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New from Hitachi

A Colossal One-Inch Step

One-inch is the VTR format of the future. It's too important a step forward for a scaled-up 3/4" or a scaled-down 2" system. It deserves to be totally original, with every advance designed in. That's how we approached the new Hitachi HR-200, after almost 20 years of experience making quad machines. The result: a one-inch Type C VTR destined to establish new broadcast standards everywhere. In every department, the Hitachi HR-200 is miles ahead of the one-inch competition!

Fast, sure, easy operation

Hitachi one-inch VTR's are loaded with features—many of them Hitachi exclusives. Like the brake release for easier threading. Both video and audio confidence. A "B-wrap" configuration, for reduced dropout. A *precision* moveable tape guide for easy loading, with an incredible 1-micron tolerance that's accurate for up to 2 million threadings! Plus a sloped design and easier-to-see top mounted drum for still easier threading.

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A microprocessor makes the built-in editor the most advanced you'll find today. And, just as important: it can be re-programmed to interface with editing systems of the future. Serial or parallel logic for remote control? Both have advantages, so Hitachi gives you both. Built-in cable compensation boosts the signal so you can use cable up to 300 feet.

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The HR-100 portable model has many of the HR-200 features, yet it's the smallest Type C portable in the world. And the most serviceable too, with plug-in PC modules. Die-cast uniblock construction makes the HR-100 durable yet extremely light. And like the HR-200, it has a non-dropout tape path. Plus an extended tape path for less edge wear, an auto back space assemble editor, and 3-way power with built-in battery pack, AC adapter or external DC.

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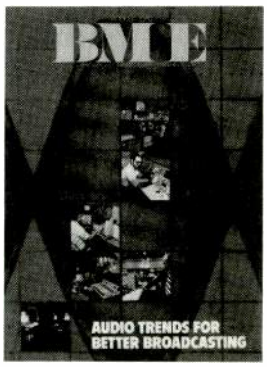

Radio and television broadcasters are showing increasing concern over the quality of audio they offer. With some new technology and a close look at how audio is produced, broadcasters will be able to offer the sounds that gain audience attention

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Advancing Technology

Etching from *Hutching's California Magazine* September 1857
courtesy of the California Section California State Library, Sacramento

Over a century ago the technology that enriched and made Grass Valley, California famous worldwide was typified by the etching above. First came the easy strikes, in which free gold in Sierra Nevada foothill streams was panned out by hand. Next came riffle boxes, fed with large quantities of streambed material by several men, using the force of the river to wash out and separate the heavy gold. That led to the above; rivers were diverted by dams and flumes, so the gravel could be completely dug up by increasingly complex technology for the placer washing processes. Ultimately giant dredges worked the rivers taking in raw material, sluicing out the gold, and conveying the debris to streamside piles in one continuous process.

Gold country technology is no longer concerned with mining, which ran its course after five generations of invention and change. Man's engineering creativity had led from panning by hand to dredging, and to tunnelling miles underground to follow the quartz veins.

As mining faded into history in the 1950s Grass Valley Group came into being, bringing a new technology of rapid change, and a renewed livlihood for hundreds of resident families. In the beautiful, historic Sierra Nevada foothills we've created another worldwide reputation ...in tv broadcast technology.

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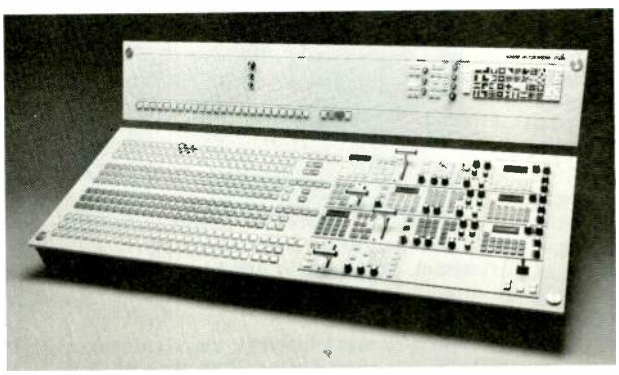

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BROADCAST INDUSTRY NEWS

"Postcard" Renewals, Random Audits Proposed

In a move that would eliminate reams of paperwork for both government agencies and broadcasters, the FCC has proposed a short-form license renewal procedure, supplemented by random audits and field inspections involving at least five percent of licensees annually.

Chairman Charles Ferris said the current problem stemmed from "the sheer weight of applications," which forced the Commission to give each "only a cursory examination." The new procedure, he and the other commissioners hope, will remove the major part of the paperwork burden while freeing the staff to thoroughly investigate those stations tagged for audit.

The short form is attractive, the Commission said, because most licensees meet or exceed the processing guidelines. It will be limited to asking if the three latest annual employment reports are on file, if the applicant complies with rules on foreign interests, if there has been any adverse finding against the applicant since the last renewal form was filed, and if the applicant's public inspection file contains required documentation of its operations. Those stations selected for the random audit would be required to fill out a detailed long form and would be liable for field inspection. About 25 stations every two months would be subject to the audit.

FCC May Back Off From Magnavox Choice

Responding to intense pressure from competing companies and some broadcast engineers, the FCC has decided to reconsider its fingering of Magnavox as the AM stereo system to go with. Word from Washington is that the Commission will stick with the one-system concept, but which system it will name is anybody's guess.

The other contenders in the AM stereo contest — Harris, Belar, Kahn, and Motorola — were certainly encouraged by the FCC's second thoughts. Magnavox, claiming "surprise" at the news, expressed confidence that the FCC would affirm its original decision.

In the meantime, it appears that equipment manufacturers on both the transmitting and receiving ends would do well to wait and see on AM stereo. Even when a single system has been finalized by the FCC, legal wrangling is sure to ensue that could tie up the issue for several years.

FCC Seeks Tougher EEO Rules

All broadcast licensees, regardless of size, would be responsible for fully reporting employment according to race, sex, job title, and category under new, stricter EEO rules unanimously proposed by the FCC in early June. The Commission's proposal also would require broadcasters to summarize all promotions in a similar manner.

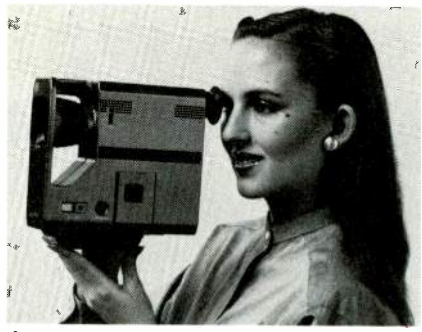
Other major changes included requiring licensees to report applicant flow and job hires, showing recruitment source, race, sex, job title and category, and disposition of each application. Names of individual applicants would not be required. The model program would have to be updated annually and placed in the licensee's public inspection file. Those licensees that employ women and minorities at 80 percent or more of their representation in the local workforce would be exempted from most EEO record-keeping and reporting requirements.

The action continues the Commission's policy of promoting equal employment opportunity goals and encouraging minority ownership of broadcast properties. Explaining the need for the new regulations, chairman

Sony Shows Prototype Of Single Piece Camera/VTR

Though intended for the consumer market, which it is not expected to reach before 1985, Sony's new "Video Movie" unit clearly demonstrated that the development of videotape recording technology is far from over. Comparable in size to a Super 8 movie camera and weighing just 4.4 pounds (2 kg), the prototype unit shown included a CCD camera, miniature VTR using a 5/16-inch cassette, and a helical scan recording format.

According to Akio Morita, chairman and chief executive officer of Sony Corporation, the purpose of the demonstration this far in advance of its routine manufacture and marketing was to encourage other manufacturers to enter into discussions with Sony of a standardized recording format for the new system. Morita also explained that further development of the system was still needed prior to its market introduction and that discussions with other high technology companies might help focus on the directions in which the system should develop.



As compact as an 8 mm sound movie camera, Sony's Video Movie camera-cum-VTR is still under development

The system is intended to be an extension of currently offered home VCRs. As such, the system includes the camera/VTR and a companion unit, called the Home Editor. The Home Editor is intended to permit direct playback of the recording through a standard television receiver or the editing and dubbing of the recording onto a Beta, or other format, home VCR. For playback and editing, the camera body itself is fitted to the home editor and the camera's tape drive is used for playback.

The system's cassette uses 25 meters of metal tape, 5/16-inch wide, to provide 20 minutes of recording time. Recording is in full color and includes an audio track. The camera uses a single frame transfer CCD and provides 250 lines resolution with a 45 dB signal-to-noise ratio. Minimum scene illumination is 70 lux and the speed of the system is roughly equivalent to 400 ASA film. Power for the system is through batteries contained in the camera grip. The system consumes seven watts and should run approximately four hours on battery power. The Home Editor is powered by ac current.

Though its picture is clearly not of broadcast quality, the system does suggest that further advances are in store for broadcast recording. Morita, however, gave no indication as to when such advances may be expected.

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One of the features you'll quickly appreciate about your ADM® audio console is that it performs in perfect harmony with your video equipment.

ADM's 2400 Series consoles are modular, multi-input broadcast production units designed to handle the most sophisticated and demanding audio requirements. They are 24 input, 4 submaster, 2 output, fully modular consoles. The 2400 housing comes completely wired, permitting ease of expansion if the full complement of modules is not initially required.

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Charles Ferris said in a separate statement, "The involvement of the previously excluded in broadcasting, the most powerful means of transmitting and affecting ideas and emotions, continues to be a centerpiece of American national policy that still requires regulatory action."

Controversy has been generated recently, however, by commissioner Anne Jones's public disavowal of the Commission's active EEO and minority ownership policies. Jones said that the Commission's EEO guidelines were too like quotas for comfort; she also questioned the effect of the EEO and minority ownership programs on programming. Tyrone Brown, the lone black on the Commission, replied in a speech that Jones had "ignored the facts . . . No one who takes the time to contrast employment at broadcast stations, and programming carried by those stations, with the situation that existed a decade ago can honestly conclude that EEO has made no difference." On Jones's side, however, was *Broadcasting*, which editorialized that she displayed "candor and independence" in her remarks. Some have speculated that Jones's stance — she is a Republican — could put her in line for chairmanship of the Commission if Ronald Reagan is elected President.

Both the NAB and the NRBA have recently called for review of the FCC's EEO policies. In separate statements, the groups questioned the FCC's enforcement of employment guidelines which, according to NRBA, have "evolved into a quota system." The FCC rejected NAB's petition for reconsideration of the EEO guidelines on July 1, expressing confidence in the new guidelines, which it felt "provide a reasonable basis for review."

Comsat Forms Direct Broadcast Subsidiary

Pressing forward with its move into direct-to-home satellite broadcasting, Comsat announced in May the formation of Satellite Television Corp., a subsidiary to develop and offer a direct-broadcast STV system. The action follows recent recommendations by the FCC that Comsat form a separate entity for competitive businesses to avoid conflicts of interest with the firm's INTELSAT/INMARSAT functions (see Broadcast Industry News, July, 1980).

Comsat VP Michael Alpert, addressing the NCTA convention in Dallas May 19, indicated that the service would be likely to begin operations sometime in 1984. He said that Comsat was working on its application for the FCC and intended to file for broadcast status.

The direct-to-home service, he said, would be "a premium pay TV service" with no commercials, broadcast from a system of two satellites with an in-orbit spare. At least two channels would be offered; selected areas could get two more channels via spot beams. The signals will be scrambled, and subscribers would be equipped with addressable decoders that would allow Comsat to turn customers on according to service selection, as well as turn off nonpayers.

Spectrum space for direct broadcasting satellite systems is abundant, Alpert told his audience — "there is plenty of room for competing systems."

Variety would be a key element of the system's programming, Alpert said. Offerings would include movies and sports, family entertainment, educational and informational programs, and special-interest programs, including minority-oriented material. Special

EYE-OPENERS

Just when everyone had their eyes wide open to the outstanding line of Ikegami broadcast and production color cameras, Ikegami introduced its color and B&W monitor line, engineered w th the same innovative technology as its cameras. A great tradition of eye-opening continues with precision, quality and beautiful images.

The Ikegami color monitor line consists of the High Resolution Series RH Color Monitors and the High Performance Series 8 Color Monitors. The High Resolution Series RH Color Monitors are available in the 14" TM 14-2RHA and the 20" TM 20-8RH. Both provide precision color reproduction at 600 plus lines for professional studios, control rooms, remote vans, etc., and feature a high resolution CRT with High Density Dot Matrix, a switchable comb filter in the decoder, and the AFPC (Automatic Frequency Phase Control) system to maintain exceptional color reproduction. Both models are rack-mountable, with the TM 14-2RHA featuring plug-in circuit boards for easy maintenance.

The High Performance Series 8 Color Monitors are available in the 14" TM14-8RC, 20" TM20-8R and 25" TM25-8. The Series 8 monitors offer high quality color reproduction, a Shadow Mask Dot Matrix CRT, Pulse Cross Circuit, Active Convergence Circuit, low power consumption, and more.

The B&W Monitors are engineered to the same exacting Ikegami standards and are available in Triple 5", Dual 9", 5", 9", 12", 17" and 20" sizes.

Ikegami's Eye-Openers are available at most dealers. For details and additional information, contact: Ikegami Electronics (USA) Inc., 37 Brook Ave., Maywood, NJ 07607, (201) 368-9171; West Coast: 19164 Van Ness Ave., Torrance, CA 90501, (213) 328-2814; Southwest: 330 North Belt East, Suite 228, Houston, TX 77060, (713) 445-0100; Southeast: 522 So. Lee St., Americus, GA 31709, (912) 924-0061.

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services might include stereo audio or a second-language audio track, teletext, closed captioning, and an experimental high-resolution picture service.

Speaking to the fears of broadcasters and cable operators alike, Alpert stressed that direct-to-home broadcasting would not "undermine" current technologies. Projected penetration of the new service is "insignificant" compared to network television, he said, asserting, "Our calculated market penetration would have to increase many times over — well beyond our reach — for us to generate any adverse economic impact on TV that could even be termed significant."

Satcom Lottery Gets FCC Go-Ahead

Calling the idea "unprecedented but impartial," the FCC has approved RCA Americom's plan to allocate the two open transponders on Satcom F-3 by lottery. Eastern Microwave, Inc., Home Box Office, and Spanish International Network had petitioned the Commission to deny RCA's request, charging that it was discriminatory.

RCA had previously used a lottery selection to assign transponders on Comstar D-2, leased temporarily from AT&T to fill the gap left by the loss of the original Satcom 3. When Satcom F-3 is launched next June, cable customers now on Satcom 1 would be transferred to the new bird, which has two additional transponders. Not surprisingly, demand has exceeded supply, leading RCA to propose another lottery.

In its decision, the FCC stated that the plan was "reasonable" since it gave all applicants an equal chance at a transponder, and that it did not constitute unlawful discrimination.

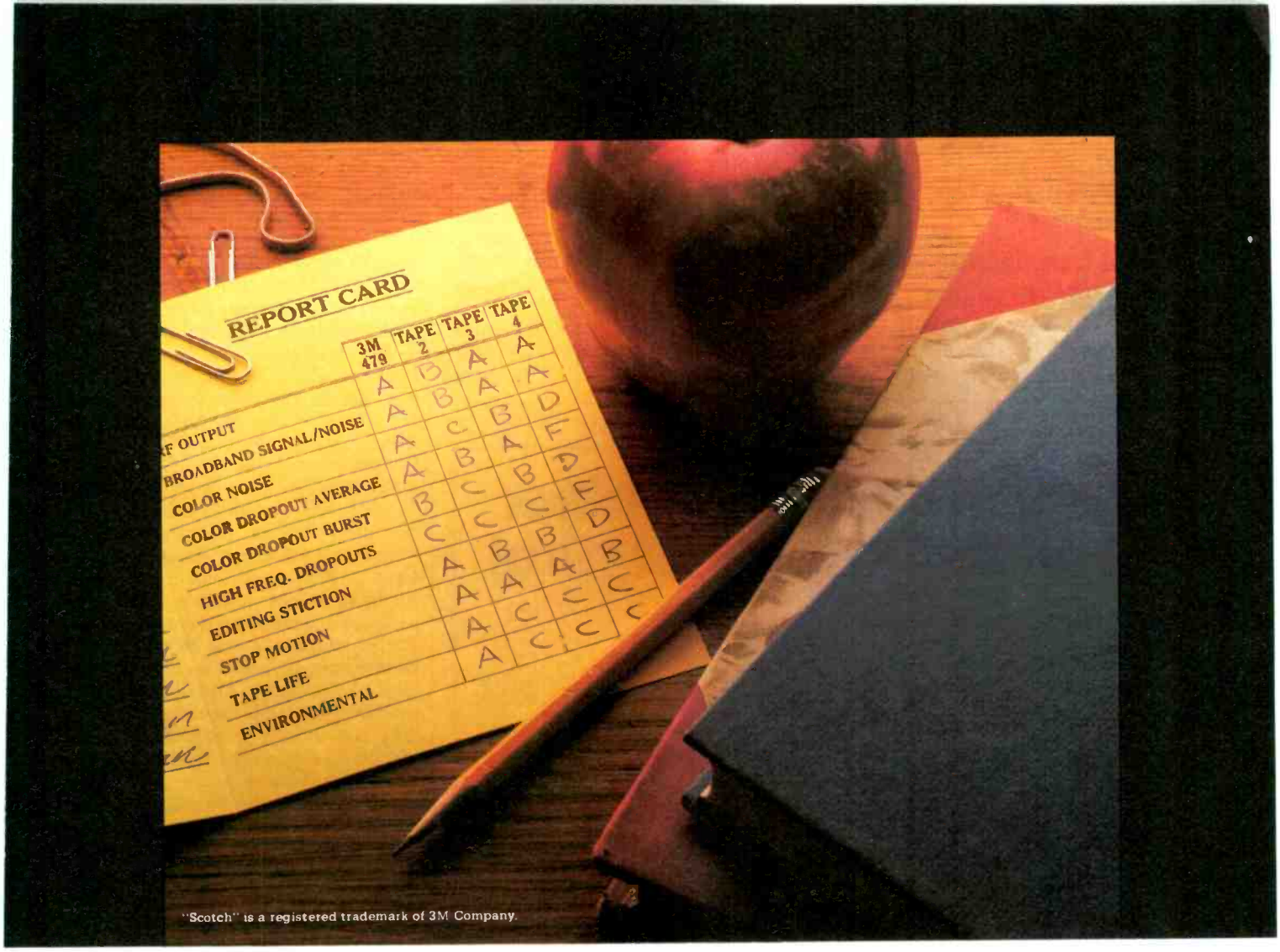
FM Continues Drive Time Gains

Nearly half of morning drive time radio listeners tune in an FM station, according to Radar 21® data released in early June. Covering the fall of 1979 and the spring of 1980, the figures show FM capturing 46 percent of all radio listeners during the 6:00 a.m. to 10:00 a.m. period, Monday through Friday — still FM's weakest daypart.

The overall audience share for FM has reached 55 percent, according to the Radar study, up from 52.4 percent in the last survey (spring/fall 1979). The strongest showing for FM continues as Saturday, 7:00 p.m. to midnight, with 63.7 percent of the total audience tuned in; the same time period on Sunday follows closely with 63.5 percent.

Radio is doing well despite the recession, according to a report in *Advertising Age*, which claims that national spot jumped 45 percent in the first quarter of this year. Other bright spots in the picture included network radio's estimated billings for the first quarter, up 30 percent, and local business, also up 30 percent. In the same issue, however, the newspaper called the TV picture far from cheering, terming the outlook for the third quarter "grim." Not helping things is NBC's dropping of the Moscow Olympics, which has left the net with many unsold minutes. Neither CBS nor ABC, however, could boast a sold-out schedule either.

Not everything is bleak for television, though. A recently released survey by Arbitron shows overall viewing levels for this past February up three percent over the same month in 1979. According to the figures, news time viewing rose two percent, prime access



IN A TEST OF ONE-INCH VIDEO TAPES, WE ACED OUT THE COMPETITION.

When we tested the top four brands under strict lab conditions, the overwhelming performance leader was Scotch 479 Master Broadcast Video Tape. In fact, we came out on top in all ten performance categories.

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

3M

time three percent, and prime time two percent. Morning viewing levels were down slightly.

Viddisc Competition Rises, But Slump Threatens

The videodisc player market may stretch soon to receive more competitors. General Electric, Matsushita Electric, JVC, and Thorn EMI Ltd. are discussing the feasibility of forming three jointly owned companies to support the introduction of the Video High Density (VHD) videodisc system in the U.S. market.

The proposed joint venture would consist of a hardware manufacturing company, a software title and artistic production company, and a software manufacturing company. The VHD disc system, developed by JVC, uses a 10-inch disc that plays for one hour per side. The companies are hoping for a good-sized hunk of the U.S. market.

Also attempting to break into the market is the Pioneer laser disc system, introduced in June and July in Dallas, Madison, Wisc., Minneapolis, and Syracuse, N.Y. The company expects to reach nationwide distribution before 1981 ends. The system operates through standard TV receivers and offers freeze frame, slow motion, stereo audio, and individual frame access; it will retail for a suggested $749.

Whether Pioneer and JVC will succeed remains to be seen. Some observers feel that the videodisc market cannot support so many major competitors. The Magnavox system, developed by Philips, is on the market and sold about 5000 units last year; RCA expects its Selectavision system to sell half a million units after its 1981 introduction. Theodore Anderson of Argus Research Corp., speaking at June's Consumer Electronics Show in Chicago, said that software and marketing, not technological superiority, would be the keys to marketplace success for videodisc systems. As quoted in *Variety*, Anderson predicted growth in the field, but probably not enough to support all competitors — especially with the recession likely to worsen.

According to the *New York Times*, home video retailers report poor sales on videodisc players. Competing, noncompatible standards and the shortage of software are not helping matters, and consumers are reportedly being cautious. *Television Digest* claims that "sales [have] virtually collapsed and rental programs [such as Fotomat's defunct plan] failed."

Addressing the software problem are MGM Film Co. and CBS, Inc., who announced early in June their intention to jointly market videocassettes and videodiscs. CBS will manufacture and market the discs, which will draw on MGM's library of over 1600 films for material. CBS's library of film and taped entertainment will also provide product for the venture.

Correction

David J. Quebbeman, manager, marketing services for Fernseh, Inc., informs us that we were incorrect in stating that the Compositor character generator cannot be used for titling when the TED election reporting system is in use ("Electronic Election Primer," May, 1980). According to Quebbeman, while the TED program is running the operator can create new pages or display any of the pages in memory. The roll/crawl mode is not operative, but a recently designed hardware retrofit kit and software program, available in October, will allow roll/crawl operations while the election system is active.

Simply fantastic picture quality. Fantastically simple set-up. Get both with our renowned TK-47.

Press a button, and it sets up automatically. In seconds, instead of hours. File and recall six basic lighting situations, and get great picture quality—instantly—under any conditions.

All RCA cameras are built to extend your creativity, lighten your chores, and deliver the very best on-air product.

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Our TK-760 has enough heft for smooth studio work, yet is light enough for easy transport to the field as an EFP camera.

And with them all comes famous RCA TechAlert service to keep you on the air, come what may. Your RCA Representative can tell you more. RCA Broadcast Systems, Building 2-2, Camden, N.J. 08102.

SIMPLY FANTASTIC.

News Briefs

Dave Crockett, staff photographer for KOMO-TV, Seattle, **spent 11 hours trapped on Mt. St. Helens** during the volcano's recent eruption. Crockett kept his camera running until ash clogged the gears and recorded his tale, which was made into a half-hour news special after his rescue by helicopter . . . . Western Union is using its Westar system to **beam Mexican TV programming to the U.S.** The programs, from Televisa, SA (Mexico City), are being received by Spanish International Network earth stations . . . . NOAA has launched its **third weather observing satellite,** NOAA-7, in May.

The **FCC has denied an NTIA request** seeking a reversal of the Commission's refusal to propose use of directional antennas in connection with the assignment of FM channels. The Commission noted that it had simply postponed the issue and not dismissed or denied it . . . . **Comments are still sought** on the FCC's rulemaking proposing a revision of the broadcast financial reporting requirements. Deadline is September 15; replies are due November 14.

The Hearst Corporation will purchase **WDTN-TV,** Dayton, from Grinnell Communications Corp. for an undisclosed sum. Hearst also recently announced the formation of a Cable Communications Division and its intention to enter the CATV industry . . . . SJR is selling its **WKLS-AM/FM,** Atlanta, **KRLY,** Houston, **WQAL,** Cleveland, and **WJMD,** Chevy Chase, to Gulf United for a reported $67 million . . . . Group operator Heftel Broadcasting Corp. will buy **WTFM,** New York, from Friendly Frost, Inc. for $8.7 million.

Knowledge Industry Publications, Inc. has dates for announced upcoming events. **Video Expo Canada** will take place September 3 through 5, 1980; **Video Expo New York** will be held October 21 through 23, 1980. More information is available from the firm at 2 Corporate Park Drive, White Plains, N.Y. 10604, (914) 694-1070.

Business Briefs

Sony Industries digital recording and editing equipment is being used extensively for the new CBS Mastersound™ Series audiophile recordings of pop, classical, and jazz music; seven of the eight recent releases were recorded with Sony equipment. Sony has agreed to distribute the recordings through its nationwide network of audio dealers . . . . **M/A-Com, Inc.,** of Burlington, Mass., has agreed to purchase Valtec Corp. of West Boylston, Mass. The deal is valued at about $135 million. M/A-Com has also formed a partnership with Aetna Life and Casualty Co. to provide digital transmission and network access control equipment for local distribution of voice, high-speed data, and image communications. The new concern is called Local Digital Distribution (LDD) Co.

Kuril Media Consultants of Chico, Calif., is now offering a new full-service television production facility. For information contact Ian Carlin at Kuril Media Consultants, 452 Posada Way, Chico, Calif. 95926, (916) 343-6094 . . . . The **Sonny Hayes Celebrity Center** may be the answer for stations that need a special personality for a program or promotion. Run by entertainment industry veteran Sonny Hayes, the Celebrity Center will contact and negotiate with any celebrity, superstar, or name-in-the-news, and can also produce an entire celebrity promotion. Contact the center at Dept. HDW, 2102 Business Center Drive, Irvine, Calif. 92715, (714) 833-8077.

