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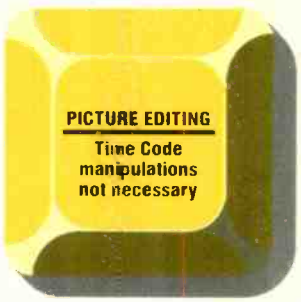

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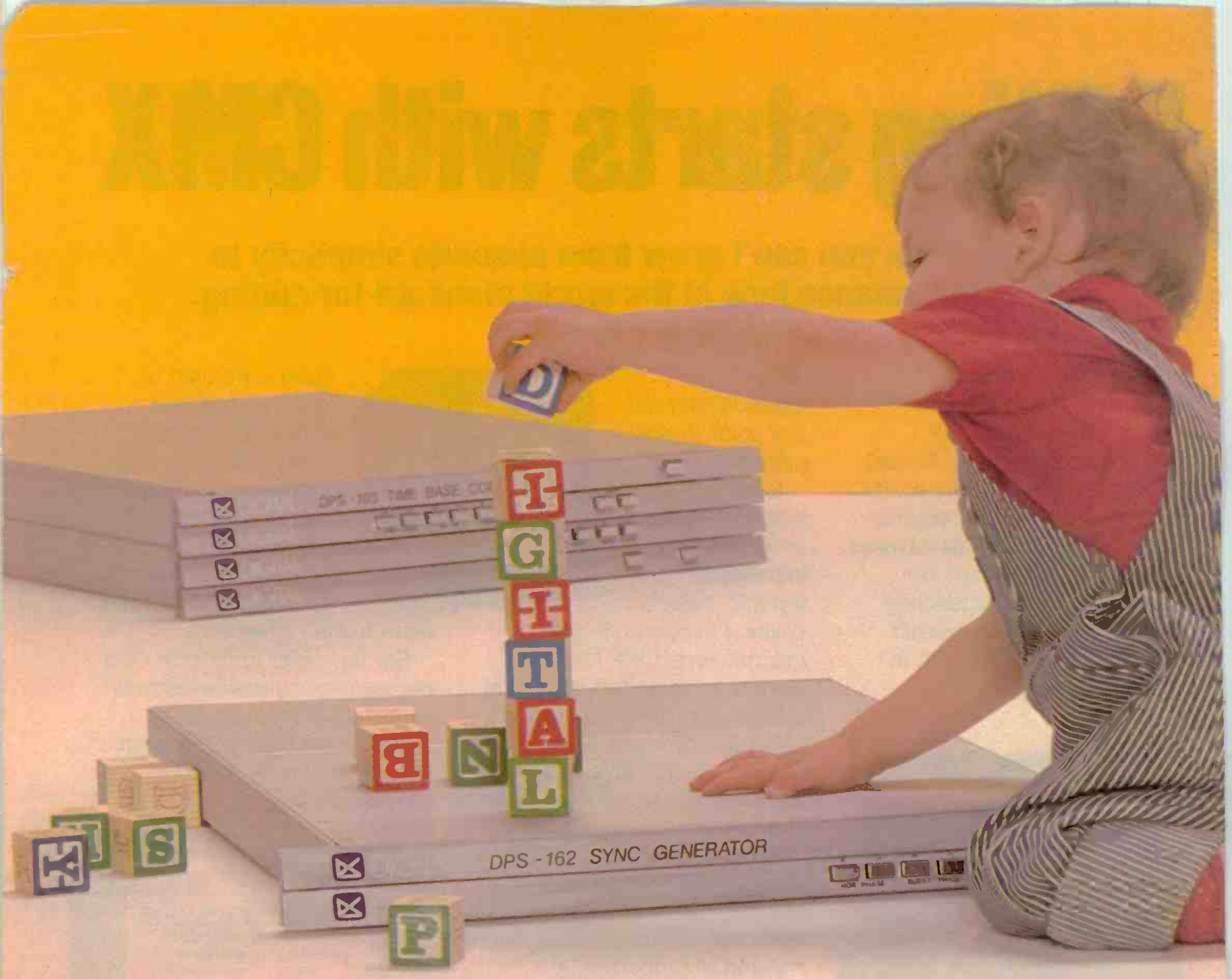

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THE LESSONS HE AS A CHILD.

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BM/E
BROADCAST MANAGEMENT/ENGINEERING

OCTOBER 1981/VOLUME 17/NUMBER 10

Photo: Robert Crawford

Precision electronics continue to enhance both video and audio post-production capabilities. Cover generated by Reeves Teletape on a Quantel special effects editing suite

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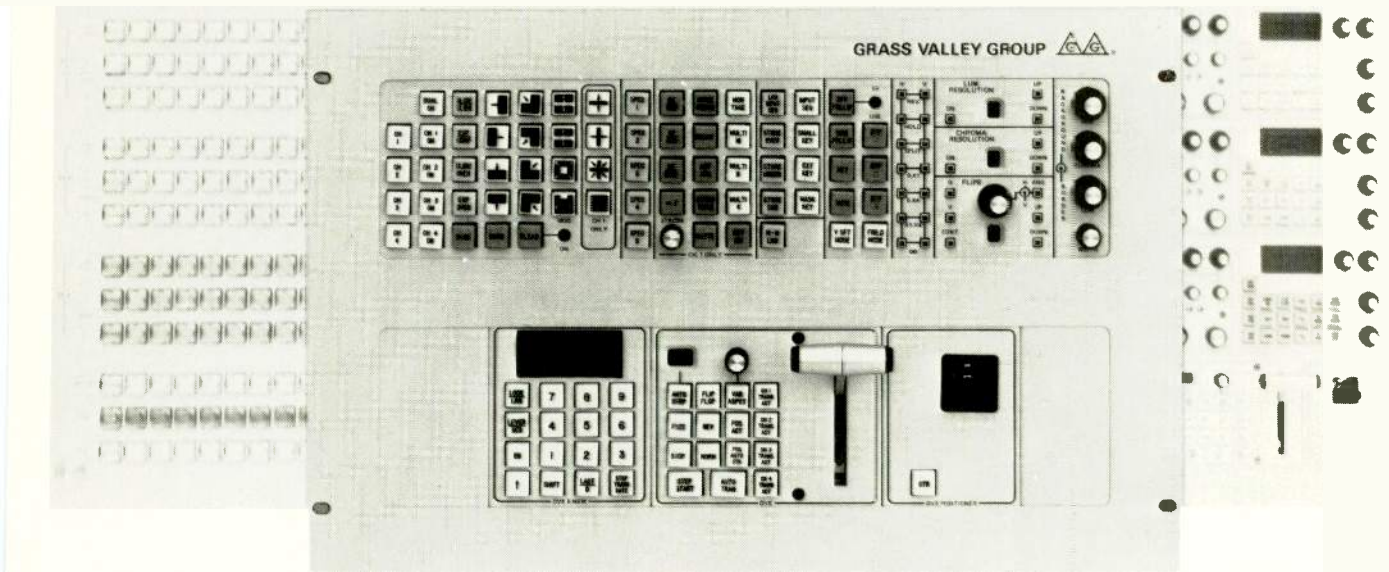

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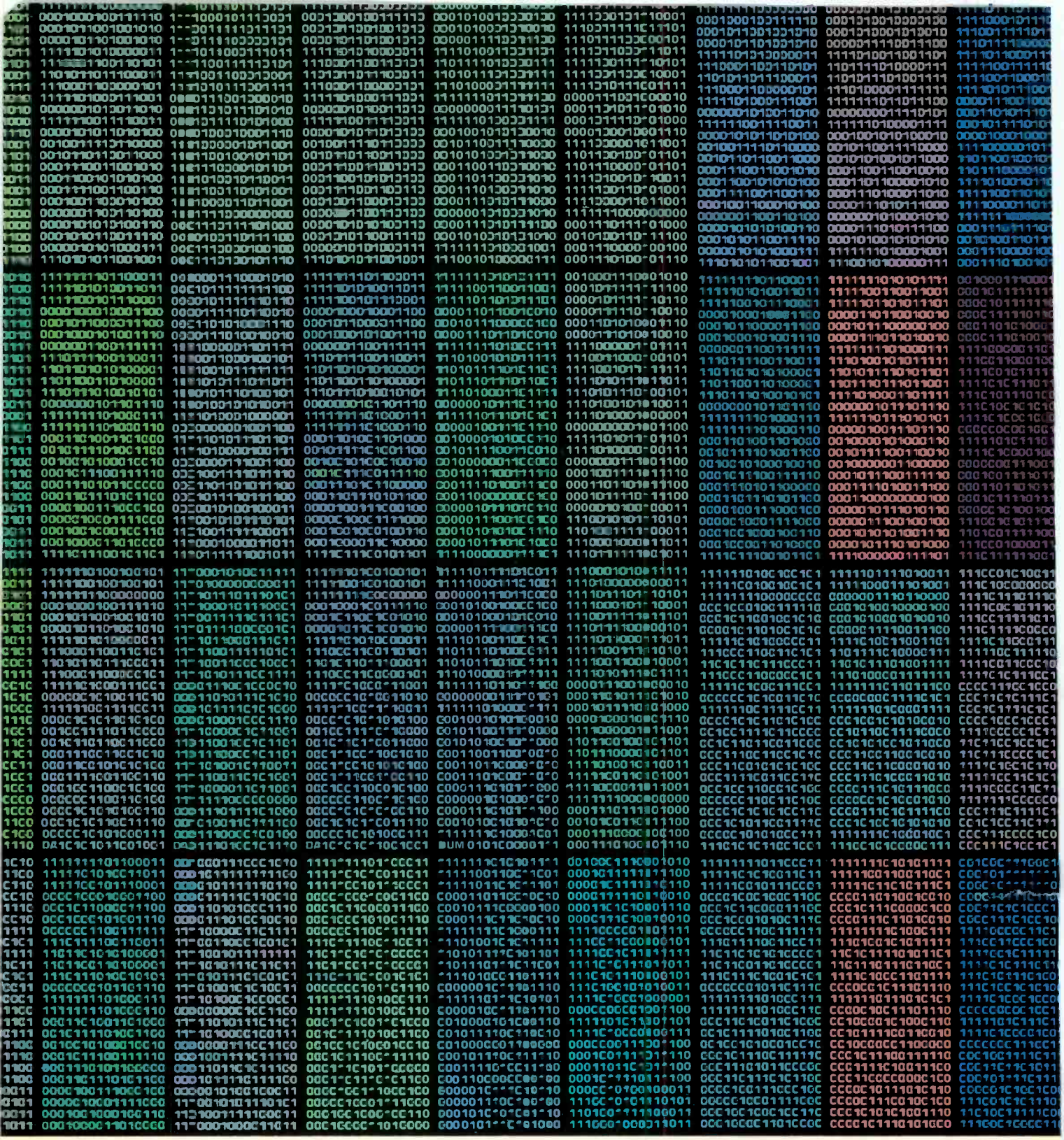
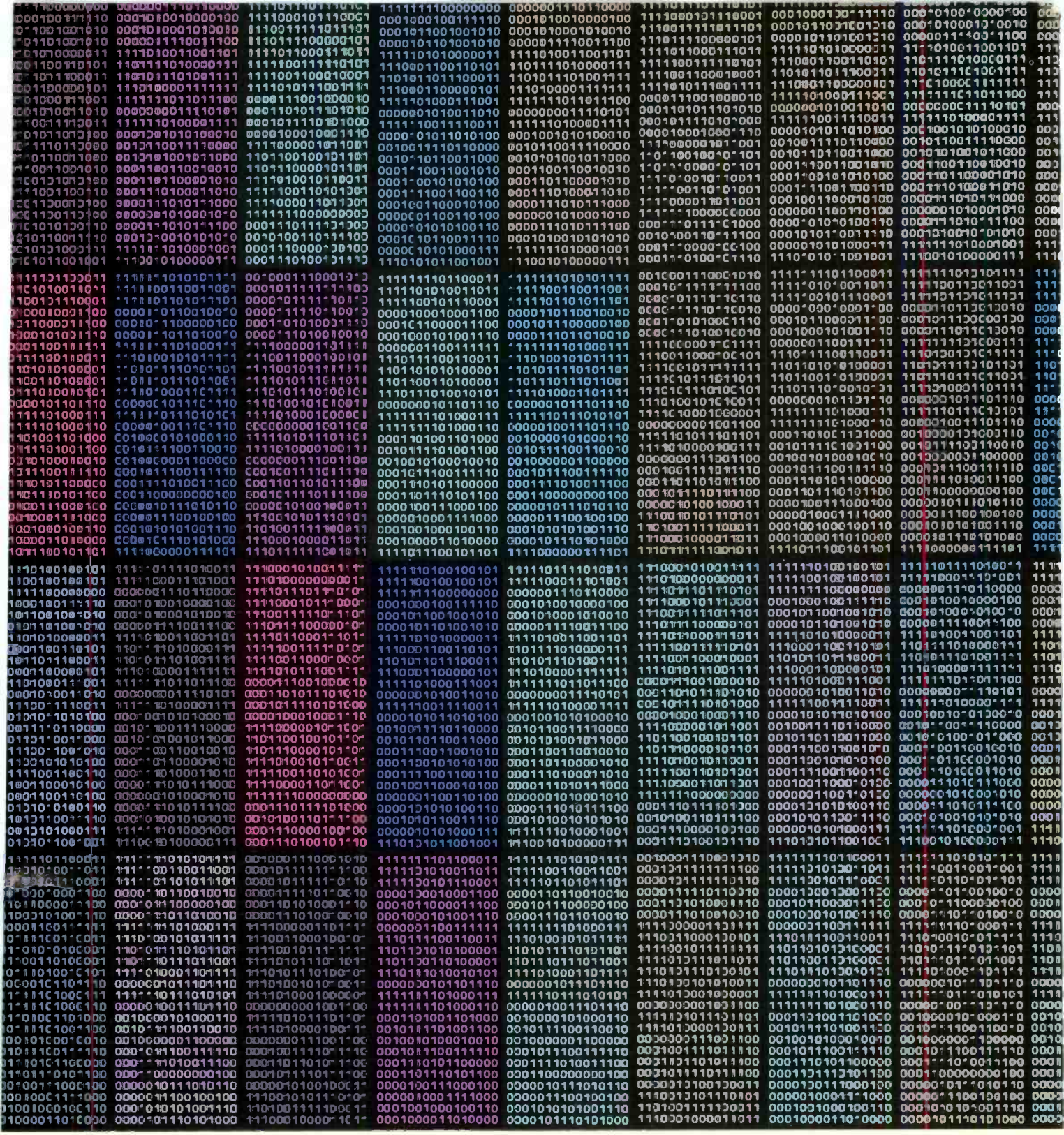


These are the first four notes of Beethoven's Fifth Symphony.



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BROADCAST INDUSTRY NEWS

CBS Cable Waiver Granted By FCC

CBS, Inc., will be able to purchase cable television systems on a limited basis under a rule waiver voted in August by the FCC. The Commission, however, balked at entirely removing the rule prohibiting networks from owning cable systems — a change CBS had requested.

That rule may still be up for change, though. The FCC's Office of Plans and Policy, which has been studying it, is expected to present its findings to the Commission soon.

The waiver allows CBS to own cable systems having a maximum of 90,000 subscribers or 0.5 percent of the country's cable subscribers, whichever is less. The net says it will use the systems to experiment with new technologies, such as high-definition TV and teletext and to test new programming.

NBC has backed CBS's waiver request, but most other comments, including those of ABC, asked the FCC not to grant the waiver but rather to rule on the cable/network crossownership issue. The Commission felt, however, that the waiver request was justified and carried a public interest benefit. It said that the other nets would receive "comparable treatment . . . . upon the submission of comparable showings."

In a spearate action taken the same day, the Commission conditionally waived the broadcast-cable cross-ownership rule to permit Time, Inc., board chairman Ralph P. Davidson (also director of Time subsidiary American Television and Communications Corp.) to join the board of directors of The Signal Companies, Inc., a company with major broadcast station interests. Signal is the parent company of Ampex Corp., which it purchased last year.

Nets, Affiliates Face Fight On Access Rule

The three television networks and their affiliates squared off for a battle in August as NBC petitioned the FCC to repeal the prime-time access rule, saying that the rule had failed to achieve its end of encouraging local production, with the other nets expected to join it. Affiliates of all three nets, angered by the prospect of losing their most valuable air time, quickly geared up to fight for the rule's retention.

Some observers at the time of NBC's original petition to end the rule saw abolition of PTAR as likely, given the Commission's current trends in favor of deregulation. Commissioners Quello and Fogarty, as well as chairman Fowler, are all said to favor possible elimination of the rule.

The NBC petition seeks to expand network news by half an hour, filling up the 7:30 to 8:00 p.m. (Eastern time) access period. The net cited findings by the FCC staff that, it said, indicated the main beneficiaries of the access rule were syndicated programmers, increasing their numbers and wealth — "results that are neither of benefit to viewers nor proper Commission goals," according to NBC.

Affiliates have been quick to challenge this view, however, pointing to recent increases in the amount of locally produced programming being aired in access time. Abolition of PTAR would create "havoc," according to Fred Paxton of WPAD-TV, Paducah, Ken. Paxton, chairman of the NBC affiliates board, said that "severe financial problems" could face stations if the rule is scrapped, since it would mean loss of money invested in equipment and programming. "We're not against expanding the news," Paxton claimed, "but the network should use its own time, not the local station's," he asserted.

FCC Eyes PBS Rule Changes

A recent FCC rulemaking could result in substantially eased programming, ascertainment, and logging requirements for public radio and television stations. The proceeding, following the Commission's recent deregulation tendencies, seeks to define the extent to which public stations' programming

BM/E Names New Editorial Director

Gerald M. Walker has joined BM/E as Editorial Director

Broadcast Management/Engineering magazine has appointed Gerald M. Walker as Editorial Director, replacing James A. Lippke. Walker had been managing editor for *Electronics* magazine, a leading McGraw-Hill publication. He has been covering the electronics industry for various publications for over 20 years and has twice received the prestigious Jesse H. Neal Award for editorial excellence. Lippke, who became editor of *BM/E* in 1968 and has guided the publication through its formative years, has been named Editor Emeritus and will continue to be active in both editorial planning as well as other special projects serving the broadcast industry. He is also a two-time winner of the Jesse H. Neal Award.

James A. Lippke, former editorial director, is now Editor Emeritus

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decisions should be regulated. The Commission said it would be guided by two goals: keeping a clear distinction between noncommercial and commercial broadcasting in its rules and limiting regulatory interference in the programming process as much as possible.

As regards general programming responsibilities, the Commission outlined four options in the rulemaking: (1) elimination of all programming oversight not based on the "return for consideration" rule; (2) retention of a somewhat larger programming obligation, perhaps with a minimum for programming addressed to important community issues, but relying primarily on the licensee's discretion; (3) retention of the current generalized programming responsibility, perhaps allowing specialization to the extent that many community needs are answered by other media; (4) retention of current policies.

Five possibilities were proposed for ascertainment rules: (1) elimination of ascertainment procedures and the general ascertainment obligation; (2) retention of the obligation, with radio and TV stations permitted to meet it by "any reasonable means" with no reporting requirement; (3) retention of the obligation, permission of any reasonable means, with maintenance of records; (4) slight modification of current requirements to eliminate the most costly aspects; (5) retention of the current requirements.

The Commission also suggested either eliminating all logging requirements, retaining them in a limited form, or retaining them in their current form.

FCC Backs Off From 9 kHz Recommendation

The FCC's August shift from its stance in favor of 9 kHz AM channel spacing has caused delight in the industry, with NAB and NRBA both lauding the move.

NAB's Vincent Wasilewski was quick to applaud the vote, claiming, "Both the American public and system of broadcasting are the beneficiaries." He urged the State Department and the FCC to work to pursuade the other Region 2 countries to retain 10 kHz spacing when they meet in Rio de Janeiro next month.

The Commission's action was far from unanimous, with commissioners Anne Jones and Joseph Fogarty jointly issuing a strong dissenting statement. Disagreeing with the majority (Quello and Washburn, who reversed their previous stances, chairman Fowler, and newcomer Dawson), Jones and Fogarty asserted that the cost of the switch even at the highest estimates, was justified in face of the probable benefits to the public of reduced channel spacing. Noting the likelihood of creating new stations, they commented, "It is disquieting to see a majority balk at the prospect of lowering entry barriers and providing opportunities for additional competition in broadcasting." They also expressed concern that a change to 9 kHz may be forced during 1984 to 1988 when a lowering of sunspot activity increases heterodyne interference from stations in Europe and Africa, which broadcast at 9 kHz intervals. Heterodyne interference produces a "whistle" over the signal, strongly interfering with reception.

Turner Lowers The Guns At ABC-Group W News Plan

Ted Turner is not one to take things lying down, and his reaction to the newly announced cable news venture from ABC and Group W is no exception. Turner's battle plan answers the Group W/ABC challenge almost point for point.

The new service, dubbed Satellite NewsChannels by the partners, plans to offer two side-by-side, 24-hour all-news channels to cable operators. The first, scheduled for launch next spring,

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is patterned on the Group W all-news radio format and will feature an 18-minute cycle of national and international headlines. Twenty-four regional contributors will insert five-minute news breaks every hour. The second channel is described as providing "in-depth" coverage; no startup date has been set. Both will be supported by advertising.

Group W has obtained five transponders on Westar 4 for the first channel; once Westar 5 becomes operational (not before November, 1982), both channels will go to 10 transponders on that bird.

Turner, who was quick to comment that he thought two news services were one too many, is aggressively working to insure that CNN is that one. CNN has two advantages right off the bat: it's already on the air, and it's on Satcom 1, the most important cable satellite. ABC and Group W may have an overall advantage in terms of resources, however: they are reported to be planning to pour $35 to $40 million into Satellite News-Channels for its first year alone. In addition, the ABC/Group W service will draw on ABC news footage, although it will have its own news staff.

Taking the bull by the horns, Turner has announced he'll spend $80,000,000 over the next 12 months promoting CNN and his Atlanta superstation, WTBS. In addition, he has announced a January 1 startup date for CNN 2, a new headline service with local — not regional — inserts. For local cable systems not ready to insert their own news, Turner will provide a weather service. He has also announced a two-thirds price reduction for CNN, bringing it down to five cents per subscriber (the ABC/Group W service is free to cable operators).

As if all that weren't enough, Turner also plans to offer broadcasters the opportunity to use selected CNN reports instead of network news. He is also reportedly planning a radio news network.

Group W-TPT Deal Closes; Gets FCC Nod

The mammoth merger of Teleprompter Corp. into the Westinghouse Broadcasting Co. was closed late in August, despite protests from consumer groups that the move violated antitrust laws. The closing followed a decision by the U.S. Court of Appeals in Washington, D.C. to deny a stay requested by Ralph Nader's National Citizens Committee for Broadcasting, which is appealing the FCC's decision allowing the merger.

