, a simulation of a computer chip, created by drawing a simple line grid on a piece of paper, then inducing video feedback while adjusting clip levels; bottom, exploding effect created by abstract feedback induced by tinfoil Christmas tree ornaments. In addition to chroma-keying puppet and actor against blue, puppet is shot as a green figure and its color chroma-key modulated by light organ tuned to actor's voice

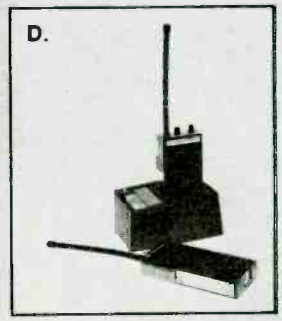
keyer detects a color such as blue or green, Ultimatte reads the camera signal and creates a true traveling matte by boosting to white wherever it reads the color blue and by dropping to black wherever blue is not present. It then inserts the foreground and background video into the appropriate places. Besides its ability to reproduce transparent and extremely fine objects such as strands of hair in the foreground shot, one of Ultimatte's greatest benefits is that it can work with foreground lighting ratios as low as 2:1.

Ultimatte appears to be finding increasing use in TV commercials, especially since the unit is available on rental from distributors such as Camera Mart in New York City and others. Recently, for instance, it was used to produce a promotional program and commercial for the Hall and Oates rock group. Shot at the facilities of Modern Telecommunications, Inc. (MTI) in New York, the band performed on a series of platforms which were draped with blue cloth. Another camera was used to shoot close-ups of the circuit boards of a tape recorder. The final matted images, with the background camera zooming in and out as the perspective on the band changed from wide to close-ups, matted the performers so that they appeared to be playing inside a transistor radio. A spot for the American Milk Association produced at Vidtronics in Hollywood showed a model walking among gigantic fruits, nuts, and glasses of milk to emphasize the importance of a well-balanced diet.

In conclusion, special effects — whether used to create spectacular, eye-appealing, memorable spots or to perform cosmetic surgery on spots which have experienced production problems — are playing an ever-increasing role in the post-production of television commercials. Newly developed digital techniques and refinements of the analog raster manipulation systems spell out a bright future for their increased popularity. What remains is only for advertising agencies and clients to familiarize themselves with the various systems and the almost unlimited capabilities they offer. **BM/E**

Air Quality.





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The most popular and innovative profanity delay, the BD-955 dumps objectionable program material, then returns programming to real time. Also excellent for musical and segue effects.

B. **Eventide Monstermat™**
A Mono/Stereo Matrix Unit that insures mono/stereo cartridge compatibility, plus adds dbx™ encoding and decoding for a super Signal-to-Noise ratio.

C. **Eventide H910 Harmonizer™**
The most popular special effects unit in the industry, the Harmonizer is a full-fledged digital delay line and a pitch changer with a two-octave range.

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Professional quality, hand-held push-to-talk walkie talkies, used by film makers, production remotes, concert producers and security personnel. Each radio is equipped with a desk-top charger and leather belt case for easy carrying.

E. **Mark 200 Transceivers**
These full-duplex (hands-free), program quality communicators are ideal for "on-camera" talent and production crew members who don't have a free hand. Belt mounted, they are the most versatile transceivers available.

In recording studios and for major concert producers, this equipment has become the standard of the industry. Over the past year, we're glad to have added over 100 major broadcasters to our customer list. Write or phone us for complete specifications and pricing details.

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GINGOLD

"Let's be us."

Chuck Gingold, Director of Programming for KATU-TV, Portland, Oregon, was a popular choice for 1979 president of NATPE. It's easy to see why. He knows not only his own job but the other jobs that impinge upon it.

"My first real job was a tiny little station in Redding, California. I did everything. Everything imaginable. That little station was probably the key to whatever knowledge I have today. I was announcer/director, I was a promotion manager, I did my own switching, I even loaded the projectors. I've been through the chairs. And that's helped give me credibility in my current job. If someone says something can or can't be done, I say, 'Hey, I've been there.'

"The programmer's job is more challenging than ever. Not too many years ago, we had to educate the advertisers as to what television was. We had to teach them to accept our products—especially marketers who were oriented toward print. Now TV is recognized as a dynamic sales tool. The big job isn't selling the medium, it's selling the programming. That puts the pressure on the program director.

"I keep telling my people not to imitate but to innovate. I tell them not to try to be some other show. Let's be us. Let's localize. We have a program called 'Sunday Morning,' which is a full 90 minutes of mostly field pieces. The idea was to get away from the Sunday morning 'talking-head ghetto.' We got good ratings with this concept.

"There are people out there who don't wear size four hats, you know, people who are interested in issues. It's encouraging when your local production wins good audiences. Success spawns success.

"The station uses both film and tape. Film is very important to us. There is a certain mood that film captures. I would rather do a sensitive documentary on film. There are lots of programs out of Hollywood that I can't imagine being shot on anything *but* film.

"The public responds when their regular programs get pre-empted. When you start fooling with their habits and you say their favorite program will not be seen that night, they get angry. The only time we pre-empt network is for local events or a documentary. We will not pre-empt network for any entertainment special. Never have.

"I think a program director should be a motivator. It is my job to instill enthusiasm. It is my job to say, 'Hey, you're not going to lose your jobs if we lose some points. You're doing the best job you can. Now let's talk about what we can do to make programming better.'

"A lot of kids today come in with a vested suit and attaché case and they want my job. I would say to them, 'Be humble. Be humble, and be willing to say, 'I'll sweep the floor, I'll take any job you give me.' I spoke to a seminar recently and the first question asked of me was, 'Do you make good money?' I asked them if they wanted to know what I made during my *first* ten years. We all had to pay our dues."

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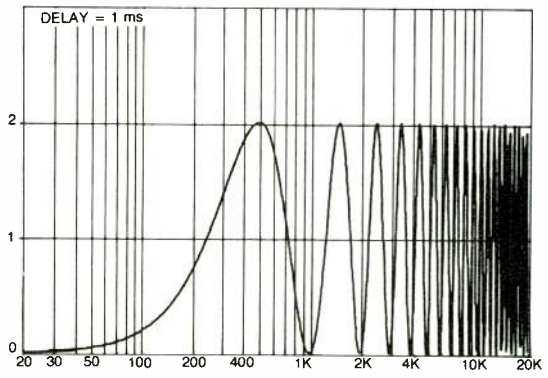
PUTTING PUNCH IN RADIO SPOTS WITH TOOTS, VIBRATO, DOUBLE GUITARS, LONG ECHOES

The special effects devices used in radio post-production can produce any sound operators can imagine, and many they never would have thought of. More and more radio stations are using special effects devices to give their spots, promotions, and programming sonic dazzle and fresh attractiveness.

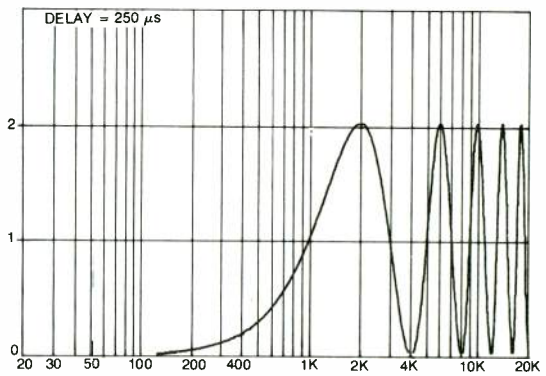
THE SPOT FOR THE NEW space toy soars into (sonic) space from New York rock station WXLO-FM. The announcer is obviously way, *way* out there, with an echo a mile long; scraps of other-worldly music that verge into strange, mechanistic sound decorate the background; when the toy itself "speaks," we recognize its "language" as a lot like that of the ambulatory computer-hero of *Star Wars*, lovable R2D2.

A travel ad urging listeners to fly to Jamaica has a lady announcer doing a good breathless-excitement job, and in back of her is some peppy-but-sensuous guitar music that adds to the spot's attractiveness. Voice down, music up and faster; Jamica sounds like fun. A spot for a new discount radio-TV-tape store in a suburban shopping center is pitched to the owner's public stance of total insanity: "Crazy So-and-So will beat any price you can find" is the basic message. The announcer carries on with a mad euphoria, and in the background is music plus a series of crowd noises that rise and fall like hordes of customers acclaiming Crazy So-and-So, in the end rising to frantic speed and pitch.

These are three examples from literally hundreds of sonically sophisticated radio spots being made every day these days by radio stations around the country, using special equipment for post-production work. WXLO, a solid New York success with its rock format, uses equipment easily duplicated in any medium to large market station, and in many small ones, too. The basic setup is a production room with two or three multitrack tape machines, at least one (preferably two) turntables, a console with at least eight channels, and cart recording equipment for getting the final ad on tape. For the effects, there is a great variety of equipment. Highly desirable are: flexible equalization, either in the console or separately; an artificial reverb unit; a delay-line special effects unit, of which there are at least a half-dozen on the market, each with an almost infinite variety of sonic capabilities; variable speed controls on the tape machines and turntables; and an audio oscillator that is assigned to post-production (not borrowed from time to time from the maintenance depart-



System frequency response produced by flanging has peaks and nulls spaced regularly across spectrum. Music and voice get "swimming" or "spacey" quality



Flanging with a different delay time has different response curve, producing distinctly different effects on program. Delay is widely adjustable

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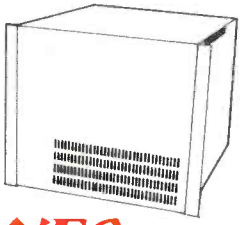

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ment). And for the particular approach of WXLO (as well as other stations), an essential is a large library of recorded background music of every variety, plus special effects records (the galloping horses, the creaking doors, the yelling crowds, etc.).

Post-production room at WXLO

Art Bonipane, responsible for most post-production at WXLO, demonstrated the station's equipment for *BM/E*. Included are two Ampex tape recorders with variable speed control; a new four-track MCI tape recorder; McCurdy console with eight channels and equalization on each; the Eventide Harmonizer (digital delay and special effects unit); and a Technics turntable with variable speed. Also on hand is a comprehensive library of background music on discs, from TM Productions. WXLO has bought a whole complement of the new ITC Series 99 carts and will be installing them about the time this magazine goes out.

The Eventide unit, very popular among radio stations with post-production operations, has an almost endless variety of functions. Several other such units on the market have a similarly staggering versatility, if somewhat different array of functions. Recently built is a talk room next to the production room, an acoustically separate space with microphone equipment for putting talk tracks onto ads.

Art Bonipane put a voice track on a tape recorder, fed it through the Eventide unit, and produced, in quick succession: a double following the voice a split second later; a triple, with two followers; various degrees of reverb, for a "big" or a "far-out" voice; a pitch change, dropping the voice nearly an octave; a sharp resonance that climbed up the scale ("flanging") for attention-getting strangeness; pitch up, for Donald Duck; a *very* low down, gravelly effect, a little like the bottom notes on the bassoon; swishing tails behind each word. He emphasized that those effects were the merest beginning of what could be done, much of it nearly indescribable in words, but often sharply effective in giving freshness to spots.

Giving music a workout

A music track sent through the Harmonizer got an even longer set of permutations and distortions, many of them totally indescribable but useful in "dressing up" ads.

What Is Flanging? What Does It Sound Like?

Broadcasters who have had no contact with the latest crop of delay-line special effects devices may want a little help with the often flamboyant, non-engineering terminology that has sprung up to describe what these smallish boxes of electronics do. A complete glossary would be a small book. Here *BM/E* defines a handful of main terms covering functions that are common to many of the devices.

Vital help in getting this together came from Richard Factor of Eventide Clockworks and Stephen St. Croix of Marshall Electronics, whose respective units are widely used in both recording and radio, according to a preliminary sampling by *BM/E*. The Eventide Harmonizer uses digital techniques while the Marshall Time Modulator is entirely analog, but there is a considerable overlap in the main functions of the devices.

Flanging is the original, now classic, delay-line special effect, and it is still heavily used in a number of sophisticated versions and modifications. Flanging started in the middle 60s, according to some by accident, when two tape machines were feeding the same program to a recording system and the supply reel of one machine was slowed by a thumb on the flange.

The result of combining a direct and a delayed version of the same program is a system frequency response that rises and falls regularly across the spectrum as the two signals go in and out of phase regularly at successive frequencies. The accompanying graphs show the frequency response for two degrees of delay—modern delay devices will adjust the delay continuously over a large range, with corresponding variation in the frequency response of the combined signal.

Most readers of this magazine have been involved in one way or another in the long battle to get the frequency response of audio systems *flat*, so a system that deliberately creates scores of sharp peaks and deep nulls seems to fly in the face of all we knew. Of course, as the graphs show, the response produced by flanging has a regular pattern with all peaks at the same amplitude and the separation between them following a mathematical rule.

We could thus expect the aural result to be something that is, broadly speaking, musical, and this proves to be the case. It is rather strange music in many cases, but this makes it more sought for in the pop recording industry.

The effects elude easy description, calling up such adjectives as "vibrant," "spacey," "swinging," "swimming," and many others equally vague. But the effects themselves are not vague at all, often adding great spice and interest to the music.

The delay is now produced electronically—as Ricky Factor put it, engineers do not often have calibrated thumbs. And innumerable variations and complications are available. Flanging can be negative or positive; it can be multiple, with a second delayed signal added in sometime after the first ("killer flanging"!); it can have various kinds of resonance added with bandpass filters; and the length of the delay, as noted, is infinitely adjustable.

Reverb. The delay-line devices are naturally set up for reverb, and can inject a great variety of reverb effects including extremely long reverb that becomes, in effect, echo—very handy in those "space" ads.

Doubling and tripling. The program material can be repeated at a selected time after the direct sound. This is handy for making quartets sound like full orchestras, for example, and is also used to make singers or speakers sound other-worldly in one sense or another.

Vibrato. Many kinds of vibrato can be added to music or voice. Properly used vibrato can make instruments sound more "live" or, again, bring in attention-getting strangeness.

Arpeggio. A single note becomes a succession of notes, which can be a graceful musical effect or a shocker depending on the use.

Pitch change. The pitch of material can be raised or dropped automatically as much as an octave. This is handy when commercials come in too long or too short, as they often do: the tape machine speed can be set to correct the timing and the special effects device to naturalize the pitch. Very deep pitch can add "menace" to a voice or give program material a dozen other special characters.

The devices' instruction books describe in detail the dozen or more other strange things that can be done with them. A newcomer will obviously need (and probably enjoy) a period of unadulterated play, listening to the results of the recommended knob-twisting and deciding which of the marvelous sounds he wants to use in his own post-production activities.

Putting Punch in Radio Spots

At WPLJ, assistant chief engineer Robert Deitsch and engineer Peter Bohm show equipment used for producing special effects in ads and promos

Deitsch operates Eventide Harmonizer to put far-out echo in voice program, then to drop pitch of voice for a menacing effect

Bonipane finds the pitch change especially useful when recorded ads come in a little too long from the ad agencies, as they often do. The ad can be speeded a trifle on the tape machine, and the pitch brought back to normal by the Harmonizer.

At WPLJ, the FM partner of WABC, the story on post-production is quite like that at WXLO. Assistant chief engineer Bob Deitsch gave *BM/E* a tour of the production room. The console is from Neve, specially built to the WPLJ order. It has extra flexibility with what is, in effect, dual mono design, allowing easy mixdown from several sources. Again, the Eventide Harmonizer has a central role. Tape machines are Studer A80; reverb unit is the AKG BX-10.

Ads become part of programming

Ads produced by WPLJ have ingenuity, freshness, and lots and lots of music, like those at WXLO, using many of the same sound specialities or very similar ones. In fact, the nearly universal use of background music in ads at the two stations establishes another characteristic of post-production ads: they can tie in closely with the station's music format, or rather, carry the entertainment pull of the music over into the ads. The ads become a characteristic part of the programming and are designed to hang on to the listener who came for the music.

Bob Deitsch makes the point that in the highly competitive markets, radio ads today need a "professional" sound that puts them in the same league as commercial recordings. The special effects battery of sonic surprises has come from the recording studios where commercial recordings are made. The slick, ingenious, fresh, strange, surprising sounds that special effects devices produce first

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got heavy use in recording. Now they are moving into radio; practice at WXLO and WPLJ shows what can be done. Sonic ingenuity can add freshness to programming and to promotion as well as to commercial spots.

Many stations are doing it

It is important to note here that this kind of post-production work in radio is not at all confined to a few big-city stations with lots of money to spend: many stations are doing it in many other places. Equipment for ingenious post-production work in radio is not enormously expensive. The complement of equipment used by the two stations already described is obviously not elaborate. The process has nearly endless capability mainly because of the unplumbable variety of effects that can come out of one small box of electronics, the modern delay-line special effects system. At least a half-dozen manufacturers are making these protean magic boxes, and the prices range from around a thousand to a few thousand dollars.

At KVIL in Dallas, chief engineer Jerry Klabunde has set up a post-production room with a special Ward-Beck console, a Neumann mic for voice tracking, the Eventide Harmonizer, and the MICMIX Dynaflanger for special effects. He is also trying a new kind of unit, the Aphex Enhancer, which adds a carefully calculated kind of phase distortion to music with results that have aroused enthusiasm in many recording studios. The objective is not to make a strange or startling sound, but to give the music more snap and freshness on its own terms. This is a fairly new idea in special effects; the recording industry as a whole hasn't quite made up its mind on the unit, although many individual studios are strongly in favor.

The KVIL production room also has, of course, turntables (Technics), tape machines (MCI), and cart equipment (ITC) for putting ads into form for airing. Made on this equipment is a great variety of material for the station. There are singing jingles, promotions for contests, and a large proportion of the commercial spots. For example, ads for the movie *Alien* gave the station an obvious opportunity to use "space" effects, and the delay units had more than enough resources for the job. The listener was given the sense of things happening very far away, but also of menacing events and forces, with scary sounds easily produced by the special effects units. Since movies that scare people nearly to death have been pulling them into the theaters in droves, a device that produces really scary sounds in a "space" setting has obvious value to a radio station.

Gimmick box for easy post-production

At RKO's WFYR-FM in Chicago, chief engineer Warren Schulz has built what station personnel call, not with disdain, the "gimmick box." It is a rack holding an Eventide Harmonizer, an Orban stereo synthesizer, a B&K function generator (oscillator), an Orban sibilance controller, and an Arvin reverb unit. In the production room with it are MCI four-track tape machines and a McCurdy console with equalizers. Every unit in the box has a 10K balanced bridging input and can be put across the console output at 0 dB without causing a ripple of disturbance. Each of the special effects units is set for unity gain. This makes it simple to switch in any unit during the handling of any program material. Also in the gimmick box is a home-made "roto blend" for mixing the various outputs in any proportion.

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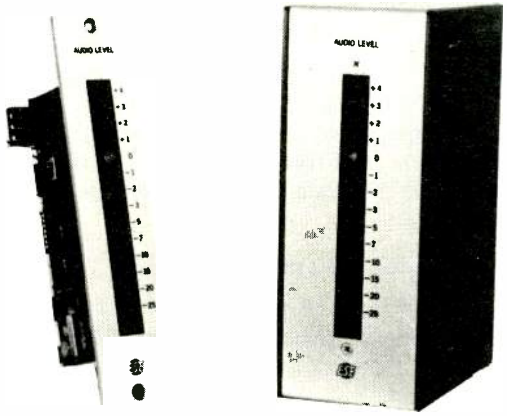

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Putting Punch in Radio Spots

The system is used on spots to freshen them "here and there," as Warren Schulz puts it. Station promotions give many chances for special punch from special effects. For example, a promo called the "Million Dollar Minute" involved a series of giveaways timed to phone calls in a game plan. The final minute was accompanied by a portentous ticking sound as though from the clock of doom; it built up in volume to the end.

WFYR's format is Adult Contemporary with a heavy share of news. The gimmick box is used to give sparkle or punch to records that seem very lackluster; occasionally the engineering staff applies equalization or reverb, or perhaps very discreet doubling to pick up the music's power.

Other ways to do it

In Pueblo, Colo., Frank Provenza, chief engineer at KDZA/KZLO, uses his own adaptation of equipment for computer-like effects: a ham radio with an SSB channel in the program line. Properly used SSB tends to produce that kind of sound, he points out. He uses two variable-speed tape decks, with the outputs combined, for phasing and flanging effects (it was with tape machines run a little out of step with each other that phasing effects were "discovered"). Also in his equipment room are Ampex and Revox machines with speed control. Provenza would like to expand his use of special effects and hopes to get an electronic delay unit in the future.

At WROK in Rockford, Ill., chief engineer Ed Jurich also uses two tape machines for phasing effects; he too is looking toward expanded use of special effects in post-production. Another chief engineer with a similar outlook is David Wright of WCHL, Chapel Hill, N.C. He is planning a post-production setup for the early future. And chief Don Strawn at WAYS, Charlotte, N.C., already has some of the key equipment for the eight-track post-production studio he is planning. Included is the Time Warp delay special effects unit made by MICMIX, Inc.

Special effects units: easy to use

As a final note, *BM/E* believes radio personnel who have had no experience with special effects devices should not be intimidated by the strangeness of many of the sounds produced or the complexity of the design of these units. Although the units are complex in design, operation has been made quite easy in most cases with front panel controls that can be set according to straightforward instruction books issued with the units. The operator hears immediately the results of any control setting and can operate the unit to a large extent by ear, aided by the guidance in the instruction book and his own experience over time. The delay units tend to become personal tools with the operator discovering by experiment things that he likes especially and and going back to them when he sees the need.

A last point is that the units can do a lot of fairly simple things, in a simple manner: the operator doesn't have to plumb the whole outrageous outer-space repertory if he doesn't need that kind of thing. Carefully used doubling often adds power to music; a little reverb can pick up voices; a little vibrato can make some instruments a lot more alive and appealing. It is easy to understand that operators can get satisfaction from such a system; it responds to each one's own likes and dislikes. **BM/E**

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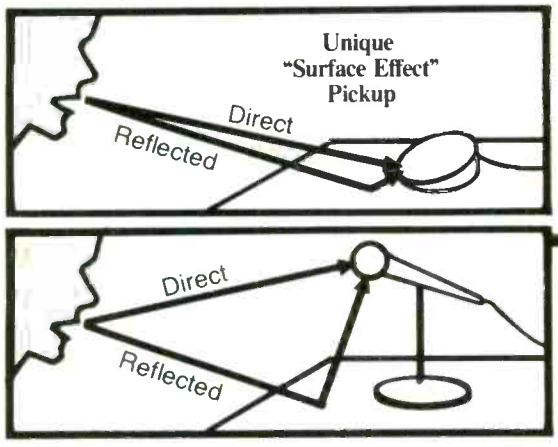

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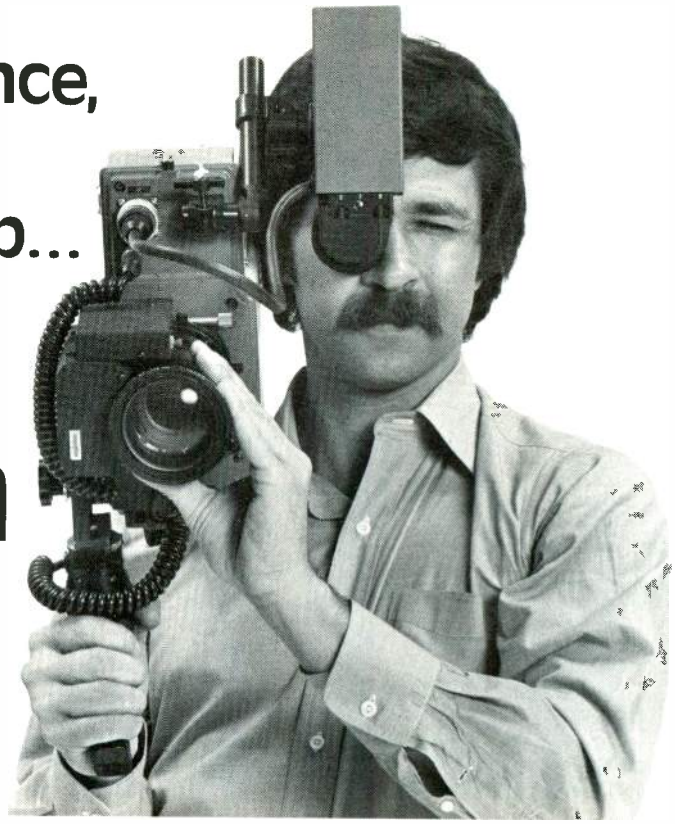

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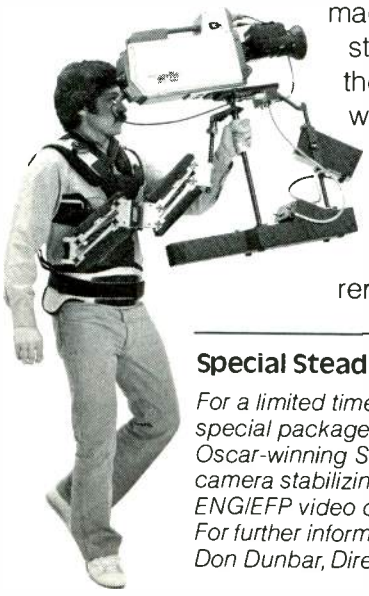

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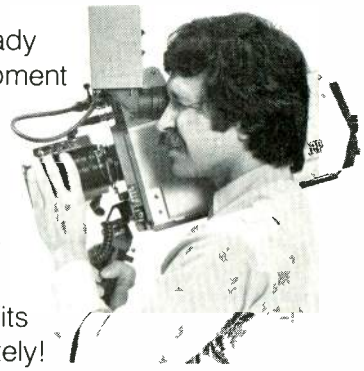

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SPECIAL EFFECTS FOR NEWS: THE TRUTH CAN NOW BE TOLD

By Paul Amos

The use of special effects in news has for some time been restricted because of lack of time for post-production and because journalists have been wary of "hoking" up serious news stories. Now, with stations using investigative reporters on stories that take weeks to develop and can be hard to translate into visual information, effects can be used to clarify and illustrate.

MOON LANDRIEU, the mayor of New Orleans, was nominated by President Carter to become the Secretary of Housing and Urban Development. Serious questions about some of the mayor's business dealings and official appointments arose. A close investigation revealed a truly confusing set of relationships — so confusing that the danger inherent in the story was that it could easily be misunderstood unless there were some way to keep the facts straightforward and organized. The goal was to get at the facts in the best journalistic tradition, and digital effects provided the visual means.

Until about a year ago, the extent of WVUE's news production was an occasional dissolve into and out of a soundbite. The deadline nature of news and the staffing problems of a typical news operation precluded much post-production work. Reporters and camera crews were generally out all day working on several stories while film was shuttled in for processing. Processed film would usually sit uncut until the late afternoon editing crunch. As a result, about all that could be accomplished was what could be done through live switching. Given the other problems inherent in a live broadcast, the production options were limited, and as a result staffers simply did not think in terms of heavy production.

Due in part to restrictions on individual news stories, the efforts in production have been traditionally centered on the live broadcast and its component parts — the set, talent, and graphics. In early 1978, WVUE management decided a new news set was in order. Many designs were examined; the chosen one was designed by Dynametrics, a San Diego firm, and used a rear screen configuration. We decided to use chroma key rather than rear screen projection, but this made for some difficulties in execution. Obviously, some sort of video compression device was necessary to position the graphics correctly within the rear screen. A preset compression would not allow for much tolerance in camera positioning.

A more suitable system was a tracking chroma key, part of the DVE system offered by Grass Valley and NEC. It provided a random position compression, determined by the location of the color background within the raster. At the time of installation we knew the DVE would have a tremendous impact on the look of our program — but we did not know yet just how dramatic that impact would be. The tracking chroma key system was just part of a whole digital video effects system, and staff directors and producers gradually learned the various ways the DVE could be used in station production.

The first real news utilization of the digital video effects, outside of the tracking chroma key function, was with the bumpers used to end various segments of the news broadcast. Stories and subject matter are determined early enough in the day for the producers and directors to work up specific production ideas for use in the broadcast "teases." With production time available, the news bumpers could be taped for use in the evening news broadcasts.

Development of "bumpers" was one of the first tentative steps in the use of DVE by WVUE. Here, the beginning of a bumper with picture expansion. . .

. . . which expands and repositions the title for greater impact

Paul Amos is senior news producer for WVUE, Ch. 8, New Orleans, La., a Gaylord Broadcasting Co. station.

Special Effects For News

A good example of this came in May of this year, shortly after the accident at Pennsylvania's Three Mile Island nuclear reactor. WVUE, like other local stations around the country, sent a crew to Harrisburg and TMI to find local angles to the story. We planned series of pre-produced videotape bumpers to use inside the news broadcast to "tease" the series, scheduled in later segments of the program. Using a film still frame of the reactor's cooling towers, several colors were keyed in for dramatic effect, and a modulated soft-edged pattern was added to simulate the effect of radiation. A compression of that composite video effect was made to fall within the center of the raster. The pattern limits were preset, so that with the fader bars we could zoom the video from infinity to a preset position on a black background. Our Vidifont Mark IV rolled the words "still to come" from the bottom of the frame to the top. Halfway through the roll, the director wiped in the compression of the Three Mile Island plant. This sequence was recorded on videotape. A second pass was required to wipe in the title of the series at the bottom of the page.

When used on the air, the first half of the bumper was matted over a wide shot of the news set. As the Vidifont roll reached the center of the screen, the director dissolved to the bumper tape to allow for the completion of the effect.

Our first concentrated use of post-production in news product came in our investigative reports. In the past many of these stories did not weather the transition from printed script to television. Therefore, we decided to put all of our production power behind the investigative stories. Our investigative reporter, however, was at first apprehensive; he was afraid that serious journalistic endeavor would be turned into a game show display of wipes and special effects.