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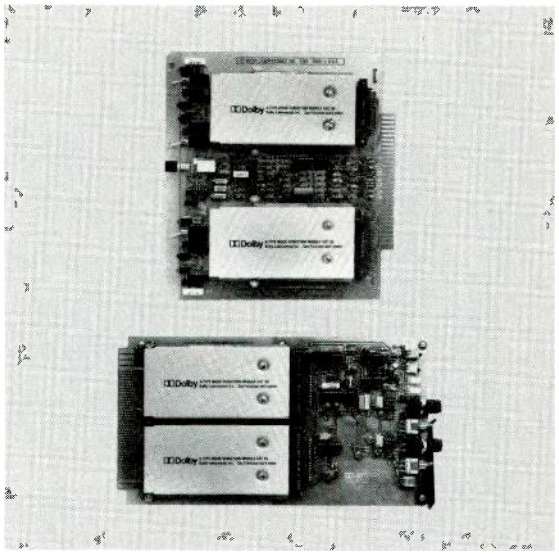
Circle 109 on Reader Service Card

With the Dolby system, the sound can match the picture.

A great deal is happening these days to improve the quality of television audio. New distribution methods such as diplexing, new post-production techniques for laying down sound-tracks without having to re-record them repeatedly on VTRs, the reality of stereo TV audio in some countries – these factors and more are combining with the growing audience sensitivity to good sound to put a new emphasis on television sound quality.



These modules are designed for incorporation into existing Ampex and Sony 1" Type C video tape recorders. Installation takes as little as 20 minutes utilizing a flexible printed circuit board interface provided with each module.

However, a major bottleneck remains: noise. The better the rest of the studio and distribution chain becomes, the more the noise from the audio tracks of VTRs limits the ultimate fidelity of television sound. The audio signal-to-noise ratio of 2" quad machines is typically worse than 50 dB, while the specs for the new generation 1" machines are typically 52-56 dB. That kind of performance is not as good as many consumer audio tape recorders, and unless improved, may always keep television sound in second place to the high fidelity color picture.

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RADIO

PROGRAMMING & PRODUCTION FOR PROFIT

Greatly Expanded NAB Program Conference Set For New Orleans

BY THE TIME this was written (early July) it was certain that the Third Annual Radio Programming Conference of the National Association of Broadcasters, at the Hyatt-Regency in New Orleans August 24–27, would be far above the 1979 meeting, in the scope and variety of the program, the exhibitors, the hospitality suites, and especially in the number and executive scope of the registrants.

Richard Vern of NBC, chairman of the conference, told *BM/E:* "This year we are enthusiastically looking forward to the largest NAB Radio Programming Conference so far. There has been expansion in every area of the conference."

The great increases in numbers are impressive enough. In 1979 there were 12 exhibit booths; this year there will be around 60, divided between software and hardware. For the hardware exhibits the conference management has set a rule to admit only equipment used in handling programs within a radio station: turntables and disc-playing electronics; all varieties of tape recording and playback equipment; consoles; audio distribution, amplification, and processing. Transmitters are not included.

The hospitality suites, many of which will function as demonstration rooms for programming, have gone up from 32 in 1979 to more than 70 in the upcoming show. And advance registration is far ahead of last year — two to three times as high.

More significant than the number of registrants, according to Wayne Cornils of the NAB, is the marked spread in the categories of registrants, with a large influx of station managers and general managers, plus engineering executives. This contrasts with last year's preponderance of program directors and their staffs. The program group is returning, but they are being joined by the other management groups.

The schedule of the conference includes the mixture of workshops and general sessions that proved to be popular and successful at the 1979 meeting, plus a new category of all-day session called a "Forum." Each day will have one Forum, on a large topic, with an organization something between a workshop and a general session. Each Forum will include a general presentation by a leading expert in the topic, followed by informal work groups and seminars at separate tables in the room.

The Forums, running concurrently with the workshops, will be scheduled so that the topics do not compete with workshop topics. The first day's Forum will be on people management, directed at aiding program directors and others in radio management with sizeable staffs, who want guidance in handling their people harmoniously and efficiently. The genesis of the topic lay in the realization that many program directors have had little training in administration, coming to their jobs directly from program creation.

The Tuesday Forum will be on news and public affairs, recognizing the increasing weight of this sector of programming in today's radio broadcasting. The tremendous expansion of news activity can be seen throughout the telecommunications industry, from Ted Turner's 24-hour Cable News Network service to the central role of news in the new radio networks of NBC and RKO based on satellite distribution.

The third Forum, running from Tuesday afternoon through Wednesday morning, will be on promotion, and will cover all aspects of radio promotion practice. There will be, for example, an hour spent on proper use of billboards, an hour on using TV spots, etc.

The Monday luncheon will have a program that promises to be highly entertaining as well as helpful. Called "Making Money With Your Mouth," it will bring to the platform three disc jockeys known across the country: Gary Owens, Don Imus, and Robert W. Morgan. They will explain and demonstrate the art of attracting audiences with DJ "chatter," bringing out some of the principles of this highly personal art.

An interval of relaxation will be brought by a Mississippi riverboat cruise on Monday night, with music, eat and drink, and hopefully gentle breezes from the river. Getting back to a deeply serious vein, the final meeting on Wednesday will be a look ahead at the future of radio throughout the 80s, with a panel of the industry's topmost

Radio Programming

thinkers and organizers on hand to supply expert predictions.

Another part of the program will be a repeat of last year's Format Rooms, permanent stands where each of the popular formats is discussed.

The Monday morning workshops will have the following topics: Small Market Promotion; Large Market Promotion; Beyond the Music; Engineering For The Program Director. Monday afternoon workshops are: Small News Staff; Write-In and Call-in Promotion; Research Workshop; Syndicators; Computers; Changing Formats.

Tuesday morning topics are: Promoting With Outdoors; ARB Advisory Council; How To Read A Book; Smalltalk; Ratings; EEO; Spot Production; Real People. Tuesday afternoon will feature: Network, Small Market; Network, Large Market; Rotation and Playlist; Managing The Manager. On Tuesday evening there will be a Chuck Mangione dinner concert.

Wednesday morning will have early bird workshops on: Promoting With Newspapers; New Wave and New Things To Measure; EEO Special Problems; Consultants. **BM/E**

BM/E's Program Marketplace

Program Producers At The NAB RPC

ABOUT 20 SOFTWARE PRODUCERS, including format syndicators and creators of specials and shorts, will have booths or hospitality/demo suites at the NAB Radio Programming Conference in New Orleans, August 24–27, according to the information available at press time. The final list will include a number more. For each of those on the advance list, *BM/E* gives here a brief summary of programs or services (many of the syndicators have been profiled in this department).

Bonneville Broadcast Consultants — suite. One of the earliest syndicators of Beautiful Music, still a leader here, now emphasizing individual planning for each subscriber.

Century 21 — booth 4. Uses highly flexible formats, adjusted to each station's needs, with mixtures of Adult Contemporary, MOR, Top 40, etc.

Drake-Chenault — suite. One of the oldest and largest, has syndicated formats in all popular styles: country, MOR, rock, etc.

Enterprise Radio — booth 11. A new operation, a satellite network supplying subscribers with sports coverage around the clock.

Gert Bunchez and Associates — booth 2. Supplies a large variety of shorts and specials on many topics: self-help, adventure, health advice, etc.

The Golden Egg — booth 33. Has a series of two- and three-hour specials of disco music, rock music, and musical comedy, with comments from DJs around the country on the music.

Jam Creative Production — suite. Producer of jingles, IDs, promotional spots, music for commercials, etc.

KalaMusic — suite. Syndicator of Beautiful Music.

Money Machine — booth 32. Jingles, promotions, IDs, etc.

The Musicworks, Inc. — suite. Has two syndicated country music series and a "soft rock" series.

Charles Michelson — booth 49. Has collected recordings of many "golden age of radio" programs: Fred Allen, Jack Benny, *The Shadow,* etc. They are rented for reruns.

O'Connor Creative Services — booth 46. Has a very large number of shorts and specials, with long series of political comment, self-help, financial advice, etc.

Otis Connor Productions — suite. Creator of jingles, IDs, and other special music shorts.

Peters Productions — booth 37. Has a large number of syndicated formats, in virtually all styles, with emphasis on a romantic, one-to-one quality; also comprehensive marketing advice for individual stations.

RKO Radio Network — suite. A new satellite operation, using news, *Lifesound* short documentaries, music specials.

Wm. B. Tanner — suite. Has syndicated formats in all popular styles. Also a leading producer of jingles and commercials.

Tuesday Productions — booth 53. Jingles, IDs, other promotional music.

The TM Companies — suite. A large syndication operation, with heavily researched young adult format, "Beautiful Rock"; also country, rock, Beautiful Music.

Thomas Valentino — booth 31. Very large library of background music of every kind.

Watermark Inc. — booths 48 and 50. Syndicator of *American Top 40,* and also of weekly interview specials with Robert Morgan, and *Alien Worlds,* a science fiction series. **BM/E**

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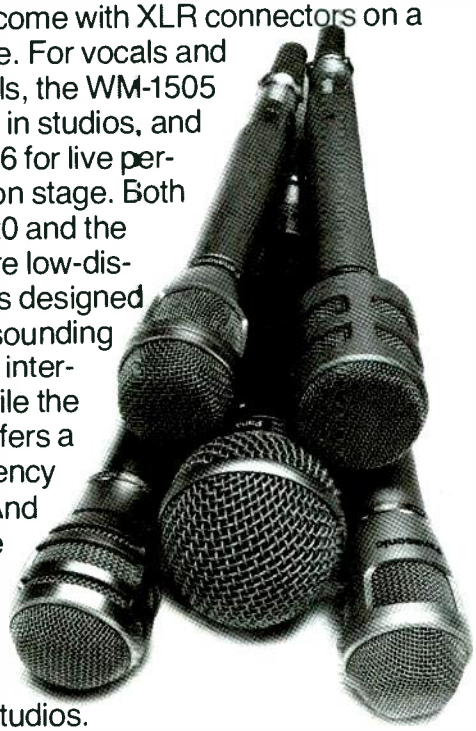

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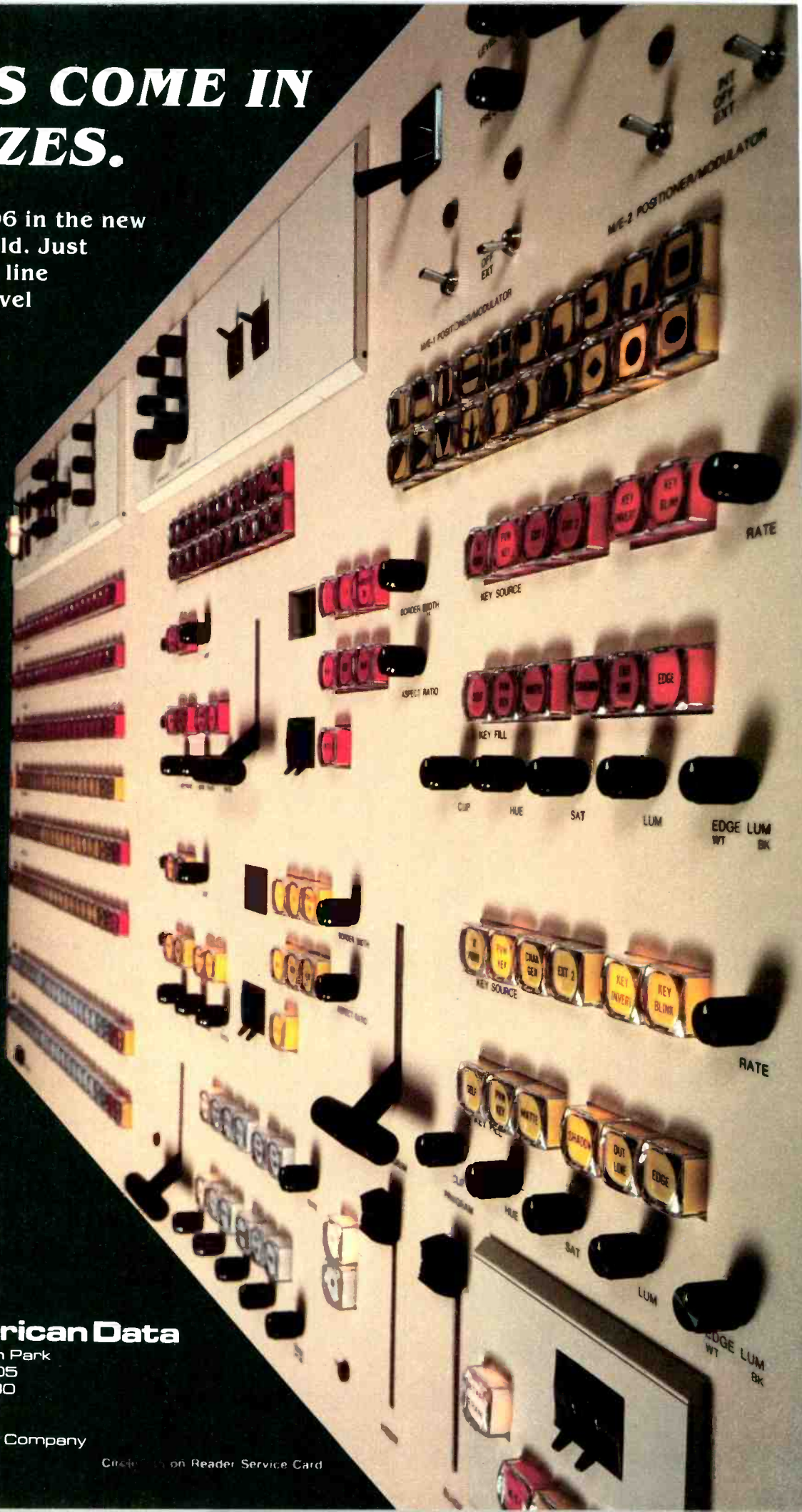

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TELEVISION

PROGRAMMING & PRODUCTION FOR PROFIT

Growing Producers At WBTV

THE LAMENT heard round the country from broadcast station executives goes something like this: "Sure we'd like to do more local production; sure, we'd like to expand our commercial production services; and sure, a magazine program would fit in nicely — BUT, we just can't find qualified people to produce these programs."

This lament is not heard, however, at WBTV, Charlotte, N.C., a Jefferson Pilot Broadcasting Company station. In addition to regularly scheduled news programs, WBTV produces a one-hour morning magazine; a one-hour midday "live" magazine; *PM Magazine;* a locally hosted "nostalgia" program; two weekly children's shows; about 20 half-hour specials; local college basketball coverage; an 18-hour TV auction; eight half-hour quiz shows; a variety of other public service specials; PSAs; a large volume of commercials; station promos; and approximately two prime time specials that may be months in production. In addition, the news department also produces a variety of documentaries and features.

This heavy production schedule would not be so surprising if it were not that WBTV programs tend to be of superb quality, validated by a variety of awards including at least two NATPE IRIS awards.

WBTV's PM Magazine *team shooting a "rock climbing" feature*

According to a survey of radio stations recently completed by the International Radio and Television Society (IRTS), station managers found 65 percent of applicants with communications majors "poorly qualified" for production jobs; they found 20 percent totally unqualified; and rated only 15 percent "well qualified." At this past February's NATPE convention, panelists and audience alike, participating in a session on producing producers, complained that graduates of film and television curricula were not well suited to broadcasting. One panelist said, "I'd rather hire an English major."

The most common complaints leveled against recent graduates of such communications programs is that they are "too artsy" and unprepared to deal with the realities of broadcasting, which means severe time restrictions, high production costs, and the constraints of program standards and practices.

Without the creative pool of a New York or Los Angeles, how then, is it possible for a station in Charlotte, N.C. to routinely generate a high volume of quality local programming? The secret is in a corporate philosophy which is dedicated to developing people. That, of course, sounds nice but seems difficult to implement. Not so, however, when the production structure of the company is designed to implement the philosophy and is sustained by a commitment to hiring from within.

Mark deCastrique, creative services manager for WBTV, is reluctant to boast too strongly of WBTV's "people-growing system." He has too often seen his staff raided by other stations. Nevertheless, he agreed to talk with *BM/E* in the hope that other stations would borrow the program rather than steal his people.

The basic principle of the WBTV development program is described by deCastrique as a "stepladder of complexity." That is, with the diversity of local programming requirements placing diverse demands on talent and skills, "we try to make it (any particular task) the responsibility of someone who is being challenged by it rather than directing it to the low side of a more qualified person."

One problem with the "stepladder" analogy, however, is that it doesn't do justice to the "branching out" nature of the structure. Just as a participant might climb straight up to producer/director, he might just as easily find his reward by going into sales, management, or some other aspect of the Jefferson Pilot family of communications companies. This happens largely because of the willingness of management to deal to an individual's strengths and predilections. While to some managements the notion of a camera operator going into sales may seem strange, at WBTV the exposure of an individual to clients and sales operations through commercial production can sometimes lead to a revelation for both the individual and the company.

The structure and how it works

About 10 years ago, WBTV merged its production and creative services departments. This placed all aspects of non-news production under a single departmental structure. Clients of creative services include public affairs, sales, programming, and, to some extent, news. Each client department requires the services of writers, producers, directors, camera operators, lighting people, production specialists, and others. Currently, creative services employs more than 50 individuals including 10 producer/directors.

The first rung on the WBTV stepladder is that of production specialist. People are recruited for these slots through a variety of means including an active summer internship program. The recruiting is done by the Jefferson Pilot personnel department, which conducts a seminar for students and faculty at colleges in Virginia, North Carolina, and South Carolina. The program, which was begun nearly 20 years ago, now involves about 50 students annually.

These students are given a complete briefing on the entire Jefferson Pilot Company including its computer company, and commercial production company, Jefferson Productions. In an informal "cocktail party" environment, students discuss their career goals with company people. Some students are selected for summer internships, and some are hired outright. As a production specialist, the new employee does more than floor managing. He may do some lighting and camera work or even undertake some writing assignments, again depending on his own interest and talents. The important thing is that he will do all of these things in varying degrees.

The variety of local programming and commercial production needs provide these production specialists with broad experience. At the beginning, a production specialist may be assigned to camera operation for the *This Morning* program, a daily 6 a.m. – 7 a.m. magazine format show with news, weather, sports, guests, and syndicated fea-

tures. Or they may do the research, writing, and camera work for *Those Were The Years*, a program featuring vintage television shows with an in-studio host providing wrap-arounds with background information on the vintage shows and their stars.

As deCastrique points out, "these are not the most visible or complex programs. You have to expect mistakes but hopefully the type of people we get are not going to make the same mistakes twice."

Each program, throughout the various levels of complexity, is staffed with experienced producer/directors and production supervisors. Their responsibilities not only include the production of the program but also the evaluation of the production crew's performance. Through a variety of mechanisms, production specialists are encouraged to involve themselves with ever greater responsibilities. When assigned to a particular program, they may suggest ideas for a segment or an approach to handling a product commercial. Since accountability is also important, such suggestions usually do not result in the production specialist "taking over" the segment. Instead, they will be asked to assist in preproduction contacts or asked for their opinions on how to approach the idea.

WBTV also has a Monday morning meeting to elicit criticisms and feedback on aired productions. Everyone in the creative services department is encouraged to attend and participate in the meeting. Since the studio must be staffed 18 hours a day, not everyone on the studio crew can attend each meeting, but an effort to rotate crews does assure that they can attend the meetings from time to time. Sometimes the Monday meetings will discuss upcoming productions, but largely the focus is on aired programs.

The first control room experience that a new production specialist may get would probably come through being assigned to direct a simple billboard tag shot to be added to a commercial. From there they may be asked to AD or TD the *Those Were The Years* wrap-around. The progression continues through line producing an on-location shoot for *WhistleStop*, a minicam-produced children's program.

As the level of production complexity increases, the new employee discovers that he is slowly beginning to spend increasing percentages of his or her time doing specific tasks. Some individuals, for instance, may find that copywriting or scripting holds a particular attraction for them. As these predilections develop, deCastrique finds himself assigning the individual to productions where his particular strength is most needed. Promotions and salary increases keep pace with the development of the individual.

A scene from the IRIS Award-winning "Rowe String Quartet Plays On Your Imagination," one of several specials produced by WBTV

WBTV Local Programs

6–7 a.m. — *This Morning*, a one-hour morning magazine with news, weather, sports, guests, and syndicated features. Creative services provides a producer/talent, two cohosts, director, and three production persons.

Noon – 1 p.m. — *Top O' The Day*, a one-hour magazine with news, weather, informational features, remotes, cooking, and crafts. Creative services commits a producer, rotating directors, 10 talent/producers who contribute to the show among other department responsibilities, and four production persons.

7:30 – 8 p.m. — *PM Magazine*, with seven staff members dedicated to show production.

Midnight – 1:30 a.m. Fridays — *Those Were The Years*, a locally hosted "nostalgia" program of varied vintage TV shows. Producer, talent, and director share responsibilities with other duties.

7:30 – 8 a.m. Sundays — *WhistleStop*, a weekly children's show, shot minicam on location. A producer, director, and two freelance talents are involved in production.

12:30 – 1 p.m. Sundays — *Kirby's Corral*, a locally hosted children's show with singing cowboy, sidekick, and cartoons. Freelance talent, a staff talent, producer/director, and four production persons are involved.

6:30 – 7 p.m. Sundays — Approximately 20 ½-hour specials on ascertained needs of the community. Some are studio, some location tape, some film. Each project requires varying manpower commitments.

Special projects — WBTV produces three to five local college basketball games per year, an 18-hour TV auction for the local Boy's Town, Health Fair, Blood Give-In, and selected coverage of special local events. The station produces eight ½-hour *High Q* quiz shows, which cover the quarter through final rounds of competition of 30–40 area high schools. WBTV also produces an average of two prime time specials per year that may be several months in production.

Getting to the top

Because turnover is not as great at WBTV as it is at many other stations, deCastrique sometimes finds that he cannot advance talented people as quickly as he, or they, would like. Certainly some of the people go elsewhere and it is with some ambivalence that deCastrique counts the number of his people who have moved on to larger markets — "usually numbers 15 and above." Nevertheless, there is movement. Creative services's producers/directors do particularly well on WBTV's *PM Magazine*, which has a full-time staff of seven people.

"Unlike some other stations, where doing *PM* has been a problem," said deCastrique, "we do very well." *PM* at WBTV utilizes about one or two locally produced features per week. The greatest concentration is paid to the local host's segments, "which are a lot like mini commercials promoting the features." Since WBTV producer/directors have extensive commercial production experience, they bring considerable creativity to the host segments and "tips" portions of the program.

With *PM Magazine* also being aired by stations in overlapping markets, paying greater attention to the hosting and tips pays off, notes deCastrique. "With a strong national reel, I find people are more interested in good stories whether they are local or not."

Some of the other benefits that managers should note were outlined by deCastrique. The Jefferson Pilot method

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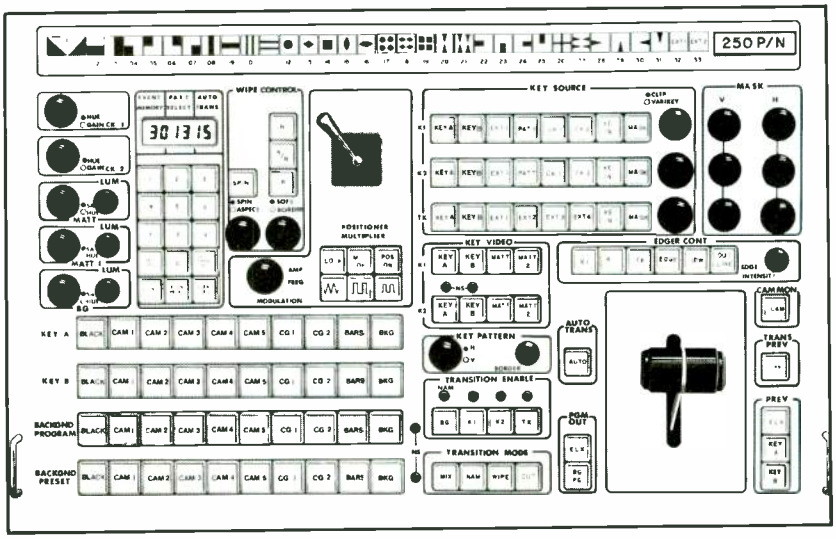

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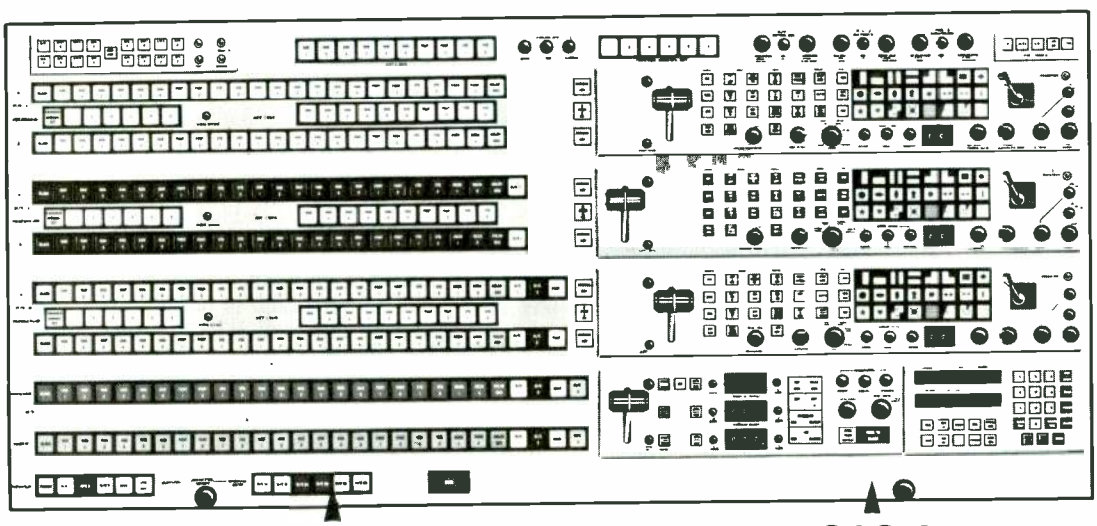

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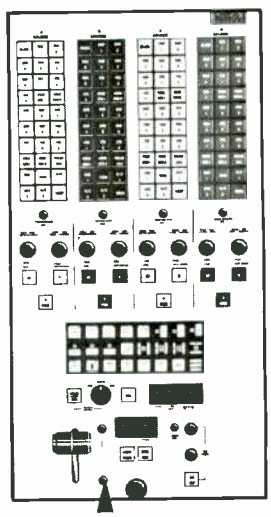

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TV Programming

tends to keep talented people longer. "We find," said deCastrique, "that even when we get raided, our people's heads are not easily turned." Also, the variety of experiences that the approach offers brings creative people to the station. Not everyone starts off at the entry level. Often new people come from competitors. Another benefit of the program is that WBTV is less a victim of the marketplace when it comes to paying for talented people. "It makes it easier for the company to plan," said deCastrique, "since we know what we have in the pipeline and we don't have to go out and compete for scarce talent." Nevertheless, salaries at WBTV are competitive with those offered by other stations in the market. "We try to be fair, and we are competitive," he said.

