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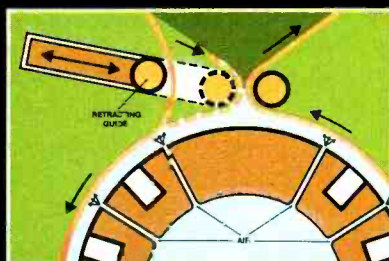
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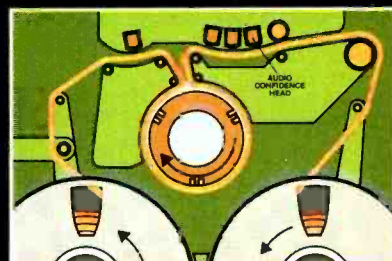
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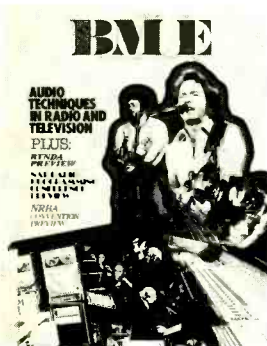
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# BM/E

BROADCAST MANAGEMENT/ENGINEERING

AUGUST 1981/VOLUME 17/NUMBER 8



Broadcasters are using the latest technology to bring to their audiences audio of the highest quality. With the supply of television programming in stereo increasing and the use of simulcast techniques, the end of "poorman's" audio is in sight.

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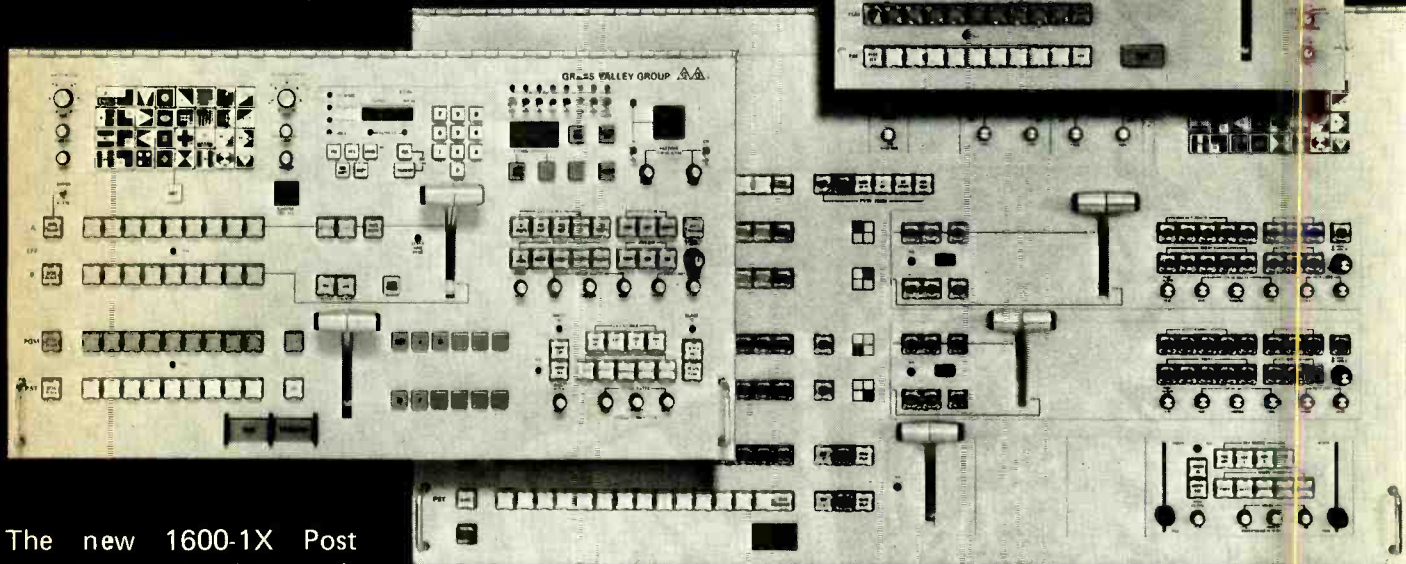
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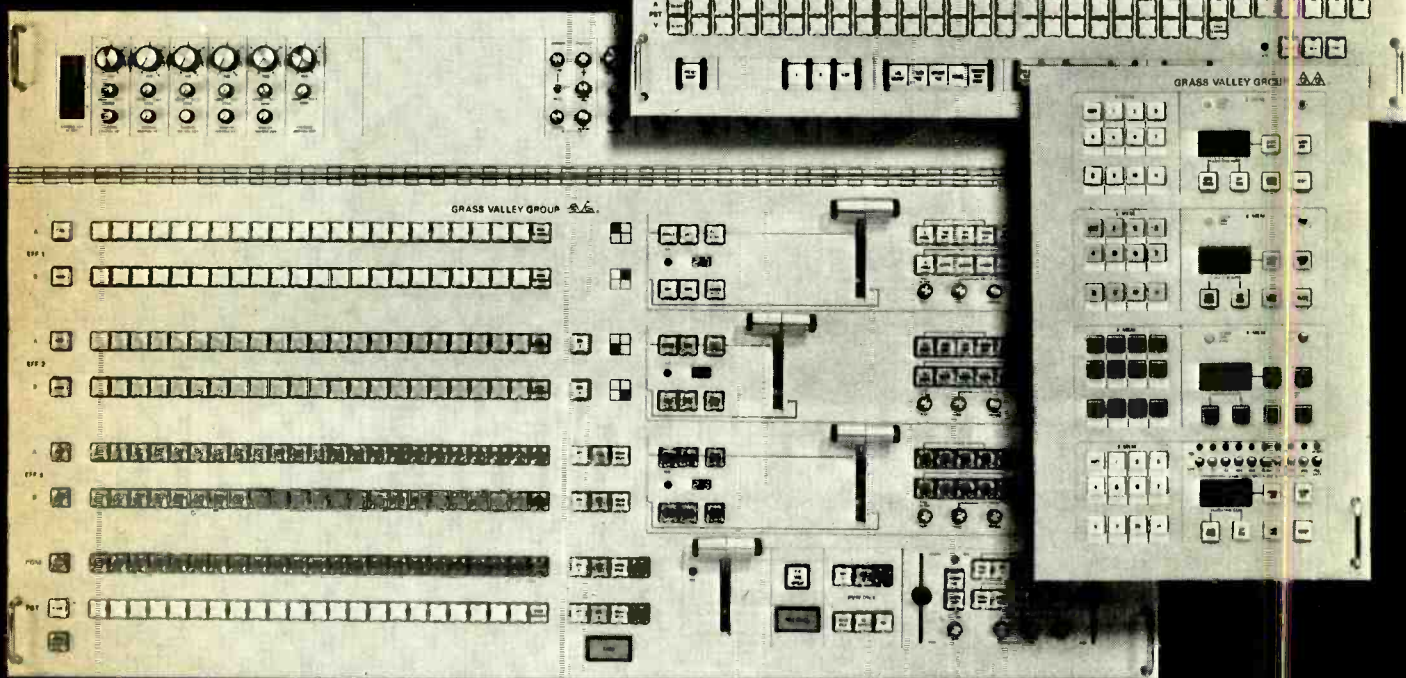
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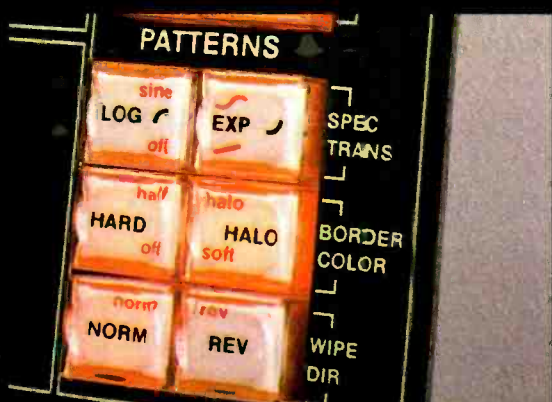
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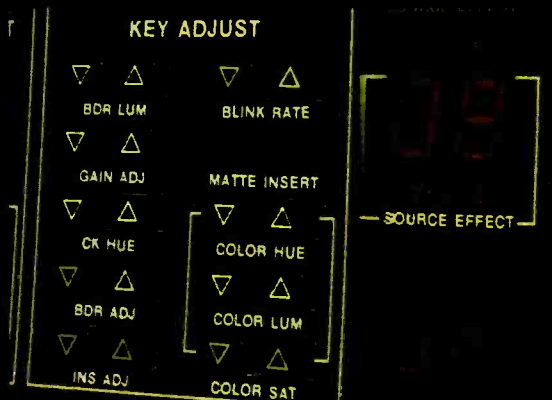
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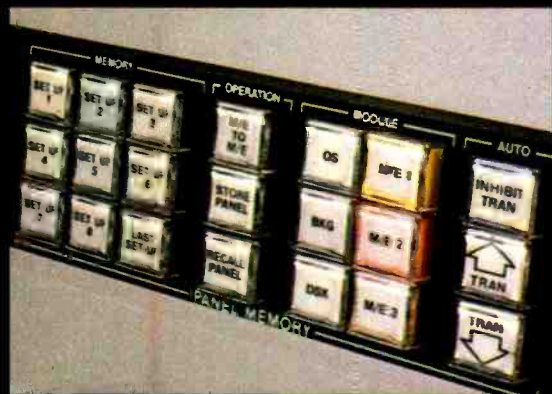
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# BROADCAST INDUSTRY NEWS

## Tinker Heads NBC As Silverman Resigns

Fred Silverman, who came to NBC three years ago hoping to lift the third-place network's sagging profits and ratings, resigned his post as net president July 1 after failing to receive "un-equivocal support" from Thornton F. Bradshaw, the new chairman of RCA. Replacing Silverman as NBC's top exec is Grant Tinker, who for the past 10 years has headed MTM Productions, producers of several highly successful TV series.

Tinker was named chairman and chief executive officer of NBC. His

interest in MTM was sold to his partners, Mary Tyler Moore and Arthur Price. The network clearly hopes Tinker's programming expertise and skill in working with producers will help lift it out of the doldrums.

In announcing the appointment, Bradshaw described Tinker as "one of television's ablest executives, a skilled administrator adept at motivating creative talents." Bradshaw was not without praise for the outgoing Silverman, saying, "No one has ever worked harder or given more of himself to his job. And his contributions to NBC over three years are many and enduring." He praised Silverman for strengthening NBC's news, sports, and radio operations, carefully avoiding mention of programming, and wished him future success.

In his letter of resignation, Silverman expressed his belief that the network's 1981-82 season would prove successful, stating, "I will take pride in that accomplishment because I feel I have laid the foundation for that progress."

The announcement of NBC's new management was one of Bradshaw's first actions upon taking office at RCA, parent of NBC.

## House Okays Commercials On PBS

The U.S. House of Representatives approved an amendment to the PBS funding bill which will allow 20 PBS stations to begin airing commercials. The amendment calls for an 18-month experiment to see if enough revenue can be generated to ease the expected cuts in federal funding.

The experiment is voluntary and will include 10 public television stations and 10 public radio stations.

The Senate is expected to pass a similar measure and indications are that the president would sign such a bill.

## Reagan Fills FCC Slots; Names Rivera, Dawson

As had been widely predicted, President Reagan has nominated Henry M. Rivera to the FCC. The Albuquerque lawyer thus becomes the first Hispanic to serve as an FCC Commissioner. Like Reagan appointee Mark Fowler, Rivera is considered conservative and pro-

business. Rivera's term will run through June 30, 1987.

Also named to the Commission was Mimi Weyforth Dawson, aide to Senate Commerce Committee chairman Bob Packwood. In addition, the President fingered commissioner James Quello to fill the remaining three years of former chairman Charles Ferris's term.

## House Debates 9 kHz; FCC May Renounce Stand

Cuban interference with U.S. radio stations was the focus of much of the debate in June's House of Representatives hearings on the 9 kHz AM channel spacing issue. While proponents and opponents of the switch had it out, there were indications that the FCC might shift its position and support 10 kHz spacing at November's ITU meeting.

The Cuban issue became particularly important with Cuba's announcement that it planned to build 69 high-power stations — a grim prospect for Florida broadcasters, already faced with serious interference problems. At least four Florida radio stations have been granted permission to raise power to combat interference; evidence presented at the hearings by NAB consulting engineer Jules Cohen indicated that even WJR, the Detroit clear channel, could be affected by the new Cuban stations.

Cohen's engineering firm, Jules Cohen and Associates, recently completed a study for the NAB that estimated costs for conversion to 9 kHz at over \$40 million, more than half again as much as the \$25 million figure in the FCC-sponsored study by Moffet, Ritch and Larson.

NAB president Vincent Wasilewski was adamant in his stand that channel spacing be left at 10 kHz. "It has become crystal clear," he told the hearings, "that the answer to the Cuban interference problem is *not* 9 kHz." He said it was "appalling" that the U.S. might change channel spacing "to accommodate Castro."

Support for 9 kHz has continued to come from minority groups and daytimers, who look to an increased number of stations as a way to further their participation in the broadcast market. The Commission itself, however, seems to be drifting back toward 10 kHz. Both Quello and Washburn tes-



Engineers lower feedhorns and antennas onto RCA's newest commercial communications satellite

## New Satcom Gets "Top Hat"

October 15 is the scheduled launch date for Satcom 3-R, replacement for the ill-fated Satcom 3, and engineers at RCA Astro-Electronics in Princeton, N.J., are giving themselves plenty of time to do the job right. The new satellite will become RCA Americom's main cable bird.

According to RCA's Frank Weaver, Satcom 3-R is virtually completed, but has extensive testing yet on its agenda. The bird's signal will cover the entire continental U.S. plus Alaska, with a spot beam to Hawaii. The satellite will blast off from the Kennedy Space Center at Cape Canaveral, Fla.



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## News

tified against the reduction, and chairman Fowler appeared to be leaning toward 10 kHz while waiting for the results of a study by the International Panel of Experts in Geneva. "The question is what is right for the U.S.," he asserted in response to concerns over the way a change of position would look.

Much concerned over the possibility of a change of position was Commissioner Lee, however, who claimed, "Our credibility is at stake."

The U.S., which was unable to con-

vince Western Hemisphere-broadcasters to go with 9 kHz back in March, 1980, has been working since then to get the 9 kHz position accepted widely. According to the State Department's William Jahn, only two or three countries (including Canada) presently support 10 kHz. The U.S., if it changes its stand, could be put in the uncomfortable position of having to persuade all those countries to change their minds a second time.

### FCC Opens Inquiry On Teletext Standards

The FCC has begun an inquiry into tele-

text standards, but has held off from issuing any specific guidelines until comments are in. The inquiry marks the beginning of what will probably be a lengthy investigation of over-the-air information services.

The staff's proposal for the inquiry calls for a 120-day comment period, with comments most likely due late in October. The entire rulemaking process could take an additional one to two years, since results of the various teletext field trials will also have to be considered.

Meanwhile, WFLD, Chicago, has taken delivery on a Context teletext system, which supplier Logica calls the first full-scale commercial teletext system in the U.S. Receivers will be placed in public locations around the city, and the station will earn revenue from both viewers and advertisers.

### First Class Ticket Eliminated By FCC

The FCC eliminated its time-honored Radiotelephone First Class Operator License in mid-June, saying that the license exam was not an adequate assurance of technical competence in radio operators. The action was the culmination of a rulemaking first proposed last fall (*BM/E*, October, 1980). It had been opposed by the Society of Broadcast Engineers, whose members felt that dropping the license could result in a lowering of technical standards at radio stations (*BM/E*, December, 1980).

In going ahead with the plan, the FCC emphasized that licensees would be held responsible for maintenance of technical standards at their stations. The license has become superfluous, the Commission argued, because new technology makes full-time, highly trained operators unnecessary; because other regulations insure compliance with FCC regulations; and because stations find it in their best interests to employ qualified operators.

The new rules suspend examination for and issuance of the first class tickets. They retain the second-class license, however, renaming it the General Radiotelephone Second Class Operator License.

### Right-Wing Coalition Calls Off TV Boycott

The Tupelo, Mississippi-based Coalition for Better TV called off its proposed boycott of advertisers that sponsor "offensive" TV programs late in June, just days before the long-expected action was to take place. In announcing the decision to pull the plug on the boycott, coalition chairman Rev. Donald Wildmon claimed increased concern about program content on the part of advertisers, saying, "To boycott companies

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## News

which are making a sincere effort would be senseless, stupid, and even immoral." He announced plans, however, for future monitoring of programs.

Wildmon and the other coalition leaders, including the Moral Majority's Jerry Falwell, named no names at any point, although there was much speculation on who the targeted advertisers would be. Interest had centered around companies listed as "least constructive" or "offensive" by the National Federation of Decency and the National Parent-Teacher Association.

At least one advertiser wasn't waiting for the boycott announcement, however. Two weeks before the coalition made its plans public, Proctor & Gamble pulled its advertising from 50 program episodes it considered offensive. Company chairman Owen B. Butler, while not endorsing the boycott, said P&G was "listening very carefully to what they [the coalition] say."

Opposition to the boycott was strong, both from the TV networks and from other quarters. In the latter category is Action for Children's Television, a public interest group that, like the coalition, has found much to criticize in commercial TV. ACT,

however, has taken a strong stand against the boycott and has started a petition campaign against "the New Right crusade now being conducted by the Moral Majority and the Coalition for Better TV." The petition goes on to "support citizen action to expand television viewing options for the American public." ACT president Peggy Charren told the Television Critics Association in June that the Moral Majority "wants to control communication in this country," asserting, "Television reform should not mean censorship and repression."

In a related development, ABC-TV and NBC-TV released studies in mid-June that showed Moral Majority members to hold similar views about television content as other viewers. The studies indicated that most viewers, including Moral Majority members, do not support efforts to restrict programming choices and do not find the levels of sex and violence in most prime-time shows objectionable. In addition, the viewing habits of Moral Majority members were shown to be similar to those of nonmembers.

### FCC Revises CP Application Form

Form 301, the construction permit application required of commercial licen-

sees, has been significantly shortened and revised by the FCC as part of its effort to expedite application processing. The revisions are intended to update and simplify the form, eliminating useless material and substituting yes/no questions wherever possible.

A major change in the form is the substitution of a certification statement by the applicant that it is financially qualified for the previous requirement of significant documentation. Commissioner Joseph R. Fogarty dissented on this point, arguing that the documentation requirement had been deleted without considering "possible alternative safeguards."

At the same time, the Commission also revised EEO reporting requirements for CP applicants, deleting "duplicative" filing requirements and dropping the demand for updated EEO programs with requests for major facilities changes.

In a related action, the Commission revised commercial and noncommercial broadcast application procedures to shorten processing time. The changes include reckoning the 30-day cutoff period from the date of release of the text of the cutoff list; certification of the local notice as part of the original application; delegation to the chief of the Broadcast Bureau of full authority to dispose of routine petitions to deny and



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## News

dropout agreements between mutually exclusive applicants; and adoption of an abbreviated pre-acceptance engineering review of all applications.

### Digital Competition Intensifies At AES

Sony and Mitsubishi brought new multi-track fixed-head digital recorders to the 69th Convention of the Audio Engineering Society, which ran May 12 through 15 at the Los Angeles Hilton. With 3M — the pioneer of multi-track

digital recording — very much in the field, we now have an active three-sided race among competing, non-compatible digital audio systems, with no standardization in sight. At the show 3M demonstrated electronic editing of its multi-track digital tapes, calling it a first in the industry.

The competition among digital systems was just one element of a very successful convention, reflecting the ferment in audio activity around the world. About 6000 persons registered for the show. There were about 200 exhibitors, a higher number than at any previous Los Angeles convention of the society.



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Sony's new PCM-3324 puts 24 channels on half-inch tape, with 16-bit full linear quantization. Two analog tracks aid in editing, and another track holds SMPTE synchronizing signals. A 14-inch reel runs for one hour.

The Mitsubishi X-800 records 32 tracks on one-inch tape, again recording for an hour on one reel. It also uses 16-bit linear quantization, and has additional analog and synchronizing tracks. Both systems claim dynamic range above 90 dB, distortion around 0.05 percent, unmeasurable wow and flutter, frequency response flat from 20 Hz to 20 kHz.

Meanwhile, there has been one positive industry move toward standardization: as noted earlier, Sony and Studer have announced joint work toward digital standards. But any full industry agreement on a digital system, obviously essential for full exploitation of the new technique, seems to be far off.

In a technical session on broadcast audio, A.H. Moris and J.T. Mullin of 3M reported that a large proportion of cartridge tapes have phase error exceeding the 50 degrees considered tolerable. They point out that a misalignment between the tracks of only 0.0003 inch will result in total cancellation of all signal at 10 kHz.

A paper by veteran systems designer W.S. Halstead gave an excellent summary of systems for multi-channel audio in television. Michael Dorough, audio processor developer, described a novel new program level indicator using colored LEDs in an arc that avoids problems he sees in both the VU meter and the PPM.

There were many other papers of real value: for a complete list of reprints, write the AES at 60 East 42 St., New York, N.Y. 10165.

### Cablers Converge On Los Angeles

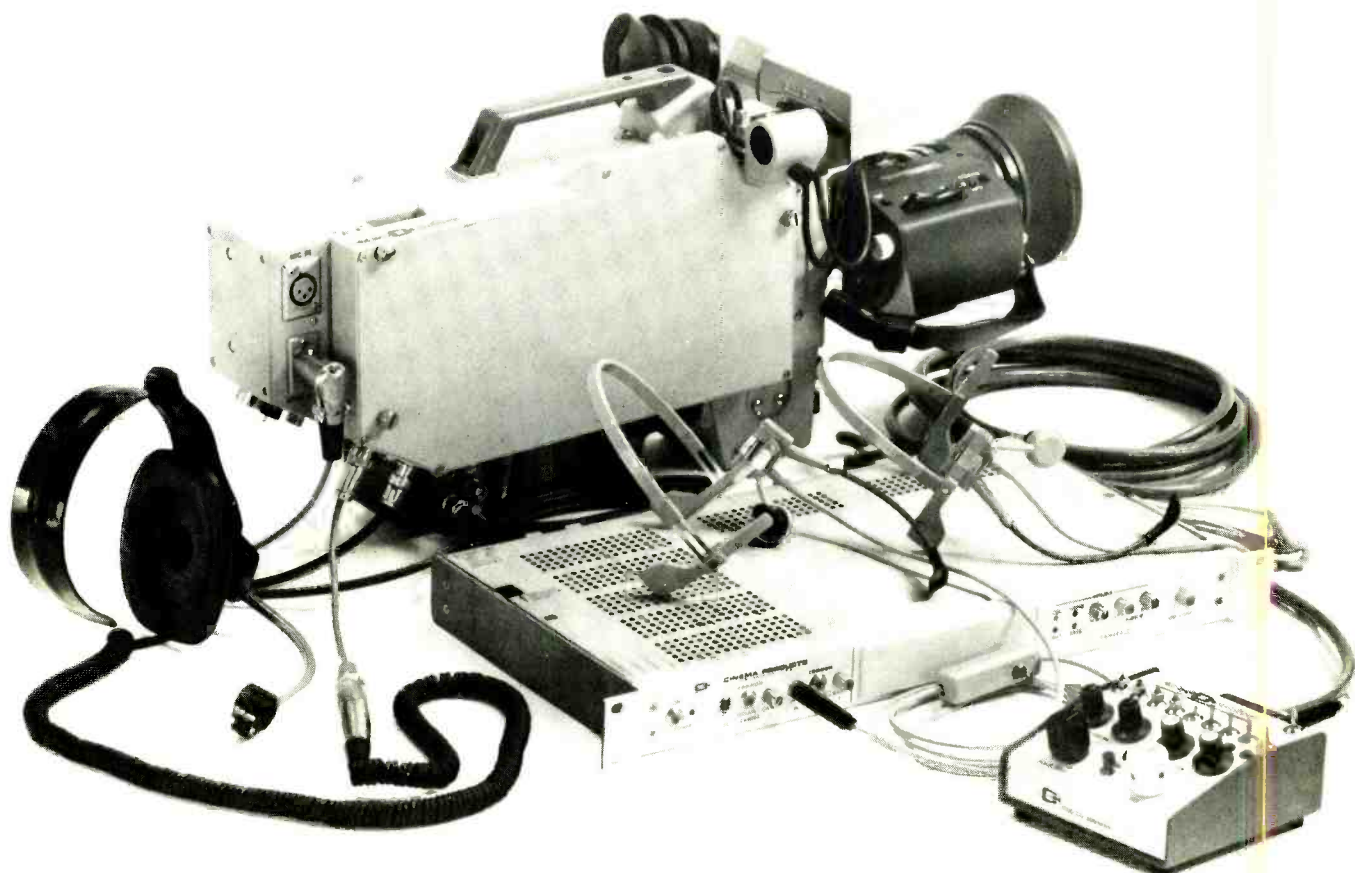
All eyes were focused on Los Angeles late in May when over 16,000 attendees swarmed through the thirtieth annual convention of the National Cable Television Association. The attendance figures astounded all concerned, exceeding pre-conference estimates by around 4000 and almost doubling last year's 9000.

New FCC chairman Mark Fowler made the oratory debut of his term at the conference, having been appointed a little too late to do the honors at NAB. His speech, well received by the audience, outlined five major objectives: creation of "an unregulated, competitive marketplace environment" the telecommunications; elimination of "all unnecessary regulations and policies"; "efficient, expeditious" service to the public; promotion, coordination, and planning of international



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## News

communications "to assure the vital interests of America"; and elimination of "government action that infringes freedom of speech and press." "The common thread that runs through these objectives like a bright, scarlet ribbon," Fowler concluded, "is what I call — perhaps ungrammatically — 'unregulation.'"

The major thrust of the convention was on technology, although programmers had some news of their own. Topping the programming news, perhaps, were announcements by both

Home Box Office and Showtime of plans to go to 24-hour operation. Showtime's round-the-clock schedule is due to start this month; HBO's will wait until January 1. RCA announced its plans to co-finance RCTV (see last month for the announcement's effect on NBC affiliates). A new programming service, PET, was introduced by Penthouse Magazine.

Last year's big headliner, Premiere, went out with a whimper June 4 as the principals — Columbia Pictures, MCA, Twentieth Century Fox, Paramount Pictures, and Getty Oil — dissolved the partnership after failing to come up with a viable plan for keeping

the service afloat. The Justice Department had pounced on Premiere almost as soon as it was announced (*BM/E*, September, 1980), charging that it violated federal antitrust laws.

Despite the dearth of software news, there was plenty going on in the hardware field. Such manufacturers as Oak Communications, Scientific-Atlanta, Jerrold, and Blonder-Tongue brought a variety of sophisticated CATV gear that generated plenty of interest. Among the hot items were addressable terminal systems from Oak, TOCOM, Inc., Pioneer Communications, and Jerrold, all designed to allow system operators to turn services on or off without going to subscribers' homes. The Oak offering, TotalControl Dimension 2, is an interactive system with 16 addressable tiers, 4000 pages of teletext, instant opinion polling, home shopping, and home security. With this kind of equipment, operators can offer pay-per-program viewing, a prospect many find attractive.

As this would indicate, new technologies were much discussed, with 14 panels devoted to that area. Other panels explored such topics as cable advertising, marketing, and financial aspects of the business. Members of the House of Representatives offered both encouraging and discouraging words on AT&T, which is taking aim at the news information and data fields, in competition with cable (see *BM/E*, June, 1981).

## TV Ministries Losing Audience

A just-published book points to Arbitron data to substantiate its claim that television evangelists are losing audience. According to a report in *The New York Times*, the book, *Prime Time Preachers*, uses sociological research to show that while a few of the better-known TV preachers are still attracting viewers, the majority are reaching fewer and fewer people.

The book's authors, Prof. Jeffrey Hadden of the University of Virginia and Charles E. Swann, GM of WRFK-FM, Richmond, Va., argue that the combined audiences of television ministries doubled during "the great period of growth" from 1970 to 1975, but since that time have leveled off. In the past three years, the overall weekly audience has fallen from almost 21 million to less than 20 million. In addition, the authors indicate that some evangelists may be overestimating their audiences by a considerable margin. For example, Rev. Jerry Falwell, the outspoken leader of the Moral Majority, claims 17 to 25 million viewers for his *Old Time Gospel Show*; Arbitron figures, however, put the viewing level in November, 1980, at 1.6 million.