The first story we did involved a sheriff about to be indicted for using illegal wiretaps to trap criminals. Our reporter learned that a district attorney allegedly asked the sheriff to tap his phone and bug his office. It was a major story, but there were problems. The district attorney would not agree to a filmed interview. The sheriff had long since refused to answer questions about the wiretapping allegations.

There was concern the story would turn out to be another tedious studio sitdown report. To prevent this, a producer and director went to work on the story. They decided to simulate the bugging to illustrate the story. Where there was virtually no cover video, a series of standups was written in. They utilized walking shots, camera turns, and insert wipes to illustrate the individuals involved in the story who refused to appear on film.

The final cut had movement and visual impact and presented the story in a way that held viewer interest. This experience convinced staff reporters that production could be used to enhance the facts and facilitate the telling of a story.

In another investigative piece, the use of post-production was the only way the story could be told in an understandable way. In August, former New Orleans mayor Moon Landrieu was nominated by President Carter as Secretary of Housing and Urban Development. A number of questions arose about some of Landrieu's business dealings while mayor, and more recently while he was working for a major land developer. One of those questions involved a confusing set of relationships between Landrieu, his business partners, and people Landrieu had appointed to governing boards. At best, the relationships were extremely complicated. At worst, they were totally incomprehensible.

Without the ability to review the copy, a television viewer could easily have gotten lost in the story. To solve this problem, we devised a chart showing Landrieu's relationships with his business partners and appointees. Using still frames and pictures, and the DVE's ability to move video sources around the raster, the chart was animated to show each level of association and interaction. In this case, the use of post-production was the only way to tell the story clearly.

A deep investigation into the business and political relationships of former New Orleans mayor Moon Landrieu. . .

. . . was given clarity and movement through digital effects. . .

. . . which permitted the viewer to see the connections between individuals and how they evolved

By this time, reporters working on series wanted to use special effects in their presentations. Over the summer, as gas lines began to form throughout southern Louisiana, we prepared a series on vacations within one tank of New Orleans. Entitled *The No Gas Getaway,* the first four segments dealt with little-known but exciting vacation possibilities close to the city. They were produced in a traditional vein. The last segment, about recreational possibilities within metro New Orleans itself, presented a problem, however. With many different locations to cover in one report, the story could have easily become choppy. To avoid this, we used a "slide show" effect to take viewers on a tour of the town. A cross-hatch pattern was wiped in at the top and bottom of the frame; the border on the pattern was then expanded to give a sprocket hole effect, and the film was rolled in behind the pattern. Assembling one segment at a time, the rolling film and the pattern were wiped off the screen horizontally using the DVE in a compression mode with a 4:3 aspect ratio. This gave the effect of a "slide" being pushed out. An edit was then made on the work tape, and the next scene wiped in.

This procedure continued for about a dozen passes until the piece was completed. The sound of a slide projector recycling enhanced the narration.

These video effects soon began having a marked impact on the look of WVUE's news program. Even more important, they had an impact on our reporters and photographers, who are now thinking in terms of post-production and, in fact, plan production aspects in the field while covering the story. There in now a concerted effort to expedite the writing and editing of packages so that additional production time can be used to enhance the final product.

For example: During the gasoline shortage, Louisiana's governor came up with a voluntary gasoline allocation plan intended to reduce lines at the pumps and to increase the number of stations open at nights and on weekends. To illustrate the plan for our viewers, we designed a number of post-production special effects.

DVE compression wipes were used to illustrate the hours of operation under the plan. A key point of the plan was the use of white and black flags to indicate whether a station was open or closed. The day the plan was announced, however, no flags were available at the station. Undaunted, we made electronic "flags" with a triangle pattern on the switcher. Using a vertical wipe and the DVE in a compression mode with 4:3 aspect ratio, the electronic flags were wiped up an electronic "flagpole."

Digital effects have come to play an important role with soft news features such as the gas shortage stories produced by WVUE

WVUE used digital effects to "raise" and "lower" electronically generated flags.

. . . to show which stations had fuel and which didn't

The addition of dramatic titles with postioning adds punch to otherwise static stories

In another story, a number of local shipyard employees were fired during a union organizing effort. To add impact to the story, a red rubber stamp with the word "fired" appeared over each employee's picture as the reporter read his name. This was simply an art card matte keyed over the film.

In each instance the use of post-production enhanced the news story. As we found at WVUE, post-production can be used to visualize a non-visual story, to add drama, to clarify. But care must be taken to insure that the production does not overshaddow the event. There are stories that simply don't warrant extensive production. In such stories special effects would clutter and detract from rather than enhance the story. A thoughtful news producer, however, will be able to find many appropriate uses for special effects. **BM/E**


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Lowest battery drain The HL-79A runs over 6 hours continuously on its integral silver-zinc battery. With the most efficient internal power supply available today, it offers the most hours per pound of battery.

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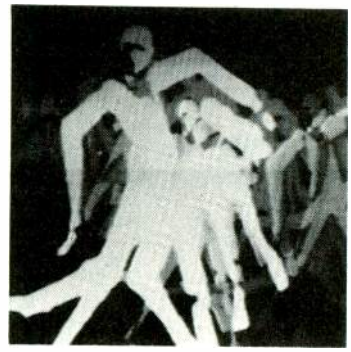


Nearly a decade has passed since the SMPTE sponsored its standard time and control code for video and audio editing. At the outset, space was left in that code for the user. Since then some attempts have been made to exploit these user bits, but more often than not, the answer has been in the development of alternatives to the SMPTE standard.

THE POTENTIAL of SMPTE/EBU Time and Control Code which permits the numerical identification of each television frame by hour, second, and frame count has yet to be fully exploited. Despite the development of a passel of equipment over the years that has paced the state of post-production in television, criticism of the SMPTE/EBU edit code remains. It works. No question. But it often is expensive to implement fully, often time-consuming to work with, frequently inaccurate unless careful attention is paid to its recording and playback, takes up valuable real estate on the finite tape path, and its 00:00:00 format scares the hell out of some editors used to working in the film rather than video medium.

As a result, SMPTE/EBU edit code is rarely used in the editing of news footage, frequently ignored in the recording of footage for use in commercials, documentaries, and other longer program material, and sometimes loathed by the editor himself as he flashes through coded footage at speeds too great to read SMPTE or too slow to capture it.

There is of course, another side to SMPTE/EBU edit code. Like "open sesame," it unlocks a passageway to a valuable treasure. With the code, the editor gains control of the most sophisticated computer-assisted editing systems available today. Not only do effects that boggle the eye and mind become available, but a marriage of film and video becomes possible and working with audio recorders for multitrack mixdowns becomes practicable.

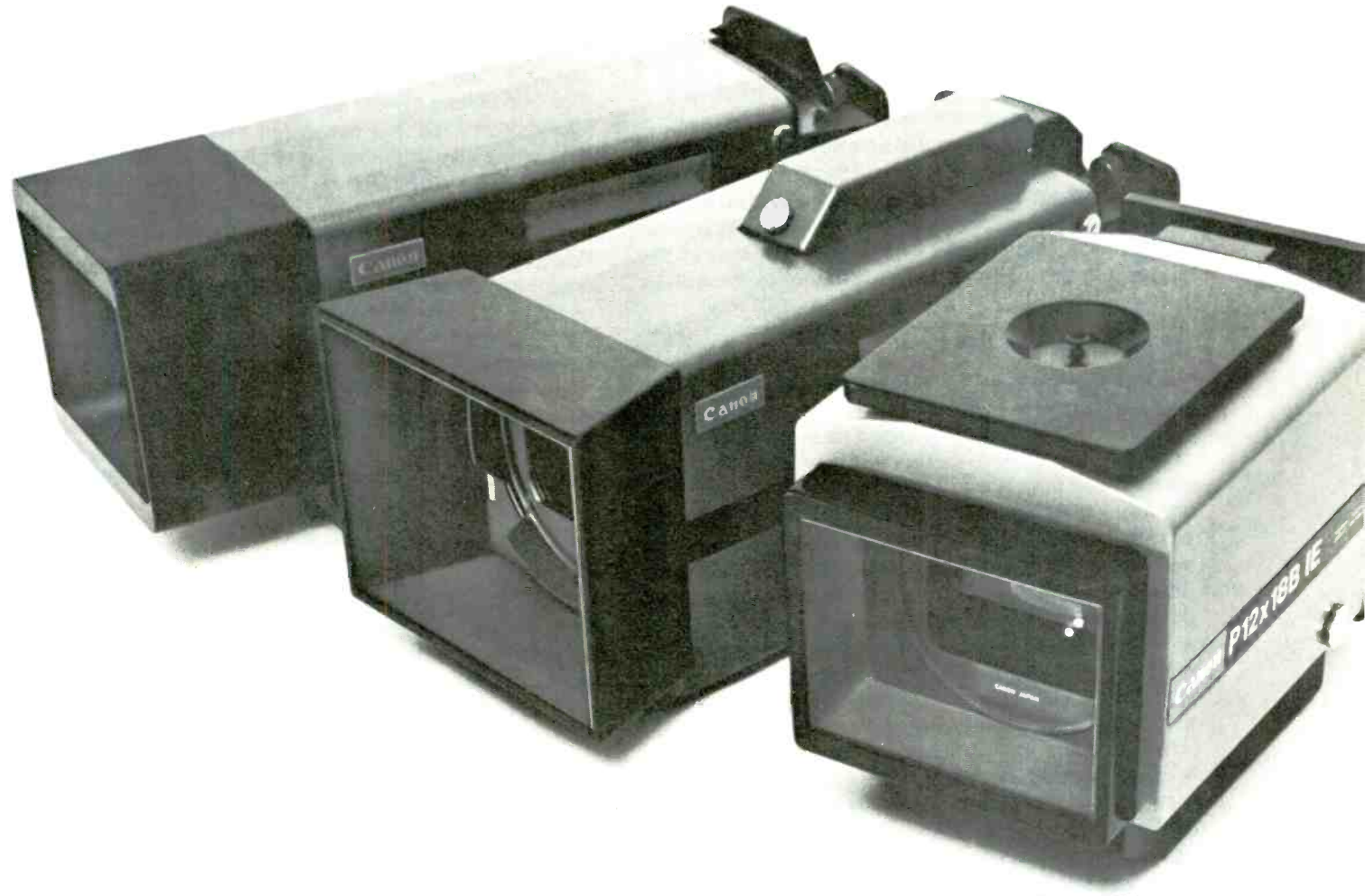
Naturally, the leading proponents of SMPTE edit code are the manufacturers of such sophisticated editing systems. Complicated edit sequences have been programmed into CMX systems, the HVS Epic (formerly CVS until recently purchased by Harris), the TeleMation Mach One, the Datatron 2000, and others. In fact, these manufacturers have led the way in exploring new uses of SMPTE/EBU code, especially the user bit portion of the code. (Next month, *BM/E* will cover some of these suggested applications in its coverage of the SMPTE Technical Conference, scheduled for Los Angeles.)

In addition to the manufacturers of sophisticated editing systems, a host of companies engaged in the manufacture of time code readers and generators have made significant advances in bringing down the cost and increasing the reliability and flexibility of SMPTE edit code products. EECO, whose edit code readers, generators, and computers are often the heart of sophisticated audio/video editing systems, has done much pioneering work in the area. Add to them BTX, Electro & Optical Systems, Skotel, Chrono-Log, and others and you begin to get a picture of the effort being made to bring the promise of SMPTE/EBU edit code to fruition.

Skotel, for instance, has recently introduced a SMPTE/EBU time code reader and generator that incorporates an intelligent RS-232-C interface permitting the use of the user bit portion of the code for recording captions, program identifacation, cues, program notes, and other data. Without such an interface, access to the user bit portion of the code has restricted users to entering data that could be rendered in eight-decimal or hexadecimal digits. This is useful for recording dates, scene numbers, take numbers, and the like, but restrictive nevertheless.

Skotel has attempted to increase the usefulness of SMPTE/EBU edit code by developing a new reader/generator that includes an RS-232-C interface. With the interface approach, the user can input bits in the appropriate portion of the code and use these "messages" to control a host of RS-232-C equipped peripheral equipment. In this type of configuration, user bit data recorded with the time code can trigger such peripheral equipment as a titler, telecine, or cart machine. The media available on the peripheral device need not contain SMPTE Time & Control Code in order to be utilized within the post-production process. The interface costs $800 as a standalone and can be added to the $1900 Skotel reader/generator.

Other manufacturers have developed similar approaches to user bit data. While the concept of user bits remains powerful, it also remains somewhat expensive. One drawback to this use of code has been the need for readers and generators on each recorder/player in a post-production system, though in some cases, such as the HVS Epic system, a different approach has obviated the



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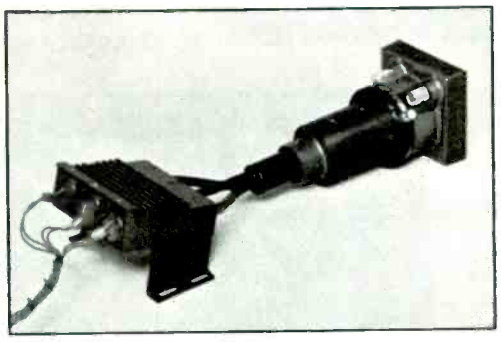

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need for readers/generators at each location. Instead, the Epic system uses an integrated time code reader/generator that assigns code to each VTR and tracks each machine's activity without the code being physically present on it. While this microprocessor/software technique represents a significant savings, the cost of the Epic system still places it at the high end of the computer-assisted editor spectrum.

Bridging the code gap

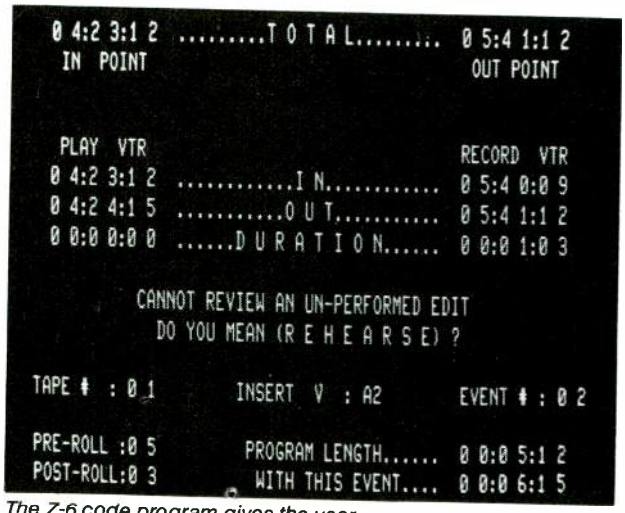
The truth of the matter is that approaches to exploiting the user bit portion of SMPTE/EBU edit code break some very treacherous ground. Because manufacturers cannot predict accurately what the user will do with the bits, error correction of that data will be difficult, if not impossible, according to Charles Liu of Datatron. Whereas a missing or incorrect time code can be compensated for when the next correct time code entry is captured, calculating the difference between one randomly selected comment and the next presents a Gordian knot.

Like the solution to the Gordian knot, some manufacturers are attempting to solve the problem by simply cutting through it — that is, devising codes that are not dependent on the SMPTE Time & Control Code standard.

To some, this may smack of a return to the former state of affairs, with loads of proprietary codes inhibiting transaction between editing systems, but this new push includes an awareness of the valuable role played by SMPTE and is designed to coexist with it.

Two approaches that are forebears of the final solution to time and control information come from Videomedia and QSI. The Videomedia approach is incorporated in their Z-6 editing system and is called Micro-Loc*. QSI, on the other hand, has one system called Q-Code and is developing two additional systems called VALID and AVID, all three of which are standalone time and control code systems.

If these approaches prove successful in the marketplace, then other manufacturers who are currently working on similar approaches are likely to enter the arena quickly. Because the new systems are supplemental to SMPTE and do not preclude its use, SMPTE Time and Control Code can remain the common language and the fear of confusion in the industry may be unfounded. Nevertheless, SMPTE is currently taking a fresh look at the problem of time and control information and may reach a standard that has broader and more trouble-free application than the current system.



The Z-6 code program gives the user either the SMPTE Time and Control Code format as above, or a Micro-Loc equivalent*

How these approaches work

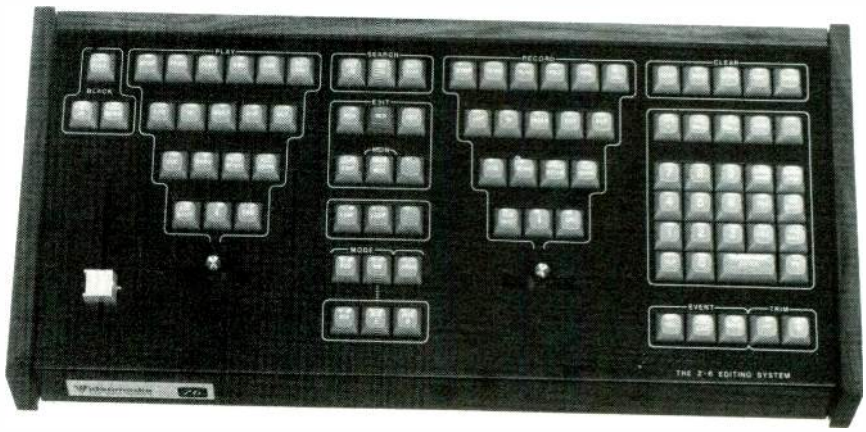
The Z-6, Micro-Loc* approach involves the use of a powerful Z80 microprocessor programmed to count and generate readouts of micro-code and to translate micro-code results into SMPTE Time and Control format, in addition to its own Micro-Loc* format. Through this method, the user can have the option of using SMPTE edit code or use only the Micro-Loc* code.

The encoding of micro-code involves the addition of a small PC board to the recorder. The effect of this board is to narrow each one-hundredth control track pulse slightly. This modification of the control track pulse in no way alters the performance of the tape on a VTR not equipped with Micro-Loc* since the leading edge of the control track pulse is untouched.

When a tape with Micro-Loc* is played back in the Z-6 editing system, if the Z-6 is Micro-Loc* equipped the code will be automatically detected and displayed. No separate reader is required for the playback unit.

The effect of Micro-Loc* is somewhat analogous to counting pickets on a picket fence in which each one-hundredth picket has been painted red. Micro-Loc* counts each picket, but the one-hundreth picket provides the system with a reference point from which it can calculate any intermediate position. For instance, if one wanted to go to the 425th control track pulse, the Micro-Loc* system could flash to the fourth red picket and then go 25 additional pulses. The same is true if one wanted to go back to 425. Having remembered where each red picket is, the system would flash back to the fifth red picket and go back an additional 75 pulses.

Since the micro-code is a single-bit code as opposed to



On the keyboard of the Z-6 system, the touchpad panel at lower right provides numerical input and the code-convert key

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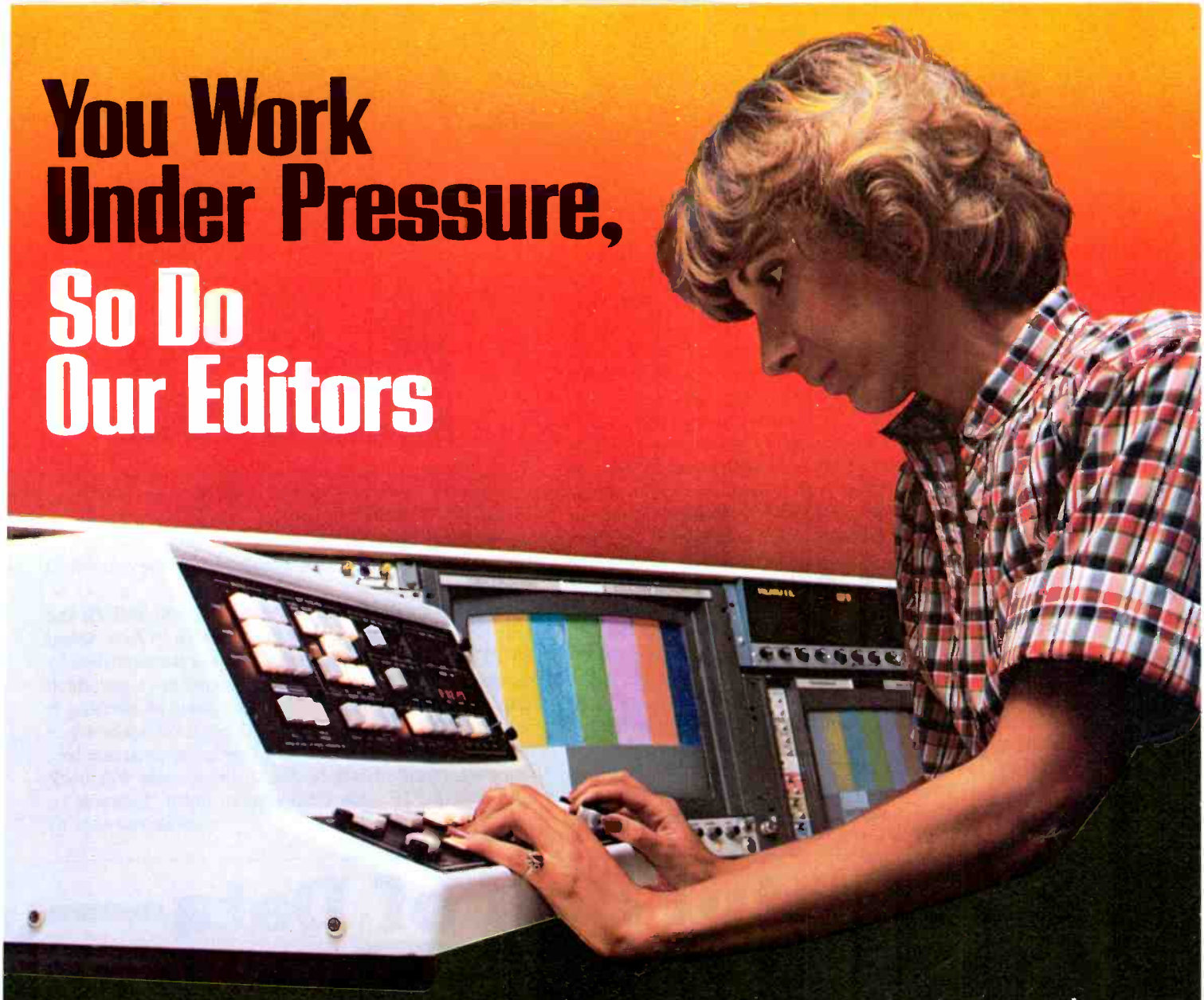

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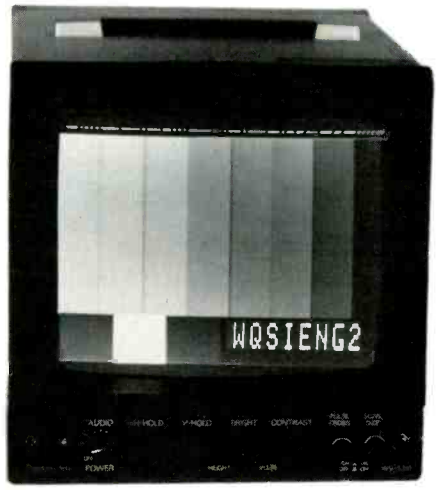
the 80-bit SMPTE code, it can be read at any speed with a Schmidt triggered input amp. Furthermore, since it resides in the video portion of the tape rather than on the audio portion, there is no problem of crosstalk, nor does the code cost any additional tape track real estate.

The identity of each tape and the location of each micro-code pulse are resident in the memory of the system and not on the tape itself. When equipped with RECAL, the identity of up to one hundred source tapes can be stored in the system. This permits the Z-6 to remember where it stopped counting on any particular tape so that if the tape is removed and later remounted, Micro-Loc* will begin counting again from the next micro-code pulse it encounters. Thus, if a tape number 14 was removed from the system when the Micro-Loc* counter read 155681 and the operator later wanted to go to location 140011 on that same tape, all he would need to do is identify the tape as number 14 when he remounted it. Micro-Loc* would then verify that the remounted tape was still at 155681 and rewind immediately to 140011.

Since micro-code is a base 10 algorithm, the method of converting Micro-Loc* to SMPTE Time and Control Code was relatively simple. Various subroutines in the Micro-Loc* software perform various tests on the registered micro-code to determine what the correlative SMPTE edit code would be. Micro-code begins at 000000 and runs to 179999. Therefore, 180000 would register as 000000 in micro-code and is equivalent to 00:00:00 in SMPTE; 179999 is equivalent to the SMPTE 99:59:29. A look-up table exists for all intermediate points in between



Currently, VALID code is used in the type of video source identification required by the FCC for remote links

the start and finish points of the two codes. The various tests performed on the numbers determine the equivalent readings.

While this will provide the user with both SMPTE and micro-code readouts, it may be desirable to have actual SMPTE code on the subject tape. This is accomplished by recording micro-code on the SMPTE encoded tape (which does not involve a generational loss since no dubbing is required) and then determining an initial off-set between the first SMPTE number and the first micro-code number. Once the initial off-set is stored, micro-code will track with the SMPTE code from start to finish. Likewise, a

continued on page 65

Useful Bits of Data

Skotel Time Code Generators and Readers will conveniently and accurately identify audio and video tapes with SMPTE User Data.

The TCG-80N Generator has unique features that meet the growing demand for identifying tapes with start of program sequences, scene/take numbers, official time of sporting events, time countdowns and documentary data.

The User Data memory can be loaded from the thumbwheels or from an external source, and the Data and Time code is displayed on the front panel.

Another feature that can be added to the Generator and Reader is our video character generator. It has an integral insert keyer that can simultaneously insert User Data and Time code into selected positions in the video of a work print or on a monitor.

Our Reader TCR-80 will save you time because it reads User Data and Time code from hand turn reel speed to 40 times play speed.

If we have all this, you can count on Skotel to include all the other features you require in Time code Generators and Readers.

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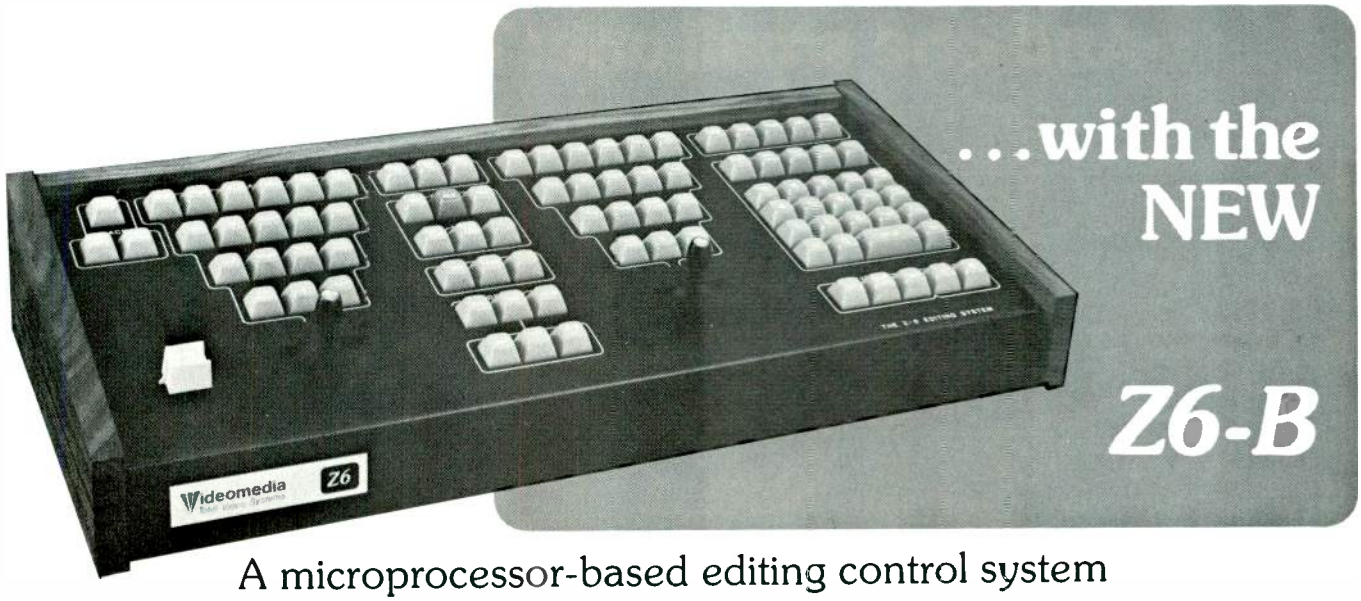
Circle 141 on Reader Service Card

CREATIVE FREEDOM



A microprocessor-based editing control system

Who more than you, deserves all this?

The Z6/B has all of the outstanding features of its predecessor, the Z6/A plus . . .

- **Auto Edit** — any or all 99 events can be performed at the push of a single button.
- **Sync** — a Z6 exclusive, keeps both tapes synchronous with respect to each other. Move either tape in either direction and the other transport will move the exact number of frames.
- **ADR** — Automatic Data Replacement, when activated, sends the editor in a "looping" condition. The operator can replace data numerous times until it is a "take."
- **Auto Cal** — automatically assigns the proper number to the proper frame of video on any new tape. No longer do known locations or SMPTE addresses need to be referenced.

The Z6 data display is a continuous readout of all edit parameters, including operator prompting messages.

Z6/B standard features include . . .

- Bi directional joystick shuttle
- Auto search
- 99 event memory
- Full status display
- Cruise control
- Rehearse, perform, review edit
- Error and prompting message
- Programmable Pre and Post rolls
- Single glide ballistics
- NO mechanical mods to VTR's
- SMPTE or Micro-code display
- Return to "in" or "out" points
- Micro-loc*— frame accuracy
- Consecutive non stop mode change
- Full VTR remote control
- A/B monitor select
- Tag functions

Z6/B options include . . .