That decision, made at the end of July by a 6-0 vote of the commissioners, approved the transfer of control of TPT to Group W. The stock acquisition had been approved earlier in the year. The FCC stated that the allegations of the groups that filed against the transfer (including the National Black Media Coalition) "raised no substantial and material questions of fact existing which would require a hearing" and said a conditional grant would be in the public interest.

The merger is the largest ever in the cable industry, valued at some $646 million. Teleprompter, the second largest cable company in the U.S., reaches over 1.3 million subscribers in 32 states. Group W, a subsidary of Westinghouse Electric Corp., owns five VHFs, one UHF, seven AMs, and six FMs.

Comments Sought On LPTV Computer Processing

Citing the torrent of applications for low-power television stations already received (and the flood that will probably ensue when the current moratorium lifts), the FCC has proposed a computer processing method for LPTV applications. The computer approach would be based on prohibiting the overlap of certain signal strength contours rather than

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The Commission stated that the proposal was not intended as an interim processing standard for LPTV applications. Rather, if approved, it would be adopted along with the final report and order, expected early next year. Reply comments are due October 15.

So far, the FCC has granted only one LPTV application, to John W. Boler for Bemidji, Minn. (see Broadcast Industry News, July, 1981). It recently authorized the Broadcast Bureau to grant 57 translator applications and to make similar future grants; none of the 57 translator applications proposed LPTV origination services.

"Character" Qualification Faces FCC Scrutiny

The role of "character" in the broadcast licensing process is the subject of a current FCC inquiry, which the Commission hopes will help clarify its licensing policies.

In issuing the notice of inquiry, the FCC noted that lack of definition for the term "character" had led to apparent inconsistencies in license decisions involving multiple owners. It said it hoped for a "clearly articulated" policy that would "allow the Commission to focus on behavior that is truly relevant to broadcasting licensing," leading to "more consistent, and thus more equitable, decisionmaking."

Among the areas the inquiry will look into are the purpose of scrutinizing "character"; methods of evaluating an applicant's reliability; ways of dealing with misconduct; effects of misconduct at one station on other jointly owned stations and on their licensee; and appropriate analysis of an applicant's past misbehavior.

Chairman Fowler, in a separate statement, supported the inquiry, calling the "character" concept "a tar pit that has managed to snare both licensees and the Commission." "Using a morality-laden word like 'character' to describe prohibited conduct of licensees may take our inquiry far afield from what we should actually be concerned about," he speculated. Also issuing a statement was commissioner Fogarty, who, while giving the inquiry his support, emphasized that character, in the sense of "competence and trustworthiness," was still an important factor in judging a licensees fitness to run a station.

Three Women Certified By Engineers' Group

Three broadcast engineers — Dorothy Altman, Nancy Dyki, and Janet Kowalczyk — have become the first women to be granted certification by the Society of Broadcast Engineers.

Applicants for certification in the Broadcast category must have at least five years' experience as broadcast engineers and must pass a multiple-choice examination that takes nearly two hours to complete; Altman, Dyki, and Kowalczyk were all certified in this category. There is also a Senior Broadcast category, requiring 10 years' experience and a longer examination. Over 1700 male engineers have been certified by the SBE since the program began in 1975.

Altman is a technician with KOOL-TV in Phoenix; Dyki is master control and videotape engineer at Michigan State University's WKAR-TV in East Lansing; Kowalczyk is engineering manager for KDKA Radio in Pittsburgh. All three are SBE members.

ABC, Scientific-Atlanta Ink Earth Station Deal

ABC Radio Network affiliates will receive digital audio transmissions on dishes from Scientific-Atlanta, under the terms of a recent agreement by the companies. ABC's four nets, with over 1700 affiliates, and two new nets slated for air dates early next year, will be the

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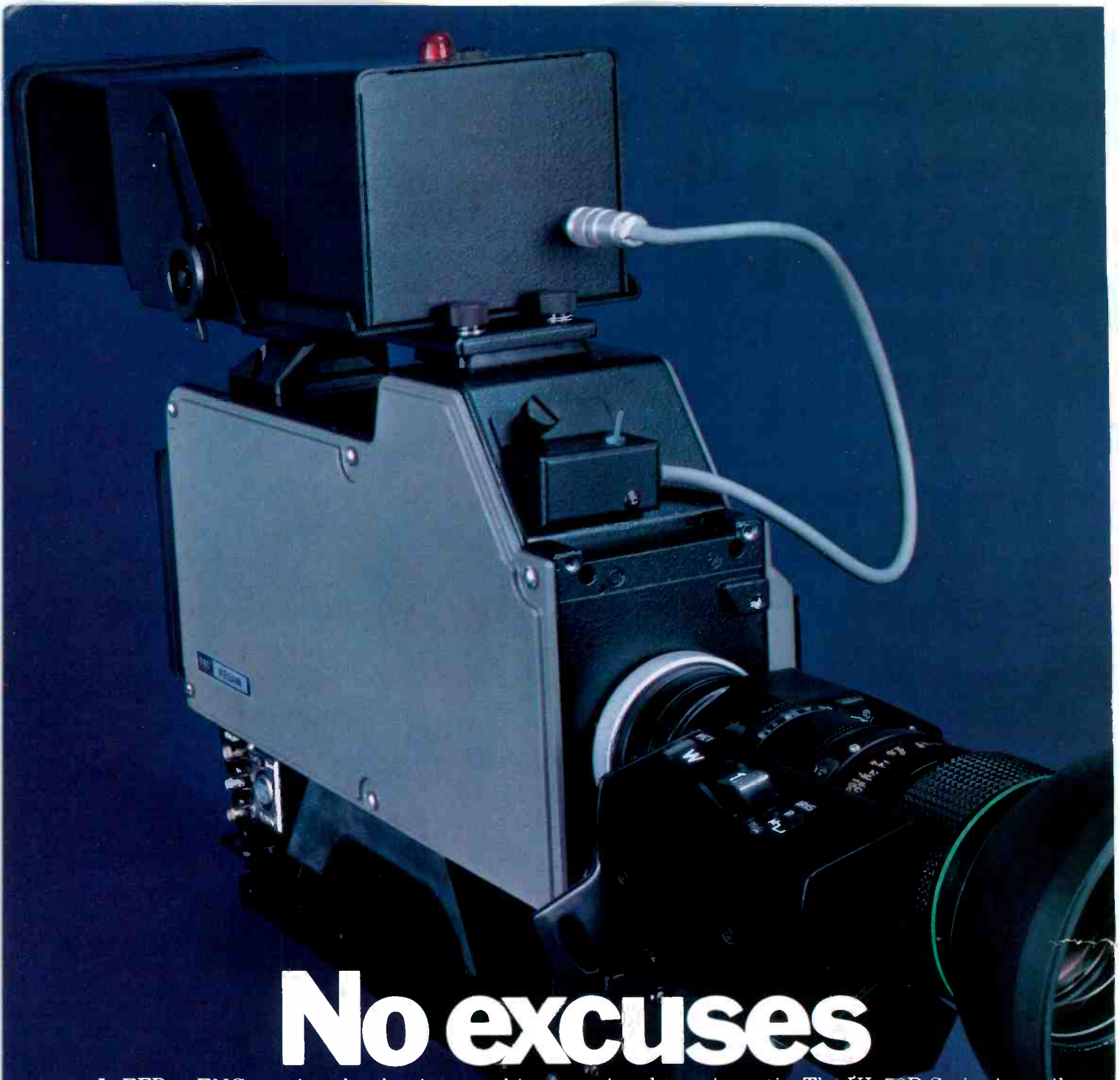

No excuses

In EFP or ENG, getting the shot is everything.

And, a growing number of networks, major stations and independent producers are consistently getting everything with the Ikegami HL-79. They've become so confident with their HL-79's that the need for a "backup" no longer exists.

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In EFP and studio production, the new HL-79D will deliver excellent results. In fact, if you don't have an Ikegami studio camera, chances are that the HL-79D will produce a better picture than whatever camera you've got on the floor.

Contact Ikegami and ask for a side-by-side comparison. Then you'll see why an Ikegami HL-79 crew can leave the excuses—and the backup—at the station.

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News

beneficiaries of what is described as the first digital transmission of audio signals via satellite by a radio network.

The earth stations, running about $10,000 plus installation, will be installed beginning in mid-1982. Target date for completion of the system is 1984.

News Briefs

Camellia City Telecasting, Inc., licensee of Sacramento indie KTXL-TV, has purchased **KLRK Broadcasting Co.,** holder of a CP for Ch. 49, Portland, Ore./Vancouver, Wash. KTXL president Jack Matranga says the new UHF will operate as a "full-service, full-time independent" with April 1, 1982 air date . . . . KISR-FM, Fort Smith, Ark., has acquired **KFSA,** in the same market, from Donrey Media Group. Donrey owns several other broadcast stations, a cable franchise, advertising companies and newspapers in 18 states . . . . Abell Communications has purchased 100 kW **WKOQ-FM,** Daytona Beach, Fla., fifth-rated rock station in the U.S.

Western Union is **going ahead with Westar 6,** its sixth domestic communications satellite. Hughes Aircraft Co. is building the bird, which will have 24 transponders and cost around $28 million . . . . National Public Radio has officially inaugurated its new **computerized Main Origination Technical Center** in Washington, D.C. The center controls switching and transmission for the net's satellite-distributed fare . . . . Wold Communications transmitted a Boeing **video news release** to national and international broadcasters via satellite late last summer . . . . NTIA has petitioned the FCC to **extend broadcast hours for daytime-only AM radio stations** by 30 minutes mornings and evenings. The proposed rules would also allow daytimers to apply for higher power or for certain FM licenses to provide better service . . . . Broadcast consultant Bob Klein, in a speech before the New Orleans Ad Club, has predicted that the rise of new cable and STV services will **diminish the importance of network prime-time** broadcasts and force commercial television to adopt more special interest programming.

The ABC-TV Affiliates Association has launched a **promotional campaign** plugging "free, over-the-air TV" to their viewers . . . . Mutual Broadcasting System became the first national net to **air issue-oriented "advocacy" advertising** with its broadcasts of national spots for the National Republican Congressional Committee in favor of President Reagan's tax program.

Henry L. (Jeff) Baumann has been appointed deputy chief of the FCC's Broadcast Bureau. He was previously chief of the Bureau's Policy and Rules Division . . . . **James H. Quello** took the oath for his second term as an FCC commissioner in August; the new term runs to June 30, 1984.

Congress must decide if the FCC can authorize DBS service, NAB's James J. Popham told the American Bar Association's Section of Science and Technology at its August meeting in New Orleans. NAB reiterated its stand that no permanent DBS policies should be adopted before the RARC meeting in 1983 . . . . The FCC should develop an **overall plan for radio broadcasting** if it is to avoid "piecemeal" actions, NAB said in response to a petition from Moody Bible Institute asking new rules for FM translators . . . . NAB has announced its support for the FCC's proposal to **eliminate VITS requirements** for remotely controlled TV operations . . . . Members of NAB's Radio and Television Code Boards will hold a **Broadcast Town Meeting** in Portland, Ore., October 29. NAB president Vincent Wasilewski will moderate.

The Society of Broadcast Engineers will hold its semiannual **certification exams** February 1 through 19; deadline

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20 ANNIVERSARY

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News Briefs

for applying is November 2. For information, write Mary Brush, Certification Secretary, SBE, P.O. Box 50844, Indianapolis, Ind. 46250 . . . . NAB has announced its 1982 **research grants program,** now in its sixteenth year. Proposals must be received by January 1, 1982; winners will be notified by February 15 . . . . NAB is seeking **technical papers** for its 1982 Broadcast Engineering Conference, April 2 through 7 in Dallas. Send a one-page abstract by November 6 to Engineering Conference Committee, Engineering Dept., NAB, 1771 N Street NW, Washington, D.C. 20036 . . . . **Conrad L. Scheetz** has been named executive director of SMPTE.

RTNDA has elected **new directors.** Seven were incumbents; the three newcomers are Brian Jennings, KXL Radio, Portland, Ore.; Fred Zehnder, KTVU-TV, Oakland; and John Hultman, WBBM Radio, Chicago . . . . ITVA has elected **new officers** for 1981-82. Don Haws is chairman of the board; Ron Brown is president; Rita Maria Sansone is president-elect; Kathy Sakowicz is vice president; Dick Van Deusen continues as treasurer; and Alma Lewis is secretary . . . . Knowledge Industry Publications of White Plains, N.Y., has established the **North American Television Institute** to provide intensive one- and two-day seminars for video users. The program begins this month; for information, contact Knowledge Industry Publications at 701 Westchester Ave., White Plains, N.Y. 10614, (800) 431-1880; in New York State, (914) 328-9157.

Western Public Radio will conduct a **national radio training program** for independent, public, and commercial radio producers with a $221,202 grant from the John and Mary R. Markle Foundation . . . . **WCET-TV,** public TV station in Cincinnati, has received a $153,503 grant from Warner Amex to acquire cable-related origination and production equipment to expand its services via cable . . . . Linda Alvarez, co-anchor at KPNX-TV, Phoenix, has received the 1981 **Ruben H. Salazar Award** for Communications . . . . KOCO-TV anchor Mary Ruth Carleton received **honorable mention** from Women in Communications, Inc., for her five-part series, *Only God and Weyerhauser,* which aired over the Oklahoma City station . . . .*Healthbeat,* the TV health magazine from BBI Communications, has **cleared on 56 stations** representing 60 percent of U.S. homes, the company says. BBIC will also distribute a national *Healthbeat* newsletter in cooperation with the Chicago *Tribune* . . . . Phil Donahue has been named IRTS **Broadcaster of the Year;** earlier this year, the talk show host won the prestigious Peabody Award.

Video Expo New York will cover two floors of Madison Square Garden October 20 through 22, with about 100 exhibitors expected . . . . NAEB's "multi-conference," **Futurecast '81,** will convene November 1 through 4 in New Orleans. Topics will include radio, new technologies, money, mainstreaming instructional services, new directions in broadcast education, and personnel management. For details contact Mark Tebbano, NAEB, 1346 Connecticut Ave. NW, Washington, D.C. 20036, (202) 785-1100.

Business Briefs

Ampex will spend $50 million over the next three years to expand its mag recording tape joint venture with Konishiroku Photo Industry Co. of Japan . . . **CMX/Orrox** has established CMX Euroservice, a service facility in the Hamburg, West Germany, area . . . . John G. Leveck has formed **Image Electronics,** a Los Angeles-based video distribution company serving the southwestern U.S. . . . Darryl E. Parker has founded **Parcom,** a manufacturers' rep and distributor in Southlake Texas. Parcom

Harris' new TC-85 upstages all other automatic cameras with...

THE 45-SECOND MULTI-CAMERA SETUP

In less time than a standard commercial break, Harris' new auto setup computers can simultaneously run a pre-production setup of all the TC-85 cameras in your studio.

With independent microcomputers in each camera, fine registration, black balance, white balance, gamma and flare are automatically checked and adjusted in all cameras—*in less than 45 seconds!* Full computer setup from a new tube installation is also accomplished quickly.

The independent microcomputer concept—a Harris exclusive—eliminates camera interdependence and enhances reliability.

The ASU-85 computer setup system is standard in the new TC-85 camera. It can also be added, at a surprisingly low cost, to all existing TC-80 series cameras in the field, and is fully compatible with the Harris Triax system. You *can* teach your older cameras new tricks!

Compare the cost. The TC-85 camera with full computer setup is priced well below competitive models.

Contact Harris Corporation, Broadcast Products Division, P.O. Box 4290, Quincy, Illinois 62301. 217/222-8200.

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

Circle 116 on Reader Service Card

Business Briefs

will rep NEC America, Ramko, and TFT broadcast gear.

Toshiba America, Inc., has reorganized into two independently operating business groups. The Consumer Products Business sector will operate from Wayne, N.J.; the Industrial Electronic Business sector, including the broadcast division, will be headquartered in a new facility at 2441 Michelle Dr., Tustin, Calif. 92680, (714) 730-5000 . . . . **Ikegami Electronics** has expanded its West Coast operations with a move to larger quarters at 3445 Kashiwa St., Torrance, Calif., (213) 534-0050 . . . . **Leitch Video** has expanded its U.S. facilities with the addition of a 12,000 square foot manufacturing and distribution plant. Leitch Video of America, Inc., is located at 825 K Green Brier Circle, Chesapeake, Va. 23320, (804) 424-7920.

Cezar International has moved its corporate headquarters to a new facility at 1026 W. Maude Ave., Sunnyvale, Calif. (408) 733-1436 . . . . **Shively Labs** is now operating out of its new plant on Harrison Road, Bridgton, Maine 04009, (207) 647-3327 . . . . **Comsearch, Inc.,** has broken ground for its new office and laboratory facilities in Reston, Va. Construction is scheduled for completion early next year.

Matthews Studio Equipment has announced a 50 percent increase in the physical size of its Burbank, Calif. headquarters and plant. The company also has a new European manufacturing and distribution division, Matthews Europa, Inc., located in Amsterdam . . . . **TDK Electronics Corp.** has announced plans to construct new U.S. headquarters in Port Washington, N.Y., scheduled for spring, 1982, completion . . . . **Tentel** has moved to new quarters at 1506 Dell Ave. Campbell, Calif. 95008, (408) 379-1881 or (800) 538-6894.

Harris Corp. has signed an exclusive agreement with RTS Systems to include RTS-compatible intercommunications circuitry in its TC-85, TC-80B, and TC-50 studio cameras . . . . **Microwave Associates Communications** has signed **North Supply Co.** of Lenexa, Kan., as distributor for its complete line of satellite products.

KSTS-TV, San Jose, Calif. independent UHF station, recently went on-air with a new 110 kW transmitter from **Harris Corp.'s** Broadcast Products Division. A New Rochelle, N.Y., AM station, WVOX, has also kicked off its operation with a Harris transmitter . . . . Wometco's WTVJ-TV, Miami, has purchased over $1 million of post-production equipment from Ampex Corp. The order includes VTRs, ADO, ACE, and a production switcher . . . . **ADDA Corp.** has sold its one hundredth ESP digital still store system to the Hawaiian Production Center, Honolulu — purchasers of the first ESP unit back in 1977.

Scientific-Atlanta has reported several major earth station orders. Opryland productions of Nashville has purchased a 10-meter dish to initiate its country music satellite broadcasts; Trinity Broadcasting is expanding with an additional 25 4.6-meter TVRO dishes; and King Broadcasting has ordered three 7-meter dishes for its TV stations in Seattle, Portland, and Spokane. The company reported increases of 44 percent in sales and 49 percent in net earnings for the last fiscal year.

Five **Imero Fiorentino** lighting directors were nominated for Emmys by the Academy of Television Arts and Sciences . . . . The **Rank Cintel** Mk III flying-spot telecine received an Emmy for outstanding achievement in engineering development at the September awards presentation.

Norm Wieland has been named director of marketing and sales for **Integrated Sound Systems** . . . . Joseph Novik has been appointed vice president and marketing manager of **Elcom-Bauer.**

WORDS & PICTURES

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☐ Up to 8 keyboards can operate simultaneously. ☐ Simultaneous on-line accessibility provided by two independent, full-function, high resolution channels. ☐ Over 35 pages instantly accessed on-line. Unlimited additions from disk.

☐ Character appearance enhanced by edge polishing to eliminate objectionable effects of aliasing.

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☐ Rolls/crawls. 196 speed/direction combinations. ☐ Up to four displays may be moved in any direction simultaneously. ☐ Ripple-on/ripple-off. Character-by-character appearance or removal at any of 127 rates. ☐ Timing relationships may be examined event-by-event, re-arranged, re-timed or otherwise adjusted.

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☐ Operator-oriented design. Prompted and menued entries. Logically laid out keyboard. ☐ Independent color edit outputs for each channel. ☐ Standard setup always available. When a different, often-used format is required, operator loads in a "user environment." Fonts, colors, channels, levels, tabs, margins, etc. are automatically configured and placed on-line. ☐ Self-test and diagnostics.

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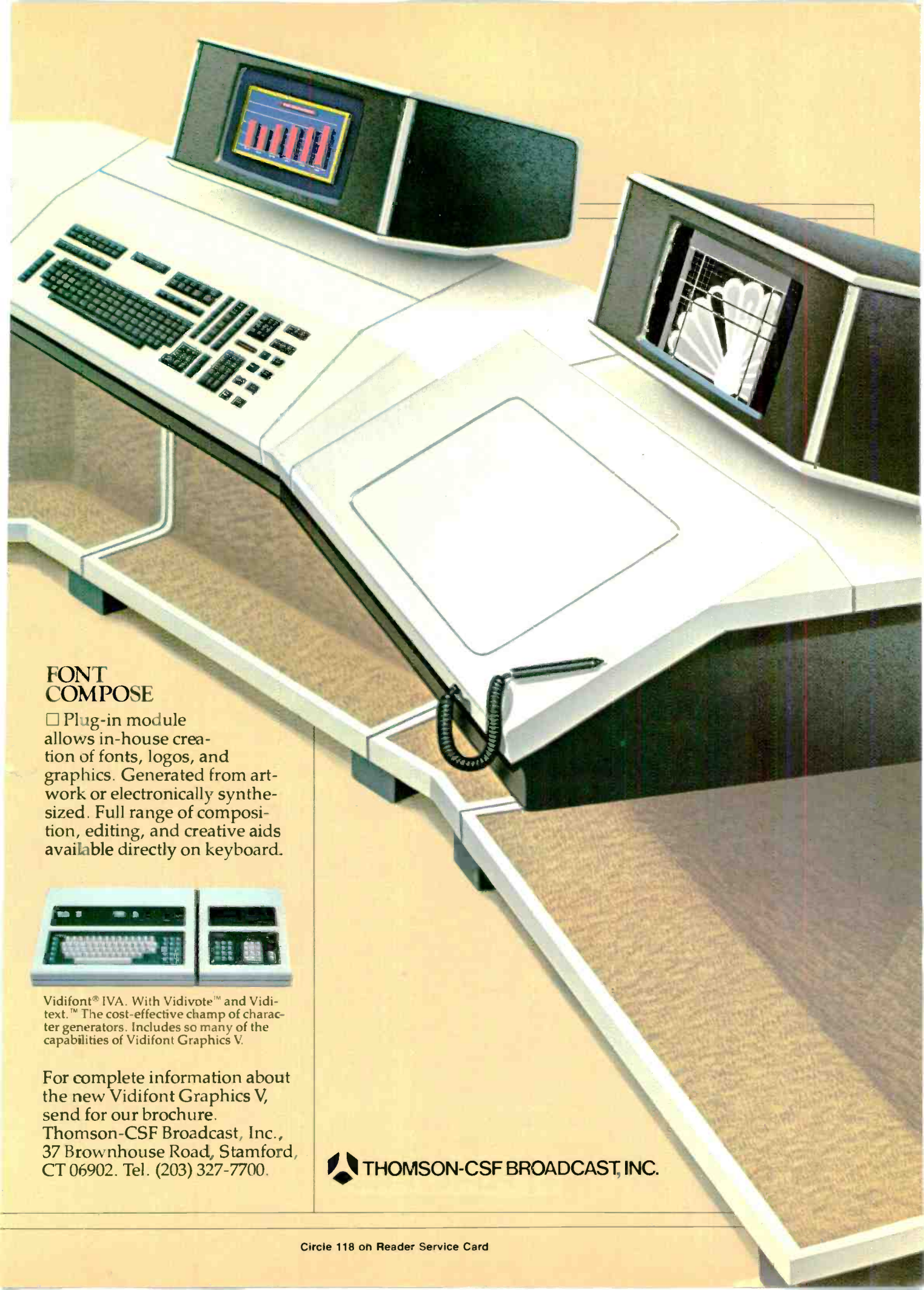

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Both TV and Radio—in the studio and for remote broadcast applications.