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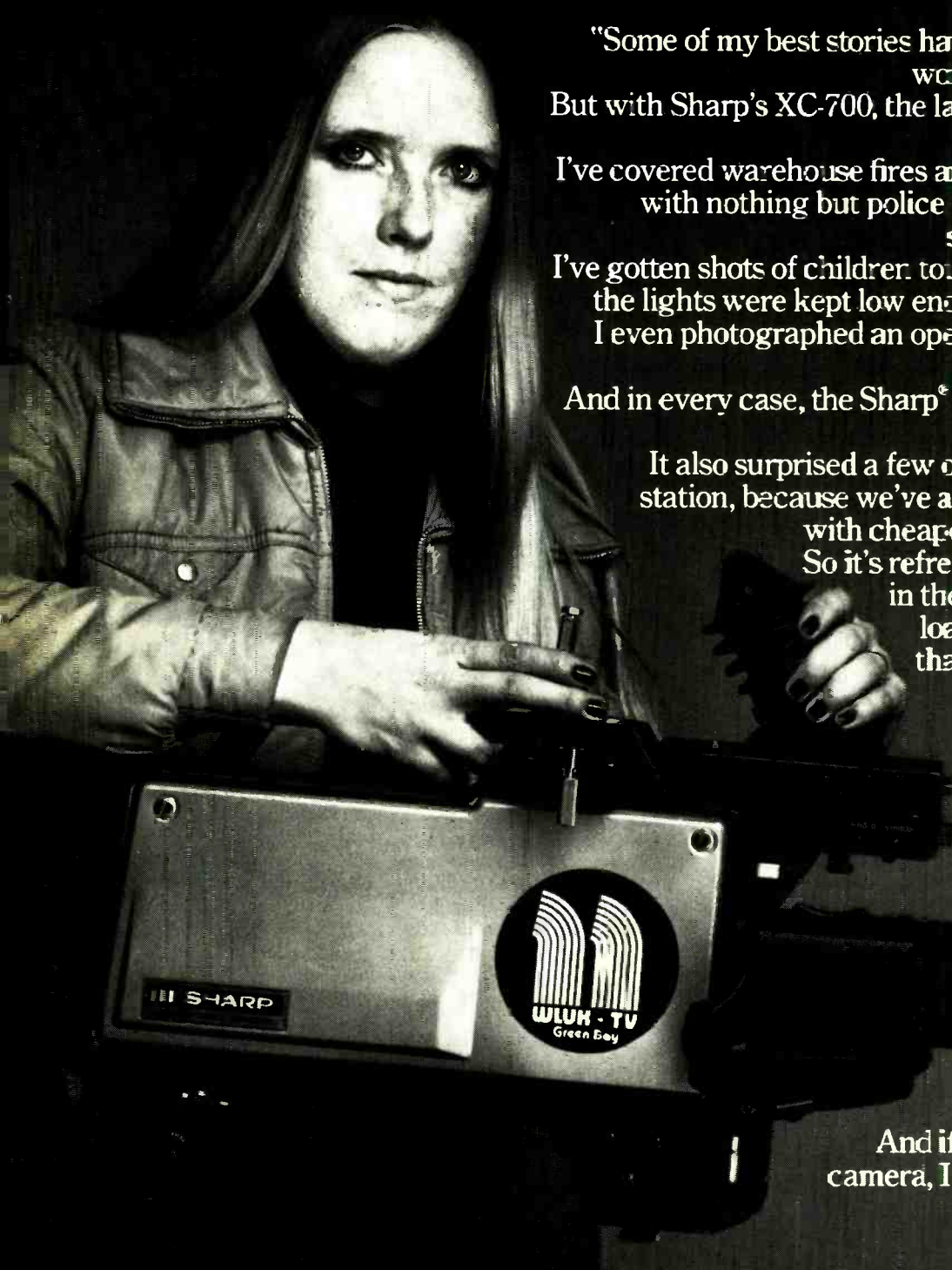
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# RADIO

PROGRAMMING & PRODUCTION FOR PROFIT

## What's New? Big Bands

LOOKING FOR A fresh element in your music programming, outside all the current upfront formats? Does your area have a sizeable "older" group of people, say 35 to 65 years old, who might form the core of an economically viable audience?

If so, think about big bands! It should not surprise one that a "fresh" style is really an old style — that is the way it often goes in music, clothes, manners, personal appearance.

The heyday of the big bands ran roughly from the 1930s to the middle 1950s, when the rock-and-roll invaders landed. At the peak, several hundred bands made a living touring the U.S.

The top echelon among the bands were the vehicles of famous musicians who were among the real greats of American popular music. Their ranks included Ray Anthony, Benny Goodman, Louis Armstrong, Count Basie, Tommy Dorsey, Duke Ellington, Woody Herman, Stan Kenton, Glenn Miller.

The music the big bands played ranged from bona-fide jazz of some variety to swing, the regularized jazz with a firm beat that was the top popular music of several decades. Characteristic of the bands was the massed-brass sound coming from the battery of trumpets, horns, and trombones that was the trademark of the style.

All this is relevant in 1981 because there is a respectable revival of big bands underway in radio. One fact is that many of the musicians of the famous big bands are still alive and tooting. Another is that programmers are finding tremendous response to big band music, especially among older demographics.

Big bands never died out completely on American radio. A few stations have used some big band music throughout the rock era. An example is WHO, Des Moines, Iowa, a 50 kW clear-channel AM station with a highly varied program mix of very comprehensive farm information, lots of local and national sports, a big call-in operation for personal problem solutions, heavy news and weather, and much more, including a regular slot for big band music. The music comes from recordings the station made in the 1930s and 1940s on 16-inch acetate records of big bands put on the air live in the station's studios. The program is very strong with the WHO audience.



Victor Knight, owner of WDBF in Del-Ray Beach, Fla., literally doubles as leader and performs, in brass, on trumpet with the band he has assembled for his station

Recent estimates put the number of radio stations using at least some big band music as high as 500. But the revival is probably at its most concentrated and commercially successful at AM station WDBF, Del-Ray Beach, Fla.

The man responsible for an explosion of big band music at WDBF is the station's owner, Victor Knight — a combination typhoon, professional trumpet player, successful radio station operator, and promoter extraordinary.

Knight is a real pro in music, with degrees from music schools to attest to his competence. He is also highly experienced in managing music, having operated as many as 17 bands at once in Indiana. He came back to his native Florida to "take it easy," by which Knight apparently means doing only three things at once rather than seven or eight.

A few years back a local retailer who knew about Knight's background in music asked if he could assemble a band for a series of promotional concerts. Knight got the word out over the air and in local print media, and soon had on hand a platoon of big band veterans of unquestioned skill and experience. He undertook to put the band together with himself as leader on trumpet. The first series of concerts, promoted strongly on the station, attracted so many people that it had to be extended.

Knight points out that his audience is much heavier in the over-50 age bracket than the national average. This is true, of course, in many parts of Florida, but

other areas, especially the Southwest "sun belt," are moving that way too. The country will have a larger proportion of people in the older age brackets into the foreseeable future, a positive for the future of big band music.

But the older listeners are not by any means the whole audience, Knight found. A large number of much younger people are *discovering* the music and liking it. He describes a common feature of his concerts: a line of listeners in their teens, 20s, and 30s standing in front of the brass section, open-mouthed at the power of the massed trumpets and trombones.

Knight decided to hire the orchestra on a permanent basis as a part of the station's operation. Apparently this is the first big band of the new era that is "owned" by a radio station. The availability of the band has let loose a whirlwind of events that have brought thousands of people to hear the band "live" and which have moved the station several notches higher in community consciousness — as well as adding strongly to the income total.

WDBF's slogan is now, "Big Bands and All That Jazz." The band has become a fixture for shopping center openings and every other kind of promotion to which a business wants to attract a large live audience. A concert put on as a promotion for the station in the largest auditorium in the area, with veteran big-band vocalist Helen O'Connell as star, brought in more than 6000 people, the biggest crowd ever for such an event in the area.

The band has been removed back to

## Radio Programming

the station from a cruise ship in Nassau, from a jai alai arena in Palm Beach, and from baseball stadiums in several places. All were extremely successful promotions. As part of the station's community involvement, Knight has used the band in events to aid the local heart and cancer societies, the paramedic organization (very important in an area with many old people), the liver/eye/ear/nose/throat associations ("organ recitals," says Knight), the civic playhouse, the firefighters, the hospital, the junior league. In every case, providing important aid.

A selection of the band events are taped and syndicated to other stations. At *BM/E*'s press time, over 20 stations had signed on, and more were coming.

Knight has found that experienced big band performers like Helen O'Connell are eager to join for special concerts. Many have little outlet for their skills today, and are looking hopefully toward the big band revival with its promise of at least occasional work.

Getting the big band sound intact from a live scene back to the studio has special problems. (See article on p. 57 on picking up classical music in the sixteenth-century cathedral on Madeira, a very different live pickup problem.) The basic equipment is a Peavey amplifier, Mark IV/600 series, with an associated preamplifier, which provides six microphone channels. A second preamplifier can add four more mic channels if necessary.

The Peavey has a built-in graphic equalizer; an adjustable reverb unit can be plugged in. The "presence" is adjusted with the equalizer and the reverb unit to get the best sound in each space and with each main group in the music: solo instrument, vocal solo, duet or quartet.

A boom mic goes right into the piano, to get it up to match the 18-piece band and for solos. A gooseneck boom mic gets the tenor sax soloist, a mic on stand the lead alto soloist. There is a mic on a high boom well above the rows of trumpets and trombones, to bring this powerful sound into good balance with the rest. Finally, there are two stage mics on stands for talk and for the vocal soloist.

Before each concert, the whole mic setup is checked carefully by ear by Knight and his engineering staff. Some of the engineers are also professional musicians. Knight says they have developed a fine ability to make the band sound good in a great variety of spaces — indoors, outdoors, in the 6000-seat auditorium or 3000-seat amphitheater, open-air shopping malls, marble floors, wooden floors. They have created, he says, a recording studio quality in some spaces with mis-



*Knight introduces Helen O'Connell, big band singing star, at concert that drew 6000 people*

erable acoustics. This expert, musically sensitive miking is essential to the flamboyant success of the band, and similar skill is part of any successful live music operation.

Radio programmers who want to try some big band music may want to get Knight's syndicated programs. Or, they may well have some big band recordings on the shelf that haven't moved much lately.

There are a few syndicated formats that rely heavily on the big band music. One is from Drake-Chenault. Another is the immensely successful "Music Of Your Life," created by Al Ham and sold by Jim West (described earlier in this department). There are also a score or so of music specials issued by various organizations that pay more or less tribute to the big bands. The formats and the specials are all listed, with their sources, in the just issued directory of radio programming from the Association of Independent Radio Producers, Box 8888, Universal City, Calif.

91608, telephone (213) 885-8855. This is the most complete list of program material for radio ever issued.

Buying the music on the open market today is very difficult: the situation is quite like the one of Beautiful Music. However, strong help on the big band recordings has just come from a group of the band leaders themselves. They have formed an organization called the Big Band Record Library and have pooled their resources to get into one place a good supply of recordings by all the bands.

They have recently issued a catalog showing more than 800 recordings, with all the great names and many of the near-great represented. Any can be ordered by mail, and the organization says that if they haven't listed the one you want, just ask and they will try to get it. Ray Anthony, one of the great band leaders, is president of the organization. The address: Big Band Record Library, 9288 Kinglet Drive, Los Angeles, Calif. 90069. **BM/E**

## BM / E's Program Marketplace

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WHEN *BM/E* first gave an account of TM Companies, the firm had already established a sharply upward growth pattern, and had expanded from the jingles, IDs, and promotion material of its earliest period into full-format programming with four formats actively marketed. The success of these formats came in large measure from very elaborate audience research aimed at the 25 to 44 demographics "slice", and was sponsored by TM to guide program development. The management of TM, directed by then-president Jim Long,

decided to find out what listeners in the target group really liked, to go well beyond external indicators like sales charts.

The nationwide preference tests organized by TM gave them a solid body of input on the likes of the target audience, which they could apply in developing the format programming. The music choices that came out of the studies were so popular with broadcasters that TM programming in a few years had been adopted by some 200 stations.

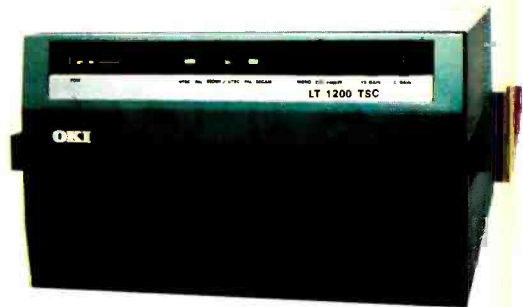
Since that time TM has continued in an expansionist pattern. The jingle, ID, and promotion production is up strongly. The program format operation, with extensive research still backing it up, has grown to six formats and about 300 stations. TM Programming now markets the following: Beautiful



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## Program Marketplace

Music, Stereo Rock, Beautiful Rock, TM Country, Alpha One, new in September, 1980 — an “urban contemporary” format, heavily dance music, with “resting places” in the form of ballads and pop songs, and the latest format (introduced in February, 1981) called “TMOR”, an MOR format that has already shown great strength.

Bob Bruton of TM pointed out to *BM/E* that the Beautiful Music format differs from the traditional “matched

flow” programming. TM has a “category group” structure which allows the user large flexibility in shifting tunes, adding or deleting. A matched flow sequence cannot be changed without losing the particular character of the sequence.

TM’s research is proving itself still through the very general success of the TM formats in building and holding audiences. The newest format, TMOR, billed as carrying “forty years of the best music”, has been aimed at helping AM stations in trouble from the competition of FM. About ten stations had

chosen it up to mid-June. Altogether, TM Programming added 36 new stations in the first part of 1981.

TM’s consulting service, which is included as part of format subscription, is also heavily based on research — in this case into the market situation of each station. Lee Bayley of TM points out that this has allowed TM to make very accurate predictions of the effects on ratings of any choice of format or change in station operation. Station managements can use this information to help with programming decisions.

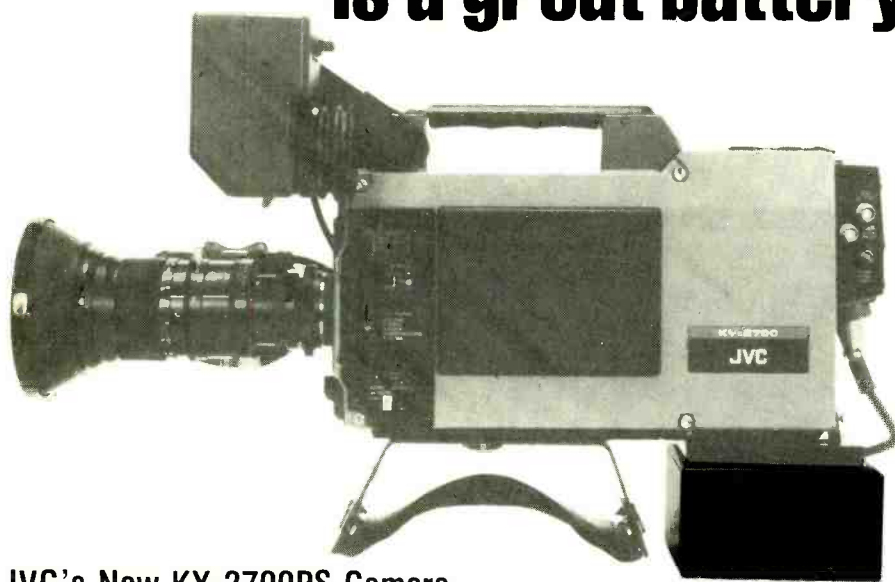
Bayley noted that fewer and fewer of the TM subscribers are using automation. Such stations can go “live” but still get central control of programming with TM formats and the TM consulting service.

An area of operation that is new since *BM/E*’s last report is TM Special Projects, which produces extended, one-time programs. Like the other TM activities, the Special Projects Division has grown extremely fast in its less than three years of operation. A listing of a few of the score of specials made so far will give the pattern. A 30-hour show, “The Beatles — The Days of Their Lives,” issued a year ago, ran in 104 markets in the U.S. Like the other specials, it combines music with narrative and many interviews for a concentrated historical-biographical study of the subject. The specials are mostly distributed on discs. They are leased to the subscribing station for two showings in the year of release. The station can split up the material in any way the program department wants.

More of the specials are: “Guitar, A Rock Episode”, a 36-hour anthology of rock guitarists and their bands; “The Clear Creek Country Festival”, a 24-hour creation of a mythical country music festival with a strong narrative line and lots of the music; “The Top Ten Hits, 1955 Till Now” is a 27-hour special of the top ten tunes of each year, ending with the top ten for the whole period; “Platinum Melt-down” is 40 hours of AOR music; “Album Greats” is 48 hours of music from the most popular album releases (bought in 300 markets); “Woodstock, 10 Years Later” is a recreation of the famous rock festival, with many of the original performers in music and interview.

When all the TM specials are added together the total air time is staggering, but the great popularity of the form makes it evident that all the material is going to be heard in many places in the U.S. This trend toward continuity on a single topic has been building for some time (a number of other software producers are heavily into specials). Radio programmers are clearly getting something they want. TM is prospering by creating the material on such a large scale and with great expertise. **BM/E**

# Behind every great camera is a great battery

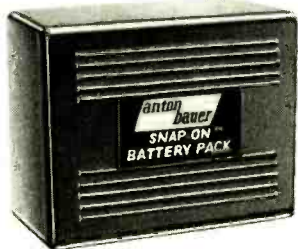


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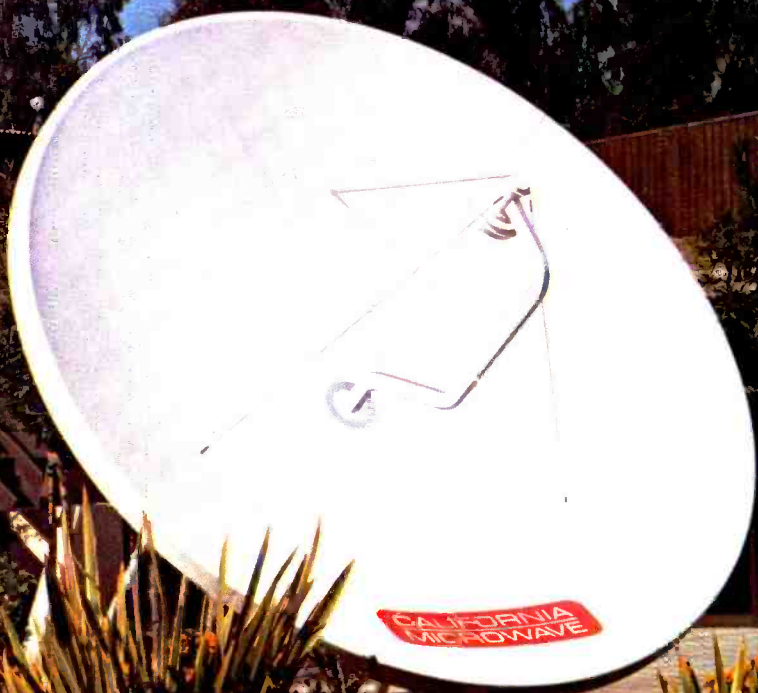
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# TELEVISION

PROGRAMMING & PRODUCTION FOR PROFIT

## Child's Play: Focus On Children's Programming

THE STORM that swirls around what children watch on television at times gives the impression that nothing worthwhile is produced for kids; especially on the local level. If the entries in NATPE's annual IRIS awards are any indication, there is a lot of programming for children being produced by local television stations around the country. In the children's category alone this year there were 52 entries out of the 340 total.

The winners, based on market size, took different tacks on how the programs were produced but the common thread was a commitment to do quality shows for the younger viewer.

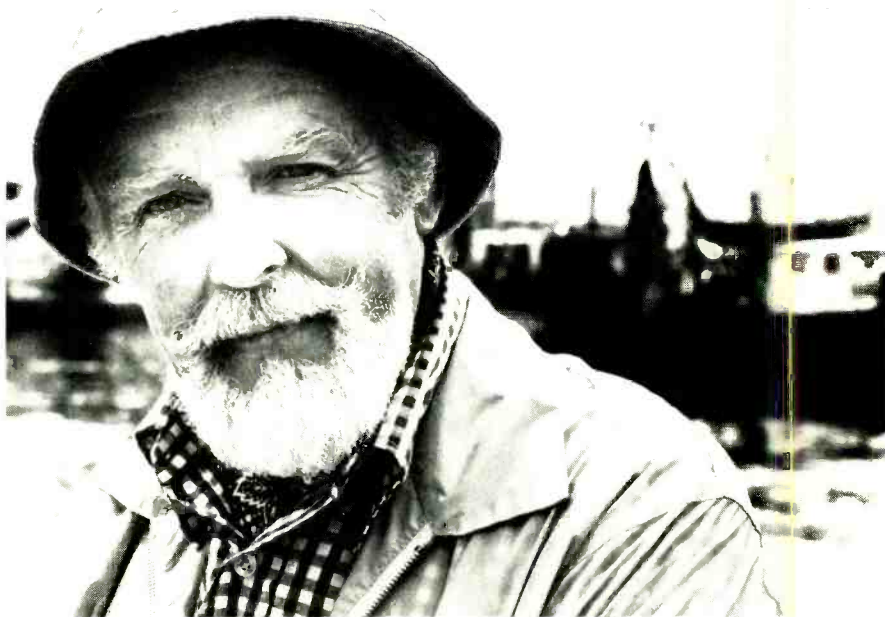
One winner was a show called "Eli and the Whale" which was produced at WCVB in Boston. It was an original story, written by local children's personality Bob Cottle, concerning a young boy who helps save his New England fishing village by bringing back the missing fish with the help of a whale.

Larry Jordan, co-producer and director of "Eli and the Whale," was faced with the problem of how to end up with quality animation without using traditional (and very expensive) animation techniques. Obviously, animation was out so what would go in its place?

"Our concept was that of an illustrated storybook," explained Jordan. "The sort of thing that would happen if you sat on your grandfather's lap while he read you a story and you would turn the pages with him and point to the pictures."

To accomplish that, Bob Cottle, who is also an artist, drew nearly 120 illustrations of his original story. Each of the drawings were mounted on a large plywood wall in the studio. Then everything was recorded on the station's one-inch machines (two Sony BVH 1100's and one RCA TR-1000) for later editing.

According to Jordan, "Each picture was photographed as a wide shot. We then took our camera and moved in for either an on-air zoom, or zoom in and out, or pan left, or followed some of the



*Bob Cottle is the author, artist and co-producer of "Eli and the Whale." The WCVB-TV children's personality lives in a fishing village on an island off the New England coast*

action, or took close-ups so that we would have within each drawing four or five additional details from the wide shot."

With the videotape in hand, Jordan and Cottle went into the post-production editing facility at WCVB and put the show together on a CMX 340X editor. But because of other considerations the show was not edited off-line and then auto-assembled.

"I did some screening beforehand to determine time code points and good takes and bad takes but we winged most of it." The "winging" included six days of nine hour sessions and 550 edits.

The final product was in four segments. The first featured Cottle on location at a fishing village setting the scene of the story. The next two segments were of the "animated" story. The final segment was a nature segment which, according to Jordan, had the premise of showing the young viewers some real whales. "We showed them

pilot whales, humpback whales and talked about ecology. We ended with the statement that, 'if we aren't careful and preserve the environment, the whales that we enjoyed in our story today will disappear'."

One interesting thing that Jordan did to get the effect of Eli riding the whale was to remember that sometimes an old technique can give the illusion of a complicated new technique: "We wanted to get a shot of Eli riding the whale at the mouth of the harbor. We had a mechanical, but although the mechanical looked really good, where it came up through the paper we could see a crack. We took the mechanical and mounted it on a chromakey card. Then we took the ocean and we split it into two parts. We split it into foreground and background so we had a three-part chromakey — foreground, midground, and background.

"We took the background and rolled it slightly out of focus and took the foreground and rolled it even more out

## TV Programming

of focus and put the midground — Eli and the whale — tack sharp. By panning on Eli and the whale and moving the mechanical and panning in the opposite direction in the foreground and zooming slightly on the background, we got this whole complex move of him swimming in the ocean with the depth of field that we wanted.

"It's about a ten second shot but it's definitely the highlight of the whole piece. It's a multi-depth chromakey which can be done on any double re-entry switcher. It achieves the illusion of depth without the expense of cell by cell animation."

Another illusion that was achieved

with "Eli and the Whale" was to liven up the story with superb sound. Jordan and Cottle spent four days in a sound studio producing what is in effect a high quality radio drama. In addition to the dialogue voice track there were 12 tracks of sound effects.

"You could take the sound track," says Jordan, "and play that and you wouldn't even need the pictures. We made it as rich as we could. That way, you could have pictures that were a little simpler but because your sound track is so lush the two of them complement each other. Your eyes are fooled into believing that there's more than is really there."

One thing became clear about "Eli and the Whale" as far as the people who put it together were concerned —

they all had fun. According to Jordan, "I know the equipment and this gave me a chance to really play with the equipment and make it sing. When you know how your equipment works and when you're using the equipment the way it can be used and you come up with a program that's that much fun . . . well, it was a great time."

### KSL aims for youth market

*Dimension 5* is a regularly scheduled magazine show that airs on KSL in Salt Lake City, Utah, every Saturday night. The show's aim is to deal with controversy, personality, places, and humor. While the show is targeted to a general audience there are periodic broadcasts aimed toward younger viewers.

The IRIS winner was one of the broadcasts for younger audiences. It featured three segments. The first was called "Concert Kids" which was a profile of musical prodigies Mary and Eugene Watanabe. At the time the show was produced, pianist Mary was 15 and violinist Eugene was 8. The segment followed the kids as they rehearsed and performed with the Utah Symphony.

The second segment featured the thespians at Edgemount elementary school in Orem, Utah. Each year the kids put on a Shakespearean play so hence the title, "Small World Shakespeare." According to Ed Yeates, KSL executive producer and producer of "Small World Shakespeare," "These kids really put their hearts and souls into it. They come out with all of the inflections that you would find an adult doing in a Shakespearean play." Yeates says that the plays have become such an institution around Orem that the kids even take the plays to the local high school for a performance or two.

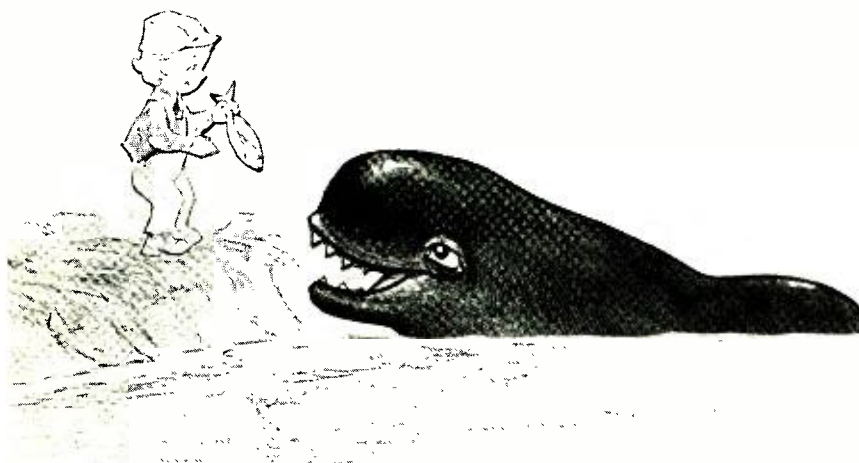
The third segment was on a local song writer, Brian Fetzer, who composes and performs children's songs with a message. Unlike the other two pieces, this one is done without narration. At the close of most *Dimension 5* broadcasts there is a segment called Parting Shot which is a visual essay. "Shim Sham Songster" was a performance by Fetzer.

Two of the segments were shot on film but the Special Projects Unit, which produces *Dimension 5*, has a complete one-inch editing system. The Ampex editor is hooked up to three Ampex VPR-2s and all the film is transferred to tape for final editing. The unit also has an RCA TK-76 attached to an Ampex VPR-20 portable recorder.