- Drop frame/Non drop frame readout
- Dump — an exclusive Z6 feature which records all memory on the video tape itself
- Line Printer — allows a hard copy read-out of all edit decisions and parameters

Z6 is truly the most powerful video tape editing system available. Call Videomedia or your local dealer for more information.

*pat. pend.

Videomedia
Professional Television Systems

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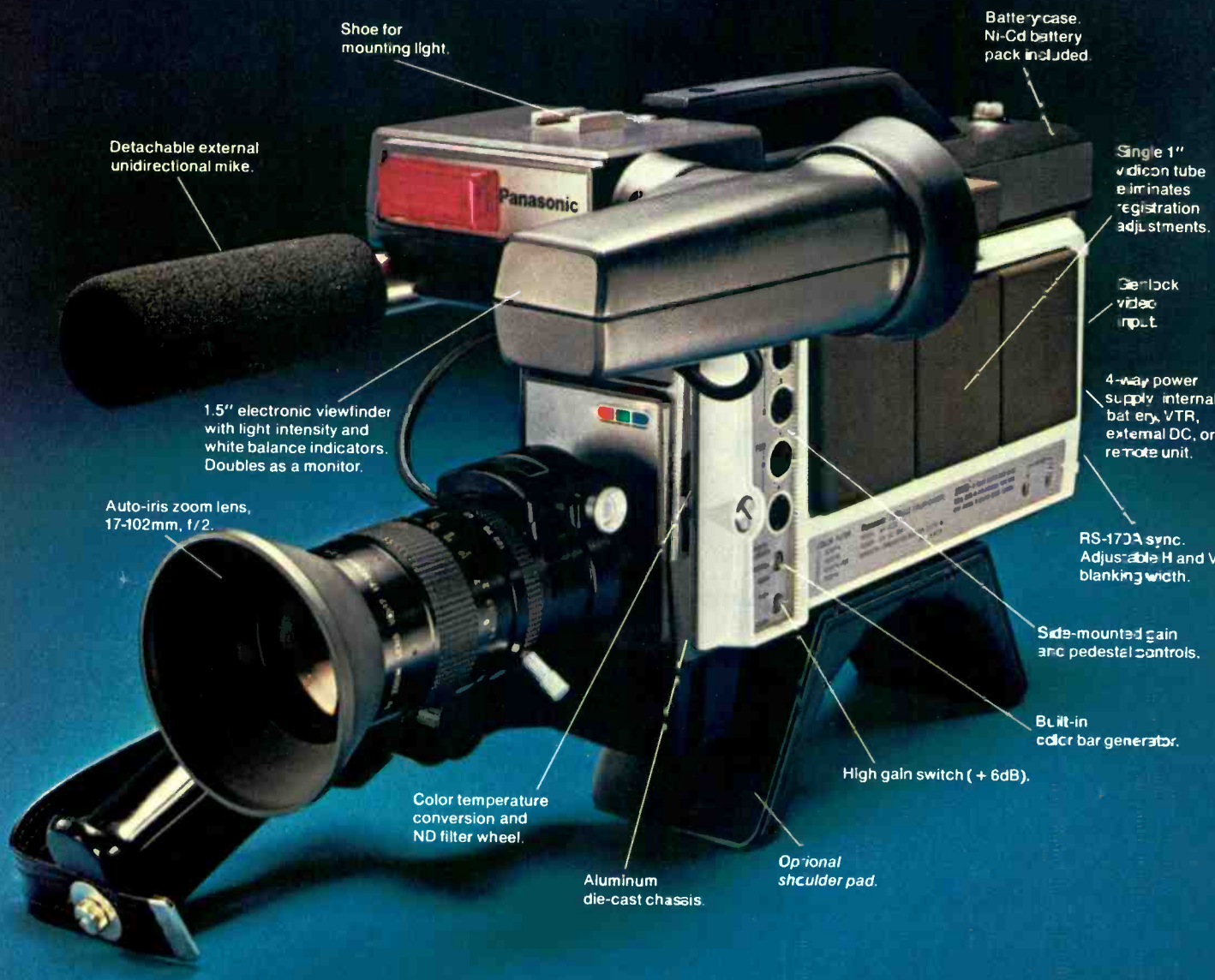
There are 14 big features on this new Panasonic ENG/EFP camera. And one small one: The price.




WV-3800EN studio configuration

The WV-3800 camera system.

The WV-3800 ENG/EFP camera as shown above includes: the mike, auto-iris zoom lens, 1.5" (diag meas) viewfinder, Ni-Cd battery pack, plus a battery case, soft cover and 10-ft. VTR cable.

The WV-3800EN at the left includes a studio viewfinder, a rear control 6:1 zoom lens, remote control unit and a 25-ft. camera cable.

Specifications: HORIZONTAL RESOLUTION: 260 lines at center. SIGNAL-TO-NOISE RATIO: 47 dB (Luminance). POWER CONSUMPTION: Approx. 14 watts. RECOMMENDED ILLUMINATION: 140 footcandles at f/4.0. MINIMUM ILLUMINATION: 15 footcandles at f/2.0. APERTURE CORRECTION: Horizontal and vertical.

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

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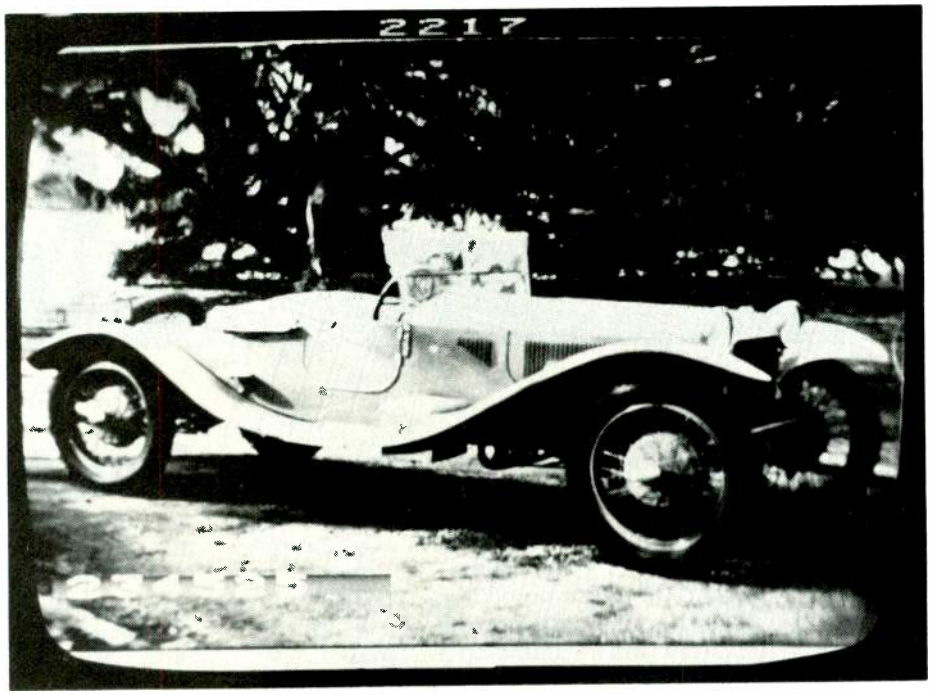

Q-Code provides a type of edge numbering for video. As in film, each frame and (for video) field is given a unique numerical code

The small Q-Code reader/generators endcode the numerical identifications in the vertical intervals of the video signal

tape that is only micro-code encoded can be translated to SMPTE by presetting a SMPTE time code generator to match the first micro-code readout. For this application SMPTE readers and generators are required.

The Z-6 Micro-Loc* is available in a building-block configuration starting with a single event editing system for $8500 and extending to the Z-6E system, capable of A, B, and C roll edits, for $35,000. The various options selected will determine how much any particular Z-6 system will cost.

QSI Systems, Inc., has been marketing for some time its Q-Code system and currently has about 100 of the systems operating in markets around the country. The Q-Code approach is as close an equivalent to film edge numbering as been developed. A unique numerical code is recorded in the vertical blanking interval of each field or frame. Since it is a part of the video information, it can be read at any speed.

Based on information supplied by QSI chief engineer Jim Albrycht, this is how the system works: Seven available lines of the vertical blanking interval of each field between standard sync and active video are burned in with regular film-type edge numbers. The numbers themselves are generated by a simple character generator system and read out on any picture monitor with a slight vertical delay. For broadcast or dubbed material the Q-Code numbers can be removed by a blanking regeneration processing amplifier.

This very simple system, which is priced at about $695, gives the operator very accurate counting of all fields and frames. With a hand calculator, simple addition and subtraction of Q-Code numbers will yield the desired locations. Elapsed time can be calculated by simply dividing the Q-Code total by 30/60 to yield seconds.

Since Q-Code exists in the video, SMPTE code on the audio track remains undisturbed. The simplicity of Q-Code makes it an excellent off-line system for logging and edit planning. Since there will be a unique Q-Code number for each frame, it will easily reference to each unique SMPTE edit code number. Q-Code, however, will not translate directly to SMPTE for use with computer-assisted editing systems.

In addition to Q-Code, QSI will be developing VALID, a machine-readable address code which follows the video and identifies itself automatically. Each field has its own identifier in alphanumeric form. Currently, VALID is being used to identify video sources from remote locations, but as it is developed further it may find a role in post-production. AVID code, the third QSI approach, is used to identify audio or video and is recorded on an adjacent audio track, as is SMPTE code. However, since SMPTE Time and Control Code is digital and AVID is recorded in analog, less bandwidth is required.

AVID, like VALID, does not replace SMPTE time code in its role as an editing code but rather is intended to provide a code for video and audio identification only. While this may be helpful in logging, it has no direct impact on the use of SMPTE Time and Control Code in the current post-production system.

While Micro-Loc* has reached down from the heights of sophisticated computer-assisted editing to bring its benefits closer to the bulk of video post-production, and while Q-Code has provided even the most mundane editing needs with an accurate numerical identification system, there remains a gap. How this gap will eventually be filled may be the subject of further developments regarding time and control information coming out of SMPTE's work. **BM/E**

Why you should continue Plumbicon® TV tubes in

The future for ENG grows brighter and more exciting with each passing day. The same can be said about the ⅔-inch Plumbicon, the TV camera tube that made Electronic News Gathering possible and practical at the same time.

Reflecting our continuing commitment to provide the broadcast community with state-of-the-art Plumbicon tubes—(it was a Plumbicon tube that revolutionized color TV broadcasting in 1964)—we invested almost four million dollars in the development of the ⅔-inch Plumbicon tube, most of it before the first ENG cameras were even introduced. Very early in the game, we felt that electronic journalism, with the support of modern tube and camera technology could surely add a new dimension to television broadcasting.

Even with that confidence, the phenomenal acceptance of Plumbicon-equipped portable cameras nearly overwhelmed us, as it did everyone else. In just 3 years we have supplied almost 7000 of these tubes to U.S. broadcasters!

In a market of such magnitude, it was not unexpected that other ⅔-inch camera tubes would arrive on the scene, sooner or later, with the usual "ours is better than theirs" claims. We feel that much conflicting and contradictory information has been given to the broadcast industry, regarding these new tubes. In the final analysis, only you, the broadcaster, can judge the *system performance* of these tubes and compare their performance *in the camera* with the Plumbicon tube.

In the meantime, we offer some of our own experience on the system performance of the Plumbicon tube compared to the Saticon (Registered trademark NHK/Japanese Broadcasting Corporation), one of these recently arrived new products.

Sensitivity Sensitivity is the critical parameter in ENG. In the field, where you have no control over lighting, you need the Plumbicon tube's greater sensitivity to maintain an acceptable signal-to-noise ratio in your final edited news story. Even in those next-to-impossible lighting situations, you are more assured of producing a useable picture with a Plumbicon-equipped ENG camera than with the same camera equipped with the Saticon.

Resolution Your final, edited tape is the criterion by which you must evaluate ENG system performance, and your pick-up tube should always be selected with that fact in mind.

Resolution specifications are a good example of this principle. Plumbicon tube sensitivity gives you enough latitude for aperture correction with very little loss in S/N ratio, to achieve the required 100% modulation depth at 5 MHz, but the resolution of most ENG *systems* is limited by the video tape equipment used. From the systems performance point of view, therefore, a pick-up tube chosen solely for its resolution specifications may have no positive effect at all on picture quality!

Lag The Plumbicon tube has lag characteristics that are so favorable that it can be used entirely without bias light. If your camera provides bias light, it simply improves the Plumbicon's lag characteristics. The Saticon *must* use bias light or its pictures will be seriously degraded. In the middle of a news event, should a bias light lamp burn out . . . . . !

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to specify ⅔-inch your ENG cameras.

Temperature Stability

Since the Plumbicon's photoconductive layer is processed at temperatures in excess of 175°F, your Plumbicon tube can tolerate temperature excursions that may take the photoconductor to 160°F. The Plumbicon tube tolerates 160°F ambient without damage of any kind. The Saticon, however, will experience partial or complete layer destruction at these temperature levels after a few hours. It is totally conceivable that your ENG camera will experience temperatures which will cause the Saticon tube in your camera to approach a critical life condition.

Life Based upon actual operating experience with the Plumbicon, rather than on statistics of accelerated life testing, you can expect from 2 to 5 years of service, depending upon operating practice.

Burn-in The Plumbicon exhibits no, or very little perceptible picture sticking (burn-in) especially in highlights. The Saticon, on the other hand, has been observed to have a noticeable characteristic of "hanging-up" on bright highlights and also tends to exhibit picture sticking after a camera has been focussed on a scene for any length of time.

Registration The Plumbicon tube incorporates a precision gun assembly for controlled geometry and registration. Our final testing includes a computerized registration check which matches each tube's performance with a data base which includes readings on previously tested tubes. Should any tube fail to match up to this data base, it is rejected. This is added insurance that your camera will maintain precise registration even after you replace your original Plumbicon tubes. Needless to say, you *do not* have to replace the Plumbicon tubes in "sets."

Storage The Plumbicon can, of course, be stored for many months without deterioration. But why store TV camera tubes? Storage means money. Amperex service to the broadcast industry is justly famous. Delivery of replacement tubes anywhere in the USA within 24 hours is routine. In extreme emergency situations, we have shipped tubes clear across the country in as little as eight hours.

We expect you to make your own comparisons and we are sure your findings will agree with ours. One of the things that may not be apparent from your comparisons is the fact that Plumbicon TV camera tubes continue to stay abreast of the needs of the broadcast industry after more than ten years of production which has put almost 150,000 Plumbicon tubes into broadcast stations around the world.

When you specify Plumbicon tubes in your ENG cameras, we deliver a lot of experience.

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SUPPRESSING RF HARMONICS AND IM PRODUCTS

By Grant Bingeman

There are no all-purpose or shortcut methods of finding and controlling intermodulation and harmonic problems in antenna systems. Each case is special and should be considered from a systems standpoint.

SUPPRESSION OF HARMONICS and intermodulation (crosstalk or mixing) products is considered a black art by some and a simple exercise by others. Neither viewpoint is tenable. Although some general rules can be carefully applied, each case has a unique, calculable solution.

The pertinent FCC rules and regulations are 73.40(a), 13, 14, and 15, and 73.46(c). According to 73.40, the shaded area of Figure 1 is forbidden to any emission from your AM station. The curve is power-dependent 75 kHz and more removed from the carrier frequency. However, all this is only the minimum required attenuation. FCC 73.46(c) requires that your station "not cause harmful interference to the reception of other radio stations."

As an example, assume that Station A is licensed to 740 kHz and is just down the road from Station B, which is licensed to 1450 kHz. Assume that marine radiotelephone conversations near 2190 kHz (1450 + 740) are chronically interfered with, and the FCC homes in on Station B's tower. Station A is found to be clean. Also, Station B's listeners have complained that Station A can be heard in the background when they are tuned to Station B. As the story unfolds, it appears that Station B recently modified its antenna coupling unit, just before the interference on 2190 kHz began. But before we delve into Station B's problem, let us talk about the harmonic attenuation properties of various networks.

In general, a network with a lagging (negative) phase shift has been considered a low-pass device, whereas a leading network has been considered high-pass. In other words, a lagging network should do a better job of attenuating harmonics than a leading network. However, there are some exceptions to this rule that you should be aware of. In Figure 3 one can clearly see that for low values of phase shift, the harmonic voltage levels are actually boosted by a lagging tee network. (This network has unity impedance tranformation at the fundamental.) But most lagging tee networks have a coil in series with the shunt-leg capacitor for adjustment purposes. In Figure 4 one can see that this series coil improves the harmonic attenuation for low values of phase shift, but degrades performance at higher phase shifts.

The leading network of Figure 5 performs just about the way we have been led to believe. But when we look at the more common leading configuration of Figure 6, the attenuation performance starts to look like that of a lagging network. The attenuation of a simple series-resonant circuit (Figure 7) hints as to why.

So far we have talked only about networks with unity impedance transformation. A quick look at Figure 8 may shock you. In the region of −70 degrees of phase shift you would have a hard time convincing someone that this is a low-pass network. Yet the physical configuration is what one would normally refer to as low-pass: networks cannot be classified as low-pass or high-pass simply according to their physical configurations.

Up to this point, I have assumed that each network was operating into a flat, resistive load. In an antenna system, the harmonics are not going to see the same load impedance that the fundamental sees. Thus, the real-world attenuation will be better or worse than what you would expect with a flat load. Compare Figure 8 with Figure 9, where Figure 9 sees the following impedances:

Harmonic	Antenna Height (Degrees)	Antenna Impedance (Ohms)
1	80	30 + j20
2	160	400 − j400
3	240	25 + j0
4	320	550 + j300
5	400	100 − j50

For the most part, this situation shows significantly reduced attenuation over the flat-load case.

Antenna characteristics

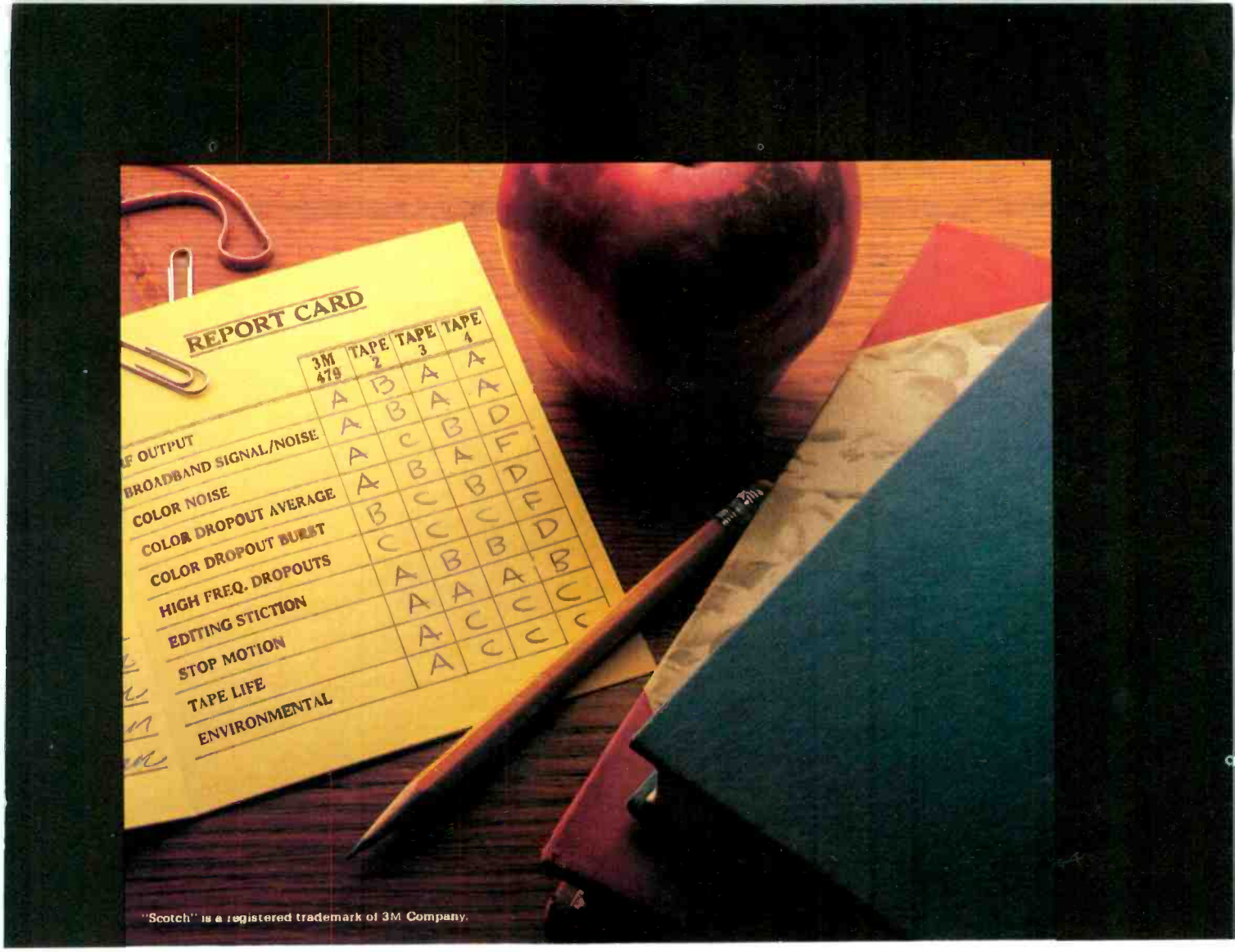
An AM tower often has a certain amount of self-reactance that must be tuned out by the antenna coupling unit. The resulting series-resonant circuit will often help to attenuate harmonics. But this can be accompanied by some bandwidth degradation near the carrier frequency. Conversely, modification of an antenna coupling unit in order to improve bandwidth may have unfortunate effects on the spurious radiation from the system. In fact, this is what happened to the aforementioned Station B. A careful consideration of this trade-off between bandwidth and harmonic attenuation is therefore required.

According to FCC 73.190 Figure 8, the field strength of a signal depends on the tower electrical height. For example, a tower which is 80 degrees tall at the fundamental gives almost a 3 dB boost to the third harmonic. This is equivalent to doubling the transmitter output power. Figure 10 of this article is an extended version of FCC Figure 8. As one can see, the limiting case is close to the n = 4 curve (i.e., for G > 4 λ).

Harmonic	Antenna Height (Degrees)	Field Intensity (mV/m/kW @ mi)	dB
1	80	186	0
2	160	220	1.5
3	240	260	2.9
4	320	24	−17.8
5	400	34	−14.8

A word of warning about phased-array patterns: compliance with 73.40(a) is much more difficult near the null azimuths where the carrier (the 0 dB reference) is attenuated, but other signals are not. You will have a com-

Grant Bingeman is with the Broadcast Products Dept., Collins Transmission Systems Div. of Rockwell International.



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We're the people who pioneered the development of video tape 25 years ago. And according to the pros who know video tape best, we're still the best video tape. Give or take an inch.

3M

pletely different pattern at the second or third harmonic than the carrier pattern you are accustomed to.

For normal ground conductivities, ground-wave attenuation increases with increasing frequency (Equation 1).[1] Thus, the ground acts as a low-pass filter. Over the

[1]See Jordan's *Electromagnetic Waves and Radiating Systems*, chapter entitled "Ground Wave Propagation."

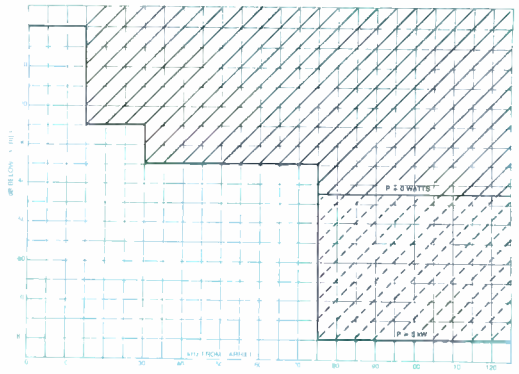

Figure 1

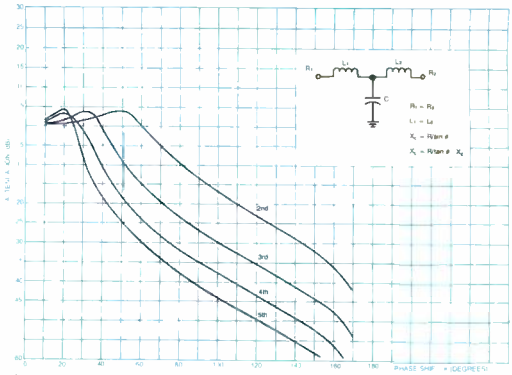

Figure 3

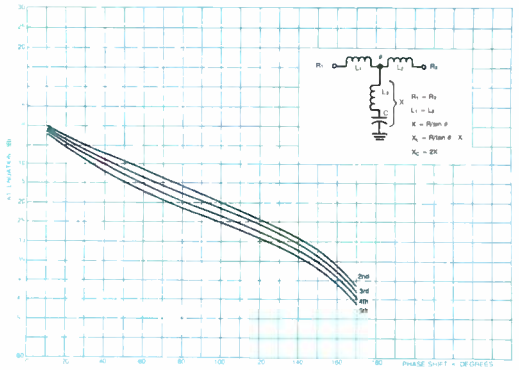

Figure 4

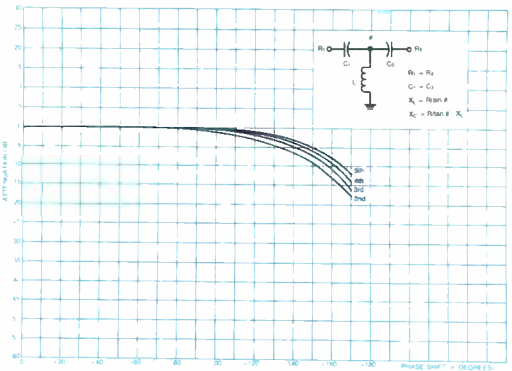

Figure 5

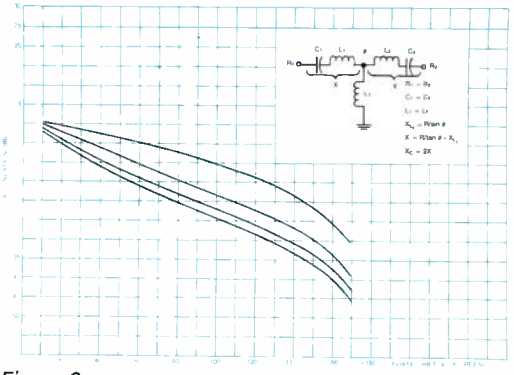

Figure 6

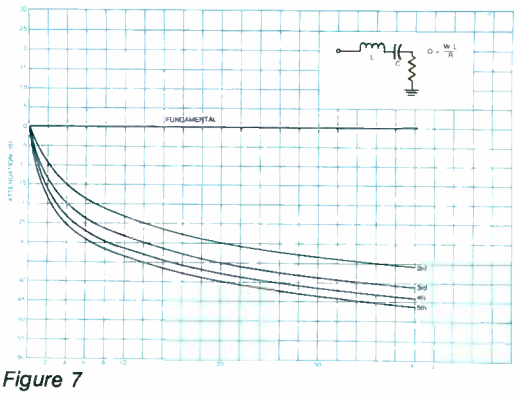

Figure 7

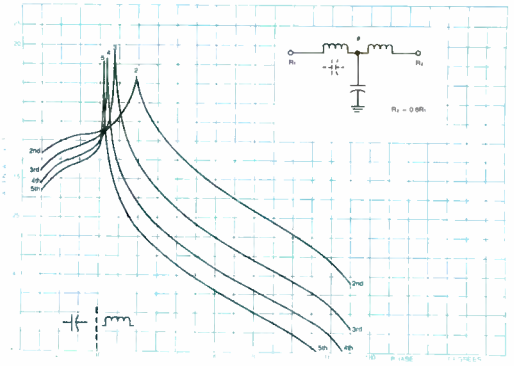

Figure 8

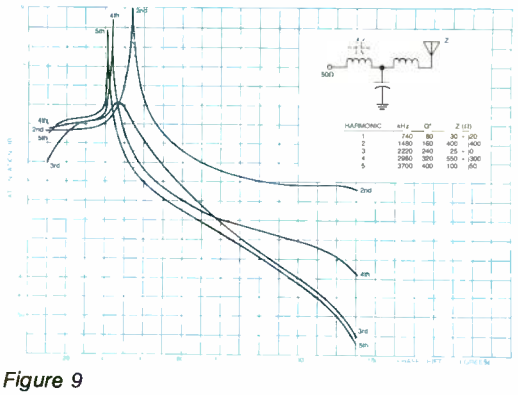

Figure 9

ADDA–THE LEADER IN DIGITAL STILL STORAGE CARRIES THE COUNTRY.

The still store picture from the East Coast to Hawaii is clear. Unequaled insight into broadcasting's digital storage requirements has made ADDA ESP-Systems by far the industry's largest seller.

MILWAUKEE

WTMJ-TV Milwaukee's NBC affiliate WTMJ-TV employs the ADDA ESP-200 for its news programming. The ESP-200, like all ADDA ESP-Systems, is a highly cost-effective replacement for slide chains. ESP-Systems cost less than slide chain equipment and occupy less floor space (only six square feet). Labor and handling costs are substantially reduced and film processing costs as well as time delays are eliminated. ADDA's ESP-Systems provide considerably greater slide capacities. On-line editing allows sequences to be programmed in advance and then reprogrammed while on the air.

MIAMI

WCKT In Miami, NBC affiliate WCKT utilizes the ADDA ESP-750 to create, store, and retrieve stills instantly for its news programming. The ESP-750 features an on-line storage capacity of 1500 frames with up to 100 programmable sequences and 800 programmable frames. Last minute news coverage material can be inserted up to three minutes prior to air time. Only ADDA's ESP digital still store systems conform to new SMPTE digital recording standards at four times the color subcarrier. ESP-Systems are also great for recalling stored character fonts.