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For more complex public address systems.

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...and all of the famous M67 original features.

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In hotels, schools, churches, community centers, hospitals, etc.

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RADIO

PROGRAMMING & PRODUCTION FOR PROFIT

Nutrition Series: A Healthy Supplement For The Radio Diet

EVERYBODY EATS — and food and nutrition are vital subjects to any station's listeners. Scott Broadcast Services of New York has recently come out with a new series of short programs on nutrition, and many station managements may find its ingredients just what the doctor ordered.

The series, *Columbia Nutrition Bulletin*, is produced by SBS in association with the Institute of Human Nutrition of the prestigious Columbia University Medical School. It features Myron Winick, M.D., speaking on various aspects of nutrition (a sample included segments on weight gain during pregnancy and the pros and cons of vegetarian diets). Each segment is 90 seconds long, with the last five seconds a notice of donated material. The series is funded by a grant from Borden.

Winick, the Institute's director, is also editorial director for the radio series. At a recent press conference announcing the series Winick claimed, "Half of the adult U.S. population is malnourished" due to poor eating habits, commenting, "Most of these problems are easily correctible through an informed public."

Informing the public is what the *Columbia Nutrition Bulletin* is all about, and SBS is busy signing stations in major markets across the country (161 as of September 17). The list includes such names as KSTP, Minneapolis-St. Paul; KMOX, St. Louis; WASH, Washington; KNEW, San Francisco; and KLAC, Los Angeles. The series scheduled debut was on September 28.

Any manager can probably think of numerous ways a program like this can enhance the broadcast schedule. Some suggestions from SBS include scheduling the spot near the news at breakfast, lunch or dinner times or airing it during a health or lifestyle segment. Of course, another smart place for it could be near spots from local supermarkets.

The spots stand nicely by themselves, but SBS will supply custom return cues to fit a station's particular programming upon request. If desired, the station's own air personality can introduce the program by cuing past the taped intro and clipping out the taped close. SBS provides recorded 10-, 20-, and 30-second promos. As an extra plus, script requests from listeners will be filled free of charge.

The Columbia Nutrition Bulletin is free to stations on an exclusive, one-to-a-market basis. Programs are supplied on seven-inch reels of 7.5 ips tape, each with 15 episodes. Five of the episodes air each week, sometime between 6:00 a.m. and 7:00 p.m. on the scheduled day; repeats are unlimited within the scheduled week. The only requirement is that the credit line be included — either as it appears on the tape, or read by the station's personality. The series is ongoing; either party may cancel with four weeks' notice. Interested? Contact Gloria Scott at Scott Broadcast Services, Inc., 1440 Broadway, New York, N.Y. 10018, (212) 921-8280.

Back to school with Co-Ed

Another new series, making its appearance just in time for the start of school, comes from well-known radio syndicator Radio Works. The Los Angeles-based company is now producing the *Co-Ed Magazine Radio Diary*, intended as a companion piece to *Co-Ed Magazine*, a fixture in the schools for over two decades.

The daily "psycho-drama" portrays problems familiar to teenagers, featuring a "radio family" who act out the situations.

Other departments include lifestyle reports with a focus on health and fitness and interviews with entertainment and sports personalities.

The program is available to radio stations on a barter basis. For more information, call Radio Works at (213) 466-1935.

Solid success

Cooperation with magazines seems

to spell success for Radio Works, which marked the first birthday of its highly successful *Forbes Magazine Report* last summer. This daily 2½-minute program reaches more than 10 million listeners over the Mutual Broadcasting System.

Mobile One, the first national sponsor of the show, now rotates with such biggies as Visa and Franklin Money Fund — not so surprising when one considers that *Forbes* is one of the country's leading business magazines. *Forbes* has also reaped benefits from the syndication venture, with increased audience interest in the magazine.

BM/E's Program Marketplace

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BEAUTIFUL MUSIC SYNDICATORS face some extra competition from Pacific Music, a new West Coast programmer. The service grew out of the programming efforts of Bob Scott at KDB-AM/FM in Santa Barbara. Both stations are programmed for the Beautiful Music format. The FM outlet was rated number one by Arbitron in the fall of 1980 in the 12-plus and 18-49 age groups.

Scott has been general manager, music, and program director at the stations since the purchase in 1971. But this is not his first experience with the Beautiful Music format. In 1952, Scott was program director at KPOL in Los Angeles and switched the station to Beautiful Music. Scott stayed at the station for nearly 20 years; during much of his tenure there, the station enjoyed top ratings.

Scott says that Pacific Music's extensive music library enables the service to offer more than 350 hours of unduplicated selections. He notes that more is being added monthly, with album imports from England, Europe, Australia, and Japan, plus all the traditional domestic standards.

Pacific Music is formatted into four basic categories: vocals, upbeat (for morning drive only), medium tempo, and soft and mellow. There is also a series of "recent and contemporary" reels for use once in each quarter-hour of the day. Rounding out the package is a special series of Christmas music.

The service does its own dubbing in-house, with the masters produced personally by Scott. The result, he says, "is a tape free of surface noises" with a 25 Hz tone applied at precisely the right spot to assure smooth, flowing 'live'-sounding production.

Pacific Music differs from many other syndicators in a couple of key ways. First, the service is not available on a lease basis. It is offered strictly as a turnkey package, with the stipulation that the tapes may not be duplicated or re-sold. The normal contract period is about 18 months.

The other key difference, according to Scott, is the price. The Pacific Music package is available for about $350 a month, which Scott says is considerably lower than the industry standard.

Even though Pacific Music is a new service, Scott thinks that his 25 years of successful Beautiful Music programming is a big plus for the clients of the service **BM/E**

The New ITC Benchmark
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No. 1 Cart Machine
Today, one out of every two broadcast cartridge machines purchased worldwide is an ITC Premium Line machine. Now, four new features make this first-choice line an even greater value.

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The head is new. The open-faced design is cylindrically shaped rather than hyperbolic. MuMetal laminations are surrounded by epoxy filler impregnated with aluminum oxide particles for shielding and durability. Core windows are wider than conventional designs. The end result is greatly improved frequency response without low end humps and bumps.

Removable Head Module
True center pivot design. Azimuth, zenith and height adjust independently. Locking one does not affect the others. Steel ball pivots and longer azimuth arms permit finer tuning.

Improved Tape-Head Alignment
New cartridge positioning system assures precise, rigid alignment of tape to head even when insertion is hurried or careless.

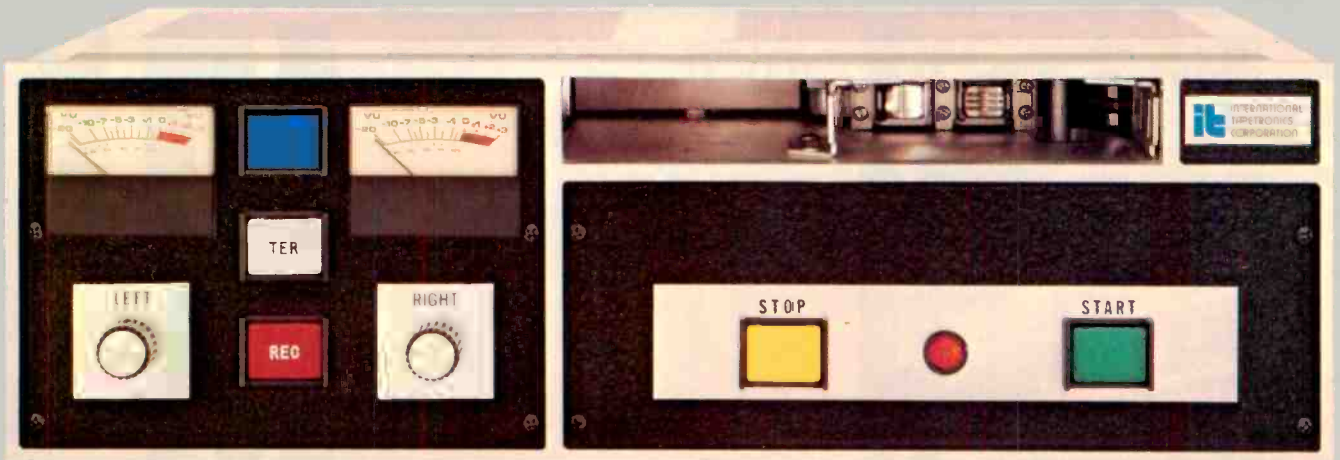
Long-Life Pressure Roller
The 525K pressure roller offers twice the pulling power and extended life. Tolerates common cleaning chemicals. Holds its durometer even in high humidity.


New Cart Hold Down


New Head Design


New Pressure Roller


New Removable Head Module



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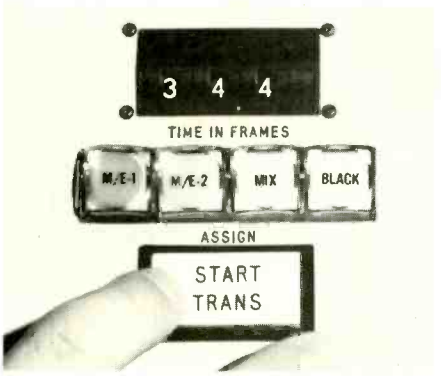

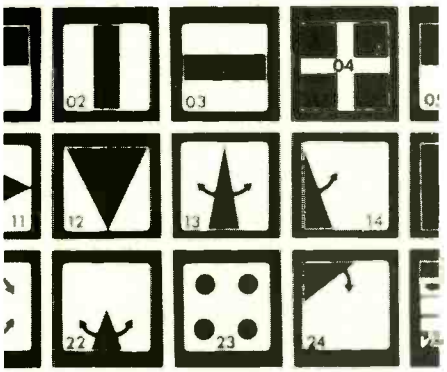

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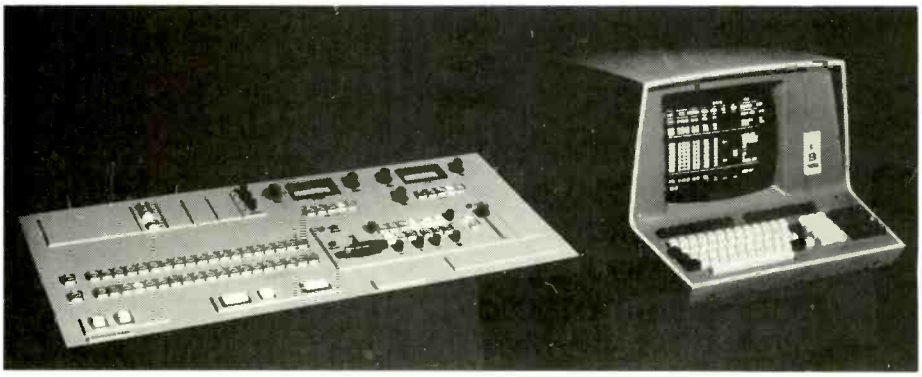

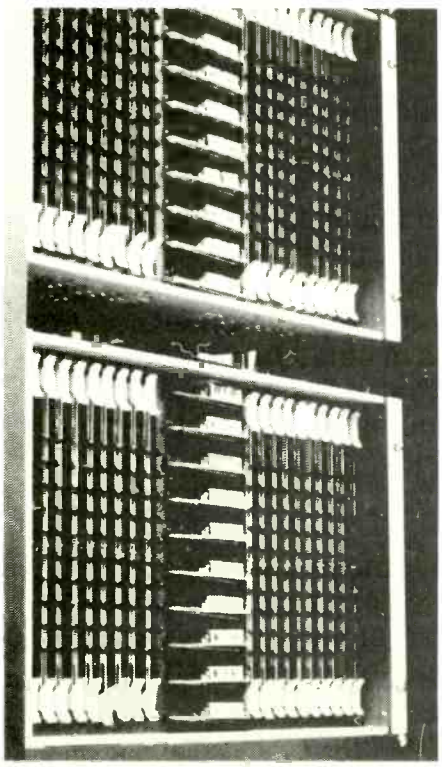

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Eighth Decade Consortium: Take Two

LAST YEAR, five television stations with nothing in common except a commitment to quality local programs and a coincidental affiliation with ABC jointly produced an hour-long documentary on working women called "What Does Your Mom Do?" (see *BM/E* July, 1980) What made the show unique was the national scope of the subject with a very local focus.

The program was narrated by Ed Asner of *Lou Grant* fame, but each individual station had a local personality (usually the co-anchor of the news) introduce the program and appear in bridges and transitions with Asner. It looked to local viewers as if their station had the clout to hire a star of Asner's stature to narrate a local documentary.

While there were some problems with the first production, the reaction was positive enough for a second broadcast.

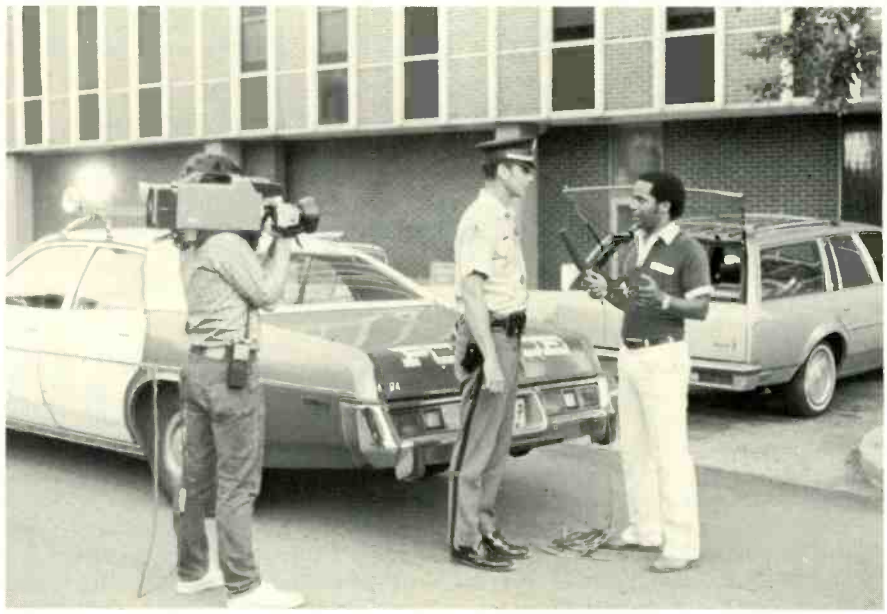
The general managers of the five stations — KOMO-TV, Seattle; KSTP-TV, St. Paul; WCVB-TV, Boston; WJLA-TV, Washington, D.C.; and WRAL-TV, Raleigh-Durham — asked their staffs to come up with a topic for the second joint project. They decided to do a program on crime, but not the normal "lets-scare-the-pants-off-them" approach. The stations wanted to take a look at some positive ways in which crime was being combated by ordinary citizens.

Each of the five cities had some kind of community crime prevention program that seemed to be working. These were not situations of gun-toting vigilantes trying to take over where the police and the criminal justice system failed, but people trying to reclaim the safety of their streets because they were simply "Fed Up With Fear," which happens to be the title of the show.

For this year's production, the executive producer is Lois Matheson from KOMO-TV, the Fisher Broadcasting outlet in Seattle. As coordinating producer for the show, it was her job to

Lois Matheson, executive producer for the Eighth Decade Consortium, checks the opening sequence with KOMO-TV's Ken Schram who produced and reported the Seattle segment of "Fed Up With Fear"

TV Programming



WRAL-TV anchor Vic Carter talks to a Raleigh-Durham police officer about juvenile crime for his segment of the program

insure a uniform look without losing that individualized local feeling. In a meeting with the other producers — Kathy Cunningham-Mathews of WJLA (last year's executive producer and the only returning alumna), Pete Peterson of KSTP, Cathy Perron of WCVB, and Kevin Duffus of WRAL — all the possible approaches were worked out and objections reconciled.

"We had an all-day session . . . in St. Paul . . . and hammered it out, from production philosophy to how we were going to make it happen to whether we were going to segment the show and to the kinds of things we wanted in each segment," explained Matheson.

Film-to-tape sans star

There are some major differences between this year's project and the first one. First and foremost, the first show was shot on film and this one is all tape. Even though four of the five stations are in larger markets (Seattle is fifteenth, St. Paul is thirteenth, Washington, D.C. is eighth, and Boston is sixth), all felt more confortable with film last year than tape.

This year there was a short lead time because the Consortium wanted a more topical subject, and tape was the only way to give the necessary speed and flexibility. The stations also had a year's more experience with tape, so the producers were as comfortable with tape as their predecessors had been with film.

Another change is that this production would not have a big-name host like Ed Asner since the producers felt that this show needed a totally local flavor. Matheson wanted a magazine feel to the show. "It really emphasized the fact that we were going to five different cities across the nation. With the local talent doing the wrap-around, it gave a stronger sense of locality to each market," she explains.

Putting it all together

The major problem with the film

WJLA-TV anchor David Schoumacher (r) rides with Washington, D.C. policeman Ronald Hampton as he patrols an inner city neighborhood which is helping the police reduce crime in the area

production last year was the sheer volume of work heaped on the executive producer. All the work of putting the final product together for five stations fell on the shoulders of Kathy Cunningham-Mathews. Each of the stations shot their segments and shipped the footage to WJLA, where the five versions were conformed.

It was too much work for one person to have to deal with. It also took a long time because of the constant wait for prints and the constant adjustment for the different shooting capabilities of the stations.

With tape, it has been possible to spread the work around to the individual station producers. The segments, when completed, were sent to Matheson for editing into a submaster. "The submaster tape had the open — which was produced here [at KOMO-TV] — and then black spaces for the individual station host; then story; then teases," Matheson explains. "Everything was built on that submaster reel, even the spaces for the local hosts. On one of the audio tracks I had our host reading the copy so the producers would know how that material integrated with the show." The producers were then able to shoot the bridges in their respective cities and edit it onto the submaster in the holes provided. Matheson felt that this gave a continuity to the show. She also wrote all the copy for the various transitions so that it was consistent in tone.

All the producers interviewed by *BM/E* had similar comments about working on this joint effort. They all felt that it gave them a different perspective on their day-to-day jobs because of the interchange with other creative people in other parts of the country doing similar work. Pete Peterson of KSTP-TV, St. Paul, was even more grateful for the joint project because he has spent his entire broadcasting career at the same station and this afforded him an opportunity to get an insider's look at the way things are done elsewhere.

The positive feedback from the first production of the Eighth Decade Consortium led to this one. The member stations feel that this kind of cooperative effort can be of enormous benefit to stations that aren't part of a chain of group-owned stations. The shared costs allow for network-quality shows at local prices and offer the prestige of doing prime-time shows. The opportunity for producers, camera operators, and editors to work on a project such as this can engender some creative fallout that will positively affect the rest of the station's product.

With all these benefits, the next production of the Eighth Decade Consortium may be just one of a type which other stations will be doing all over the country. **BM/E**

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WCVB-TV: THE TREND IN POST-PRODUCTION?

The range of post-production at Boston's WCVB-TV goes from the simplest news editing to the most complex Hollywood-style movies. Can other stations produce 62 hours of local programming at a profit?

IN THE LONG and bitter battle to acquire the license of Ch. 5 in Boston, a local group of investors had to make a lot of promises. They promised to make the station truly responsive to the community by producing what many considered an enormous amount of local programming. Many in the broadcasting community firmly believed that it couldn't be done; certainly not on a profit-oriented commercial station. Toss in the fact that the station was an ABC affiliate in the days when ABC was number four in a three-network race, and the prospects for WCVB seemed to spell disaster.

That was 10 years ago. Today, WCVB-TV is considered by many to be the best television station in the country. It is without question the most prolific. WCVB-TV produces 62 hours of local programming a week. It recently produced a made-for-TV-movie, *Summer Solstice,* which will air on ABC this season and stars Henry Fonda and Myrna Loy. The station has a syndication service, BBI Communications, which markets many of its programs such as *House Call, The Baxters,* and *Miller's Court.* BBI Productions, another subsidiary, produced *Summer Solstice* and plans to produce other entertainment programs.

If there remain any skeptics about the viability of WCVB's approach to local broadcasting, that skepticism should be put to rest with the news that the station has been sold to Metromedia for a record $220 million. Metromedia obviously feels that WCVB and its affiliated companies will be profitable enough to repay the investment.

At most stations, a large volume of the editing effort takes place in the news department. Things are no different at WCVB. The station's news effort occupies a good chunk of the broadcast day, starting with an hour-long newscast at 6:00 a.m. In a random, unscientific survey of Bostonians, four of the six people asked were viewers of *Eyeopener News.* Other newscasts are at noon, 6:00 p.m. and 11:00 p.m.

Henry Fonda and Myrna Loy star in Summer Solstice a movie made by WCVB-TV for air on ABC-TV. It's the first film by a local station to be purchased by a network

The station has been all-ENG for less than a year, but when the transition was made, it was made with a vengeance. The six editing booths are equipped with Sony BVU-500 recorders and BVE-500A editors. There is a news department videotape area equiped with six BVU-500s for recording microwave transmissions, network newsfeeds, Cable News Network (the station has an agreement with CNN for exchanging news material), satellite feeds (the station is in the process of installing its own downlink), and anything else necessary for the news department.

The news department's editing and videotape facility was designed cooperatively by the news and engineering departments. According to assistant news director Emily Rooney, "The engineering department . . . is really sensitive to our needs and they want to make things as good as possible. They're the ones who are quite creative when it comes to new equipment and new ideas. Very often, they are the ones who will come forward and say 'Hey, why don't you try this.' We have a really good relationship with our engineering department."

The concept behind the news department's ENG opera-

The Trend In Post-Production?

tion is not unique, but it seems to have been effected without many of the transitional problems that other stations have experienced. It may be that the extra time it took for the station to make the full switch gave everyone a chance to study the mistakes of others. At this stage, the post-production effort of the news department is limited to the simple cut-only edit capability of the Sony editors. There is no effort to go beyond this method execpt for series during rating periods. The day-to-day news pieces are kept simple. The only exception is the pre-mix of graphics that might be difficult to do live.

Several other news departments have started to place a greater emphasis on more creative post-production techniques even in the more routine daily news pieces. For example, WTAE-TV, Pittsburgh, recently installed a Convergence ECS-103 editor with built-in switcher. According to news director Joe Rovitto, "The new editing system allows us to do freeze frames, dissolves, and other effects right in the edit booth."