Last year, *Dimension 5* had four shows that were specifically geared toward the younger viewer. The station felt that broad appeal for a broadcast included non-adults. "We thought," added Yeates, "that we would try to

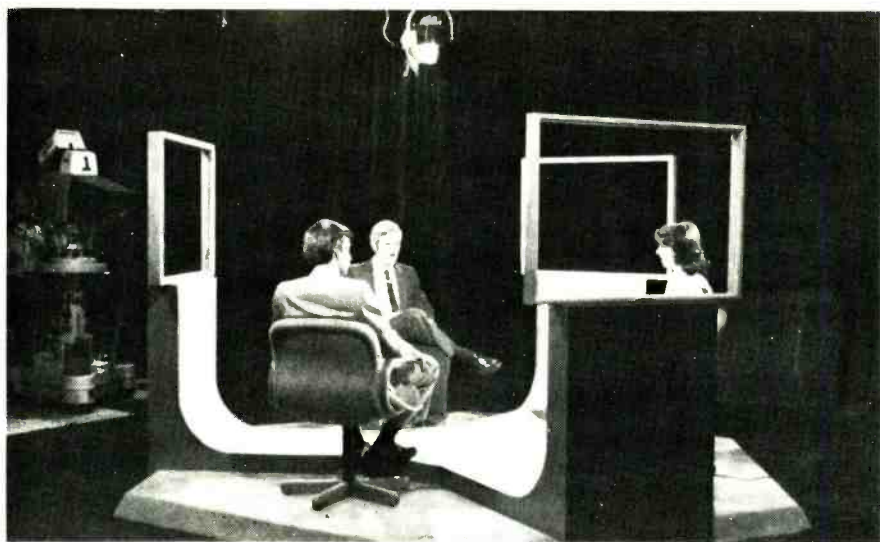


To get the proper depth of field of Eli riding the whale involved, at one point, a triple chromakey effect splitting the picture into foreground, midground and background



While the animation wasn't the usual cell technique, the vivid audio made up for the simpler visuals





Executive producer Ed Yeates (center) prepares to introduce "Small World Shakespeare" on that edition of *Dimension 5* of KSL-TV, Salt Lake City

cover a broad spectrum of the audience. We would try to appeal to adults in some areas and we would try to appeal to youth in some other areas.

"Most people who watch *Dimension 5* believe that they have seen something with some substance to it and rather than have fluff and stuff in kids programming, we tried to isolate a youth personality who has something to say."

#### A KOOL look at juvenile justice

The idea for "Juvenile Justice" came from the kids who regularly appear on KOOL-TV's young people's program, *Chapter 10*. Co-producer Bill Lucas said the idea came out of discussions with the kids when he realized that there were many myths about what happened to kids caught up in the juvenile justice system. "We thought that a show explaining the process might be a good way to show what it was like," explained Lucas.

The format was a dramatization of what would happen to a youngster accused of shoplifting from a convenience store. "since we weren't allowed to use a real juvenile defendant we decided to use one of our own kids so that everyone would realize that it was a dramatization."

But except for the role of the defendant, played by Jimmy Clark, everyone else involved with the show was part of the juvenile justice system. The judge was real, the arresting officer was real, the role of Jimmy's parents were played by juvenile probation officers, and even the shopkeeper where the alleged shoplifting incident took place had been involved in a juvenile shoplifting case.

The narrator of the show, who also played the part of Jimmy's lawyer, was the wife of Arizona Governor Bruce Babbitt. Hattie Babbitt is a practicing attorney.

An interesting twist to the program is

that the final verdict in the case was left up to the audience as to Jimmy's guilt or innocence.

"Juvenile Justice" took three days to shoot and was set up in five different locations. The production used the station's small EFP unit though only one Ikegami HL-79 camera was used. The truck was equipped with Ampex VPR-2 one-inch VTRs. According to Lucas, "it was the first show that we ever did totally on one-inch videotape." After the shooting, the tape was edited on the station's Datatron Vanguard editor.

A touch that added a bit of realism to the production was the isolation of Jimmy Clark from the other "actors." "Jimmy is a very likable kid," says Lucas, "and by keeping him from meeting the others in the production, until completion of shooting, they related differently. Also, Jimmy didn't have to do too much acting because he really didn't like being in that place . . . not one little bit."

*Chapter 10* has been on the air for about three years now and Bill Lucas finds doing a children's show fulfilling.

"It's one of the only areas left in local TV where you can let your imagination go. There is no call for some of the other things that I might like to do. We get all that from the network or from syndicators. But in children's programming there is a real good opportunity to do some good work . . . to try and entertain the public and try to educate them too," concludes Lucas.

Roger Ottenbach of KMTV was the chairman of the awards committee for NATPE and he felt that the number of entries in the children's programming category spoke well for the vitality of children's programming on local television. "There are" he added, "lots of bright, aware, and talented people at local stations who care about programming for kids." **BM/E**

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# O'LEARY



*"Each of us is the star in our own human drama."*

*Richard A. O'Leary is President of ABC-owned Television Stations, and of ABC International Television, Inc. He is responsible for the operations of the five ABC-owned TV stations and guides ABC's international relations.*

"I'm a believer in the competitive system. Above all, it motivates. In competing for viewer attention, variety creates a frame of reference for excellence, professionalism, integrity and character. Our system is such that it tests our character. And for me, character is all.

"Our stations became successful because of the heavy commitment we made to serving our local viewers. And our permanent and absolute commitment to achieving maximum honorable profit. Our news and information services had such a magnetic appeal that viewers made the effort to tune in to us when the traditional 'local' periods came up.

"With the arrival of cable and other alternatives, the viewers are naturally going

to have more choices. They're going to have more kinds of programming available to them, in the same way that bookstores are filled with books. That doesn't mean our place in the sun shouldn't be better for it. There really are endless opportunities here for us in local broadcasting.

"No programming form is bad unto itself. Examples of those forms can be good or bad. And I don't find any one form inherently better than another. They all have a right to exist. Like the novel in 18th-century England. It evolved, producing good novels and bad novels. My own opinion of whether a particular program is good or bad comes when I ask myself a simple question: Does this enhance, or demean the human condition? One's own instincts make that fairly easy to decide.

"Ours is a motion picture society. That's why our television looks a certain way. That's also why I have to acknowledge the specific advantages that only film can provide. That 'look,' for example. Certain subjects lend themselves to film. You know they wouldn't have the same impact on any other medium. Film has served us extremely well, and will certainly continue to do so. By the way, when I think 'film,' I think 'Kodak.'

"In making sense of our environment, each of us is the star of our own human drama. If we, as broadcasters, can coordinate all these human dramas to a purpose, hoping that each person finds enlightenment, then we're doing a good job. Television, in that sense, seems to be the lightning rod of today. I'm in it all my waking hours: it's my life; and I love it."

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# KCST-TV SAVES

**“RCA TK-47 cameras cut set-up time and lighting costs, made troubleshooting easy, and increased our commercial production”**

... Tom Wimberly, Chief Engineer  
KCST-TV, San Diego, California

KCST-TV went through some painstaking steps before they added four new TK-47 studio cameras. They even set up a side-by-side comparison study with six other cameras.

According to Tom Wimberly, Chief Engineer, it was no contest. A technical committee judged the TK-47 to be far and away the best studio camera available. Best in automatics, best in picture quality, best in cost effectiveness and best in all around performance.

That was “before”. What about on-air performance after a year of operation? Here’s what Tom Wimberly has to say:

“The TK-47 cameras have resulted in substantial cost and manpower savings. We’ve cut camera set-up time from an hour to less than ten minutes. Our studio lighting costs have dropped \$400 per month.

Camera maintenance is cut a whopping 48 hours a week. We were concerned initially about the complexity of the TK-47, but we worried needlessly. The camera is extremely reliable. When we experience an occasional problem we find that the microprocessor control makes the TK-47 easier to troubleshoot than any other camera. But best of all, we’re getting unmatched picture quality, and that’s helping us build our audience and double our commercial production.”

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# CHICAGO CONSPIRACY HATCHES PLOT FOR BETTER AUDIO

**Today's technology is already capable of providing radio and television audiences with much better sound than they currently receive. A group of radio broadcasters, television broadcasters, post-production specialists, and cable television producers are cooperating to bring an end to "cheap" sound.**

"FOR ANYTHING YOU'RE PRODUCING in the 1980s, you'd be foolish not to produce it in stereo," said Phillip Byrd, executive producer of Bravo Performances. Byrd is a member of a growing conspiracy that aims to bring high fidelity stereo audio to the television viewer. Other members of this group include engineers, producers, station managers, audio producers, and a host of technicians that have decided to end the "chicken and egg" dilemma that has for so long stalled any real progress in television audio.

Chicago is the hotbed of this conspiracy. Not only is it the site of the EIA-sponsored on-air testing of multi-channel sound for television (see sidebar) but it is also home to WTTW/Channel 11, a partner in the tests and purveyor of high quality simulcast programming. WTTW will air more than one hundred such simulcast programs this season working with WFMT as its "fine music" partner and WXRT-FM as its rock 'n roll and progressive music partner. Another major conspirator is Optimus, an unusual production and post-production house in downtown Chicago specializing in recording major musical events in full stereo to provide its clients with the best audio possible to go with their pictures.

Bravo, the nation's first "performing arts" television network has been an Optimus client for some time, using the Optimus post-production and sweetening facilities to assure its CATV viewers of the quality they expect to be present in programs originating in the country's finest



*Bravo Performances' production of the Cleveland Orchestra is just one of the many programs now being offered to television viewers with stereo audio. Bravo distributes via satellite to CATV systems*

## Chicago Conspiracy For Better Audio

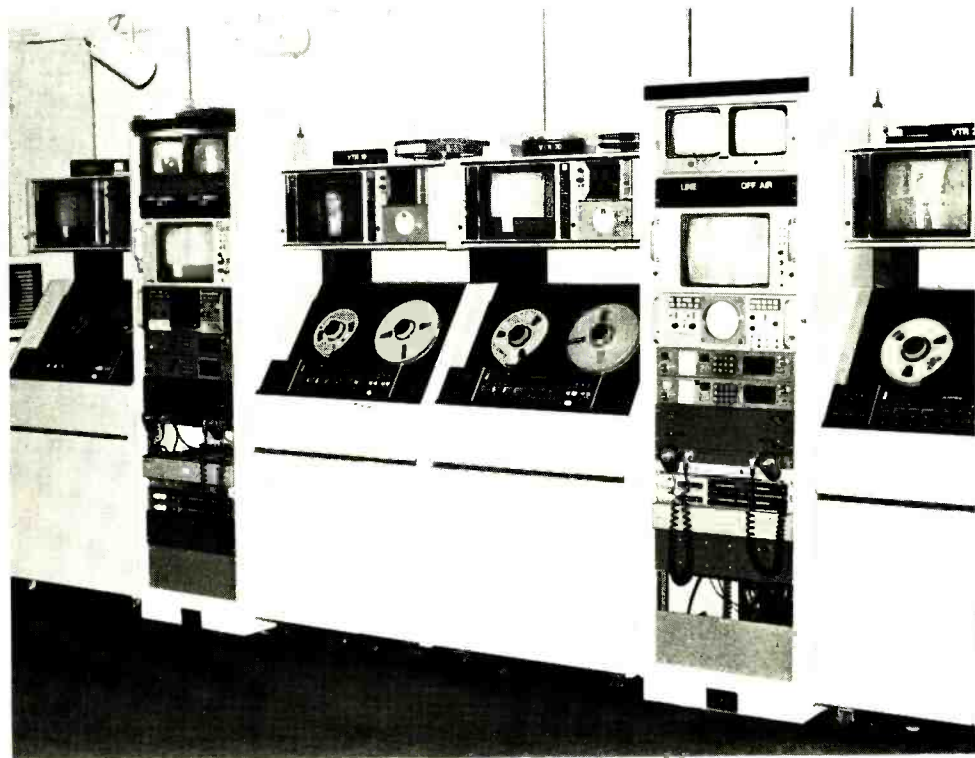


*Accounting, take note: You may find an expense line for tuxedos on engineers' next expense report if they go after a classical music audience*

opera houses and concert halls. Bravo is located on Long Island, in New York, where the hi-fidelity conspiracy spreads. Bravo now has built its own audio/video posting operation to handle its programming and has incorporated many of the techniques established at Optimus by Larry Eskridge. Eskridge has left the Optimus operation in the capable hands of another audio quality combatant. George Slominski, and moved himself over to WMAQ-TV, the Chicago NBC affiliate. There, Eskridge is manager of studio operations and is planning two new audio editing and sweetening facilities as part of WMAQ's expanding post-production commitment. WMAQ, itself recently originated a "Beach Boys" concert which they simulcast in stereo with their FM sister station. Thus, the movement grows.

Ultimately, the hi-fidelity audio strategists reason that with enough public exposure to high quality audio in the company of television pictures, the masses can be aroused. Once confronted by a stimulated public, receiver

*The VPR-2 installation at WTTW now employs Dolby equipped audio sections for a 68 dB S/N*



manufacturers will get off their duffs and hatch an appropriate receiver. By no means do the audio conspirators see the home VCR, videodisc, stereo-capable CATV, or any of the other emerging entertainment systems as "foxes in the henhouse," but rather as a clutch of new voices adding to the clamor for better audio. It is partially these new media that encourages Byrd to believe that all new production for the '80s should be done in stereo. Stereo sound tracks represent a prudent investment in the future value of today's show which may wind up at some later date on disc, videocassette, or even as a re-run on a stereo-capable broadcast television system of the future.

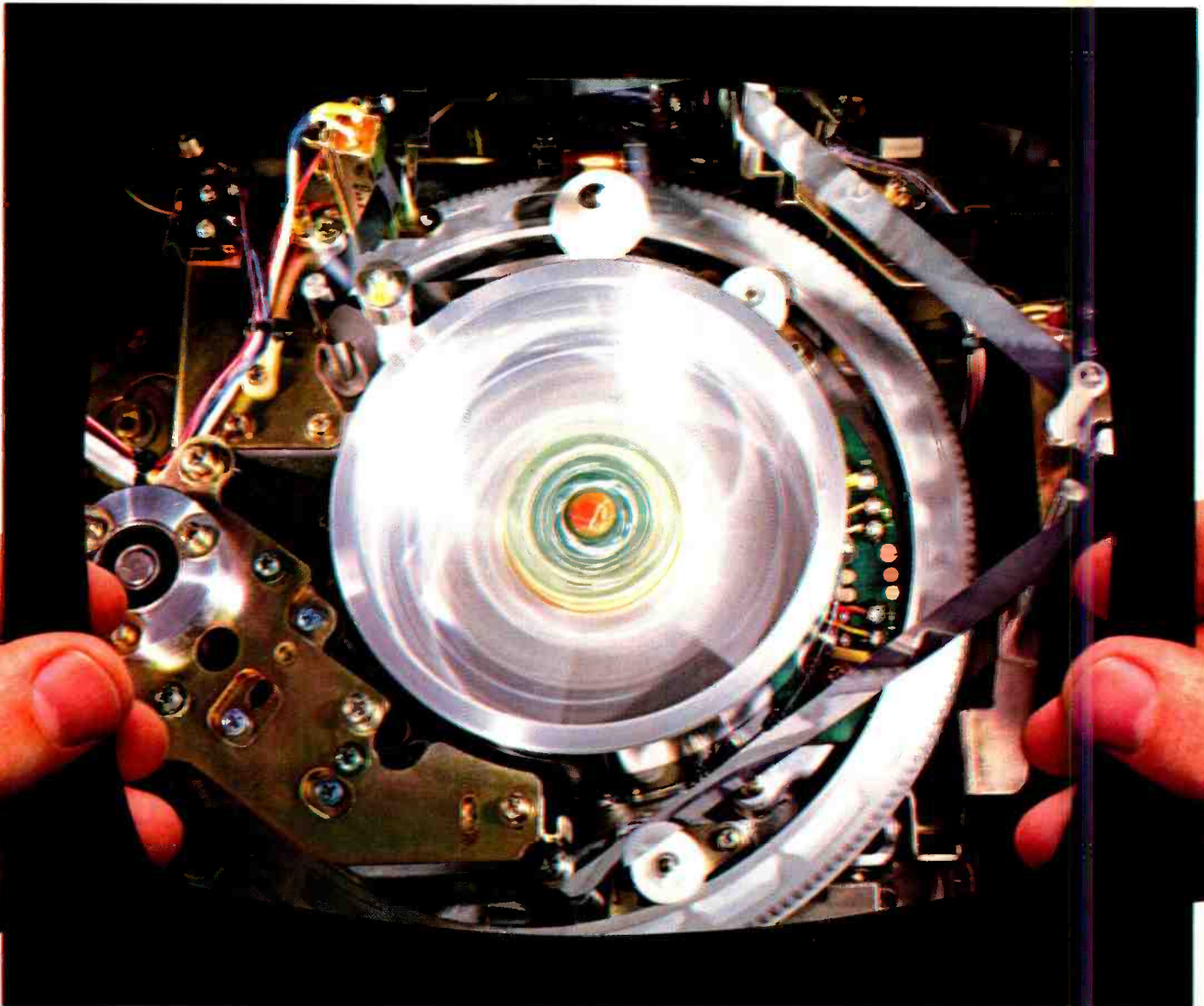
In the meantime, simulcasting of concerts, operas, ballet, and similar events is seen by many as an exciting way to bring lively entertainment to today's audience using today's technology. Seth Mason, general manager of WXRT, points out that his progressive station "gains credibility" with its current audience, and exposure to new audiences, with its participation in WTTW's *Soundstage* series of rock and popular concerts. "When *Soundstage* features an artist we do play, we get our own audience plus the television audience. And, even when they feature an artist we don't play, like Barry Manilow, we maintain a lot of our regular audience, get the TV audience, and a lot of Manilow fans that would normally be listening to his type of music on some other station." Mason sees his audience as somewhat older — not teens — and as intelligent. "When we carry *Soundstage* people perceive us as participating in something progressive; something exciting."

### WTTW, a good TV station to listen to

WTTW is a community-owned television station and local outlet for PBS programs. It carries "Live From The Met" and "Live From Lincoln Center" in simulcast as part of the PBS network. It is also becoming a major producer of programs for national distribution and is currently doing three series under the titles of *Sneak Preview*, *Soundstage*, and *The Paper Chase*. It was the start of the



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## Chicago Conspiracy For Better Audio

*Soundstage* production six years ago that gave impetus to doing multitrack audio recording for stereo simulcast broadcast.

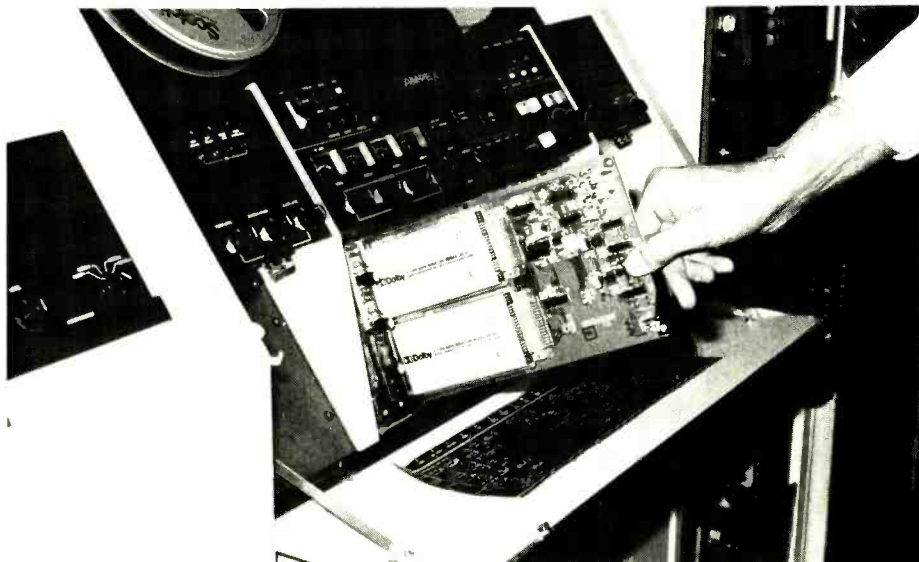
In 1973, a local producer, Ken Erlich, proposed doing a show called "Made in Chicago" which would be recorded in stereo and transmitted the same way. WTTW had only single program audio channel quad VTRs so it took a few months work to improve the quality of the cue track on the quads, and they were able to air the first stereo simulcast on WTTW. The public reacted favorably; the producer enjoyed doing it; a local CBS-FM station donated the radio air time, and a few local Emmys were won in the process. Stereo ended its days as "stepchild" to television and stereo became the way to greater things at WTTW.

Eventually, three Ampex quads (two VR-2000s and one VR-1200) were equipped with custom-built stereo audio heads using 10 mil guard bands (as the two channels were never intended for unrelated sounds tracks such as those used for multilingual broadcasts). CMC built the special heads and Innovonics provided the stereo audio electronics. Though there was no SMPTE time code then, WTTW could record and playback stereo and even do a little electronic editing with a CMX 300 system.

*At Optimus, Type-C Sony BVH-1100s are employed with the CMX-340 editing system*



*The use of the Dolby plug in noise reduction boards has proven operationally simple at WTTW*



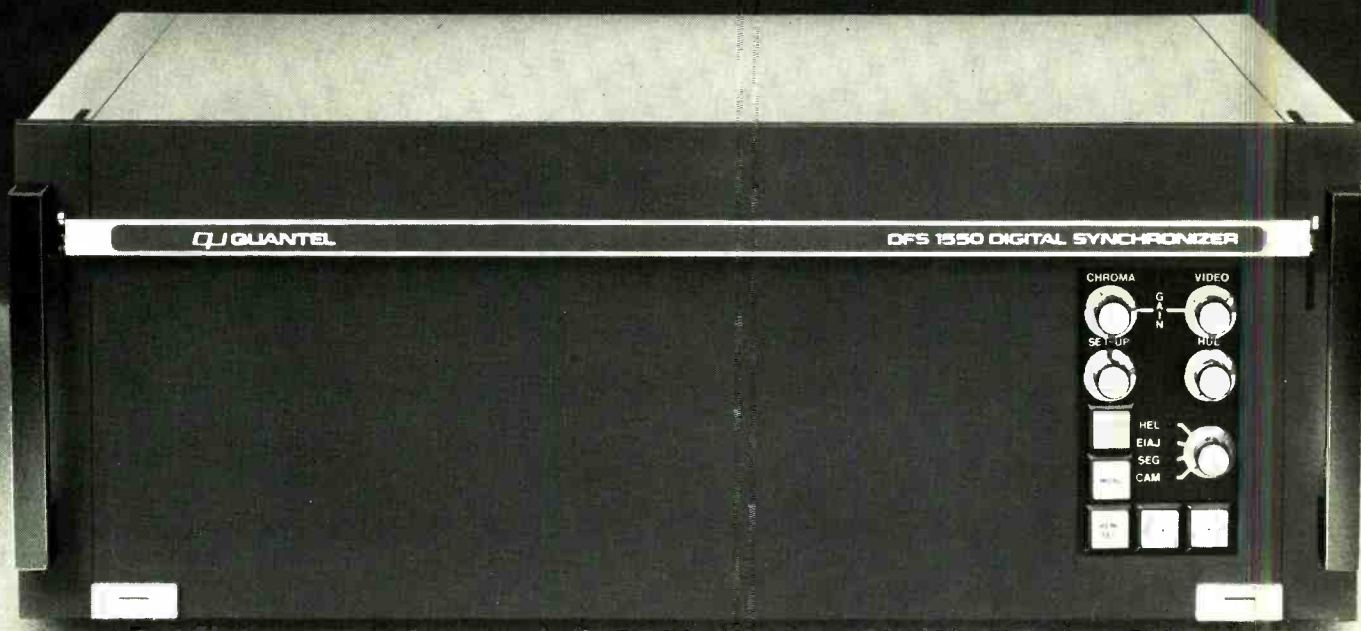
The quad VTRs continue to this day to be the work horses of stereo operations and they now utilize Dolby noise reduction units to achieve the best quality stereo sound possible on these audio limited machines. When the audio heads were split for stereo, signal to noise dropped an unacceptable 9 dB but with the Dolby encoded signal, WTTW is able to retrieve 55 dB. According to George Slominski, stereo separation "is probably on the order of 28 dB." WTTW also uses Dolby noise reduction on synchronized audio recorders to produce playback tapes for stations not equipped with stereo quads.

For the past two years, all of the *Soundstage* series — featuring such well known musical groups as the Manhattan Transfer or the Doobie Brothers, and singles like Emmylou Harris, Gordon Lightfoot, and Ella Fitzgerald, — have been simulcast via these stereo equipped quad VTRs. Currently, WTTW is switching over to one-inch helical Type C VTRs and this provides for even better sound quality.

There are four Ampex VPR-2 recorders now installed at the station, and the first machine was detoured through Dolby Labs in San Francisco to have Dolby noise reduction installed. It was this unit that Dolby used as a test bed for development of their Dolby noise reduction boards for plug-in installation on one-inch machines. The other three Ampex VTRs operated meanwhile at WTTW with the rack-mounted Dolby units. Now, all of the one-inch ma-



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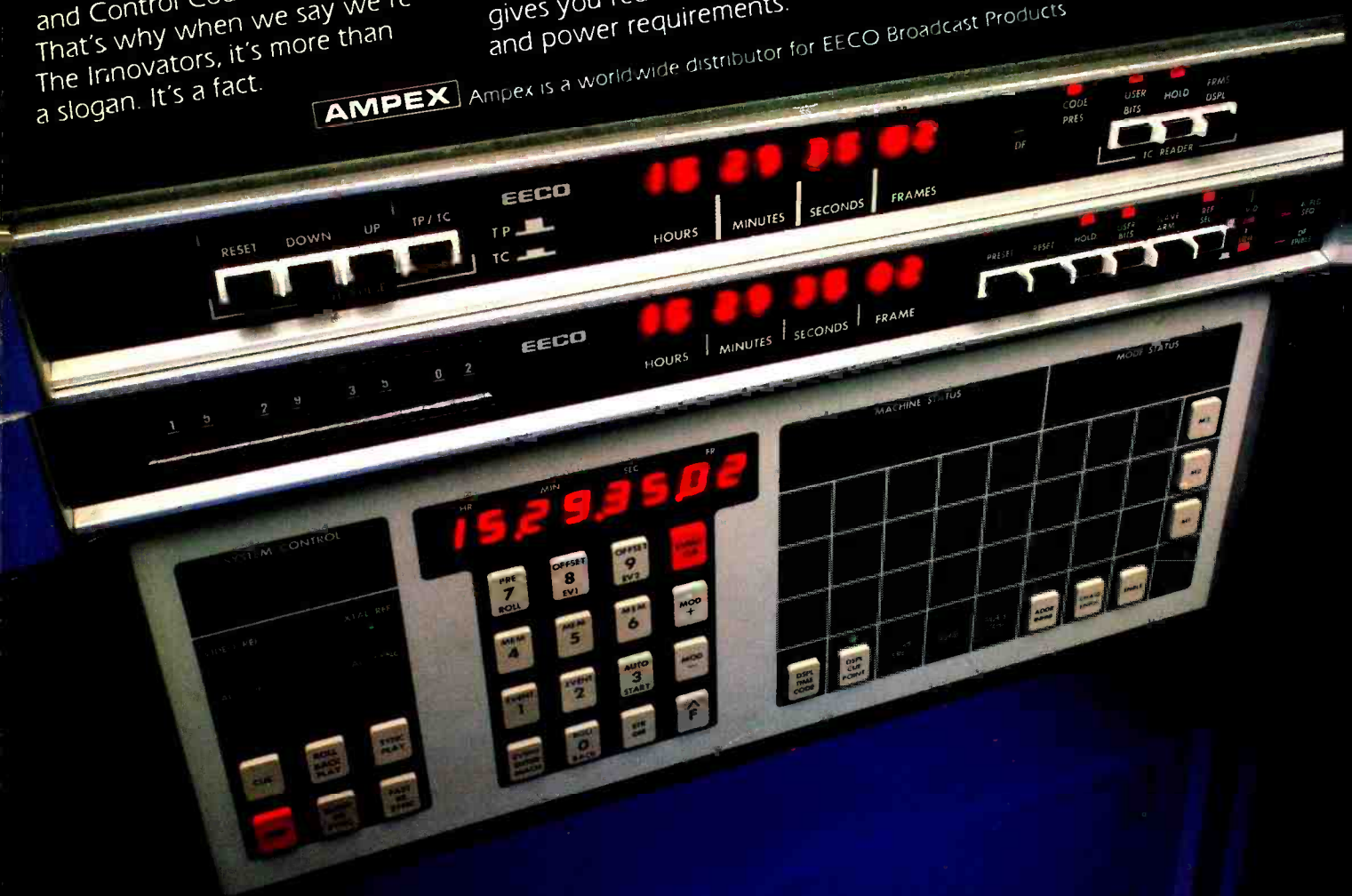
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## Chicago Conspiracy For Better Audio

chines have been equipped with the plug-in Dolby noise reduction modules and Slominski reports a 68 dB S/N ratio. Without the modules, the recorders were delivering about 58 dB.

The natural objective when audio is of the utmost concern is to capture the best sound possible and preserve it at levels nearest to its original quality. To avoid multiple generations of audio on the VTRs, WTTW records the original studio sound on multi-track audio recorders, then mixes down to stereo, where that set of signals is Dolby encoded and recorded on the stereo sound tracks of the VTR. With careful attention to calibration, even several dubs between VTRs can be tolerated.

On the two-inch quad VTRs, noise reduction made the difference between using or not using stereo. Once that hurdle was cleared it led to a more critical appraisal of the other elements in the studio sound chain. The mic placement techniques were scrutinized and a new selection of microphones made; dropping from the line-up many of the conventional broadcast mics for those better known in the studio recording industry. Even with better microphones, however, producers at WTTW still did not want microphones in the picture so new techniques had to be developed to place microphones with an eye to the picture, an ear to the audio, and a tight hand on the purse strings.