HONOLULU

KGMB-TV The commercial production department at CBS affiliate KGMB capitalizes on the creative versatility of the ADDA ESP-200. All of ADDA's ESP-Systems enable you to simulate zoom or animation, spin stills, fade, dissolve, wipe, and super through the program switcher. High resolution stills can be created from live camera, VTR, 16mm film, and network or satellite feeds.

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DIGITAL

The digital video experts.

Circle 146 on Reader Service Card

Suppressing RF Harmonics

ocean, however, this is not the case because of the very high RF conductivity of salt water (recall that Station B was interfering with *marine* communications). For infinite ground conductivity, the signal simply falls as the inverse of the distance from the antenna (as far as the radio horizon). Beyond the radio horizon, the curvature of the earth creates some additional attenuation.

Equation 1:

$$A = \frac{2 + .3P}{2 + P + .6P^2} - \sin(b)\left[P/2\right]^{1/2} e^{-P/1.6}$$

Where: $b = \arctan\dfrac{f(\epsilon + 1)}{18\sigma}$

$$P = \frac{.936f^2 r \cos(b)}{\sigma}, \quad r \leq 30 \text{ miles}$$

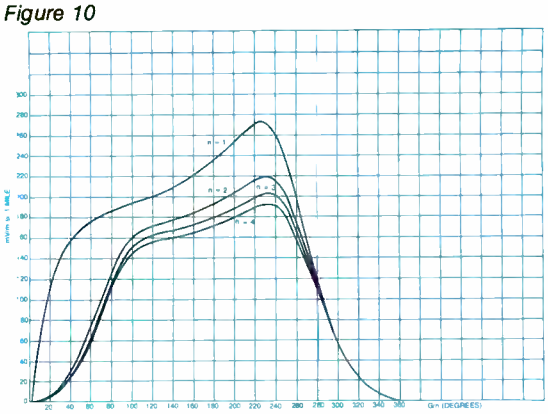
r = distance (miles)
f = frequency (MHz)
σ = ground conductivity (mmho/m)
ϵ = dielectric constant relative to air
e = 2.718

Because the FCC field intensity curves (73.184, graphs 1 through 19a) only cover 540 to 1640 kHz, I have included some field intensity curves (Figures 11a through 11f) covering zero to 12 MHz. These curves can be used for predicting the far-field strength of ground-wave harmonics and intermod products. Note that the Figure 11 curves are based on an unattenuated, vertically polarized field intensity of 100 mV/m at one mile, and stop at about 30 miles, near the radio horizon, since Equation 1 does not include the effect of the curvature of the earth.

Hunting stray RF

How do you know when a significant level of another station's RF energy is getting into your system? You can measure it, calculate it, or both. The simplest way to calculate the induced voltage is to use the model of Figure 12. Note that all the impedances are at the suspect station's carrier frequency (f_1), not at your frequency (f_2).

Figure 10



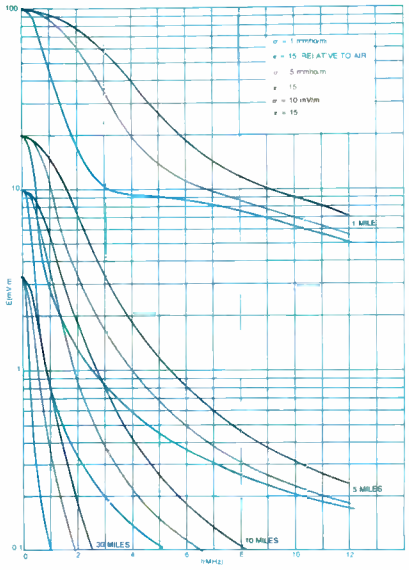
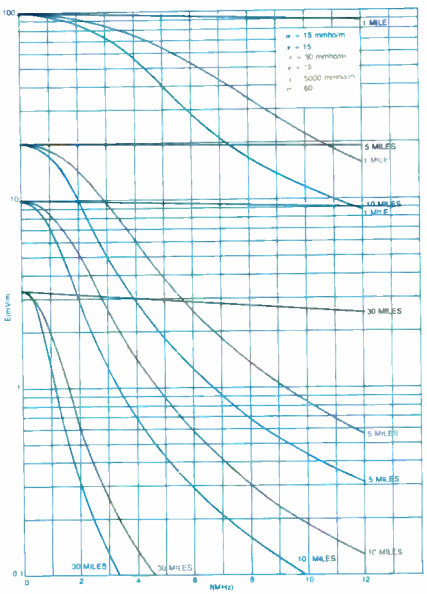


Figure 11a (shown in blue), b (gray), and c (black)

Figure 11d (in blue), e (gray), and f (black)



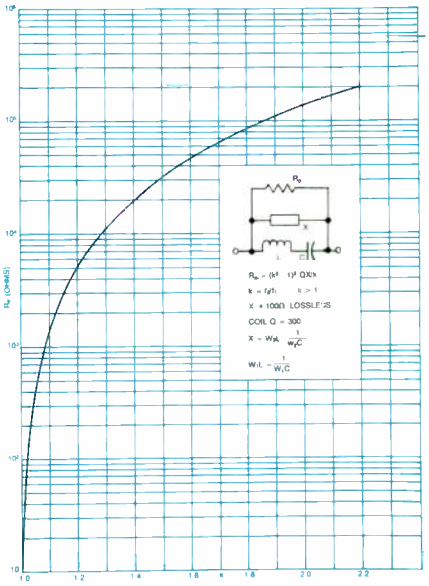


Figure 17

Suppressing RF Harmonics

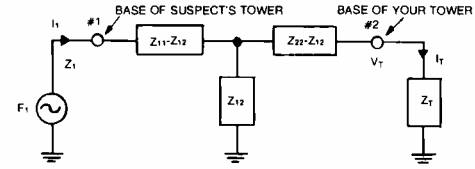


Figure 12

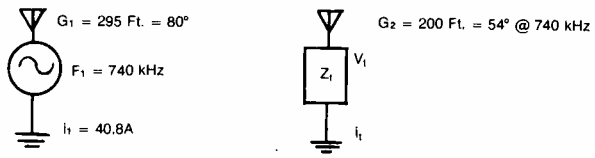
Z_{11} = Self base impedance of Tower 1
Z_{22} = Self base impedance of Tower 2 (your tower)
Z_{12} = Mutual base impedance between Towers 1 and 2

The voltage induced at the base of your tower by the field from the suspect station can be readily determined from Equation 2. Although the induced voltage becomes zero when $Z_t = 0$, the induced current does not (Equation 3). Note that the induced current is maximized when $Z_t = -X_{22}$, not when $Z_t = 0$. These formulas do not hold true if either antenna height is near 180 degrees at f_1, unless an accurate mutual base impedance value is available (this excludes mutual impedance values based on sinusoidal current distributions).

Equation 2: $$V_t = \frac{i_1 Z_{12}}{1 + Z_{22}/Z_t}$$

Equation 3: $$i_t = \frac{i_1 Z_{12}}{Z_t + Z_{22}}$$

Calculation of induced voltage and current



S_{12} = 2000 feet = 541 degrees
$Z_{12} = -0.5 - j2.7$ ohms
$Z_{11} = 30 + j25$
$Z_{22} = 12 - j100$

When Z_t is a short circuit, $i_t = \frac{i_1 Z_{12}}{Z_{22}} = \frac{40.8(2.7)}{100.7} = 1.09$ A

When Z_t is an open circuit, $V_t = i_1 Z_{12} = 40.8(2.7) = 110$ V

When you adjust Z_t, you not only affect the induced voltage level on your tower, but also the pattern and operating impedance of the other tower (Equation 4). Usually the effects are small, but not always! Z_1 (see also Figure 12) is affected most when $Z_t = 0$.

Equation 4: $$Z_1 = Z_{11} - \frac{Z^2_{12}}{Z_t + Z_{22}}$$

In the case of tall towers, the best approach for a station engineer is to measure the induced voltage. One way to do this is to connect a voltage divider to a convenient place in the antenna system or transmitter output network and drive a field strength meter with the safely reduced voltage. Be sure that the voltage division ratio is large enough to prohibit damage to the field strength meter from excessive input levels (read the manual).

A divider with a large ratio will also insure that no undesired impedance transformation is introduced by the measurement technique. Because of heating in a resistive divider, a capacitive or inductive divider is preferable.

A few informative places to make measurements are at the output of the transmitter, at the PA of the transmitter, at the base of a tower, and at the input to an antenna coupling unit. Since the mixing process is most likely to occur in the PA, you should concentrate your efforts at this point.

First measure the voltage level at your carrier frequency. Then as a start, tune across the band and record any frequency where you find a signal level within 30 dB of your carrier level. Note that the relative voltage levels of the signals will be different at different places in your system. There may be some places where you appear to be in compliance with 73.40(a), and yet another set of measurements at another place may not meet the minimum required attenuation. It is important to keep in mind that it is the relative strength of the spurious emissions at someone else's receiver which you should be most concerned about. This is why a systems approach, as described here, is advisable.

Ultimately, you want to compare the RF spectrum that you record when your transmitter is on with the situation when your transmitter and exciter are off. Pay close attention to anything which completely disappears when you turn your transmitter off. Anything which changes level but is still present when you turn the transmitter off can probably be ignored. The reason for these changes in level is the apparent change in terminating impedance when the transmitter is turned off and on.

If there appear to be some spectral components coming from your transmitter which are not harmonically related to your carrier frequency, you need to decide if this is a transmitter problem alone or if it is your carrier beating with someone else's carrier. Two carriers can produce a large number of intermod products ($f_1 + f_2$, $f_1 - f_2$, $f_1 + 2f_2$, etc.). Usually the stronger mixing products are closer to the fundamentals.

A note of caution: do not be fooled by intermod products generated inside your receiver! Be absolutely certain that you are not overdriving your field strength meter.

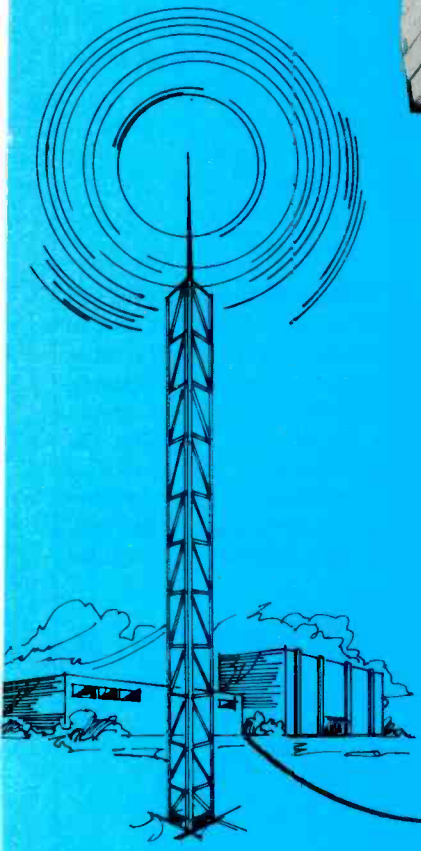
Capturing the problem

If you have determined that your transmitter is generating objectionable intermodulation products because of the presence of another station's RF energy in your system, there are two general approaches to the problem. The simplest method is to adjust the existing antenna networks for improved attenuation of the undesired signals. A change in phase shift of an antenna coupling unit or a common-point matching network may be all that is required. Sometimes a series-resonant circuit at the transmitter output will suffice (Figure 7).

More often, however, a reject filter is installed to trap out the incoming RF. This filter may consist of a single "pole" (Figure 13a), a single "zero" (Figure 13b), or both (Figures 13c and 13d). A pole is in-line anti-resonant at the reject frequency (f_r), whereas a zero is shunt series-resonant at f_r. To avoid undesired impedance transformation at the pass frequency (f_o), the reject filter must provide a zero at f_o where it produces a pole at f_r, and vice versa (Figure 14).

If this sounds confusing, perhaps a design example will clarify things. Figure 15 is a filter that the previously mentioned Station B could place between its antenna coupler and tower in order to reject the energy coming from Station A. The design equations derive easily from Ohm's Law. Note that both a pole and a zero have been

ST1910/1911 Spectrum Translator



- Extends the low frequency spectrum of standard, voice-grade telephone facilities by 240Hz, delivering the added punch needed by the broadcaster at minimum cost.
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- Easily connected to existing circuits.
- Simple, easy to operate, two-unit system consisting of a transmitter, which translates the spectrum of 60-2760 Hz up to 300-3000 Hz for transmission and a receiver which recovers the original signal after reception.
- Lightweight, portable transmitter and receiver are housed in rugged, molded ABS plastic cases equipped with a convenient handle/stand.
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Suppressing RF Harmonics

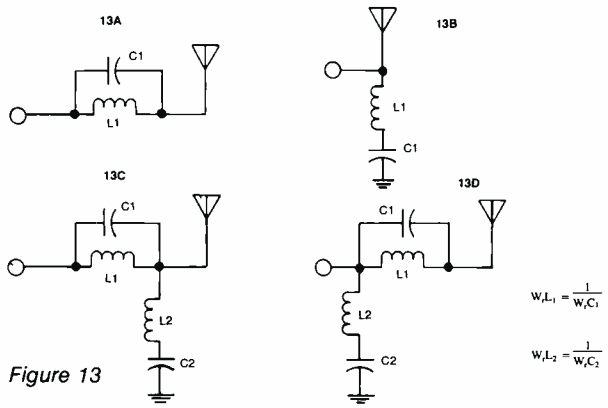

Figure 13

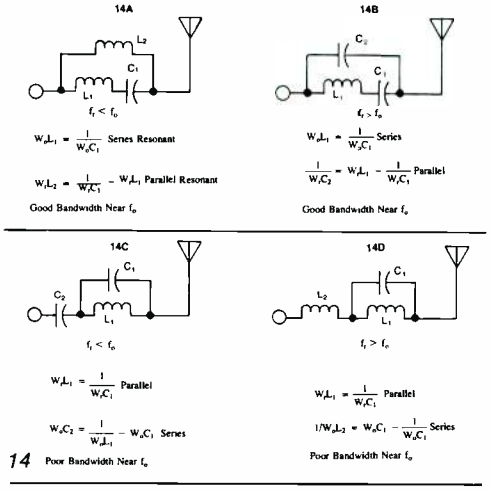

Figure 14

If these networks are to be used in shunt, exchange f_r and f_o and W_r and W_o.

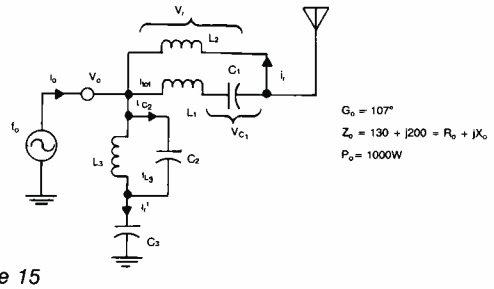

Figure 15

$f_o = 1450$ kHz
$f_r = 740$ kHz
$V_r = 110$V
$C_1 = 2000$ pF
$C_2 = 1000$ pF

$$L_3 = \frac{1}{W_o^2 C_2} = 12 \text{ pH}$$

$$C_3 = C_2 - \frac{1}{W_r^2 L_3} = 2840 \text{ pF}$$

$$i_o = \sqrt{P_o / 130} = 2.77\text{A}$$

$$V_o = \sqrt{i_o = 130^2 + 200^2} = 661\text{V}$$

$$i_{tot} = \sqrt{i_o^2 + i_r^2} = 3.1\text{A (definition of r.m.s.)}$$

$$i_{L_3} = i_{C_2} = V_o W_o C_2 = 6\text{A, if } i_r^1 << i_{C_2} \text{ \& } i_{L_3}$$

$$L_1 = \frac{1}{W_o^2 C_1} = 6\ \mu\text{H}$$

$$L_2 = \frac{1}{W_r^2 C_1} - L_1 = 17.1\ \mu\text{H}$$

$$i_r = V_r / W_r L_2 = 1.4\text{A}$$

$$V_{C_1} = \frac{i_o}{W_o C_1} + \frac{i_r}{W_r C_1}$$, when i_o and i_r are in phase, which occurs many times each second. $= 301$V

used. A pole or a zero alone may have provided enough rejection, but it would have been a gamble since the rejection performance depends on the terminating impedances (recall Figures 8 and 9).

In order to minimize the effect of a parasitic tower on a given pattern, the reradiated field from the parasitic tower must be minimized. For a short tower, the filter configuration of Figure 15 is preferred because it minimizes the induced current at the tower base. However, if the tower were somewhat taller, the opposite might be true. In the case of a tall tower, a configuration similar to Figure 16 is indicated. For the sake of comparison, I am using the same tower parameters in Figures 15 and 16.

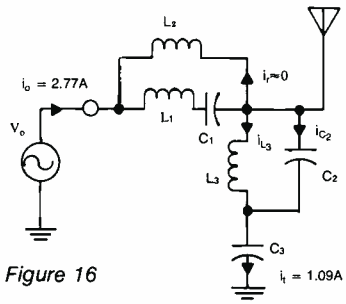

Figure 16

$$i_{L_3} = \sqrt{\left[\frac{V_o}{W_o L_3}\right] + \left[\frac{k^2 i_t}{k^2 - 1}\right]} = 6.20 \text{ amps}$$

$$i_{C_2} = \sqrt{\left[\frac{V_o}{W_o L_3}\right] + \left[\frac{i_t}{k^2 - 1}\right]} = 6.03 \text{ amps}$$

$$V_{C_2} = V_o + \frac{i_t k W_o L_3}{k^2 - 1} = 744 \text{ V}$$

$$k = f_o / f_r = \frac{1450}{740} = 1.96$$

$$V_{C_3} = \frac{i_t}{W_r C_3} = 83 \text{ V}$$

The attenuation (Eqn. 5) of the reject voltage (V_r) can be predicted if the Q of the components is known. As can be seen in Figure 17, it becomes progressively more difficult to obtain good attenuation as the carrier spacing decreases. The concept behind the reject traps is simply voltage or current division (Figure 18). Actually, the voltage attenuation will be slightly better than shown by Equation 5 because of the impedance (Z) seen looking towards your transmitter, which appears in parallel with R_s. The current-divider trap type behaves in a similar manner.

Equation 5:

$$R = X/Q \qquad \text{Atten.} = 20 \log \frac{R_s}{R_s + R_p} \text{ dB}$$

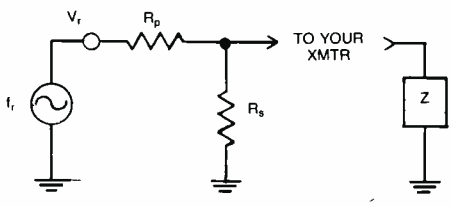

Figure 18

In conclusion, let me emphasize that each case is a special case. The relative field strength of spurious emissions depends on: (1) terminating impedance, (2) network characteristics, (3) ground conductivity, and (4) antenna gain. It is best to consider an intermodulation problem from a systems standpoint, especially since the exceptions to the rules can turn things upside down. **BM/E**

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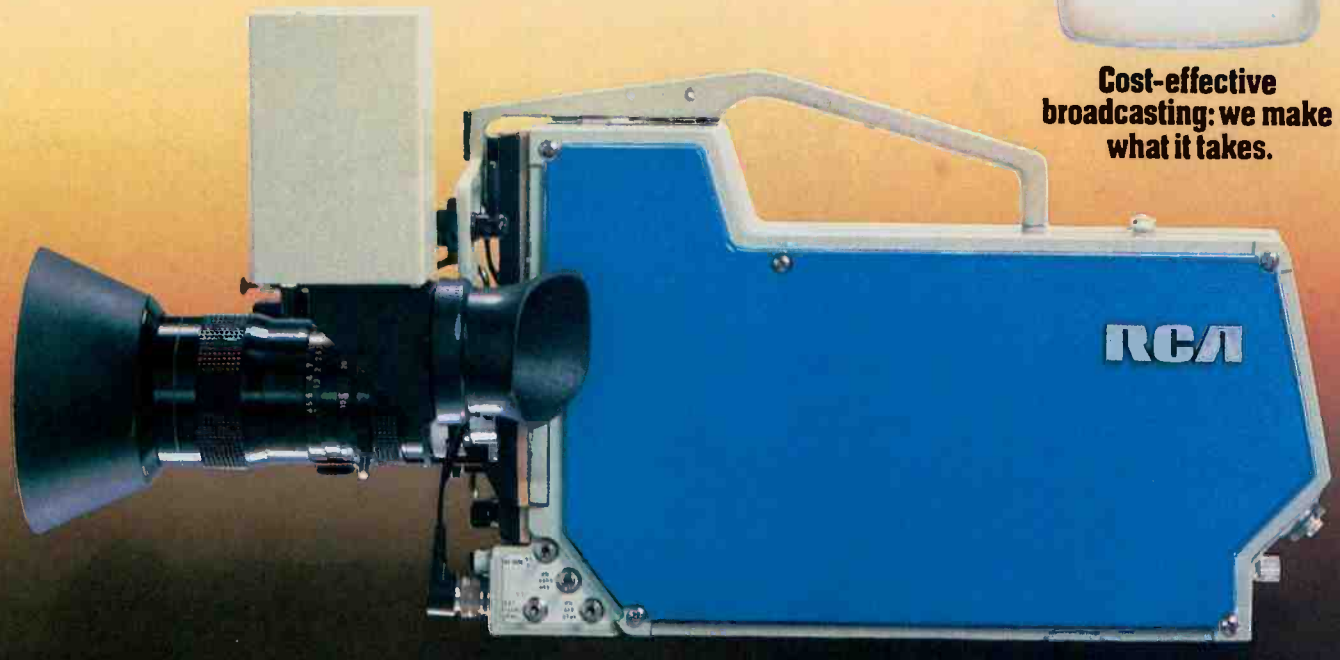

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WHERE WILL THE AM BROADCASTER FIND A STEREO STUDIO-TRANSMITTER LINK?

The RF spectrum is extremely tight in many cities, and the telephone company is not much help. Unless AM broadcasters planning to go to stereo get busy on the STL problem soon, it could be a case of "you can't get there from here."

EVERY AM BROADCASTER who uses a studio-transmitter link must revise or replace that link before he can get a stereo signal on the air. This is an imperative of the changeover that presents some sticky problems not yet widely discussed in the industry and thus all too likely to take many broadcasters from behind and unawares.

The many other revisions and replacements the AM broadcaster needs for stereo got comprehensive discussion in last month's *BM/E* (''AM Stereo: Ready, Set, Waiting on the 'Go' ''). The STL problem was on the list, but could not be dealt with in depth with a dozen other changeover needs in studio and transmitter to describe.

BM/E decided therefore to give a full article to the changeover to stereo STLs for AM broadcasters. Some facts that just about everybody will acknowledge can be put down at the beginning. The AM broadcaster going to stereo will universally want better quality on both channels than he was likely to be getting on one, especially if he used telco lines for his STL: that quality upgrade is a part of the whole competitive game.

The Bell System is maintaining the public stance that, yes, it will supply high-quality, low-noise lines in matched pairs wherever AM broadcasters may want them. But the experience of dozens of broadcasters across the country makes this dubious, to put it gently. In many places the local telco personnel simply say there are no such lines available.

Even when a broadcaster does get a matched telco pair — and in many medium and large cities in the past they have been widely used — the job of keeping them phased together has been nearly insurmountable. The telephone company can change the routing, according to the needs of telephone service: with an entirely new loop coming in on one side, the phase problem becomes nearly hopeless, and bandwidth, noise, and distortion are also hard to control.

The telco problem has sent a large proportion of FM stereo broadcasters to their own RF STLs, and these perform extremely well, on the average. The hardware for the UHF or microwave STL for broadcasters is very highly developed, reliability and fidelity are excellent, and the one-time cost is not too punishing, being usually in the $3000 to $5000 bracket. For many broadcasters this is the optimum way to get the STL, especially since the technology is wide open to any demands for bandwidth, noise levels, and distortion that a broadcaster might impose.

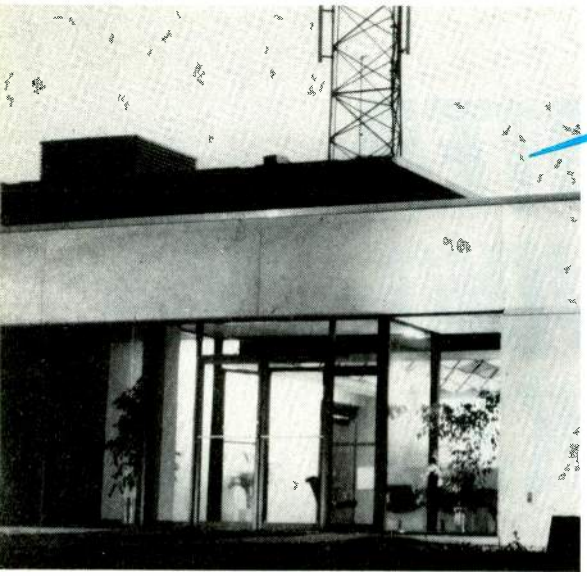
An AM broadcaster already using an RF STL (not many do) is sitting pretty. His STL supplier is more than likely prepared to convert it to stereo use or to replace it with a stereo system. If not, other suppliers will certainly have stereo systems that can be used on the broadcaster's assigned STL frequency.

But if he is not already established in the STL RF spectrum, and many AMers are not, the RF STL can help him only if he can find in his area a slot in the spectrum for his STL carrier. In a lot of cities, particularly the smaller ones, there will be room in the spectrum, but in many medium cities and in all the big ones there are simply no more RF slots tooles, for emample, has such a crowded spectrum that local users have been forced to sit down together to try to cut the pie in an equitable way; some frequencies are used by many different organizations with the help of directional antennas and careful control of RF power levels.

Some 10 or 12 other cities have UHF and microwave crowding that makes getting a new channel for STL just about out of the question, and the difficulty is only slightly less severe in a lot of other places.

AMers must start now

Thus we quickly come to the conclusion that many AM broadcasters trying to get into stereo are going to have big trouble with the STL; it will be almost a case of ''you can't get there from here.'' The industry needs to work on this problem now because solutions will necessarily take a little while. If STLs for AM stereo are going to be ready at anywhere near the time they will be needed, an early start on the problem is imperative.



Route from studio to transmitter can be RF (excellent if room in spectrum is available). Other possible routes: cable TV or, if link can be shared, a telco video line or fiber optics

What solutions are there? The most obvious one is a substantial increase in the spectrum assignable to STLs for radio broadcasting. John Leonard of Moseley, a major supplier of RF STL systems, told *BM/E* that his firm, conscious of the coming crunch, suggested to the FCC more than a year ago that some of the higher UHF frequencies, not usable in particular spots because of the TV taboo table, be given to STL use. The point is that the directional antennas and very low RF power of an STL would prevent such an operation from interfering with local television signals. Moseley figured that a great many channels could be had this way for STL use, but also noted that this was just one suggestion for dealing with the crisis.

Joseph Wu of Time and Frequency Technology agreed firmly with this general approach. He believes, though, that the best place to find more spectrum for STLs is in the 1.5 GHz band. M.E. McClanahan of Marti, a third major supplier of RF STL equipment, agreed that any substantial hunk of spectrum would be most welcome. He noted that the STL assignment used to include 942 to 952 MHz; at one point the FCC took away the band 942 to 947 on the grounds that broadcasters were underusing it and assigned it to other services. Some relief would come if STL users could get that band back.

But whatever the slice of spectrum that seems most likely, actually getting it will take a fight with 10 other kinds of users who want it just as badly as the broadcasters do. That means the industry must organize a concerted effort, a full-industry push that will have the clout to persuade the FCC to move in the right direction. Perhaps this is a problem that the NRBA or the NAB could be directly concerned with. At the least, some interested persons in the industry could organize an industry committee to draw up recommendations, get large industry support, and give the recommendations and evidence of support to the FCC.

Some other ways to go

If getting more spectrum takes a long time (as it well may), some broadcasters in cities where there is no more RF space may look around for other paths from studio to transmitter. One big-city AM engineering chief kicked in the idea of renting a *video* line from the telephone company and putting the audio on a subcarrier (see below on available equipment that does just this for cable television). This solves all technical problems, with several times the bandwidth needed for two, three, or four top grade audio signals; but it is extremely costly. Standard Bell System charge for a video line up to 25 miles is $1000 per month, against $34 for a dedicated telephone line. Whether or not the same tariff would apply to a video line used for *audio,* with lower bandwidth requirements, is a totally open question at the moment — nobody has asked for a tariff yet. If there were a situation in which several stations could share the video line (technically easy), the scheme might be cost effective for many stations.

Where is the right of way for glass fiber?