Another example of added post-production effort is at WDVM-TV in Washington, D.C., where a number of regular news features have standard animated openings and closings that give those pieces a different look from normal features. For example, science reporter Steve Gendel began a series of weekly reports on trends in science called *Future File,* and a special animated open and close was designed to highlight the reports. The reports became popular and were increased to two a week. "After a while," said Gendel, "we were doing a science piece almost every day, so we decided to drop the *Future File* animation. I started to get phone calls and letters from viewers asking why we stopped running *Future File.* People were reacting as much to the special look of *Future File* as to the content of the reports." Gendel feels that the extra post-production effort adds to people's response to reports. What is even more telling is that, except for the animated open and close, the *Future File* pieces are simple cut-only edits. The addition of the animation gives a slick, network-quality look to the piece.

The post-production effort in the news department at WCVB-TV is aided by the library of file tapes. Rooney feels that it gives the reports a depth that wasn't possible with film. "We did a local rally recently, commemorating the anniversity of Nagasaki combined with the Reagan Administration's announcement about the neutron bomb. We only used about 15 seconds of the actual local story, but we built a piece around a lot of stuff that we had on tape and we were able to do a retrospective." Rooney feels that there was no way to add such post-production flourishes with film in the hour and an half that the reporter had to edit.

Allen Risko, executive production manager for WCVB, is responsible for mediating the post-production

WCVB does some of its off-line editing on CMX Edge editors. Editor Rob Roy uses one of the station's three Edge editors

Chief engineer Dave Underhill (r) talks with technician Jim Watson in the videotape area. Underhill believes that "good people" make the difference in WCVB's post-production effort

Rhonda Hasday, supervisor of ENG operations, edits a new piece with Scott Obreza. She is responsible for coordinating the post-production activity for the news department's six edit booths

Burt Lippman, President
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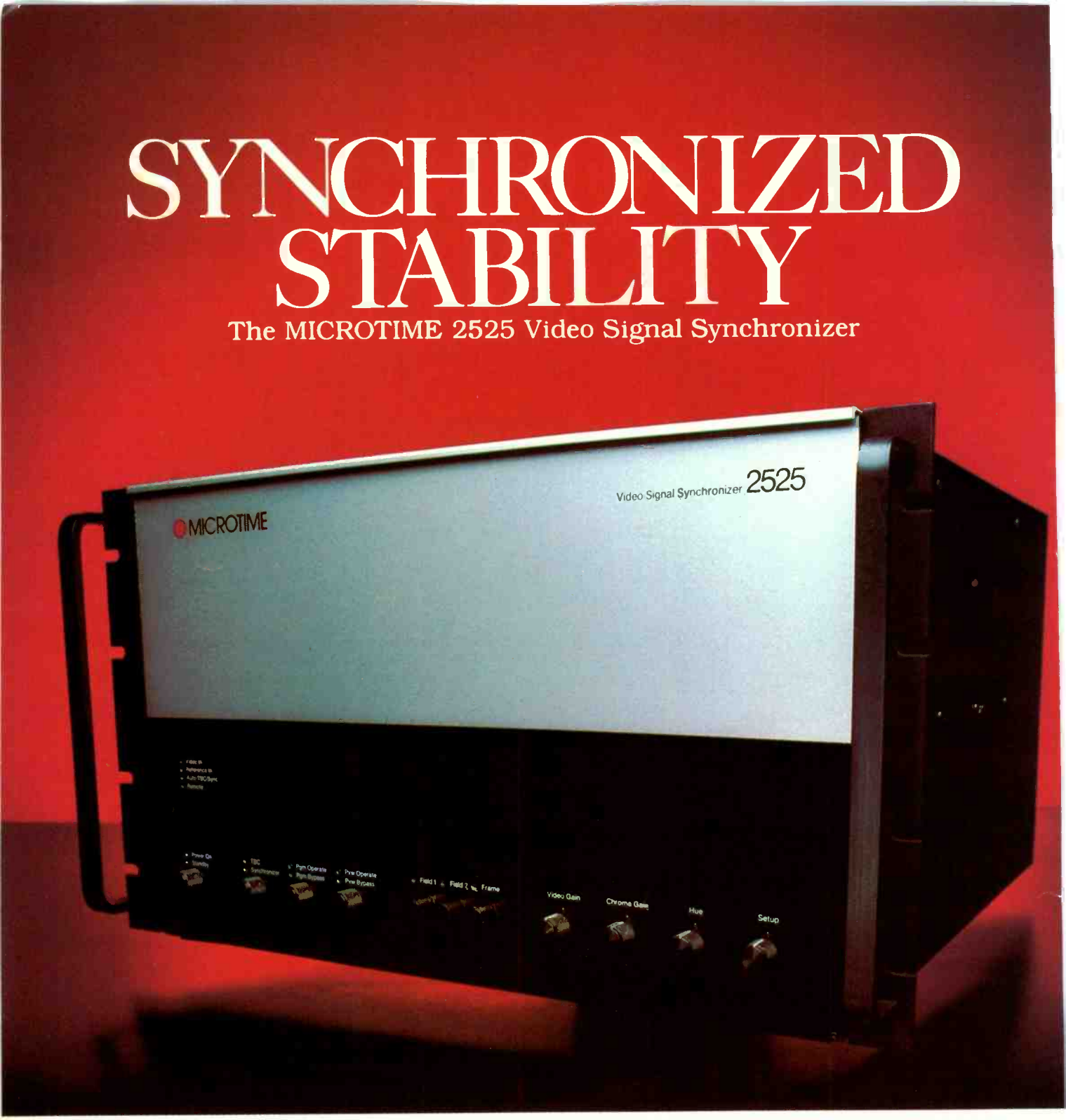

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The Trend In Post-Production?

WCVB's control room gets a constant workout because of the volume of live and tape production. The live production at the station averages nearly seven hours a day

There is a certain enthusiasm that is prevalent at WCVB and the staff is not above showing it

for the non-news areas of the station. He constantly has to navigate the no-man's land between the needs of the post-production effort and the on-air needs. The overlapping priorities could cause conflicts, but somehow everything gets done and none of the tension that is observable in other stations was evident during a recent *BM/E* visit to WCVB-TV.

Risko and others interviewed at the station seemed bent on avoiding the problems that can develop in a station that also doubles as a production house. He says the station has to deal with "a terrific scheduling problem, a difference — an extreme difference — in the mind sets of the kinds of individuals that work in both places, and the ability to schedule large blocks of time for production facility and yet not have it interrupted by on-air operation."

One solution that is used at WCVB is to take some of the post-production out of house. Because of the syndication effort, some of the programs are profitable enough to mandate it.

Technically, WCVB-TV is not remarkable — neither super state of the art nor behind the times. The station has one-inch capability, but there is still much two-inch equipment in the videotape area. The CMX 340X edit facility is still new enough so that not everyone is at ease with its capability; the learning process is still going on. For off-line, the station has three CMX Edge editors. Most of the off-line editing is done on the ¾-inch U-Matic format with Sony BVU units. The main control room could be upgraded, and there is no digital effects generator.

If the station isn't remarkable technically, how does it turn out not only volume but quality productions? Chief engineer Dave Underhill says simply, "good people." He thinks the attitude of the personnel, both engineering and production, makes the crucial difference. It is not a new answer, but it was voiced with real belief not only by Underhill but by practically every person interviewed.

"A good engineering manager or technician ought to be a producer at heart and a talent at heart and a director at heart too — he's got to have those instincts," Underhill explains. "You can't really coordinate a good post-production effort if you don't understand editing. And I don't mean just understanding how the machines get phased together and how an insert occurs; I mean understanding editing — feeling it. Probably you have to have done it. You centainly have to have an empathy for the

The Trend In Post-Production?

instincts that go with it.

"If you're going to get a documentary edited, it's not a question of looking at the schedule and seeing who's available to run tape machines. You need someone with the ability to turn to the producer and say, 'That cut doesn't work.' You need someone to be critical of the quality of the material from a technical standpoint but also to be able to put logic into it and know when ideas are being communicated effectively."

The idea that WCVB is still a place for people comes through in all the conversations with staff members. Bob Bennett, president and general manager, sets the tone for staff. Bennett is a man who is not afraid to fail. He seems to be more concerned with not having tried and later regretting it. "We've done some shows around here," he explains, "that didn't work quite the way we wanted, but we proved that we could do some things that we weren't supposed to be able to do at a local station." Bennett feels that you can gain as much from those projects that were less than successful as from those that work perfectly. When the leader says "Let's try it!" (and means it), the staff has more of a tendency to stretch its wings and try not only to fly but to soar.

An example of that tendency is *Summer Solstice*. Someone asked, "Where are the new generation of writers coming from?" There had to be a pool of people who could write television shows outside the Hollywood enclave, so the station held a contest for an original teleplay. What came out of the competition was a script so good that the newly formed production arm of the station, BBI Productions, was able to convince Henry Fonda and Myrna Loy to star in a made-for-TV movie. ABC took a look at *Summer Solstice* and bought it for airing this season.

Aside from the fact that a local television station produced an entertainment film of network quality, what stands out is that most of the people who worked on the film were already on staff. Allen Risko tells of the time when Henry Fonda arrived for his portion of the film and there was a screening of rushes of the earlier shooting. Everyone was waiting in a mild state of panic for his reaction when the screening was over. "I like it already. Who's the cameraman," said Fonda. "I want to meet that man." Bob King, director of photography, was on the WCVB staff and had never shot a feature film before. "It broke the ice," said Risko.

Producing on *Summer Solstice* was a physical drain on the WCVB staff. The same people who were working on the location shooting on Cape Cod also had to keep the station on the air and shoot and post-produce all the other programs.

"It was extremely draining, but it was also very exciting," adds Risko. "It was a chance to do something that was the next level of production."

Giving the staff an opportunity to work on what Risko calls "the plums" raises the level of the routine work. Risko says it gives the ordinary work a certain sparkle that would be missing if producers, editors, camera operators and sound recordists didn't feel that there were frequent opportunities to work on special projects that really are special.

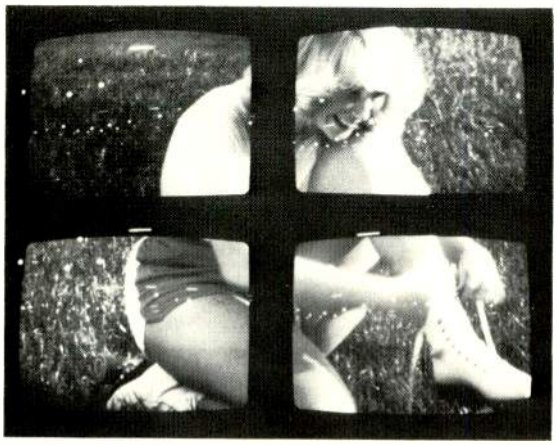
That knowledge attracts a higher caliber of person to WCVB-TV. "It draws the kind of people to the station who have the talent and energy to take on all types of projects, and knowing they'll have the opportunities to work on the plums keeps their enthusiasm up for doing the more routine work."

BM/E focused on the post-production effort at WCVB-TV because of the volume and range of programs that the station produces, thinking that some new lessons might be learned. Maybe we would discover the secret that causes the station to be widely regarded as a model for all commercial broadcasters.

The secret is that there is no secret.

Unless you consider genuinely respecting peoples' talents a secret. Unless you consider giving people a chance to use their potential a secret. Unless you consider openness a secret. Unless you consider encouraging people to have fun a secret. Unless you consider giving people the tools with which they need to work a secret. If you do, you've just learned the secret of what makes WCVB-TV work. **BM/E**

CMX MULTI-SCREEN VTR DEMO



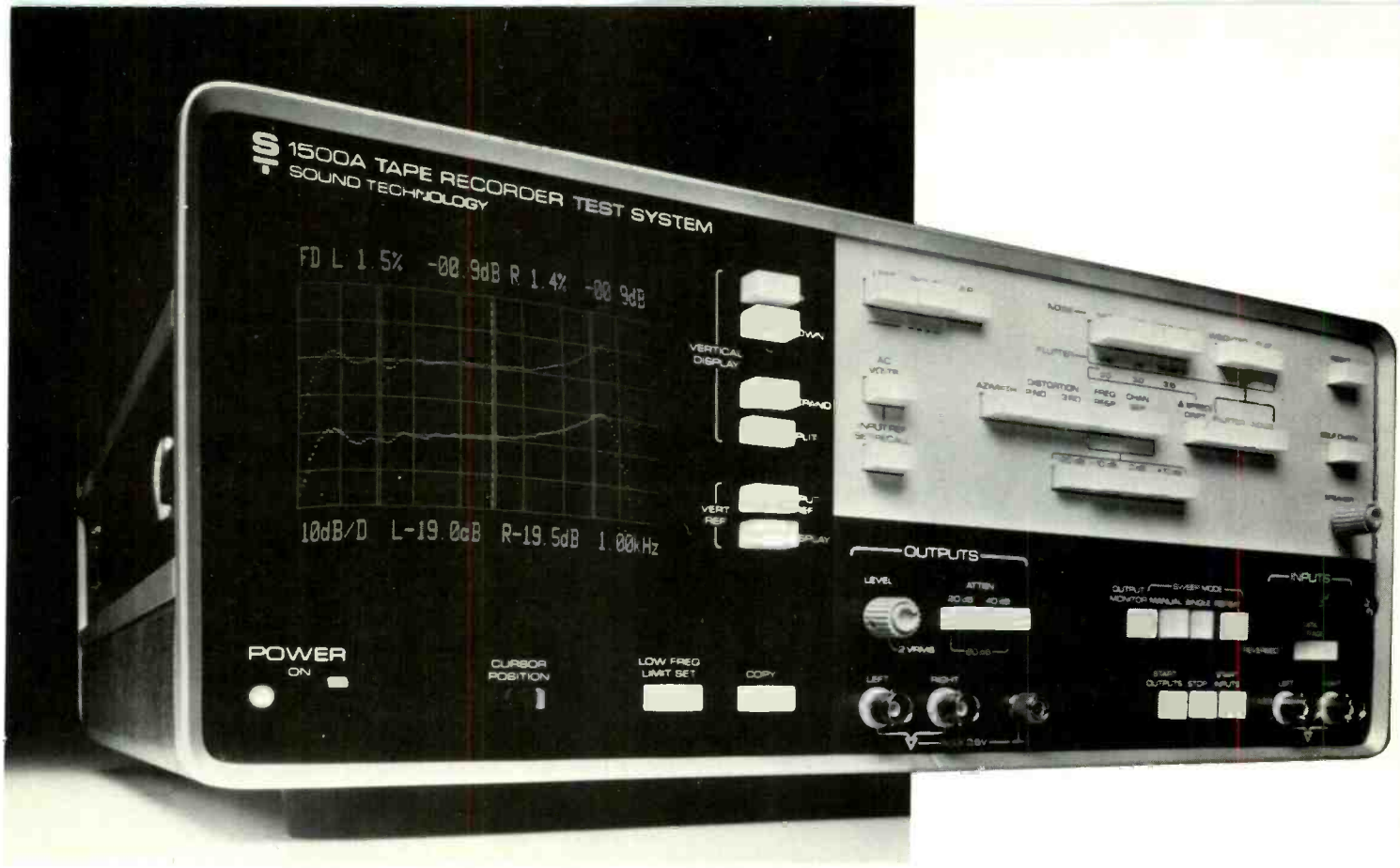
What looks like a quad split is really four separate screens

From the aisle it looked like a quad split on a projection-size screen with a grid blotting out part of the picture. At closer examination it became clear that it wasn't a quad split but four separate screens. The usual reaction was open-mouthed disbelief; then intense interest. The interest centered on how it was done.

At this year's NAB convention in Las Vegas, CMX/Orrox put together a tape presentation to honor both its tenth year as an NAB exhibitor and to show off the capability of the CMX 340X editor. They called the demonstration 4-Sight and freely admitted that it had no practical use outside its promotional value. CMX executive producer Don Reynolds said, "We've had a number of inquiries from pr firms and ad agencies but when they find out that you need four $70,000 tape machines and a $50,000 editor they lose interest." CMX was willing to bear that kind of expense and, if the reactions of the crowd at the CMX/Orrox booth were any indication, it may have been worth it.

Reynolds and producer Gary Youngs conceived the project and put it together with the assistance of One Pass Productions. The key to the production was the use of four cameras mounted in a grid so that each camera shot one quarter of the scene. Each camera was attached to a separate VTR.

Reynolds explains the editing technique, "We edited two of the tapes and then played them back with a quad split to see them together. Then we went back to fix up any bad matches. We edited the third tape and put that in the quad split and then the same thing with the fourth tape. We had to go back and do some more re-editing but that's the basic technique." At the NAB, the tapes were synced on the four tape machines with the CMX 340X.



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THE QUALITY OF FILM— THE SPEED OF TAPE

Increasingly the film vs. video dilemma is becoming a film and video solution. Either/or has been supplanted by and/or in which producers are resorting to both media's strong suites. Nowhere is this trend clearer than in the post-production of commercials where the precision of electronics is as valued as the vaunted "film look."

IN THE DARKENED ROOM, the account executive points her finger toward the carefully calibrated, split-screened monitor, on which a model's hand, a cheese cutter, and four or five pounds of cheddar are freeze-framed in mid-slice.

"The girl is all right but the cheese is terrible."

The colorist leans back slightly, his eyes moving rapidly between the cheddar the way they liked it yesterday and cheddar the way they wanted it today.

"Which is terrible . . . the new . . . ?"

"No, the one on the left. The one we did before. The client is very concerned that their cheddar look bright yellow, but I think that the yellow on the old one is maybe a little too much . . . I think this one is a little more like real cheddar . . . they were real concerned when they saw the rough cut because it was a one light print. But this one's fine."

"Okay . . ." responds the colorist, jogging ahead a few frames. "How about this last scene?"

The color correction system is controlled from this room at Chicago's Editel

Editor's note: This article is based on contributions from Doyle Kaniff, executive vice president; Len Pearlman, general manager; Don Cox, chief engineer; Joe Gordon, film services manager; and Pete Janotta, senior colorist, at Editel-Chicago.

Quality Of Film — Speed of Tape

Before transfer, all negatives are carefully cleaned using the Lipsner-Smith CF-2000 system

"Well . . . there's only one problem I can see. I think the second cheese may be a little too close in color . . . since I lightened the cheddar we may have to lighten the gouda. Make it a little less yellow . . . a little creamier color."

"Like that?"

"Yeah . . . what we want to do is make a definite distinction between those two cheeses . . ."

"Well, we could make one green and one magenta . . ."

With this client, it was cheese. For the next, the right shade of suntan. With each new commercial, another product, another model — and another producer, who can very easily go for cool today and insist on warm tomorrow. Which used to mean, under the rules of one light answer prints, lots of time in screening rooms and lots of trips back to the film lab. But with the emergence of new negative transfer technology — and of course, the computer — it's no longer a case of color correction while you wait, but color correction while you watch.

To the followers of new trends in post-production techniques, instantaneous color correction might be seen as another video victory in some sort of film vs. tape "battle." Indeed, the familiar arguments advanced by the true believers on either side, while no longer able to convince the listener that film is always better or tape is always better, still tend to make us settle into a comfortable set of notions about the relative advantages of the two media.

However, we should never try to dictate how people do their business; what we should do is provide tools. Once we have the tools, we must let our customers — agencies, production companies, and film editorial services — know what we have to offer. Not in terms of a film vs. tape battle, but in terms of capabilities. Our job is to service trends.

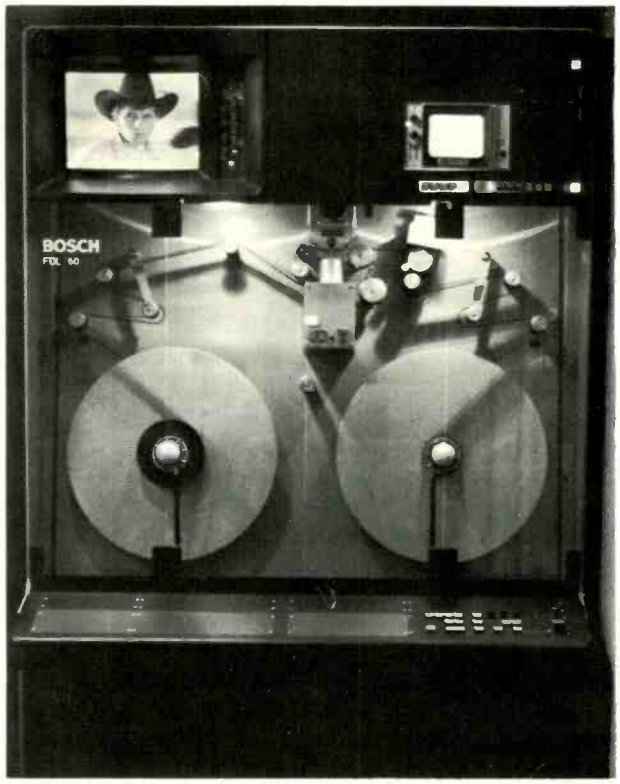
In order to combine the latest ideas in post-production with the best available equipment and most creative environment, Editel-Chicago embarked on what we refer to as the Phase II Expansion project shortly after moving to our present location in 1977.

Positive views on negative transfer

One of the major objectives of this project was to take advantage of the much improved negative transfer capabilities offered by the telecine scanner — a device that combines projector and camera into a single unit. The film handling and picture performance of these systems has now reached the point where clients are willing to load what they understandably regard as precious camera negative film onto, of all things, a machine with electric motors and buttons that say FAST forward, FAST rewind, and STOP!

With the elimination of the film-eating issue, and the disappearance of conventional pickup tubes with all their problems (scanners use flying spot or solid state devices instead of tubes), the way is now clear to realize the primary benefit of negative transfer: fewer production generations, resulting in an end product with better resolution and, especially with the addition of computerized color correction, better colorimetry. Beyond that is the interesting prospect of shooting on 16 mm film and finishing with a spot that's just as good as 35 mm done the old way.