Another mark of a WBTV producer/director, said deCastrique, is his efficiency. Studio time must be booked weeks in advance and though scheduled shoots do sometimes run over, "we have more trouble with outside producers." Responsibility and accountability are greatly emphasized. Producers are asked to specify in great detail what resources they will need and how long they will need them for. The stress on planning reduces the amount of bickering over who got what and why.

While the Jefferson Pilot system has produced scores of broadcasters, including one of their own corporate vice presidents, it should not be viewed as pedantic. Outside producers are encouraged to use the WBTV production operation, and WBTV finds this broadens the experience of those participating in the program. Moreover, WBTV does compete for outside talent when they need to acquire specific talents not on hand.

This approach is possible to a large extent since WBTV is non-union, which minimizes complications. Nevertheless, it should be clear to numerous stations, both union and non-union, that to meet the challenges of the coming years, the development of people for roles in broadcasting should be among their highest priorities. The plundering of competitors' staffs is too short-sighted to qualify as a solution to the problem of producing producers (or filling other broadcast positions as well). Just as the foundation of civilization can be traced back to the development of agriculture as a substitute for foraging, so will the foundation of a human development program be the basis of a stable and productive broadcasting industry. So, if you need producers, grow your own. **BM/E**

A FRESH APPROACH
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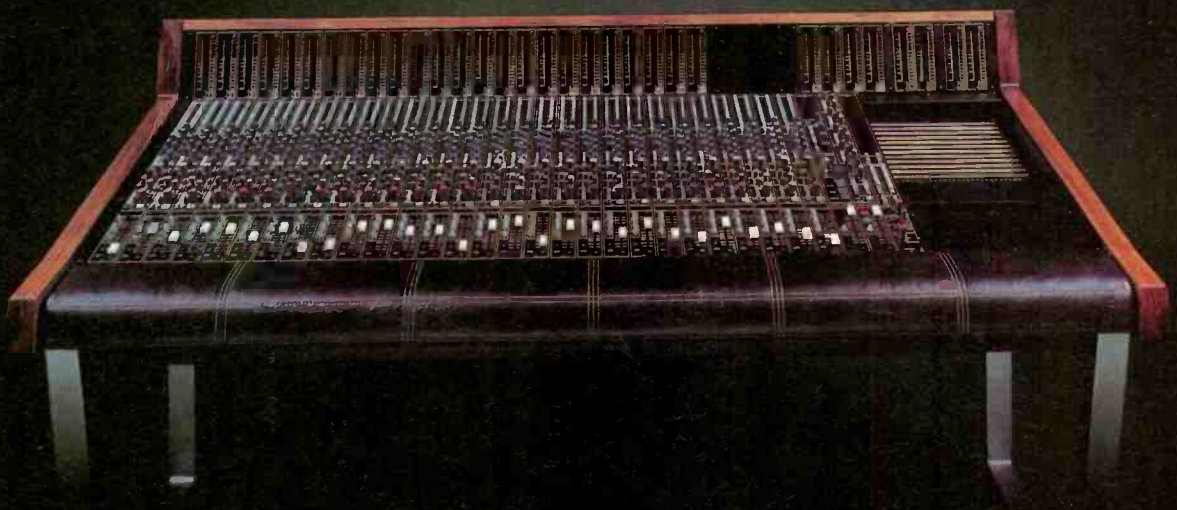

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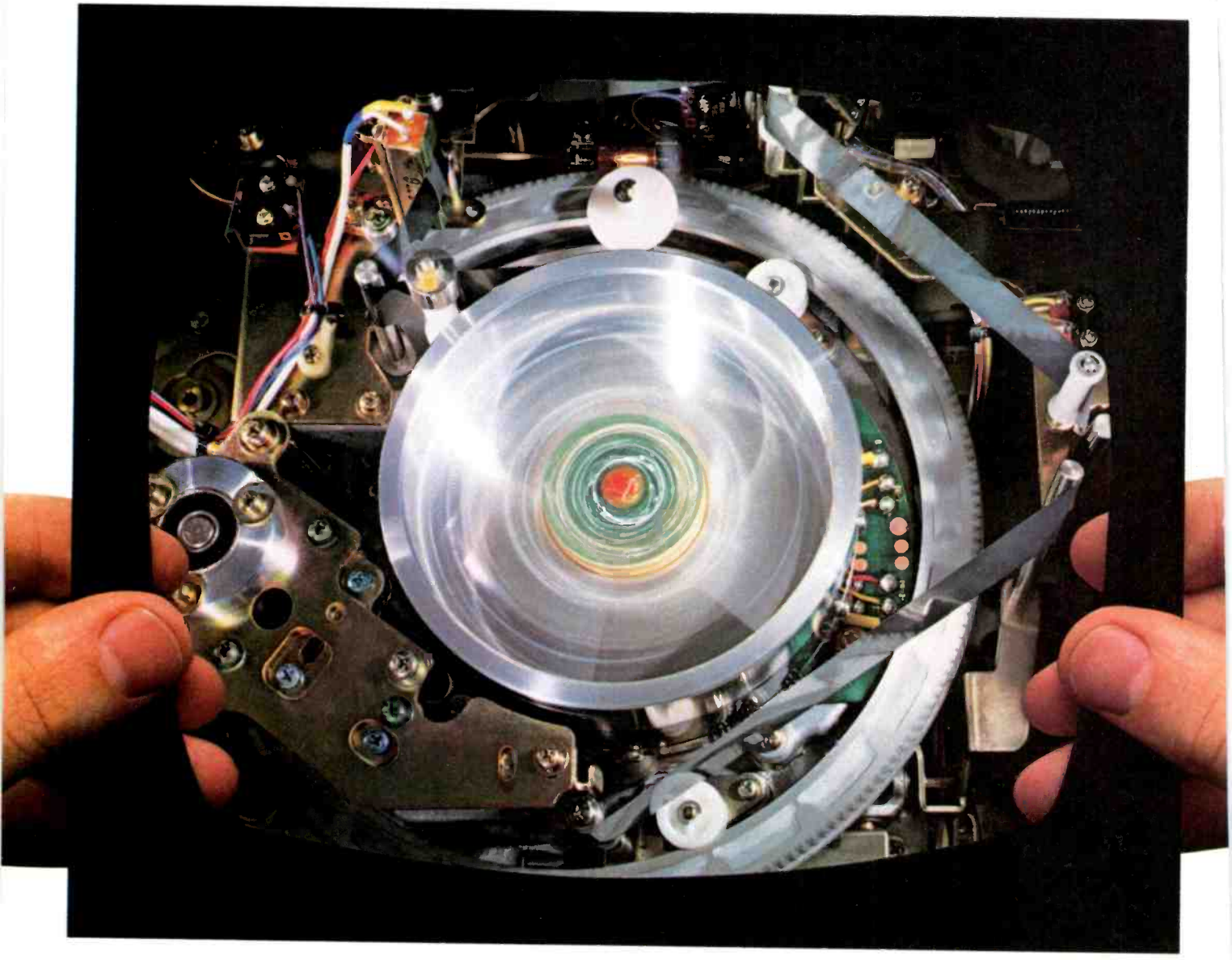

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A die-cast aluminum chassis to give strength, promote easy interchangeability, keep weight down.

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JVC's TapeHandlers not only have a new way to handle your tape, they have new electronics, too.

FM-FM direct dubbing capability for multi-generation duplication.

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UTMOST VERSATILITY. SIX UNITS. BROAD INTERFACING CAPABILITY.

JVC's heavy-duty TapeHandlers have been designed to have wider use than just professional video productions.

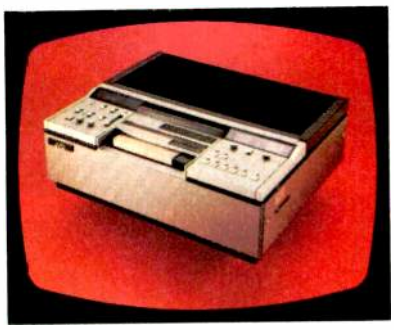
With their ruggedness, the six separate units can be used in varying combinations by anyone involved in video. And they interface without modification with most other microprocessor-based editing units on the market.

These units are just a start. Other fully compatible products, complementary in function, are soon to follow from JVC. The advances incorporated in the TapeHandlers are too important not to be extended to all who want and need to use video, at any level.

CR-8200U TapeHandler: THE NEW-GENERATION RECORDER/EDITOR.

The leader of JVC's TapeHandler Series is the all-purpose CR-8200U Recorder/Editor. A built-in rotary erase head and blanking switcher make it easy to perform automatic assemble (back space) editing and split insert editing—a must for professional quality video productions. The new FM-FM dubbing system transfers the chroma and luminance signals in FM form, to cut deterioration significantly. Capstan servo, of course, for top editing performance. Random access capability. Direct mode change without going through "Stop," to allow full remote control. Subcarrier and external sync capability for use with Time Base Correctors. And, naturally, the new TapeHandler Direct Drive reel servo system to keep tape tension constant in all modes.

The CR-8200U TapeHandler is the ideal core unit around which to build a fully automatic electronic editing system



CR-6600U TapeHandler: THE FULL-FUNCTION RECORDER WITH ASSEMBLE-EDITING CAPABILITY.

The CR-6600U is the videotape recorder designed for the busy studio. Its rugged construction and gentle tape handling give you the kind of reliability you need when workloads are heavy. The built-in automatic pre-roll mechanism and blanking switcher let you do assemble editing using only the record and pause buttons. FM-FM dubbing makes it perfect as a master VTR for multi-generation duping. Microprocessor-based logic allows full remote control. Two audio level control meters. External sync capability. TBC connections.

This is the recorder you'll value for its quality, reliability, versatility.

CP-5500U TapeHandler: THE COST-EFFICIENT PLAYER WITH ON-AIR QUALITY.

Want a low-cost player for stable and reliable on-air playback? That's the CP-5500U. Or use it with the CR-8200U and an automatic editing control unit and you have a superb, fully automatic electronic editing system. Or take advantage of its FM-FM duping capability and use it as a companion to the CR-6600U.

It's a TapeHandler, with the stable tape transport that makes it perfect for these critical applications.

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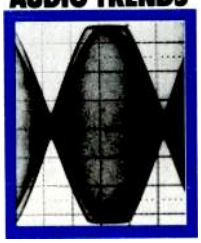
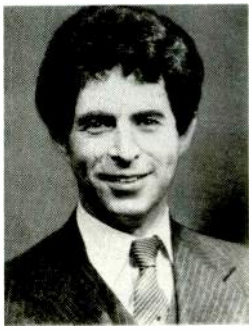


A SOUND RENAISSANCE FOR TELEVISION —IT'S HAPPENING NOW

Television producers are beginning to rediscover the importance of audio. While much remains to be done before television can claim a "true high quality" sound system, industry leaders like Compact Video's Emory Cohen have set their sights on the "probable demand" for superior sound.



Emory Cohen, president of Compact Video Services, Inc., Burbank, Calif. is a graduate of USC (Business Administration-Finance). A 20-year veteran of the motion picture and television industry, he formerly was vice-president of operations for Glen Glenn Sound Company, and has written articles for several technical journals

WHILE CONSTRUCTION CONTINUED on Compact Video's new seven-story corporate headquarters and production complex, Emory Cohen, president of Burbank-based Compact Video Services, discussed for *BM/E* the plans with which Compact will meet the needs of television in the 80s. Recent advances in technology, including the first use of digital audio systems, are being put in place to offer broadcasters a level of quality that will put them in good stead for the future.

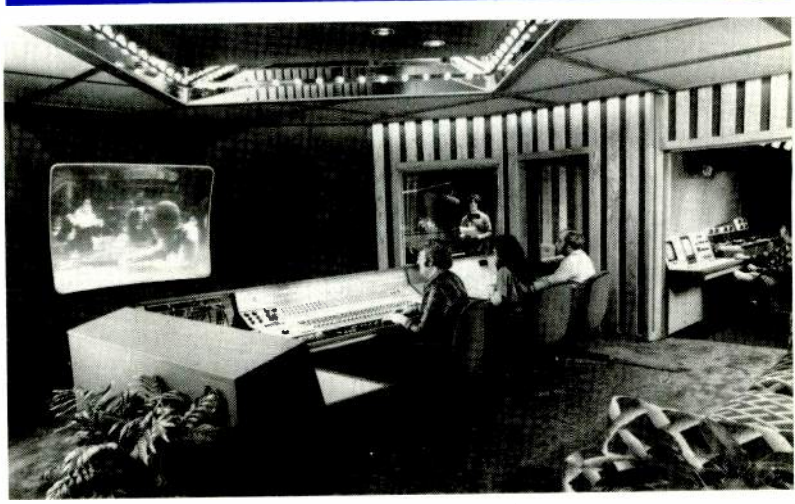
"We are now at the dawn of a renaissance in TV sound," imparts Cohen, "and when this renaissance reaches its peak, techniques and equipment that we've been using all the years before will become obsolete."

BM/E: *How did this so-called "renaissance" come about?*
EC: Well, about seven years ago there arose a "specialization consciousness" in regard to television sound tracks. That is to say, audio production and post-production was assigned to people and systems which specialized in audio, rather than being considered an offshoot of production or editing. A combination of techniques were borrowed by these specialists from our sister industries: the recording industry and the movies.

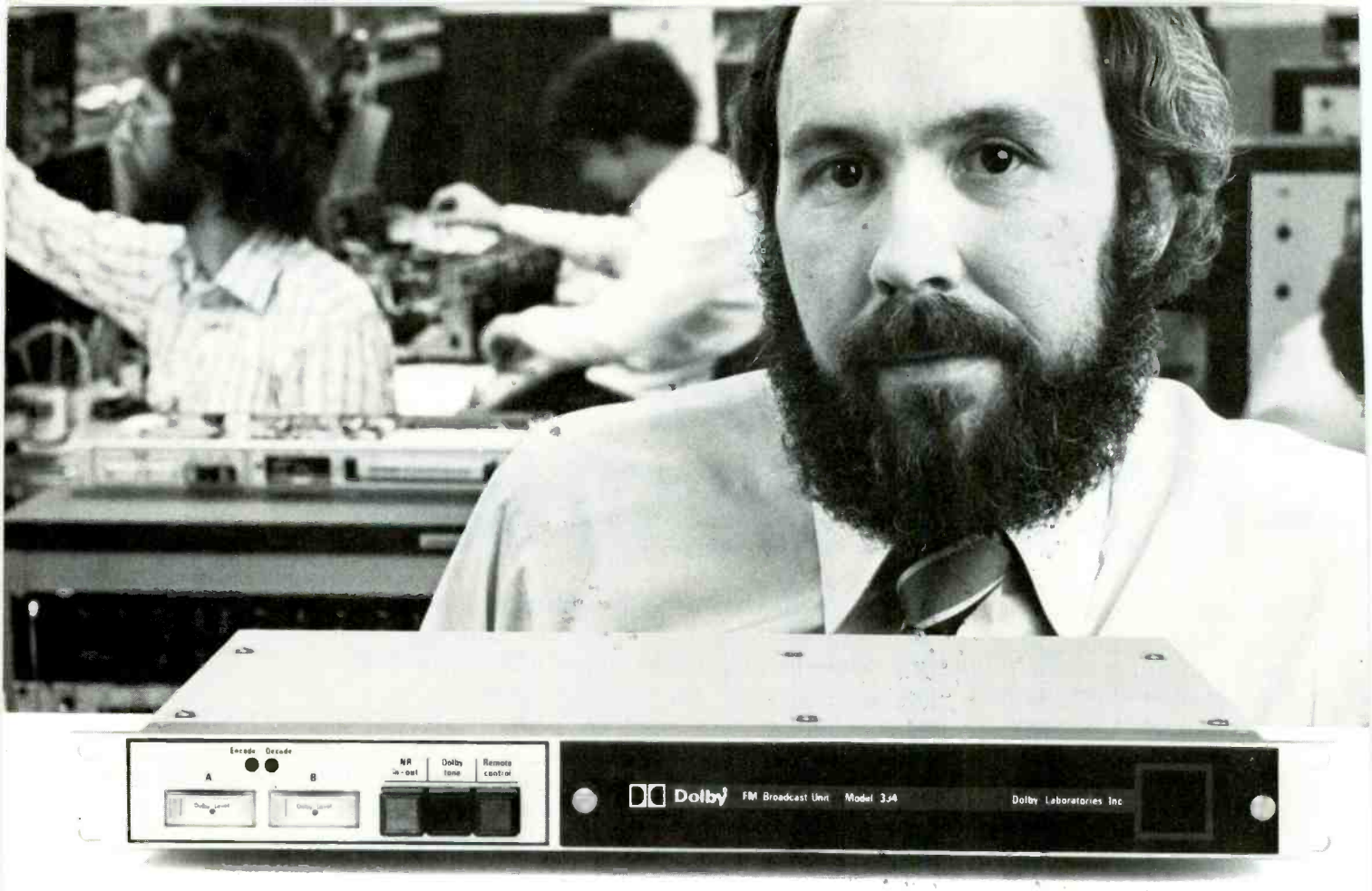
BM/E: *Why do you think this consciousness arose during this specific time?*
EC: First of all, it was economics. The networks started pushing the Holllywood production companies into tape, because tape was so economical. Concurrent with that, creative TV producers soon found out that a program's quality . . . its watchability . . . could be enhanced quite appreciably by paying more attention to the sound tracks.

BM/E: *But hadn't this been done before?*
EC: To a very large extent, no. Traditionally, audio had played a very small part in the whole part of TV programming, especially when compared to films. Real sophistication in videotape sound track technique is a very recent development. But as more and more creative and engineering attention was devoted to video post-production, the technology naturally spilled over to audio. Since the start of what I like to call the renaissance of videotape audio, we've developed a very sophisticated complement of systems for sound post-production, including extensive use of SFX, looping, and post scoring.

BM/E: *It sounds like the technology for film.*
EC: It is. At Compact, we have the facilities and knowl-



The audio sweetening studio provides the latest and most efficient facilities – in a comfortable and creative work environment. Mixing is done here to Advent television projection



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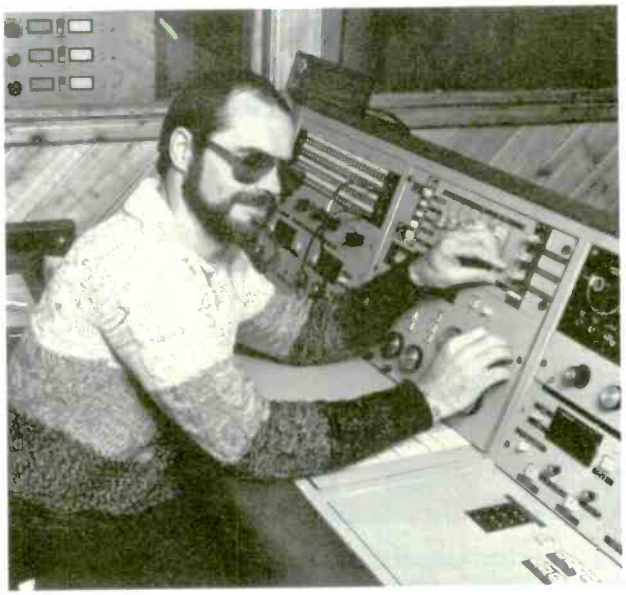
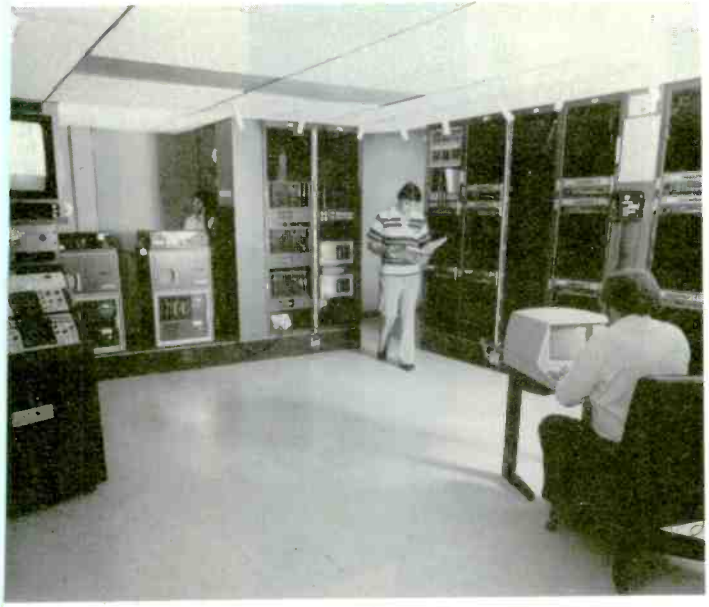


John Cunningham, seated at the optical and magnetic transfer console

Audio console in the sweetening room has a recording console as its heart and is extensively supplemented with processing and synchronization equipment



Central computer room for all videotape editing systems

The off-line computerized editing room for ¾-inch videotape

edge to treat TV sound tracks exactly like a motion picture post-production facility would. We're able to "build" sound tracks using the same techniques as the film sound editor, but utilizing tape's electronic tools. When the mix is done, we have a track that's suitable for videotape transfer, or transfer to an optical sound track negative for film release. We also end up with a music and effects only (track), so foreign languages can be postdubbed. All the tools that have been developed over the years by the film industry are now available for the videotape medium.

BM/E: *Let's talk about recorded music on videotape for a second. With the expected proliferation of video discs (to say nothing of home taping units) won't there be a rise in the uses for high quality videotape music reproduction?*

EC: That's absolutely right. But it has been uphill with people in the recording industry.

BM/E: *Why is that?*

EC: They've been traditionally prejudiced against TV sound for years. TV sound is mono, it's severely limited in dynamic range, and the technology of the home TV unit sound system hasn't changed significantly in three decades, basically, while stereo had been developed and refined in an intensive effort to make music at home sound better.

BM/E: *What about the noise factors on the videotape*

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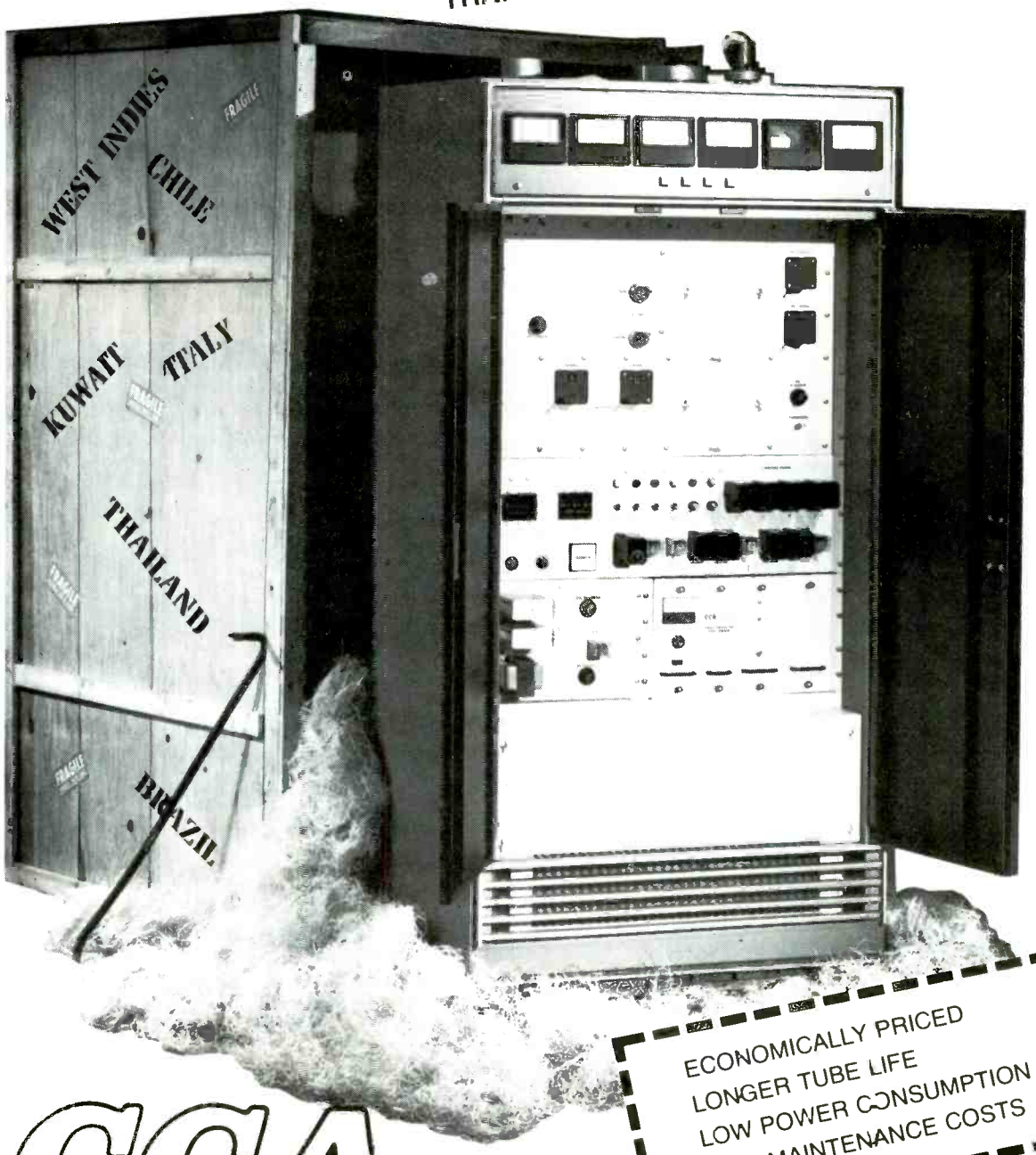

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recording machines themselves?
EC: That's another major reason for their prejudice. Videotape recording machines (and videotape itself) have a poorer quality signal-to-noise response than topflight recording equipment. Plus most TV stations and production houses have less than state-of-the-art equipment.

BM/E: *Is that still true throughout the industry?*
EC: Lamentably, yes. But I'm proud to say that at Compact, we try to replicate the best Hollywood recording facilities in our Sound Services Department. In fact, in terms of quantity and type of equipment, we're superior to many of the so-called "state-of-the-art" recording studios around this town.