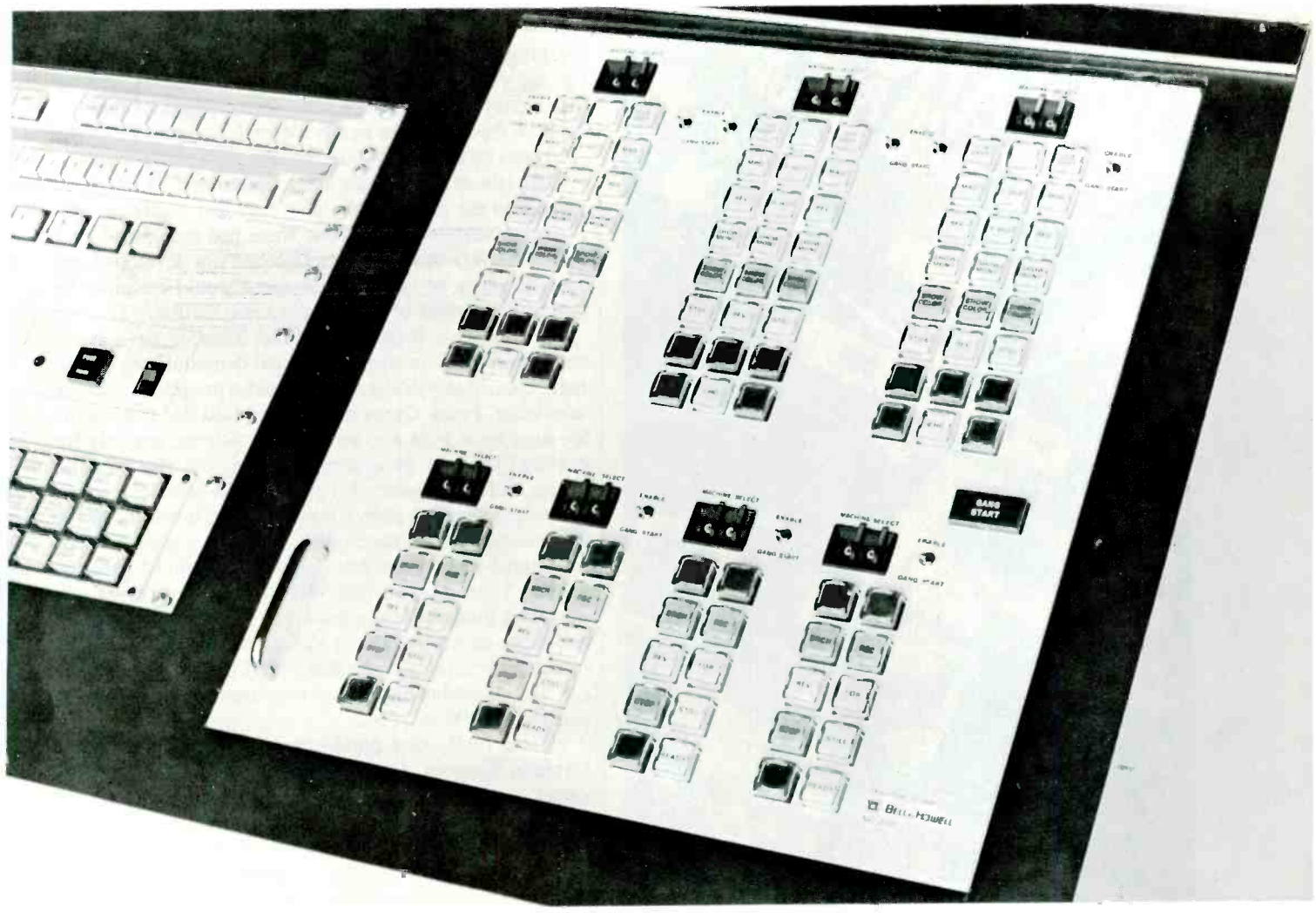
The same kind of sharing would be needed to get costs into line for another kind of STL — a fiber optics link. The technology of fiber optics is ideal for the basic job: there would be no problem in sending two to four channels of top-grade audio over the tiny glass fiber. Single fibers today are handling bandwidths of 100 MHz and more. The equipment is very small and inexpensive, the cable is ultra-light and inexpensive, and reliability is high.

The hold-up comes from the necessity of finding a right of way for the cable and from the necessity of maintaining the cable. In most places the right of way must be rented from the telephone company, either on their poles or through their ducts. *BM/E* talked with three firms in the fiber optics field, all recently making installations that clearly indicate full competence for the broadcast STL job. All agreed that the technical part of the job was simple for fiber optics, which is now doing communications jobs many times as difficult. But all agreed too that hiring the cable right of way would make the system expensive for a radio station.

On the other hand, if several stations were, again, in a position to share costs, fiber optics might become attractive. Costs for fiber optics systems are dropping steadily, the cable in particular now costing less than coax in many cases, with larger bandwidth and much lower losses. Radio broadcasters will want to keep an eye on fiber optics developments as this new technology becomes cost effective for more and more short-distance and long-distance communications jobs.

Cable television can do it

A final possibility looks hopeful in nearly all respects: hiring a channel, or a part of one, from a local cable television company. If the cable itself is well situated for



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The TCS-1 is easy to install because it uses dual twisted pair audio-type wiring, rather than the complex multi-conductor cables normally used with remote controls. Through the use of microprocessors, the TCS-1 can use these twisted pair connections to operate up to 100 VTR's and/or film chains.

But aside from easy installation, there are some significant technical advantages to the TCS-1. For example, the system includes provisions for assigning specific machines to specific control panels, eliminating the possibility of conflicting or unauthorized control commands reaching the same machine from different control stations. And, by spreading the machine control data over as many as eight buses, the TCS-1 is able to send and receive data more quickly than systems in which all data must be funneled through a single bus.

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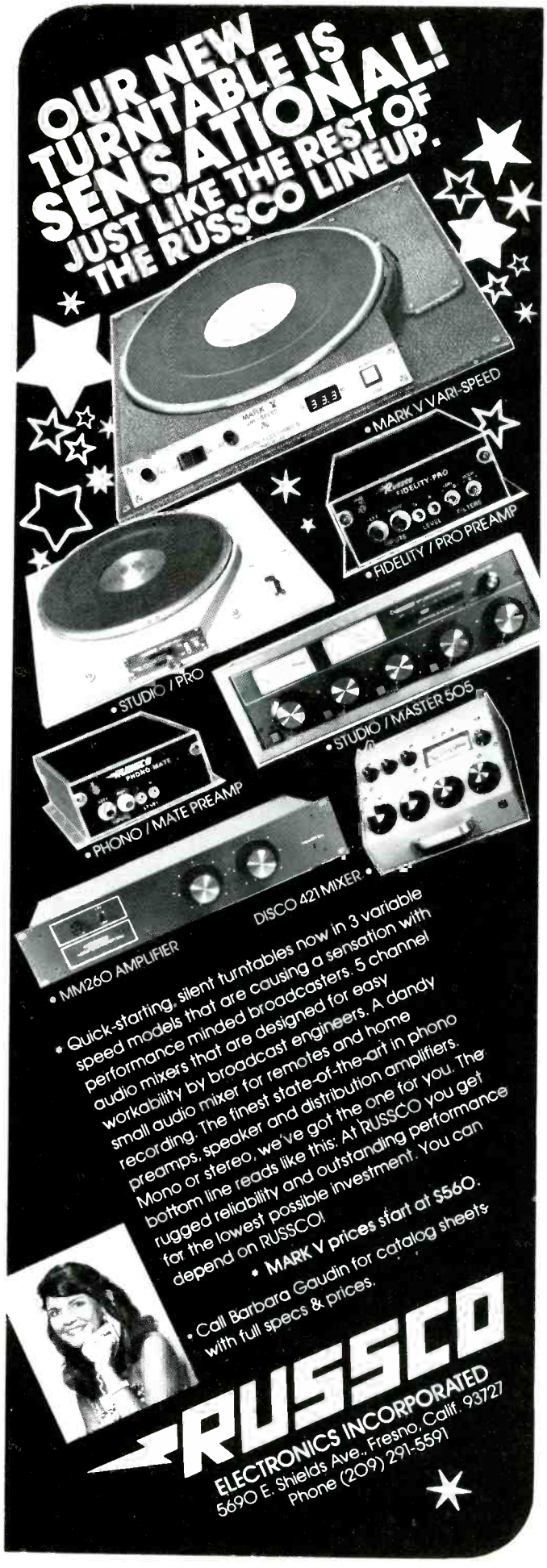

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AM Stereo

carrying the broadcaster's signal from studio to transmitter, the cost would certainly be quite moderate. And the technology is fully developed, with equipment that has been on the market for nearly a decade that puts FM radio programs on the local cables in many parts of the country.

Officials of cable companies questioned by *BM/E* all agree that the job is technically easy and would be welcomed as additional business. None had thought about it before *BM/E's* approach and thus had not developed any specific ideas of charges; but these would certainly be within the budget of almost any radio station.

At least two firms, Catel and Tomco, have long-established lines of modulating and demodulating equipment specifically designed to put radio programs on cable television. Frank Genochio at Catel told *BM/E* his units are used by at least a score of cable systems, not only for putting FM stereo programs onto cable but also for data, video, and other material. In general the scheme is to put the program onto a carrier that can be used readily by the cable company; for stereo, the system may use a composite signal or two separate signals multiplexed onto the carrier. There is great flexibility in choice of carrier frequencies, modulating methods, etc., since any technically favorable carrier frequency can be used on the cable. A broadcaster using the method would need both modulating and demodulating units; total cost could be on the order of $1000 to $2000.

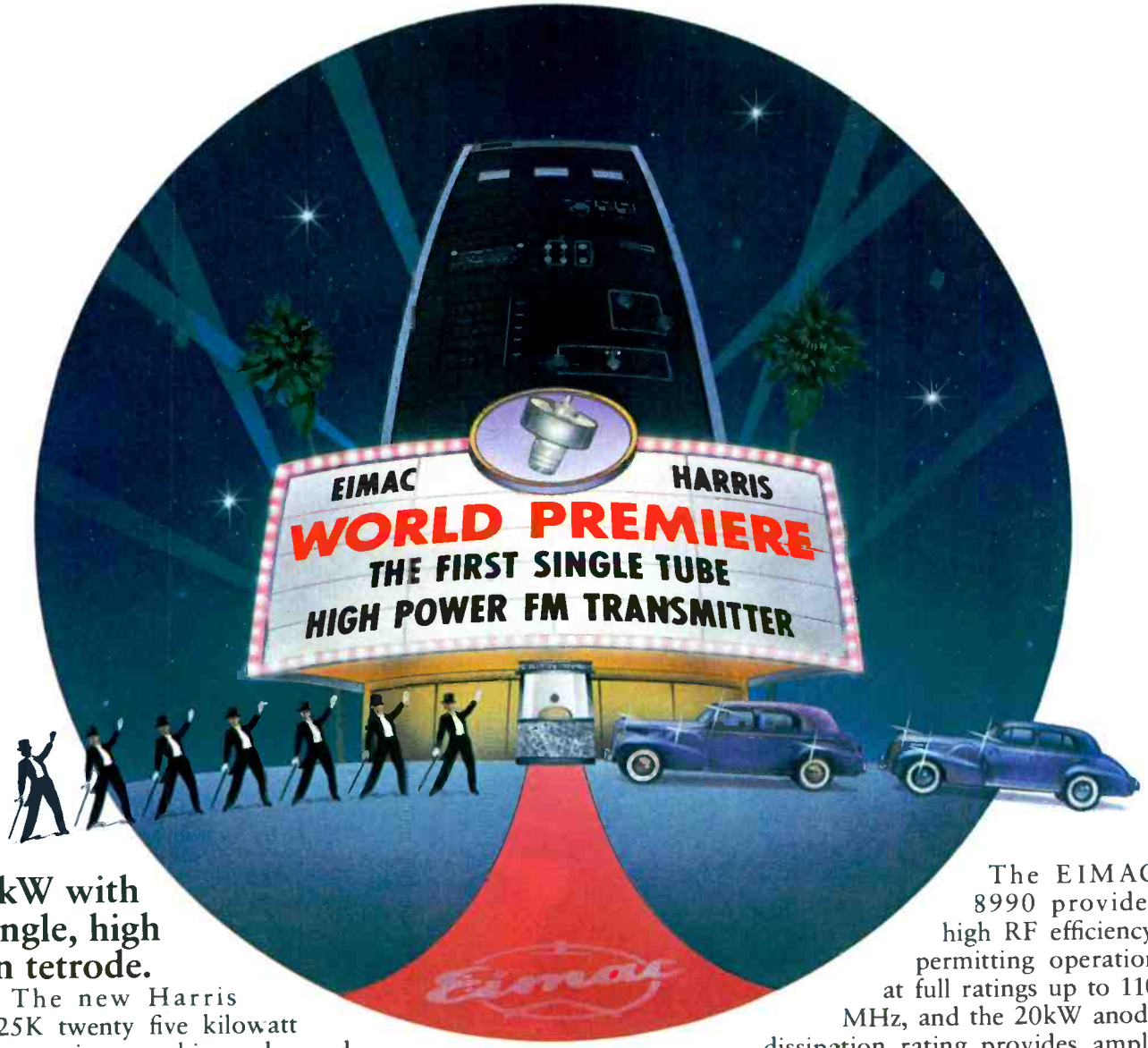
Harold Null, vice president, engineering, for Storer Cable in Sarasota, Fla., said that carrying an AM broadcaster's stereo signal would be technically routine for almost any cable company. Although the possibility had not been discussed in his company, he said Storer would certainly be glad to get the assignment. "We are in the communications business and the more of it we can do, the better," was his summation. He said that Storer was already using Catel modulating and demodulating equipment for various purposes. To indicate the kind of thing that could easily be done, he said one attractive way to put the AM stereo programs on the cable would be to FM-modulate them onto a carrier at the top of the FM band, say at 108.1 MHz; the equipment is all in hand for this.

Ron Simon, chief engineer of Teleprompter, confirmed these ideas in full. He pointed out that Manhattan Cable (the company dividing Manhattan with Teleprompter) is already using Catel modulating equipment to carry data for banks in New York, a service attracting a lot of industry notice when it started a few years ago.

Richard See, chief engineer for the Massachusetts area for Warner Cablevision, agreed that there were no technical problems in the scheme. He too said that his company would undoubtedly welcome business from AM broadcasters, although the subject, again, had not to his knowledge come up.

BM/E's conclusion is that the AM broadcaster *will* be able to solve his STL-stereo problem, but only if he gets after it at an early date: waiting until he is just about ready to go on the air is likely to lead to disaster. Each radio management should decide early which path is best for the station: helping push the FCC for more RF spectrum; opening negotiations with the local cable television operator; joining with other stations on a telco video line or a fiber optics installation. Any of these might supply a road from studio to transmitter. **BM/E**

EIMAC's new 8990 tetrode premieres in Harris' FM-25k.



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Complete specifications on the exciting new FM-25K transmitter are available from Harris Corporation, Box 4290, Quincy, IL 62301. And complete data on the 8990 power tetrode is available from EIMAC, Division of Varian, 301 Industrial Way, San Carlos, CA 94070. Telephone (415) 592-1221. Or contact any of the more than 30 Varian Electron Device Group sales offices throughout the world.

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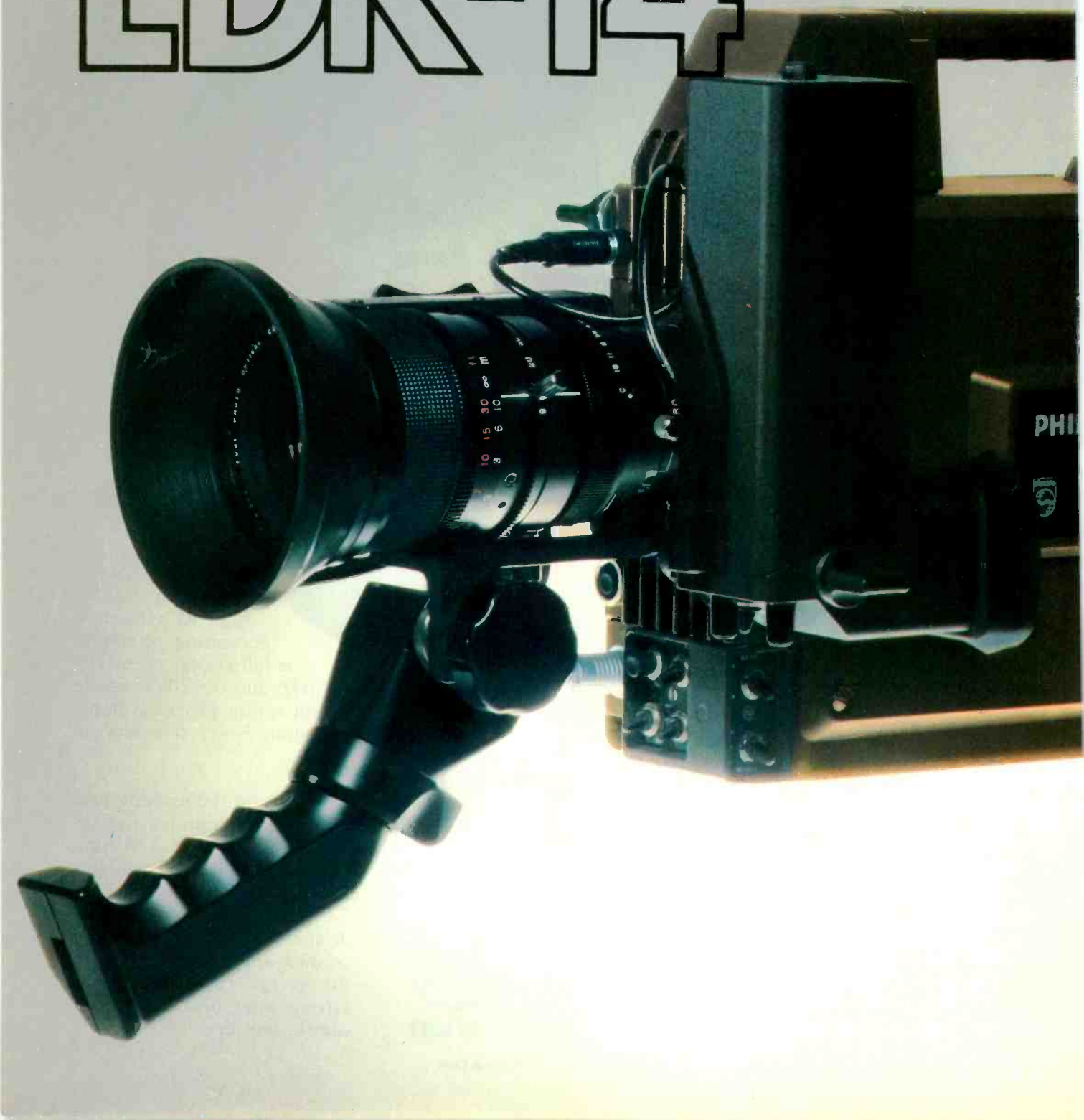
New Standard for Portables...

LDK-14



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1977...Video 80 An innovation in lightweight camera and production system...**LDK-15L** Latest version of the LDK-15.

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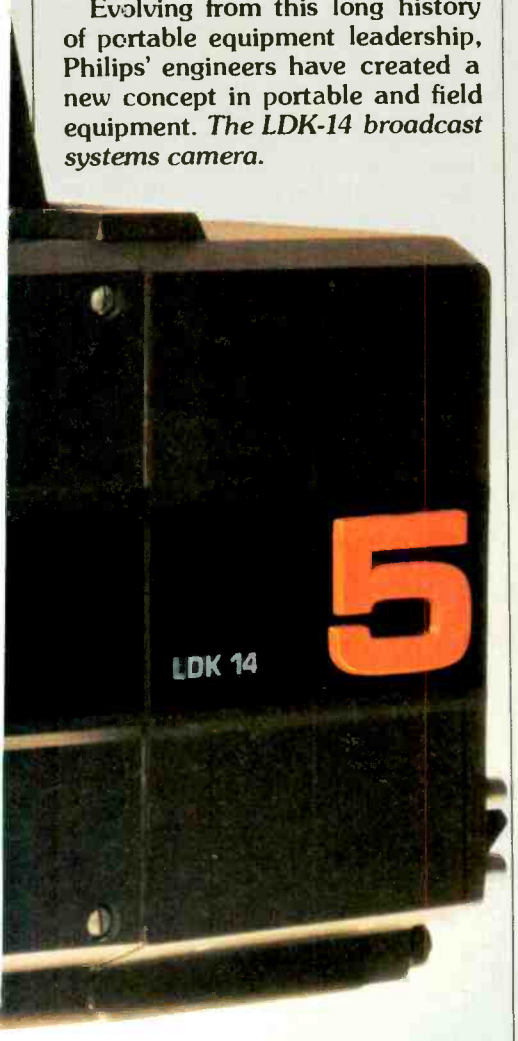

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2. *EFP*—studio quality portable, with remote control: timing and phase adjustable gen lock; instant convertibility to studio camera use by simple change of viewfinders.
3. *Studio*—compact, maneuverable; full broadcast quality; 5" viewfinder.

The LDK-14 combines innovative design and unique capabilities in a state-of-the-art 2/3 inch camera that is *much lighter* and *uses significantly less power* than the competitive ENG-only camera. Plus the LDK-14 gives you additional advantages in size, picture quality, stability, maintainability and cost.

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- Viewfinder displays include: contour enhanced camera picture or external video signal; status monitors for video level, color balance, bars on, battery discharge, VTR functioning, intercom call and camera tally.
- Automatics include: color balance; white and black level; centering; noise reduction when operating with extra gain; auto iris with set and hold facility.
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RTNDA Faces The Challenge Of Technology In More Ways Than One

BROADCAST NEWS is probably one of the fastest-growing areas of the industry, and the 34th Annual International Conference of the Radio Television News Directors Association confirmed this with its largest gathering yet. But the optimism of the 1459 delegates in attendance was restrained by the grave concerns raised by setbacks to journalistic freedom in the courts and the growing complexity of reporting the news in the nuclear age.

While the news departments of radio and television stations have increased their importance and have been rewarded with bigger budgets, bigger staffs, and, often, more air time, life for news directors has become more complicated. Recent surveys show that few broadcast professionals change jobs more frequently than news directors — and often, that change is made at the request of station management rather than voluntarily. RTNDA president Curtis Beckman (WCCO-AM, Minneapolis, Minn.), who organized the conference as RTNDA's president-elect, took notice of this by devoting all day Saturday to a "Management Training Day." The management sessions, it was hoped, would be just the beginning of a continuing education process that Beckman sees as badly needed now that news directors find themselves responsible for large staffs, large budgets, and ultimately ratings. One session that was offered on both the morning and afternoon programs gave participants some ideas on how to cope with stress.

Stress on today's news director, however, comes not only from the pressures of management but also from the changing position of the press in and before American courts. While the organization's First Amendment report was able to note advances for electronic journalism in gaining access to the courts for its reporters and equipment, those portions of the report dealing with judicial decisions gave a far dimmer view of press freedom.

Howard K. Smith, in his keynote address, reflected on what he called "the assault by the American judicial system, headed by the Supreme Court, on our freedom to report the news." In a series of court cases that have resulted in the approval of 500 subpeonas of reporters' confidential notes in 1978 alone, the legalization of searches and seizures in newsrooms, the legitimization of inquiries into journalists' state of mind in libel cases, and now even the closing of trials and pretrial proceedings as a result of the Gannett v. DePasquale decision, Smith noticed what he called a "Nazi-like" trend.

As dismal as this trend is, Smith noted that the best defense of press freedoms lies in a reliance upon "our simple, beautiful First Amendment," and cautioned against seeking protective legislation, which could be the precedent for harmful legislation.

Paul Davis, immediate past president of RTNDA and news director for WCIA-TV, Champaign, Ill., commented during the First Amendment Report, "perhaps we should ban the word 'privilege' " from association with the word "press" when discussing the First Amendment. Instead, Davis, as chairman of the First Amendment Congress — a confederation of press organizations — will enlist new groups of non-press organizations in a series of projects that seek to educate the public to its stake in the First Amendment.

Technology flying high

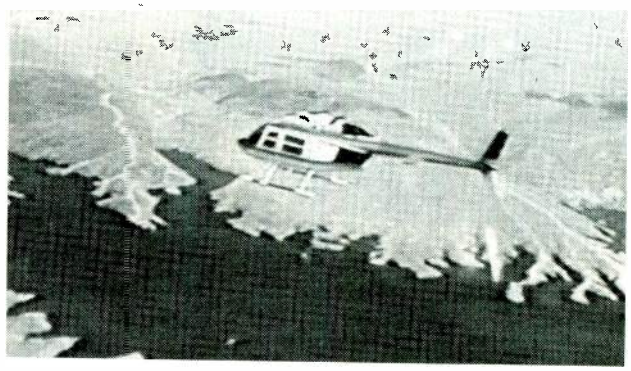
While news directors as journalists remained vigilant in their pursuit of First Amendment rights, they also pursued better tools with which to do their job in a modern age. Nearly 60 exhibitors displayed their equipment and services at this year's Las Vegas conference site. The single category of equipment that gathered the most attention was airborne microwave systems.

Competition among microwave system manufacturers was intense and often resembled a genuine dog-fight. Bell Helicopter provided a ringside seat for spectators through a bank of monitors that displayed the performance of one system after the other. Tayburn Electronics of Carlsbad, Calif., and Microwave Associates of Burlington, Mass., were the prime contenders at this exhibit, but the presence of airborne units from Phoenix's KOOL-TV (a Microwave Associates' system) and KPNX (Tayburn-equipped) created a genuine tag team.

Nurad and Farinon microwave gear was also represented in various exhibits, though neither company was there as an official exhibitor. Though Bell Helicopter could boast that it was the only helicopter company in the air for this engagement, Enstrom Helicopter showed a sleek little contender as part of the Microwave Associates exhibit on the convention floor. The Enstrom chopper was a small two-seater equiped with a M/A 2 GHz microwave transmitter backpack system and, while much smaller than the Bell Jetranger, it also had a smaller price tag of $100,000 to $120,000, as compared to the $225,000 to $250,000 Jetranger.

Al Buch, KPNX news director, provided some insight to the actual cost of an airborne operation in his presentation during one of the sessions. Buch said that his system, which consists of a Bell Jetranger, complete avionics, various two-way radio systems, and police, fire, and other emergency frequency scanners, costs upwards of $300,000. Depending on how extensive a microwave system is used, costs for the entire package could run between $450-500,000.

Internally, Buch budgets the helicopter operation at $115 per hour and operates the system 60 hours per month on the average. This amounts to an annual operating budget of about $83,000 and includes the production of a cash re-



KPNX Bell Jetranger helicopter beams back signals to convention site using Tayburn microwave system

Newscom from Station Business Systems was one of four computerized news editing and writing systems on view at RTNDA

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RTNDA Challenge

serve for maintenance of the aircraft.

The salary for the pilot is somewhat harder to pin down. In KPNX's case, the pilot, Jerry Foster, does a lot more than fly. He reports, operates a camera, and has become a local media star. Buch showed a promational tape of their airborne system, dubbed "Sky 12," and it was apparent that Foster cuts a wide swath in the air space of Phoenix with solid reporting, exciting pictures, extraordinary rescues, and impressive flying. In response to a question from the floor, Buch pointed out that he's got an ironclad contract with Foster and Foster gave the impression that Phoenix is his home for keeps. Idiosyncracies aside, a pilot will cost between $25,000 to $50,000 per year.

The microwave systems themselves differed primarily in approach. Tayburn's system includes an Auto-Tracker ground station that orients itself to the incoming signal automatically while Microwave Associates relies on the hemi omnidirectional transmission pattern of its antenna. Both companies agree that such systems depend greatly on topographical considerations and other variables for each station so that a good deal of the ultimate design is customized.

While the cost of such systems is obviously sizeable, some news directors consider it manageable since the "telicopters," as Buch calls them, can compare favorably to the cost of operating and maintaining several electronic news bureaus in a far-flung ADI. Moreover, while news bureaus require that the news director pinpoint the most important areas of his region, the telicopter can be dispatched to any point quickly. Apparently, this notion has not gone unnoticed. There are currently more than 30 such telicopters in operation around the country at radio and television stations. No one seriously challenges the ability of these telicopters to give a station's news operation a highly visible public presence.

Computers in the newsroom

Now that electronic news gathering has become an accomplished fact at many stations, electronic news management (ENM) is on the way. At the least, a number of companies believe that ENM is on the way. Four different companies arrived in Las Vegas with impressive computer systems designed to give broadcast journalists the benefit

TMI: When Technologies Collide

Within a few hours of alarms sounding in the control center of Metropolitan Edison's Three Mile Island Nuclear reactor facility near Harrisburg, Penn., media descended on the site filled with questions and anxious to report answers to a worried public.

The RTNDA asked itself this question in one of the conference's most interesting sessions: "Three Mile Island: Did We Make It Worse Than It Was?" Present on the panel were the governor of Pennsylvania, Richard Thornburg, director of the Office of Nuclear Reactor Regulation, Harold Denton, a representative of the nuclear power industry, Warren Owen, and three members of the press who covered the TMI accident.

The general conclusions of the discussion were that the media did a good job of covering a difficult story but that the job could have been better. The toughest problem faced by all parties, including the governor of Pennsylvania and Denton of the Nuclear Regulatory Commission, was getting timely and accurate information as to what was really going on inside the reactor facility. The major thing that prevented accurate information was the absence of on-site personnel with knowledge of the industry and the ability to communicate that knowledge to others.

Part of this problem was also a lack of understanding on the part of the media for the very complex technical issues involved in the nuclear energy industry. Language was complicated, consisting largely of jargon that was difficult to translate into common, everyday terms that would help the public understand what was going on. The panelists did give the media credit on this account for quickly acquiring the services of outside scientists to help them understand the implications of what they were being told by power company representatives.

Technically the media performed very well. The public telephone system was quickly jammed with telephone conversations by local citizens trying to reach families outside the region. Electronic news gathering equipment, including microwave and two-way radio, quickly provided alternative means of communication for the media. The few available telephone lines of video grade were taken over by the national networks, but cooperation between them and the local news media was rated outstanding.

The panel concluded that in future circumstances, the industry will be better prepared to communicate with the media, the government will attempt to be better informed before commenting on emergencies of this magnitude, and the media will try to learn more about the highly complex issues of nuclear energy and will prepare to obtain outside scientific expertise when such crises arise.