Since film cleanliness is second only to preservation of sprocket hole integrity in the mind of the film maker, an additional objective of the Phase II program was to create a clean room environment for the entire scanner area, to



Transfers take place through the Fernseh FDL-60 film scanner which uses CCD imaging technology. Both positive and negative, 16-mm or 35-mm film can be accommodated

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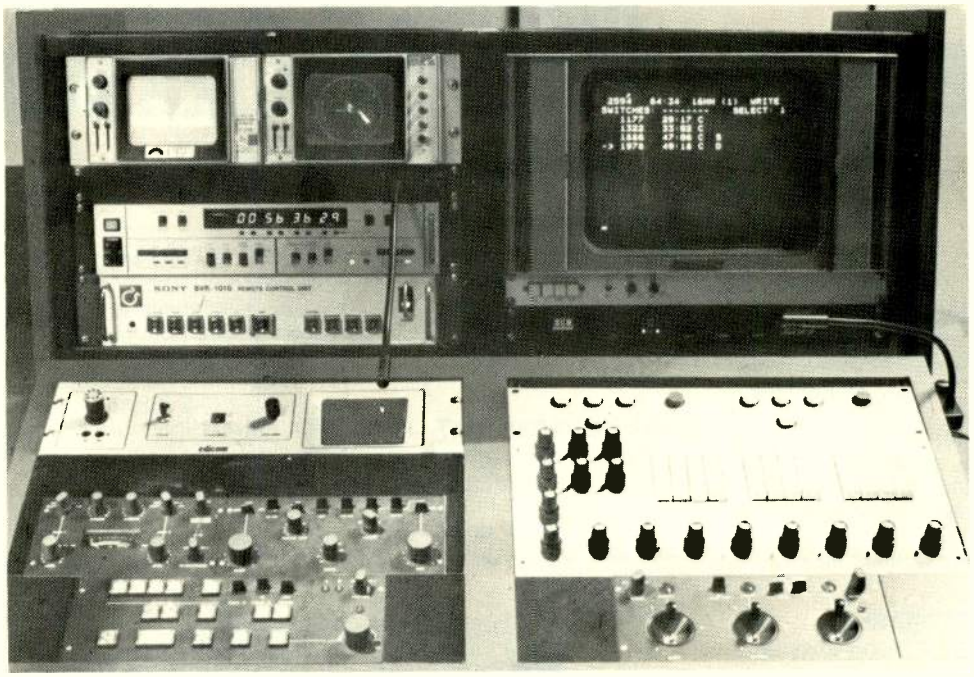
Quality Of Film — Speed of Tape



CRT displays the locations for frame-by-frame color correction using the controls on the panel

include the latest in cleaning equipment for the film itself.

With this as a plan, the need for an expanded editing capability for post-transfer work became clearer than ever. It seemed to us that as clients completed the negative transfer process, many would want to continue right into electronic editing. Accordingly, two new editing suites, along with a new audio mix and sweetening room, formed the balance of our objectives for the Phase II program.

Following acquisition of 9000 square feet of space on the floor immediately above our existing facility, preparations began for installation of the required hardware. With an investment of this magnitude — over $1 million at the time of our open house in November, 1980 — a great deal of consideration was given to the choice of equipment, which, though it comes as no surprise to anyone in this business, sometimes led us toward products so new that they couldn't be delivered. This was especially true of the FDL-60 and the Mach One; but they were both impressive enough, we felt, to make the wait worthwhile.

In the case of the FDL-60 we saw not just a better film chain, which is the way Bosch seemed to think of it, but a real breakthrough in negative transfer capability. We brought a negative film to the Bosch booth at the NAB show two years ago, and apparently were the first to think seriously about using the FDL strictly for negatives. Flying spot scanners were around at that time, but the FDL, which uses charge coupled devices (CCDs), produced a better negative transfer than any we had seen previously and had the potential for further improvements as newer CCDs became available. The FDL's superior picture quality was due in large part to the higher vertical resolution provided by a full-frame, 525-line memory. (It also appeared, at least at first, that the FDL could easily be integrated with a computerized color corrector. As it turned out, mating these two devices required some additional engineering on our part, about which more later.)

Aside from picture quality, we were also very interested in the film-handling and picture-viewing characteristics of the unit. One of the built-in features of all telecine scanners is, of course, continuous film motion (capstan drive) as opposed to the intermittent pull-down movement (sprocket drive) found in conventional projectors. Beyond this inherent advantage, we noted the FDL's simple, clean-looking film deck (some of our clients, seeing it for the first time, have said, "That's it? I thought that was the film cleaner!"), which serves to speed up the threading process, further reduce mechanical stress, and permit higher shuttle speeds.

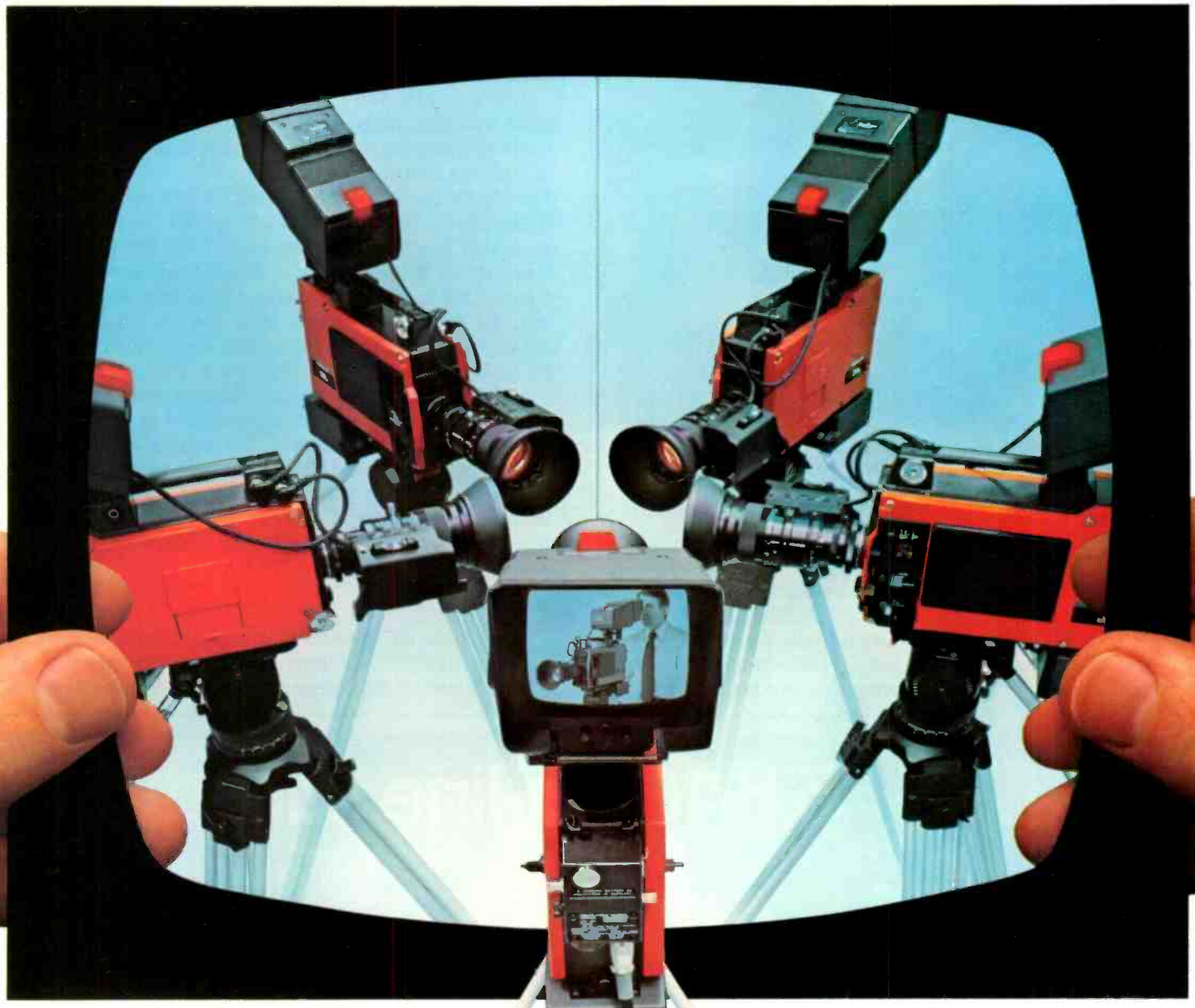
While everybody likes breathtaking acceleration when the time comes to shuttle film or tape, nobody likes to see the picture turn into an unrecognizable jumble while searching for that Great Shot which the client is "almost sure" is on the reel — somewhere. Although this has been a problem with some scanner designs, the FDL's CCD/framestore concept provides viewable pictures at all speeds, with the frame always full and positioned normally.

The 9000 square feet of floor space allocated for the Phase II project was divided into a film transfer department, with an adjacent "clean room" for the FDL and associated equipment; an editing suite with an adjacent VTR room; and an office area.

The clean room, which was furnished with an air conditioning vent large enough to assure continuous, positive air pressure, contains an air filter ("High Efficiency Particle Arrestor," the manufacturer calls it); a film inspection/splicing/rewinding bench; a Lipsner Smith CF-200 film cleaner, in which film is passed through a filtered and ultrasonically agitated solution of methyl chloroform and then vacuum-dried; and the FDL-60 itself equipped with a dust-protected film compartment.

The controls for the FDL, which are located in the adjacent screening room, include those necessary for film speed selection (6, 12, 18, 24, and 48 fps, forward and reverse) audio levels and video settings. Many of the FDL's video controls are integrated into the frame-by-frame color corrector, which can store an extensive list of color settings for automatic recall and implementation

Compare



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Quality Of Film — Speed of Tape

Workprint editing data is converted from feet and frames to timecode for videotape assembly using the Mach One editing system

during the actual transfer process. These include black, white, and gamma balance; gamma trim; contour (enhancement) correction; and white/black level controls.

The color corrector also includes phase and gain controls for six color vectors; a white compression control (especially useful for bringing down hot supers without affecting the rest of the picture, and for minimizing film grain); a black compression control (to increase contrast especially on prints); and a set of key pads for entry of frame numbers and other data. The color corrector also incorporates an "event list" CRT display that indicates where, by frame number (and feet and frames), color correction settings are to be applied.

While the FDL was designed to work with an external color corrector, we soon discovered we needed an additional downstream processor for white and black levels and gamma trim in order to see the effect of these corrections on the monitor when the machine is stopped on one frame. To understand the reason for this, you have to remember that the FDL scans each frame one line at a time, stores these lines in a digital framestore, then "scans" the framestore to re-create the picture. As it turns out, the gamma/white/black level circuits are located ahead of the framestore, so there's no way to modify these particular settings while looking at a still picture. Of course, you can see the correction come in the instant you roll the film again, but our colorists need to be able to concentrate on a still picture as these settings are varied. Our solution is to use the FDL's standard controls to make coarse adjustments when the machine is running, then go in and look at each frame, using our own processor (which is downstream of the framestore) to make the final adjustments.

A brief review

Before attempting to describe a typical application of our film transfer/color correction system, it might be helpful to review the film production process as it relates

to our operation. Among the several possibilities is direct transfer and color correction of either selected or all camera negatives, followed by electronic editing. Another approach is for the spot (or program) to proceed through some of the traditional stages of film production. In this case, the camera negative is used to produce positive dailies, which in turn are used as workprints by the film editor. The edited workprint is then used to select some of the camera negatives for transfer and electronic assembly. Or, the edited work print might be used as a guide for production, from the original negative, of the master positive, which in turn is used to print an "optical" negative.

Following physical inspection and cleaning, the negative is loaded onto the scanner and the individual CCDs optimized. The color corrections are then "roughed in" on a scene-by-scene basis, the first objective being to use the white, black, and gamma balance controls to remove obvious impurities in the highlights, which should normally be true white and the shadows, which should normally be true black. "Bringing up the blacks," that is, bringing out detail in the shadow areas by manipulation of black levels, is also a routine, preliminary operation. Once these settings have been made and entered by frame number, the film is rewound to picture start for a scene-by-scene review with the client.

At this stage of the process, we have found it very helpful to compare existing scene color directly with the ongoing corrections by alternating the output of the color corrector with a previously transferred one-inch copy of the original scene.

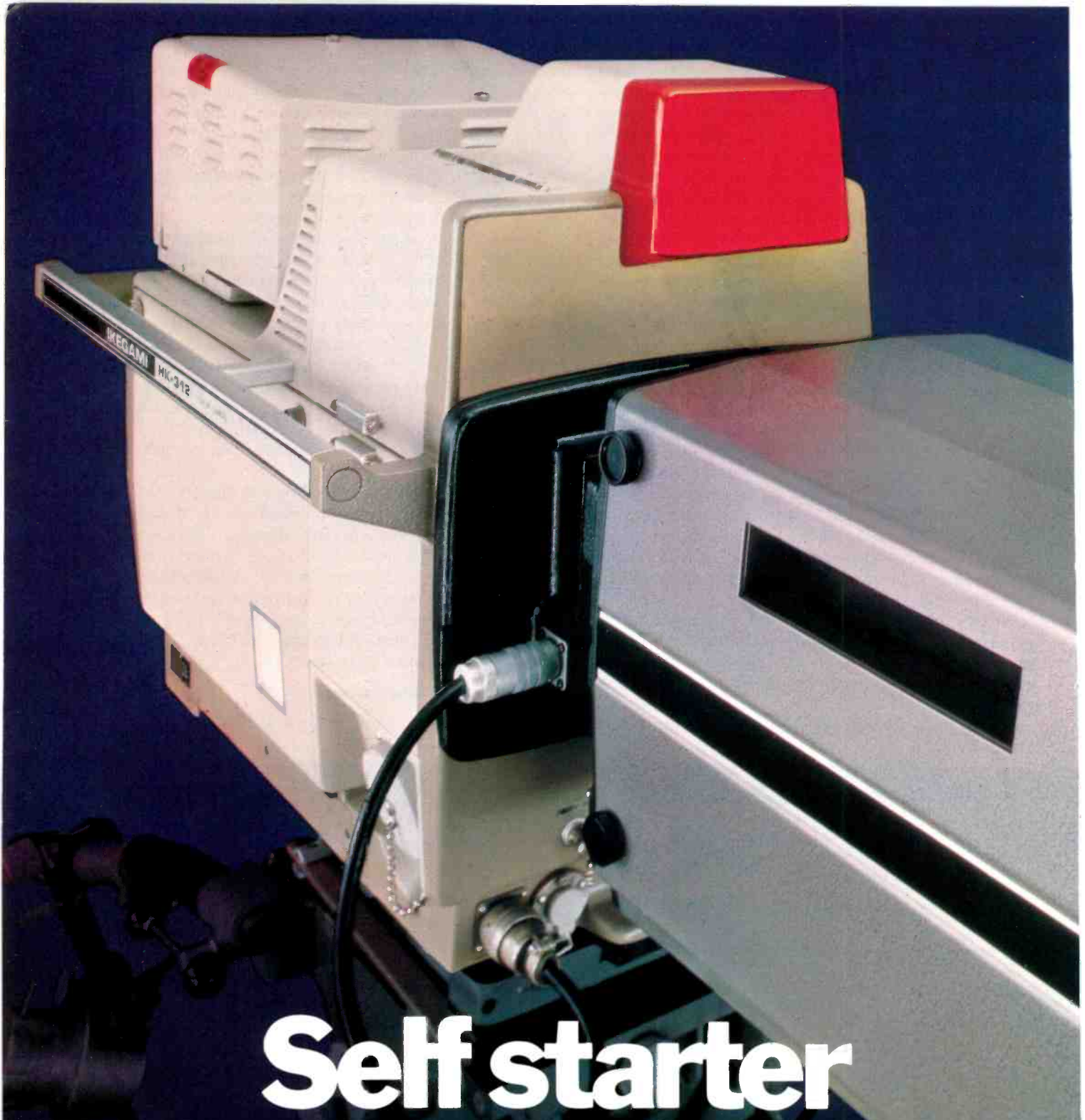
During these sessions, the client and the colorist work toward the best possible balance between "natural and realistic" on the one hand and "pleasing and attractive" on the other — always keeping in mind, of course, the FCC's color specs. The frame-by-frame review is followed by a real-time run through for final sign-off; the actual transfer, using the client-approved color settings, is made later. The correction settings are saved on floopy disk in case later adjustments are required.

Since most optical negatives are largely finished products before they come in the door, the time required for the color correction/transfer process is not great. The benefits to the client, however, are significant. By using an optical negative instead of the usual release print to make the transfer, the client has moved only one generation closer to the original material, yet the end product will compare very favorably with a print straight from the camera negative. This is largely due to the nature of negative film stock, which, by design, provides wider latitude and more stable colorimetry than the low-cost stock used for release prints.

But even with these advantages, optical negative transfer has nothing like the impact potential, for the future of teleproduction, of camera negative transfer. The reason, of course, is that film production can now "go electronic" at the point of maximum image quality, compressing all production steps, especially in the realm of editing and effects. This, as we said earlier, accounts for the development of the Mach One editing suite as in integral part of the Phase II Expansion program.

Considering the alternatives

Again, the temptation is to think of camera negative



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Quality Of Film — Speed of Tape

transfer/electronic editing in terms of "television winning out," rush out to buy the equipment, and sit back to wait for film producers to crash through the door with can after can of freshly developed negatives. Well, we shouldn't, and they won't! What really happens, at least in our experience, is that each producer will continue to carefully consider all the options and choose the avenue that combines quality, speed, cost-effectiveness, and convenience. If we want the producer's business, we must be ready to come in at any point.

Reviewing the theatrical-style film production sequence once again, we have camera negatives, followed by dailies, followed by edited workprints. Since dailies serve a function wholly apart from editing (in effect, quality control), they can be considered a permanent fixture, a guaranteed part of the budget. Well, if you have to pay for them anyway, might as well have the editor use them for the workprint, right? And once the editor is finished with the workprint, you know which scenes (selects) on the camera negative require an investment in color correction/transfer. In other words, the more elaborate the production, the less the producer will be inclined to transfer every foot of film that has been shot.

Let's pursue the economics of the process one step further: if the producer has already paid somebody to edit and conform the workprint, he now has an edit decision list, which, he reasons, should be used by the tape editor's computer to assemble the transferred negatives, including A-B rolls, into a finished program — automatically, of course!

As a start in this direction, we have developed a program for one of our desktop computers that converts the conformer's frame (or feet plus frame) list to time code, which in turn is entered into one of our editing systems. Using our "Mach One simulator" we have also written a program which allows us to feed the frame list directly into the Mach One, which then performs the necessary calculations.

We have also developed a program integrating the Mach One computer with our Grass Valley E-MEM processor, which allow us to store E-MEM instructions within the Mach One's edit list for preview, modification, and recording of complex transitions.

The availability of the program listings, along with the dedicated keyboard concept and sync mode ("on-the-fly") software, was a major factor in the decision to purchase the Mach One, which we have combined with Sony one-inch VTRs, a Vital SqueeZoom, and a Compositor I Graphics System. Speaking of Compositor, we would also like to work up a program that will allow the Mach One to call up pages directly from the disk — but that, along with a lot of other custom software, and another film scanner, will probably come under the heading of "Phase III Expansion."

Ultimately, systems will develop that will allow the application of all of Editel's video editing power to be applied to film. Editel's main editing suite includes the Mach One editor, Grass Valley 1600 7H switcher with E-MEM, and Vital Squeezoom digital video effects

How to win without taking sides

While there never has been one and only one right way to produce a show or a commercial, the advance of videotape technology, especially in the post-production area, has multiplied the options, allowing the producer who insists on maximum picture quality to make the transition to tape at earlier and earlier stages of the production cycle. The task for production companies like Editel is not to argue in favor of this or that transition point, but rather, by bringing in the right people and the right equipment, to allow the customer to do it his way. **BM/E**

Who is Editel-Chicago

Editel began in Montreal as a division of Imasco. The company later moved to Detroit (Southfield), then moved on to Lincoln Avenue in Chicago, opening a production facility with two editing suites and a telecine/color correction system. An additional facility was later opened in Los Angeles.

Editel was acquired by Columbia Pictures in 1976, becoming part of the EUE Screen Gems group. The Chicago office, now known as Editel-Chicago, moved to its present location at 301 E. Erie St. in 1977.

Services provided by Editel-Chicago include film-to-tape transfers (negative or positive, 35 mm and 16 mm); scene-by-scene color correction; editorial; electronic opticals; location and studio shooting; audio mixing and sweetening; electronic titling; and duplication.

About 80 percent of Editel-Chicago's business involves post-production of television commercials, with the remainder comprised of shows and industrials. Clients include commercial production companies, film editorial service companies, and advertising agencies.

Operating 24 hours a day with a staff of 50, Editel's 15,000 square foot plant is presently equipped with four editing suites (Mach One, CDL, CMX, and Sony ¾-inch); two telecine systems (FDL-60 and TK-28A); an audio mixing room with MCI automated console; and more than 20 videotape machines, including quad, one-inch Type B, and one-inch Type C. The company also maintains a studio with two Hitachi SK-70 cameras, an Ultimatte IV system, and a fully-equipped remote van.

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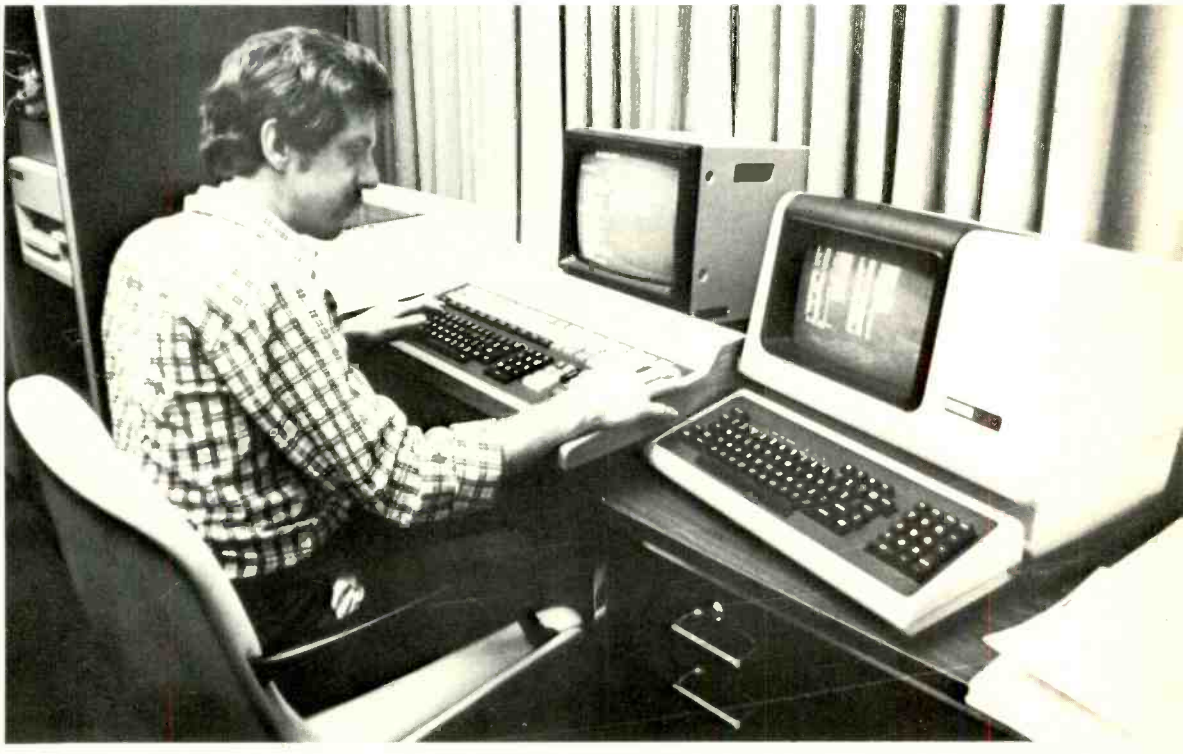
NEW COMPUTER PROGRAM BRINGS THE SPEED OF VIDEO POST-PRODUCTION TO FILM

While the film vs. video controversy continues to generate more heat than light, a West Coast post-production company finds a way to make the media relate to one another. This system, and others, could save the industry a fortune.