BM/E: *What kind of equipment are you talking about?*
EC: All the normal stuff, Ampex ATR Series multitracks, Automated Processes mixing consoles, plus a very representative complement of outboard equipment, including harmonizers, digital delay, limiters, Dolby noise reduction, parametrics, filters. Almost everything you could need. The rest we can rent. This is Hollywood, don't forget.

BM/E: *Anything new on the horizon technologically concerning music and video?*
EC: There is something very interesting. The Sony PCM 1600. It's a digital audio recorder which we are using to store video sound tracks for future use. That'll be important when video discs happen. For instance, we recently completed a Joni Mitchell special. The sound track for TV was mono, but we also recorded it in stereo for when stereo TV comes along. And we've also got it on the PCM for high quality archival storage.

BM/E: *You mentioned stereo TV. Do you think that's going to be a force soon in the industry?*
EC: Yes, I certainly do. There will be resistance to having to buy a new television set just to receive stereo, but now with the public acclimated to using componentry in home stereo, it won't be such a giant shock to have a component TV system as well. Of course, there'll be new problems for us to handle in production. Music's easy. But how, for instance, do you treat television dialogue in stereo? . . . or SFX? Do you pan them or what? It'll be a real challenge. The development of home videotape and stereo TV will force another explosion in the technology of TV sound.

BM/E: *Would you like to make any predictions about the future of videotape sound?*
EC: Like I said, the 80s will be a time of great challenge and also industry-wide upgrading. There will be three sources of entertainment to the home viewer. There will be video disc, which will have very high quality stereo sound. There will be cable TV, which probably will start delivering a higher quality sound signal soon and, of course, there will be free network TV and local programming which, unless substantial improvement is made in the near future, could end up with the lowest quality audio signal of them all.

BM/E: *So how can local TV keep up?*
EC: By keeping aware of modern post-production techniques so when they need to make changes they'll know what's available. My philosophy is that if you stay on top of the game, you'll stay in the game. **BM/E**

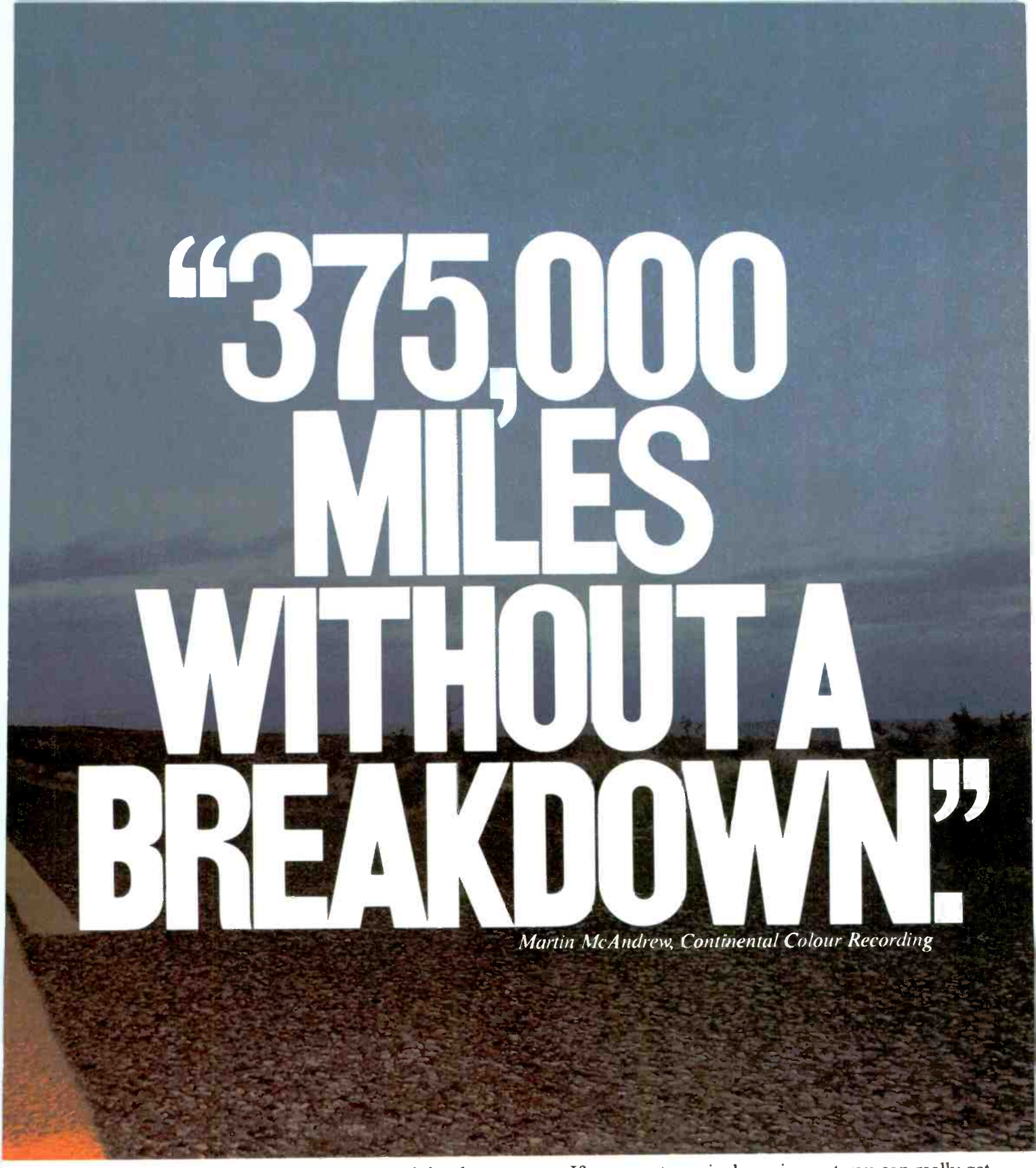
"Our Sony video recorders have not only traveled the equivalent of fifteen times the circumference of the earth, but they've logged more than 2,500 hours of taping time," says Martin McAndrew, Vice President of Operations for Continental Colour Recording.

"Not one of these machines has ever broken down," McAndrew adds. "What makes that even more impressive is that they're constantly being used by different people with different ideas about how carefully to handle equipment.

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

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

"Sony picture quality is excellent," says McAndrew,



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

"No wonder our Sonys are almost always on the road. They've covered the World Series, the Winter Olympics, the daytime Emmy Awards, the Tony Awards, operas and symphonies for PBS, and the Pope's visit to the U.S. And we've had zero problems; working with Sony has been delightful."

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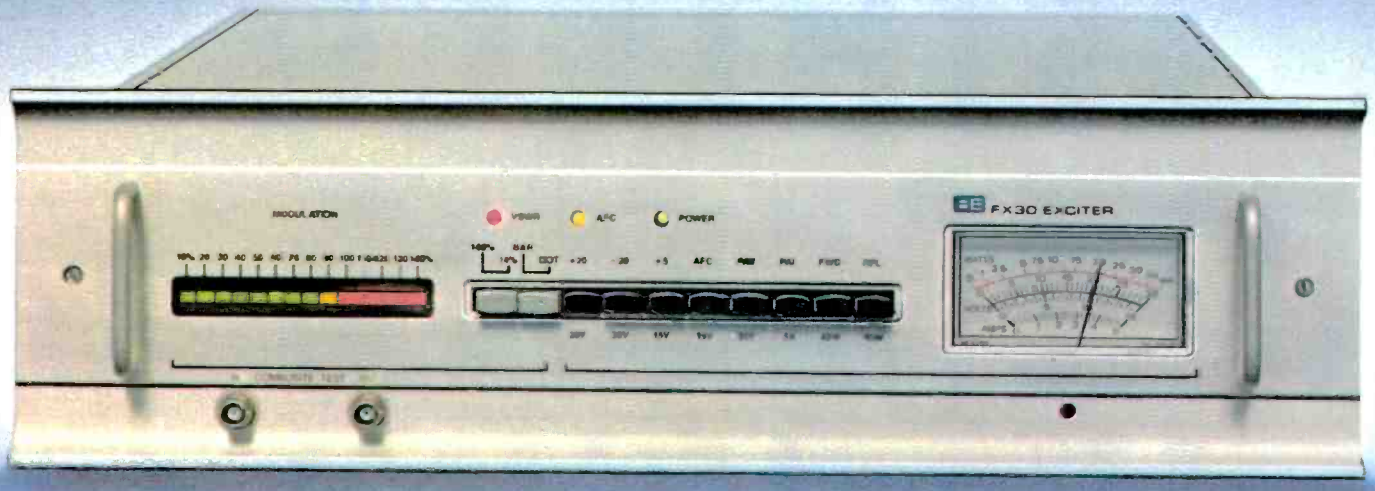

Broadcast Electronics introduces a new FM Exciter —the FX 30—with superior performance that rivals the best hi-fidelity tuners available.

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

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Advanced dual speed phase locked loop puts more than 2000 channels at your fingertips.

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

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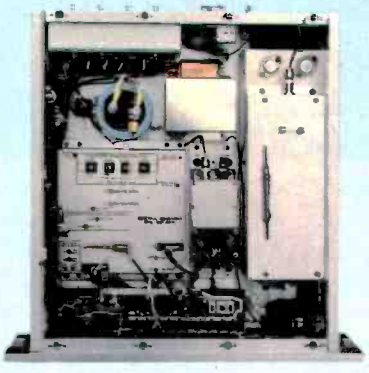

Styling Elegance.
Elegant in styling as well as in performance, the new look in FM is the elegant look of the FX-30.

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

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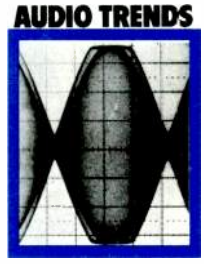


PORTABLE SOUND CONSOLES "READY-TO-AIR"

Audio mixing systems on today's market range from large multitrack recording consoles to small, hand-carried portables. In between there are smaller consoles suited for remote broadcasting and small studios. This part of *BM/E's* sound console survey will take a look at portable mixing consoles designed for live broadcasting.

FLEXIBILITY, SPEED, AND DEPENDABILITY are the keys to remote live broadcasting, and makers of portable audio equipment are refining their products to meet the new demands of sportscasters, field reporters, and sound engineers alike. Gone are the days of complicated setting up, improvised hook-ups, and lost feeds. With compact consoles a field reporter can get to the action at a moment's notice and start live feeds in the time it takes to open a suitcase.

AVAB America, maker of theatrical lighting and sound equipment, is now making mixers for radio and television broadcasting. In conjunction with Skyline Productions, AVAB has come up with a new production sound mixer in a suitcase. The PM 800 console is an eight-channel mixer weighing 18 pounds. Features include straight-line faders which are sealed for protection, condenser mic powering on each input, and a reference oscillator. A built-in condenser mic has separate level control and 40 Hz test tone. An independent cue circuit allows mixer-to-boom talkback. Designed primarily for use in film production, the console is useful in TV sound production as well. Pre-Fade Listening (PFL) allows each input to be monitored ahead of the fader.

BSM Systems of Spokane, Wash. has introduced a new remote broadcast unit in a suitcase weighing four pounds. By using telephone line hook-ups it will carry sound for radio or TV from remote locations. Suggested applications are sports events, news, commercial production, and live promos. The Remote Broadcast Unit has two mic inputs and a high-level cassette input. The unit is powered by 12 "D" batteries or its own built-in ac power supply. With headphone talkback and rotary faders, it is priced at $269.

The Sport III is Micro-Trak's latest addition to its line of portable audio consoles. Like the Sport I and II, the unit is a two-channel console incorporating many features designed for sportscasters (talkback, built-in ac supply, telephone dial option, and three headphone outputs).

This console uses a hybrid transformer at the output and

The 069-OB portable console by Studer Revox is fully equipped at 53 pounds

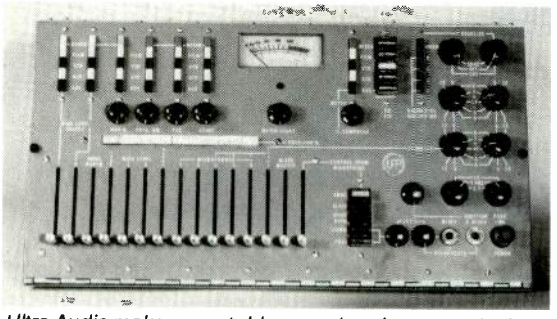
a switch-selectable auxiliary input so spots can be run directly from location. The Sport III weighs eight pounds in its case. Open it, connect to a telephone jack, plug in ac or use battery, connect the mic, and the Sport III is set for play-by-play coverage. The unit has a 2600 Hz filter to avoid accidental disconnects and a line drop indicator to let the operator know if he's lost his connection. With dial, built-in ac supply, and five-hour battery, the Sport III is priced at $569, less without the dial option. Micro-Trak also makes a 14-pound portable console for stereo or mono with five channels and eight inputs. The 6445 and 6455 models both have rotary faders, VU meters, and ac power supply. Options include a portable carrying case and preamp selection. Each sells for about $1000.

Panasonic's professional audio division has introduced the Ramsa WR-130 mixer for remote broadcasts and studio use. It has eight inputs and two outputs and comes in a leatherette case. Features include tone controls, pre- and post-sub mixing, equalizers, overload indicators, and pan pots. Four inputs will take turntable as well as balanced mics. In addition, the unit features aux input, echo send, and headphone audition. This console is priced at $995.

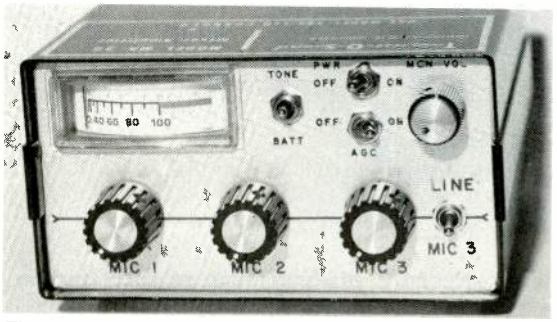
Portable consoles in the Shure group include the Model SR101 Series 2. This unit is rack-mountable with eight-channel mixer/preamps that can be custom installed in desk, console, or accessory case. The Series 2 weighs 22 pounds. With the SR 110 mixer, it will provide indepen-

Portable Sound Consoles

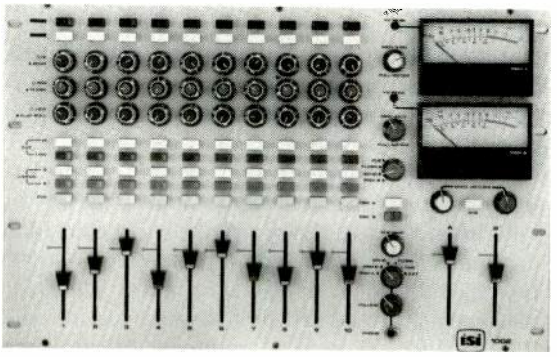
Micro-Trak's Sport III has a five-hour battery supply and optional touch dial



Ultra Audio makes a portable console using seven-inch rack height



The MA-3VR mixer by Transist-O-Sound weighs less than one pound



The 1002 console by ISI is designed for remote or studio use

BSM's Remote Broadcast Unit has two mic inputs

dent monitor mix or stereo capability. The SR 101 console accepts up to eight low impedance mics, each with individual controls for volume, reverb, high- and low-frequency equalization, and input attenuation. Channels seven and eight will take auxiliary high-level signal or high impedance mics or line feeds. The SR 101 console's program output has a 600 ohm, balanced line level output. Features include master reverb, four anti-feedback switches, attenuators for each channel, a 1 kHz test tone oscillator, and lighted VU meter. Options include the SR 110 professional monitor mixer, panel lamp, and carrying case.

At the top of the price range ($6000 complete) is Studer Revox's 069-OB console. This portable unit comes in a sturdy carrying case containing the console itself in one half, and in the other, accessories, commentator box, mics, headphones, connecting cables, mating connectors, spares, and (just in case) complete operational instructions. The unit can operate inside the case and allows one-man operation by the reporter or control by the sound engineer at the same or another location. With limited talkback and monitoring, it is possible for two reporters to use the console at the same time. The mixer unit has a telephone call generator with optional dial and a distribution box (also optional) for two simultaneous transmissions. Eight Ni-cad batteries slide out for easy replacement. The unit is modularly built so units can be exchanged and/or serviced. For line check, a test oscillator features a selector for frequencies of 1 kHz and 10 kHz as well as pink noise. A mute switch can be remote controlled from the commentator box. The unit weighs 53 pounds fully equipped.

Rupert Neve's 5422 model is an eight-channel two-group suitcase console designed for mobile use. It incorporates a rechargeable power supply unit, slide faders, VU meters, and test tone generator. It measures 25 by 16 by 7 inches and sells for $11,000.

Other portable consoles have varied applications

Often, the only major difference between "portable" audio mixers and small, compact studio types is the power source. Portables use dc sources; studio types need ac line voltages. Small studio mixers are available in two configurations — integral and modular — although this distinction can be misleading. Some consoles look like integral units from the outside but use PC board modules as mixing channel components.

Broadcast Electronics, Quincy, Ill., makes a four-mixer stereo console ideal for stereo production or on-air use. The 4S50 console uses ac and rotary faders.

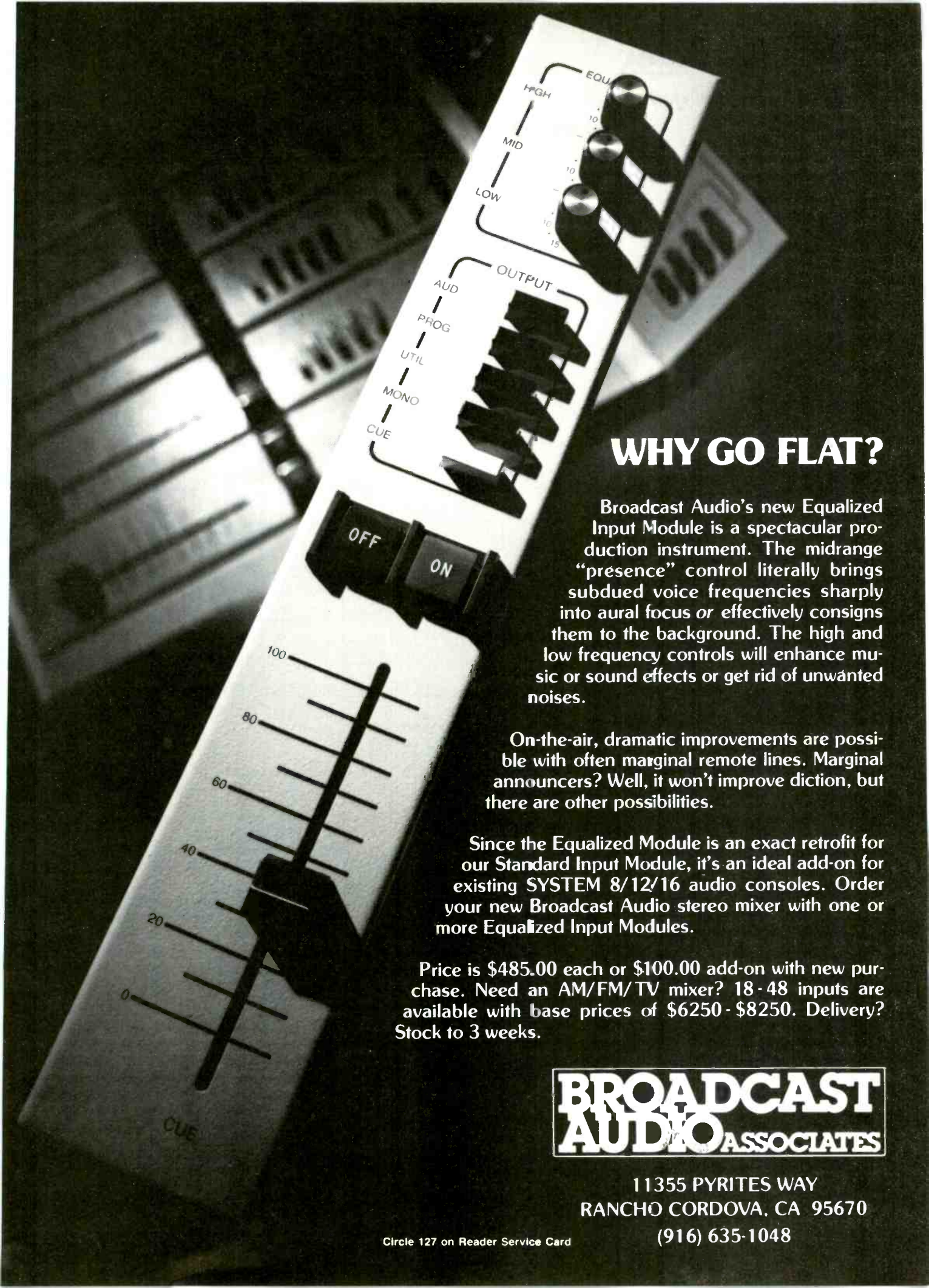
McMartin's Accu-five mini console is self-contained in a 19 by 3½-inch rack-mount unit. Five mixing channels, a vertical console, and an integral design make it ideal for remote or production applications.

A similar console is RTS System's HPM-41 four-channel mixer. Features include test tone generator, ac line and battery power sources, and limiters on each input.

Other makers of compact portable audio consoles include Arrakis Systems of Bolivar, Mo.; Dyma Engineering, Taos, N. Mex.; Quantum Audio Labs, Glendale, Calif.; Ramko Research, Rancho Cordova, Calif.; Transist-O-Sound, Indianapolis, Ind.; Ultra Audio, Beverly Hills, Calif.; and Yamaha, Buena Park, Calif.

Ramko Research makes a number of stereo and mono consoles designed for remote broadcasting. The DC-12

text continued on page 47



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Broadcast Audio's new Equalized Input Module is a spectacular production instrument. The midrange "presence" control literally brings subdued voice frequencies sharply into aural focus *or* effectively consigns them to the background. The high and low frequency controls will enhance music or sound effects or get rid of unwanted noises.

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text continued on page 47

Portable Sound Mixing Consoles

Mfr.	Model	Channels				Specifications				Features								Physical			Other	
		Mode	Mix	Input	Output	S/N Mic	S/N Line	Frequency	Distortion THD	Equalizers	Limiters	Faders	Cue	Echo	Test Tone	Meter	RF Shield	Console	Design	Dimension (inches)	Power	Price
Ampro/ Scully	Microtouch	S/M	5	10	2			±1				rotary or slide	yes			VU	yes	slant	port.	21"	ac	III to IV
Arrakis Systems	1000 Series	S/M	5,8	20,32	2	−125	−125	±0.5	0.1%	opt.		slide	yes			LED peak	yes	slant	mod. port.	12X 12X 32	ac	IV
AVAB America	FM 800	S/M	8	8	6			±1	0.1%			slide	yes		yes	VU		flat	mod. port.	18X 13X 6	ac batt.	
Broadcast Electronics	4S50	S	4	8	1	−70	−70	±0.5	0.1%	no	no	rotary 4			no	VU	yes	vert.	port.	46X 33X 19	ac	II
BSM Systems	Remote Broadcast Unit	M	3	3	1	−70	−60		0.1%	no	no	rotary	no	no	no	VU	yes	flat	port.	25X 35X 10	ac batt.	I
Dyma Engineering	International	S/M	8	8	2	70	80		0.5%	no	no	slide	yes		no	VU	yes	vert.	mod. port.	19X 5¼X 12¾	ac batt.	III
Harris Corp.	M90	S/M	4	8	4	74	80		0.1%	yes		slide	yes	yes	yes	VU	yes	slant	mod. port.	32½X 13X 50	ac	
Howe Audio	Mini 600	M	6	7	2	−122	−129	±1	0.05%	yes	no	rotary	no		no	no	yes	vert.	19X port.	1¾X 19X 6⅝	ac	I
Industrial Sciences	1002	S	10	20	2	123	68	±0.5	0.5%	yes	no	slide	yes		yes	VU	yes	opt.	mod. port.	12¼X 19X 8¼	ac	IV
McMartin	Accu-five	M	5	13	2	−60		±1	0.5%	no	no	rotary 5	yes		no	VU		flat	port.	47X 9X 25	ac	I
Micro-Trak	Sport III	M	4	4	2				0.5%	no	no	rotary	yes		no	VU		flat	port.	9½X 13¾	ac batt.	I
Panasonic	Ramsa WR-130	M	8	8	2	−128	−13.8	±2	0.5%	yes	no	slide		yes	no	VU		flat	port.	46X 15X 41	ac	I
Quantum Audio	QM-8P	S/M	8	8	4	−127	−70	±1	0.25%	yes	no	slide	yes	yes	no	VU		flat	port.	50X 21X 50	ac	IV
Ramko Research	DML-2M	M	1	2	1	−60		±2	0.25%	no	yes	rotary	no		yes	VU	yes	vert.	port.	6¼X 13X 21¼	ac batt.	
RTS Systems	HPM 41	M	1	4	4	−127	−76	±1	0.1%	no	yes	rotary 5	no	no	yes	VU peak LED	yes	vert.	port.	29X 63X 19	dc	II
Rupert-Neve	5422	S/M	10	8	2	−78	−80	±1	0.05%	yes	no	slide	yes		yes	VU PPM	yes	slope	mod.	63X 40X 18	ac batt.	V
Shure Group	SR101 Series	S/M	8	8	2					yes	yes	slide		yes	yes	VU		flat	port.	31X 48X 16	ac	
Studer Revox	069-OB console	M	5	3	2	F≤5	+85	±1	0.2%	yes	yes	slide 3	no	no	yes	VU PPM	yes	flat	mod. port.	31X 35X 14	ac dc batt.	VI
Transist-O-Sound	MA3CT	M	3	4	2	−68	−70	±2	±1%	no	yes	rotary 3	no	no	no	VU	yes	vert.	port.	3X 4X 5	ac batt.	I
Ultra Audio	MS-105	M	1	18	2	−83	−90		0.02%	yes	yes	slide 15	yes		yes	VU	yes	vert.	port.	17X 8X 7	ac	IV
Yamaha	PM-180	S	6	6	4	−123	−73	±0.5	0.3%	yes		slide 12			no	VU	yes	flat	mod. port.	60X 52X 19	ac	

Price Code: I under $1000; II $1000-1499; III $1500-2499; IV $2500-4999; V $5000-9999; VI $10,000-19,999; VII $20,000-39,999; VIII $40,000-99,999; IX $100,000 and up

Individual prices vary depending on number of modules, tariffs, etc.