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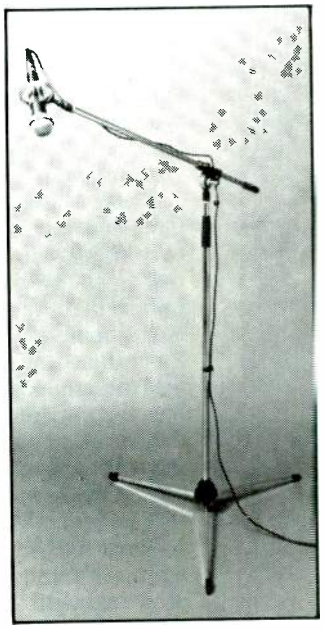

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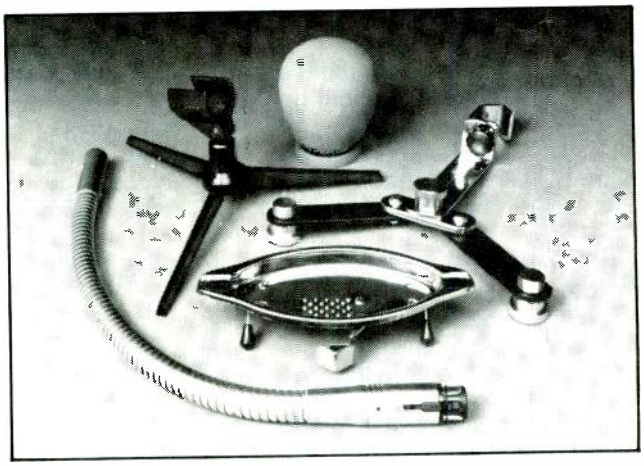

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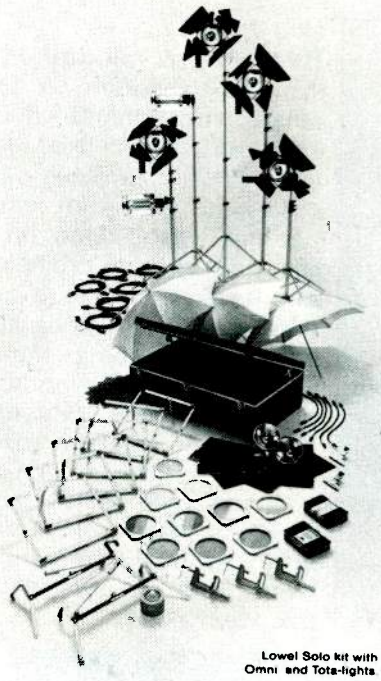

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RTNDA Challenge

of modern word processing and information management.

In general, these systems permit news writers to compose their stories on typewriter-type keyboards with output registered on an associated CRT. Software controls the format of the readout and also permits the writer to edit the copy along several guidelines. That is, a writer may change a letter, word, sentence, or paragraph by adding, deleting, or moving the element. Any resulting change affecting adjacent words, sentences, or paragraphs in terms of spacing is automatically accommodated.

These systems differ from the computerized text editing systems common to print journalism in that the basic format is arranged for broadcast delivery rather than the typesetting process. Additionally, many of the systems keep a constant time count on the copy so that the producer can have an accurate idea of how long the story will take to deliver. Notes and instructions regarding collateral material are also provided so that the newscaster knows if there is film or video associated and what that material is. Scripts designed for the producer's and director's use are also produced with information pertinent to their functions.

The management aspect of such systems involves the ability of the editor to monitor the stories through his own CRT as they are developed for air, the connection of such systems to wire services so that instant access to these sources is available to writers, and various schemes for an "electronic notebook." The notion of the electronic notebook is that all information input into the system is given a "slug" so that comments relevant to any story can be accessed quickly by a writer regardless of whether he or another reporter entered the note. Various archival files allow reporters access to all past stories and information contained in memory on a wide range of topics.

Some of the systems interface to teleprompters so that completed stories can be electronically routed and displayed direct to the newscaster. In a sense, the object of the systems is to eliminate paperwork wherever practicable.

Some of the systems came from companies already familiar to broadcasters such as Station Business Systems, Jefferson Data Systems, and McInnis & Associates, developers of Weatherscan.

Newscom, from Station Business Systems, is one of the most complete systems offering a full range of the features mentioned. To avoid "culture shock" to a newsroom long accustomed to typewriters, newswire printers, files, etc. — all of which would be replaced by the Newscom computer — the system is available in three modular stages.

The system is completely in-house and can be configured as a standalone or in an ARC (Attached Resource Computer) design depending on the economics of the station. Training, installation, software and hardware support are all parts of the offering.

The Jefferson Data system, known as ENP (Electronic News Processing), is similar in terms of completeness but uses IBM computers, based on the theory that IBM offers a greater degree of field service. All of the systems, however, use brand name computers and offer field support. ENP was designed by Jefferson Data in cooperation with the WBTV, Charlotte, N.C., news operation.

TvNS (Television News Support System) is a product of Slyboom, Inc., of New York City, and it too offers the wide range of information management features designed for broadcast. This system is also in-house and falls into the same price range as its competitors, about $100,000. TvNS, however, is anxious to get its system into some actual newsroom situations to prove its capabilities and is offering the system to pilot stations for $85,000.

Basys offers its system, "News Fury," with a complete list of software features including preparation of the "director's script" with cues. It is somewhat smaller in scale, however, offering just eight terminal positions rather than 32, typical of the larger systems. Up to 40 terminals for "News Fury" will be available in early 1980, according to the manufacturer.

Newscan is yet another complete package offering computer-generated graphics for weather information as well as the other newsroom features. This system is designed to be used in conjunction with the Weatherscan graphics of maps, temperatures, sports graphics, bar charts, etc. In this case, the NTSC color output is designed for on-air display as well as internal uses. This system, utilizing the Hewlett Packard 1000 Computer System, sells for nearly $140,000 plus a monthly maintenance and support fee.

As sophisticated and powerful as this new technology for news is, the problems of journalism remain. While these tools certainly increase the efficiency of news, technology itself is news and presents its own problems. The session on Three Mile Island helped to outline the problems of reporting highly technical issues (see box, page 000). The general thrust of the RTNDA's 34th annual conference clearly indicated that while the tools of the trade have never been better, the job of electronic journalism has never been more important or difficult. **BM/E**

Direct drive made Panasonic Series 9000 a great 3/4" editing system. Here's what makes the new 9000A an even better one.

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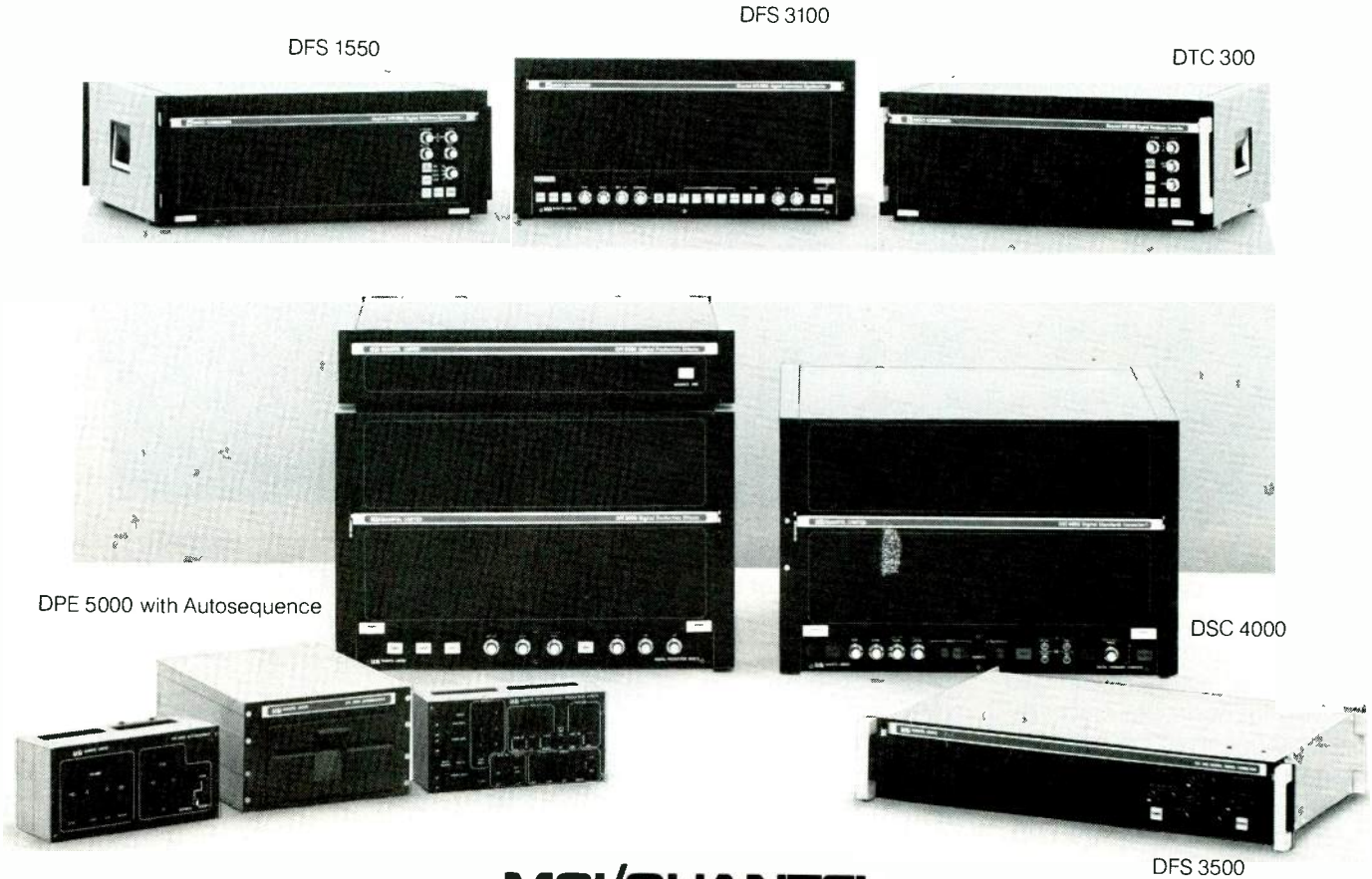

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CBS-EIA ISSUE TELETEXT RESULTS

AT PRESENTATIONS in Washington, D.C., and at KMOX-TV, St. Louis, Mo., CBS and the EIA's subcommittee on teletext issued interim reports on progress towards an NTSC-compatible system of broadcasting alphanumeric and graphic data through use of a portion of the vertical interval. According to Joseph Flaherty, vice president of engineering and development for CBS Television Network, the initial testing period has yielded significant information on both the potential and limitations of teletext in the NTSC system.

Clearly, the primary result of the CBS-inspired tests, conducted at KMOX-TV, was proof that modified versions of the United Kingdom systems (CEEFAX/ORACLE) and the French system (Antiope) can work successfully in the NTSC domain. The purpose of testing these systems was to prove that a U.S. system of teletext could be established based on the experiences and technology already developed abroad so that, as Flaherty put it, "we would not have to reinvent the wheel."

The importance of successfully modifying the European systems was explicit since they were designed to operate in a transmission scheme that has a 7 or 8 MHz bandwidth and 625 line/50 field scanning as opposed to the 6 MHz, 525 line/60 field scanning approach used here. Moreover, since the principal broadcast band used in Europe is UHF while the U.S. uses both UHF and VHF bands, differences in multipath interference and impulse noise energy from cars, appliances, and power lines can increase errors. The problem of errors, or bit error rate (BER), is critical because teletext is a digital transmission system in which errors will result not in some subjective effect like ghosting but rather in an objective error such as the misspelling of a word or the generation of a wrong number.

Clearly, if teletext were to provide services such as stock exchange information, improper numerical data could lead to a serious miscalculation on the part of a stock buyer or seller.

In order to avoid such serious errors, a U.S. teletext system might need a lower data rate and more complex and expensive error correction circuitry, resulting in a severe cost/benefit impairment.

The presentation in Washington, D.C., attended by *BM/E*, clearly showed the need for error protection

The "cover" of the KMOX-TV teletext magazine using the Antiope system

Underscan monitor shows data of teletext transmission contained on four lines of vertical interval

and correction. Any approach to the problem that would result in a data rate reduction would seriously impair page access time, the time spent waiting for a page to appear after it has been requested.

Receiver's role demonstrated

In the course of the field tests conducted at KMOX, the transmission of teletext had to be shifted from lines 13, 14, 15, and 16 of the vertical interval to just lines 15 and 16. This was necessary when reports from station personnel and television service shops in the testing area reported interference to the picture signal from the teletext data on lines 13 and 14. Statistically, this interference was reported on about 11 percent of the receivers involved and attributed in large part to the widely varying quality of different receivers in response to the retrace time interval.

William G. Connolly, managing director, development for CBS, who delivered the field test progress report, stressed the burden that a viable teletext system will place on TV receiver manufacturers. In addition to better per-

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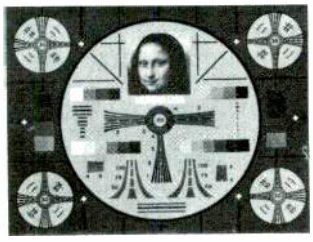

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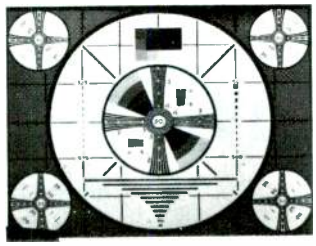
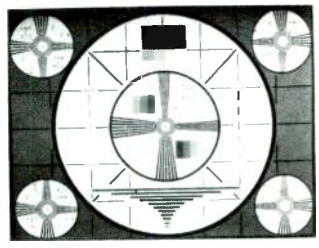


- Model 525A11 Picture (Models 525A11H and 525C11H picture is the same, except for the resolution.)



Since the signal is generated electronically, there is no deflection distortion or unstability such as that of the conventional monoscope camera
DRC (Digital Rise time Control) system generates the same picture quality as a camera
One-source generation system assure accurate horizontal resolution
APC system in the same, constant picture size generates a perfect measurement signal
Masterpiece that will not change in the future. You can select this pattern with confidence
Simple maintenance plug in unit system
Same Picture as a conventional monoscope up to letters.
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CBS-EIA Results

formance regarding vertical interval retrace time, receivers manufactured for use with teletext may need to include a time-domain adaptive equalizer system in order for the data rate to remain high while the bit error rate stays low.

Robert O'Connor, also of CBS, who chairs the EIA BTS Subcommittee on Teletext, pointed out that Task Force D of the subcommittee has been checking into the development of such an adaptive equalizer. So far, they have found that though the device is simple in concept, it may be expensive to implement in a consumer product. Recent advances in semiconductor technology development are the only indication that such a device might be possible. Pending further development, the task force might be able to at least recommend a "training pulse" and a position in the vertical interval that might make use of the device when and if one is developed.

The demonstration

CBS prepared a demonstration for the Washington presentation based on its continuing KMOX experiments. Only the French Antiope system, which CBS appears to be leaning toward for a variety of reasons, was demonstrated in Washington, though another demonstration scheduled for KMOX later in September would also show the CEEFAX/ORACLE experiment results.

Two teletext magazines of 25 pages each were designed for the demonstration. Each magazine had its own table of contents and the viewer could select either of the two index pages. From the table of contents, the viewer selects a particular subject, and a subject page is then displayed which contains its own index. For instance, if magazine "A" were selected, its table of contents might show sports information on page 14. When page 14 appeared it would advise the viewer that baseball scores were on page 15, football on 16, league standings on 17, and so on. The viewer would then select the page with the desired set of details.

Since all teletext data is transmitted serially, the receiver must contain some storage so that the data requested can be stored (collected) and displayed. Future teletext sets may very well offer different storage capacity and peripheral features in different price ranges.

The data rate thus effects access time to individual pages and the writing time on those pages. When teletext data exist on four of the VI lines, access to any page is just over a second, even when the page called for has just passed and time must be allowed for the system to cycle through to that page again. But as the demonstration reduced the number of lines on which teletext was transmitted, both writing time and access time became seriously extended to the point where waiting for a requested page became annoying.

Obviously, waiting time is also a function of how many pages are being transmitted, so that reducing the time could be accomplished by reducing the number of pages. This route would clearly affect the usefulness of the system.

Technical problems can be solved

While the CBS-EIA experiments, which also involve tests previously conducted at KSL-TV, Salt Lake City, clearly indicated that a teletext system can be workable in NTSC, numerous bugs remain to be worked out before the full potential of teletext can be reached. These problems include the development of an ideal data bit rate, pulse amplitude and shape considerations, and the identification of the specific line of the vertical interval on which teletext should be located.

Other considerations that are being examined include the evaluation of a set-top adapter, the development of an adaptive time-domain equalizer, the effect of long distance network transmission, the effect of reception of teletext through CATV systems and translators, and considerations relating to home VCRs and large-screen projection systems, which tend to effect the retrace time functions.

Throughout these areas the concern is clear that standards need to be adopted that will allow early systems to be "upwardly compatible" — that is, a range of standards that allow for future developments without becoming themselves obsolete.

Non-technical considerations

While the KMOX experiments, the KSL experiments, and the various task forces of the EIA subcommittee focus exclusively on the technical issues, little is known or is being done to determine the commercial viability of teletext.

CBS Broadcast Group president Gene F. Jankowski, who was present at the demonstration, was clearly optimistic about the potential offered by teletext but admitted that little if anything had been done to research applications of the system from a marketing standpoint.

In fact, the presence of teletext in the broadcast structure offers at least one knotty problem. Though it is conceivable that HUT levels might rise as viewers use their TV sets to get teletext, will they also turn to teletext during commercial breaks? **BM/E**

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RADIO DEREGULATION PROPOSED IN MAJOR FCC ACTION

LARGE-SCALE deregulation of radio is the subject of sweeping proposals issued in early September by the FCC. The Commission at that time began an inquiry proceeding to determine whether it should scrap long-standing regulations governing nonentertainment programming, ascertainment of community needs, commercial time limits, and program log requirements. (For a discussion of some legal aspects of the deregulation proposals, see this month's FCC Rules and Regulations column on page 104.)

The rulemaking, which applies only to commercial radio licensees, was sparked by the FCC's realization that the radio industry has changed dramatically since the adoption of the current Communications Act in 1934. Specifically, the Commission cited the increase in stations from 583 in 1934 to over 8600; the number has almost doubled since 1960. This rapid growth has allowed many specialized formats to flourish. In addition, the FCC cited its own data showing that most radio stations substantially exceed the minimums for nonentertainment programming, and many air fewer commercial minutes than currently allowed, even in small markets.

Based on this information, the Commission has suggested that marketplace forces are now sufficient to regulate commercial radio — something radio broadcasters have been arguing for some time.

The Commission stated that the rulemaking procedure "reaffirmed its commitment to regulate only to the minimum amount necessary to foster broadcast services that maximize the well-being of the consumer." The deregulation proposals apply to markets of all sizes, not just the large markets that had previously been considered for a deregulation "experiment."

The FCC noted, however, that it fully intended to retain the public interest standard and "would reenter the marketplace" if it found that marketplace forces were insufficient to insure the public interest. It pointed to "increased enforcement" of policies encouraging nondiscrimination against women and minorities in employment and incentives to expand minority ownership as ways to "help redress any remaining marketplace imperfections." Also explicitly stated in the notice of proposed rulemaking was retention of the Fairness Doctrine.

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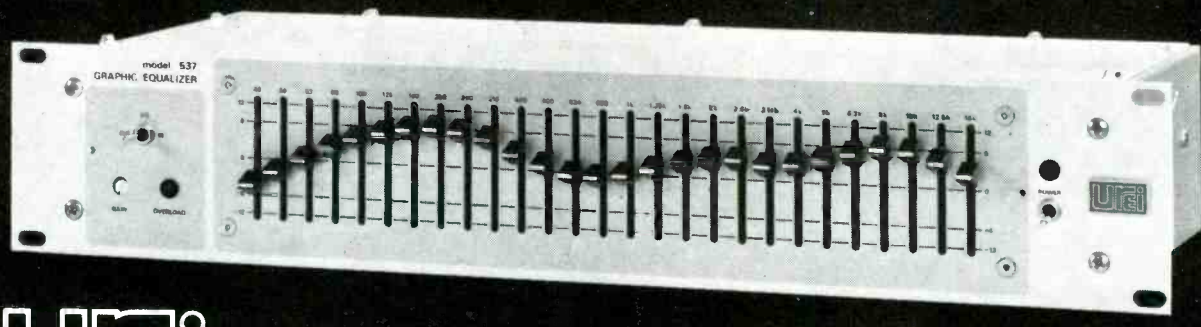

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Noting a "wide range and variety of options for deregulation," the Commission outlined several deregulation proposals for each area under consideration. In all cases, the first proposal and the one that the Commission prefers involves removing all regulation; the last, and presumably least desirable, is to leave regulations as they presently stand.

A major thrust of the Commission's effort is a switch from considering compliance with the public interest standard by individual stations to considering it on a market-wide basis. While this would be pleasing to broadcasters, there is doubt on the part of some Commission members that it is actually legal. The Communications Act, as it now stands, requires the FCC to monitor stations on an individual basis. Both Chairman Charles Ferris and Commissioner James Quello made note of this problem and urged Congress to pass legislation permitting radio deregulation.

Ferris, speaking by satellite to the Southern Cable TV Convention in Atlanta, reiterated his plea for Congressional action, saying that even "a one-line piece of legislation saying the FCC doesn't have to regulate if market forces prevail" would be sufficient to insure the hoped-for deregulation actions.

In another speech, he pointed to promotion of minority ownership of broadcast stations by the FCC and the industry as having played a major part in the Commission's decision to propose deregulation. Ferris told the National Association of Black Owned Broadcasters and the NAB, "I based my vote [for deregulation] in part on the dramatically changing radio marketplace, which includes a new influx of minority owners and minorities in significant jobs." He continued, however, ". . . for any form of deregulation to work well, we must remain committed to keeping the marketplace competitive, and continuing to increase its capacity to respond directly to consumer needs," a point previously made in a separate statement he issued with the notice of proposed rulemaking. Ferris stated that other areas of regulation, especially EEO enforcement and promotion of minority ownership, will "become even more critical" with deregulation.

Several other Commissioners also issued separate statements. Commissioner Quello, calling the action "an important first step toward deregulation of radio broadcasting," stated that "the marketplace is a very good regulator . . . the marketplace and public acceptance, not regulation, is responsible for advancing the radio broadcasting industry in this country to its present preeminence in the world." He and Ferris were the most unstinting in their support for total radio deregulation. Quello, in fact, called for the elimination of the public interest standard, which he termed "nebulous, troublesome and outdated," and of the Fairness Doctrine. Broadcasting, he said, should be subject to "exactly the same regulations and First Amendment constraints as its major competitor and closest cousin — newspapers." He also called for the establishment of a "practical" spectrum usage fee.

Not all the commissioners were willing to go as far as Quello or even Ferris. Commissioner Abbott Washburn concurred with the proposals to deregulate ascertainment and nonentertainment programming, but disagreed on commercial limits. Claiming that abandonment of the restrictions would lead to a gradual increase in the number of commercial minutes per hour, Washburn said, "I am convinced that the public *expects* the FCC to involve itself in commercialization." He also expressed his opinion that some form of

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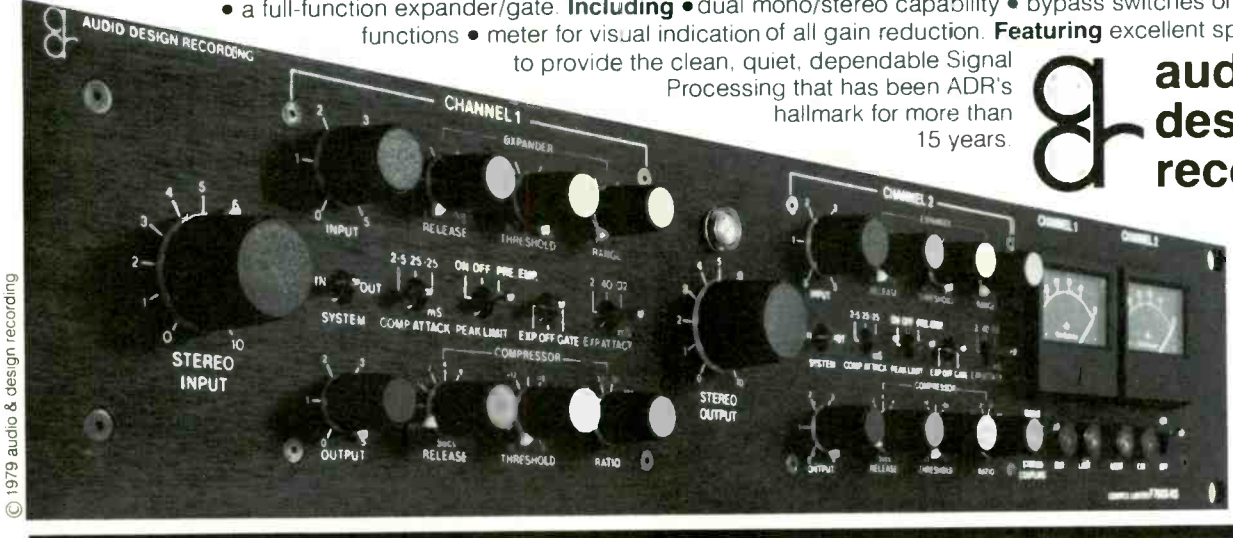

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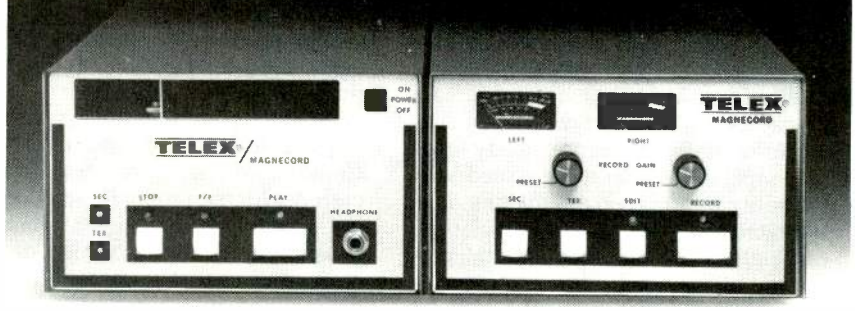

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Radio Deregulation

ascertainment was needed, but that it should be greatly simplified and streamlined from the present "detailed, complicated, and time-consuming" process.

Commissioner Tyrone Brown, in a lengthy separate statement, applauded the efforts toward deregulation of radio, but was emphatic in stating that the public interest standard must not be abandoned. In that vein, he expressed reservations about removing regulation of nonentertainment programming, stating that the marketplace may not be able to insure that listener groups that are not "large enough to attract a market response to their program preference" get a voice on the air. "I am particularly concerned," Brown continued, "about discussion of issues in their embryonic state — before they reach the level of 'controversial issues of public importance.' " He asserted, "if we completely eschewed oversight of informational programming, I would expect to see many more complaints filed under Part 1 of the Fairness Doctrine." As an alternative to total deregulation in this area, Brown proposed that radio stations be required to air a fixed minumum percentage of local public service programming.

Broadcasters, as expected, applauded the deregulation move. The NRBA has established a task force to study the proposals and prepare comments detailing the association's position; a preliminary statement called the FCC's action "encouraging," but pointed out that the Communications Act "prohibits the FCC from changing some of the most onerous and inequitable regulations which afflict our industry. Only legislation enacted by Congress can achieve true deregulation . . ." NRBA pledged to continue fighting for such legislation.

NAB president Vincent Wasilewski, quoted in *Television Digest*, said, "NAB is pleased with the decision . . . and we are very optimistic concerning the outcome of this proceeding. For the first time, radio appears to be on the brink of being allowed to prove that the public can be best served in the free and open marketplace."

Predictably, though, some consumer advocates found the prospect of deregulated radio objectionable. Ralph Nader, long noted for outspokenness on consumer issues, called the FCC "clearly one of the worst regulatory agencies in Washington." He blasted the proposal, saying that it "further entrenches federally protected monopolies for a few hundred corporations at the expense of 220 million Americans."