WHAT'S THE GOING INTEREST RATE on $5 million? That question may seem peculiar in an article on trends in post-production, but it is central to producers of prime-time television programs and motion pictures. For the past 25 years, the industry has been trying to find a way to apply the faster post-production cycle of videotape to the task of editing film — to use videotape as a tool for editing film. Why do producers need that kind of speed? The answer to the second question is the same as the answer to the first. Borrowed money is increasingly expensive, and until a project can be brought to the screen or the air, the producers will bear enormous interest charges.

Nevertheless, suprisingly few major feature film or action/adventure prime-time television projects are posted in video. While producers may be extremely concerned by



Don Kravits, one of the principal developers of the software, runs an edit decision list through the CFI computer to produce the printed cut list

New Computer Program

their cash flow situation, few are willing to sacrifice what they see as the creative certainty of film post-production for a system that still leaves too many questions unanswered when applied to the filmmaking process.

Video post-production, over the recent past, has become an enormously sophisticated process offering unparalleled speed, accuracy, and flexibility to producers of programs in the videotape medium. But the principal problem of the differences between television's 30 frames per second rate and film's 24 frames per second rate has denied most filmmakers the advantages of video post-production. Now, however, CFI (Consolidated Film Industries) of Hollywood, Calif., has made a truly significant breakthrough in the area of electronic post-production for film. According to Art Schneider, supervising editor at CFI, "we have completely licked the problem of the three-to-two pull down relationship between film and video," with no hardware modifications.

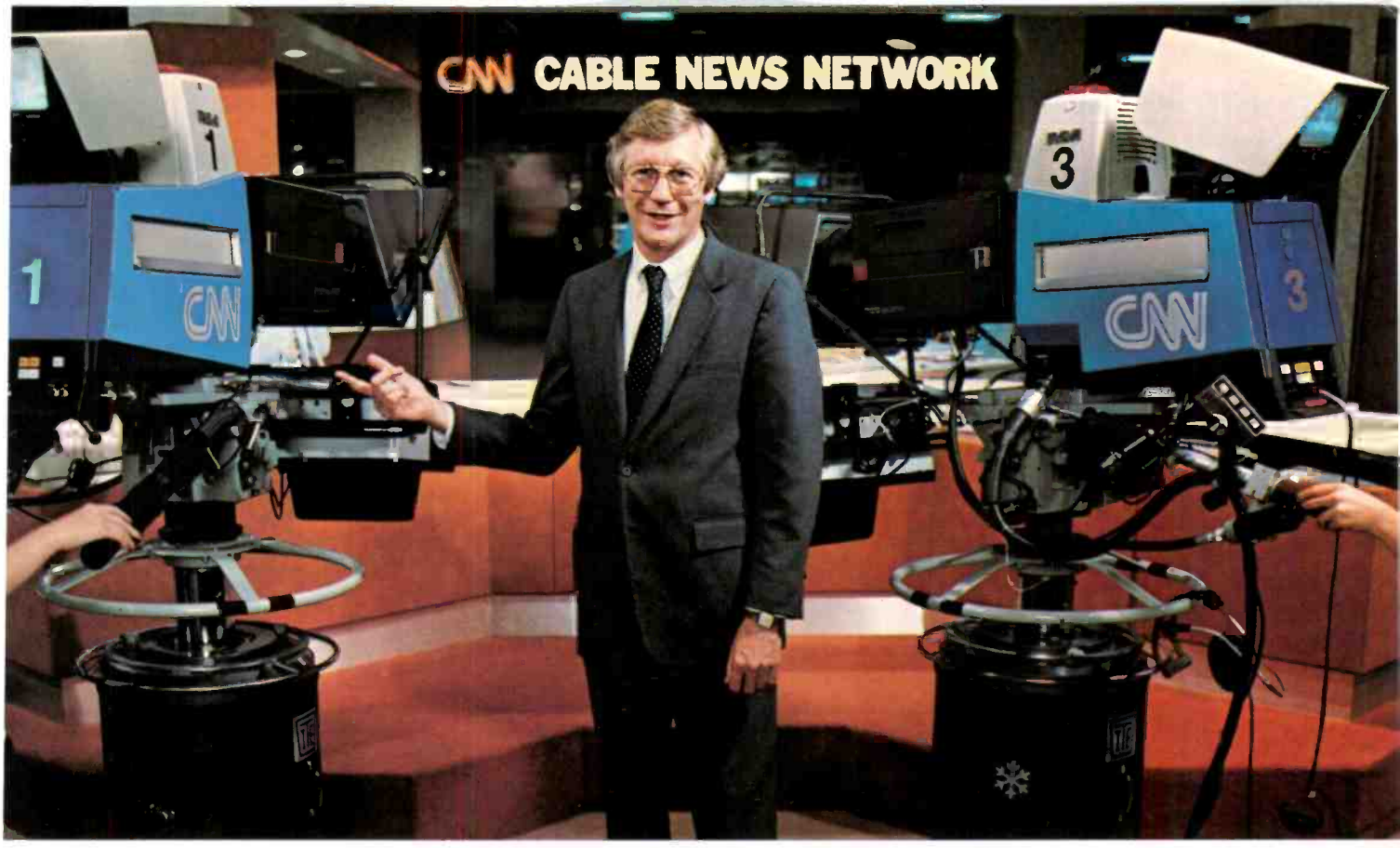
CFI, using a proprietary computer program on its in-house LSI-11 minicomputer, is able to generate a frame-accurate cut list or edit decision list using SMPTE time code for the video and either Eastman Kodak factory key numbers or laboratory code numbers for the film. While the concept of using video as a film editing tool is not new, the speed and accuracy of CFI's method are. That absolutely none of the conventional hardware, for film or video, has had to be modified is another significant achievement.

The major problem, according to Schneider, has been three-to-two film pull down ratio. "Many people, on their own, have come up with calculating methods to convert 30 frames to 24 frames," he noted. Most systems provide an accuracy of plus or minus one frame, which is good, but not good enough to truly get the benefit of the electronic posting system transferred to the film editing system. While producers of commercials have sometimes transferred film negative to video for posting, they often have determined that they would not have to return to cut the film negative. At other times, post-production of films for television has gone so far as to reach the optical negative stage in conventional film technique before transfer to video, but stumbling blocks have always arisen because of the lack of finesse available in the translation of the one medium to the other. The one situation in which the film-to-tape transfer has dominated is in the area of color correction. With the modern telecines like the Rank Cintel flying spot scanner and Fernseh's FDL-60 CCD line scanner, superb quality film-to-video transfers have been achieved. Even the modern pickup tube based systems now provide a quality of transfer that dispels the criticism of their harshest critics. All such systems use the latest in digital circuitry and processing to eliminate nearly all traces of the transfer.

The bugaboo has clearly been the problem of retaining the speed advantages achieved in video when the producer ultimately must cut the film negative. This is what the CFI approach sets out to accomplish.

Electronic editing of the transfer normally takes place using CFI's Mach One editing system

The initial transfer takes place in CFI's Rank Cintel Flying Spot Scanner room



...Gene Wright, Vice President of Engineering,Turner Broadcast Systems

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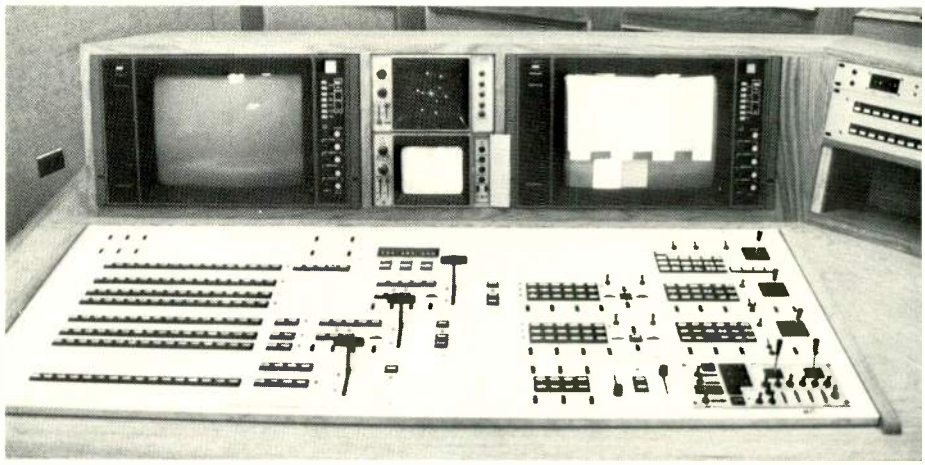


Even though sophisticated effects are available through equipment such as this CDL switcher with digital special effects, video and film effects techniques are still not totally conversant

Supervising editor Art Schneider has played a major role in seeing to it that the resulting cut list has everything in it that a negative cutter could want

A 16 mm or 35 mm film negative is transferred on CFI's Rank Cintel flying spot scanner, and a ¾-inch dub made of the transfer to serve as the video workprint. SMPTE time code is inserted in the video for easy reference and for conventional generation of the electronic edit decision list. At this point (or even later, after the electronic editing has been completed), the beginning factory key number or lab code number is entered into CFI's LSI-11 minicomputer. gthe computer program then generates a table of offsets relating each specific frame of video to one of the film key numbers. Once this table of offsets is established, the electronic edit decision list can be related specifically, at any time, to the film edge number system used. When all edit decisions have been made electronically, the computer compares that edit decision list to the table of offsets and spits out a printed cut list using factory key numbers and/or laboratory code numbers on a high-speed printer with the push of a single key.

As Schneider points out, factory key numbers on negative are usually not continuous, since only the "good takes" get printed. The program accomodates such discontinuities by searching them out and reconciling the differences. Even when a scene is repeated, the printed list will note this and organize the negative cutter's print list so that scenes that need to be duplicated can be. Further, scenes from the same roll will be grouped together, so that the negative cutter does not have to go back and forth among numerous reels searching out scenes in sequence according to the workprint. Art Schneider recommends making a 35 mm film "dirty dupe" of the video workprint in order to provide the negative cutter with a visual reference. "We have found that negative cutters without something visual to go by may make cutting errors by misreading numbers," he explained. This is not the fault of the system, which is frame-accurate, but rather simple human error. In the tests conducted at CFI, Schneider reports a high level of satisfaction among negative cutters with the system.

"There's nothing that the negative cutter will ever want for in this list." says Schneider. "It describes the edit number, eliminates discontinuities, provides the in and out key number plus duration of the event in footage and frames; it will tell you whether or not the scene needs to be duplicated and how many times; it indicates special effects such as wipes, dissolves, and fades; and it will indicate how many pieces of film were used out of each reel, and in ascending order so that the negative cutter doesn't have to run back and forth breaking apart the film." Moreover, the system doesn't care if the transfer took place with the three-frame pull down first or the two-frame — or if the pull downs have been intermixed. The system will work with factory key numbers, labora-

KCST-TV SAVES

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

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

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

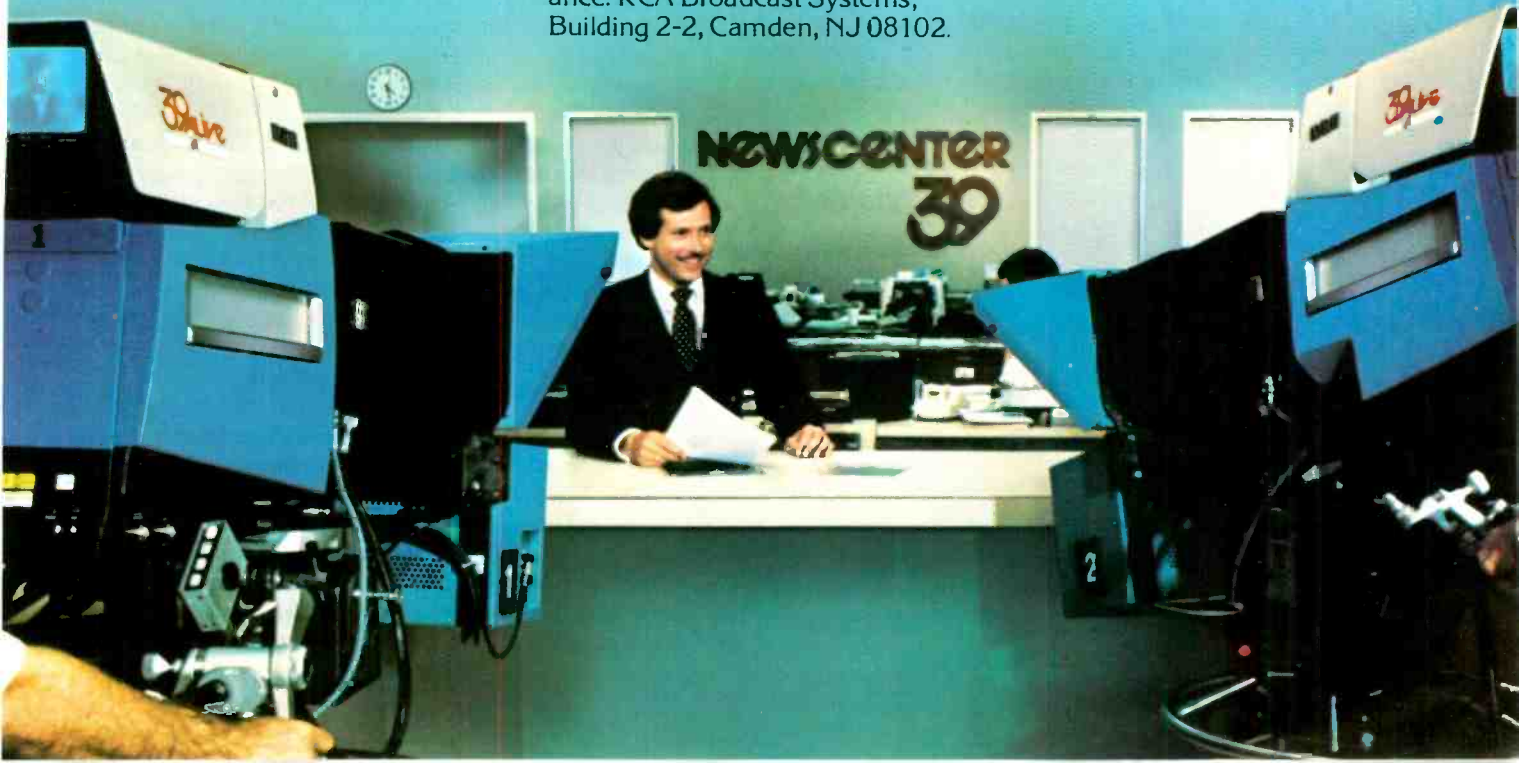
According to Tom Wimberly, Chief Engineer, it was no contest. A technical committee judged the TK-47 to be far and away the best studio camera available. Best in automatics, best in picture quality, best in cost effectiveness and best in all around performance.

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

"The TK-47 cameras have resulted in substantial cost and manpower savings. We've cut camera set-up time from an hour to less than ten minutes. Our studio lighting costs have dropped $400 per month. Camera maintenance is cut a whopping 48 hours a week. We were concerned initially about the complexity of the TK-47, but we worried needlessly. The camera is extremely reliable. When we experience an occasional problem we find that the microprocessor control makes the TK-47 easier to troubleshoot than any other camera. But best of all, we're getting unmatched picture quality, and that's helping us build our audience and double our commercial production."

Find out how the TK-47 can give you a new "look" in cost-saving, time-saving, and picture quality. TK-47—it's automatic, versatile and now available in Triax. Call your RCA Representative and ask for a showing of a tape in which six top engineering professionals tell how they are using TK-47's in their broadcast and teleproduction operations. You'll see why the TK-47 is first choice for savings and performance. RCA Broadcast Systems, Building 2-2, Camden, NJ 08102.

RCA



New Computer Program

FILM PROGRAM #115F25

EVN	EFFECTS/SLN FILM RLN	CUT-IN	CUT-OUT	DURATION	TYPE
THE NEXT EDIT IS PART OF AN OPTICAL EFFECT					
001 32A-4	B28	F23X46856 +01	F23X46856 +09	00010+07	DISSOLVE
002 33-1	B29	F19X49247 +10	F19X49252 +02	00004+07	CUT
003 32A-5	B28	F12X33334 +09	F12X33343 +03	00008+09	CUT
004 34B-2	B30	F11X54959 +07	F11X54968 +07	00008+15	CUT
005 32A-5	B28	F12X33337 +07	F12X33346 +07	00008+15	CUT
006 33-1	B29	F19X48228 +09	F19X48238 +12	00010+03	CUT
THE NEXT EDIT IS PART OF AN OPTICAL EFFECT					
007 32A-4	B28	F23X45413 +08	F23X45437 +01	00023+09	CUT
THE NEXT EDIT IS PART OF AN OPTICAL EFFECT					
008 33-1	B29	F19X46420 +10	F19X46500 +01	00079+07	DISSOLVE
009 34B-2	B30	F11X55855 +08	F11X55863 +15	00008+07	CUT
010 33-1	B29	F19X46346 +15	F19X46369 +01	00022+01	CUT
011 34B-2	B30	F11X54413 +09	F11X54416 +03	00002+09	CUT
012 32A-4	B28	F23X46314 +01	F23X46324 +08	00010+07	CUT
013 33-1	B29	F19X45712 +15	F19X45721 +14	00008+15	CUT
014 32A-4	B28	F23X46269 +09	F23X46276 +10	00007+01	CUT
015 33-1	B29	F19X46863 +07	F19X46869 +06	00005+15	CUT
THE NEXT EDIT IS PART OF AN OPTICAL EFFECT					
016 34B-2	B30	F11X55184 +07	F11X55278 +15	00094+07	CUT
THE NEXT EDIT IS PART OF AN OPTICAL EFFECT					
017 BLACK & LEADER	BL	00000 +00	BL 00004 +06	00004+07	DISSOLVE

The cut list. The list is frame accurate and provides sufficient data, with factory key numbers or laboratory code numbers to permit the negative cutter to move through his material quickly

tory key numbers, or both in those instances where dupe material has been included in the negative reel. The printout can provide both key and lab code numbers because, as Schneider points out, "some negative cutters prefer to work one way and others prefer another way."

Where unique optical special effects are employed the list will show in and out points, but where conventional effects are applied, the list will detail the effect with the exact nomenclature of the optical house.

Where sound is concerned

The system is adaptable to conventional double system post-production of the sound track. In the current stage of development, the system can transfer the film without sound and generate a parallel code list for use with the ½-inch, 4-track ATR. CFI's sister company, Glen Glenn Sound, can take the 4-track which includes the same time code set along with the log sheet and sweeten it. Currently an interlock system is used but work continues to eventually integrate the audio track using a fully parallel system.

According to Schneider, there are two stages yet to be completed in the development of this system. Schneider, Dan Brewer, CFI director of engineering, and programmer Don Kravits, who have collaborated closely on the development of the project, continue to refine the system. In the second stage, "which we have now solved essentially," the videotape process is skipped entirely if the producer wishes to work only with the coded cut list for film and audio. In a third stage, CFI anticipates being able to transfer film to video at 24 fps and to work with the video editing system at the film frame rate. Schneider notes, however, that this will involve some substantial hardware modifications to the video editing system.

The third stage is particulary attractive because it would mean complete compatibility between the video and film systems. Effects in video are achieved automatically, while the film effects process is painstaking. Although some motion pictures, especially science fiction films, often generate effects in video and transfer them to film

PRODUCTION PAY-OFF

"TK-47 cameras give us unparalleled picture quality...A must for our commercial productions"

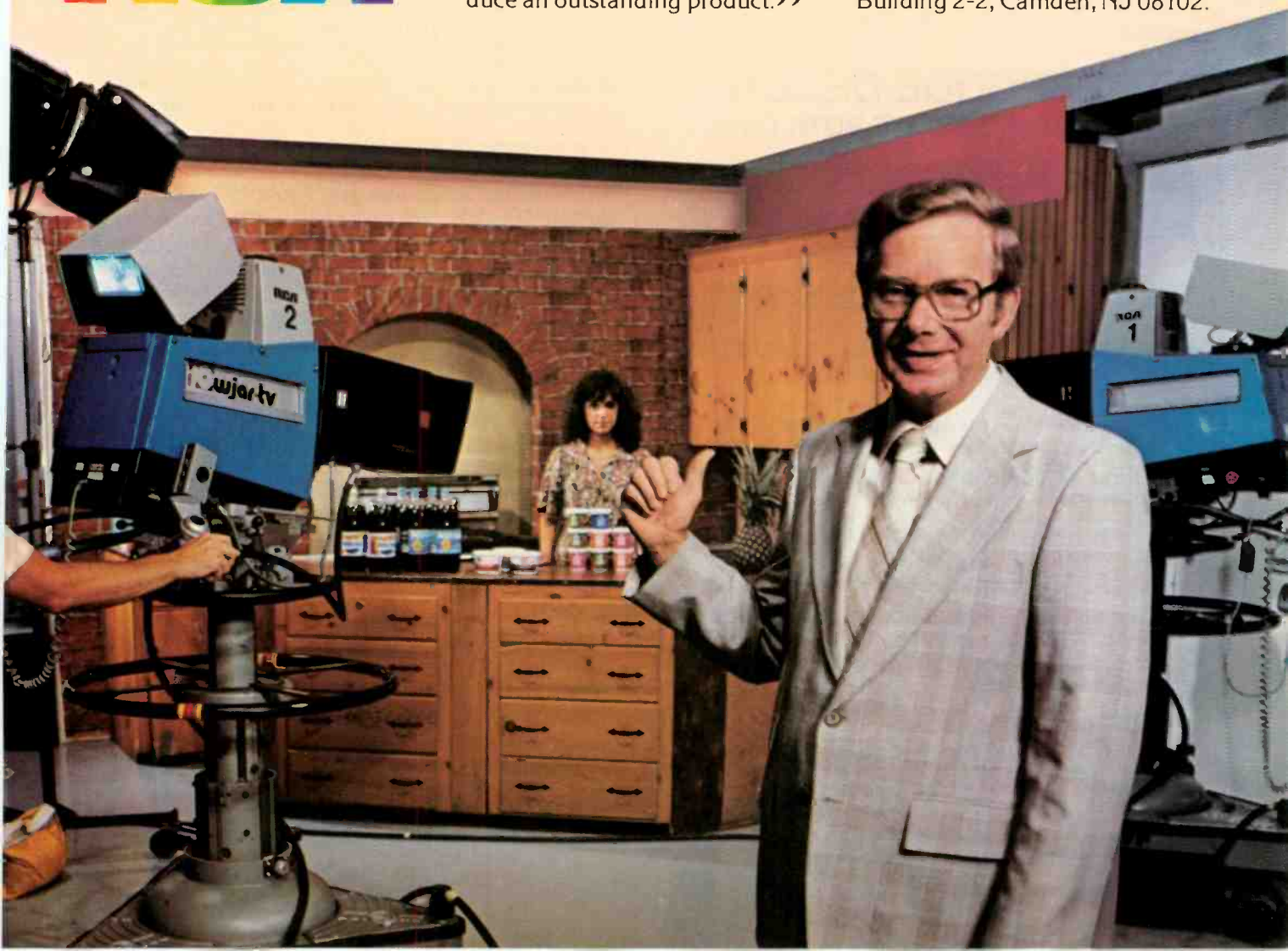
...Wyatt McDaniel, Chief Engineer
WJAR-TV, Providence, Rhode Island

WJAR-TV, a 33rd market station, is actively and successfully competing for commercial production work in the New York and Boston markets. And, according to Wyatt McDaniel, Chief Engineer, the RCA TK-47 cameras that were purchased in 1979, have played a big role in the station's growth in the production area.