Notes: Modes: S=stereo; M=mono. Mix: Buses/modules. S/N: dB. Frequency response: dB. Distortion: THD/IM

the New Workhorse

Quietly, you have made the OTARI tape machine a standard for reliability and performance in literally hundreds of stations and thousands of production studios—worldwide! The legendary 5050 series were the first compact professional recorders accepted by the industry and remain, dollars for dB's, the best tape recorders made. Whether moving ¼" or ½" tape, these SMPTE adaptable machines are complete with every necessary production feature.

Our ARS Series Reproducers have been accepted by the most prestigious automation manufacturers in the business. These people must have a reliable product before they put their name on it. Our MX-7800 1" transport production machine remains the most functional eight track on the market.

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Models 5050B & Mark II-4 shown in optional cabinets available from the Russ Lang Corporation, Bridgeport, Conn. (203) 384-1266

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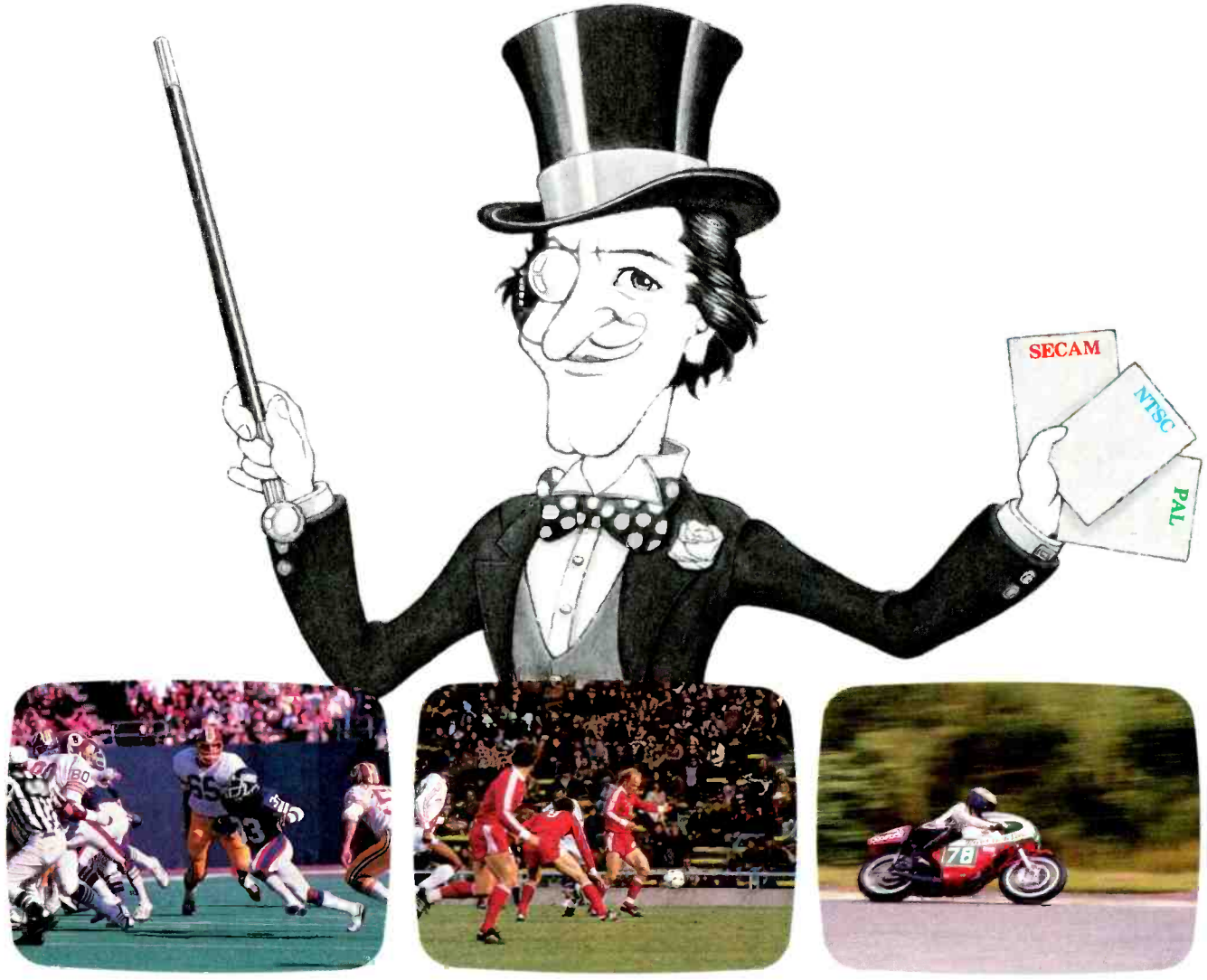
When Your Wand Is Wanting Abracadabra..... Oki!



NTSC PAL SECAM

The LT1200 Digital Television Standards Converter is Oki's highly portable answer to the problem of different television standards—NTSC, SECAM, PAL, and PAL M. Whether you need tape-to-tape conversion in the studio or real-time conversion in a broadcasting station, the LT1200 can handle it. Superb image quality backs up a host of valuable features. Like frame synchronization, time based correction (TBC), one-touch freeze switch, and totally-automatic operation. When you're ready to go international, leave the magic to Oki.

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Portable Sound Consoles

Series are remote-controlled audio consoles designed with operator controls separate from output and input racks. This allows the operator to work 60–90 feet away from the active audio components, and reduces the susceptibility to RF pickup. Functions such as mute, on-air cue, and remote start/stop are programmed by setting internal switches. Ramko also makes a portable mono console, the DML-2M, designed for tabletop or belt hook. It measures 3 by 5 by 8 inches and has a VU meter, test tone, two inputs, and one output.

The Harris Corporation's M90 console comes with two, four, five, or eight program outputs and a combination of mono, stereo, and sum channels. Other features include optional echo-reverb, send-receive channels, foldback, and test oscillator. The M90 unit also has a self-contained mic for studio talkback and muting.

The mainframe of the M90 is rugged and lightweight, making it practical for remote or portable use. Harris also makes the Stereo 80 console, an eight-channel transistor audio unit with 18 inputs, interchangeable cue, monitor and program amps, built-in cue speaker, and talkback sends. All eight channels may be switched to either program or audition positions to allow independent recording and monitoring of any incoming sources without disturbing programming. Channel eight is designed to work with network and remote line feeds as sources. Preview, talkback, and program cue are possible using front panel switches.

Howe Audio of Boulder, Colo. makes a six-channel mixer with equalization. It is 19 inches long and designed for rack mounting. The MINI-600 weighs 6½ pounds. Howe also makes a 12-channel stereo console for the small studio. The 7000 console has rotary faders, two VU meters, and cue circuit, and weighs 50 pounds.

Ampro/Scully's Microtouch console comes in five or eight channels with choice of rotary or linear faders. It has two inputs per mixer, built-in cue amp and speaker, VU meters, and LED program output.

Industrial Sciences Inc. (ISI) makes a 1002 console with rack mount design and modular construction. The unit has 10 inputs and two program outputs. Features include three-frequency equalization, foldback and echo sends, cue, slide faders, VU meter, LED peak indicators, and tone oscillator. This mixer is designed for either studio or remote TV audio applications.

Yamaha's PM-180 mixer has six inputs and four outputs, and features limiters, equalizers, VU meters, and LED peak indicators.

A great diversity of types of mixers by size and features have evolved to meet different applications (news-gathering, sportscasting, political event coverage, and field production). While various manufacturers make consoles for customized use, those covered here are only representative of consoles designed for portable use, light enough in weight to be adapted for remote broadcasting applications. It is true, of course, that the large remote broadcast units employed by networks and teleproduction companies often include studio type consoles modified for mobile use. Such installations, however, reflect a different set of priorities in their design and will therefore be covered in a later survey of recording studio types. **BM/E**

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Finally you can get your hands on a cart system with reel-to-reel performance.

A cart system that eliminates phase shift error once and for all. That sets new standards for low wow-and-flutter. That provides signal-to-noise, distortion and frequency response that are better than anything else in the industry.

Finally, the PhaseMaster.

PhaseMaster: the cart machine, redefined.

The new Ramko PhaseMaster has all the features you want, and some that never existed before.

It's built to take the pounding you're going to give it, hit after hit, commercial after commercial, day after day.

The deck is a 5/8″ casting for stability, with a stainless steel cover plate for wear resistance. The crystal-controlled dc servo motor ensures greater speed accuracy and lower heat

PhaseMaster™ not just a whole new concept.

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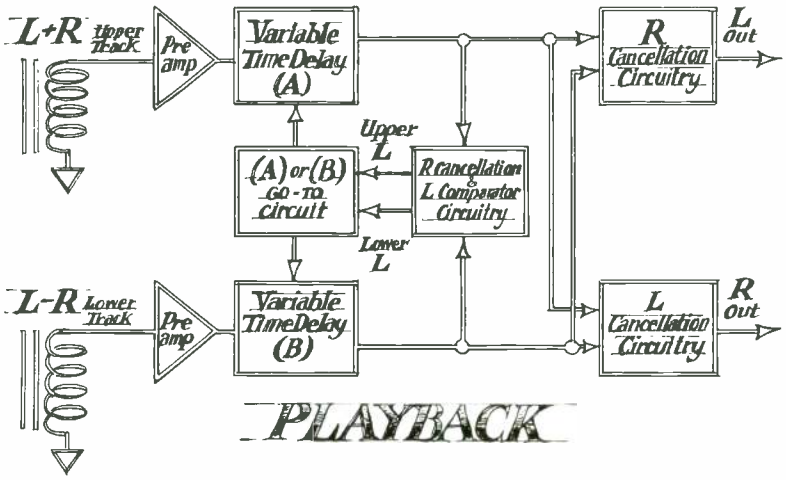

And no more stereo phase shift error

Phase shift doesn't much matter in mono, so when you're recording stereo, the PhaseMaster encodes a mono L + R signal on the upper track, L − R on the lower track. On playback, the left channel signals from both tracks are compared, and any phase shift difference is corrected automatically by a continuously tracking electronic time delay.

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To record, you switch-select any of three inputs to record on any or all of the decks. When you play back, the control center determines whether your tape is mono or stereo, coded or uncoded, and automatically reproduces the correct outputs.

To dupe, you simply load tape (cart or cassette) and one or two blanks, then hit Record/Play and the control center puts the signal where it's supposed to be.

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DEGRADATION OF THE FM SIGNAL BY BASEBAND CLIPPING

By Robert Orban

Some FM stations are using baseband clipping to increase the "loudness" of their signals. There has been no approval of the technique by the FCC, however, and no engineering data on its use have been available. A detailed series of laboratory tests, described here, turned up a number of serious faults induced in the signal by baseband clipping.

SOME FM STEREO BROADCASTERS have begun to use clipping after the stereo generator either as a means of overshoot control or as a means of signal processing to make their signal louder. This is unprecedented in the history of U.S. broadcasting because it is being done without approval or knowledge of the Federal Communications Commission.

Clearly, potential for signal degradation exists. Because the usual FCC investigative procedure has been ignored by those promoting use of the technique, virtually no solid engineering data have been published. We therefore undertook to measure some of the effects of baseband clipping using sine wave test signals modulating a very high-quality stereo encoder. While it may be argued that these signals are not representative of speech or music, if severe degradation is noted on sine wave signals, then this certainly indicates cause for concern.

We first observed the spurious spectral components introduced by the clipping by means of a baseband spectrum analyzer (Tektronix 5L4N) connected to the output of the clipper. The second test was to perform conventional "stereo performance verification measurements" through a type-approved exciter (Collins 310Z-2) connected to a type-accepted FM monitor and stereo monitor (TFT 763 and 724A), which in turn drove a low-distortion THD/IM test set (Sound Technology 1700B). In all cases, the sine wave source was the low-distortion oscillator in the Sound Technology 1700B.

The clipper employed was the Sta-Max manufactured by Automated Broadcast Controls, Inc. It was chosen because it has been heavily promoted and is probably in use by more stations than any other similar system.

Main-to-sub and sub-to-main crosstalk

Main-channel to subchannel crosstalk was measured both with the TFT monitors and with the spectrum analyzer. A 2 kHz frequency was used in the spectrum analyzer tests, modulating L+R, L−R, and L only in turn to 100 percent. FCC standard (50, 100, 400, 1000, 5000, 10,000, and 15,000 Hz) frequencies were used in the mod monitor tests. In both tests, observations were made at no clipping and at five different clipping levels: 0.5, 1.0, 1.5, 2.0, and 2.5 dB.

The spectrum analyzer revealed that the added crosstalk was all nonlinear (i.e., distortion), and is therefore far more offensive to the ear than the linear (non-distorting) crosstalk which ordinarily makes up most of the crosstalk measured in a conventional stereo transmission system. The distortion induced is highly complex because of interaction between the 2 kHz modulating frequency and the pilot. Substantial energy is observed in the 23–53 kHz L−R region, which implies considerable main-to-sub crosstalk. Further, when demodulated by a stereo decoder, this crosstalk bears no harmonic relationship to the fundamental, and thus sounds unnatural and amusical.

Measurements with the exciter and monitors reveal that if clipping of 1 dB or more is performed, main-to-sub crosstalk exceeds FCC limits [FCC 73.322(o)] at frequencies of 1 kHz and above. At 10 kHz and 2.5 dB clipping, crosstalk deteriorates to −20 dB!

For the L−R spectrum, a trend similar to the L+R case was evident, wherein an exceedingly complex pattern of non-linear "garbage" appears. The level of this garbage increases rapidly as the depth of clipping is increased.

Separation

Non-linear crosstalk such as that caused by baseband clipping is always accompanied by non-linear left/right crosstalk as well. The large amount of main-to-sub nonlinear crosstalk introduced by the clipping implies that separation will also deteriorate. With no clipping, 55 dB separation was measured through the system. The separation deteriorated markedly as clipping depth was in-

Bob Orban is chief engineer, Orban Associates, Inc.

creased, although it never exceeded the 29.7 dB limit of FCC 73.322(m).

Because this left-to-right crosstalk is almost pure distortion, it is quite disturbing to the ear despite the fact that it never exceeds FCC limits. In order to evaluate its audible effect, program material was applied to the system through its left channel only, and the deemphasized stereo outputs of the TFT 724A stereo monitor were audited on headphones.

With no clipping, separation was subjectively perfect. When more than approximately 0.2 dB clipping was introduced, a clearly audible "crunching" noise became audible. With more than 0.5 dB clipping, this "crunching" was audible at all times.

Pilot modulation

Perhaps the most disturbing aspect of baseband clipping is its effect upon the pilot. The pilot is added to the encoded signal, and rides on top of it. Therefore, at the peaks of the encoded signal the pilot will be totally removed (100 percent AM) if clipping in excess of 0.82 dB is effected. With approximately 1.5 dB of clipping, the pilot is stripped from the peaks of the waveform. The effect of this radical amplitude modulation of the pilot is to create high-level sidebands around it.

The results for the subchannel and left-only cases are substantially identical, and are lower than the L+R case by about 12 dB. In the case of L−R or L only modulation, the pilot is being modulated at a 38 kHz rate at the peaks and this causes the sideband energy to be redistributed more widely throughout the baseband. In the L+R case, the pilot is being entirely interrupted twice per cycle (on the upper and lower peaks of the modulating sine wave); this explains strong sidebands at twice the frequency of the modulating sine wave. In the case of 2.5 dB clipping depth, the sidebands are only 7 dB below the level of the pilot!

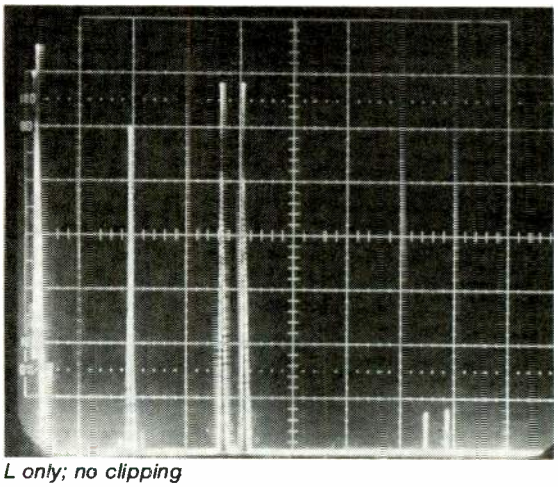
One might expect this level of modulation to have a strong effect on the operation of the stereo decoder in a receiver, as these decoders were designed with the assumption that the pilot would be constant in level. In our tests, this proved to be the case.

This phenomenon would tend to be excited by strong bass in the music (which, unfortunately, is always put in the L+R channel of the record where it will excite this distortion mechanism most severely). It is likely to be perceived as similar to intermodulation, and its effect will blend with the more conventional forms of IM already induced by the clipping, but which are decoder-independent.

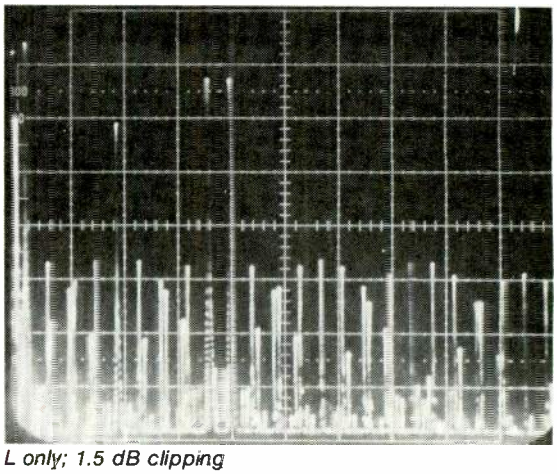
In extreme cases, baseband clipping may cause a PLL decoder to lose lock altogether. It has been reported that baseband clipping in "commercially useful" amounts tends to cause the stereo indicators of late-model Delco AM/FM stereo automobile receivers to flash on and off in time with the music. It seems we must invent yet another "three-letter" distortion to go with TIM, SID, and so forth: SMI (stereo/mono intermodulation)!

Distortion of the demodulated signal

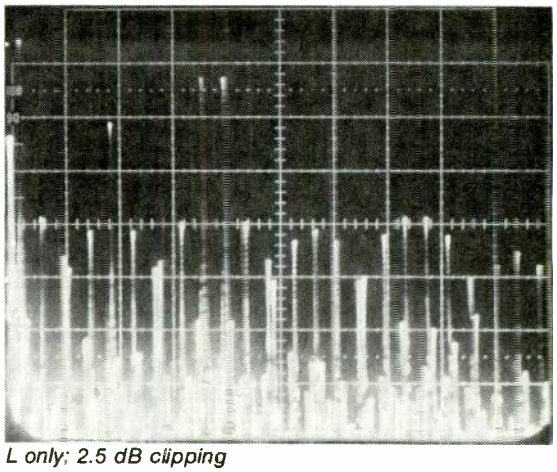
After examining the more exotic damage that baseband clipping can do to the stereo signal, it is interesting to measure the amount of harmonic and intermodulation distortion emerging from the stereo decoder as a function of clipping. We did this by examining the left channel deemphasized output of the stereo monitor. In our tests the distortion with no clipping was exceedingly low in both the THD and IM cases. THD was highly frequency-dependent, notably more severe in the main-channel case



L only; no clipping



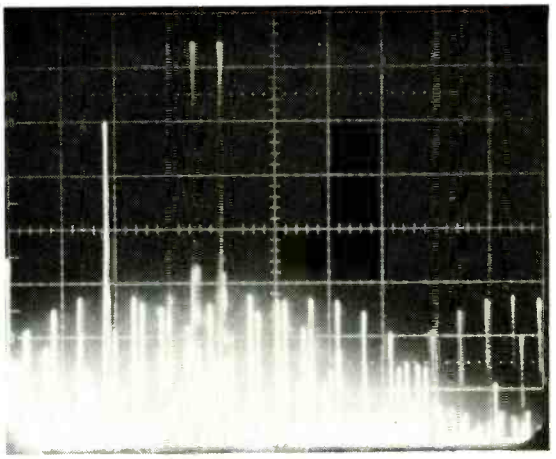
L only; 1.5 dB clipping



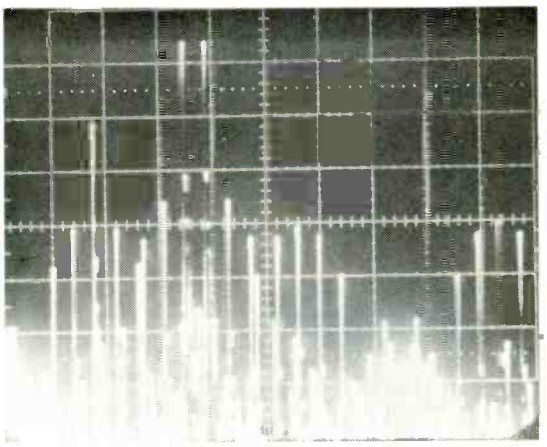
L only; 2.5 dB clipping

than in the left-only case. In both cases, it is lowest in the midrange and rises at low frequencies. It increases *dramatically* at high frequencies. The high frequency distortion is not harmonic distortion at all, but is instead pilot IM products below the 15 kHz cutoff frequency of the audio lowpass filters built into the stereo monitor.

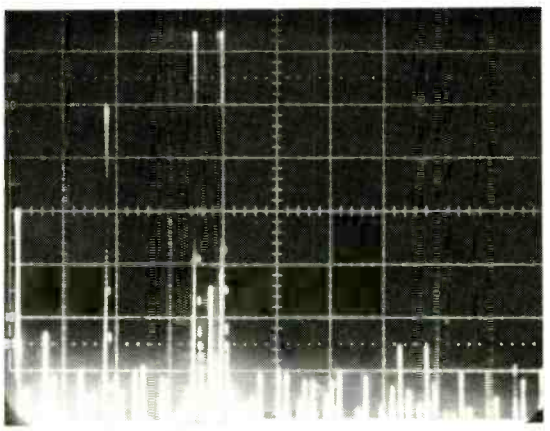
As in the THD case, less IM was measured in the left-only case. In either case, the IM behavior is much more unfavorable than the THD behavior would ordinarily imply, with IM measuring as high as 21 percent with 2.5 dB clipping in the main-channel case. This is because the spectrum rapidly "fills up" as the complexity of the



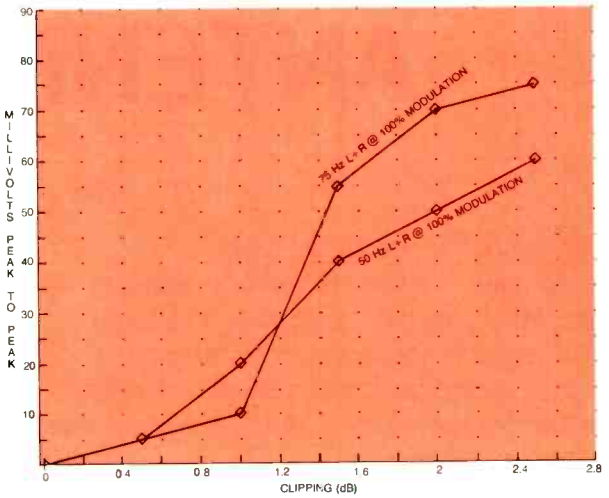
L–R; 1.0 dB clipping



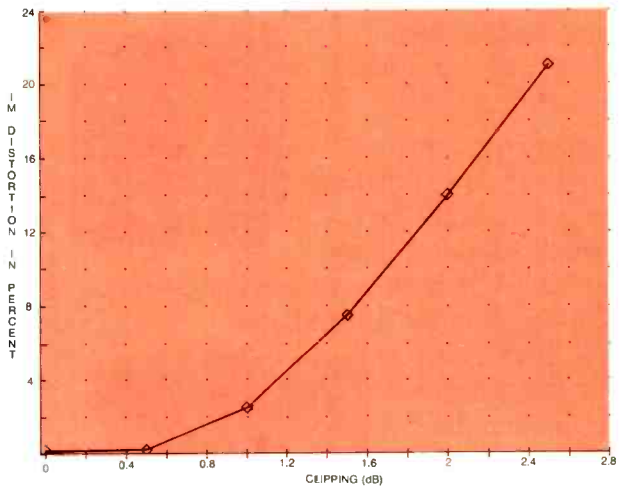
L–R; 2.5 dB clipping



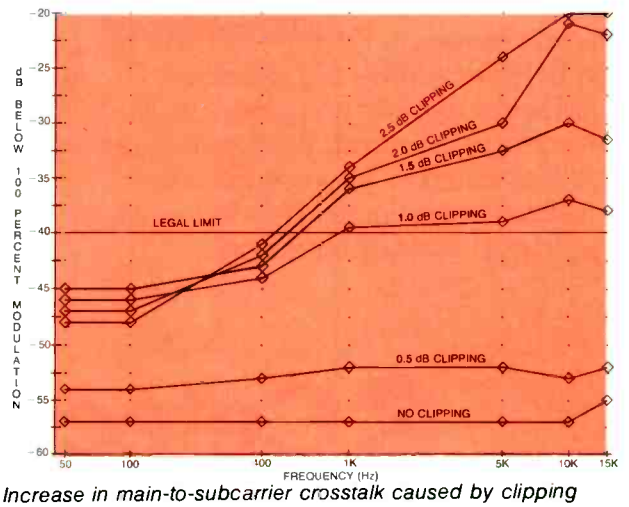
L–R; 0.5 dB clipping



Effects of clipping on a PLL decoder control voltage



IM distortion produced in the L+R signal by clipping



Increase in main-to-subcarrier crosstalk caused by clipping

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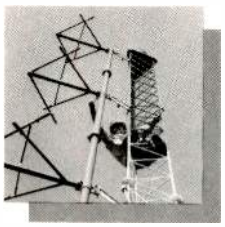

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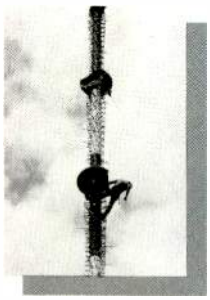

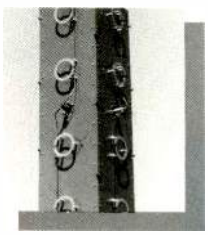

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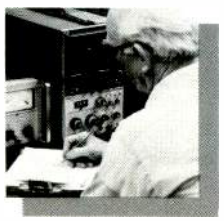

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Baseband Clipping

modulating signal increases. As we saw in the spectrum analyzer photos, intermodulation products dominate throughout the baseband, and harmonics are negligible by comparison.