Comments are due sixty days from the issuing date of the notice. **BM/E**

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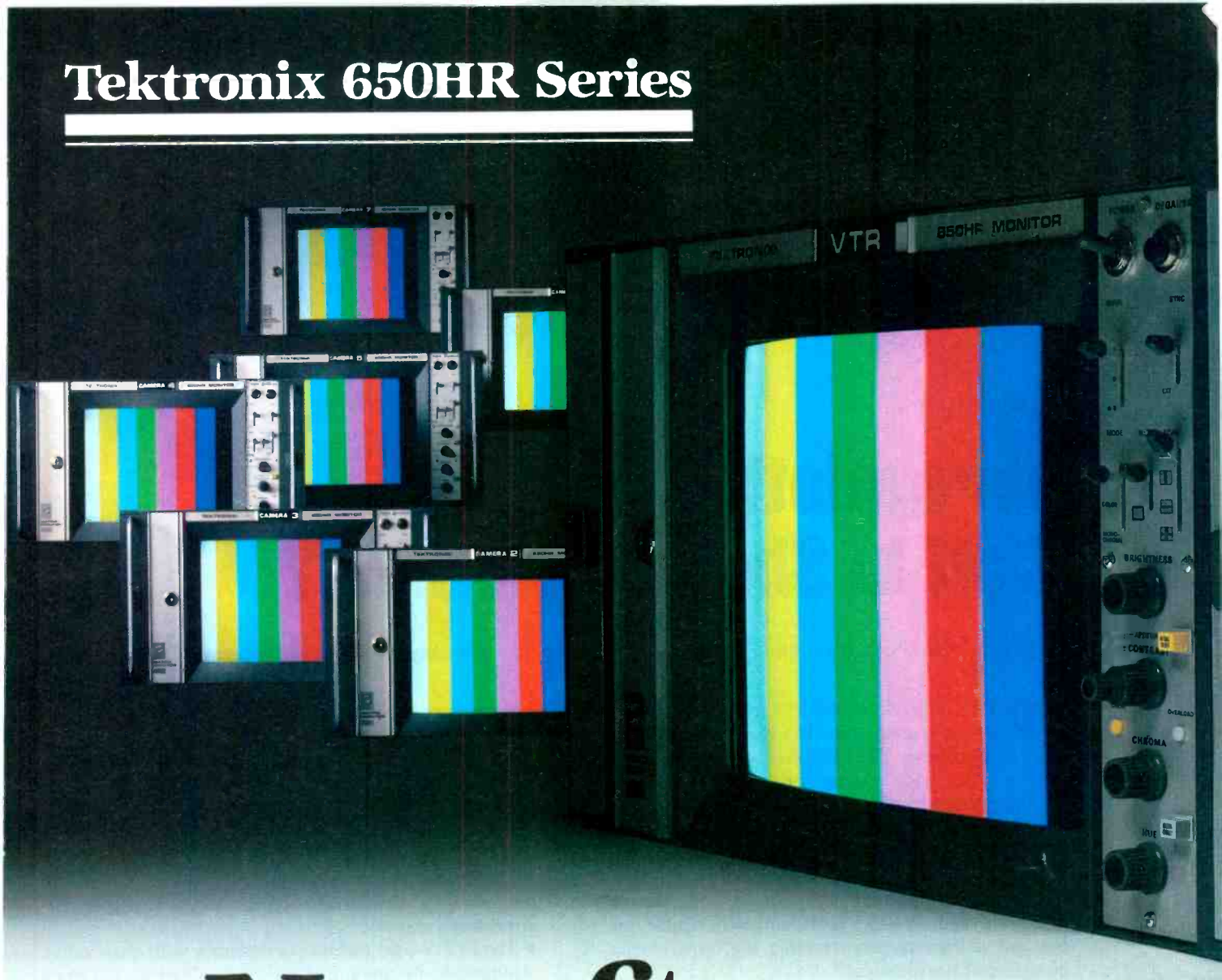

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INTERPRETING THE FCC RULES & REGULATIONS

Deregulation Of Radio: Wolf In Sheep's Clothing?

By Frederick W. Ford and Lee G. Lovett; Lovett Ford and Hennessey, P.C., Washington, D.C.

RADIO DEREGULATION FCC-STYLE might well mean more headaches for broadcasters than the Commission would have us all believe. The Commission voted last month to begin a major, wide-ranging review of radio regulations.[1] The proposed rule changes in the regulations include (1) the elimination of the FCC from consideration of precise amounts of nonentertainment programming; (2) the elimination of all requirements regarding the methodology in ascertaining community needs; (3) the elimination of current regulations on actual commercial time; and (4) the end of current programming log requirements for commercial broadcasters.[2]

These proposals represent the latest attempt to deregulate the broadcast industry. Some have argued that although the FCC should be commended for its attempts to do so, these present proposals have confused the simplification of procedures with deregulation. The opponents of change argue that nowhere is the confusion more apparent than in the proposals for the elimination of the quantitative requirements for nonentertainment programming and ascertainment of community needs for broadcast licensees. This article will examine these proposals and the charges of confusion that have been lodged against the FCC.

Nonentertainment programming

In each of the four general areas covered by the notice, a set of alternatives has been proposed for comment. In the area of nonentertainment programming, the Commission has drawn up six options. They are as follows:

- The FCC would remove itself entirely from all consideration of the amounts of the nonentertainment programming. This proposal would leave the determination of what levels of such programming would be presented to market forces.
- The Commission would eliminate precise nonentertainment programming requirements for individual licensees. Instead, the FCC would analyze the amounts of such programming on a marketwide basis.
- The FCC would free individual licensees from specific responsibilities with respect to nonentertainment programming. Licensees would have to show that they were serving the public interest if their renewals were challenged.
- The Commission would impose minimum, quantitative programming standards for *each nonentertainment programming category*.
- The FCC would measure compliance with quantitative standards by the amount of each station's expenditures on such programming.
- The Commission would establish a *minimum fixed percentage* of total local public service programming. This percentage would include news, public affairs and public service announcements.

The Commission has presented various statistics to show how radio broadcasters have responded to particular community needs in recent years. The notice specifically points out the number of all-news stations in the country, the number of stations which broadcast — part time or full time — black and Hispanic programming, and the number of stations across the country which have foreign-language programming.[3] It could be argued that this market response has led the Commission to believe that there is no longer any need for particular nonentertainment programming guidelines.

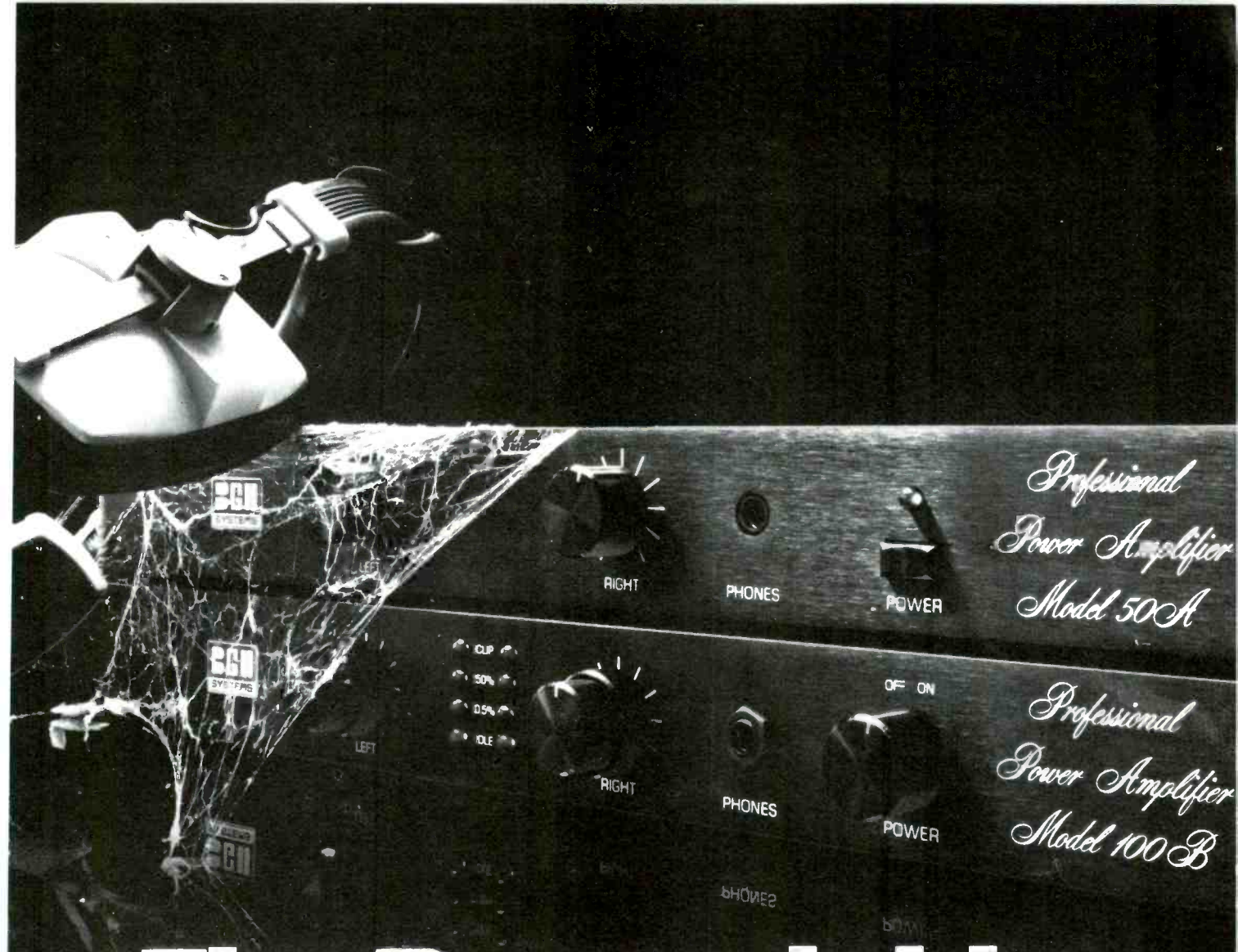
Broadcasters may be well advised to support options which retain some amount of required nonentertainment programming. Commissioner Abbott Washburn has pointed out in a partly dissenting opinion:

> "How will individual stations know what is expected of them? . . . In this proposed move, the Commission gives the impression of seeking to delete the informational

[1] *Notice of Inquiry and Proposed Rulemaking (FCC 79-518).*

[2] The Commission had still not released the full text of this *Notice* at the time this article went to press. It will announce shortly dates on which comments must be filed for inclusion in this rulemaking proceeding.

[3] According to the FCC, there are 118 all-news stations in the country. Of 4416 radio stations, 239 markets provide regularly scheduled black-oriented programming. 139 of these stations provide regularly scheduled Spanish-language programming. A total of 270 stations in 173 markets provide regularly scheduled Spanish-language programming.



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programming requirements completely. In actuality, however, it would be jettisoning clear guidelines for news and public affairs, and substituting in their place 'further actions' of an undefined nature.''

The Commission points out in the notice that changes in nonentertainment programming regulations would not remove the basic responsibilities of the broadcaster under the Fairness Doctrine. The elimination of quantitative requirements altogether, however, may not preclude the possibility of a renewal challenge. Rather, it could require either case-by-case decisions by the Commission or an entirely new set of procedures to deal with such a challenge. This may *complicate* rather than simplify existing procedures. It can be argued that the evidence *does* show clearly that unlike past practices broadcasters have responded to community desires for more informational programming. More importantly, in absence of any kind of a benchmark, a licensee may be vulnerable to a renewal challenge even if he has tried to respond to community needs.

Ascertainment

The Commission has proposed three options with respect to ascertainment requirements. One would eliminate ascertainment requirements altogether. The second would require some kind of ascertainment study by the licensees but leave it to the individual licensees to determine how best to conduct that study. The third option would retain the existing ascertainment requirement.

Ascertainment represents another case where the Commission has confused deregulation of the industry with simplification of procedures. Already, the Commission has eliminated certain ascertainment requirements for approximately 1100 stations in most cities of less than 10,000 people.[4]

Then and now, it was argued that broadcasters in smaller communities *must* remain closely in tune with particular moods and interests in the community. Conceptually, one could also argue that a type of general public survey is always underway at any station which stays in tune with changing public moods. This would be especially true in a larger market where a station is conscious of gauging the competition.

The problem with ascertainment surveys evolves from the time-consuming procedures. Once again, broadcasters might opt for a proposal which requires less paperwork rather than the total elimination of the existing policy altogether. As Commissioner Washburn pointed out in his dissenting opinion, ascertainment survey requirements, particularly with regard to community leaders, have contributed to a healthy dialogue between the community and the broadcaster. Therefore, an alternative proposal which calls for the elimination of the general public survey and retention of the community leaders survey might prove a worthy compromise.

When it issues the final order in this proceeding, the Commission might do well to review its final decision which revised procedures for the processing of contested broadcast applications last June.[5] The spirit of those rule

[4]*First Report And Order* 57 FCC 2d 418 (1975), in the matter of ascertainment of community problems by broadcast applicants, docket no. 19715.

[5]See *Report and Order*, 72 FCC 2d 202 (1979), in the matter of: Revised Procedures for the Processing of Contested Broadcast Applications.

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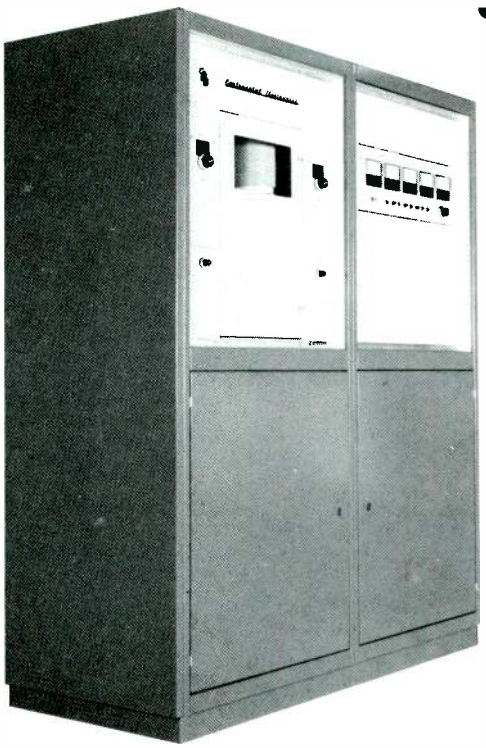

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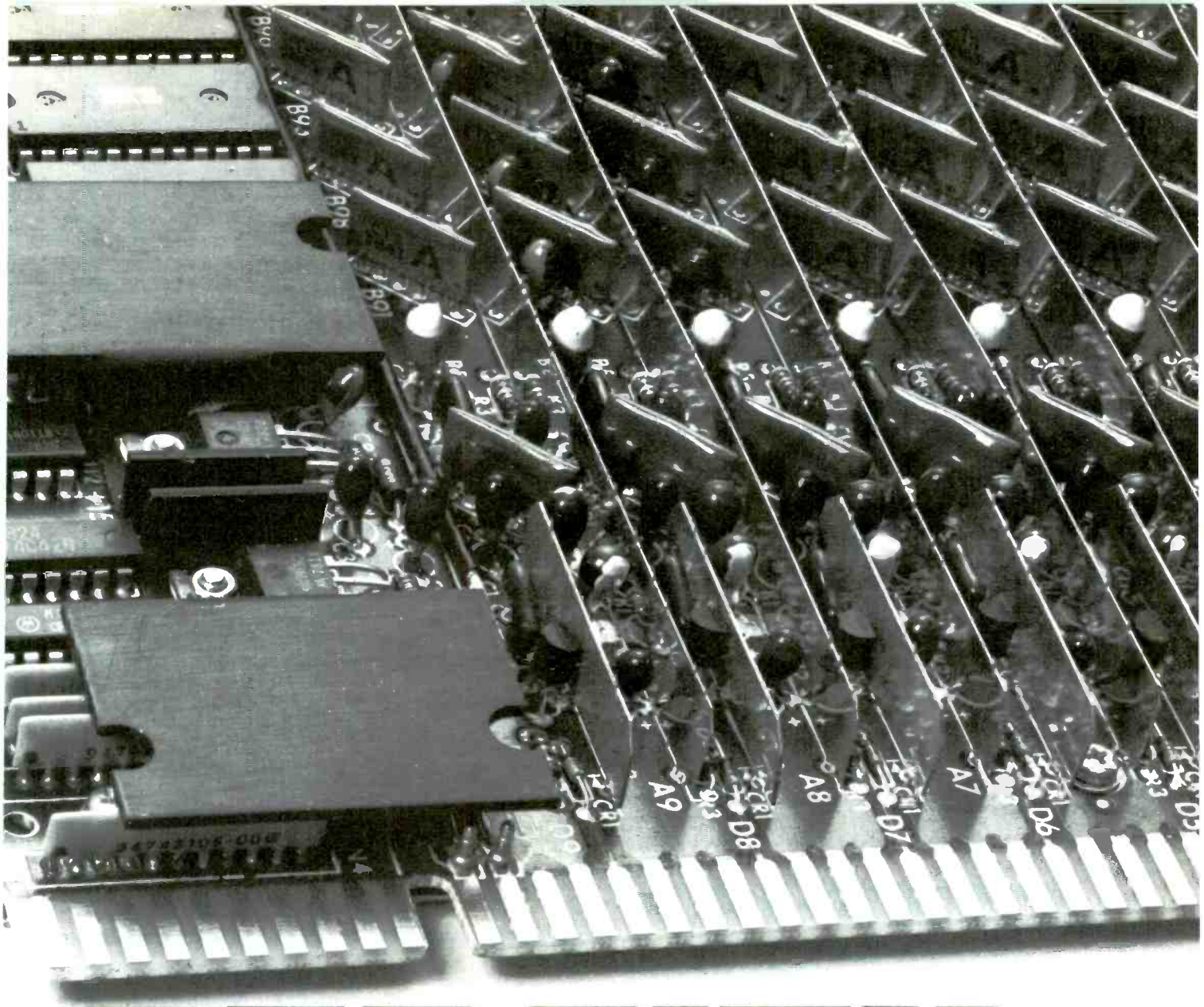

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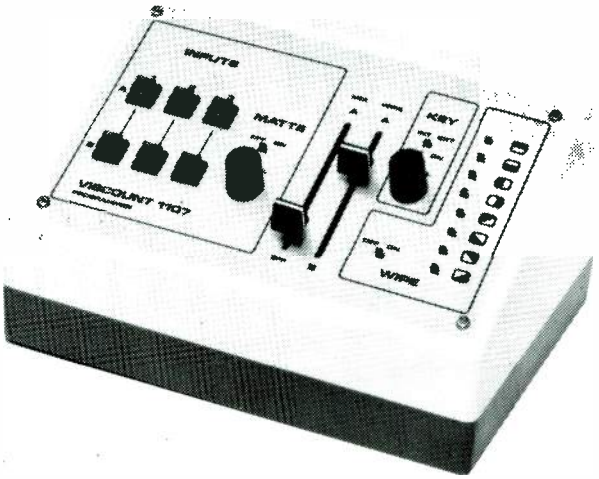

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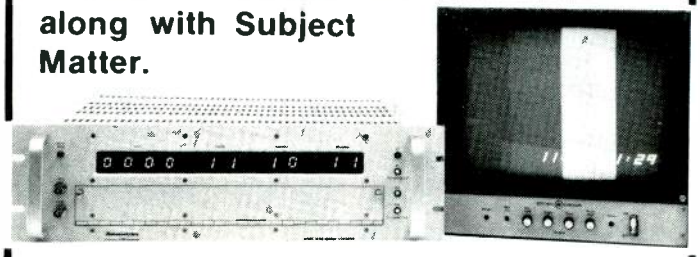

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FCC Rules And Regulations

changes for processing applications had a basic goal. It sought to preserve the integrity of existing policy, while streamlining procedures. Specifically, the purpose of changes in the ascertainment policy requirements from "strict" to "substantial" was to end much of the nit-picking that ocurs in comparative broadcast hearings. In changing ascertainment requirements for existing broadcasters, the Commission should be mindful of maintaining this delicate balance.

Conclusion

Much of the confusion over the concept of deregulation has arisen out of the mania in Washington for moving the government out of regulation of any and all industries. Supporters of deregulation point to the success of it in the case of the Civil Aeronautics Board. The FCC is not the CAB, however, and more importantly, the broadcasting industry differs markedly from the airline industry. By virtue of technical limitations, broadcasters — unlike airlines which can always fly more planes and open more routes — will always be limited by a scarce resource: the broadcast spectrum. The industry can only be *relatively competitive* from an economic standpoint. There is no easy entry or exit in the broadcast industry — as is the case in more competitively structured industries. Perhaps the answer should be that the FCC should merely seek to simplify existing procedures.

The broadcast industry is experiencing a transition. This transition may determine the complexion of the industry for years to come. Therefore, broadcasters should exercise great care in choosing what avenues of change they will support. In this manner, broadcasters may insure that the broadcast industry is not over-regulated, while adequately providing for the needs of the public. **BM/E**

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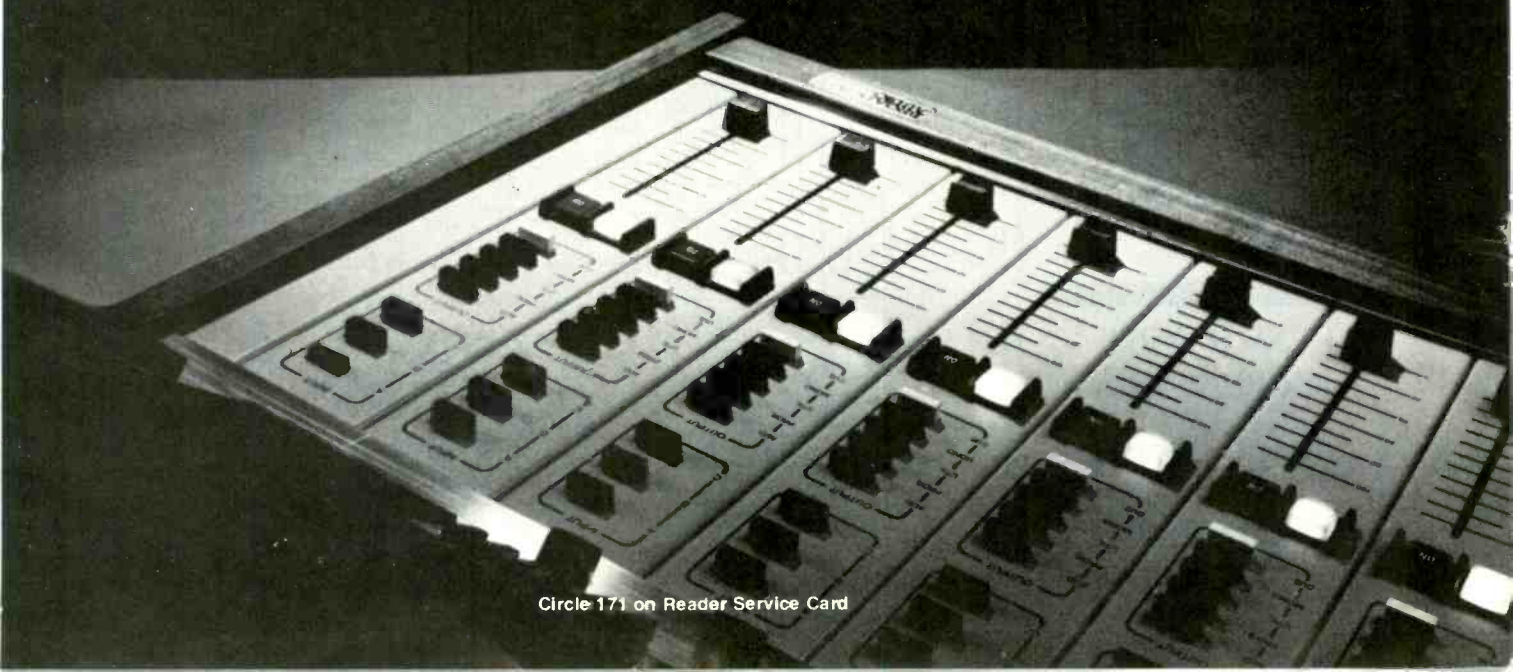

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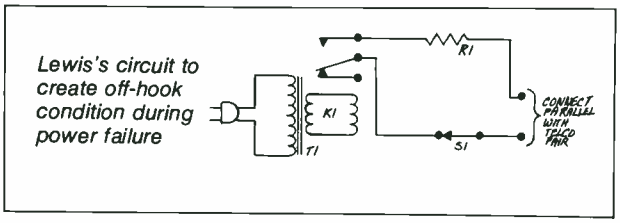
GREAT IDEA CONTEST

28. Remote Power-Failure Indication

Charles Lewis, Chief Engineer, WHSL/WWIL, Willmington, N.C.

Editor's note: Anyone connecting this or any other circuit to telco equipment should determine that it complies with FCC Rules and Regulations, Part 68.

Problem: Stations multiplexing telemetry from a remote site onto the main carrier are in a dilemma when that carrier fails. Often the outage results from a failure of the electrical service, but in the absence of return telemetry our remote control system cannot be used to determine this.



Lewis's circuit to create off-hook condition during power failure

Solution: The accompanying circuit is a very simple way to overcome this problem, provided there is a telephone at the remote site. In the event of a power failure the relay de-energizes and switches a resistor across the telephone line, simulating an "off-hook" condition. Consequently, anyone dialing this phone during a power failure will get a busy signal.

Care should be taken to prevent any possibility of phone line coming in contact with the ac line. The transformer was incorporated to increase the isolation between the ac circuit and the telco circuit.

The purpose of the switch is to allow use of the phone during a power failure. This simple gadget can help reduce station down time and save the engineer many unnecessary trips to the transmitter. A quick call to the local utility will usually verify the outage indicated by the busy signal.

Parts are as follows: K1: almost any ac relay of suitable size, or a dc relay may be used by adding a diode and capacitor; R1: simulates phone's dc resistance — 100 ohms should be all right; S1: SPST switch — may be opened to allow use of phone during a power failure; T1: transformer with suitable primary rating for ac voltage being monitored and secondary voltage to match K1 coil.

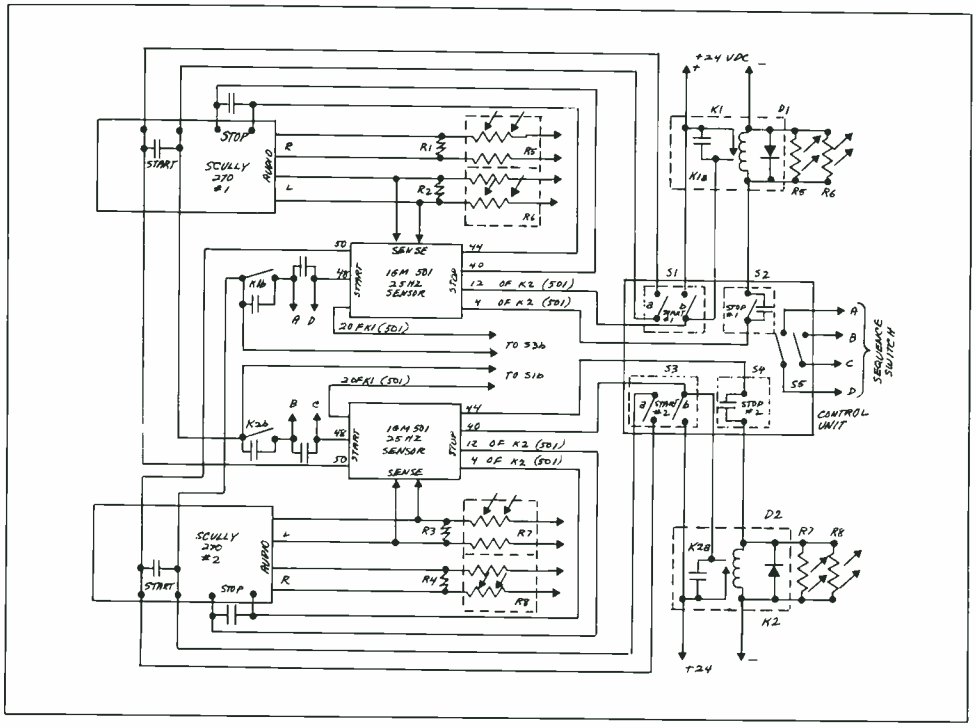
29. Semi-Automation For Radio

Paul Christensen, Engineer, WAJP, Joliet, Ill./WLMT, Wilmington, Ill.

Problem: To automate music at a radio station with two tape decks, while maintaining a "live formatted" sound.

Solution: This "semi-automation" system gives the operator more time by sequencing two tape decks back and forth. We needed to totally isolate each tape deck without the use of external switching. This would let the operator audition a tape and advance a song in a "dead" state, eliminating the problem of starting the other tape deck when a cue tone is sensed.

My system, which uses two Scully 270 tape decks and two IGM 25 Hz tone sensors, works like this: When the sequence switch is on and S1 (start 1) is depressed from the control unit, tape deck no. 1 starts rolling. At the same time, S1b energizes latching relay K1 and two Sigma opto-isolators (R5 and R6), passing audio and providing continuity for the 25 Hz start pulse. When the pulse is



Christensen's diagram for back and forth semi-automation of two tape decks

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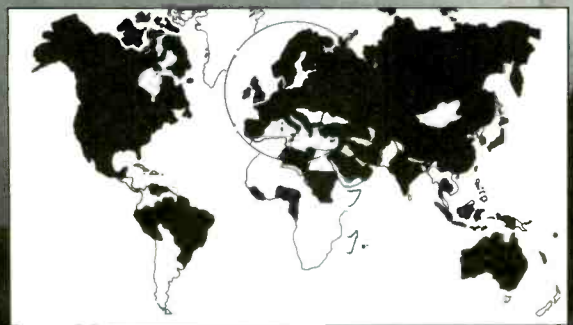

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sensed, the tone sensor rolls tape deck no. 2 and at the same time energizes K2, R7 and R8 to pass audio and to provide continuity for the 25 Hz start pulse back to tape deck no. 1. The end of the 25 Hz tone causes the tone sensor to stop the roll of the tape deck that just played and also de-energizes K1, R5 and R6 by momentarily opening both circuits. One circuit is a closed loop to the tape deck remote stop terminals and the other is a closed loop to both S1 and S2. This process will continue until S2 or S4 (stop) is depressed or when the sequence switch is turned off. This will open the start pulse circuits going to the remote start terminals of the tape decks and to both S1b and S3b.

There are two small modifications that must be made to each IGM 501 tone sensor. First, the foil beneath relay K2 of the IGM 501 sensor must be cut, leaving pins 4, 8 and 12 isolated from the other poles. IGM uses a 4PDT relay with all four poles parallelled to insure a postive contact closure. Removing one or even two poles won't affect the rest of the relay. Second, pins 2, 6 and 10 of relay K1 are unused. By tying pins 10 and 11 together, output terminal 48 will be common to both pin 2 and output terminal 50 (pin 11) of K1.

The Sigma opto-isolators have a series resistance in each pole of approximately 200 ohms. Bridging resistors R1, R2, R3 and R4 are each 1500 ohms, giving the tape deck an impedance of 600 ohms to look into. Some type of filtering should be used on both the left and right channels to roll off the 25 Hz tone. Placing a filter on the right channel will assure that no phasing problems will result. If an FM-Optimod is used in your audio chain, a high-pass filter strapping option is included in the unit.