RCA

In order to expand our production capability, we had to have the best studio cameras available. We chose the TK-47's for their proven reliability and performance. But the TK-47's have exceeded our expectations! They are outstanding, virtually trouble-free. And the TK-47 cameras give us unparalleled picture quality...a must for our commercial productions. We're making our niche in quality production and the TK-47 is helping us produce an outstanding product."

Find out how the TK-47 can give you a new "look" in cost saving, time-saving, and picture quality. TK-47—it's automatic, versatile and now available in Triax. Call your RCA Representative and ask for a showing of a tape in which six top engineering professionals tell how they are using TK-47's in their broadcast and teleproduction operations. You'll see why the TK-47 is first choice for savings and performance. RCA Broadcast Systems, Building 2-2, Camden, NJ 08102.



New Computer Program

Computer Streamlines Audio Post-Pro At New York's Sound Shop

Sound Shop, a New York City sound post-production company that is a division of Reeves Communications, is making life easier for a lot of sound editors these days. ACCESS, its new computer audio post-production system, has been fully installed for several months and is saving time and broken pencils in great quantities.

ACCESS (an acronym for Automated Computer-Controlled Editing Sound System), developed by Bill Dietrich of Mini-Micro Systems, Anaheim, Calif., is described as a digital sound effects editing computer system. Over 40,000 sound effects, entered into ACCESS as digital information, can be reconverted into sound and played back in any way an editor chooses. As if that weren't enough, all of these effects can be modified by the ACCESS board, which can change the pitch, equalize, loop, or stretch the sound.

The system operates in a simple and straightforward manner that must be refreshing to those used to standard film and tape audio post-production methods. The effects library is stored on computer disks, with a menu of categories appearing on a display screen. The editor views the tape on a video monitor, selects the appropriate category of sound and the particular desired sound within that category, and displays it with the keyboard. Any necessary alterations are made to the sound, which is then synchronized to the picture and stored in the computer's memory. This process continues until the entire effects track has been created. Playback is instant — and always in sync with the visual, thanks to a time code that is typed into the computer along with the sound data.

The result is a synchronized sound track produced, according to the Sound Shop, in just one-quarter of the time usually required. The computer maintains a complete record of each program, allowing it to be recalled at any time. The system works with both film and videotape and has already been used successfully by a number of clients.

for inclusion in the film print, there are still enough subjective quality differences between the two media to make this approach unacceptable in most other types of programs. Many companies are working on this, including Image Transform, Teletronics, and Gray Engineering. It is a complicated problem involving not only synchronization but also the actual physics of imaging, and it is not likely to be solved in the very near future.

As mentioned earlier, generation of film cut list can be accomplished either at the time of transfer or after the rough cut in video has been made. The relationship of the electronically generated SMPTE time code to the original edge numbers or code numbers is absolute. After the electronic decision list has been cleansed by running it through commercially available programs, like Trace or 409, the original numbers can be found and the offsets established. No further hardware is required and no additional steps are introduced.

Schneider says experiments have shown that editing the same material in video rather than in film can produce a finished product in 30 to 50 percent less time than with the conventional film post-production process. Now, with a simple off-line process that will allow what occurs in the video domain to be translated in a frame-accurate way to the film editing process, producers, editors, and especially debtors can look forward to a significant reduction in the cost of post-production. **BM/E**

YOUR EMMY

We are proud to be the recipient of an Emmy for the development of an automatic color television camera – our TK-47. We are grateful to The National Academy of Television Arts and Sciences for this prestigious Engineering Award for "...the development of digital computer techniques for the automatic alignment of color television studio cameras."

But it is you, our TK-47 customers, who are the real Emmy Award Winners. With over 300 TK-47 cameras in use today around the world, it is you who are producing news, documentaries, variety shows, dramas, commercials and public service programming with award-winning camera performance. You know that you have to start with the best camera in order to deliver the best programs.

TK-47 cameras and TK-47 customers are a winning combination! We, at RCA, are proud of the part our TK-47 has played in advancing the technology of the television industry and in helping our customers produce picture-perfect programming. RCA Broadcast, Building 2-2, Camden, New Jersey 08102.

RCA

"OUR NEW SONY ALL KNOWN

"Finally there's a ¾-inch recorder that doesn't just inch along," says Fred Rheinstein, president of The Post Group.

A major post-production facility in Hollywood, The Post Group counts among its clients all three networks, PBS, and major cable TV and syndicated production companies. It will edit the new syndicated children's show "We're Moving" entirely on the BVU-800.

"The 800 is amazingly fast. To be able to go backward and forward at 40 times play speed means you can search for your edit points—and find them—more than twice as fast as ever before," continues Rheinstein. "And this machine goes from its highest speed to a still frame. Instantly. Without slewing or breaking up.

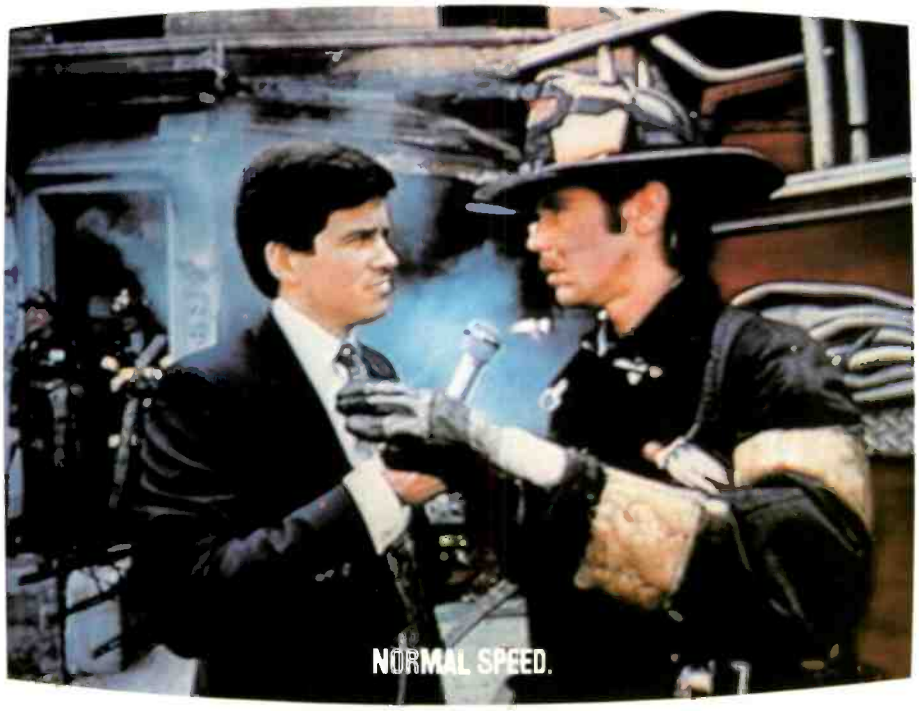
"It also has a direct-drive system, which promises greater reliability and accuracy.

"We have extremely critical clients," says Rheinstein. "They're used to the best performance, in terms of picture quality and in terms of flexibility. This new Sony can deliver it.

"It's the perfect combination of U-matic economy and broadcast quality. It's a true mastering process; with the BVU-800, there's no need to transfer to one-inch and lose a generation in order to edit your tape."

U-MATIC BREAKS SPEED RECORDS."

Fred Rheinstein, THE POST GROUP



Other breakthroughs incorporated in the BVU-800 include its ability to make machine-to-machine cuts without a separate controller; its adjustable, removable edit control panel; and its narrow, front-loading design, which makes rack mounting possible.

"We've always bought a lot of Sony, because we can depend on the company for reliability and innovation," says Rheinstein. "Now, with the BVU-800, Sony makes its competitors look like they're operating in reverse."

Sony makes a full line of 1-inch and ¾-inch broadcast equipment, including cameras, recorders, editors and digital time-base correctors.

For more information, write Sony Broadcast, 9 West 57th St., New York, N.Y. 10019. Or call us in New York/New Jersey at (201) 368-5085; in Chicago at (312) 860-7800; in Los Angeles at (213) 537-4300; or in Atlanta at (404) 451-7671.

SONY®
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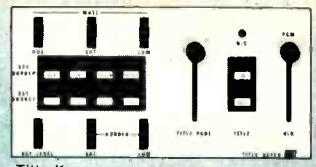
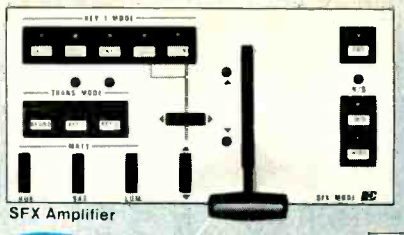
*When used in conjunction with the BVT-2000 digital time-base corrector.

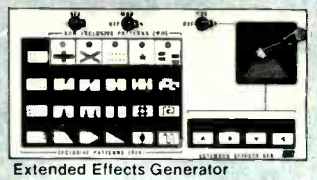


Title Keyer

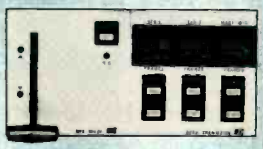


SFX Amplifier

Chroma Keyers...RGB and Encoded

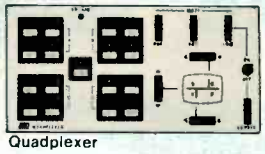


Extended Effects Generator

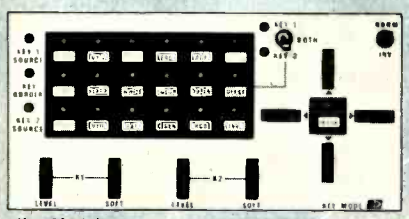


Master Mix & Auto Transitions

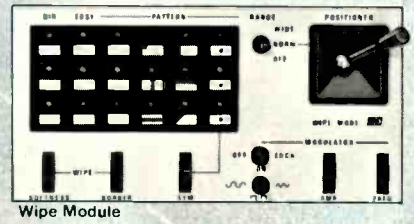
CD 480 SFX



Quadplexer

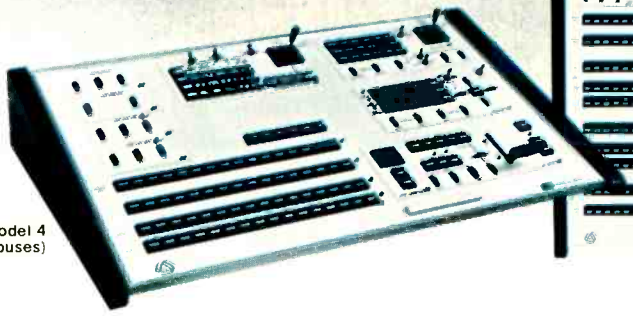


Key Module

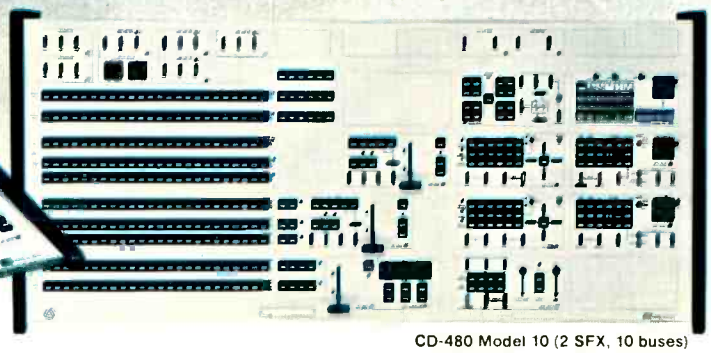


Wipe Module

CAP...Computer Assisted Production System



CD-480 Model 4 (1 SFX, 4 buses)



CD-480 Model 10 (2 SFX, 10 buses)

CD-480...the most powerful and modular production switcher available today.

The 480's proven superior performance, reliability and flexibility has evolved from these powerful video production modules.

That's why you can customize a 480 to your specific production requirements...within your budget. And because of the 480's modular design we can deliver the largest model within 90-120 days.

Design your own switcher starting with any one of 9 basic models, and selectively equip it with a wide range of powerful 480 modules and accessories.

No other manufacturer can offer you that flexibility ...and every 480 is equipped with the unbeatable video power of the CD-480 SFX Processor System that includes the SFX Amplifier, Key and Wipe Modules.

The 480 family includes switchers with 4 buses to 10 buses...even a model you can upgrade from 1 SFX and 5 buses to a Model 8 or 9 with 2 SFX Amplifiers and 8 or 9 buses. And the 480 continues to evolve which means you can always add the latest 480 production accessories.

That's why over 300 users call the 480 the most powerful and flexible new generation switcher available today.

Start designing your new CD-480 now so you can have the competitive advantage. Call or write for literature or *our complete CD-480 Design Kit.*

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WQRC-FM: MEDIUM-MARKET SUCCESS BUILT ON TOP-GRADE POST-PRODUCTION

Determination to have top technical quality, plus complete production facilities and strong localism, can lift an FM station well above the competition. This story tells how WQRC-FM's Donald Moore, founder-president-chief engineer, built an outstanding radio operation.

TOP-GRADE PRODUCTION and post-production in radio have become more important in recent years as increasing competitive pressures and technical advances put more pressure on stations. It is now accepted wisdom that radio strength in a medium or small market depends on, for one thing, strong identification with the community and service to it.

The story of WQRC in Hyannis, Mass., on Cape Cod, enlarges this concept by showing the advantages, in this community identification, of being able to produce important local programs of outstanding technical quality and programming skill. Clearly this kind of localism costs a great deal more than a bare-bones local news operation — but the more sophisticated and careful operation has the potential for lifting the station out of the competitive mass, giving the programs (and their sound) individuality. This is one solid way to make the station seem "better" than less carefully operated competitors, and WQRC is a splendid example. The same attention to technical quality and the same top-grade equipment also give the station an enormous advantage in production of commercials — another fundamental in its success.

Donald Moore had held executive engineering positions at several Boston radio and television stations before he managed to launch his own station on Cape Cod. Those stations included WHEH and WHDH (now WCVB, the prize in the recent staggering multi-million sale). WHDH, in particular, was long in the forefront in technical quality, and this accorded well with Moore's own predilections.

As Moore put it to *BM/E*, he knew what he wanted technically when he came to Cape Cod in 1970, but he had to learn the business side of radio to make it a reality. He started with a solid technical base for his Class B FM station, and continues to actively refine it.

The erection of the station was his first technical triumph. He managed to get on the air in just under 30 days, after getting his CP in July, 1970. The Boston office of the FCC was convinced that he had jumped the gun on his CP, and sent an inspector to look at all the receipts for the equipment and construction. WQRC passed this test, establishing a habit that has continued to the present.

Moore understood from the beginning that careful production would be basic to a firm position among the competitors in Hyannis. A look at his plant gives a good idea of the strength of his commitment to production.

Control/production rooms

The operation is presently based on two nearly identical control/on-air rooms that are also fully equipped production rooms. Moore's production operation is expanding so rapidly that he is now planning a third room for production, a technical enlargement of the present interview/newsroom, which will then have a double or triple function.

The main program format, during the day, is Beautiful Music, which has been a success with WQRC's somewhat older audience, with its many retirees. Even in this part of the operation, though, technical quality has been basic, as noted presently. The music comes from Chicago syndicator FM 100, and is on the air basically from 9:00 a.m. to 10:00 p.m.

During that period, however, the basic music is arranged in segments to make room for WQRC's strong local news and public service operation. Local and national news dominates from sign-on at 5:00 a.m. to 9:00

WQRC-FM: Medium-Market Success

Operator in one of two identical on-air-and-production studios at WQRC

a.m. After 10:00 p.m., the main fare is a jazz/Big Band program with host, Richard Golden, who does much more than simply put records on the air. His commentaries give each program coherence and interest, and they have won a strong following among the upper-educated, upper-income retirees and summer residents in the area. Golden adds live interviews with musical personalities whenever possible. For example the singer Tony Bennett, appearing in a program at the nearby Cape Cod "Melody Tent," gave Golden an interview after a performance which Golden later edited into a program of Bennett recordings.

The Beautiful Music is put on the air by an SMC automation system — bringing us back to the two production/control rooms. They reflect Moore's fanatical adherence to the very best audio quality. As Moore says, at least one of the rooms is always free for production, and the other is free for a good part of each hour when the automation system is airing the program.

Each room has three reel-to-reel tape machines (Scully, Otari, and Revox) in a number of cases with electronics altered for very low noise and distortion. There is complete equalization and noise reduction (a Burwen system). Each has a complement of the new ITC Series 99 cart machines, and Moore, like other users, is extremely pleased with their quality — he was unhappy with earlier cart machines.

A strong remote pickup operation is essential for active community identification, and Moore has given his remote equipment the same attention and care to assure top quality. The console in the van, like those in the production rooms, is a UREI 10-channel model. Reporters can go on the air from the van with a McMartin UHF radio. In addition, they have Marti hand-held transmitters for instant communication from outside the van, which then can act automatically as a repeater.

This system, now a familiar general arrangement at many radio stations, has one novel and highly useful addition by Moore. He uses his FM subcarrier (devoted to SCA background music by so many FM stations) as an auxiliary communications channel for remote operations.

The Marti hand-held "bricks" have small subcarrier receivers attached; the McMartin in the van has been modified to receive the subcarrier. Thus the moving reporter has a full duplex communications link to the studio at all times.

Personnel and time, also essential

For top-grade production, Moore notes, skilled operators are just as necessary as top-grade equipment. And they must have time to do each job right, to listen to results carefully, to amend the material until it comes up to the station's standards. This is the real essence of post-production in radio. WQRC has proved that it works.

Among the characteristics that Moore demands of his equipment are vanishing-level noise and distortion. He finds low intermodulation distortion particularly important, especially with women listeners. They are sensitive to a low, "gritty" quality that often comes from IM distortion, and without knowing intermodulation from transubstantiation, will tune out the offending program.

Moore points out that *producing* a fine program is pointless unless the equipment puts it on the air without serious degradation. He finds his present equipment doing an excellent job, with the only processing on the air an Optimod 8100, feeding the new Broadcast Electronics FM exciter. This last unit, says Moore, has solved a number of problems for the transmission chain quality.

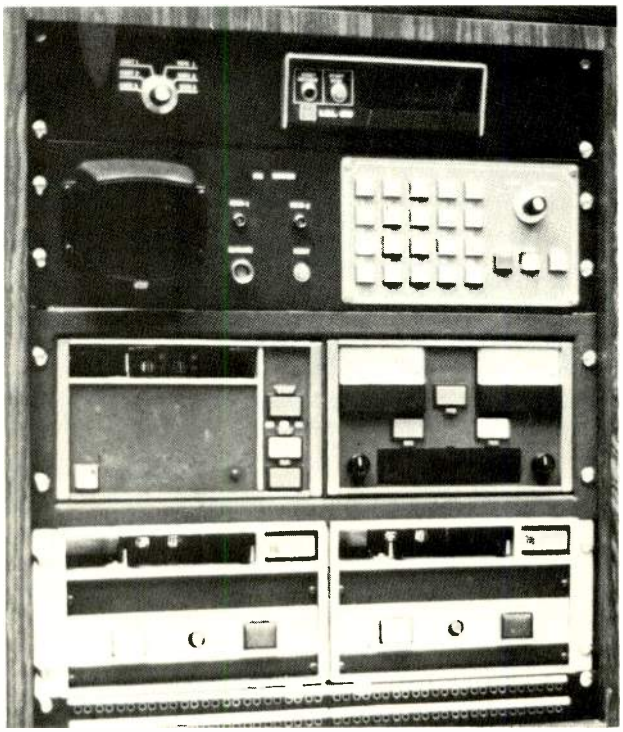
But Moore, like most other broadcasters interested in top quality, is not standing still. He keeps his eyes open for new approaches and new equipment that may improve his operation. For example, the installation of a satellite earth terminal to link WQRC to the United Press for

Overall view of studio, with turntables on right, tape machines left, automation system visible through window at rear

national and international news, is a recent forward move in the technical capability of the plant. It is the first satellite earth terminal on Cape Cod, but Moore notes that simply being "first" is not the main point: The real plus is the tremendously better technical quality of the newscasts. Moore told *BM/E* that the improvement exceeded even his own expectations.

At the time of the *BM/E* interview (late August), WQRC had suffered a serious accident, a crippling lightning strike on the antenna tower. Fast emergency work got the station on the air promptly at reduced power, and 24-hour effort restored full operation within a couple of days. Moore told *BM/E* that this experience has led him to plan a complete dual transmission chain: two STLs, two

WQRC FM: Medium-Market Success



Close-up of equipment turret, with digital timer at top, automation remote control, ITC cart recorder and playback units, Ramko switching unit

transmitters, two antennas. With a hot standby for the whole out-of-studio plant, WQRC would seem to be well insulated against loss of air time from transmitter accidents.

Results: business, business

What has happened to WQRC as a producer of commercials is one big part of the payoff. Turning out *good-sounding* commercials, both in the technical and content sense, has been a constant ideal. Over the years, WQRC's commercial production load has increased without letup, both for the station's own use and for *virtually every other station in the area*. WQRC has taught competitors that haphazardly made commercials don't work any more, and has taught listeners to expect commercials to sound good. This last development was borne out in a recent listener survey, when WQRC's listeners said one of the things they liked about the station was that the *commercials were enjoyable*. Moore has assembled a highly expert staff who know how to make attractive commercials of top technical quality.

The payoff on the main programming side is WQRC's rating spot ahead of direct competitors in the area. The payoff in the public service, community identification area is also substantial, and it is complex and interesting.

WQRC, a power for the community

A typical special program that WQRC edited as a documentary went on to win an Armstrong Award in 1978. It was the nearly full-day coverage of the 75th anniversary celebration of Marconi's first transatlantic radio exchange. Marconi had set up his equipment for the American end of the historic long-distance communication at a site near Wellfleet, on the outer Cape a few miles from Hyannis. That site, now named for Marconi, is still serving as the American anchor for transatlantic radio, with both government and commercial installations spread over many acres.

The celebration included historical summaries, statements by officials on both sides of the Atlantic, and a recreation of the original messages — which had been between the American president and the King of England — by ham operators at both ends of the link. In the recreation, President Carter greeted the Queen of England and received greetings in reply.