We therefore conclude that baseband clipping shows a substantial advantage over simple clipping if harmonic distortion is considered by itself. This is because some harmonics which would otherwise appear as distortion are distributed outside the frequency range of the main channel or subchannel, while others decode in the *opposite* channel and are therefore not measured (but of course can be heard). Measured THD is being traded for bandwidth spreading, quasi-aliasing distortion, and pilot sideband generation.

The mechanisms which work to reduce measured THD are much less effective in controlling IM distortion, which is consequently very high.

Conclusions

The effect of baseband clipping on sine wave test signals is cause for substantial concern when even a small amount of clipping is used. What is most disturbing is the effect of clipping pure L+R modulation. L+R energy dominates on most records; many components of broadcast programming (such as most live announcers and many spots) are dead mono. The worst effects of baseband clipping thus tend to manifest themselves with the most common program material.

With L + R sine wave modulation, the clipped signal specifically violates FCC 73.322(o) [main-to-sub crosstalk] with clipping of 1 dB or more and modulating frequencies of 1 kHz or higher. FCC 73.322(n) [sub-to-main crosstalk] is violated with clipping in excess of 1.5 dB and frequencies of 10 kHz or above. FCC 73.322(b) [pilot subcarrier injection] is violated with clipping of 1.5 dB or more. FCC 73.322(q) [main-channel THD] is violated with clipping of 1.5 dB or more. Substantial bandwidth spreading has been observed with L-only or pure L−R modulation; this writer has not determined whether this violates FCC 73.317a (12–14).

Listening tests have revealed that the distortion effects of baseband clipping are clearly audible. An additional distortion mechanism is the effect of pilot modulation on the stability of the regenerated 38 kHz in the stereo decoder. This is above and beyond any predictable distortion

Any Processing That Alters FM Baseband Signal Can Bring Citation

The controversy over the legality of composite clipping has been clarified by recent statements from the FCC. Summarizing, the official position is that composite clipping as such is not against the rules. However, the composite clipper must be used to *prevent overmodulation only,* which was the original objective of the design. If the clipping level is increased above that necessary to prevent overmodulation, resulting in alteration of the FM baseband signal beyond the limits in the FCC rules, Part 73-1570, the station operator is liable to a citation for a violation. There are reports that some operators are using composite clipping to increase modulation density for a "louder" signal. The pilot signal is particularly vulnerable to damage from this; it is against the rules.

Baseband Clipping

caused by distortion products in the baseband, and is entirely decoder-dependent.

It is my opinion that baseband clipping is acceptable from an engineering point of view solely as a means of eliminating occasional overshoots in composite STLs, where the overshoots have an extremely low duty cycle and tend to be of small magnitude. It is not suitable for eliminating overshoots in the left and right 15 kHz low-pass filters in the stereo encoder because some program material introduces overshoots so severe that the clipping can cause complete pilot cutoff as well as audibly-obvious quasi-aliasing distortion.

In particular, baseband clipping is not appropriate as a signal processing means to increase loudness. Most modern audio processing equipment is carefully designed to perform as much non-linear modification of the signal as possible without causing audible distortion. Any *further* distortion added to the signal is likely to send it "over the edge" into audibility. This phenomenon can be easily verified by listening to many of the stations now employing baseband clipping.

The mischief that can result from overuse of baseband clipping is so disturbing that it would seem preferable to simply forbid the use of the technique altogether. In that way, stations could once again compete on an even basis — and the basic integrity of the FM stereo transmission system would be preserved. Excessive signal processing has already compromised this quality severely at many stations. Isn't it time that we drew the line? **BM/E**

A Defense Of Composite Clipping

(An open letter to the FM industry from Chris Hood.)

Dear Editor,

I am the designer of the controversial Sta-Max FM stereo composite clipper. Although I could not attend the NAB this year, I understand the issue of composite clipping was under heavy debate both in the technical sessions and on the convention floor. Since most of the noise was made by parties against the concept, and few people with expertise were present who could adequately defend the issue, the whole argument leaned towards disfavor of the technique. I'm sorry I was not present to provide favorable comments about the device. Although there are three manufacturers of these so-called composite clippers, the Sta-Max has stirred up the most controversy, probably because it was promoted so heavily and it performs so well. Most opponents of the technique claim the units are being overused to clip off more than overshoots, resulting in incredible loudness increases while ruining that station's stereo specifications, often lowering them below FCC minimum standards. To that extent, this is true, but the Sta-Max was designed to instantaneously clip off any composite overshoots (that could cause overmodulation) and perhaps a small bit of pilot, while simultaneously providing unbelievable faithfulness and transparency to the program material and its stereo specifications. At least that was the intent of the device, and with the early demos, they were adjusted this way and were very beneficial to the stations who had them on line, who could then fully modulate safely.

But all it takes is one pig in every market to start a composite clipper loudness war. At that point, the signal abuse starts and multiplies as stations increase their clipping levels to just below the point of audible and irritating distortion. This is often done against engineer's wishes by management edicits [sic] who want their station to be the loudest signal on the dial, particularly for ratings. When

additional audio processing is also used, the loudness on-air can be tremendous. I did not intend for the Sta-Max to be used (or abused) in this manner. And I can't stop it.

The only thing that will stop this runaway clipping mania is an across-the-line reduction by all stations in any given market. But I believe they will have to be *forced* to do it by the Commission, which is frowning on all this abuse anyway. If the clippers were adjusted for overshoot-protection (only) and their stereo proofs show compliance with the specifications, I think the Commission would be much happier. Setup with a scope off the baseband output of a mod-monitor at the transmitter site is fast and easy. Visible pilot clipping is not hard to point out. The design and marketing of an automatic overshoot-only clipper that works reliably is not economically feasible.

While I cannot speak for the other two competing units, the Sta-Max will have very little or no effect on any stereo specification at or below the threshold of clipping. It will also pass a stereo proof with ½ dB of continuous pilot clipping at any audio frequency or test mode. Extensive testing and research was done, but not filed, on the Sta-Max long before its introduction. The basic circuit design is seven years old. It will not even cause off-air RF bandwidth specs to be violated. In light of the recent controversies, new data has and will continue to be filed with the Commission on its use for *overshoot protection only*.

It seems most of the noise about the unit's illegality is being caused by equipment manufacturers with a competing commercial interest, or by claims that their STLs don't overshoot and therefore don't need this type of device. I have never seen a composite STL in the field yet that didn't overshoot. The size and occurrence of these overshoots vary from station to station, depending on the unit's manufacture, age, distance between antennas, and signal strength received. Everybody's stereo generator overshoots to some extent too. I have seen the addition of a Sta-Max bring up a station's modulation and greatly increase listenability in the licensed coverage area, simply by eliminating overshooting and allowing the program level to be raised up to about 100 percent. This is particularly true for Beautiful Music and easy listening stations that do not rely on or desire heavy audio processing or compression for loudness. They must compete with the pigs somehow.

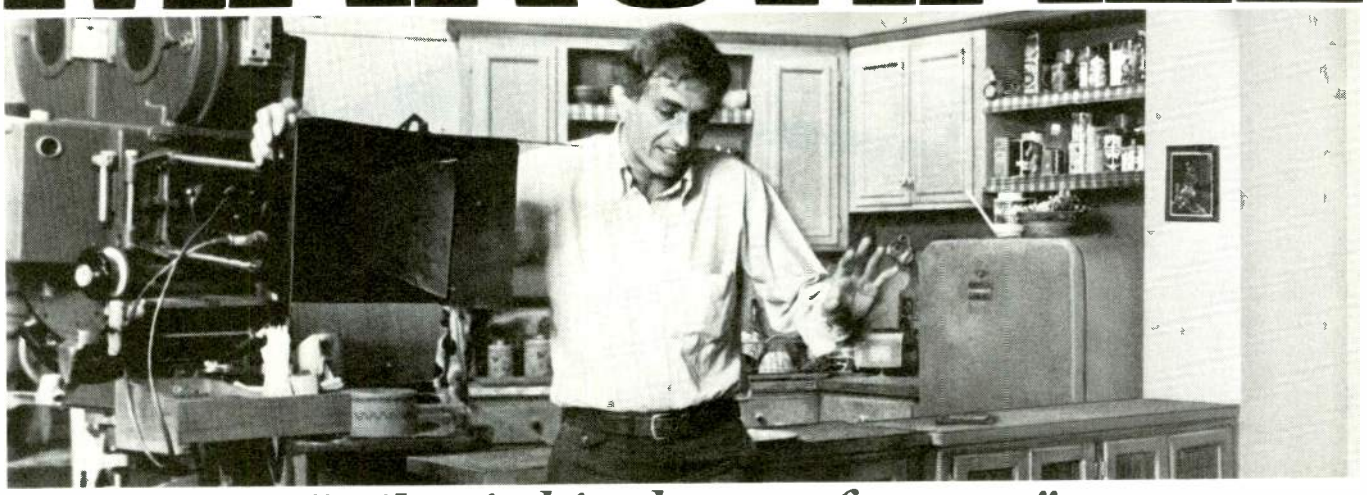
In addition to all these problems, the Sta-Max is suffering from financial difficulties (stations not paying for it), and will be discontinued after this run of units is exhausted. The circuitry is probably one of the finest, low-noise wideband dc amplifiers ever made, but bad publicity, unfavorable acceptance by the competition, overuse, slander, widespread abuse, and panicky rumors of illegality have killed it. I wish the radio industry suppliers could produce products that performed as well, but the modern mixed-up, cut-throat, sell-it-now and cheapen-it-up attitude common to many broadcast equipment manufacturers has stagnated the chance for good, dependable, innovative products to ever succeed or exist. Maybe the Sta-Max will return someday after the storm has subsided, and will be used properly. In the meantime, I am asking every station with a composite clipper to cool it and run the thing with modesty. Don't be the pig in your market.

Very truly yours,

Chris Hood, Broadcast consultant and Sta-Max designer
Pittsburgh, Penn.

(Editor's Note: BM/E received just before press time the data on a comprehensive series of tests run by Mr. Hood, showing the effects on the stereo signal of using the Sta-Max at 0.5 dB of clipping. These test results support Hood's position that use of Sta-Max at a low clipping level will not degrade the baseband signal, nor cause its characteristics to deviate beyond FCC limits. Details of Hood's test will be published in an upcoming issue of BM/E.)

MARSHALL



"Film is kind to performers."

Few stars on television shine as brightly as those of Garry Marshall, producer of Mork and Mindy, Laverne and Shirley, Happy Days, and Angie. Garry credits the stars themselves, the stimulation of live audiences, and a technique of working with not one, but three cameras recording all the comedy subtleties on film at the same time.

"Funny is funny. On television, in a nightclub, in the theater, movies, no matter where, funny is funny. And the key is the audience. You're funniest when you use the audience.

"I use the audience as a barometer. I listen to 300 people, and I can *hear* whether they laugh or don't laugh; so I don't need subjective opinions about what's funny.

"The three-camera technique gives me the best chance to be funny, because I always have three cameras looking at *everything*. I don't have to pick the very best shot until later in the quietness of the editing room. Then I can listen to the audience, see where they laughed, and pick the funniest shot. For me it works better than picking the shots electronically as you shoot.

"The three-camera technique involves lots of rehearsal. We're often rewriting up to the very last moment. I have even rewritten lines in front of the audience. I welcome contributions from anybody in my shows, because comedy can come from any place. Many of my cameramen have given me funny lines. Gate guards have contributed. The more creative the atmosphere, the better.

"I think film is kind to performers. It's *much* kinder to women; it makes women look prettier. This may be due partly to the subtler lighting and partly the nature of film. At any rate, my gang is pleased with how the film camera treats them.

"About 86 percent of prime-time television originates on film. The *look* of film may have something to do with this.

"I don't use a laugh track but even using a live audience can be bad. A number of my shows have featured cult heros; so when a Fonzie or a Mork makes an entrance, the audience stands up and cheers. That distracts the viewing audience from the story, so we take that out.

"Part of the appeal of series television is *comfort*. It makes people comfortable to see the same familiar faces each week, doing different kinds of things, but remaining in character. It's like having friends. If you make your series a best friend, you can put it in that wood frame, and it will last for seven years."

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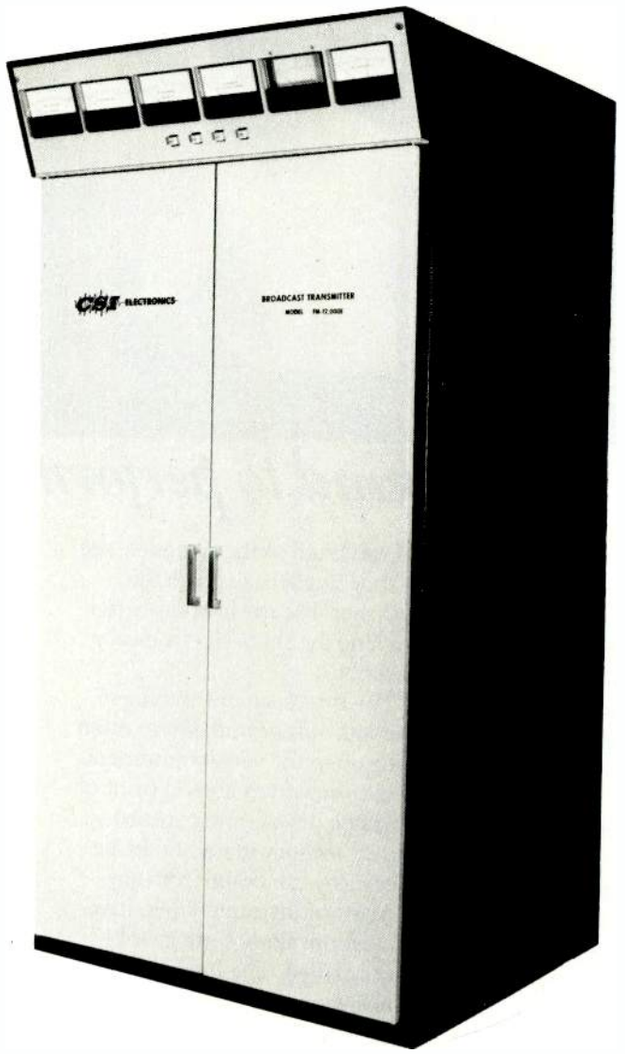

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FM PROCESSORS IN THE "WRONG" HANDS

AUDIO TRENDS

By David H. Solinske

The tendency to rely on processing to increase loudness or compensate for otherwise poor engineering is threatening the tradition of FM quality sound, once synonymous with 'superior sound.'

THERE HAS BEEN an increasing tendency of major market FM stations to chase their potential audience away as the AM mentality moves to the newly discovered band. Ignoring, forgetting, or unaware of the paramount technical reason for the AM to FM listener switch (which isn't stereo since most FM listening is still done in mono), an increasing number of station managers are deleting their stations' audio responsibility from the engineering department's duties to add it to the programming department's . . . that same department that has just transferred, in many instances, from the now faltering AM band. This tendency seems more pronounced in major markets where the thought of AM dollars often obscures FM realities, and a quality FM sound is nowhere to be heard. Most publications have found "state-of-the-art" audio in major markets humorous, since finding a subconsciously endurable station is often challenge enough.

The prime objective of this AM mentality has become the new FM game plan: loudness wars. Forgetting that the defects in AM receivers and the nature of AM power and noise caused the original AM loudness war (justifiably, I may add), their main goal in FM seems to be the loudness objective. Yet, I challenge any programmer to find a listener that has stayed with a station after scanning the dial only because it was the loudest. Format, announcers, music, and/or monotony are likely to be the determining factors of any radio dial's final resting place. A country music fan is not going to listen to the loudest station if it is AOR, or if it is inferior country. On the other hand, I know many listeners who avoid a station or tune out quickly if the continuing, repetitive pounding of music, announcers, and commercials brings on a headache. Still, at any cost, including but not limited to extreme AGC, unashamed clipping, and now composite limiter abuse, FM stations are now intentionally inverting the trend of consumer purchases and neglecting their goals of obtaining a quality audio system by downgrading the stations' technical tolerability.

Consideration at this time should be given to this direction of consumer equipment acquisitions. The LSI technology of today has enabled $195 receivers of 1980 to surpass the quality of $500 units sold in 1970. At that time, quality units were beyond the reach of young adults. The 1980 $500 receiver, now within the reach of the same young adult age group, offers the direct coupled, high speed circuitry not dreamt of a decade ago. Generally, all but the bargain basement systems are capable of exceeding the quality to which FM is degrading. When is the last time a manager has caught his programmer reading *High Fidelity* or *Audio* magazines? These highly successful periodicals not only reveal present trends in audio, but also are heavily into future trends (such as metal tape, cassette variations, etc.) long before improvements are widely available. Yet, the person to whom the manager has entrusted the quality of his station probably hasn't seen an issue in years.

As an example of the new sophistication of the listener, consider the recent increase of equalizers, dynamic range expanders, and noise reduction units. The marketplace, flooded with these relatively low priced devices, indicated a solid growth in the demand for realistic, quality audio. A live concert, offering a 100+ dB dynamic range, certainly cannot be offered on FM. The frequency response, while limited, and an acceptable dynamic range can and should be offered to the best of our engineering ability.

Prior to a discussion on corrective measures, we must exhibit the doom an AM mentality can wreak on an FM operation. It certainly helps to define the competition faced by an FM station. Only in morning drive can AM be considered FM competition. This results not from kitchen or car penetration, but rather the fact that even in the top 10 markets, AM still offers better informational services

Mr. Solinske is chief engineer of WEFM, Chicago.

needed at that time of day. When drive time is over, AM can be very difficult, if not impossible, to receive in an office building. We can also eliminate television as competition to FM. It is, after all, intentionally viewed for visual stimulation, requiring concentration and participation of several of the senses. When visual stimulation is required, music radio cannot compete. It is impossible, though, to view television in a busy office. Generally, television is not viewed when studying or at a party. AM fidelity on large speakers automatically demands a band change. This leaves only two mediums for FM to compete with on a home or office stereo. Tapes and records are the real threat to FM, offering full fidelity, dynamic range, low noise, and minor inconvenience.

Back up though — to a point in that last sentence. Dynamic range. Why should a radio station watch it? Why offer any? Well, a person studying or talking on the phone or at a party can neither talk nor think above the music. A wide or reasonable dynamic range permits "breathing" . . . thought and/or conversation around or between the lines of the music.

Call it the Social-Acoustical Phenomenon. Already widely accepted is the Psycho-Acoustical Phenomenon. This was well understood, if not simply defined, by Bob Orban years ago: constantly compressed, severely clipped, always loud music fatigues listeners quickly. His FM Optimod increased loudness without fatigue when it was used properly. The race then was misrepresented by some manufacturers to sell loudness to the now invading AM mentality, forgetting Orban's feelings on fatigue. Loudness wars started spreading through compression. Clipping followed. Now, density. If only Mozart and McCartney knew their music would not be dense enough for the human ear. Maybe there was no realization of the dense human mind evolving.

So, what about car radios and drive times? Assuming all other informational and programming services equal between bands, consider the fact that the average car driving into Chicago contains 1.2 persons (1.8 during transit strikes). There is not one AM generation auto radio listener who has not turned down the car radio to have a conversation. If in the 25–49 age group, chances are he turned to a softer station during an extended discussion to talk around the breathing of the music without eliminating his informational input. Always loud, obtrusive music is not conducive to either relaxing in traffic jams or conversations in autos. Back at the audio outlets, 50 W auto stereo systems are selling like hotcakes. Try compression with 50 watts and triaxial or biamplification speaker systems in a car. Then try to relax with the new trend recently noticed to "loud" beautiful music. Thank the lord for cassette players in cars . . . but there goes another part of your potential audience, and a habit that could have been.

The end result of the induced distortion is guaranteed to be higher rating cumes, with poor quarter-hour maintenance. To boil this down, many potentially loyal listeners tuned in. They either disliked the programming, or you fatigued them; gave them a headache, tired them out by hammering too hard. In short, they left you. They could have stayed. But they moved on, perhaps before they could have heard the hook in your format. High cumes, low quarter-hour.

The resolution: every station cannot sound the same. Subtle differences are often pronounced to an outsider. Autonomy by either programming or engineering is undesirable — cooperation is required with mutual understanding. Within determined limits, the programmer should be allowed a range of compression/clipping. Ascertain that your channel VU meters exhibit dynamic range. Keep an eye on your processed frequency response. Run a test record through your entire audio chain including active processing, and watch the results on your modulation monitor. You may find that some limiters prevent overshoot by rolling off 15 kHz by 3 dB to aid their electronic processes. A shelving equalizer could flatten you out again. A simpler but less desirable way could be to increase the load resistor on the phono preamp input for a slight shelf boost at the high end.

If your FM operation has music on cart, use high quality photo cartridges such as a V15-IV or an 881S for music transfer. Use high output tape on individually aligned carts for phase checking high frequency tone sweeps. Prevent pumping hiss by eliminating it. Music is the blood of your station. Invest in a dbx or Sanyo Super D noise reduction system for 30 dB better S/N ratios. Then consider one of the widely available cart matrixing systems to prevent further high frequency loss due to cart misalignment, or upgrade to a self-correcting azimuth system (now available from at least two manufacturers). All of these units can be arranged to be turned on and off by the secondary and tertiary cues so a complete rerecording of your cart library is not immediately required. Whatever you do, bring FM back. Give Major Armstrong a good night's sleep.

Most of all, remember that the listener you save through improved sound just might be mailed a diary. Many turned-off music enthusiasts of all orientations could put away their record and tape collections and listen to radio again. **BM/E**

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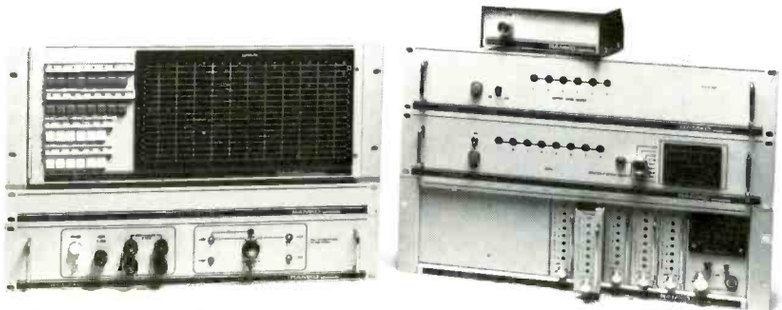

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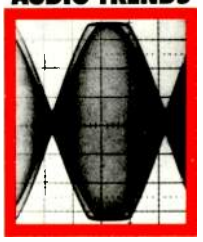


MULTISOUND TESTS WILL LAY BASIS FOR FUTURE OF TV AUDIO

In July the EIA's Subcommittee on Multichannel Sound initiated tests to evaluate three systems for putting multiple sound into television. A new TV receiver, free of audio faults of 30 years' standing, and a top-grade TV stereo system could be among the program's benefits.

LAST MONTH, at public television station WTTW in Chicago, the Subcommittee on Multichannel Sound of the EIA Television Facilities Committee began a long series of over-the-air tests of three systems for putting stereo sound into television. In addition to the over-the-air tests, the group will run lab tests with space and equipment lent by the Quasar Corp. in Chicago.

Committee chairman Tom Keller, formerly chief engineer of WGBH in Boston and now with the Public Broadcasting System in Washington, told *BM/E* the hope is to complete the whole study by the end of this year. The committee then will make a report to the EIA, and through them to the FCC.

In *BM/E's* October, 1979 article, "Good Sound Is Nearly Here For Television," the committee tests were identified as part of the final movement to get stereo sound to the TV viewer on a regular basis. We noted there that high-grade stereo sound is now reaching the local television station via satellite feeds or via AT&T's new diplex system that puts sound on a subcarrier on the video feed.

But the stereo can get no further on the way to the viewer until the FCC and the industry agree on a system for putting stereo through the TV transmitter and home receiver.

The tests are now the focus of action to remove those final barriers. It is vital to remember that the committee findings are advisory only. Action will come from the FCC, in consultation with the industry. However, the findings will certainly be tremendously influential, and will furnish the primary material for discussion of the question by the FCC and the industry.

A one-time chance

Moreover, it has become evident that much more is at stake than simply choosing a stereo system. A changeover to a new audio system brings a probably never-to-be-repeated chance to upgrade audio performance in general, both at the transmitter and at the receiver. If this opportunity is compromised receiver design, in particular, may be irretrievably frozen at a lower level than the best. At the transmitter end the upgrading, in large part, will consist of a sharp tightening of operating techniques and practices (of which more below). But the receiver has inherent faults, particularly in the control of noise, that demand a substantial redesign to get us to really top-grade TV sound.

The hopes for receiver redesign are much higher now than at any earlier time in TV history. For a long time it was accepted that the intensely competitive receiver industry would find it economically impossible to upgrade receiver design substantially, if this involved noticeable increases in cost. But the stage is now set for a dramatic new start.

Any stereo system chosen will obviously be compatible with the present mono system, in the sense that the owners of mono receivers (for a long time, nearly everybody) will be able to see stereo programs on their sets without any degradation of performance, compared with present service. So an entirely new kind of receiver can come in gradually as the public switches to stereo without obsoleting present equipment, except that the new receivers will have immensely better sound.

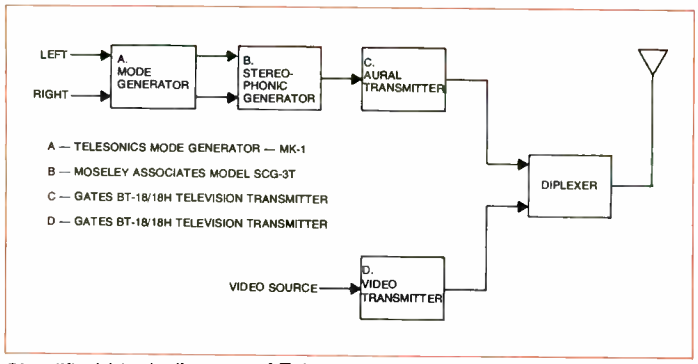
And this fact is the key to a new mood on the subject in the industry. Improvements in picture performance that can be made within the technical system and within the cost imperatives of the industry are now apparently no longer available. Thus stereo sound is looked to as the new "feature" that will vitalize the market.