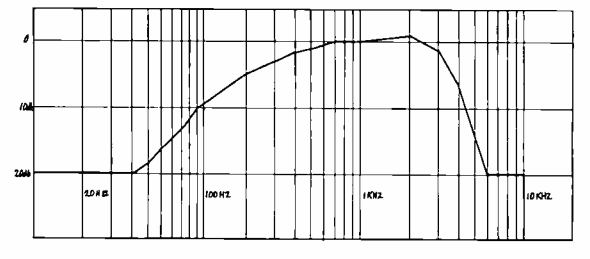
Parts used were: all capacitors: .05 mfd @ 100 V dc; D1, D2: 2 A; K1, K2: P&B KHS 1711 @ 24 V dc; R1, R2, R3, R4: 1500 ohms @ ¼ W; R5, R6, R7, R8: Sigma opto-isolator #301-R2-24; S1, S3: DPST momentary action, N.O.; S2, S4: SPST momentary action, N.C.; S5: DPST snap action.

30. Telephone Noise Filter

David Blankenship, Engineer, WLAP, Lexington, Ken.

Problem: To eliminate objectionable hum and line noise from telephone audio used in our daily station operation.

Solution: Telephone audio obtained from voice couplers at our station contained hum, static, and other objectionable noise making it for the most part unairable. This



Noise inherent to telephone audio

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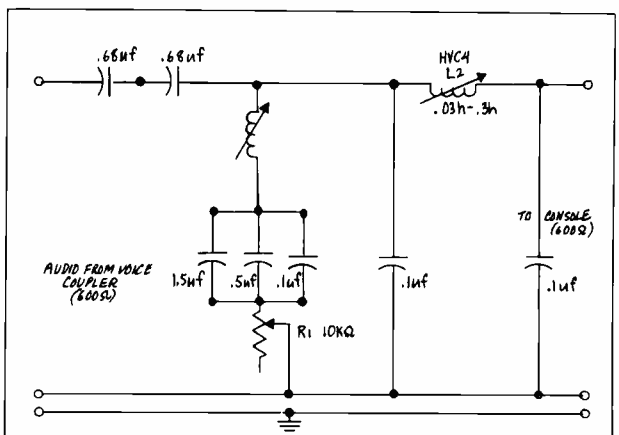
Tests performed on incoming audio indicated that while the noise was evenly distributed across the audio spectrum, by eliminating the frequencies above 3 kHz and below 300 Hz we could eliminate most of the objectionable noise.

Our first filter (a textbook design) accomplished this but gave an unnatural quality to certain voices. We found by inserting R_1 and adjusting we could improve the voice quality while sufficiently suppressing the low frequency noise. The resulting response can be seen in Figure 1.

The circuit (Figure 2) is simple to build and should be adjusted as follows. First short out R_1. Using 700 Hz as reference adjust L_1 for -3 dB at 400 Hz and a minimum of −10 dB at 300 Hz. Next adjust L_2 for −6 dB at 4 kHz. Remove short from R_1 and adjust R_1 for −5 dB at 200 Hz.

In our filters we used variable inductors to allow for greater control, but fixed components could be used to reduce cost.



Blankenship's noise filter to compensate for telephone audio

31. Transmitter Remote Redundancy

Vincent Hoffart, Engineer, KPBX-FM, Spokane, Wash.

Problem: Loss of transmitter remote control due to malfunction of a relay or associated circuitry in the remote control unit.

Solution: If your remote control unit has unused raise/lower functions, you might consider using these in parallel with the transmitter ON and plate ON functions. This would give redundancy in control if the remote control malfunctions in the operation of a relay or associated circuitry. For instance, if button 2 controls the plate, button 8 may be parallelled with it so that the raise function of both buttons will turn on plate current. In this way the relay and associated electronics of button 8 act as backup to button 2.

This may save you a trip to the transmitter and, more importantly, air time. Since most of the remote control functions are momentary closures, the parallelling could be done at any time, even when the transmitter is on the air, and at practically no cost — just a little wire and some crimp lugs.

Rules for BM/E's Great Idea Contest

1. Eligibility: All station personnel are eligible. Consultants to the industry may enter if the entry indicates the specific station or stations using the idea or concept. Manufacturers of equipment or their representatives are not eligible.

2. How to Enter: Use the Official Entry Form on this page or simply send *BM/E* a description of your work. State the objective or problem and your solution. Include diagrams, drawings, or glossy photos, as appropriate. Artwork must be legible but need not be directly reproducible and not exceeding three in number. Camera reproducible material is preferred. Length can vary, but should not exceed 500 words. *BM/E* reserves the right to edit material. Entry should include: Name, title, station affiliation, and the class of station — TV, FM, AM. Indicate if idea is completely original with you.

3. Material Accepted for Publication: *BM/E* editors will make all decisions regarding acceptability for publication. If duplicative or similar ideas are received, *BM/E* editors will judge which entry or entries to accept. A $10 honorarium will be paid for each item published.

4. Voting: Every reader of *BM/E* is entitled to rank the ideas published. This can be done on the Reader Service Card in the magazine or by letters or cards sent to the *BM/E* office. To vote, readers should select the three ideas they like best and rank them 1, 2, or 3.

5. Winners: Top rated entries in the year-long tally will become winners in each of the three major categories (AM, FM, TV). Final winners will be picked in February 1980 and announced in the March 1980 issue of *BM/E*.

6. Prizes and Awards: Three top prizes will be awarded: a programmable electronic calculator will be awarded for the highest rated entry in the respective categories of AM, FM, and TV. Ten engineering slide rule calculators will be awarded as secondary prizes for the highest rated entries in the following additional categories (top three winners are not eligible for these prizes): audio (three prizes, one each in the AM, FM and TV categories); RF (three prizes, one each in the categories of AM, FM, TV); Control (three prizes, one each in the AM, FM and TV categories); Video (one prize in TV).

Mail to:
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295 Madison Avenue
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1979 Entry Form

Name _____ **Title** _____
Station Call Letters _____ **City** _____
State _____ **Zip** _____
Telephone No. _____
Licensee _____
Class of Station at which idea is used (check one)
TV _____ **FM** _____ **AM** _____
Category: Audio ___ **RF** ___ **Video** ___ **Control** ___
Objective or Problem: *(In few words; use separate sheet for details)*

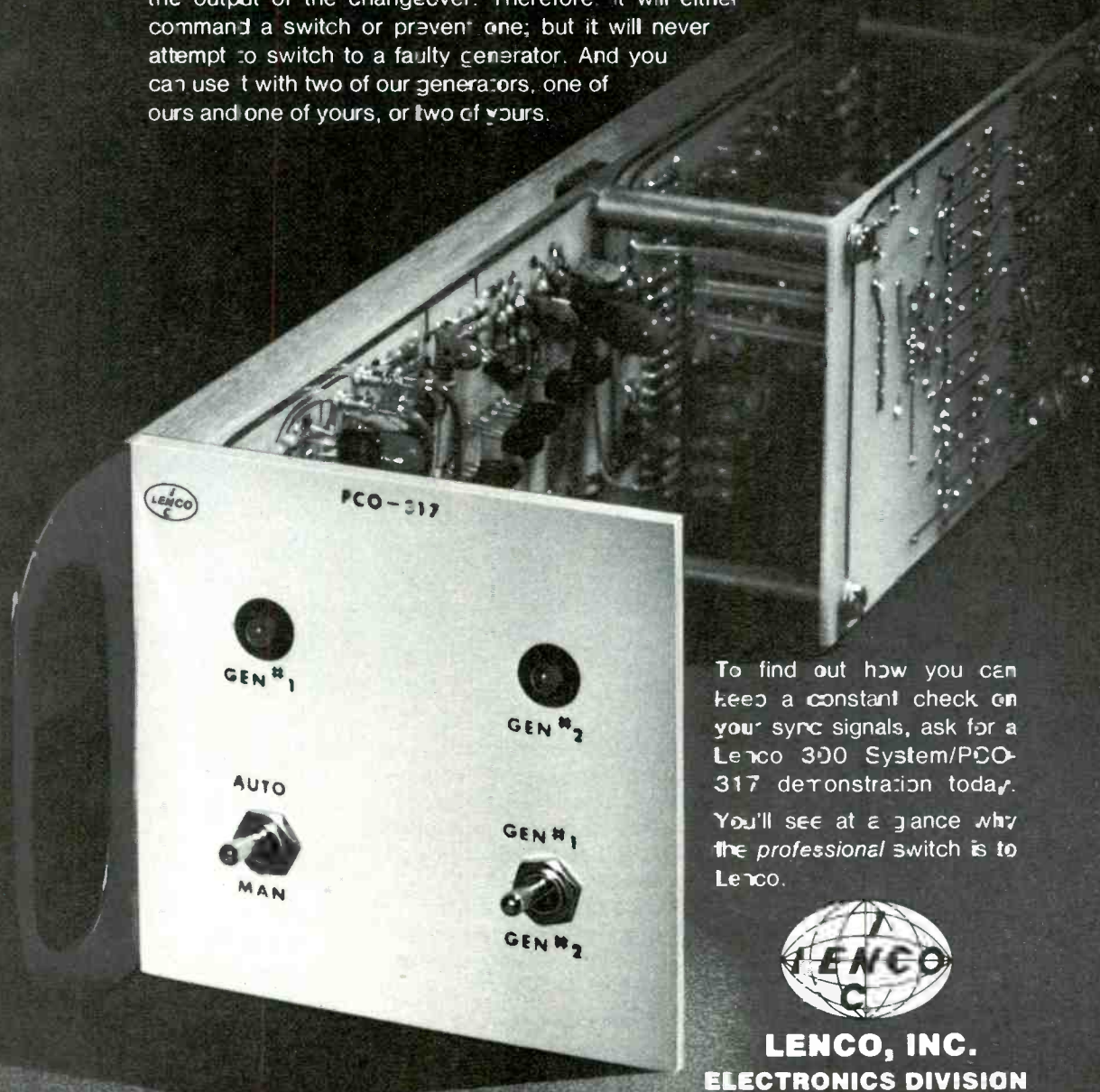
Solution: *(Use separate sheet—500 words max)*

I assert that, to the best of my knowledge, the idea submitted is original with this station; and I hereby give BM/E permission to publish the material.

Signed _____ *Date* _____

Super Sleuth

The Lenco 300 System/PCO-317 Automatic Sync Changeover Switch instantly detects the failure of any synchronizing signal and immediately switches to an alternate source. Each input is monitored for the level and timing of the sync, blanking, horizontal drive, vertical drive, burst flag and subcarrier signals. The PCO-317 monitors the outputs of the *generators*, and not the output of the changeover. Therefore, it will either command a switch or prevent one; but it will never attempt to switch to a faulty generator. And you can use it with two of our generators, one of ours and one of yours, or two of yours.



To find out how you can keep a constant check on your sync signals, ask for a Lenco 300 System/PCO-317 demonstration today. You'll see at a glance why the *professional* switch is to Lenco.

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ELECTRONICS DIVISION

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Phantom or AB powered, the CL42S comes complete with windscreen, shock mount, carrying case and handle for hand-held applications. And it's rugged.

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The CH15S is actually more directional than a mini shotgun mike – in a package that's only 4 inches long that weighs less than 6 oz. Specially designed for boom and fishpole use in TV and motion picture studios, but equally at home wherever working space is small and you have need for a compact, highly directional microphone.

Compatible with phantom or AB power, the CH15S comes complete with windscreen, shock mount and carrying case. And, this microphone is rugged.

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Electro-Voice backs up these two microphones with the only unconditional warranty in the business: for two years we will replace or repair your CL42S or CH15S microphone, when returned to Electro-Voice for service, at no charge – no matter what caused the damage!

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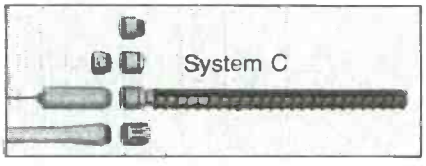

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BROADCAST EQUIPMENT

5 kW AM Transmitter 250

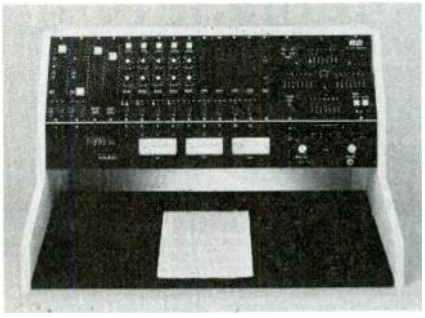
The SI-A-5 5 kW medium wave AM transmitter is solid-state up to the RF power amplifier and modulator stages, which use three 4CX5000A tubes. Low-level RF and audio solid-state circuitry is located on eight plug-in modules accessible from the front of the cabinet. The exciter is synthesized, allowing it to be set to any frequency in its range by setting 10 miniaturized switches. The transmitter uses high level plate modulation and provides 125 percent positive peak modulation. It is self-contained and includes a 12-pulse high-voltage power supply. $28,300. SINTRONIC CORP.

Video Writer 251

The FVW-910 allows pictures and graphics to be drawn directly on the monitor screen with a lightpen and direction buttons. Picture matrix is 232 by 360, providing smooth lines of two thicknesses. The unit has a three-page memory and a full or partial erase function. System includes an operation panel, control unit and monitor. $7500. FOR-A CO. LTD.

Automatic Audio Console 252

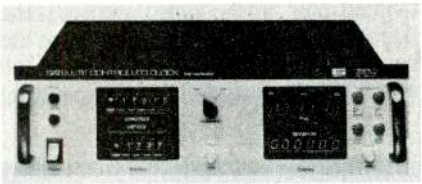
Model JL-412 can automatically program sequences of up to 28 events, accessed from up to 11 inputs. A logic system permits the unit to be operated as a fully automatic system or as a manually operated sequence system, with manual override provided at all times.



In automatic mode, the console senses 25 Hz tones at the end of reel-to-reel sources and secondary tones at the end of carts. The NEXT EVENT command permits use in semiautomatic mode. Status of input modules is indicated by LEDs. Each time a sequence is operated or a manual insert performed, the previous source is cleared, insuring only one source on-air. Other features include built-in headphone amplifiers at 5 W per channel, 10-step mic attenuator, two separate stereo transformer balanced outputs, and digital display of time in hours, minutes, and seconds. IRV JOEL & ASSOCIATES.

Satellite-Controlled Clock 253

This microprocessor-based time code receiver and decoder uses a signal relayed by satellite to deliver Coordinated Universal Time. The satellite-controlled clock (SCC) is precise to 30–50 μs relative to the National Bureau of Standards signal which is



relayed via the GOES east and west satellites. After a non-critical antenna is attached, the east or west satellite is selected and the latitude and longitude are entered on thumbwheels. The SCC locks to the signal and requires no further initial setting, calibration, or correction. Time is displayed in hour-minute-second format with provision for a selection of pulse-coded outputs. The unit will work at virtually any location in the western hemisphere. It is portable, has low power requirements, and is self-contained except for the antenna. LaBARGE, INC.

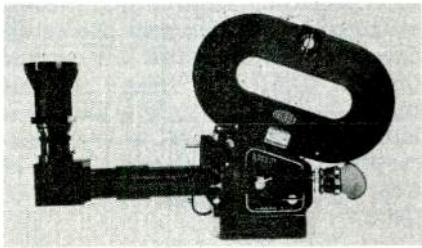
Portable Mic Mixer 254

Model FI-1500 is a compact, portable battery-powered mic mixer. The unit has three independently controlled inputs and an output line level, plus an LED meter and phantom power for shotgun microphones (XLR connectors). The mixer measures 4.6 by 3.6 by 2.2 inches, weighs 24 ounces, and has a cast aluminum case. $825. ARMAC ASSOCIATES.

For more information circle bold face numbers on reader service card.

Snorkel Lens 255

The Hajnal miniaturized snorkel lens is 12 inches long and weighs 40 ounces. It can be adapted to fit any studio or port-



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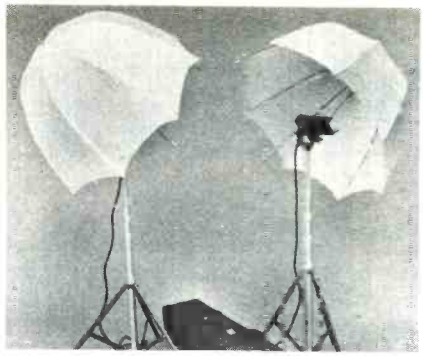
able TV camera and may also be used with film cameras and 35 mm still cameras. The snorkel accepts any prime lens in Arriflex mount from a focal length of 5.7 mm on up, including all zoom lenses. The lens allows the camera to be hand-held and walked through tight sets. Image remains right-side-up no matter how the lens is turned, and it is possible to shoot inaccessible locations, such as the inside of a car engine or washing machine. F&B CECO.

Lightweight Field Light

Bubbelite is a portable, lightweight key or fill light that can be set up in less than 30 seconds. The light can fill shadows at or near eye level or can be used as a key light when feathered soft and deeply graded shadows are desired. It has an umbrella-like reflector of a special fabric and uses two 600 W tungsten-halogen single-ended lamps to produce a light intensity of 185 fc and area coverage of more than 80 square feet, both at eight feet. Each Bubbelite kit contains two complete lights (heads, stands, and cables) in a carrying case,



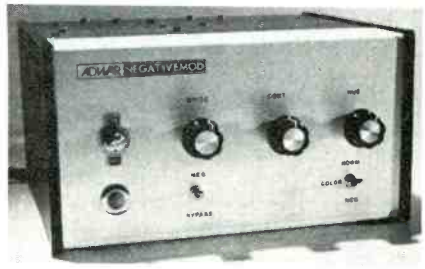
all weighing less than 12 pounds. $500. CINEMA PRODUCTS CORP., 2037 Granville Ave., Los Angeles, Calif. 90025.

Multiple Remote Control 257

The TCS-1 machine control system can operate up to 100 VTRs and/or telecine film chains from up to 240 control locations. The heart of the system is a microprocessor/software-based device that can assign specific machines to specific control panels. Connections between the control panels and the VTRs/film chains are made with dual twisted-pair audio-type wiring. One pair carries serial control data from the control panel to the machine while the second pair returns machine operating status data. The status of all machines is constantly monitored through the microprocessor. TELEMATION.

Negative Video 258

Negative Mod is a self-contained unit which makes a composite video signal negative. Originally designed for video animation, the unit is useful for industrial and broadcast graphics and titles. One use is to chroma-key a person or



product in normal color values while the background is rendered in negative color, thrusting the principal image into relief. Controls switch the color to negative or positive values with adjustments for brightness, contrast, and hue. A bypass switch permits positive feed-through. The unit requires only video-in, video-out, and ac power. ADWAR VIDEO.

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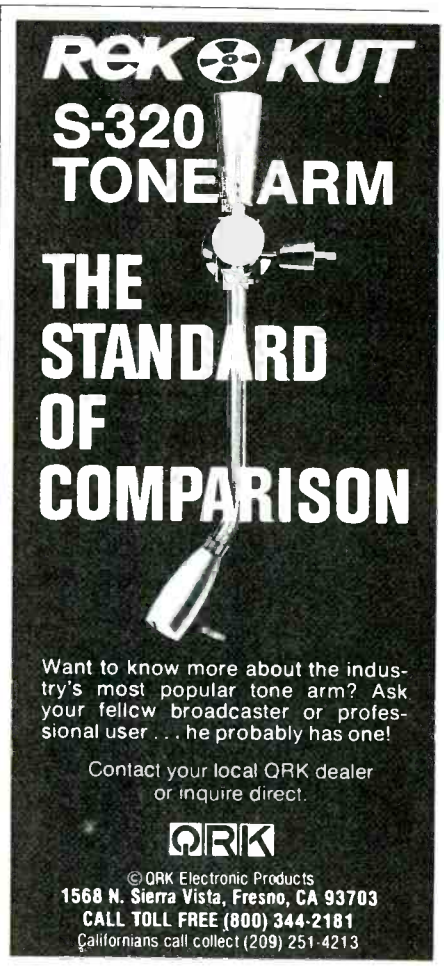
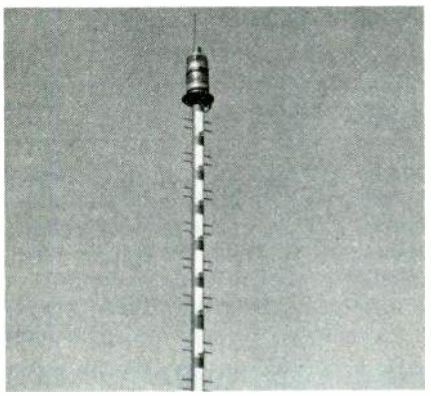


Circle 178 on Reader Service Card

UHF Slot Antennas 259

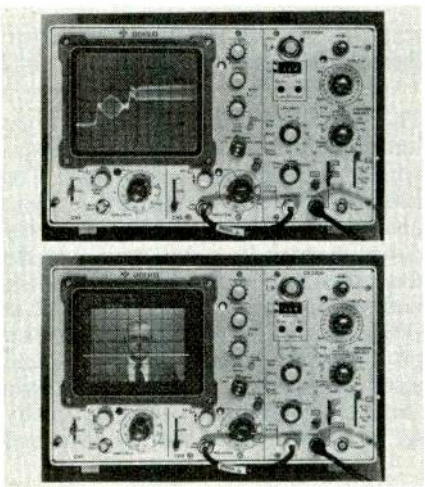
A new series of JSL slot antennas designed for use with translators and low-power transmitters (10 kW) on channels 14–83 is available with rms gains of 4, 8, 12, or 16. The antennas are constructed of heavy-duty steel pipe, hot galvanized inside and out with a bottom flange for tower-top mounting and a top plate for beacon attachment.



Slot radiators and steel directors provide a wide choice of azimuth patterns. Slots are protected with fiberglass-reinforced plastic radomes that are electrically transparent. The antennas offer low VSWR and very low weight and wind load. $11,000–$19,000. CETEC ANTENNAS.

Video Monitoring Scope 260

The OS3350 combines the functions of a TV waveform monitor and a conventional 40 MHz dual-trace oscilloscope in a single portable instrument. A time base generator in the scope provides video triggering, enabling it to be used for line-by-line examination of TV



waveforms as well as for viewing a complete picture on the eight by 10 cm CRT. A line and field may be selected for waveform display by a digital up-

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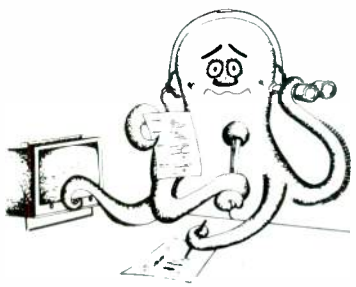

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Broadcast Equipment

down counter or an electronic cursor on the screen. The unit accepts a one volt composite signal with or without sound-in-sync pulses to provide any of six triggering modes — vertical field one or two or one and two alternating, single or repetitive horizontal line and telefax line pairs. Triggering can be delayed up to 90 μs and clamping is switched. 525 and 625 line versions are available. $3500. GOULD, INC.

Satellite TV Receiver 261

Model X-24 is a 24-channel frequency synthesized satellite ground station receiver with automatic antenna polarity selection. The receiver can be tuned manually using front panel controls or remotely via a BCD interface to provide a wide choice of remote tuning methods

including computer control. Threshold extension circuitry insures optimum FM demodulator C/N performance and an internal coax switch automatically selects the properly polarized antenna when a channel is selected. With optional 1¾-inch rack-mount audio subcarrier demodulator, up to four subcarriers ranging from 4.5 to 7.5 MHz are provided for processing slow scan video, high fidelity audio, or other software items offered by programming sources. MICRODYNE CORP.

Remote DC Program Timer 262

The T-100DC is a dc program timer intended for use in remote locations where no ac power is available. The timer has .56-inch orange LED displays and operates in both count up and count down modes. In count up mode the timer runs to 99 minutes and 59 seconds with automatic rollover and restart at 100 minutes. Grounding a remote reset pin resets the counter to zero and restarts the upward count. In countdown mode each digit can be independentally set up to the desired starting point and

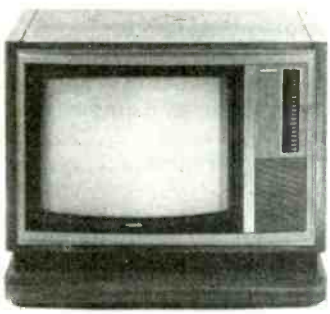
For more information circle bold face numbers on reader service card.

the display flashes when it reaches 00:00. In either mode the count may be interrupted with or without resetting the timer. The unit uses a TV color burst

crystal to generate a stable, accurate time base and is housed in a tan ABS case. $175. LOGITEK ELECTRONIC SYSTEMS, INC.

Color Monitor/Receivers 263

Model RM-26 Trinitron® color monitor/receiver (shown) is the largest receiver offered to the video industry, according to the maker. Models RM-17RC and RM-21RC are 17 and 21-



inch units, respectively. All three feature TV-line-VTR selection, dc restoration, eight-pin VTR connectors, chassis ac isolation, and express tuning. The 17 and 21-inch monitors also feature triple-function remote control commanders. RM-26, $1700; RM-17RC, $1060; RM-21RC, $1350. VIDEOTEK, INC.

VCR Spindle Gauge 264

The SHAG gauge detects improper spindle height alignment in 3/4-inch U-type VCRs, preventing edge damage. SHAG consists of a gauge assembly the size of a mini U-Matic cassette and a precisely formed steel base that serves as a reference. To use the gauge, the operator sets the assembly on the base and zeroes the two dials to ideal alignment, then places the assembly in the VCR. Misalignment of one or both spindles is instantly registered on the dials. $695. MEMOREX.

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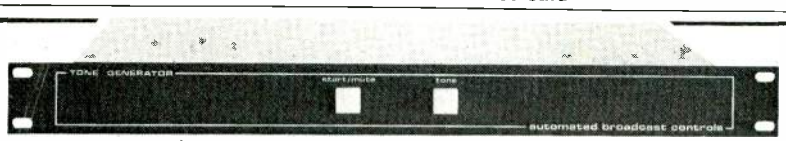

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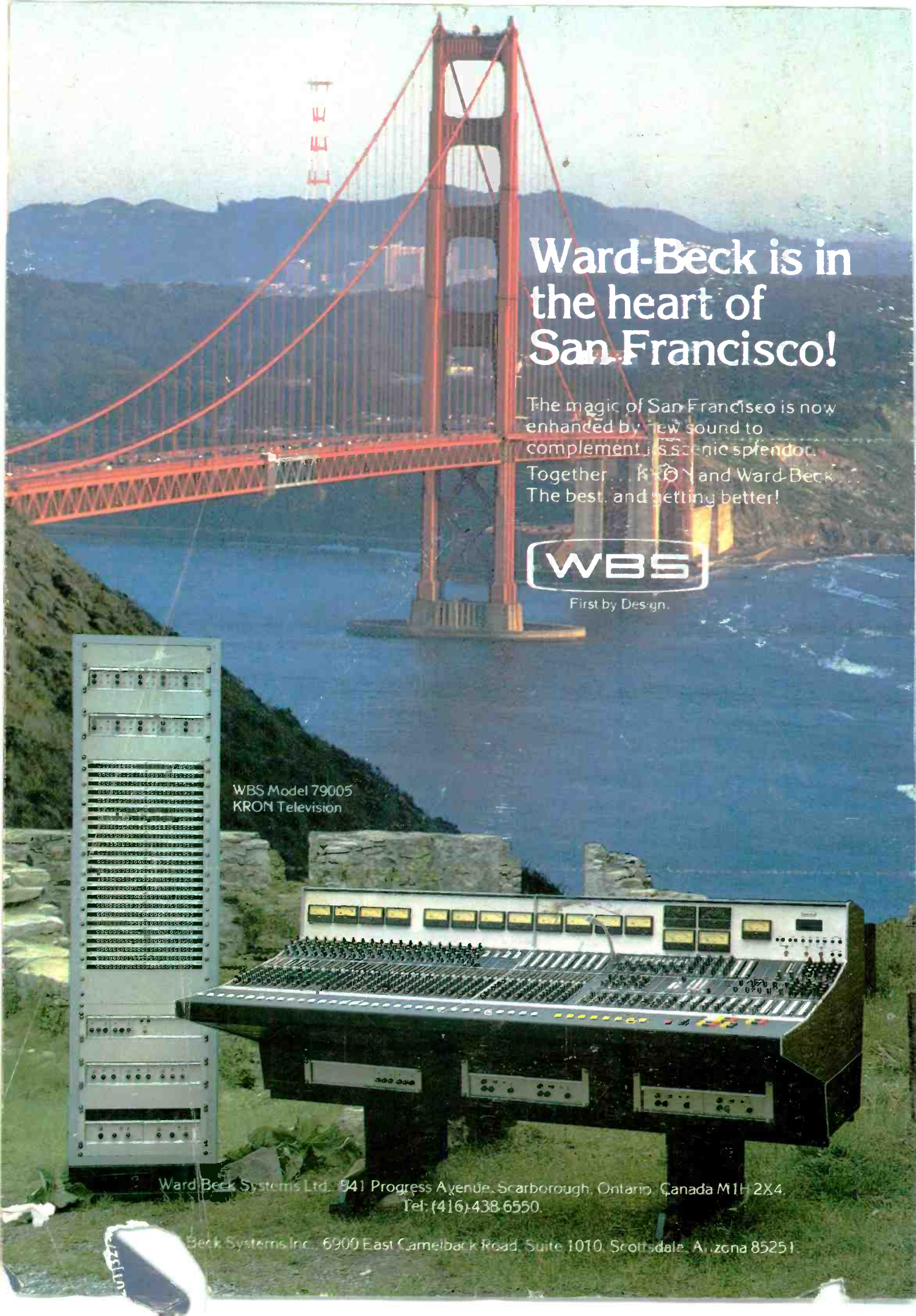
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