### Stereo at Optimus

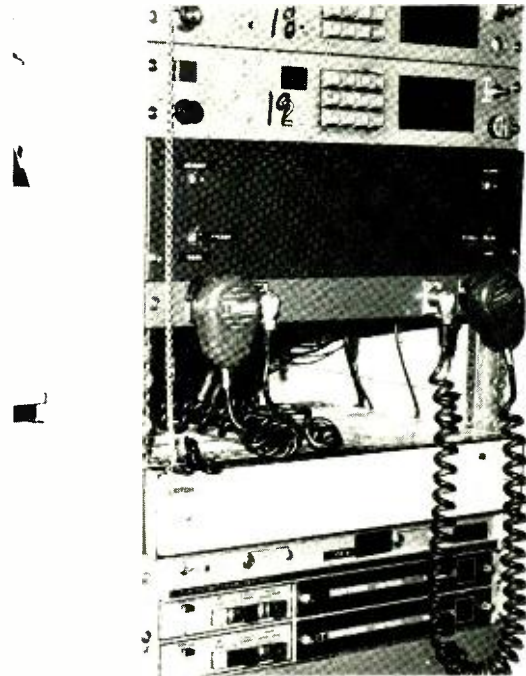
Jimmy Smyth started Optimus as a film editing company in 1973 and soon found that the editing market was going video, and that 3/4-inch VTRs were the closest thing to the film Moviola in the electronic realm of 1973. Though many clients wished to do off-line editing on the U-type systems, Smyth was dissatisfied with the quality of the film-to-tape transfers he was getting. This led him to acquire on-line quad and one-inch helical editing systems as they became available. To this, Optimus added their own telecine system and employed scene-by-scene color correction as part of the normal post production system. In 1979, Optimus moved to a new facility set-up to handle full post-production in both film and video formats.

The equipment at Optimus in the "on-line" rooms includes RCA TR-600 quads, RCA TH-200 one-inch helical VTRs, a Grass Valley 1600 switcher, NEC digital effects, and a TK-28B telecine with a scene-by-scene color correction system from Armand Serabian's Corporate Communications (this system is now marketed by Fernseh). A Chyron IV graphics system is also included in the chain. The two off-line editing suites employ Sony 2860s and GVG 1400 switchers. Full CMX editing is used at Optimus with the 340X for on-line and the CMX-50 for off-line. There are also four full film editing suites to handle 35-mm and 16-mm film.

One of the special technical aspects of Optimus is the dedication to good sound quality on everything they do. Their experience with film, where separate system sound produces very good quality, led to a relative dissatisfaction with audio on the videotapes received. Larry Eskridge, then the chief engineer at Optimus, decided to make a special effort to improve the audio of videotapes.

The decision to upgrade audio got a big boost when Optimus was contacted by Bravo Associates out of Long Island, who were doing classical and folk music concerts

all over the country and wanted better than average sound for their programs. Bravo was already using Dolby encoded noise reduction for their one-inch helical Type C field recordings. They wanted Optimus to do the post-production and they wanted the Dolby encoding pre-



Prior to the availability of the Dolby boards, rack-mounted noise reduction units were employed (lower center)



Larry Eskridge, former director of engineering for Optimus, has moved over to NBC's Chicago station where he carries on the struggle for better audio



Larry Ockert, director of engineering at WTTW is a strong proponent of better audio and has led his station to employ the means whereby it can be accomplished

## Chicago Conspiracy For Better Audio

served. Optimus took the opportunity to equip themselves appropriately.

When Bravo programs arrived in stereo, Optimus played them back with their own Sony BVH-1100 units equipped with the CAT 155 modules from Dolby. The



*Bravo is bringing music to a wide audience with varied tastes. Above, a performance of the Canadian Brass Quintet*

### EIA Aiming for August Completion Of Multi-Channel TV Audio Tests

The Tests of several systems for incorporating multi-channel sound (including stereo) into television, organized by the Electronic Industries Association to develop recommendations to the FCC, were within sight of completion at *BM/E's* press date in late June. The EIA now believes the tests will be finished by late August.

After the tests are done, the preparation of a report, will take several months, and the EIA projects submission of the report to the FCC at the beginning of 1982. As EIA's Ed Tingley pointed out to *BM/E*, a vital part of the whole project will be getting a united industry front on the recommendations. This presumably would encourage the FCC to move quickly in choosing a system, avoiding unconscionable delays like those that have brought AM stereo to a standstill in spite of large industry need and desire for a system.

The multi-channel tests have included a long series of closed-circuit tests carried out at the Quasar laboratories in Chicago. Over-the-air tests are being transmitted by public station WTTW in Chicago. A few of the dozens of factors checked have been the compatibility of the different signals with existing TV receivers; interference between the subcarriers for the additional audio channels and the regular channel; and performance of the various systems on typical cable TV headend equipment, an increasingly important part of the users of the system chosen.

An important series of the over-the-air tests have compared various companding systems for improving the signal-to-noise ratio. As did the shift to FM stereo, the shift to stereo in TV will entail a substantial loss of the margin over noise, and getting some of it back with companding has seemed to the committee essential to acceptable performance.

The three systems under test are the Japanese EIA system, in active use in Japan for about three years with good success; a system developed by the Zenith Radio Corp.; and one developed by the Telesonics Corp. of Chicago. Heading the EIA test Committee is Tom Keller of PBS.

system worked well and over the first six months of use there was no need for further maintenance of one-inch machines other than normal tone calibration. One objective for improving audio had been met: It was kept simple.

The sequence for audio on a field recorded tape is to re-record the stereo sound on an in-house edit master tape with Dolby. This maintains the quality of the audio intact until a final edited dub can be made. When necessary, the audio tracks from incoming tapes are laid off on a multi-channel ATR-104 audio recorder and then transferred with encoding to the edit master videotape. The ATR-104 is run at 30 ips to get the best wideband audio quality at this stage.

Careful listening tests have been conducted and the results presented to commercial clients of Optimus. Many commercial producers have now opted to follow the production and post-production steps established for Bravo in order to obtain the higher quality audio even though they realize that the ultimate sound track will be monaural.

Now that Bravo has set up its own posting operation, they have elected to stay with the techniques established at Optimus. According to Byrd, quality audio is essential to the type of "performing arts" programming they do. The audience, said Byrd, has to get a sense of "the enormity of opera—how big it all is—and they can get this sense by opening up the audio."

All Bravo productions are done using one-inch VTR recordings. On one of the most recent productions, "The Greek Passion" from the opera hall in Bloomington, Ind., the now classic approach was used.

Since Bravo programs are recorded proscenium-type performances, a great deal of attention is given to avoiding interference with the normal run of the show. Bravo records several performances and selects the best portions for inclusion in the final master version.

In Bloomington, Bravo used the TPC truck out of Pittsburgh. The mobile production unit is equipped with TK-47 cameras, of which Byrd speaks highly in this environment, and provides an Audiotronics 44-channel mixer for audio. Audio producer, Vic Muenzer, used only eight microphones, a stereo pair for the orchestra, four microphones taped across the stage floor, and two more microphones overhead in the auditorium for ambient sound. The four stage microphones consisted of two directionals on the inside and two omni-directionals on the outside of the array. The orchestra mics were directional and the house mics were omni. All microphones used were Cheops.

The audio was run back to the truck where the stage mic levels were ridden by the mixer operator, Sam Chapman. Some small compression was used on the vocals to compensate for the wide range and variety of sound that is picked-up in a situation of this type. A Lexicon Electratone 224 reverb unit was employed to provide the proper psychoacoustic "feel" of the concert hall. All audio was Dolby encoded directly on the Ampex VTRs.

The recorded performance, when ready for post-production, is transferred to an edit master. The same steps are employed as those at Optimus so that the air tape is never more than third generation audio. Byrd is confident that current technology is more than adequate to the task of providing high quality stereo audio for television.

The others in this conspiracy, like Byrd, believe that once the public gets a taste of good stereo audio, along with their diet of television pictures, better audio will be perceived as a staple and not just a condiment. **BM/E**



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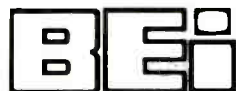
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# STEREO AUDIO TECHNIQUE FOR TELEVISION

By Peter B. Scharff

**Now that broadcasters are giving serious consideration to producing stereo sound tracks for television production, here is an intensive course on how to do it right.**

AT ONE TIME, not very long ago, all television shows were transmitted with only monophonic audio. Virtually all network audio lines had a bandwidth ranging from 100 Hz to 5 kHz, at best, and had a dynamic range often less than 50 dB.

Today, however, there are stereo simulcasts with FM radio stations, and proposals are being submitted for stereo television sets (already a product in Japan). Videodisc players and videocassette recorders are being produced with stereo capability, and network audio lines are now flat from 50 Hz to 15 kHz, with dynamic ranges often exceeding 70 dB, and with stereo capability.

As a result, more and more television programming is being produced in stereo. Unfortunately, much of this programming is being produced utilizing the same equipment and techniques which were barely suitable for mono reproduction through a tiny TV speaker.

Consider, for example, tape recorder set-up. When a pre-recorded videotape is played back, it is adjusted for such features as video, set-up and chrominance level, and subcarrier phase. On quad machines, the equalization of the heads is carefully adjusted to prevent banding. As far as audio is concerned, however, virtually all VTR operators simply do a quick check to see that tone plays back at 0 VU.

Contrast that to the situation in an audio studio, where more time may be spent setting up an ATR than a typical operator spends on a VTR. First, head azimuth is carefully adjusted, and then each track is equalized for both low and high frequencies.

In the old days of low frequency mono, VTR azimuth

and equalization were not vital adjustments. With high fidelity stereo, they are. However, such adjustments cannot be made from a single, 1-kHz tone. Therefore, a series of tones—a standard audio sweep—must be recorded at the head of a tape. Similar care should also be taken before recording, in terms of bias and other adjustments.

In the old days, all audio mixers strove for a good mono mix. Those recording stereo today often strive for a good stereo mix. Unfortunately, now, and for many years to come, the bulk of the audience for any television show will listen in mono, and a good stereo mix is not always compatible with a good mono mix. Therefore, it is important to monitor both in stereo and in mono. Wherever it is possible to record separate mono and stereo mixes, that should be done. If it's impossible, care should be taken in the stereo mix to avoid "center channel build-up" and phasing problems. One way around the mono build-up problem is the use of left, center, and right mixing channels, which can then be combined, through appropriate level adjusting matrices, into left, right, and mono outputs. This is the approach used in "Live From Lincoln Center's" new mixing facilities.



*Engineer Gino Lombardo operates the SCI custom-designed console for "Live From Lincoln Center," perhaps one of the best known purveyors of high quality audio for TV*

**Peter B. Scharff** is president of Scharff Communications, Inc., New York, N.Y. Scharff rents equipment to the film and television production industries and specializes in audio systems for video production.

## Stereo Audio For TV

### Achieving proper phase

Phase is critical in stereo, but is often ignored. Of course, all of the cables used in a facility must be phased properly. That's rarely a problem in XLR-XLR microphone cables or ¼ in.-¼ in. patch cables. Unfortunately, adapters from XLR to ¼ inch or from screw terminals to either connector type are often phased differently every time they're wired. Adopt a convention, post it everywhere, and stick with it.

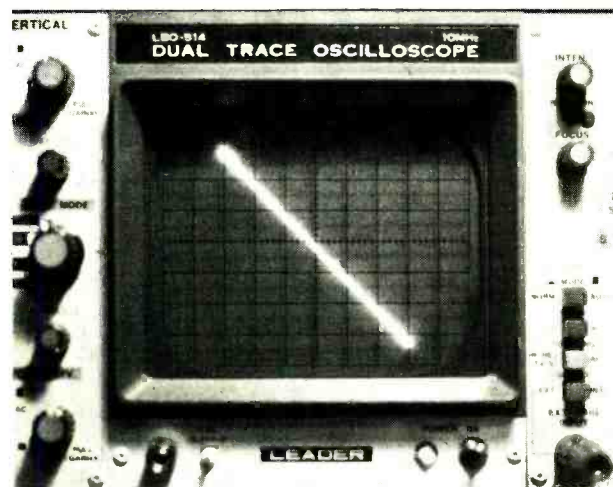
To check phase in a stereo production, the ideal tool is a phase scope. Virtually *any* oscilloscope can be turned into a phase scope, simply by feeding the left channel to the vertical amplifier and the right channel to an external horizontal input. Since there is no need for horizontal sweep (nor any need for precision calibration or high bandwidth), even old, broken scopes will do.

A Tektronix 602 Display Unit being used as a vectorscope can be easily adapted for use as both a vectorscope and a phase scope, simply by adding some external switching.

A quick glance at a phase scope instantly conveys information about stereo separation, phasing, channel balance, and even distortion (which appears as a squaring of the edges of the phase diagram). The phase scope is particularly useful in editing, where only one out of a



With the same equipment, stereo appears out of phase (top) . . . and then (bottom), adjusted properly for stereo phase



A simple scope can be used to detect stereo and monophase. Here, mono is shown out of phase (top) . . . And here it is in phase (bottom)

dozen reels might have been recorded out of phase.

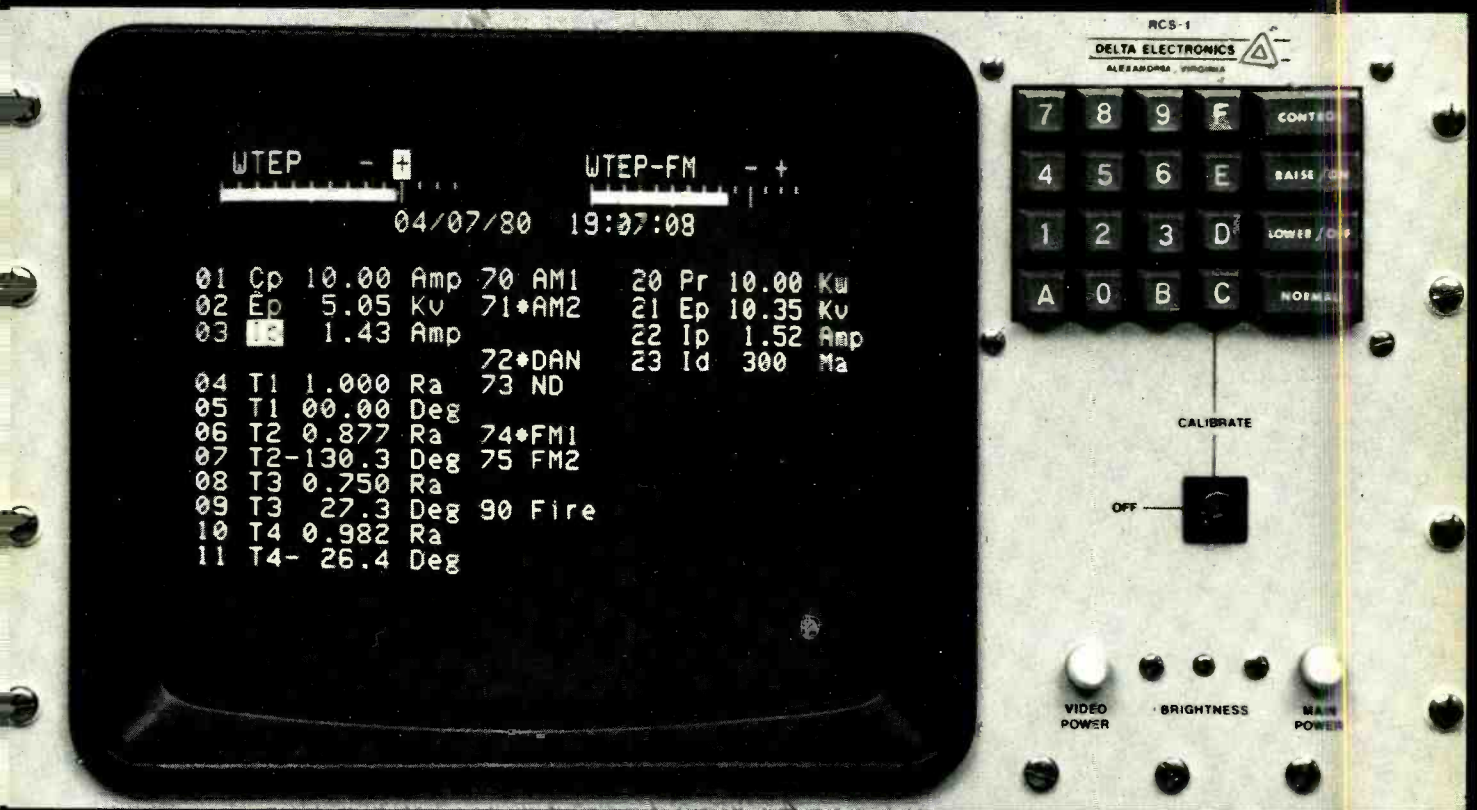
Cable and equipment phasing is easily detected. Microphone and speaker phasing is too, as long as the appropriate equipment is used. In this case, the appropriate equipment is a "popper" set. The transmitter is held in front of the microphone to be tested and produces pops, the acoustic phase of which is always the same. A receiver held in front of a speaker then indicates, usually through red or green LEDs, whether its detected phase was the same as the transmitter's. Most transmitters also include a connector for feeding appropriate electronic pulses into a system, and most receivers include a connector for detecting those pulses' pre-speaker. In that way, phase can be checked through an entire system.

Improper microphone phasing might go undetected in stereo, only to cause problems in mono, later on, another reason why mono and stereo should be alternately monitored.

There is little question that the audio quality of the new 1-inch VTRs exceeds that of their quadruplex predecessors. However, it does not equal that of state-of-the-art audio recorders. For that reason, and the fact that video editing and distribution will almost certainly add several generations of re-recording problems, some form of professional noise reduction system should be used to reduce tape hiss and/or provide more headroom before reaching saturation. These noise reduction systems, however, require extra care in the alignment and equalization of a VTR.



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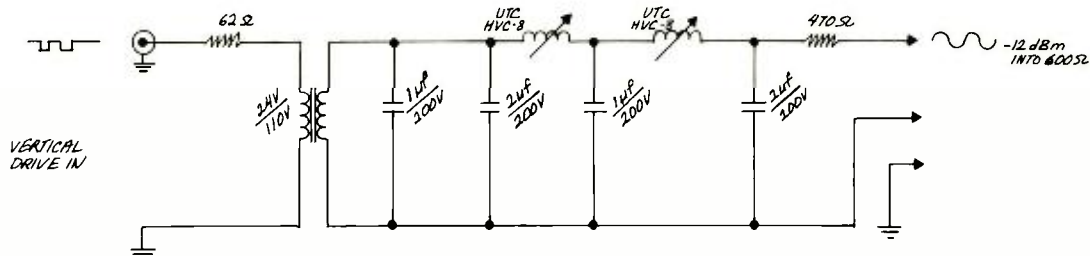
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## Stereo Audio For TV



Stereo audio technique for television

If Dolby A noise reduction is used, be sure to record "Dolby Tone" as the very last item in your audio test signals at the head of each tape. The distinctive tone will let operators down the line know that they should switch in Dolby A noise reduction, and will give them a reference level, regardless of the convention used for the frequency sweep.

### Proper use of SMPTE time code

Even if the quality of the audio tracks on the new VTRs exceeded that of two-track audio recorders, there would still be times when it would be necessary to record audio information synchronously on a separate machine. Just as a dissolve in editing requires two video machines, an audio mix requires multiple tracks. For that reason, it is often desirable to record audio on a multi-track (8, 16, 24, or 32 track) audio recorder, and lock it to the video recorders through SMPTE time code.

In recording, the process seems extremely simple: Just record SMPTE time code on one of the tracks of both the audio and video machines. In editing and mixing, it often becomes apparent that the recording process is not as simple as it appears.

If, for example, the time code being recorded on the audio machine came from a separate time code generator, perhaps in an audio mobile truck, that generator may not have been locked to the video facility's sync generator. The time code thus recorded is useless. Never use any time code that is not locked to video sync. (Note: in most cases, it is not necessary for the video time code and the audio time code to use the same numbers at the same time—most synchronizers and editing systems can adjust for the offset).

If time code is recorded on track 1 of a 24-track recorder, it may require some rewiring in a studio accustomed to getting time code on track 24. On the other hand, if time code is recorded only on track 24, tape edge damage may cause problems. Therefore, if the tracks are available, record time code both on the last track and on the next to the last.

Since time code is a very energetic signal, apt to "splash" into adjacent tracks, it is customary to leave a guard band track between time code and desired audio. Fill this guard band with a 59.94 Hz reference signal.

If there's a problem with time code on a video tape, new code can always be re-recorded. The video tape's speed is locked to house sync by the recorded video. Unfortunately, there is nothing characteristic to an audio signal that can be used to lock an audio recorder to house sync if

there's a time code problem. The 59.94 Hz component of video, however, can easily be filtered (through a simple low-pass network) to a sine wave. The same sine wave can be derived from a number of sync generator outputs, of which "V-drive" will usually result in the highest level. This sine wave is a very gentle signal and will not "splash" onto adjacent tracks. It can, therefore, be recorded in the guard-band track. Should anything happen to the time code, this signal can be used to lock an audio recorder to house sync.

There are a few other things to be careful of when using time code. Be sure the numbers always increase over the course of a tape, including the area used for bars and tone. Otherwise, when the machine is told to cue to a certain point by an editor or synchronizer, it may spin the tape off completely. Exercise caution if you're using "time-of-day" time code and a show will run over midnight.

Never record SMPTE time code that is being played from a tape. Always regenerate such code by feeding it to a reader/generator combination if you need to use the same numbers. Adopt a convention for the use of drop-frame and non-drop frame code and stick to it. Many editors and synchronizers claim to be able to deal with a mixture, but others can't. Drop frame time code runs at clock speed, but, to do so, it drops two frames every minute except every tenth minute. This can cause problems in computations of offset, event durations, and so on. Non-drop frame time code has no computational problems, but gains 3.6 seconds every hour over clock time.

Finally, if a multi-track audio recorder is not available, but audio should still be recorded separately, try using a servo-motor recorder or one with a self-resolving system (such as a Nagra). Video sync will be virtually constant from facility to facility and day to day, so a recorder playing at constant speed should be able to maintain synchronism for a fairly long time. Do not use a machine with a synchronous or induction motor. While power lines exhibit extraordinary long-term frequency stability (they are adjusted nightly), their short-term stability is awful, and a synchronously recorded tape is unlikely to maintain video sync for even a very short take.

None of the suggestions in this article should take very much effort or cost much money. Equipment that will be used only occasionally (such as multi-track recorders or noise reduction units) can be rented as needed.

Yes, the broadcast video bandwidth is 280 times larger than audio's, but that doesn't mean you should spend one two-hundred-eightieth of your budget or effort on half of your finished product.

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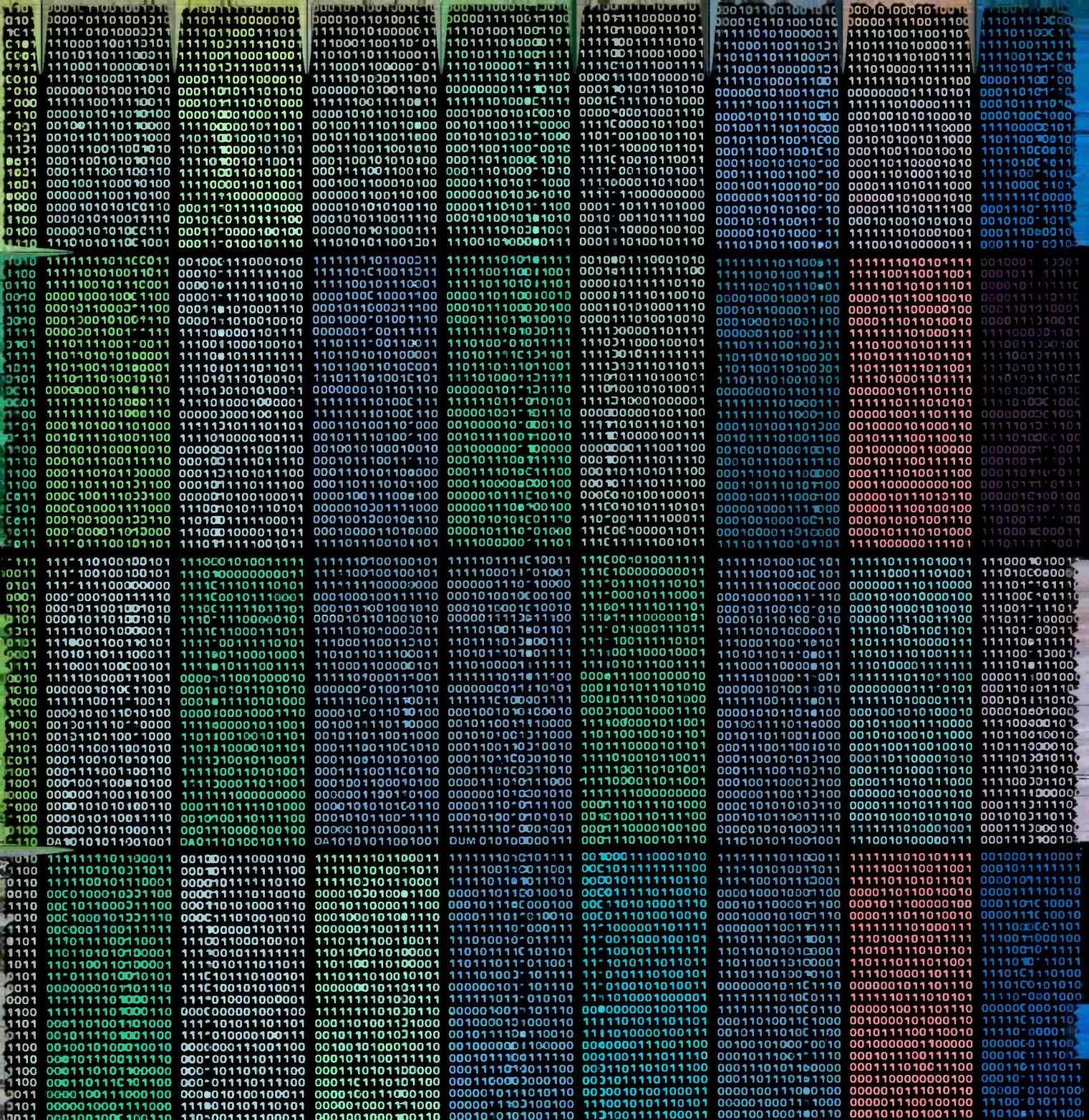
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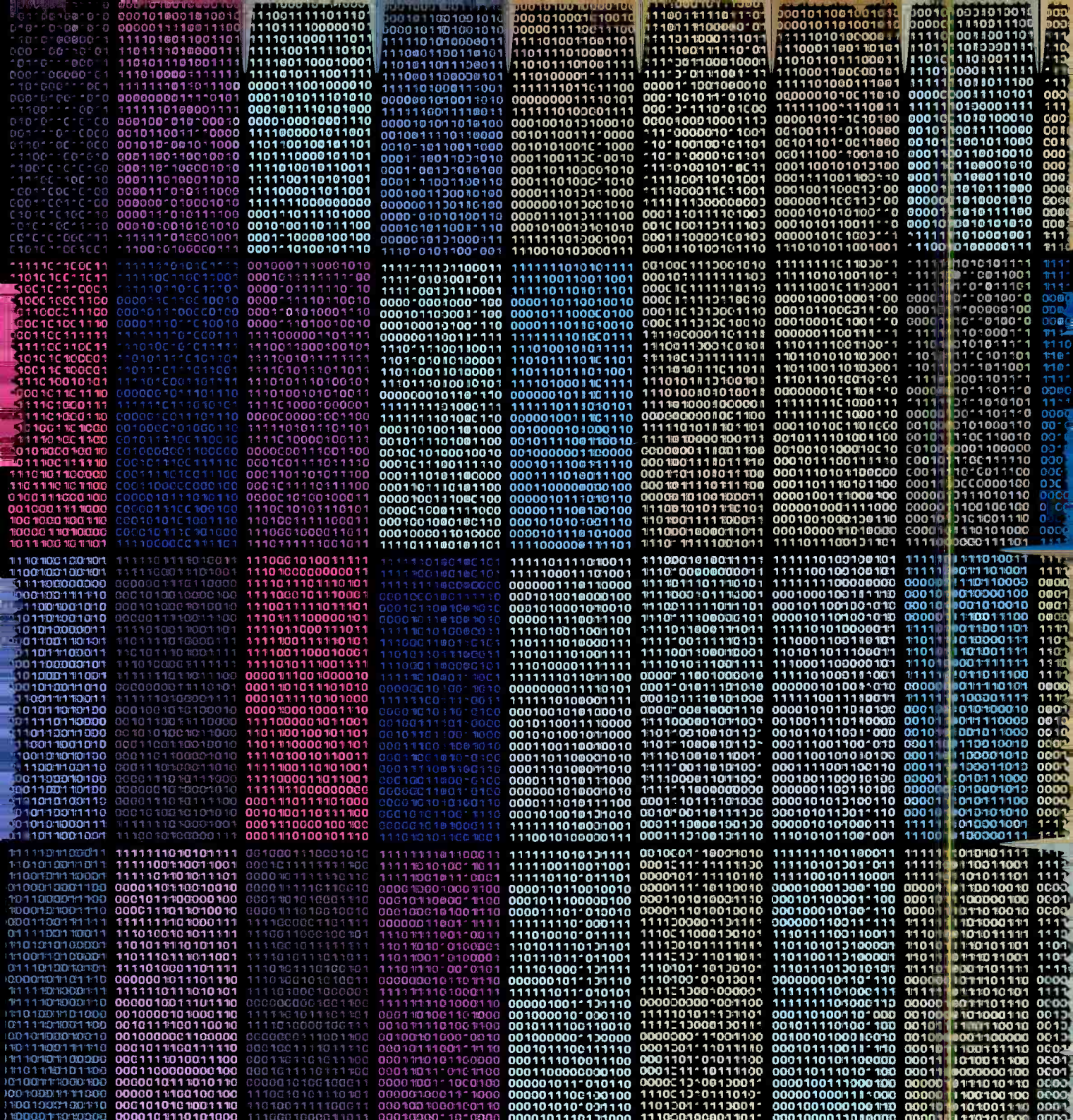
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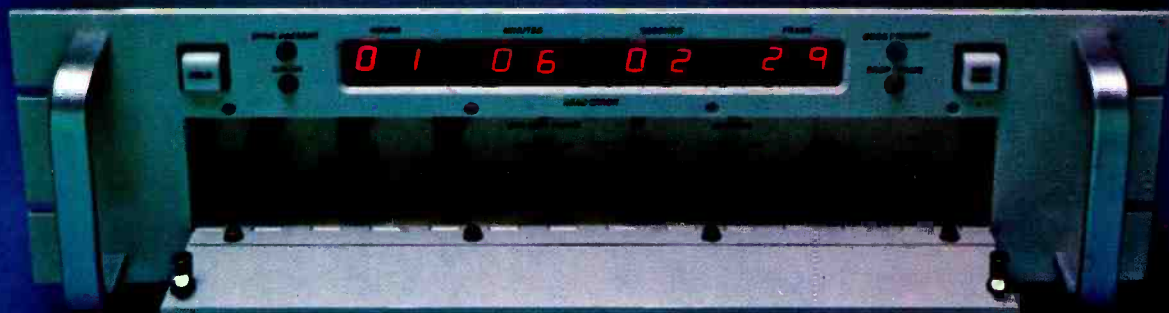
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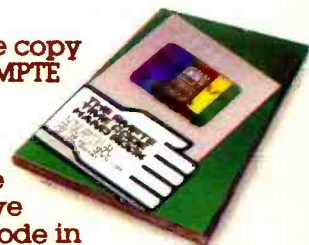
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# **DIGITAL AUDIO IN TV POST-PRODUCTION**

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***The transition to digital audio in television is an even slower process than the transition to digital audio in recording. But the reason may have more to do with tradition than future shock.***

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OUTSIDE THE EXPERIMENTAL use of digital audio for demonstration purposes, there has been limited practical penetration of digital audio into the TV marketplace. The few applications have been for television commercials; and even those have been done more for experimentation than for the actual desire to come up with cleaner sound.