Needed: fidelity *plus* stereo

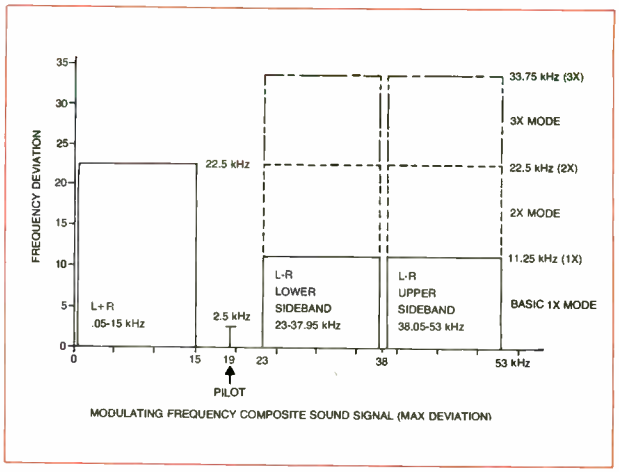
But everyone will recognize that this attitude does not automatically guarantee industry devotion to the top-most grade of sound fidelity. Stereo and fidelity are separable (as AM stereo may unfortunately demonstrate). It is in this situation that the committee can perform a crucially important function. By specifying the characteristics that the receiver must have (and by persuading the FCC to go along with that) the committee could lift the whole level of TV audio considerably closer to the best grade of home hi-fi sound and best FM sound — in short, to the sound quality that vast sectors of the public will expect in the 80s. If the committee does *not* succeed in this the TV receiver could again be frozen at a less-than-the-best level, with little hope of change in the future.

If TV sound could join the club the gains to the public, to the manufacturing industry, and to the broadcast industry will be tremendous.

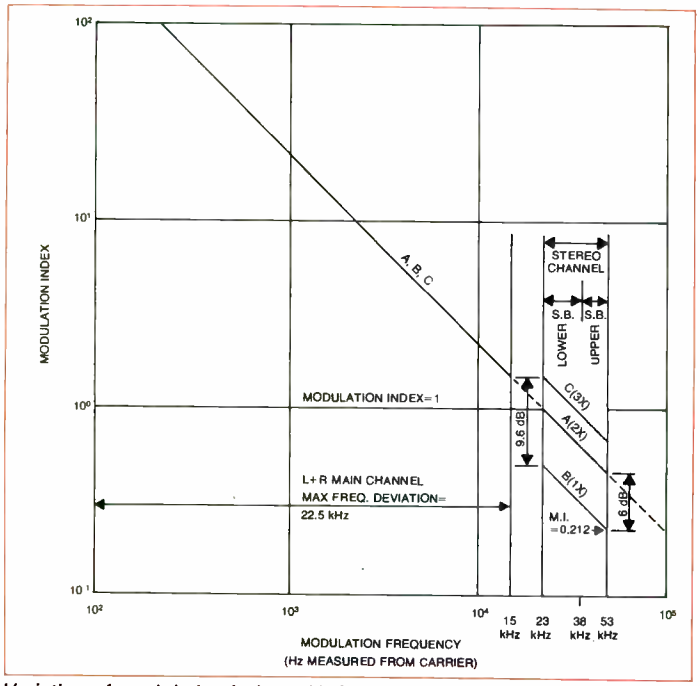
Of course, every part of the system through transmitter and receiver must be set up for high-grade sound. But as already noted, it seems that not much basic redesign will



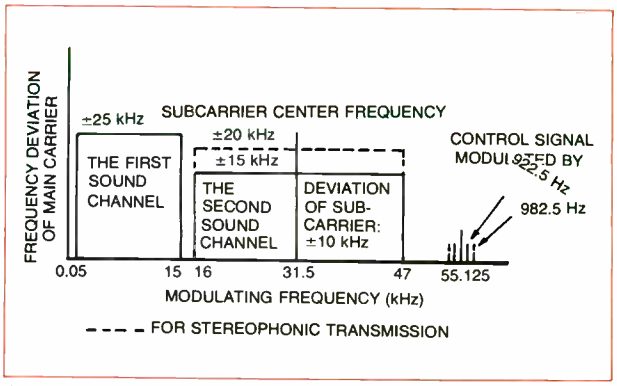
Simplified block diagram of Telesonics test, WTTW



Baseband spectrum of Telesonics stereo system



Variation of modulation index with frequency, Telesonics



Baseband spectrum, NHK (Japanese) stereo system

be required at the transmitter end: the receiver is the main focus for large changes. The committee's action gives us a rare chance to break out of the cost bind that has always restricted large upgrading of receiver quality.

The members of the committee are listed in the box accompanying this article. The three developers of stereo systems submitted for test are: NHK, the Japanese government broadcasting system, which has been working on stereo for TV for a number of years and has developed a system now in use by about half the broadcasters in Japan, both government and commercial; the Telesonics Corp. of Glen Ellyn, Ill.; and the Zenith Radio Corp. The NHK system and the Telesonics system were described briefly in the October, 1979 article. Brief summaries follow, along with a description of the Zenith system.

The Japanese system

The Japanese system adds a subcarrier in the TV aural baseband centered at 31.5 kHz to carry the L−R signal; L+R goes on the main channel. The subcarrier center is at twice the horizontal scan frequency — disposition of the subcarriers with respect to the harmonics of the scan frequency is one of the most important factors in control of noise. The Japanese subcarrier is FM modulated, with a maximum deviation of ±10 kHz. The developers claim frequency response of the L−R signal up to 12 to 14 kHz and S/N ratio around 51 dB.

Both American systems use L−R subcarriers that are AM modulated, double-sideband, with suppressed carrier. The American developers claim this allows a wider-band, higher-fidelity characteristic. Their reasoning is that FM modulation on a subcarrier in the aural baseband must have a signal that is bandwidth-limited to reduce FM sidebands that spill over and cause interference in the main channel and even to adjacent TV channels. This may be an interesting case in which AM modulation allows higher quality than FM modulation. Both American systems claim L−R frequency response to 15 kHz, for a really high-grade stereo service.

The Telesonics subcarrier is centered at 38 kHz, with lower sidebands extending to 23 kHz and upper to 53 kHz. There is a pilot at 19 kHz. The L+R, as in all the systems,

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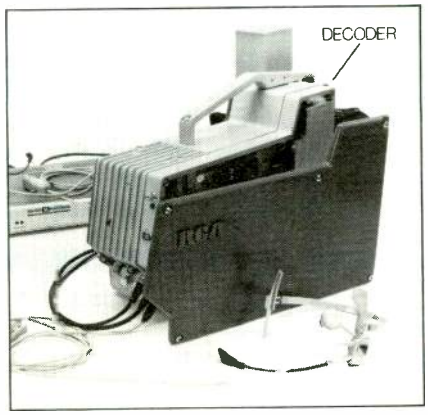
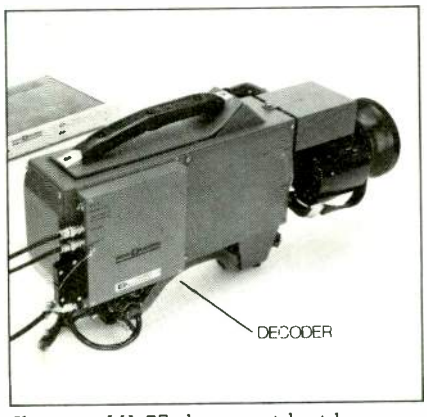
- ☐ System is ideal for all extended shooting situations such as sports events, live concerts, political rallies, etc.



RCA TK-76B shown with decoder nearly "sandwiched" between camera body and door.



Ikegami HL-77 shown with side-mounted decoder.

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is on the main channel, 0.05 to 15 kHz in the aural baseband. The system got a year-long test at WTTW in 1978–79, and the engineering staff of WTTW noted very satisfactory performance in its report to the FCC. Presumably the committee tests will be more comprehensive, and in any case the three systems must each get exactly the same tests so that valid comparisons can be made.

Last year's WTTW tests do tell us an important fact: that stereo in TV of excellent quality is possible with comparatively simple and inexpensive additions to and changes in the present TV plant.

The Telesonics system includes circuitry to "enhance" the L−R signal by increasing the level fed to the subcarrier. James Simanton of Telesonics says this is desirable to increase the signal-to-noise ratio, since the division of the power into the two sidebands reduces the noise margin. His system allows for two enhancement modes, increasing the L−R level by 6 dB and 9.5 dB, respectively.

Zenith: four subcarriers

The Zenith system is the most elaborate of the three, and reflects the sentiment in the industry for using parts of the aural baseband for other services in addition to stereo sound. The complete baseband spectrum has the main carrier and four separate subcarriers. The first subcarrier, for the L−R stereo signal, is centered at 31.468 kHz (twice the horizontal scan frequency); as already noted, it is AM modulated, double sideband, suppressed carrier. There is the necessary pilot at 15.734 kHz (the scan frequency).

The second subcarrier, second-language and other information services, is centered at 62.936 kHz (four times the scan frequency). It is FM modulated with signal bandwidth limited to 8 kHz and maximum deviation of 8 kHz. The third subcarrier is centered at 86.5 kHz (5½ times the horizontal scan frequency); this one is FM modulated, with signal bandwidth restricted to 3.5 kHz and maximum deviation 3.5 kHz, and is used for cuing, order, etc. in ENG — or voice channels if the bandwidth is adequate for the assignment.

The fourth and last subcarrier is centered at 102 kHz, FM modulated, signal restricted to 2 kHz bandwidth, and is intended for telemetry. Maximum deviation is 3 kHz, so the whole array takes up the aural baseband to 105 kHz.

The Zenith system, in other words, promises to supply a lot for the money. Everyone will recognize that the design of such a system involves extremely complex tradeoffs among considerations of noise, distortion, interference, and the like. The problem is far from solved by putting as many eggs in the basket as possible. If a lot of service can be supplied with top-grade performance, that is the answer we need.

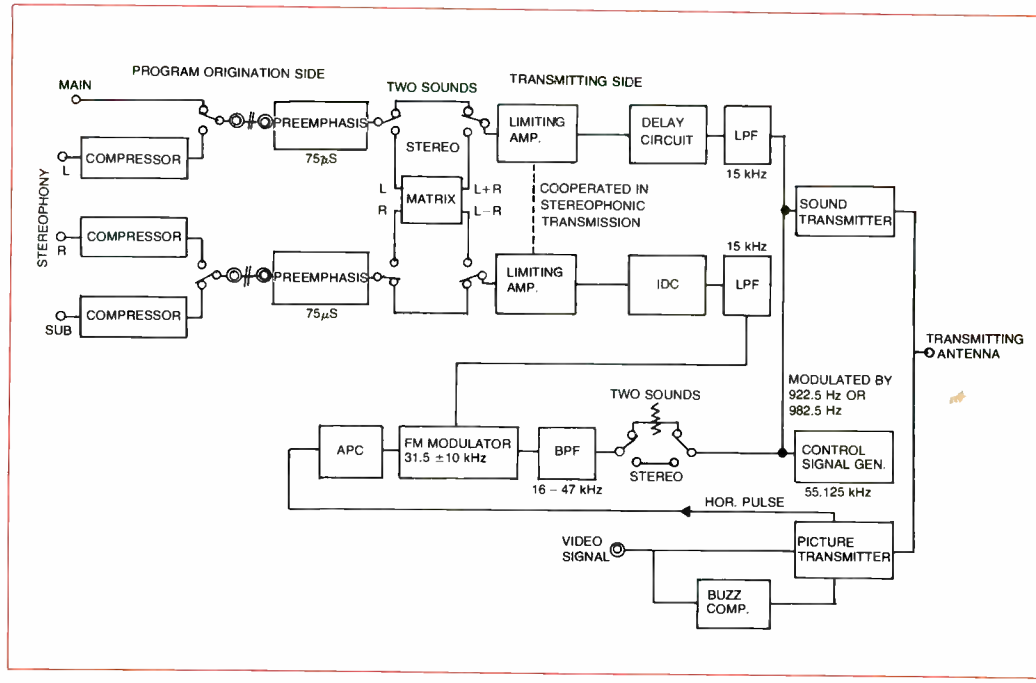
One major problem that all the developers face is disposing the subcarriers with respect to the harmonics of the scan frequency, since these harmonics are a major source of noise. Zenith attacks this problem by centering the subcarriers on the scan harmonic frequencies; Telesonics has put the subcarrier *between* two of the harmonics. The superiority of choice will not be known until the Chicago tests supply some actual-use evaluations.

Greatly improved control of noise, in fact, emerges as a central requirement for getting top-grade sound in the new system. Stereo's higher vulnerability to noise, as compared with mono, is a fact that all the systems have to deal with.

Toward a new receiver

This turns attention to the receiver design in a basic way. The extremely high noise level of today's television audio transmission comes, in large part, from the use of intercarrier sound, a staple of receiver design for many years: a number of industry spokesmen interviewed by *BM/E* agreed with this, including personnel at some large receiver manufacturers. The high noise level in present-day television, among other bad results, forces the use of very heavy compression on the audio channel in TV broadcasts, with all the degradation of audio quality that

Experimental stereo transmitter, NHK development tests



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this brings.

So a basic part of the solution for the noise problem, as nearly everyone interviewed by *BM/E* agreed, is a shift to the use of split sound in the receiver. The intercarrier system, sending both audio and video through the same IF circuits, enmeshes the audio hopelessly in a variety of noise signals. With a separate audio IF and demodulator track, the situation is immediately greatly improved — if the audio signal is filtered out right behind the tuner, it avoids most of the noise.

Split sound could have another great advantage, Jim Simanton points out. Double conversion would lead to an audio IF of 10.2 MHz, standard in today's high-grade FM tuners. The TV audio chain could then make use of the top-grade, low-cost IF and demodulating components developed in recent years for the best FM tuners. The gains would be in both quality and economy, a fine combination.

Another highly desirable change in receiver design (noted by Daniel Talbor in a recent AES paper) would be synchronous detection (already used in a few receivers). This would aid in keeping harmonic distortion low. Talbot also asks for better control of AM-to-PM conversion in the receiver, by reducing amplitude or by improving slew-rate symmetry.

The receiver changes noted here are certainly just a sampling of those that need to be made. Split sound seems to be basic; beyond that there will be many subtleties of design that must be attended to. Noise sources at the transmitter are also subtle and fairly numerous, but apparently many of them are correctable by careful adjustment and operating practice.

The Subcommittee On Multichannel Sound In TV: List Of Members

Here are the members of the committee directing the tests of the three systems for incorporating multichannel sound into television broadcasting, whose recommendations could bring a great enhancement of TV sound quality as detailed in the accompanying article.

Chairman is Thomas Keller, director of engineering development, PBS. The other members are: Carl Eilers, Zenith Radio Corporation; Larry Ocker, director of engineering, station WTTW, Chicago; Saburo Oniki, Sony Corporation; James Simanton, Telesonics Corporation; Michael Paladino, General Electric Co.

One source of noise at the transmitter end, perhaps not recognized by some broadcasters, is the character generator with extremely fast rise times for sharp edges on the images. The sharp leading edges produce pulses that come through the audio chain as troublesome noise. Extremely bright images on the character generator screen also introduced noise components. Both sources of noise have reportedly been reduced in some of the latest crop of character generators.

We can see from the foregoing that our chances of getting great sound in television depend on a number of interlocking developments, each with its difficulties and inevitable inertia against progress. We might well have a negative view of our chances. But the pressures for a positive outcome are now very strong, too, so we are entitled to a considerable measure of hope. **BM/E**

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Circle 145 on Reader Service Card

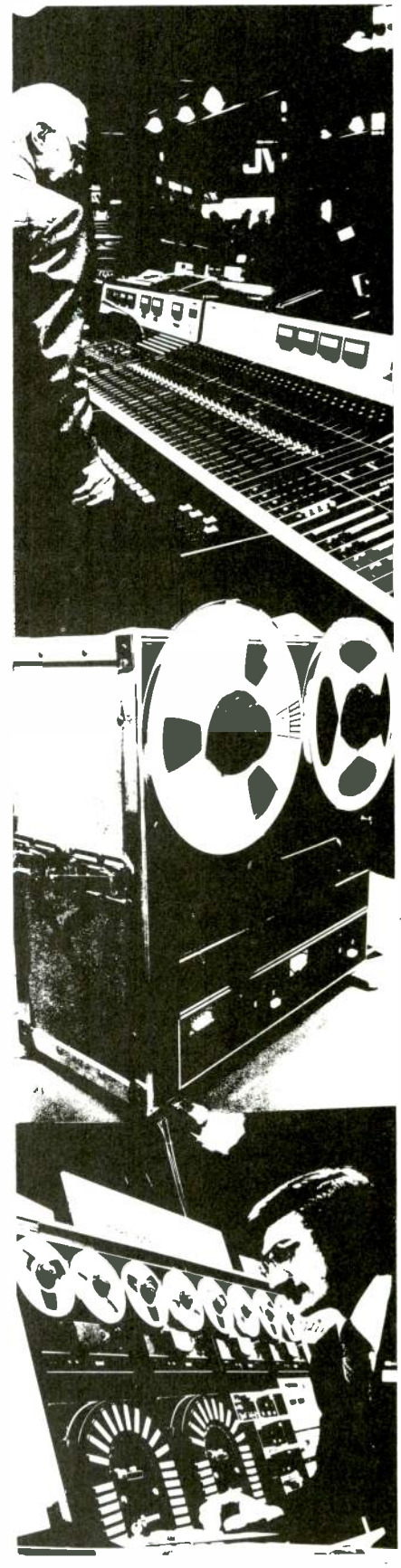
BM/E NEWS FEATURE

NRBA Getting Ready For L.A.

"OUR BIG GOAL is involvement and participation," says Lisa Friede, organizer of the upcoming Fall Convention of the National Radio Broadcasters Association. The conference is being held at the Bonaventure Hotel, October 5–8. "We're going to have debates, specialized sessions with panels of consultants from various fields of the radio broadcasting industry, and presentations on life-style trends, coop sales, and syndicators."

While a definite schedule has not been set as this goes to press, tentative highlights include a debate on radio versus records, the presentation of the Delphi Study (new radio technology for the future), engineering sessions involving discussion on questions submitted to panelists in advance, three to five specialized sessions for each category of the broadcasting industry (station management, production, sales promotion, news, music, programming, and others), and format rooms including those directed at large and small markets, fine tuning for book ratings, networks, and syndicators.

While registration is slated for Sunday, no formal sessions are being held. Format rooms will be open Sunday night following a gala reception. The first General Session is scheduled for Monday morning, followed by workshops on finances, sales, engineering, small market promotion, and fine-tuning for ARBs. NRBA awards will be presented at a noon luncheon. Monday afternoon is reserved for special events at the Exhibition Hall, and Monday night, Paul Simon will be giving a concert. Workshop sessions are being held through Tuesday, including sales, syndication, management, engineering, coop sales, and large market promotion. An FCC panel will conduct a question-and-answer session. The Exhibit Hall closes on Tuesday night. On Wednesday morning a special presentation will be made on the Delphi Study and the future of radio technology. So far, about 70 exhibitors have confirmed attendance and more are expected. Preregister by Sept. 25. **BM/E**



NRBA Exhibitors 1980

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Andrew Corp.
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Auditronics
Belar
Bonneville Broadcast Consultants
Bonneville Data Systems
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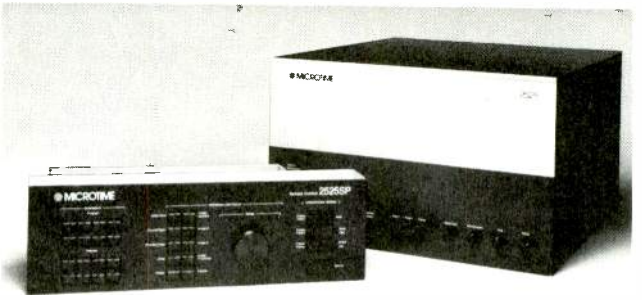

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INTERPRETING THE FCC RULES & REGULATIONS

Clear Channel Ruling Paves Way For 125 New AMs

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

IN A RECENT DECISION of major significance, the Federal Communications Commission has resolved the long-standing issue of clear channel AM stations. Essentially, the FCC forged a compromise in its June decision[1] in order to balance the various competing interests and policies: the clear channel broadcasters, daytime-only operators, the demand for more spectrum from potential new broadcasters, and the like. The 25 Class I-A clear channel stations have enjoyed exclusive or near-exclusive use of their respective frequencies at night. The peculiar characteristics of AM signal propagation have made them familiar to, among others, nighttime travelers driving hundreds of miles from home. This article will briefly review this long proceeding and its outcome, which has resulted in the reduction of nighttime protection for the Class I-A clear channels and the addition of up to 125 new stations to the AM Table of Assignments.

Background of clear channel proceeding

The dominant clear channels had their start in the early days of radio, when large parts of the nation were without primary radio service. At high levels of power, the AM signal could be received, with varying degrees of clarity, within a radius of hundreds, and sometimes even over a thousand, miles from the transmitter site. In large measure, this extent of service results from the nature of the AM signal. The signal has both a groundwave and skywave character. At night, the skywave reflects off the ionosphere and returns to earth hundreds of miles from its origin. In the early days of radio regulation, these clear channel broadcasters were afforded exclusive use of their respective frequencies at night to maximize the dispersion of radio news and information.

The first inquiry into the continued status of the dominant clear channel stations began in 1945. In the intervening years since that first inquiry, the number of communication outlets has increased to nearly 9000 AM and FM stations, while those people without primary service have declined drastically in number. Consequently, much of the rationale for continued protection of the Class I-A stations has disappeared. Through the use of complex arrays of directionalized antennas, the 33 Class I-B clears have long shared the spectrum with other full-time stations of lesser power.

In 1961, in a controversial decision,[2] the Commission ordered that 11 (later 12) of the 25 Class I-As share frequencies with a second, unlimited time station. The FCC also deferred action on previously filed requests for increases in power (some for increases to 500 kW, or an increase of 10 times over the present ceiling of 50 kW). Finally, the Commission deferred consideration of the possible assignment of more stations. More than 35 years

[1] *Report and Order*, Docket No. 20642, In the Matter of Clear Channel Broadcasting in the AM Band, ___ FCC 2d ___, FCC 80-317.

[2] *Report and Order*, Docket No. 6741, 31 FCC 565, (1961); *Recons. Den.*, 45 FCC 400 (1961); *aff'd Sub. nom. Goodwill Stations, Inc. v. FCC*, 325 F.2d 637 (1963).

after the inauguration of a formal inquiry, the Commission has finally decided the matter and terminated the proceeding.

The decision: a balance

Class I-A clear channels will continue to enjoy protection of their signals at night to a radius of 750 miles from their transmitters. However, nighttime exclusivity will end for those clear channels that have retained it up to now. Some 100 new full-time stations can now be authorized on the same frequencies as the clear channel stations, as well as an additional 25 new stations on adjacent channels, which have been restricted since a previous clear channel action.

The Commission rejected outright proposals to eliminate the clear channels altogether, as well as variations which would have grouped the clears on a reduced number of channels. The FCC also refused to sanction the increases in power requested over 20 years ago by most of the Class I-A operators.

Finally, the Commission indicated it would give preference to four kinds of applicants for the new stations: (1) applicants with more than 50 percent minority ownership; (2) applicants who proposed a first or second local, nighttime service; (3) a first noncommercial service; and/or (4) a first nighttime primary service.

Rationale for Commission's action

In deciding to preserve Class I-A protection to a radius of 750 miles, the Commission determined that there were continued benefits to such distant service, including particular programming provided by some broadcasters[3] and the special service of news and information for travelers. However, the Commission determined that benefits from the Class I-A stations were marginal, at best, beyond a 750-mile radius, since the signals deteriorate with distance. As evidence, the FCC noted that the vast majority of listeners of clear channel broadcasts fall within the 750-mile area. In any event, whatever benefits could be derived from continued protection *or* increased power did not outweigh the utility of furthering other FCC policies, including diversification of control of media outlets; provision of local broadcast service to as many communities as possible; more outlets for noncommercial broadcasting; and increased minority ownership. In the Commission's mind, clear channel "use of spectrum space [has] hindered the ability to provide outlets for self-expression to as many communities as possible."[4]

Immediate beneficiaries of the decision could be some of the more than 2000 stations essentially limited to daytime operations under the old rules. In addition to daytime-only stations, some limited-time stations are allowed at present to operate during some evening hours, when it is still daytime at the Class I-A clear whose channel they share. (For example, WHLO in Ohio can conceivably broadcast until sunset in Los Angeles, city of license of clear channel station KFI). The Commission encouraged the small number of such limited-time stations that are sufficiently distant from the co-channel Class I-A stations

[3]Specifically, the Commission noted the enormous amount of mail from listeners of WSM, Nashville. WSM has broadcast the famous country music revue *Grand Ole Opry* for many years.
[4] 1980 *Report and Order, supra,* at ¶9.

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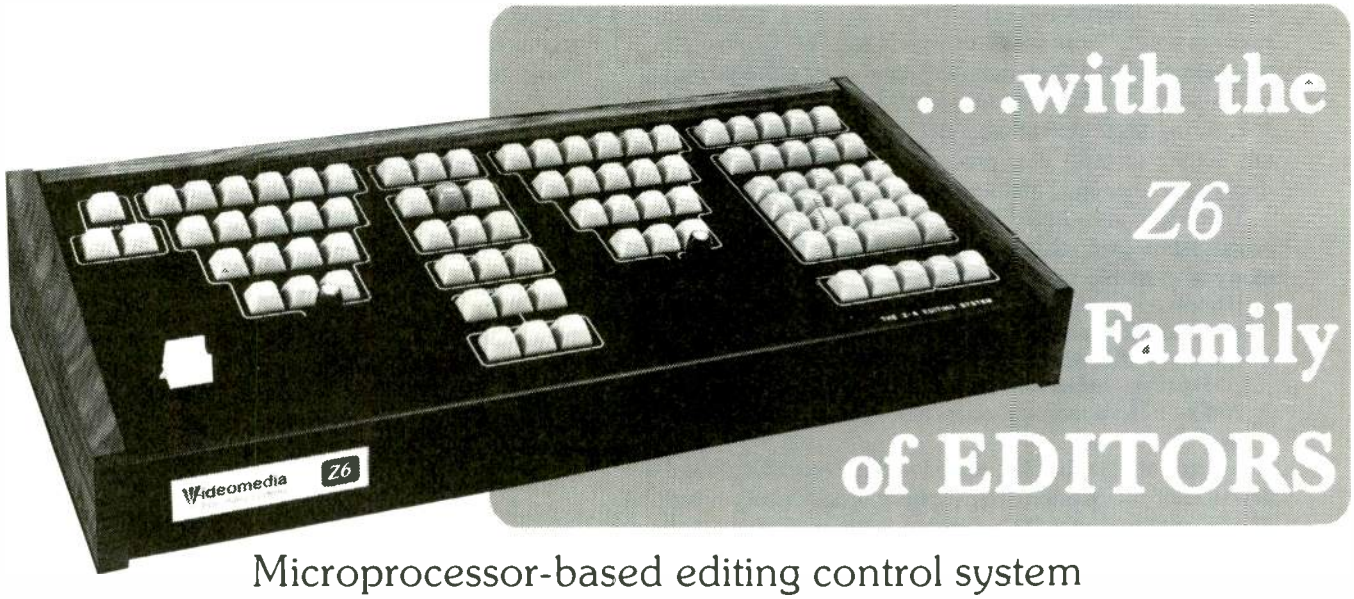

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to apply for interim authority to operate during additional evening hours "with facilities which will duly protect the co-channel Class I-A stations and meet other prerequisites of the rules."[5] These stations would still be limited to 1 kW during night operations, and must request waiver of any failure to meet new preconditions for first service, minority ownership, and noncommercial service.[6]

The FCC also noted the position of daytime-only broadcasters and indicated it would seek to release as many as possible from these limitations.