There is a lot of discussion about better sound in television. Many stations are paying more attention to the quality of their broadcast sound, but it is still dealt with in the analog domain. The feeling seems to be that until there is a clear winner in the digital format, it is better to concentrate on what is available in analog to improve sound quality on television.

It seems strange to some in the recording industry that television hasn't jumped into digital audio at once, since the handling of most video equipment is similar to the handling of digital audio equipment. Several of the manufacturers of digital audio systems either use videotape as the recording medium or use video editing techniques to manipulate the tape transports during the editing process.

Similarity also exists in the "live" sound of digital and the "live" look of videotape. Digital audio for television would seem to be a natural marriage of systems that are not only compatible but complementary. Why then the reluctance in television to use digital audio even outside the problem of digital standards?

Tom Bates of Sound Ideas Studios in New York feels that one reason is the lack of pressure from the public.



*Bruce Freeman of Sound Ideas Studios conducts regular diagnostics on the 3M digital recorders*



Sound Ideas has a 3M 4-track and 32-track recorder, but has used Sony, JVC, and Mitsubishi digital recorders

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"The traditional TV viewer is used to lousy sound. It has contributed to the phenomenon that we are all familiar with—that if sound counts, as in watching a PBS broadcast of a symphony orchestra, they simulcast it on FM.

"I think that the TV viewer has been numbed in clamoring for greater sound, but there has always been a certain audiophile element to the record buying public. There have been huge numbers of people who are into the technical end of reproducing sound accurately, and it is exemplified by the ever-increasing complexity and price range of equipment offered on the home hi-fi market.

"For them [the audiophiles], sound is the only thing that they are concentrating on. In video, there are many people who don't care about sound."

Scott Rivard of Sound 80 studios agrees that sound is often an afterthought in television. "The thing that is most limiting about TV sound," Rivard explains, "is just the way that it is thought about from the conceptual stage. If people who are involved in production start thinking of audio separately from the video and not as something that just goes along with the picture, there are a lot more things that can be done with the sound. With the new time code synchronizers, you can have a higher fidelity sound without any trouble at all."

From the producer's standpoint, there has been reluctance to go with digital audio because, at this point, it costs more. The main concern though seems to be that no one will be able to hear the difference once the signal switches to analog for broadcast.

"People keep saying, 'Does it really matter over a three-inch speaker?' or 'Who can hear the difference?'" says Murray Allen of Universal Studios, Chicago. "Yes, it really does matter and yes, you *can* hear the difference over a three-inch speaker."



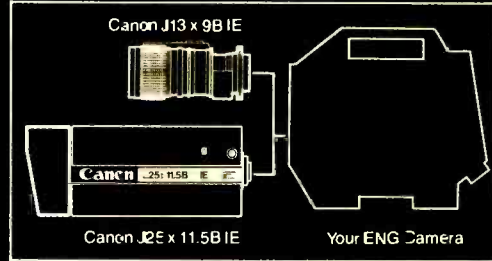
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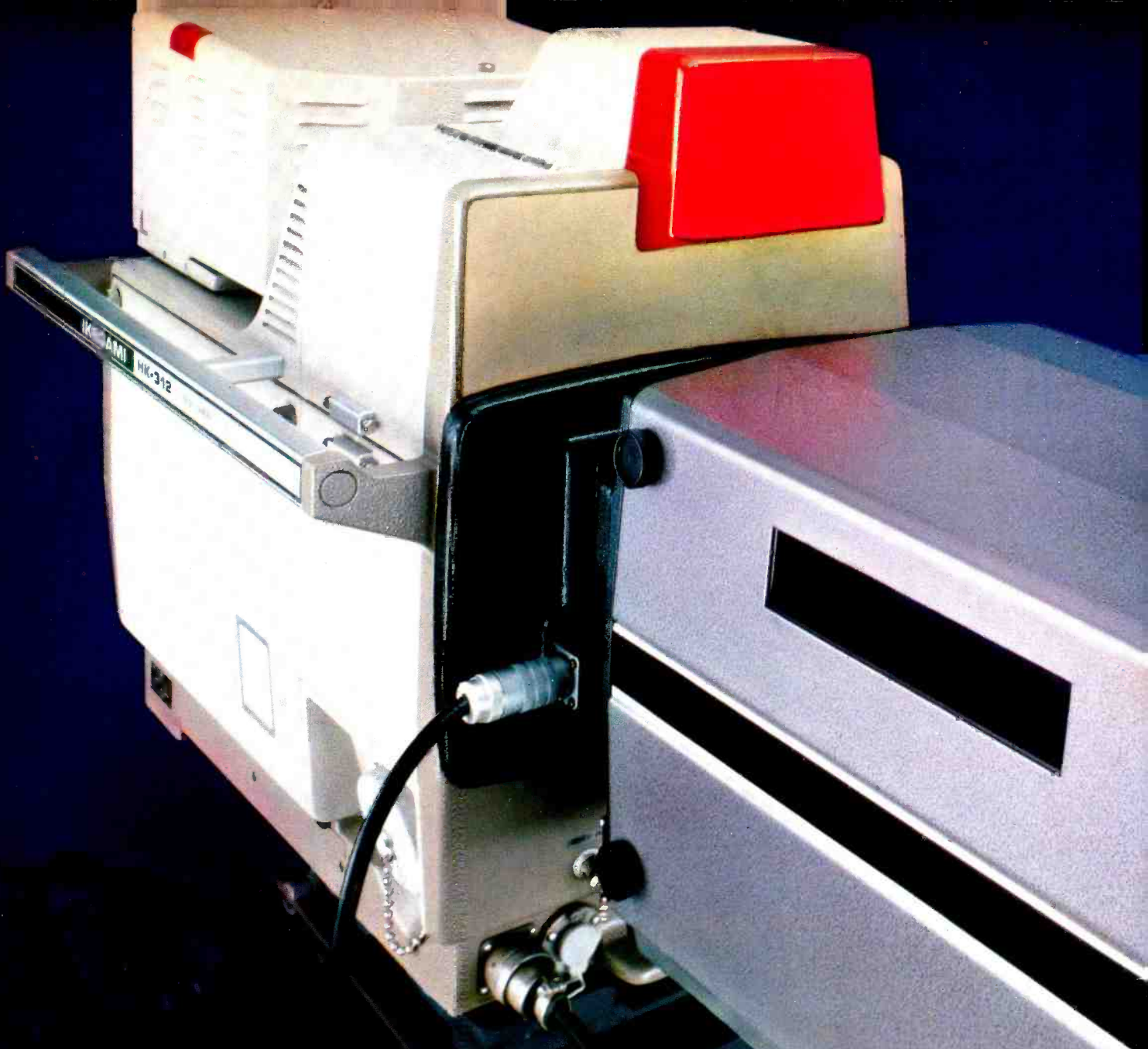
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## Digital Audio

Allen goes even further and suggests some detractors may be suffering from "digital envy." "Entry into the digital field is expensive and some facilities that don't have it bum rap it," Allen points out. "If everyone had a digital machine you would hear them saying that it's the best there is and everyone would be using it."

"There also seems to be a lot of fear in moving into a new technology. This is the first time that I've seen that happen. Any time that there has been a new technology, like when we went to 16-track, everyone jumped on the bandwagon immediately. When we went to Dolby™ everybody jumped on the bandwagon. This is the first time that I've seen people slow to jump on the bandwagon."

Bandwagon or not, there are a number of sound studios and post-production facilities which have and are using digital audio. There is universal agreement that once you've used digital audio, it is difficult to be satisfied with less. The difference can be that noticable. Bates explains it this way in relation to television sound: "If you're watching something on television and a commercial comes on, it is easy to tune it out. There is a certain masking quality that makes you know that it's simply a voice off in a television set."

"If someone was actually standing in the room talking to you, your ability to tune that person out would be greatly inhibited. There is an insistence to the image of someone actually talking to you. I think that even through a three-inch speaker in a Sony TV set, digital has that kind of immediacy to make it that much harder to ignore."

"From my own experiences, I would conclude that it would be a significant step forward for advertising agencies in terms of grabbing the attention of the audience." Murray Allen agrees, saying that once a client has used digital audio, they want to use it again.

There appear to be some misconceptions about the use of digital audio. Many feel, for example, that it calls for some exotic, hard-to-learn techniques to use the system properly. The techniques of using digital audio are the same as in analog recording. Aside from the fact that those things that produce sound (voice, instruments, and ambient noise) are the same, manufacturers have designed digital recorders to operate in much the same way as analog recorders.

The differences are, of course, in the editing and the sound quality. There are some who will miss the razor blade and find the transition difficult, but compared to past experience in the film editing to videotape editing transfer, most will find it easier and more flexible. In fact, when digital audio becomes widespread at the station level, there should be no transitional problem at all as the editing techniques are exactly the same as those for videotape. The Sony and JVC systems use 3/4-inch U-Matic videotape for recording digital sound; 3M uses its quad editor as the controller for its digital audio editing system.

Many also fear that moving digital audio into the television realm will affect the role of the audio technician. The ability to manipulate the numbers within the microprocessor, some feel, will take away the creativity of audio engineers. The engineer's talent to hear when the sound is off and change miking or the EQ or any number of things could be threatened by someone who merely understands computers and not sound. The fear is that number-



"The TV viewer is used to lousy sound. If sound counts," says Tom Bates, "they simulcast it on FM"

Murray Allen agrees, saying that once a client has used digital audio, they want to use it again. crunching will replace sensitive ears.

On the need for "sensitive ears" there is no disagreement. Bates says, "There is no substitute for good people. They can never disappear. If anything, the requirements are more stringent. You need a good engineer because you are now able to hear so clearly what's going on. Not only can you hear the good parts very clearly, you can hear the bad parts very clearly."

Allen concurs, adding, "You have to have more sophisticated technicians. Being a knowledgeable engineer is becoming more and more important."

It has been suggested that the main problem with digital audio for TV is that it has been oversold. Digital audio has been touted as the savior of sound, and this has led to heightened expectations. Nothing could live up to that kind of advance billing. Bates put it into perspective, saying, "Some people have heard digital recordings and said, 'What is the big deal about digital audio if it sounds this bad?' What people forget is that it was probably a bad digital recording, but if it was analog it would have been terrible."

The clear implication is that no amount of new technology can repair the unrepairable. Bad sound is bad sound, whether digital or analog.

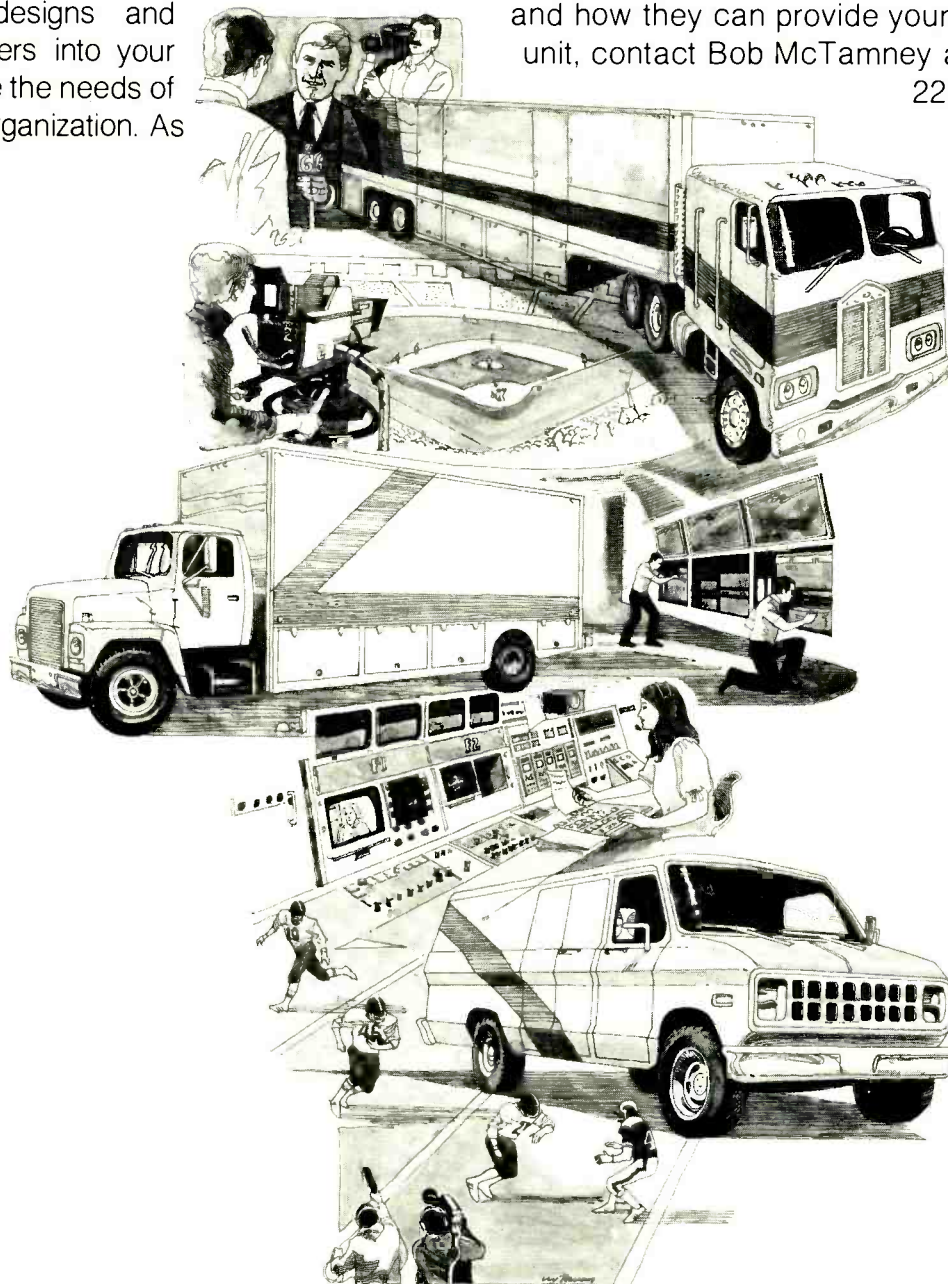
All things being equal, of course, most studios that have used digital audio equipment are firmly convinced of its place in television's future. "Digital audio will solve all the problems people are having with sound in television," says Murray Allen. "When all video is digital we are going to have some super sound on television. You may even see, down the road, that TV sound actually leads recording sound."

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# WNCN: TO PORTUGAL AND BACH

**Getting an excellent sound from each of a wide variety of music groups, playing in the Funchal Cathedral for the Madeira Bach Festival, presented a series of pickup problems for the staff of WNCN, New York classical station, where the taped concerts will be aired. This article tells how recordings were made with outstandingly natural and lively sound at each of the concerts.**

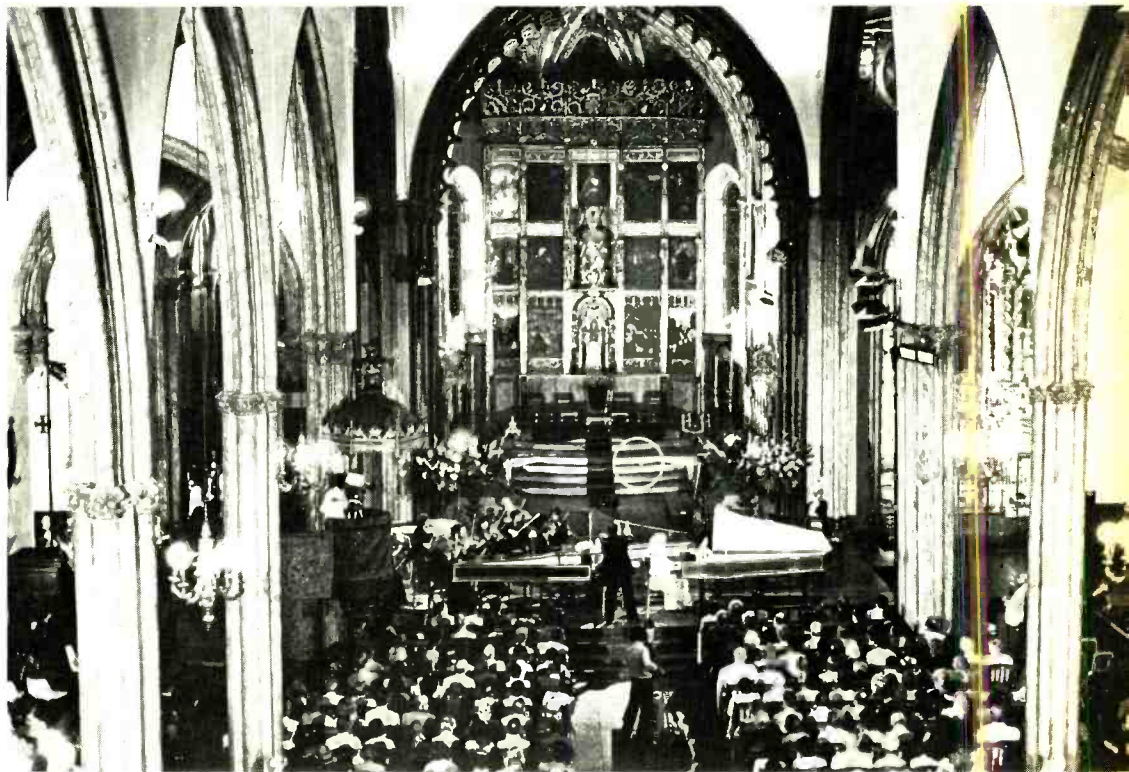
MAKING EXCITING and reasonably accurate recordings of live concert music in acoustical environments ranging from medium good to terrible has been an important problem for only a minority of radio broadcasters in the

past. But the live concert, broadcast directly or taped for later broadcast, is one of the growth areas in radio. The proliferating satellite nets, cable, radio AM and FM, are all going to compete more and more for a public that is showing strong response to live music of every kind, whether rock, pop, jazz, show music, or classical.

The techniques for success in pickup of concert music are anything but routine. The engineer naturally must know how to use microphones in a variety of spaces. He needs sensitivity to musical values and knowledge of how various kinds of music should sound. He needs a good supply of ingenuity, and the ability to make-do in unforeseen situations. The knack of getting along well with musicians, especially conductors, will also be found useful.

Richard Kosiol, chief engineer of WNCN, a New York classical FM station, displayed all these qualities with excellent results during a one-week stand on the Portuguese island of Madeira in June this year. The assign-

*Performance of two-harpsichord concerto of Bach at the Madeira festival was recorded by WNCN crew using microphone techniques described in story. Hanging coincident stereo mics, barely visible in circle above musicians, got a good balance of direct sound and reverb*



## WNCN: To Portugal And Bach



View of chorus in Bach Magnificat, with musicians left and right of platform, also shows intricate ceiling that helped break up and diffuse reverb

ment was to record, for later broadcast by WNCN, all the main events of the Madeira Bach Festival, carried out in the capital, Funchal. This eight-day series of concerts was in its second year, with great success.

Madeira is the 30-by-12 mile top of an immense volcanic mountain that rises from the Atlantic deeps about 500 miles southwest of Lisbon. A central peak towers 6000 feet above sea level. Rocky cliffs come down to the ocean in many places to form wild, spectacular headlands. The Portuguese settled Madeira in the 15th century. With elaborate irrigation systems and terracing of many of the slopes, they made the island into a large producer of wine and sugar. Madeira wine, of course, has been a staple in Europe for three centuries.

The equable climate, winter and summer, has made Madeira into a 20th-century vacation spot, so a music festival was a logical addition to the island's activities. A New York-based organization, the Madeira Bach Festival, with the collaboration of the Portuguese Travel Bureau, developed the eight-day program, built on a variety of musical forces playing the 18th and early 19th century masters.

All but one of the concerts this year were played in the Funchal Cathedral, a 16th-century building of medium-cathedral size. A platform erected in the transept held the musicians.

Kosiol's job had three main objectives. He wanted the best possible tapes for the broadcasts on WNCN. He also had to feed a stereo signal to the Portuguese National Radio for direct broadcast throughout that country. And he fed a mono mixdown to the local Madeira radio for broadcast on the island.

This meant a supply of mixers with multiple outputs that could be fed at high level to different inputs. For the pickup, the microphones were AKG condenser models of the 451 series. This series, with its replaceable heads for various applications, seemed good for a far-off remote operation; Kosiol points out that he needs only *one* set of spare heads to back up his whole complement of microphones.

The recording was done on Studer tape machines, which operate on different line frequencies and voltages: Madeira has 220 volts, 50 Hz for power. Kosiol took converters to run the electronic units, all designed for 110 volts, 60 Hz.

Because the cathedral does not have the overpowering size of the great Gothic buildings, the reverberation was not of the immensely long kind that makes recording a natural sound extremely difficult. Kosiol believes the reverb was further "tamed" by a pattern of intricate moldings on the ceiling, which tend to diffuse the reflected sound.

However, the reverb was strong enough to require great care in the primary microphone pickup, aimed at a pleasing, lively, *natural* balance between direct sound and ambiance. This is in accord with Kosiol's philosophy of concert recording (and that of his station) which is directed toward a true concert hall sound, a hall with strong but well balanced reverb of pleasing frequency constitution.

Kosiol got this sound with an array of two coincident microphones, suspended from cables that ran across the front of the platform, running down from high on each side. The two microphones sat in the "V" of the suspended cables, about 10 feet above the conductor's head.

The mics were AKG unidirectional condenser models; one pattern was tilted to the left, the other to the right, to supply the basic stereo image. A light rope was attached to the array and run back over the orchestra, so that the whole hanging array could be swung forward or back for best placement over each musical group.

This arrangement produced an excellent, well-placed stereo sound, with a spread-out image and great instrumental clarity. However, for some large groups Kosiol used one or two "spot mics", directional mics on stands at the side of the orchestra, aimed at specific groups of musicians who were somewhat weak in the total sound. These were AKG medium-shot-gun mics using the CK-8 mounting, which has a relatively broad pattern picking up a group of musicians rather than just one. The signals from the spot mics were mixed in very gingerly simply to reinforce slightly the weak groups. With this care, the spot signals had no effect on the main stereo image as picked up by the hanging array.

This arrangement worked beautifully, for example, for the opening number on the first night, a Mozart piano concerto. The hanging array got the soloist "perfectly," as well as the mass of strings in the front of the orchestra. A spot mic filled in certain groups in the center-back of the orchestra.

It also worked extremely well for the Bach "Magnificat" with its four soloists in front of the orchestra and large chorus in back. Kosiol says that the hanging mics were "splendid" for the soloists, the chorus, and, again, the string sections of the orchestra. Two spot mics gave some sections in the center of the orchestra the slight help they needed.

Kosiol reminded *BM/E* that every single operation of this kind, in a "concert hall" approach, is an individual balancing operation. It is more work, and more demanding work, than multi-mic mixdown after the fact because the engineer cannot go back and do it again to remove his mistakes. Only by hearing the actual music with the actual placement on stage can the recording engineer get a balance that represents the music properly and pleasingly.

Kosiol did most of his balancing during rehearsals of





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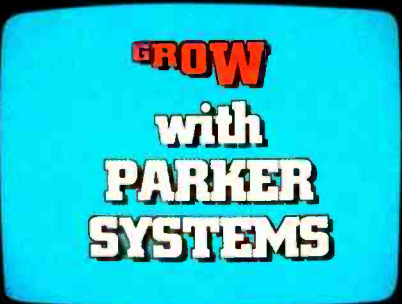
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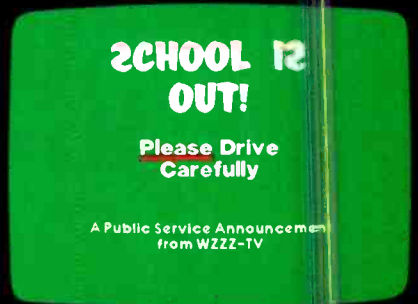


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## WNCN: To Portugal And Back

the various concerts. Since the rehearsals usually preceded the concerts by a couple of days, he had to keep elaborate notes on each set-up. The intervening concert would require a different balance; his notes would take him back to the other concert when that one came up.

The hazard in this, of course, is that the conductor or a musician may change his mind about instrument placement between the rehearsal and the concert. If a substantial change is made, the engineer has to do some fast work right at the beginning of the concert to get back on the track. Kosiol says he worked hard to convince the musicians that they should stick with whatever they did in the rehearsals. The few slippages got well covered, he believes.

A highly original system solved the problem of recording a guitar concerto of Vivaldi. The acoustic guitar would tend to get lost in the orchestra sound in such a "live" acoustical environment. Kosiol unobtrusively fastened onto a music stand in front of the guitarist a Sony ECM-50, lavalier condenser mic. The cable was hidden by the stand down to the floor. It fed to the back of the orchestra, to a Marantz audio amplifier and two AR-3 loudspeakers, all of which were invisible behind the orchestra.

The guitar sound from the speakers, carefully adjusted to boost slightly the direct sound from the guitar, put the guitarist with an excellent balance into the hanging mic array. This had advantages for the conductor, who more easily got a good balance in the performance. It helped the other musicians by allowing them to hear well what the guitarist was doing.

It is important to recognize that this was in no sense an "electric guitar" sound, the radically different instrumental sound used by the rock groups. It was a really "hi-fi" acoustic guitar sound, low enough to amalgamate with the direct sound, giving it just the right amount of power. The delay between the direct sound and the amplified sound coming from the back of the stage was especially good for this, acting somewhat like reverb to build up the body of the sound.

The same method was used, with similar success, for a harpsichord concerto of Bach.

A main difficulty in the operation was the lack of anything corresponding to a "control room", a space where Kosiol could see the musicians but not hear them directly, and monitor the pickup on loudspeakers. He had to settle for a space where he could peer out from a screen at the back of the cathedral, so that he was nearly invisible to the audience. This required monitoring the pickup on headphones since he was, in effect, in the same room as the musicians.

This, he notes, has the hazard that the sound may be quite different on the phones from what it will be when the final listener hears it on his loudspeakers. Kosiol minimizes the possible errors by using phones with which he is intimately familiar. He has learned how to transpose the sound he hears into the speaker sound.

A further hazard was the presence in the same small room of the Portuguese announcer and commentator for the Portuguese National Radio system. Although neither of the men could speak the other's language, each understood well what the other's job entailed and how his own interacted with it. A kind of intuitive cooperation developed that was highly effective, and a friendship was

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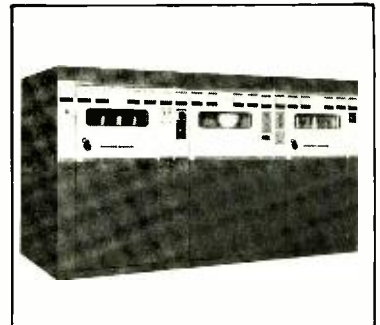
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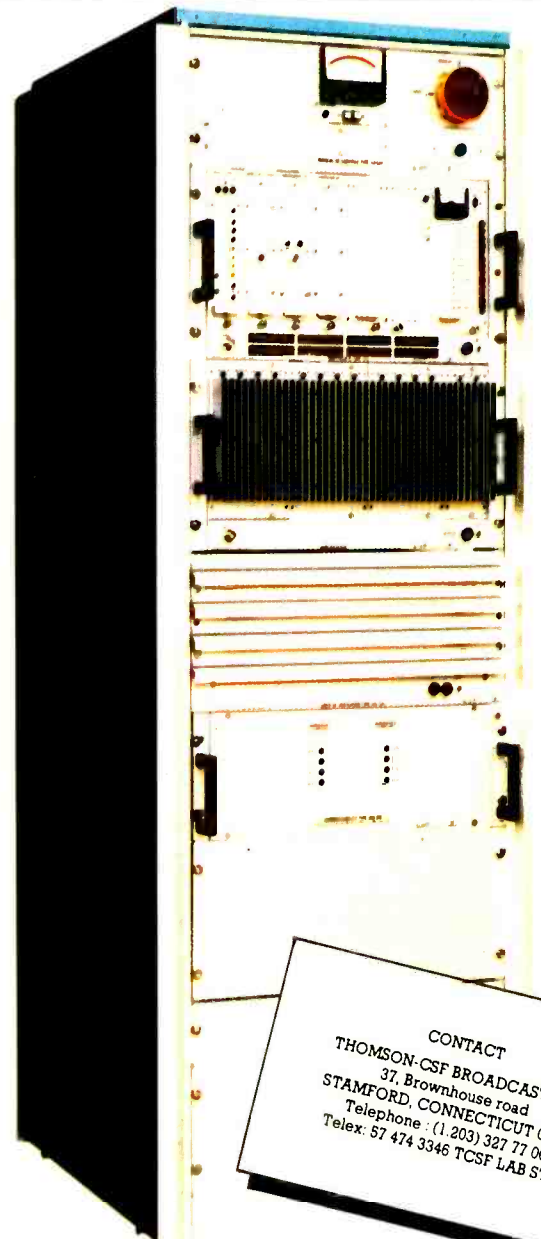
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## WNCN: To Portugal And Back

definite by the end of the series. The special aura of the room may have helped in this. The walls are covered with splendid religious art from many centuries, likely to lift the spirits of even harassed radio engineers and announcers.

Another standard hazard of live-concert pickups was present in Funchal—street noise. Very few of the buildings in which live music must be picked up are adequately insulated from outside noise, which is much more obtrusive in a broadcast sound than for the audience sitting in the space.

In Funchal, the authorities had cooperated by banning street traffic in the area around the cathedral during the concerts. This was essential, because the local busses wheeze and grind mightily as they climb the slanting streets, and the favorite small motorcycles of local residents are also racket-prone. Even so, a few distant traffic sounds did come through, audible to Kosiol on his headphones. He counts himself lucky that this noise came in when the music was pretty loud, and will probably be unnoticeable when the concerts are heard on loudspeakers. The lesson is that a similar clearing of the streets should be sought for many live concert pickups, well in advance of the concert night when the city fathers are all home at dinner.

The hanging-mic pickup had to be altered slightly on only two occasions, for solo performances. In these cases the noise level did become troublesome and the mics had to be moved in quite close, a procedure that Kosiol avoids



*Waverly Consort, the only group not heard in the cathedral, performs in Municipal Theater. Hanging stereo mics are visible in upper right*

in most situations because it tends toward a "studio" sound rather than a natural hall sound.

The concerts will be heard beginning in mid-September on WNCN, with Fleetwood, the station's late-night music host, as commentator. The whole project is sponsored by TAP, the Portuguese national airline. Kosiol carried out a similar operation for the festival's first year, in June of 1980, and the results were immensely popular with WNCN's classically-oriented audience. It seems certain that the 1981 series will repeat. **BME**

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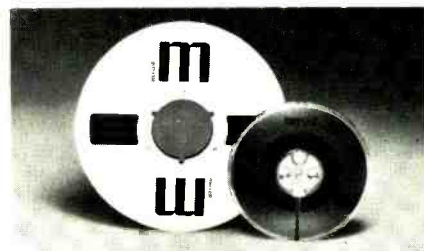
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# REVERB: R FOR A STRONG AND LIVELY SOUND

**The devices producing artificial reverberation and special effects have become potent tools for the broadcaster. In this first article of a series, the basics of natural reverb are reviewed and the techniques of one type of artificial reverb are described. Later articles will tell of other ingredients that fill the prescription for lively sound.**

"NATURAL" SOUND, as everyone knows, means sound with *reverberation*, reflections bounced back from the room surfaces, in virtually every case. Hearing totally "dry" sound—no reflections at all—is a rare experience in everyday life. Not only is it rare, it is also generally dull, depressing: The sound is thin, lacking body, lifeless.

In broadcasting, the natural reverb of a sound is often reduced, lacking, or altered in some way. So the broadcaster who wants a natural, lively sound often wants to recreate the reverb, or enhance it in one way or another. One common situation of this kind is the pickup of live sound in a space lacking in natural reverb, which might be a small studio with very heavy acoustic treatment, or an outdoor area without nearby reflecting surfaces.

The technology of artificial reverberation is old, but in the last few years it has blossomed into something new: The multi-faceted electronic digital reverb system, immensely versatile, compact, comparatively inexpensive. These systems keep getting more flexible, more varied in their capabilities every year. An important part of this advance is toward easier operation. Using one of the better digital reverb systems today is like working magic by turning a few front-panel knobs—there is a strong element of pure fun in it. The designers of these systems are among the wizards of current electronic and psychoacoustic technology.

BM/E believes that the industry will now welcome a comprehensive review of artificial reverb and special effects technology. The devices now on the market are so varied in their capabilities that a separate article is needed for each device, or each small group of similar devices. Each article will include some basic background, to be followed by a discussion of operation of a particular group of devices and the effects they can produce.

Heavy use of artificial reverb has been standard in the recording industry for decades, of course. The earliest technique was built around the underground chamber which had a speaker at one end, a microphone at the other. A side circuit picked up the reverb in the chamber, which could be added to the main signal line in any proportion.

*Editor's note: Important elements of this article have been adapted from Application Note AN-1, "Multi-Tap Digital Delay in Broadcasting", by Christopher Moore, president, URSA MAJOR, Inc.*

Later came the steel plate (still used in many recording studios). All-electronic reverb is now nearly universal in recording, and lately the most advanced special effects have won a place there (including such far-out effects as the Aphex "enhanced sound", to be covered here in detail in a later article).

Although special effects, meaning in general *unnatural* sounds of many varieties, have become extremely important, an effect producing something approximating to "natural" reverb will undoubtedly remain a basic operation in broadcasting. What constitutes "natural" reverb?

Any sound produced in a closed or partially closed space has three main elements. The *direct sound* is the part that travels directly from the source to the ear (or the microphone). It travels the shortest distance and gets to the ear or mic ahead of any reflections. The direct sound establishes the direction of the source. The binaural direction-finding of the hearing system operates on this first-arriving, direct, sound.

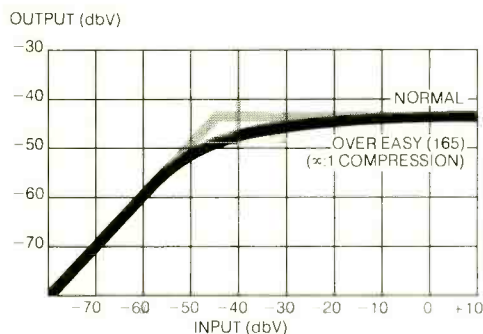
The second main element is the *early reflections*, essentially separate sounds coming in from a number of different directions, one after the other (see drawing). Early reflections occupy from 30 to 80 milliseconds of the time after the direct sound, obviously taking up more time in larger spaces.

Although the early reflections are separate sounds, the hearing system in most cases amalgamates them with the direct sound, as far as the psychological total is concerned. But they have a number of very important effects on the total sound as perceived. The early reflections add power and body, and also help establish the stereo image. The early reflections increase the apparent loudness of the sound by extending it in time and raising its average level.

To the broadcaster this is an important psychoacoustic fact because adding early reflections will increase perceived loudness without increasing the peak level as shown on a monitor, or as handled by the transmission equipment. This is a way to make the signal "louder", entirely separate from the compression/limiting operation now so dominant in radio broadcasting.

The third main part of a sound event in a closed space is the *reverberant period*, in which the sound energy becomes quite evenly diffused through the room and gradually dies away. We get a lot of the character of the hall, and the character of the sound, from the time it takes the

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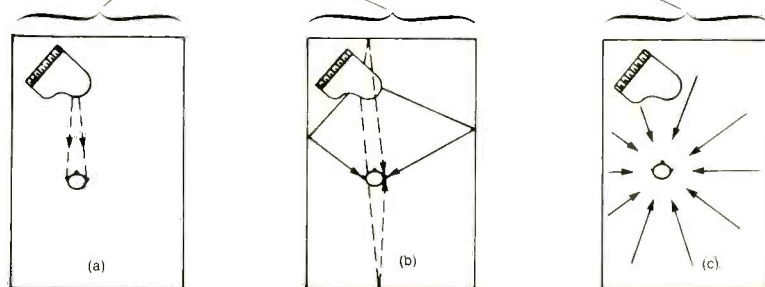
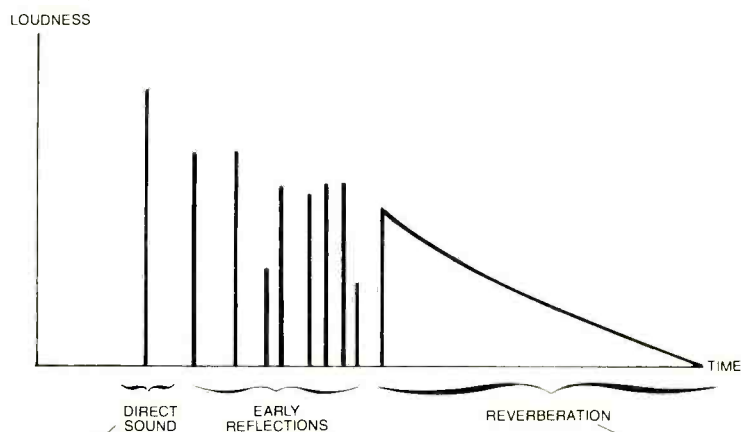
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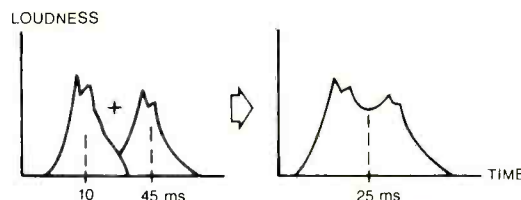
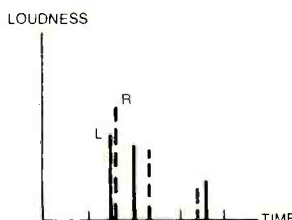
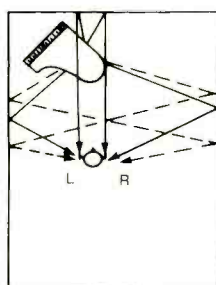


# REVERB

Graph shows distribution of direct sound, early reflections, and reverb in time. Drawings show how each is produced in a closed space. All drawings from Ursa Major, Inc.



Early reflections aid in producing stereo image by arriving from different directions at slightly different times



Left graph shows direct sound and early reflections arriving separately, with peaks at 10 ms and 45 ms respectively. Hearing system amalgamates them into one sonic impression (right graph)

diffused reverb to die away; this is the traditional "reverberation time", the RT60, or time for the energy of a sound to fall 60 dB from its level at the time the original sound stopped. Many aspects of the final character of a sound depend on the RT60, the slope of its decay, its frequency constitution, and so on. If the high frequencies, for example, decay more rapidly than the middles and lows, we get the "mellow" full-bass feeling of the classical music hall. If the highs remain strong throughout the reverberant period, however, the sound character is "hard", and we could imagine being in a concrete garage.

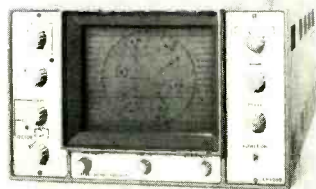
An important function of the early reflections and the reverb is to establish a stereo character, even for sounds that come from a very narrow source. The reflected sounds, coming from many directions, make the hearing system conscious of space around the sound, even a single voice, for example. There is no such thing as a purely monophonic sound in live hearing in a closed space. But a radio station may put a purely mono sound on the air, an announcer on one mic, for example, which inevitably results in a flat and unnatural acoustic image.

With an artificial reverb system it is useful, in many situations, to be able to handle the early reflections and the diffuse reverberation separately. Speech intelligibility, for example, is aided by strong early reflections but degraded by very long reverb. Generally speaking, as long as the hearing system can "fuse" the reflected sounds into a single impression with the direct sound, the effect of the reflections can be positive. If reflections begin to be heard separately, as echoes, they are likely to degrade the psychoacoustic quality. The hearing system can fuse a longer period of music reflections than of speech. A very long reverberant period can also cause trouble with speech or impulsive sounds because the lingering sound puts a floor of noise, of acoustic mud, under the signal.

A digital system aimed to take advantage of these facts of psychoacoustics in a systematic way is the Space Station developed by Ursa Major, Inc. It uses a Multi-Tap Digital Delay method, based on more than 20 separate taps that bring signals out of the digital memory, each tap at a different delay interval. One group of eight taps are the Audition Delay Taps which can be used to create

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## REVERB

something very close to early reflections. The level of each of these signals is adjustable on a built-in mixer, and the delay times can be set into any of 16 patterns to simulate closely the early reflections in a wide variety of spaces, from very small rooms to large spaces with long delays.

A second and larger group of the taps are used to simulate the diffuse reverberation, providing a dense pattern of random "reflections." These delayed signals are combined and the total is adjustable in level to simulate reverberation times from zero up to about 3.5 seconds. A built-in equalizer also allows the frequency character of the diffuse reverb to be altered in a number of ways.

The maker of the Space Station points out that broadcasters can use this system to lift the power and liveliness of speech broadcasts without adding so much diffuse reverb that voices are muddled. Short decay times down to 0.3-1.2 seconds have been found to enhance voice quality without impairing intelligibility. The experience of several broadcasters using the Space Station, interviewed by *BM/E*, has been that this method does, indeed, give voice broadcasts more punch and natural liveliness.

Another use of the system recommended by the maker is the return of the reverb signal to the audio chain in stereo, for a spatial effect that removes a sterile or boxy quality. The diffuse reverb, of course, is most useful in recordings or broadcasts of live music from acoustically poor spaces, often a problem for broadcasters doing live remotes. The reverb can be adjusted to make the pickup sound like a professional music recording, with adjustment of both the early-reflection section and the diffuse reverb.


Adding a stereo early reflection pattern to mono sources, the maker points out, will give such sound sources a pleasing, live, open quality, although they will retain the strong center sound placement of monophonic reproduction. The process has brought great improvement to voice announcements, film sound tracks, mono LP's and 45 rpm records, and others, bringing new life to old record collections for example.

Ursa Major says this "stereo reverb" enhanced sound folds "gracefully" into mono on mono FM receivers because the delay and reverb paths are limited to a 7 kHz bandwidth. The very wide adjustability of the timing and level of both the early reflections and the diffuse reverb allow the effects to be matched to a wide variety of sources, from very dry to rather reverberant.


An array of special effects, of *unnatural* sounds, can be produced with the system. For example, a more regular pattern of time delays in the Audition Delay taps can produce a comb filter effect. Long delays can make several distinct repetitions of the sound moving left to right in stereo space, and very long delays on the order of 150 to 250 ms create slap and echo effects.

A large number of other far-out sounds are available with special settings of the controls; many are described in the instruction book. A number of users of the Space Station, however, have told *BM/E* they like it primarily because it does add great liveliness to many of the sounds they normally put on the air, and gives them the means to make music broadcasts sound professional.

Other artificial reverb systems can create quite similar results, with variations that broadcasters should understand. They will be covered in later articles. **BM/E**



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

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

The Sentry 100 also had to have a tweeter that wouldn't go up in smoke the first time someone accidentally shifted

into fast forward with the tape heads engaged and the monitor amp on. This meant high-frequency power handling capability on the order of five times that of conventional high-frequency drivers.

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

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

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

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

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# Fourth NAB Program Meet Adds Special Sessions For Engineers

BY LATE JUNE, about 80 firms had signed for exhibit booths or hotel suites at the fourth Radio Programming Conference of the National Association of Broadcasters, which will run August 16 through 19 at the Downtown Hyatt Regency Hotel in Chicago.

This number, far exceeding the total at the same time last year, indicates strongly increasing industry acceptance of the meeting. Moreover, the NAB administration is confident that it will sell all the available space, for a goal of about 150 exhibitors. The total will be heavily weighted toward programmers, with at least 50 to 60 on hand. So the programmers may have found their home among the industry meetings competing for their support.

The hardware exhibits will be confined to studio equipment, and the early

list includes about 20 of the top audio manufacturers. To increase the audience for the hardware makers, NAB has scheduled a class of events (new for the Programming Conferences) the "Engineer's Day" on Sunday, August 16. Participating engineers are invited to a continental breakfast, followed by two workshops — "What Engineers Really Ought to Know about Programming," and "Why Audio Processing — Do You Really Need to be That Loud?" — and a technical paper covering telephone-studio interfacing.

A special reduced-rate (\$25) registration gets the engineers into all the Engineer's Day sessions and into the exhibits throughout the show.

Outside stars of the show will include Mark Fowler, new FCC chairman, who will speak at the final luncheon on

Wednesday, August 19; country singer Willie Nelson, on stage at the dinner on Tuesday night; and Paul Harvey, keynote speaker at the opening session on Monday morning.

The main burden of the conference, the material on radio programming, will include the successful elements of the earlier shows, plus a number of innovations. There will be 20 workshops, with such titles as "How Does a PD Become a GM?," "Big Solutions to Small Market Problems," "Winning Numbers with Sports on a Music Station," "Win the Battle of PD Stress," and "News, the Big Stick Weapon on AM Stations."

The format workshops, highly popular at last year's conference, will be back in a more structured form. Each of these all-day sessions is devoted to a particular music format, with short talks, informal round-table discussions, and panel sessions.

The luncheon on Tuesday will also be a repeat of a popular event. "Making Money with Your Mouth" will bring four experts to tell how to talk profitably on the air. The four are Gary Owens, KMPC, Los Angeles; Larry Lujack, WLS, Chicago; Deno Day, WCXI, Detroit; Dick Purtan, CKLW, Detroit.

An all-day forum Monday will be devoted to People Management. Tuesday morning, the forum will be on Market Positioning; Tuesday afternoon, on Promotion.

Another new element of the show will be a radio syndicators' new product show and breakfast, starting at 7:30 a.m. Monday. Radio broadcasters are invited to talk with the syndicators and find out about their new programming. The preliminary exhibitors' list includes many of the most successful syndicators.

Fifteen Wednesday morning round-table discussions, each devoted to a particular problem in radio programming and operation, will bring experts to talk informally, answer broadcasters' questions and enlarge on important topics from their own experiences.

NAB is projecting a registration of 1500 to 2000 broadcasters. If the trend set by the first three programming meetings continues, the fourth will be an unqualified success, giving the industry three viable yearly conventions. The National Radio Broadcasters Association, slated for a September meet, is also on a strong uptrend and the industry has shown no signs of abandoning one show in favor of another. **BM/E**

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## NRBA Will Meet In Miami Beach

IT HAS SEEMED over the past couple of years that the NRBA convention has been forced to play musical chairs with dates and hotels. The convention was originally booked for Hollywood, Florida, but because of space problems the site was switched to Miami Beach and the Fontainebleau Hilton, September 13-16.

Despite all that, the NRBA has put together a full program that should please most radio broadcasters. The engineering sessions cover everything from career planning to deregulation.

The opening engineering session on Sunday night will look at how new technology will effect career paths for radio engineers. On Monday morning, there will be a roundtable on audio processing. The second session will examine the communications problems between managers and engineers. Monday afternoon will be free to allow uninterrupted access to the exhibits.

Tuesday's first session will be devoted to digital audio. As if digital audio wasn't enough of a look into the future the next session will offer some blue skying. What are the future trends in programming and what technology will be needed to support it? The afternoon session will be part II of telco problems — "The Things Ma Bell Never Told You." Tuesday's final session will be on satellite transmission and distribution.

There is a joint session Wednesday morning which should appeal to engineers — the Cuban problem, or the Bay of 9 kHz. As a companion piece, the engineering workshop will take a look at regulations, deregulation, station proliferation, and AM stereo.

New FCC chairman, Mark Fowler, will address the group at Tuesday's luncheon. Also at the luncheon, former FCC commissioner Robert Lee will be presented with the Gabbert Award for outstanding service to the radio industry. This year's Golden Radio Award will be given to Gordon McLendon. **BM/E**

### NRBA Exhibitor's List\*

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Cablewave Systems, Inc.  
Capitol Magnetic Products  
Celestial Mechanix Inc.  
Charter Broadcasting Inc.  
Cliff Gill Enterprises  
Commodity News Services  
Computer Concepts Corp.  
Comrex Corp.  
Concept Productions  
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Continental Plastic Card  
CSI Electronics  
Custom Business Systems Inc.  
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Enterprise Radio  
Fidelipac Corp.  
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Philadelphia Resins Corp.  
Processing Plus, Inc.  
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RCA Corporation  
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TFT, Inc.  
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\*Booth assignments were not available at press time.

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# Preview of the RTNDA 36th International Conference

RTNDA is at that odd point in its development where it is too big but not yet big enough. The reason for this incongruity is the parallel change in the status of news directors, especially television news directors. News departments have become the growth industry in most stations and few people were prepared for it.

RTNDA in its turn is trying to cope with its new and enlarged status in areas

outside the original mandate of the organization — which is to enhance the role of broadcast journalists in the exercise of their first amendment rights.

What has happened concurrently is that equipment manufacturers and program syndicators have found a new market for their wares.

The exhibitors have taken on added importance at the annual convention, and help defray a large portion of the

cost of the convention. In fact, accommodations for the exhibitors have dictated a change in the 1983 site because the original site did not have enough exhibit space. New Orleans is the site of this year's RTNDA convention, September 10th through 12th.

Another change to accommodate the exhibitors is to arrange the working sessions so that there will be time set aside during one of the days so news directors

## RTNDA EXHIBITOR'S LIST\*

EXHIBITOR	BOOTH NO.	EXHIBITOR	BOOTH NO.
Animation Video	10	National Right to Work Committee	62
American Institute of Physics	66	Newsday/Weathergraphics™	60,61
Alcare Communications, Inc.	29	Newsweek Video	E
American Heart Assoc.	14	N I W S	K
Angenieux Corp. of America	2	Nurad, Inc.	38
The Associated Press	48		
Association of American Railroads	43,44	Oakwood Productions	G
		Omniflight Helicopters, Inc	13
Basys, Inc.	36	Osmond TV Sales	8,9
B.E.I. (Beston Electronics, Inc.)	15		
		Paul Harvey News/VIPRO	56,57
Champion International Corp.	25		
CQI — Sportsticker	5	Q-TV	3*
Colorgraphics	6		
Conoco, Inc.	Adjacent to "F"	RCA Broadcast Systems	D
Convergence Corporation	24	RF Technology	H,1
		Rohrs Television, Inc.	63
Dyna-Metrics	4		
Dow Jones News Service/TV	23	Station Business Systems	32,33,34
Edison Electric	49,50	Station Program Resources	51,52
Electronic Applications, Inc.	41,42	Synsat International, Inc.	12
		System Concepts, Inc.	71,72,73,74
Fujinon Optical, Inc.	22	Sony Corporation	A
G&G Designs	67	Telescript, Inc.	35
Government Information Services of Hong Kong	68	Telesound, Inc.	70
The Graphic Express Corp.	11	Texaco, Inc.	75,76
		The Tobacco Institute	17
Harris Corp./Farinon Video	39	Toshiba America, Inc.	L
The Heritage Foundation	16		
Hughes Helicopters, Inc.	C		
		United Press International	F
Independent Petroleum Assoc. of America	54	Uni-Set Corp.	55
Information Processing Systems	3		
		W. Scarberry & Argus Newspot Division	69
Jefferson Data Systems	B	Weathercaster, Inc.	64, 65
		The Winsted Corp.	7
King World Productions, Inc.	G	World Communications, Inc.	26,27,28
		Weathermation	19,20
Marti Electronics, Inc.	30	Westinghouse Broadcasting	H,2
Mead Data Central	37		
Microwave Associates Communications	45,46		
Mighty Minute Programs	40		

\*Subject to change

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## NEWS FEATURE

can spend some time at the exhibits without feeling that they are missing an important session.

There are expectations that once again the convention will set new attendance records in all areas. The number of exhibitors will be the highest ever and, as has been the case in the last several years, the number is limited only by the size of the hall. Several vendors are waiting in the wings in case someone drops out.

While there probably won't be any new equipment introduced at the convention, it will be the first time that many news directors will have a chance to see it because many of them do not attend NAB.

As we go to press, it is unclear whether RCA and Sony will be demonstrating their respective one-piece camera/VTR's. Both will be exhibiting at the convention but no firm decisions had been made on showing the RCA Hawkeye or the Sony BVW-1.

### Session highlights

This is the year that the newsroom computer vendors get a real hearing from the membership. There are two sessions scheduled which will deal with newsroom computers. Both will be departures from previous sessions because they will both be in the evening. According to session chairman Ken Kurtz, it is to "give news directors a realistic picture of the issues involved in trying to make a decision on whether to move into this area."

Other sessions include a panel on broadcasting and the law with F. Lee Bailey; a group of general managers discussing what is the "Ideal News Director;" the problem solving and management skills workshops.

This year's Paul White Award will be given, for the second time, to Walter Cronkite. The only other person to be given the award twice was former CBS president Dr. Frank Stanton. Cronkite will deliver the address at the closing night's dinner.

Cronkite's CBS colleague, Ed Bradley, will be one of the featured luncheon speakers.

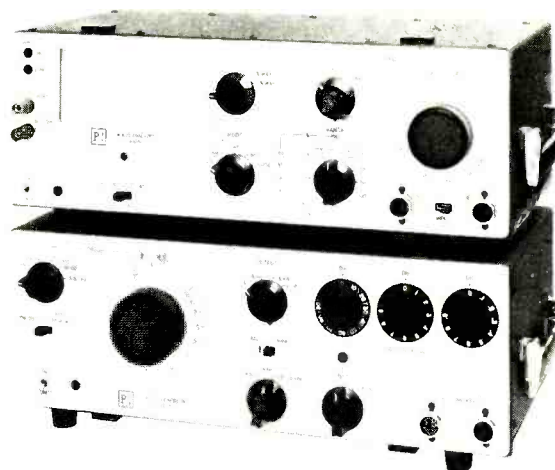
This is the first RTNDA for Ernie Schultz as the organization's managing director. Schultz took over the reigns of the Washington office last May following the death of Len Allen. In an interview with *BM/E* Schultz stressed continuity in the aims of the RTNDA, "I want RTNDA to continue to speak for people who work in broadcast news and to continue to look out for their interests. To try and remove those regulations and laws that limit us in trying to do our jobs."