> [However] in providing for use of the limited amount of clear channel spectrum space . . . we must focus on those in communities which are served locally only by daytime AM stations, and have no locally assigned unlimited-time AM or FM stations and no locally assigned FM channel."[7]

A final catalyst for FCC action in this proceeding was a decision of the Western Hemisphere broadcasting board of the International Telecommunications Union. The March session required member countries, including the U.S., to provide an inventory of AM stations either now in operation or to be authorized or operating by the end of 1982 for which they want protection. The United States has priority use of its 25 clear channels under present international agreements.

[5] *Id.*, at ¶83.
[6] See 47 CRF §73.37(e) (2).
[7] 1980 *Report and Order, supra*, at ¶81.

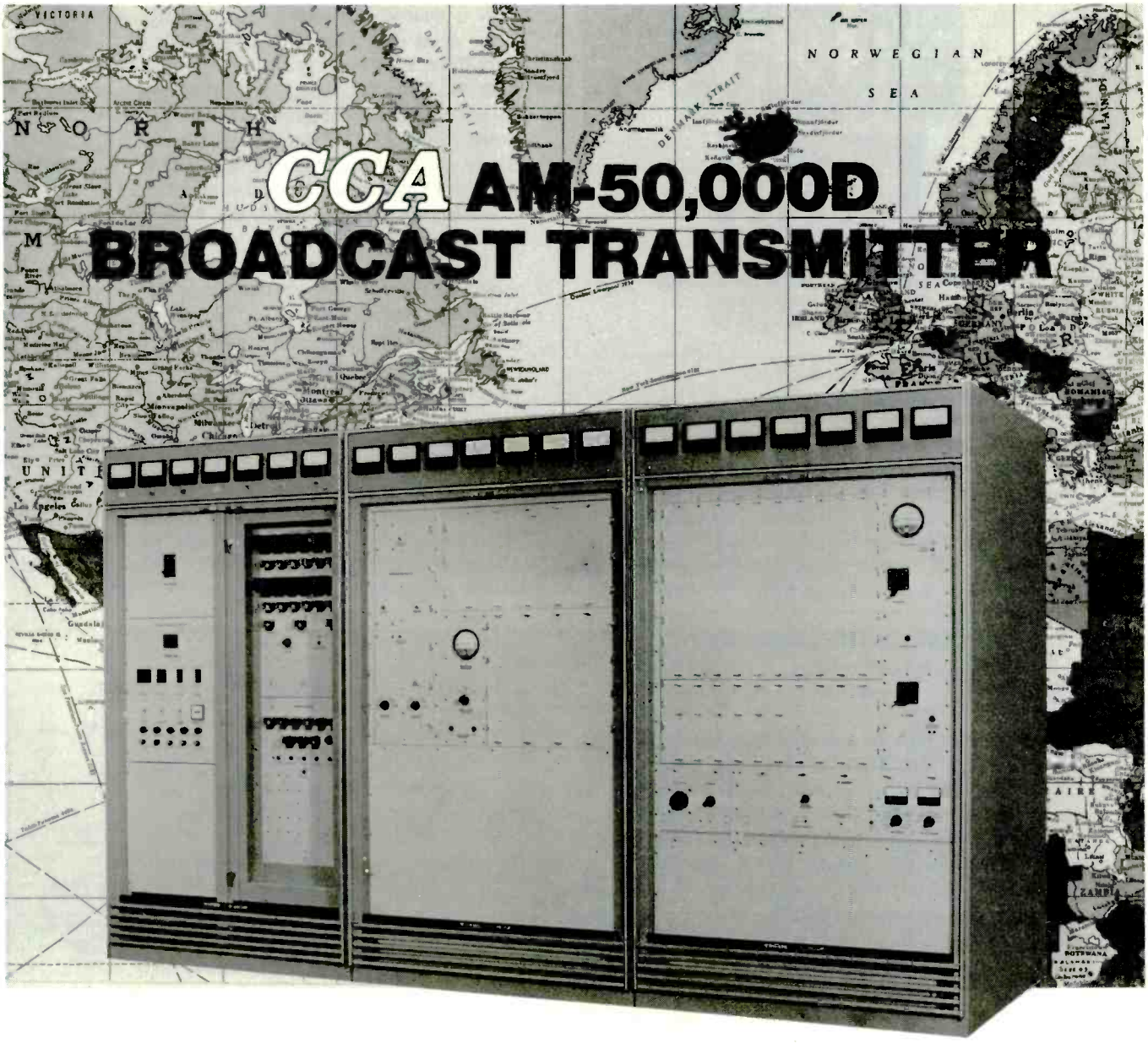
The conference action, in effect, also established an obligation to have the new stations that will broadcast on the clear channels at least authorized, if not operating, by December 31, 1982. Otherwise protection rights against interference from foreign stations might be lost.

Finally, this conference had adopted a plan for use of the A spectrum by Western Hemisphere nations with a limitation of the nighttime power of AM stations to a maximum power of 50 kW. So, limitation of the Class I-A stations by the FCC to maximum power of 50 kW was consistent with international accords, as well as effective use of the spectrum.

Conclusions

The Commission's recent decision on clear channels has left many unanswered questions with regard to future operations of existing and prospective broadcasters. For example, what about interference caused by the new, unlimited Class II-B stations on existing Class II-B Operators, as well as the dominant clear channel stations? The Commission said it would examine these questions during the review of applications for new stations. In addition, the FCC decision suggested such questions as pre-sunrise authority for daytime-only stations with co-channel Class I-A stations would be dealt with in a future rulemaking.

In the meantime, this clear channel decision took effect August 1, 1980. AM broadcasters who share frequencies with Class I-A clear channel stations should carefully examine any conditions on their licenses. Together with counsel, they should review how this decision will affect present and future operations, as well as available courses of action for increased service. **BM/E**



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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.

17. VTR Status-Start Indicator

N. Kevin Burris, News Engineer
WBRZ-TV, Baton Rouge, La.

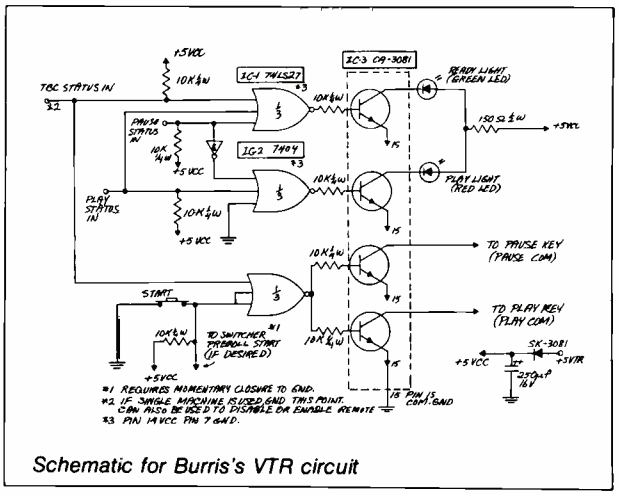
Problem: To provide a remote start and status indication for Sony BVU-200A VTRs.

Solution: The circuit shown provides for a play and ready indication and a START button. Logic lows are required for the play and pause status inputs from the VTR and should be available at the VTR's remote plug. The TBC status input provides for using two VTRs through a changeover into a common TBC. A low or ground from the changeover is required to tell the circuit the VTR is routed to the TBC. If this is not desired, simply ground the point.

When the VTR is in PLAY or RECORD mode, the play status input is low and the pause status input is high. The PLAY light will light regardless of TBC routing. When the VTR is paused and routed into the TBC, the play and pause status inputs are low, causing the READY light to light. If the VTR is not routed to the TBC, the TBC status input will be high, causing the READY light to go out. The interesting point about this circuit is that if the VTR is not routed to the TBC, it cannot be rolled with the START button, therefore eliminating the possibility of rolling the wrong VTR when two are used with a common TBC. The START button will also pause the VTR when depressed while it is in PLAY mode.

The pause key output (pause command) can be connected to the high side of the pause key if you use a BVE-510A search control, as we do, or to the pause command on the VTR remote plug. The play key (command) output is connected in a similar manner. The play command out is not necessary unless the BVE-510A remote is used since SEARCH mode is released by depressing the PLAY button. It also allows the VTR to be placed in PLAY mode from stop with the START button. Power for the circuit is obtained from the VTR (5 V).

We have been using this circuit for about six months with very satisfying results. It works well with BVU-200As, BVE-510As, and Sony VO-2800s, and should also be adaptable to VO-2850s and VO-2860s.



Schematic for Burris's VTR circuit

18. Cart Machine Timer Interface

Morgan Evans, Announcer
K104 Radio, Lebanon, Oreg.

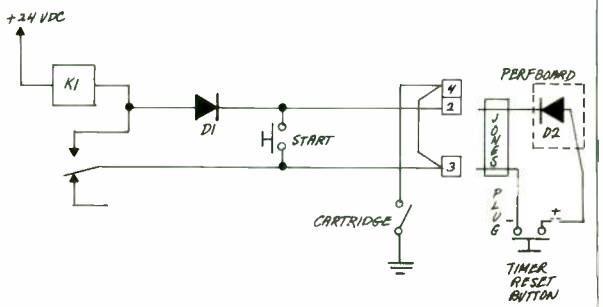
Problem: To design a circuit to reset an ESE 510 timer when any of the START buttons were pushed on our ITC triple deck cart machine (for use as an E/T), using minimum parts and requiring minimum funds.

Solution: I added two diodes to each of the deck's three start circuits, one internally and one externally, using the following procedure. Via the access door on the front of the deck, I installed a small-signal diode between the positive terminal of the START button and attached the wire to it. As the schematic shows, one side of the START button is grounded when there is a cartridge in the deck. The diode was installed on the opposite side (the polarity is *not* the same on each deck). The cathode of D1 was connected to the terminal on the button and the anode was soldered to the wire and insulated with spaghetti. The front panel was then screwed back on.

I then unscrewed the back panel and cut the wire going to terminal 2 of the remote socket. I installed a wire between pin 2 and the cathode of D1 on the front panel and soldered it directly to the terminal on the respective START button.

After I modified each deck, I put the machine back together and designed this external interface. A wire of desired length was connected between pin 2 of each remote control plug and the cathode of another small-signal diode (D2), one for each deck, mounted on a small piece of perfboard. The anodes of these three diodes were then tied together, and connected to the positive side of the timer's reset pushbutton. A wire connected to pin 3 of one of the Jones plugs provided a ground to the negative side of the timer pushbutton.

The circuit operates on some very basic electrical principles. When the START button is pushed, a ground is provided for control relay (K1), which locks itself on through its own contacts as shown on the schematic. The purpose of D1 is to isolate pins 2 and 3 of the remote socket from these relay contacts so that when the START button is released pin 2 will float back away from ground, allowing only a momentary signal to reach the timer but



Evans's timer interface for cart machines

still allowing the ground signal to flow through D1 initially, permitting normal machine operation. D2 simply acts as an isolation device so that each deck will start independently.

This project costs less than 10 cents and should be adaptable to most other cart machines.

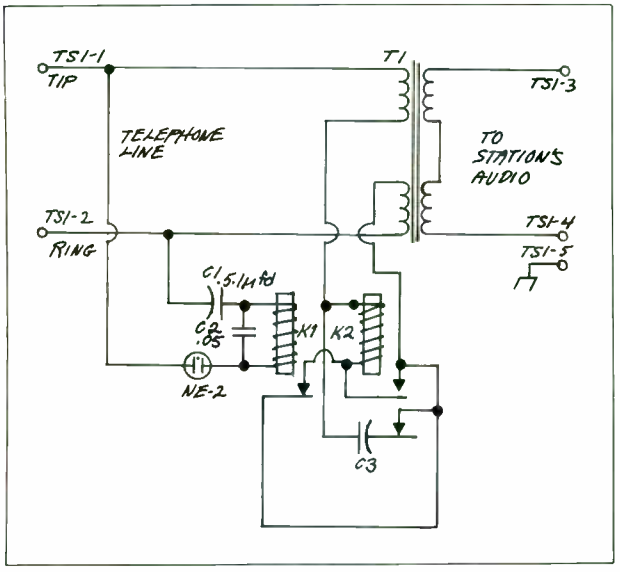
19. Transmitter Ring Repair

D.M. Haworth, Engineering Dept.
KHAS-TV, Hastings, Nebr.

Problem: Harris BT-18 transmitter down due to arc-over in dielectric of screen bypass capacitor, aural PA (tube type 8807).

Solution: Since we had no new ring in stock, repair of the original was necessary. We used the following procedure: disassemble the tube socket, separating the two rings that form the plates of the capacitor. Remove the Teflon dielectric and clean it using a suitable solvent, such as freon-TF. Remove any burned spots by carefully scraping them with a razor blade. Then tape over the damaged area using Teflon pipe thread tape, overlapping the damaged area by approximately one-half inch or the width of the tape. Finally, reassemble the tube socket.

This repair is, of course, temporary in lieu of a new ring. It could make the difference between many hours of downtime or getting back on the air, however. It should also work on other socket/tube assemblies.



In the May issue, the drawing for Ken Anderson's auto phone feeder for program audio (Great Idea 13) contained several errors. The corrected drawing appears above

BROADCAST EQUIPMENT

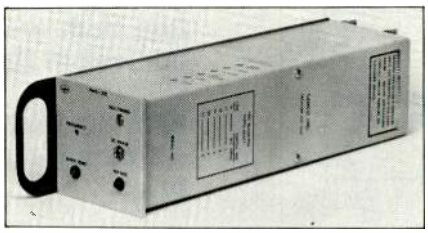
Portable Audio Console 250

Sport III is a portable dial-up audio console that allows a sportscaster to plug into any telephone jack and dial the station directly. An electronic rotary dial uses a 12-button touchpad to create dial pulses for standard telephone sys-

tems, and a hybrid output stage gives the unit full talkback capability. Other features include built-in 2600 Hz filter to avoid accidental disconnects, line drop indicator to advise the user when the connection is lost, built-in ac supply, five-hour battery supply, and three headphone outputs. Also available without plug-in dial option. $569 with dial option. MICRO-TRAK.

Master Sync Generator 251

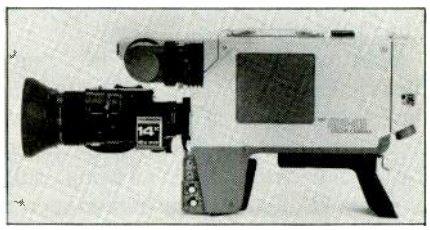
The PMG-312 master sync generator exceeds current broadcast and teleproduction specifications, according to the maker. Chrominance subcarrier is extremely stable, with an accuracy of 3.5 Hz drift over a 10-year period. An ovenized crystal oscillator provides the master frequency from which all



pulses, including subcarrier, are derived. Meeting RS-170A specs, the unit features strict SCH phase, maintained to within one percent. All pulse widths except vertical drive are adjustable, as are all pulse amplitudes. The unit provides two composite reference signals for system timing. Vertical blanking width is selectable from line 16 through line 21 via a five-position DIP switch, allowing accurate adjustment without a waveform monitor. A strap option on the output filter board provides a black burst-type composite signal to appear at the burst flag output jack if burst flag is not required. LENCO, INC.

ENG/EFP Camera

The compact, lightweight MNC-81A ENG/EFP color video camera weighs less than 11 pounds with 1.5-inch viewfinder and without lens, and measures approximately 10¼ by four by 13½ inches. The camera uses ⅔-inch Saticons or Plumbicons (or diode gun Plumbicons) and features S/N of 54 (±2) dB, high-transmission prism optics, four-position gain control with noise reducer, ABO control for handling highlights, state-of-the-art preamp design, built-in mic and intercom amps, built-in genlock or optical remote external genlock, and built-in test pulse setup system. White balance,



black balance, iris, beam, and optional centering control are all automatic. Power consumption is 24 W. Options include 12 V snap-on battery or battery belt operation, a small remote control panel for operating from a distance of 150 feet, a teleproduction CCU, a coax remote control unit, and a fiber optics module and cable adapter. $35,000. CINEMA PRODUCTS CORP., 2037 Granville Ave., Los Angeles, Calif. 90025.

AM Modulation Monitor 253

AM-90 is the first AM modulation monitor to eliminate the moving coil meter as a display device, according to the manufacturer. Instead, it incorporates a highly accurate neon bar graph display. The operator has a choice of multiple display ballistics, including FCC-specified or peak reading. An additional display ballistic gives an RMS value of the absolute value of modulation. The optional remote display panel

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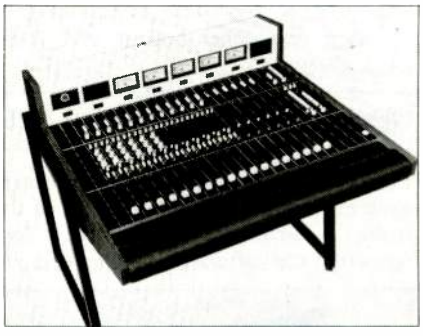
duplicates most functions for measurements at distant locations. The solid state, self-contained, rack-mounted unit consists of a compact mainframe and two printed circuit cards. All controls are front-panel mounted. Other features are an internal AGC, digitally programmable selectable peak flasher, and built-in carrier and modulation alarm units. HARRIS CORP.

Mixing Console 262

Model 110B is a stereo on-the-air mixing console also suitable for production use. Available with up to 18 input positions, its modular design has a motherboard into which a wide variety of standard input, signal processing, and output modules may be installed. Mono and stereo modules may be intermixed to provide for AM or TV stereo and the board arrangement may be customized to suit individual requirements. Available input modules include mono without EQ, mono with three-knob equalization to ±12 dB at any switch-selected frequency, and stereo line level input. All inputs are preceded by the maker's patented A series fader, which offers 85 dB attenuation at the end stop for muting without switching. Standard features include control room monitor, headphone con-



trol, seven mono line output amps, three stereo bridging line amps, and five VU meters. Although intended mainly for fixed-base operation, the unit is small and rugged enough to be used in mobile vans or in the field. AUDITRONICS, INC.

Compressor/Limiter/Expander 254

The FM Stereo Express Limiter is a compact compressor/limiter/expander designed to provide high-quality, high level/density FM signals. Function mode is controlled via digital logic momentary switches, with no audio path contact to wear out. A memory system retains last use settings when switched off (or during power outages) with a series of LEDs to show status of functions. The unit features stereo I/O attenuators, variable attack and release

Broadcast Equipment

times, and an auto release network. Ratios include 1.5:1, 2:1, 5:1, and limit (20:1), turning into a limit slope after 10 dB of compression to insure smooth overload protection. The 1:2 expander function has range factory preset on the PC board (10 dB); there is a choice of three threshold settings. Frequency response is +0 −0.5 dB, 20 Hz to 25 kHz at threshold; noise is rated as better than −82 dB, ref to +12 dBm (maximum limit level). AUDIO & DESIGN RECORDING, INC.

Digital Delay Line 255

The JJ193 digital audio delay line produces signal doubling, echo, preecho delay, and other effects and features RAMs and an all-CMOS logic system. It has four outputs and one input and is available in 510 ms, 1.022 second, and 2.046 second versions. A tamper-proof option is available. Specifications include distortion less than 0.2 percent at 1 kHz with 0 dB input (reference level), dynamic range greater than 90 dB from clipping to noise floor, and frequency response 30 Hz to 12 kHz ±1 dB (typically ±0.5 dB). Delay is calibrated in 2 ms steps and controlled by front-panel DIP switches. The unit operates on 115/230 V ac, 50 to 60 Hz, +5 percent, −10 percent. It draws a maximum of 10 W with any delay option. EVENTIDE CLOCKWORKS.

Lighting Control System 256

Performer II memory lighting control system incorporates the features of the maker's Performer system. New features include software patching of up to

512 dimmers to 20 through 125 channels; an encoder for adjusting channel levels, individual memories, or groups of memories and fade times; additive and subtractive group master combinations; flash buttons associated with the group master setups; a gold access button for various functions such as dim-

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

mer check; and a hand-held, pocket-sized portable remote. Options include a hard copy printer, visual display unit, auxiliary control panel, terminal and receptacle boxes, and a sturdy trouping case. The unit measures 19 by 11 by 22 inches and weighs 35 pounds. It operates on 110/120 or 220/240 V ac; control output is 0 to 10 volts dc. KLIEGL BROTHERS.

VTR Travel Cases 257

Approved by the Airline Transport Association, these VTR cases are available for virtually every model in use

today, according to the manufacturer. Cases can be custom-designed to fulfill any special requirements. They feature top-grade plywood sidewalls covered with gouge and scuff-resistant ABS plastic available in a variety of colors. Also featured are steel hardware, strong and lightweight aluminum framing, and machine-driven steel split-rivets throughout. ANVIL CASES.

Video Compression System 258

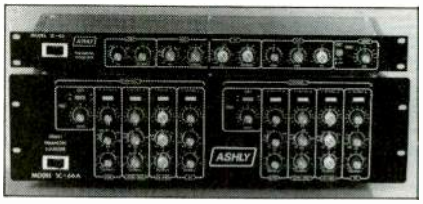
The VIP-2, with time base correction and frame synchronization, offers low-cost video compression for news and commercial broadcast production.

It compresses live or still video in real time along the H or V axis with infinite area compression. Fixed picture center or fixed picture edge are featured. Setup controls are on a separate, external remote control panel. The basic unit has preprogrammed size and position controls, located on a remote production panel. Optional remote panels include joystick control for real time adjustment of size and position. Under $40,000. ADDA CORP.

Broadcast Equipment

Parametric Equalizers 259

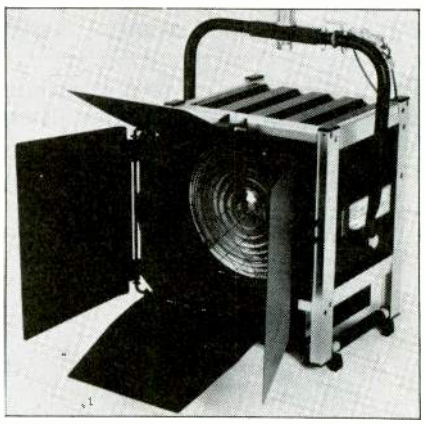
Model SC-66A parametric equalizer covers the entire audio spectrum with four overlapping bands per channel. It provides 15 dB boost or cut, 5½-octave tuning range per band, and bandwidth adjustable from 3.3 octaves to 1/20 octave. Noise is −87 dBV and distortion



is less than 0.05 percent at full output. Features include balanced inputs, peak overload lights, ±15 dB gain controls, and an overall defeat switch. The unit is housed in a steel rack-mount enclosure. Model SC-63 provides the same performance in a smaller three-band format. SC-66A, $599; SC-63, $369. ASHLY AUDIO, INC.

HMI Fresnel Spots

The RDS/HMI lighting series manufactured by Ryudensha Co., Ltd. (Japan), consists of four units: 575 W, 1200 W, 2500 W, and 4000 W daylight-balanced luminaires, each with its own ballast designed to operate at 120 V, 60 Hz. They feature a specially designed fresnel lens that provides a more effi-



cient optical system resulting in a smoother field of light, as well as a wider focusing ratio from spot to flood, according to the distributor. Modular construction permits safe, convenient changing of lamps and easy maintenance; the entire HMI insert assembly, including lamp socket, ignitor circuitry, and switches, can be removed without tools. The lights can be converted to incandescent fresnels by replacing the HMI inserts with optional

inserts that permit the use of 1 kW, 2 kW, 5 kW, and 10 kW tungsten-halogen lamps. $2500 and up. CINEMA PRODUCTS CORP., 2037 Granville Ave., Los Angeles, Calif. 90025.

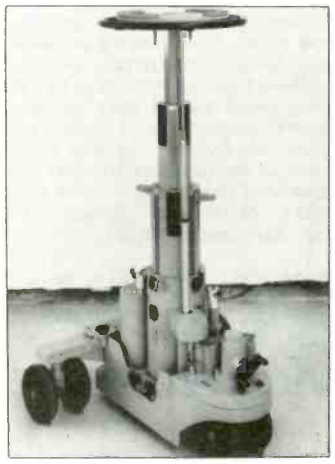
Studio Lighting Control 261

Promptor® is an economical minicomputer studio lighting control system for storing and randomly retrieving up to 544 cues without peripheral equipment. It interfaces with manual preset scene control panels. Designed for automatic

or manual sequencing, it includes a two-scene playback capability with a split handle dipless cross fader and recordable time fade. Available in 24, 36, 48, and 60-channel models, all with a base cue capacity that can be doubled, tripled, or quadrupled. Options include memory and control channel expansion, cassette or floppy disc library storage, visual display monitor, and custom interfaces for other electronic control systems. Basic system, $7600. THEATRE TECHNIQUES, INC.

EFP, Studio Pedestal 262

The Plover remote and studio pedestal is a high-range pneumatic pedestal with a good minimum height range, according to the manufacturer. The unit has full studio facilities as well as features allowing it to be used for EFP. Its three-stage column detaches from the base for ease of transport; the base accepts a variety of wheels. Legs are adjustable, permitting the pedestal to be tracked through narrow openings. A feature on the columns enables various track loads to be carried without altering pneumatic pressure, so that lens changes from light to heavy may be accomplished easily. VINTEN.



Video And Pulse Delays 263

Matthey video and pulse delay lines are designed to reduce signal timing to seconds, saving installation time and cable costs. An appropriate delay line is plugged into the line; quick adjustment of switches and fine trimming of the vernier complete the job. The delays

feature built-in equalizers out to 5.5 MHz and impedance of 75 ohms. They are available in boxes with BNC connectors, or as rack-mount or PC-board models. TELEVISION EQUIPMENT ASSOCIATES.

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