BM/E

## FOR BROADCAST AUDIO MEASUREMENTS, if you compare features . . .

	Hewlett Packard 339A	Sound Technology 1710A	Potomac Instruments AT-51
<b>AUDIO GENERATOR</b>	Combined With Analyzer	Combined With Analyzer	Separate Unit
Intermodulation test signal	No	Option	Yes
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
<b>AUDIO ANALYZER</b>	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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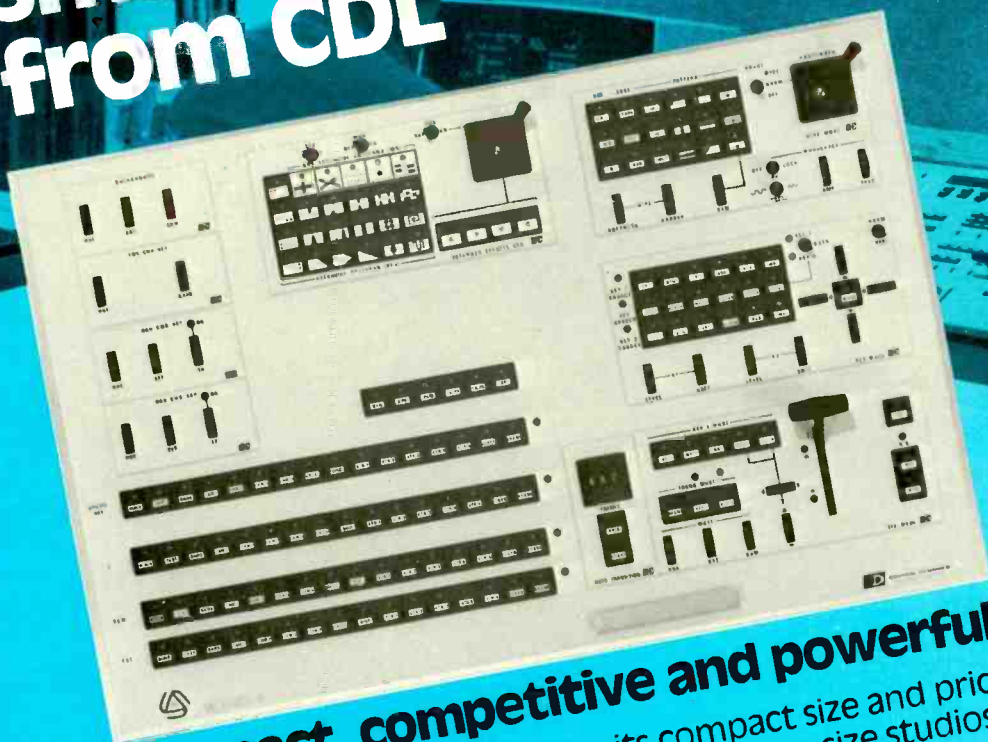
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BM/E AUGUST, 1981 77

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**CENTRAL DYNAMICS**





## Montreux Symposium Reveals New Hurdles For Digital; Film Community Joins Push For Technology

AS NEWS SPREAD at the 12th International Television Symposium, Montreux, Switzerland (May 31 to June 5) of concurrence between the SMPTE and EBU on a 13.5 MHz, 4:2:2, sampling structure for an international digital television standard, knowledge of other problems retarding the development of a practical digital VTR multiplied. (Both organizations officially proclaimed their intention to recommend to the September meeting of the CCIR a 4:2:2, 13.5:6.75:6.75 component sampling scheme just on the heels of the conference closing.)

At panel sessions, in papers, and in informal discussions, however, it became clear that thornier issues than sampling frequencies remain to be solved if a practical international standard is to be reached. Among the issues raised were inclusion of a compatible audio standard, error concealment and error correction methods, continuous versus discontinuous recording approaches, number of heads, tape thickness, and a host of other mechanical considerations. On the issue of a digital audio format suitable to the DVTR, it was apparent that what many thought

to be a simple problem was likely to nettle engineers for some time to come.

The general impression left by discussions of an international digital VTR standard was that none would be reached in less than two years, and then, if successful, no machine would be ready in less than another three years. Nevertheless, there was optimism largely due to the burgeoning demand for a recording system that could provide the quality and cost effectiveness demanded not only by today's broadcaster, but also by film producers seeking a way around the spiraling cost of production. Both broadcasters and filmmakers agreed on another point: If they are to meet the demands for product implied by increasing channel capacity and new transmission schemes, then they must be able to produce more quickly if not more economically. Throughout the vision illuminated by broadcasters and filmmakers from around the world, ran the demand for "a much more productive electronic production system."

### Coppola outlines 'thinking machine'

Film director Francis Ford Coppola

drew rapt attention from the international audience of television engineers and managers as he outlined his plan for using computers and associated video systems for the development of his "thinking machine." Coppola, who now heads his own Zoetrope Studios, in California, has taken the first steps, he says, towards the development of a system that would allow him to "previsualize" the film.

Elements of Coppola's "previsualization system" are already in place at Zoetrope Studios and certain of the techniques he wants to develop have been practiced on his film, *One From The Heart*. In brief, what Coppola has begun building is a network of computers and communications lines that allow him to broadly conceive a film and then to develop the details of each element in the film as he goes along. For instance, a script is written on a word processing system. A terminal allows a sketch artist to read the script as it is developed and to draw impressions of representative scenes. These sketches are entered into a still store where they are now associated with lines in the script. Then actors read and



Director Francis Ford Coppola outlined his new electronic production technique for film. Coppola said the new system would allow him, and other directors, to "previsualize" the work

# NEWS FEATURE

E. Lionetti, RAI, reviewed the experiences of Michelangelo Antonioni's first "all-electronic" production



rehearse the scripts with their recorded voices eventually replacing the text dialogue over the picture. Then specific scenes are picked for further development in order to add action to the film in progress. The rehearsals may be on location or in the studio, but at this stage they are shot in small format video giving little or no attention to technical perfection. These scenes then replace the sketch/voice segments.

This iterative process continues with each scene progressing towards full

maturity at its own pace. Eventually, Coppola builds a "prototype film" — not a rough cut, but a prototype.

Such an approach, allows Coppola to see the development of each section of the film in juxtaposition to other segments — opening and reopening — the film, making changes, perfecting — all prior to committing it to 35 mm film. With such an electronic network, Coppola, sees the opportunity to have all crafts, talents, and resources brought to bear on any problem, at any time.

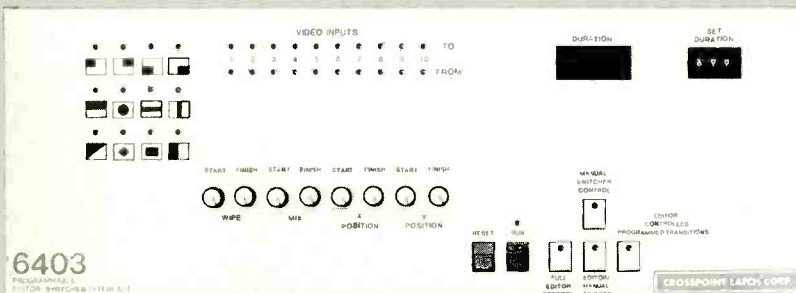
Currently, the Zoetrope system uses word processing, still-store, small format video recording, and a variety of custom-made time code and synchronizing systems that partially implement Coppola's theories. Does it save money or time? "I went back and reshot more than I normally would have," said Coppola of his *One From the Heart* experience, but the audience was reminded that much reshooting took place using less expensive gear and less than full dress crews. They were further reminded that the system is only experimental and that much new development remains to be done.

Another noted filmmaker thrust into video was Italy's Michelangelo Antonioni. RAI, the Italian network, decided to experiment with new production techniques that would result in a single film intended for both the large screen and the small television screen. Using only conventional PAL equipment, each scene was shot twice: Once for an aspect 1.85:1 for large screen and once for an aspect ratio of 1.33:1 for small screen.

According to E. Lionetti, who presented the paper on this experiment, a great deal of useful information was gathered on what was needed before this approach could be deemed practical. Lionetti called current video edit-

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## NEWS FEATURE

ing systems, "no good." A system is needed which can drive a color corrector and direct a digital effects unit for reframing of shots. Current transfers from film to tape are inadequate and require improved error correction.

The creation of this film for theatrical as well as television release was successful in its main goal of revealing weaknesses in current technology. Foremost among the new developments

Lionetti wants is a new camera, designed especially for electronic cinematography and better resolution tubes. The weaknesses he found in the recording and editing systems he felt might be remedied by the digital video recorder when it becomes a reality. All in all, however, "we are convinced that magnetic tape has all the potential to succeed film both economically and artistically," concluded Lionetti.

### Digital solution egged on by spectre of new distribution

While current concern over spiraling

## Quantel's Taylor Takes Montreux Gold Medal



Richard Taylor, managing director of Quantel Ltd., was granted the coveted Montreux Achievement Award for contributions to the improvement of television engineering.

Specifically, Taylor was named for his work on INTELLECT, a real-time interactive image processing system. This work at Quantel eventually led to the DPE-5000 and related digital video products from Quantel. Taylor gave credit for winning the Gold Medal, in large part, to his colleagues at Quantel.

An idea whose time has come . . . again!



### The Merlin ME-188 Drop Out Compensator.

Since the introduction of the first drop out compensator, videotape has steadily improved, leading some to think the DOC is obsolete. But, the demands being placed on tape recording have also multiplied . . . especially in the case of the new one-inch broadcast VTR's which require increased density of recorded material.

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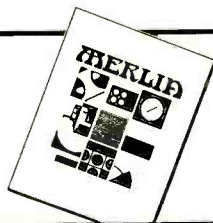
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production costs and inefficiencies motivate development of digital video systems, the spectre of direct broadcast satellites, high definition television, advanced cable television, videodisc, and a flat screen TV system, which RCA claimed will emerge before the end of the decade, add importance to the argument that whatever digital system is developed be capable of serving the qualitative and quantitative needs of these new distribution systems.

According to W. Hittenger of RCA Laboratories, and a supporting paper by Thomas Credelle also of RCA labs, the goals for a flat screen system under development at RCA include a screen size of 30 in. by 40 in., a thickness equal to or less than 4 in., and a weight of under 110 lbs., in order to facilitate "hang-on-the-wall" mounting. Based on "cathodoluminescence," RCA has developed a flat CRT which uses an electron beam guide technique to excite the screen's phosphors. Considerable use of digital circuitry and storage is made at the receiver not only to facilitate the beam guide structure but also to provide considerable signal processing and enhancement. Results, so far, compare favorably with the performance of conventional color television receivers and, according to the paper, should be capable of reaching resolution levels suggested by HDTV demands. Hittenger commented that a practical flat CRT could emerge in the market before the end of this decade.

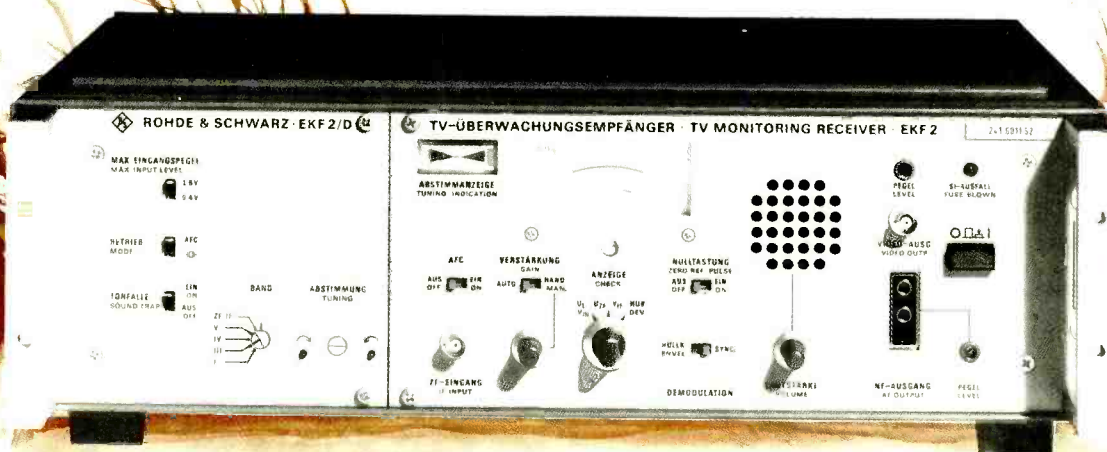
Storage capacity at the receiver was

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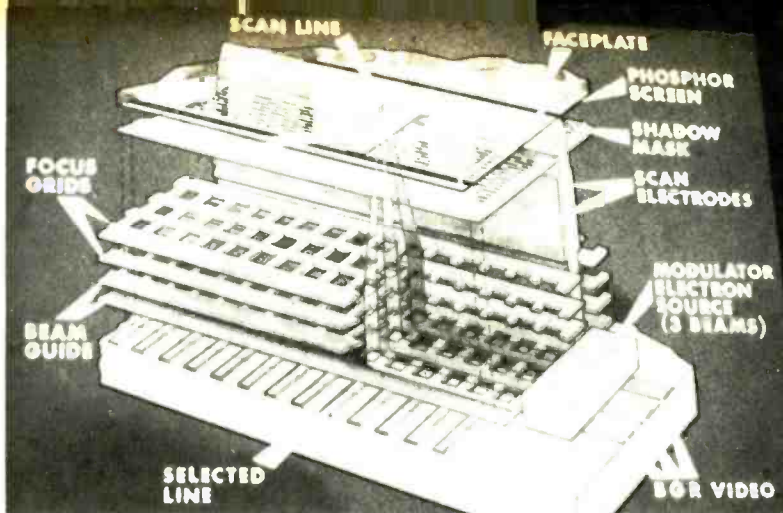
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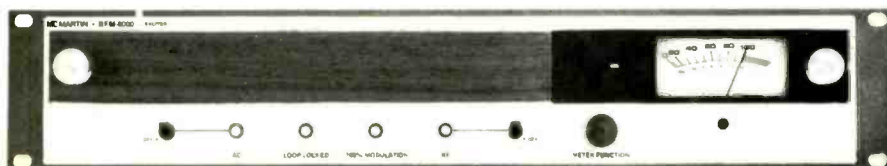
## NEWS FEATURE

mentioned by several of the discussants who saw a need to accommodate teletext, desired a switchable HDTV and conventional receiver, and recommended various signal processing strategies that could best be accomplished at the receiver. Nearly all presenters and discussants of future TV systems saw the inclusion of multi-channel sound as a byproduct of future systems and receiver developments.



Partial view of RCA's "electron beam guide" system for flat screen television projection. Practical units should be on the market within ten years according to RCA

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William Connolly provided delegates with an update of CBS efforts in electronic cinematography

Direct Broadcast Satellites (DBS) received considerable attention at the conference. R. Suverkrubbe, of IRT, surveyed the DBS plans of Canada, Japan, Europe, and the U.S. and predicted that the first practical high power DBS system will be in orbit by 1984. By 1990, said Suverkrubbe, DBS satellites will be a routine part of the communications network. Representatives of the Franco-German cooperative project said that the German TV/SAT and the French TDF-1 satellites were on target for a late 1984 launch. The European Space Agency's L-SAT, a large multi-purpose communications platform, with one television channel, should also see a 1984 launch. Swedish plans call for a 1986 launch of their Tele-X DBS and may be joined that year by the Swiss Tel-SAT system. The U.K. plans for use of L-SAT 2 in 1985-86, while the U.S. plans, under



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Glenn Larson (center) participated in a panel discussion along with Joseph Flaherty of CBS (right). Larson outlined the imperatives felt in the filmmaking industry for a much more productive "electronic production system"



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the auspices of Comsat and Satellite Television Corp. (STC), see 1985 as likely DBS launch dates. All the DBS systems described at the conference include multi-channel sound and the European L-SAT experiment would definitely include the digital transmission of four sound channels according to L. Cheveau of the EBU. Teletext may also form a part of the L-SAT experiments.

### More earthly concerns cloud immediate picture

In papers and roundtable discussions that addressed themselves to the future of TV home entertainment, changes in the TV production system, and a host of related technical matters, it became clear that while progress is constant it is not unimpeded.

CBS's William Connolly outlined progress towards a single camera electronic production and post-production system achieved by CBS. Connolly noted that some 76 percent of prime-time programming produced each year in the U.S. is accomplished using the single camera technique on film. This, said Connolly, represents some 900 hours of programming and to expect an all-electronic production system to replace current techniques overnight "is both unrealistic and intellectually arrogant."

Connolly cited the EC-35 Electronic Cinematography camera by Ikegami as one step taken towards the development of a system that incorporates the video equipment in a format consistent with cinema technique. This approach is needed, implied Connolly, in order to retain the years of artistic experience and practice built-up in conventional filmmaking while progressing towards a more economical and productive electronic system. The plan, said Connolly, is to slip an electronic camera into the hands of the conventional cinematographer, without his ever noticing it.

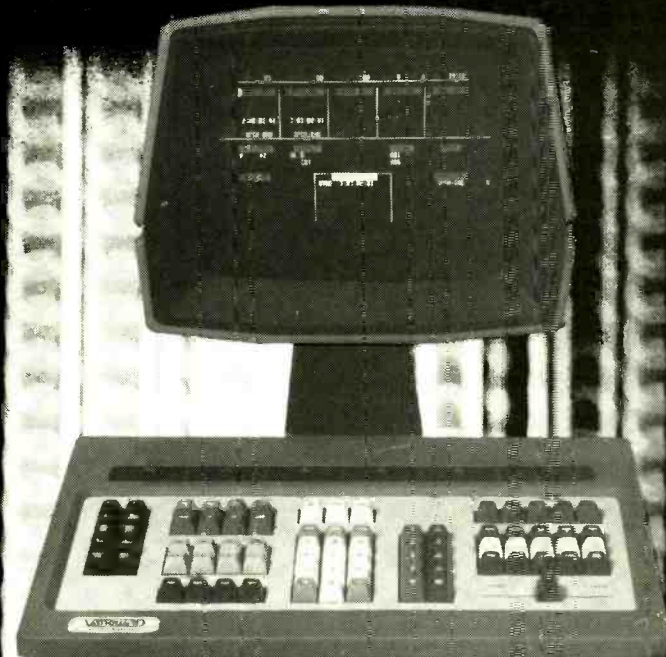
Nearly all participants agreed, however, that the main arena for the changeover to new technology would occur in the post-production suite. Connolly outlined progress on the CBS Beta-format computerized 1/2-in. editing system being jointly developed by

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CBS and Sony Corp. and described in *BM/E's* July, 1980 issue. This system, said Connolly will become commercially available from Sony Corp. later this year or early next.

In a wide ranging discussion, participants from France, Germany, Italy, Britain, and the U.S.A. outlined progress and innovations accomplished in their own countries. Clearly, 1-in. helical VTRs are becoming the mainstay of computer controlled post-production suites around the world. Moreover, much more attention is being given to audio with multi-track mixdowns and stereo production becoming commonly practiced.

What deficiencies remain in existing systems will hopefully be resolved in the digital systems of the future. As mentioned earlier, however, there is little consensus on the approach to future digital recording techniques even with the imminent agreement on component encoding sampling frequency. Charles Anderson, with co-author, M.O. Felix (both of Ampex Corp.), outlined some of the areas that promise to present digital recording with its thorniest issues.

According to the paper, crosstalk may set limits both in head construction and in track format. Head stacks or clusters versus spaced heads will create different crosstalk problems. Both continuous and discontinuous recording have been proposed with several cost disadvantages accruing to discontinuous systems though admittedly, memory cost is on the decline. Another problem area noted in the paper is the number of heads to be used. Single heads, clustered heads, and stacked heads each have drawbacks and advantages. Drum rotation rates suitable to both 50 and 60 Hz systems present several problems to designers. Any variance in drum rotation rates that would occur as a result of differences in the 50 and 60 Hz electrical systems would result in direct variances in the linear bit densities of tape recorded in different systems. This could create unacceptable errors in one system or the other. Variable speed playback and editing functions would also be complicated by differences in the electrical systems unless some approach to drum rotation rates can be found that is mutually acceptable — such as an integral number of rotations per field.

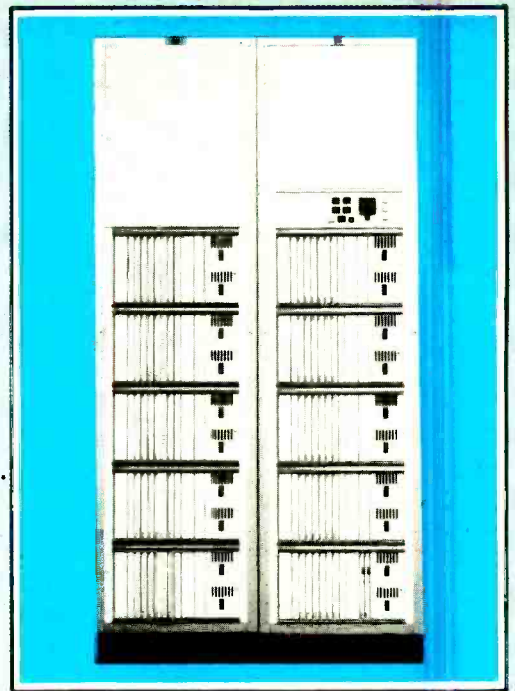
The selection of an audio sampling frequency for use with digital video is also complicated by the 50/60 Hz differences. A common sampling frequency suitable to both electrical systems would result in an unacceptably high rate of samples per second while the use of an integral number of sam-

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## KTRK TEST DATA BREAKDOWN

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

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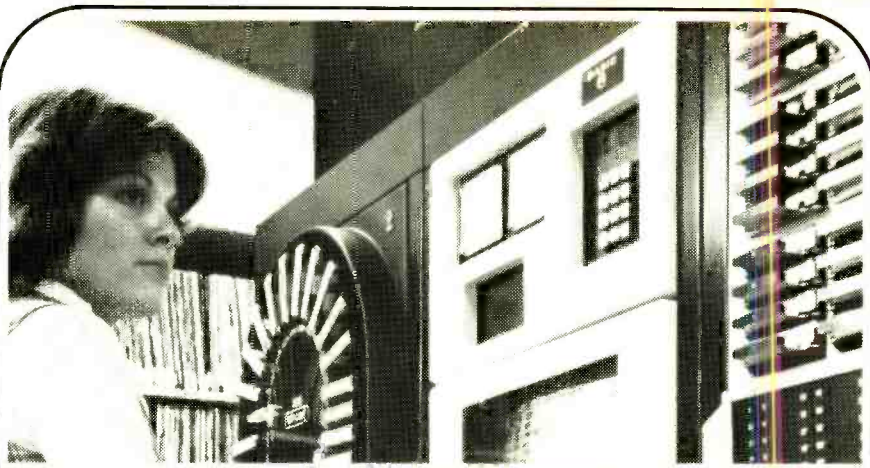
## NEWS FEATURE

ples per field such as 60 kHz (the lowest rate suitable to both 50 and 60 Hz systems) produces 1001 samples at 60 Hz and 1200 samples at 50 Hz. Other parts of a studio system, however, are much more sensitive to bit rate and may present problems. Ultimately, there is the problem of selecting a system that will be compatible with professional audio production systems and soon, digital consumer audio standards.

Toshi Doi, of Sony Corp., was called on, at one point in the meeting, to deliver an impromptu summary of the status of digital audio's search for standardization. Doi, outlined the parameters of some nine operating digital audio systems and noted that the search for standardization had "become a horse race." Said Doi, pointing at a table showing the various system parameters, "as you can see, some of these are horses and some of these are turkeys." Clearly, Sony anticipates the market to produce a *de facto* standard.

Joseph Flaherty, CBS vice president of engineering and development, said during the opening roundtable, that the interim progress towards some ultimate television system might best be termed "hi fidelity television" rather than high definition television or some other as yet undefined term. While he noted that "the old technology limits of broadcasting have been broken," an era of competition for segments of audience has begun. Between now and the arrival of that ultimate television system "what really counts in this high fidelity system is what is seen on the screen." As audience segmentation continues, noted Flaherty, the cost of production of any particular program will be spread over smaller and smaller audiences.

This spectre is one that deeply bothers producers. Glenn Larson of Glenn Larson Production/20th Century Fox, sitting in for the detained Coppola, expressed his deepest concern. He noted that prime time productions now routinely cost \$1 million per hour to produce and that shows are now surviving with only 26 percent shares of audience. Thus the networks receive proportionately less for national advertising and production costs represent proportionately more of total costs. He further noted that Fox is committed to making films for cable with budgets of about \$4 million. These films are likely to have far less than 26 percent of the national audience. Larson implied that the Hollywood production industry separately needs an electronic production system capable of "1000 to 2000" lines of resolution, one which will allow about a 20 percent savings over current techniques. **BM/E**



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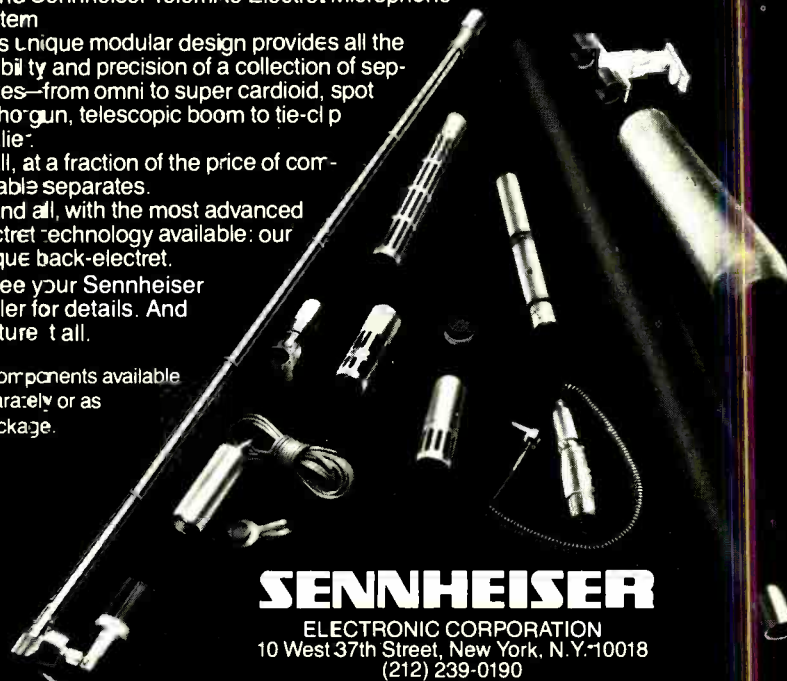
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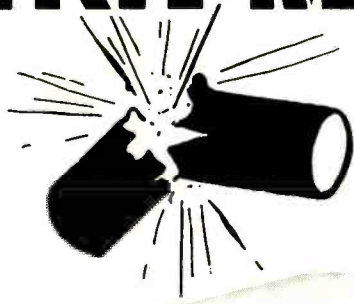
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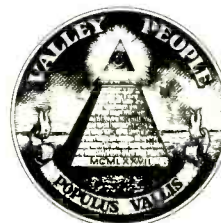
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# INTERPRETING THE **FCC** RULES & REGULATIONS

## FCC Simplifies Renewal Process

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

WITH THE ADOPTION of a simplified renewal form, the FCC has taken yet another step in the process of deregulating the communications industry. The Commission adopted its proposal for a simplified renewal application, sometimes referred to as a "post card renewal," only a month after the effective date of the radio deregulation proposal and a few weeks before a U.S. Court of Appeals panel in New York upheld an FCC decision to eliminate its distant signal and syndicated exclusivity rules which relate to cable television.<sup>1</sup>

The Commission authorized the newly streamlined renewal form, which will affect all commercial and non-commercial AM, FM, and TV licensees in a May decision.<sup>2</sup> In addition, the Commission amended regulations governing Form 323 ownership reports. The Commission determined that the changes will result in considerable savings of time and money by both the licensees and Commission without avoiding the Commission's statutory mission that it only grant renewal applications that serve "the public interest, convenience, and necessity."<sup>3</sup> In this article, we shall outline the changes in licensee filing requirements, as well as interim procedures to be followed by renewal applicants prior to final approval of the newly shortened form.

### Why a simplified form?

The major change resulting from this recent Commission action was the Simplified Renewal Application form

("SRA"). The Commission requires submission of a renewal application because of the present statutory limitation of three years on a license term and because of the requirement noted above that the Commission must determine a renewal to be in the public interest. To comply with the public interest standard, Congress mandated that applications:

"... shall set forth such facts as the Commission by regulation may prescribe as to citizenship, character, and financial, technical, and other qualifications of the applicant to operate the station."<sup>4</sup>

The particular form of a renewal application, like any other Commission regulation, is subject to change so long as it conforms with the Communications Act, as amended, and any other relevant laws.<sup>5</sup> Indeed, the courts have ruled, as the Commission noted in this decision, that the FCC has substantial discretion to "reconsider and review the appropriateness of our regulations including the continuing need for particular information in connection with renewal applications."

A primary motivation for the decision was the tremendous backlog at the Commission resulting from applications for new facilities alone; thousands of applications await full processing. The Commission contends the adoption of the SRA would free up many scarce resources for use in more pressing matters. Similarly, the SRA will free up licensees to attend to other matters. One party commenting in support of the proposal estimated that an informal survey of affiliates showed that 48 hours of station staff time was required for preparation of a renewal application.<sup>6</sup>

Wherever specific concerns are brought to the Commission's attention—such as in a petition to deny—which indicate that the public interest would not be served by granting renewal, the Commission still has "an obligation to create a full and complete record concerning pertinent conduct on the part of the licensee."<sup>7</sup> The information

<sup>1</sup>See *Malrite TV of New York v. FCC*, Case Nos. 80-4120, et al., United States Court of Appeals for the Second Circuit, Slip Opinion, June 16, 1981. See this column in the next issue of *BM/E* for a further discussion of this case.

<sup>2</sup>*Revision of Applications for Renewal of License of Commercial and Noncommercial AM, FM and Television Licenses*. Report and Order in BC Docket No. 80-253, 46 FR 26236, 49 RR 2d 740, Released May 11, 1981.

<sup>3</sup>47 U.S.C. §309 (a).

<sup>4</sup>47 U.S.C. §308(b).

<sup>5</sup>*Renewal of License*, supra, 46 FR at 26239. See *National Association of Regulatory Utility Commissioners v. FCC*, 525 F.2d 630 (D.C. Cir. 1976).

<sup>6</sup>National Public Radio figures, cited in *Renewal of License*, supra.

<sup>7</sup>*Id.*

## FCC Rules and Regulations

necessary to conduct an in-depth review of a licensee's performance both by the Commission and the general public will be available at the station's public inspection file. The Commission dismissed expressions of concern by several communications public interest groups that data would no longer be available to monitor licensee performance in public files at FCC offices in Washington. The Commission wrote that its "concerns for assuring the ability of local citizens to monitor the operations of licensees who serve them are fulfilled by maintenance of local public files."<sup>8</sup>

Broadcast licensees are cautioned that the Commission did *not* intend this proceeding to change *substantive requirements*, unlike the radio deregulation, but rather *procedural requirements* at renewal time. Most licensees must still keep full records in their public inspection files as to employment practices, ascertainment study methods and results, programming devised to meet ascertained needs, certain station logs, ownership reports, and complete copies of all pending applications.

### The SRA forms

The SRA forms are not as yet available. They must still be approved by the Office of Management and Budget, which now conducts a full review of all forms issued by U.S. government agencies to assess their impact on time and resources of both the government and the public sector. However, the facsimile of the proposed SRA included by the Commission asks basic questions about the following:

- Renewal applicant identification (name, call sign, city of license, etc.);
- Whether current EEO Reports (FCC Form 395) and Ownership Reports (FCC Form 323) are on file;
- Compliance with the alien ownership restrictions of Section 310 of the Act;<sup>9</sup>
- Legal and character qualifications;
- The completeness of the local public inspection file.

Exhibits are attached only if the questions are answered negatively and the required information has changed and not previously been updated. Otherwise, licensees will be required to do no more at renewal time than file the SRA.

### Interim commercial radio application

The radio deregulation decision,<sup>10</sup> which eliminated programming percentage guidelines, ascertainment requirements, commercial guidelines, and program logging requirements for commercial radio licensees, became effective on April 3, 1981. Since the new SRA forms are not yet ready, commercial radio applicants who file for renewal should cross off the following questions on the Form 303-R renewal form: questions 11, 12, 14, 15, 16, 17, 18, and 19. Since formal ascertainment procedures are no longer required of commercial radio licensees, the word "issues" should be substituted for "problems, needs, and interests" in question 13. Licensees should place their "issues — programs" listings in their public inspection file rather than file them with the Commission. Also, the Commission cautioned in a separate public notice that all Commission requirements affected by deregulation such as ascertainment and promise versus performance were effective up to April 3, 1981. The Commission urged licensees to keep all documentation necessary to support compliance prior to that date.

### Other changes

The Commission also adopted back-up procedures, enforcement tools in the FCC's words, to monitor the effectiveness of the streamlined renewal process. The most prominent is the "long-term audit." The Commission will randomly select five percent of all commercial television licensees and a similar percentage of all noncommercial licensees and send them an audit form instead of the SRA. Since including commercial radio licensees among those licensees eligible to receive the audit form would fly in the face of the substance of the radio deregulation, commercial AM and FM licensees are exempt from the audit. The audit form will be similar to the current renewal application. Each station stands at least a five percent chance of being audited, although the Commission reserved the right to increase the number if it thinks it is necessary. In any event, a minimum of five percent of all noncommercial licensees and commercial television licensees will be audited.

Another enforcement procedure to ensure the integrity of the new, simplified process is the field audit by the FCC's Field Operations Bureau (FOB). All licensees will be subject to an FOB field audit to monitor the broadcaster's compliance with the FCC's technical requirements. Engineering data submitted with the original construction permit or license modification application must be kept current. Equipment must be maintained to specifications. The FOB field audit will ensure these things. The Commission cautioned that:

"One of the most essential duties incumbent upon the licensee of a broadcast station is that of insuring the continuous operation of the transmitting equipment. In fact, this is an indispensable condition of good service of any station. Failure of this equipment due to causes reasonably within human control, whereby the public is deprived of service, denotes a state of carelessness and mismanagement which this Commission, in the exercise of regulatory authority, will not condone."<sup>11</sup>

Thus, we urge you to monitor the engineering portion of your operations to avoid difficulties in such a random audit.

Another random auditing procedure will be conducted by the Broadcast Bureau. The bureau will do an on-site inspection of licensees submitting proper SRA's and audit forms. However, commercial radio licensees will not be subject to such random audits.

In addition, ownership reports for all licensees no longer need to be filed every three years at renewal time provided there has been no change in the information on file with the Commission. Any changes in the information required must still be reported within 30 days on FCC Form 323.

### Conclusion

The major changes outlined above became effective on June 10, 1981, except the SRA form, which we noted had not yet been approved by the Office of Management and Budget at press time. We urge you to secure a copy of this decision from either the FCC or communications counsel, particularly if you will be filing a renewal this summer. **BM/E**

<sup>8</sup>*Id.*, 46 FR at 26240.

<sup>9</sup>47 U.S.C. #310 prohibits foreign ownership of 20% or more of a broadcast licensee.

<sup>10</sup>*Deregulation of Radio*, Report and Order in Docket 79-219, 46 FR 13888, 49 FR 2d 1 (1981).

<sup>11</sup>*Renewal of License*, *supra*, 46 FR at 26242, quoting *Brooklyn Broadcasting Corp.*, 4 FCC 521, 531 (1937).



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**FACTUAL.** In 570 fact-filled pages, liberally illustrated with photos, diagrams and charts, the Handbook offers detailed analysis of existing equipment and systems, probing strengths and shortcomings of current product design and covering key parameters for product comparison. It offers guidance in long range organization and systems planning, as well as predictions about emerging technology and trends. Authored by C. Robert Paulson, this video production handbook is written in an informal style that satisfies the needs of both the technical and non-technical reader.

**ESSENTIAL.** With constant changes in technology and the proliferation of products, there are no "simple" purchasing decisions in the ENG/

EFP/EPP market. With each buying decision impacting on plans for the future, you need all the help and advice you can get. Now. Whether you're technical or non-technical, operations or management, this book is your required reference for coping with the "digital decade," for assuring productivity and profitability in your operations, now and in the future.

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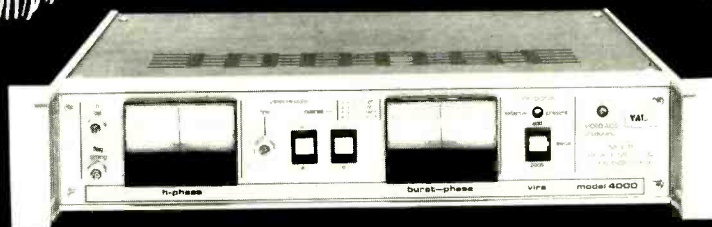
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# GREAT IDEA CONTEST

**Just four months remain in the 1981 Great Idea Contest. ENTER NOW. You may have the idea that every broadcaster has been waiting for – and if you do, you could win your own programmable calculator.**

*Editor's Note: Before attempting to implement any Great Idea involving the modification of equipment, station personnel should check with the equipment manufacturer to insure that no violation of warranty will occur.*

*If the Great Idea involves any technical standards governed by the FCC, stations should make sure that the idea will in no way cause a violation of FCC rules.*

## Rules for BM/E's 1981 Great Idea Contest

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

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

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

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

**5. Winners:** Top rated entries in the year-long tally will become winners in each of the three major categories (AM, FM, TV). Final winners will be picked in February, 1982, and announced in the March, 1982, issue of *BM/E*.

**6. Prizes and Awards:** Three top prizes will be awarded: a programmable electronic calculator will be awarded for the highest rated entry in the respective categories of AM, FM, and

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

**1981  
Entry Form**

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**New York, New York 10017**

**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** \_\_\_\_\_

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# BROADCAST EQUIPMENT

Leading off this month's Broadcast Equipment column are four products introduced at the recent Twelfth International Television Symposium and Technical Exhibition, held in Montreux, Switzerland (see report on p. 79).

## Video Painting System 250

Flair is a computer-based video art system, developed by the BBC, that allows artists to work without altering their normal techniques. Selecting from a palette of up to 256 colors and a wide range of "brushes," the artist draws with the electronic stylus on a drawing board that remains unmarked. Results appear immediately on the monitor. Flair will automatically draw precise circles, boxes, straight lines, and ellipses; will fill a defined picture area with a chosen color; and will letter, with an electronic equivalent of dry transfer techniques. Colors may be mixed on-screen until a desired shade is achieved. Complete or partly finished designs may be stored on removable diskettes; palettes and picture may be stored separately, if desired. The single microprocessor results in easy maintenance and competitive pricing, the manufacturer states. The unit has either external mixed sync or internal sync pulse generator. Picture size is 768 by 574 pixels; permanent storage of art and palettes is on 1.2 MB floppy disks (typically 40 pictures/disk). LOGICA LTD.

## Telecine 251

The B3410 telecine, an advanced design based on second-generation CCD imaging sensors, operates on PAL, NTSC, or SECAM standards, or with RGB or digital output. Virtually all video signal processing is carried out digitally; 11-bit sampling before gamma insures accuracy of the three video signals. The digital circuitry results in precisely defined drift-free operation, according to the manufacturer. Microprocessor control sets up gamma correction, matrix correction, aperture correction, and other basic parameters; it also supports the automatics. It monitors continuously the control panel states, film transport, and automatic controls, and routes the appropriate commands to the video chain and projector light control servos. A built-in

resident monitor program permits rapid checks with diagnostic aids. The telecine will accept both 16 and 35 mm film and handles positive and negative color film as well as black and white. Various forward and reverse running speeds are possible. Also provided are automatic or manual control of black level, exposure, and white and black color balance. MARCONI.

## Flying Spot Slide Scanner 252

The AA-1B flying-spot slide scanner is designed to produce broadcast-quality color picture signals from standard two by two-inch mounted slides (diaposi-



tives). It delivers separate R, G, and B video outputs with associated sync signals; the timing is derived from the internal sync generator, which can be locked to an external composite video input signal if required. Slides are carried in a precision carousel unit that holds rapidly interchangeable 80-slide magazines. Sequential or random-access slide selection is from the front panel or a remote keypad; worst-case access time in the random-access mode is five seconds. The scanning system light source is a 108 mm precision flat-screen CRT operating at relatively high voltage, with close tolerance deflection circuits. The unit includes an RGB afterglow corrector circuit and an electronic mask that can be aligned for a particular film stock or for a good compromise between two or three. A horizontal aperture corrector enhances definition to produce acceptable pictures when transparency quality is below normal. The modular unit operates from ac mains and can stand alone or be rack-mounted. Available for all color standards. CROW OF READING.

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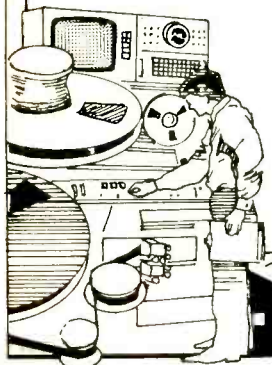
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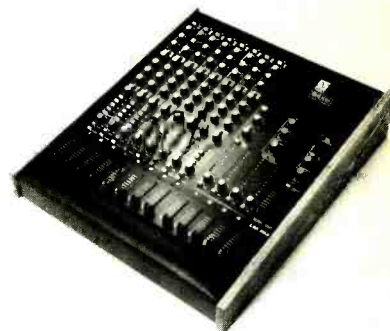


### Production Switcher 253

The RME compact production switcher comes in 16-input single-level and two-level versions, each featuring separate preview and key buses, title insert, RGB chroma key, borderliner, flip-flop stage, and pulse processing as standard. A new kind of dual mixing stage enhances the unit's versatility by processing six inputs simultaneously. The new stage is split into two parts, one of which performs mix or wipe transitions with colored pattern borders. The resultant signal passes to the second part and becomes a "background" signal for chroma key and titling. The two parts of the dual mixing stage can be inverted, on air if desired. All switching functions and the data transfer between the switcher panel and the separate electronics are housed in three rack frames of plug-in modules. The switcher control panel can be hinged up to reveal detachable function modules for easy service. Options include additional caption inserter, encoded chroma key technical preview bus, central color background generator, control function memory, multichannel mixer, and digital video effects processor. ROBERT BOSCH.

### Mixing Consoles 254

XM Series advanced mixing consoles, for studio and mobile use, feature four submaster/stereo/mono output formats



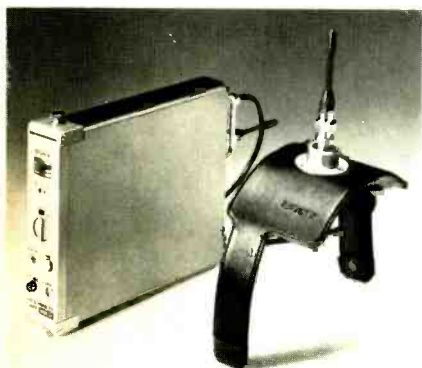
and are available in eight-, 12-, 16-, and 24-input channel versions. Features include transformer-balanced mic input with switchable line level input; input preamp input/output jacks; pre-EQ/fader monitor bus; post-EQ/fader effects bus; extensive input preamp equalization with switchable base shelving and sweepable midrange; submaster assignment switches; channel mute; solo; 60 mm slide channel fader; independent left and right mono output level controls; powerful headphone amp with level control; and



much more. Options include external power supply for phantom powering of console and condenser mics and 220 V, 50 Hz power configurations (internal and external). NEPTUNE ELECTRONICS, INC.

### Wireless Diversity Tuner 255

The compact, portable WRR-37 UHF diversity tuner, designed for ENG and EFP use as well as studio applications, operates with the WRR-27 belt-pack transmitter and lavalier mic or the WRT-57 hand-held wireless mic. It utilizes two independent receivers on



the same frequency, two separate antennas, and a diversity switching circuit that continuously samples the outputs for the most stable reception. The battery-powered unit weighs 2.8 pounds. Output level is  $-64$  dBm ( $\pm 1$  dBm) at a deviation of  $\pm 2.4$  kHz; harmonic distortion is less than 0.3 percent; S/N is greater than 53 dB at a deviation of  $\pm 3$  kHz. Frequency response is 200 Hz to 15 kHz and the receiver features a peak deviation of  $\pm 150$  kHz. Features include two-channel selectability, monitoring with supplied earphones, and three-mode meter indicating RF input level, audio output level, and battery conditions. SONY.

### Monitor Speakers 256

The 4430 and 4435 Bi-Radial studio monitors, equipped with the maker's unique Bi-Radial constant coverage horn, have been developed to meet the requirements of digital and advanced analog technology. The Bi-Radial horn



provides smooth, flat frequency response at all coverage angles on or off axis, according to the manufacturer, allowing great flexibility in speaker placement. The horn is coupled to a compression driver, crossed over at 1000 Hz. The speakers have 15-inch low-frequency drivers (one in the 4430 and two in the 4435). Maximum power output is 300 W for the 4430 and 375 W for the 4435. JBL.

### Bulk Tape Degausser 275

The Model 8000 bulk tape degausser provides hands-off fast degaussing automatically. It incorporates a high-quality Bodine drive motor, all solid state (CMOS) control logic, high current resonant coil technology, heavy cast aluminum construction, and a sturdy molded fiberglass cabinet. Operation is simple and automatic; the unit quickly adjusts for changes in tape size, insuring complete erasure of video and audio tapes in all formats. Erase operation is completed in less than 32 seconds. OPTEK, INC.

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The Param centrally computer-controlled multichannel audio equalization system consists of a dedicated computer system that controls up to 64 individual equalizer channel modules. All operator input is through a single nine- by six-inch control panel. System operation is monitored by an interactive graphics display on a custom 12-inch, high-resolution video monitor; displays include exact frequency response curves of each equalizer and data on the status of each equalizer, memories, and system. All equalization operations are in real time. System memories retain up to 36 settings for each equalizer and 32

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standard response curves that the operator has previously stored. Interfaces to existing console level control automation are available, with SMPTE time code systems scheduled for fall delivery. S/N ratio exceeds -96 dBm; switching noise is below -88 dBm. REDWOOD RESEARCH.

**TV Error Corrector 261**

The Y-688<sup>32</sup> Total Error Corrector, for broadcast/teleproduction use, provides sophisticated image improvement functions plus time base correction. It accepts two wire luminance (y) and chroma (688) signals from high-grade color under VTRs, or composite video



from older units. A patent-pending phasing/separator and comb filters provide component signals to a dual digital, 32-line TBC, and a one- and two-line digital look-ahead Phase Comp circuit provides accurate velocity/phase correction. The unit will reduce luminance noise by up to 10 dB and chrominance noise by up to 15 dB; increase horizontal details; sharpen transitions; remove chroma-luminance delay errors; and eliminate second order ringing. All image processing functions can be accomplished automatically. The rack-mountable unit draws 175 W and weighs 30 pounds. EDUTRON.

**Graphic Equalizer 262**

Model 1500 is a third-octave graphic equalizer offering a high level of performance in noise and distortion, according to the manufacturer. It provides 27 bands (ISO frequency standard) of equalization, with a switchable boost



and cut range of either  $\pm 6$  dB or  $\pm 12$  dB. A constant impedance input level control has a range from +10 dBv to full signal attenuation. The unit features LED indication of power and approaching overload of audio signals. Also provided are a switchable infra-sonic filter and a system bypass switch that removes the unit from the signal path entirely if desired. The input is an active differential amplifier (bridging) terminated by a standard female XLR-

type connector. Rack-mountable, the unit is available for either 110 V ac/60 Hz or 220 V ac/50 Hz operation. SPECTRA SOUND.

**Audio Distribution Amp 263**

The TM-53 audio distribution amplifier offers an overall gain of 14 dB, continuously variable. Its high-level input capability is buffered and has a level control to drive six individual opamp outputs, each of which will drive a 600 ohm load to a +21 dB with THD less than 0.25 percent and 0.08 percent at 0 dBm (1 kHz). Noise is greater than 70

dB below 0 dBm. The unit has unbalanced input and outputs; transformer output balancing and/or differential input balancing are available upon request. Output circuits are available with individual level controls, but are set for unity gain unless requested. A stereo version is also offered. Basic mono version, \$197. S.C. ENTERPRISES.

**Tape Eraser 264**

Taberaser 409, designed for high coercivity tape, is an eraser for audio, video, and instrumentation tapes and magnetic films that accommodates

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Credit the NBC Electronic Journalism Department/Operations and Engineering in New York for putting the Electro-Voice DO56 shock-mounted omni in the field. Although originally designed as an on-camera entertainment and MC's microphone, NBC found the DO56 to be the microphone that provides an audio signal commensurate with video in real-life crisis situations. In these situations audio often takes a back seat to video,

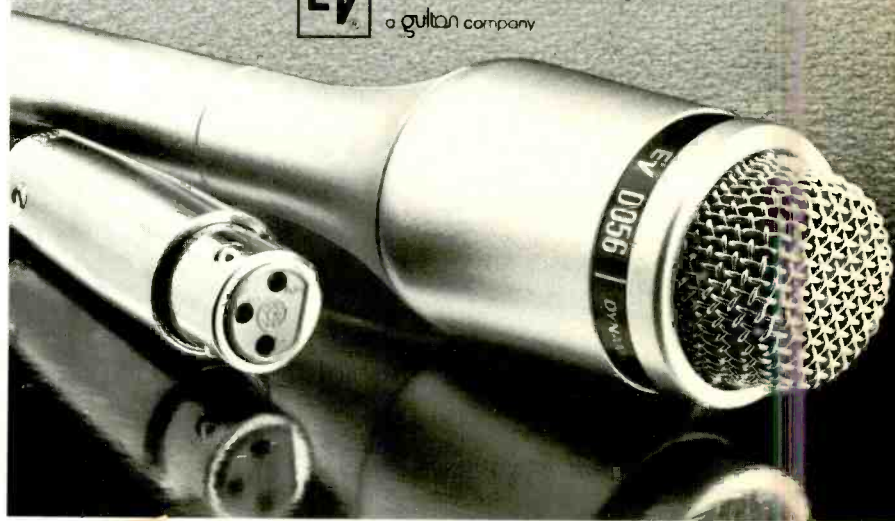
### Electro-Voice DO56 Shock-Mounted Omnidirectional Microphone

resulting in a final product that doesn't accurately reflect the broadcaster's professional standards. NBC discovered that the DO56 takes the

pushes, the shoves, the rubs and finger taps in stride. And when handling *really* gets rough, the DO56's unique internal shock mount virtually eliminates the bell-like clanging transmitted by other shock-mounted mikes.

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

For an in-depth description of this and other case histories, get on the Electro-Voice "Mike Facts" mailing list. Write on your letterhead to Mike Facts, c/o Electro-Voice, 600 Cecil Street, Buchanan, MI 49107.



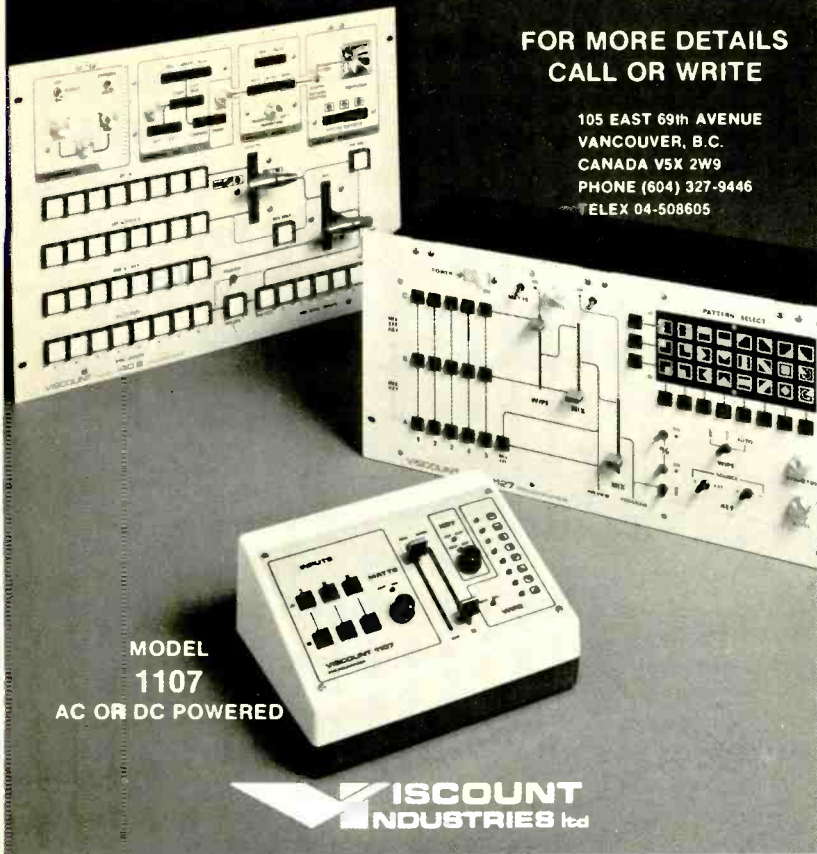
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## Broadcast Equipment

reels up to 16 inches. According to the manufacturer, this model is 40 percent more efficient than its predecessor. The unit will degauss audio and video cartridges, as well as tapes on reels or in boxes, and all reel-to-reel tapes from 150 mil to two-inch widths. Erase field is automatically diminished at the end of each 20-second erase cycle, minimizing residual noise caused by turnoff transients. An overheat "start interlock" and continuous fan blower operation provide complete electrical protection from overheating damage. TABER.

## Professional Monitor System 265

The Sentry 100 professional monitor system for broadcast and recording studios features high efficiency with extended low-frequency response, high power handling capacity along the entire frequency range, and uniform fre-



quency response and dispersion. Its Super Dome tweeter can handle 25 W RMS of input power with response out to 18 kHz and uniform dispersion, 120 degrees at 5 kHz. The low-frequency section is an eight-inch direct radiator woofer in an optimally vented enclosure with fourth-order Butterworth tuning, permitting small size, extended bass response, and high efficiency. A high-frequency control offers boost as well as cut and is mounted in front of the loudspeaker. The unit is designed for rack-mounting from the front and is suitable for mobile or studio use. ELECTRO-VOICE.

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Cine/Video Dolly. The fluid head is designed for cameras weighing up to 10 kg and provides smooth 360-degree panning, upward tilting to 60 degrees, and downward tilting to 90 degrees. It can be set to lock downward movement at 45 degrees and offers simple adjustment for panning drag and vertical drag. The Universal tripod weighs less than 12 pounds and extends to 66 inches; the field tripod can be set from 12 to 63 inches. The dolly features individually braked wheels (five inches in diameter) and a unique leg locking system. BOGEN PHOTO CORP.

### Lighting Control System

267

Command Performance® is a micro-processor-based memory lighting control system incorporating non-volatile



bubble memory (for up to 700 cues) and proportional electronic patching (for 32 to 320 control channels and 32 to 9216 dimmers). Two Color Graphic monitors provide an interactive display of patch and playback information in a clear, concise layout. Features include level setting by keypad or encoder and cue command functions of fade times, fade delay, auto-sequence, dimmer slope, and operator messages. KLI EGL BROTHERS.

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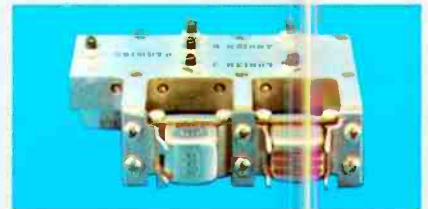
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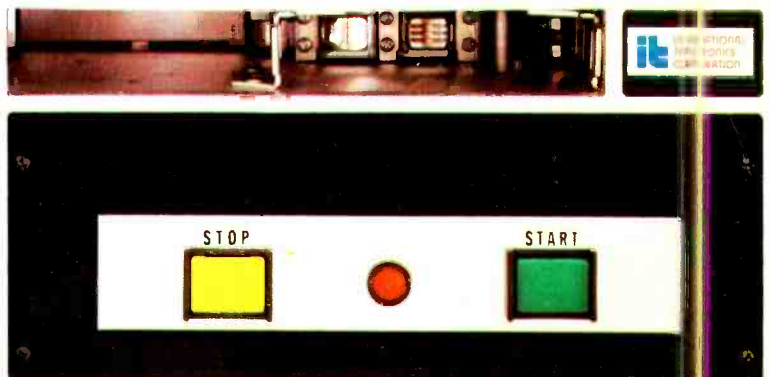
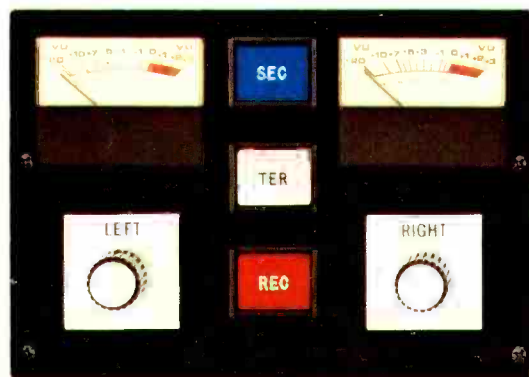
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