WQRC stationed a remote pickup van at the site and was able to put on the air directly all the important transatlantic exchanges, as well as many of the statements made during the celebration. This material was all recorded at WQRC and later edited into a documentary with comment by the WQRC news staff. The interest of the material and the skill of the WQRC staff in assembling the program were noted in the Armstrong Award. WQRC's rearrangement of regular programming to allow large-scale coverage of the Marconi celebration is one example showing Moore's sense of what is important in his operation. The skill and technical finish of the completed tape were based, of course, on Moore's use of high quality in both personnel and production equipment. **BM/E**

WQRC: A Public Service Operation

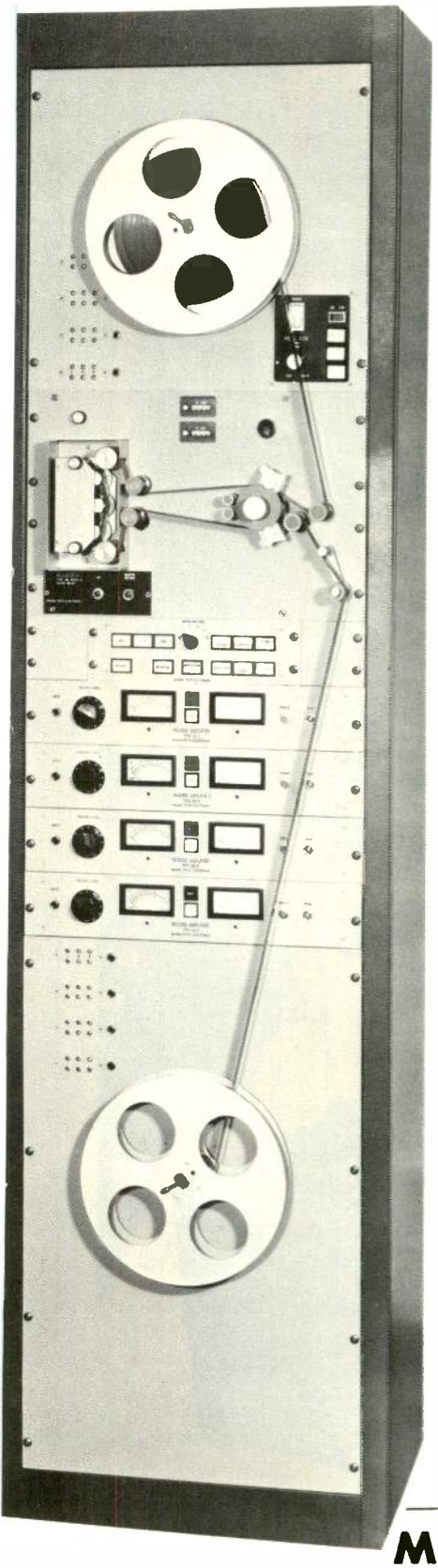
This summer a nurse's strike shut the hospital in Hyannis, a very serious blow to medical service at the peak of the summer season. WQRC altered its programming to keep reporters and the remote van on the scene for frequent up-to-the-minute reports.

The picket line was outside the hospital, the administration on the inside, and on the second day no talks were underway, nor planned. The WQRC reporter, with a hand-held transceiver, put the administration on the air with the question: would the nurses consider opening the emergency room? The reporter went out to the picket line and was able to put the question directly to the head of the union, who had heard the administration via WQRC through constantly tuned in car radios. The nurses agreed that they would be willing to talk about it.

The WQRC reporter, by moving back and forth and keeping the two sides on the air so that each heard the other, was able to lead to a crucial arbitration meeting that eventually led to the reopening of the emergency room. The strike was settled a few days later. WQRC's role in the breakthrough was noted in local and Boston coverage of the event, and obviously increased the station's community prestige — in addition to giving the station management the tremendous satisfaction of an excellent service.

The other public service operation to be noted here is part of a continuing operation — a fleet of specially equipped repair cars that cruise the main Cape Cod roads in the summer to aid motorists in trouble, at no cost to the motorists. The operation is spreading to other areas and is underwritten in each area by some local or national business.

With many repair cars spread over a large area, the operation obviously has a dispatching problem. WQRC has therefore supplied the operation with the use of the FM subcarrier and all calls come into the station and are relayed as needed. Thus WQRC has an essential role in getting the "Cape Cod Samaritan" to people who need the service. Moore's ideals, technical savvy, and energy are bringing him a rare level of satisfaction.



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ARTIFICIAL REVERB REACHES FOR THE NATURAL SOUND

The new technology is bringing artificial reverberation closer to the complexity of the real thing than it ever was before, and the best new systems have outstandingly attractive sound. In this article experts in the field tell how to judge the performance of artificial reverb systems, and how to choose one that will give the radio signal the maximum lift and excitement for listeners.

WITH SONIC COMPETITIVENESS dominating the radio market more and more, broadcasters can no longer afford to ignore any important influence on the technical quality of their signals. The "sonic imperative" has lifted audio processing to a major position in radio technology. Pushing modulation density to the utmost has become a near-mania in many parts of the industry.

Artificial reverb, a particular part of audio processing, is very old in radio and recording. But the new market pressures, added to the great advances in reverb technology, have brought artificial reverb to the top bracket among the radio broadcaster's technical concerns.

The fundamental fact is universally known: sound not accompanied by reflections of itself is thin, static, and lifeless. Reverb systems bring life, power and vibrancy by adding delayed duplications of the sound, simulating the situation in a closed space in which any sound is followed by its reflections from the interior surfaces of the space.

The simulation can have excellent results, changing a sound from lifeless to powerful and exciting. But it is worth noting that "real" reverb, in an enclosed space of at least moderate size, is far too complex for exact *duplication* by any technique now in sight. The number of reflections in the room after, say, 50 or 100 milliseconds is enormous, and their timing, relative strengths, and directions are enormously varied.

Luckily the ear-and-brain system, which is fantastically discriminating in many respects, finds sonic power and vibrancy in a simulation that reproduces *some* main features of natural reverb. However, there are simulation faults detailed later that the ear will not accept, or will find definitely unpleasing.

There are three main parts of a complete reverb situation, as discussed in the first article of this series. First, always, is the direct sound that travels straight from the sound source to the ear or the microphone. Very close behind the direct sound are the "early reflections," a series of discrete "echoes" that come in separately from various directions. The hearing system will not distinguish them separately if they come within a short enough period after the direct sound. But they change the character of the sound, giving it "largeness," a feeling of space, and aiding in the formation of a stereo image.

After the early, discrete reflections, the reflections rapidly become so numerous and so close together that the sound energy is distributed diffusely throughout the space. This energy gradually dies away; this is the "decay" period. The duration of the decay is the "reverberation time," the characteristic so widely used as one of the main definers of acoustic quality; it is defined as the time it takes the diffused energy to fall 60 dB from its initial power, or to one-millionth of that power.

The reverberation time, as everyone knows, leaves a sound too "dry" if it is too short and muddies it up if it is too long. The rate of the decay can also influence sensations of "smoothness" or "abruptness." The frequency characteristic of the decay is vital in determining the perceived frequency range of the sound. Thus, it is highly advantageous to be able to control these aspects of the simulated decay.

Reverb from stairwell

Reverb systems are old in radio. Perhaps the oldest (paralleled by the underground chamber of the recording industry) is the stairwell or back hallway into which the signal is projected by a loudspeaker. The sound acquires a body of reflections in the space, and the mix is picked up by a microphone at the other end. This signal-plus-reverb can then be mixed into the main audio channel in any desired proportion.

This is, of course, "real" reverb, and if the radio station was lucky in the available space the system could have a positive and very pleasing effect on the quality of the signal. But the system is inflexible: changing the quality of the reverb means changing the acoustic character of the room, an expensive construction job. A lot could

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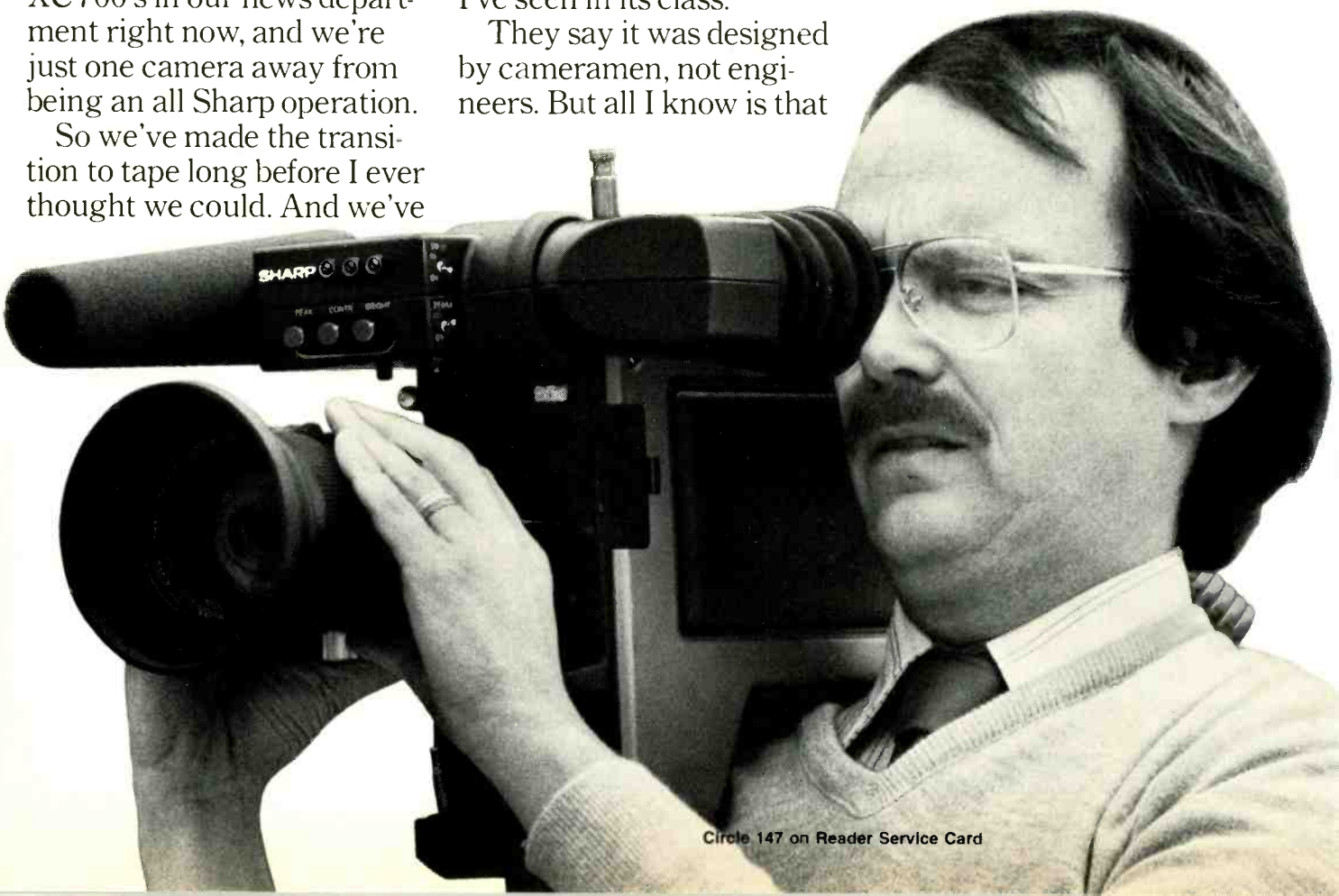

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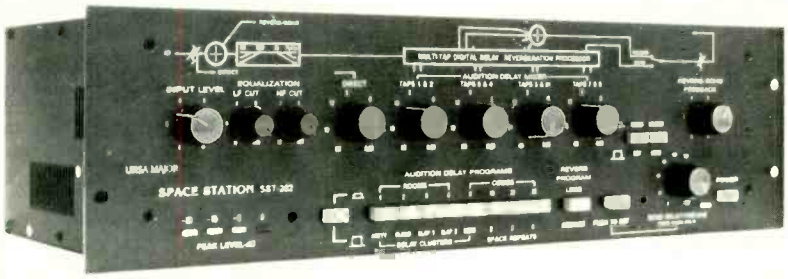


Ursa Major "Space Station" uses multi-tap delay system to supply multiple delays, for well-simulated reverb and many other effects

be done with equalization or other processing of the "wet" signal from the chamber, but to a large extent the chamber's own quality was the quality the user had to live with. A station would have to be very lucky in acoustics to have stayed with a stairwell set up.

Plates serve up acoustics in two dimensions

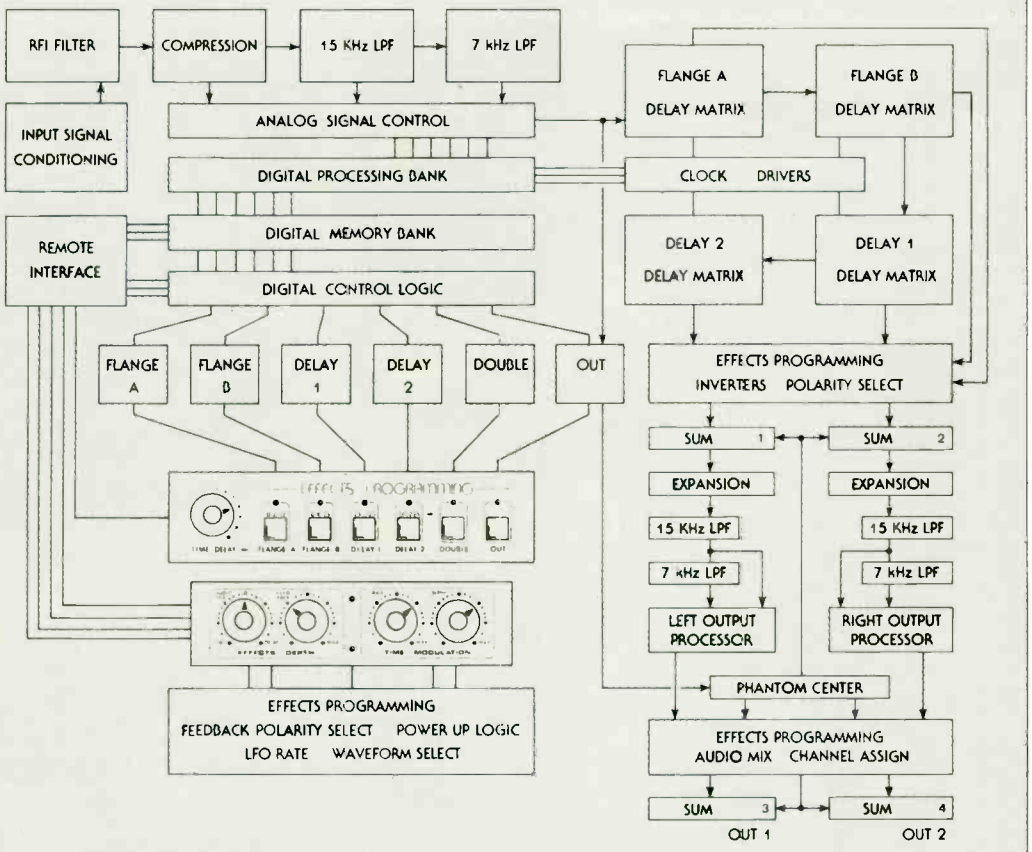
The metal plate is nearly universal in the recording industry, and for good reason: when well designed and well adjusted, a plate can provide an extremely pleasing "decay" effect, simulating well what happens in a fairly large acoustic enclosure. The plate is suspended under tension, with an electro-mechanical driver to feed the signal in at one end and a reverse transducer at the other end to pick up the vibration and turn out a corresponding signal.

The energy spreads through the plate in all directions from the driver and bounces back from the edges in a great multiplicity of reflections. This is a fairly close two-dimension mechanical analog to the acoustic action in a three-dimensional space. The plate has served the recording industry (and many radio stations) extremely well.

But plates tend to be large — some of the most popular are on the order of eight feet by four feet, in an enclosure around six inches deep. Since the vibrational action is a function of the tension on the plate, frequent careful adjustment is essential. Ingenious methods have been developed for controlling the duration of the decay, the frequency response, and other parameters, but a plate is quite inflexible. The action obviously depends, too, on the character of the metal.

Springs, good and bad

The spring is another of the old reverb devices, and it



Block diagram of Marshall Electronics delay system shows complexity of function needed for realistic performance

spans a quality range from rudimentary (and very inexpensive) to quite sophisticated (and quite expensive). The rudimentary spring system can add a strong delayed signal, but it is likely to color the sound with its own resonance effects, for "boing" or "twang" qualities. Moreover, the delays that come out of a spring are limited in number — they lack the density and the randomness needed for natural-sounding reverb, and these two qualities are the essence of the artificial reverb job.

Lately some excellent spring systems have appeared, using multiple springs in one kind of matrix or another. This arrangement can reduce the "one-note" resonant effects of the single spring, and with state-of-the-art control systems may do a job fully meeting the needs of the radio broadcaster, at a cost well below that of delay-line systems. Broadcasters must learn to listen to pick a spring system.

Delay-line reverb is the future

Analog and digital delay lines have become the front edge of artificial reverb technology. The basic idea is simplicity itself: store a multiplicity of duplicates of the signal, and feed them back in one after the other to simulate the reflections in an acoustic situation.

The idea is simple, but the realization is far from it because of the enormous number and complexity of reflections that exists in a real situation. The delay line systems, besides introducing a highly flexible and resourceful technology, have advanced artificial reverb mightily by focusing sharp attention, at last, on just how the artificial effects differ from the real. In the past, reverb systems produced something *more or less like* real reverb, often with pleasing results. Delay line systems, however, are forcing the designers to find out exactly what is needed, what the ear actually finds pleasing in reverb. Designers have discovered that what listeners most want is the closest thing thay can get to the real.

Since the real, as already noted, is very complex, artificial reverb systems are now under pressure to perform at a level that once was hardly imagined. A few systems on the market have come closer than any in the past, and they are correspondingly popular for the simple reason that they sound so good. No one should hold back from artificial reverb now because the ultimate has not been reached: by learning to listen and choose, both in buying a unit and in adjusting it, spectacular effects on a radio station's signal can be secured.

The good and bad of reverb

Richard Factor of Eventide Clockworks, whose delay systems are among the most used today in both recording and radio, described for *BM/E* some of the most important elements of the "natural," the ideal toward which artificial systems must strive. In the "early reflection" period, there must be *enough* repeats so that the ear does not get any sense of separate sounds: with only a few separated repeats in this period the effect may be rough and will tend to muddy the sound. Moreover, the repeats must be "random," not closely related harmonically, for a pleasing smoothness.

In the decay period, the number of repeats must in-

"Harmonizer," Eventide Clockworks, has multiple delay feedback for reverb and wide variety of special effects

crease sharply, and they should come closer and closer together for a great "density" and diffuseness. This is the basis for a smoothly powerful sound. The decay period must last long enough, but not too long.

These requirements put a heavy load on the computational capability of the system. As Factor notes, digital technology is just coming to grips with the problem. Some computer algorithms are helping, and as designers continue to narrow the gap between the artificial and the real, the artificial systems become more and more pleasing.

The system should avoid great fluctuations in frequency content during the decay period. Factor emphasizes that the future belongs to the delay line systems in part because of the extraordinary flexibility of control they allow, in a single box no bigger than a 100 W audio amplifier.

Stephen St. Croix of Marshall Electronics, whose units also show up in hundreds of recording studios and radio stations, is involved in careful study of the aural effects of good and bad reverb. He reinforces Factor's emphasis on the desirability, and complexity, of the "natural." St. Croix says that a reverb system that lacks high frequency transmission, cutting at 6-7 kHz, will lack real "life" and "sizzle." Poor systems, that supply repeats too few, not random enough, may produce a reverb effect but will tend to "muddy" the sound, as though it has a cloudy screen in front of it.

A good test for this, says St. Croix, is a vocal recording; if strong reverb added by the system makes the words a little harder to understand, the system is not "transparent" enough. A good reverb "lifts" the voice, making it *more* understandable and impressive. A good test for the density and randomness of the early reflections is a sharp hand clap or a drumbeat. Poor performance on the early reflections will produce something like a machine gun, or like an acoustic flutter — the results will not please the ear.

A clever test for the randomness of the reflections, says St. Croix, is a strong male vocal, listened to with the "straight" sound cut off so that just the reverb added by the system is heard. If the vocal is clearly understandable in the reverb, the system will simply muddy the sound: the reverb should be random enough not to carry the intelligence to compete with the straight sound. **BM/E**

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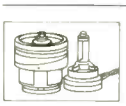

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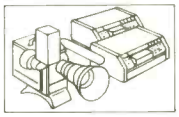

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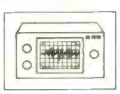

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DUAL VS. COMPOSITE: HOW TO CHOOSE AN STL, PART II

By James L. Tonne

In the first part of this two-part series, the author compared the dual STL with the composite STL with respect to signal-to-noise ratio, crosstalk, distortion, separation, redundancy, audio response, and fade margin. In this concluding part he continues with subcarrier considerations, maintenance, retrofitting, modulation control, monitors, and frequency allocation.

IN MANY CASES one or more FM subcarriers are applied to an STL to "ride piggyback" on normal modulation, for control and/or secondary-programming purposes. In the case of control subcarriers, the subcarrier generator is usually an integral part of the remote-control equipment. Subcarrier generators used for programming purposes are usually "outboard." Sometimes two subcarriers are applied to the system.

In the case of the dual system, it is common to apply one subcarrier (control, at 26 kHz) to one link and the other subcarrier (programming, at 67 kHz) to the other link to reduce the possibility of crosstalk between subcarriers. In the dual system, the total modulation is lowpass filtered (to obtain the program signal) and it is highpass filtered (to obtain the subcarrier signals). The program signal appears at a screw-terminal connector on the rear of the receiver, while the subcarrier signals appear at a Type BNC connector, also on the rear of the receiver.

The composite STL can pass a subcarrier at 67 kHz. Such a subcarrier will appear along with the stereo signal at the "composite" output port on the STL and will be directly rebroadcast. The composite STL can also handle subcarriers in the region from 110-152 kHz (185 kHz in some cases). These subcarriers are separated from the remainder of the modulation by highpass filtering in the receiver and appear at the subcarrier output connector on the rear of the receiver.

It is appropriate to mention that a subcarrier is not a very high fidelity medium. It is inherently noise prone, because it is located in a relatively poor portion of the baseband (total) spectrum. Distortions in the interconnecting link, including the STL, the exciter, transmitting antenna, and SCA receiver, can cause crosstalk between the main channel modulating that RF carrier and the subcarrier. The crosstalk on a modern STL is satisfactory for background music, speech, and data applications.

It is *not* recommended that a subcarrier be used as a *primary* feed for an affiliated AM broadcast station because of both noise and crosstalk. In addition, to get the performance that is currently achievable from a subcarrier requires the use of audio frequency pre- and de-emphasis. This complicates things for the AM broadcaster, who has to comply with rules that assume a flat-amplitude-capability interconnecting link (i.e., free of de-emphasis in the receiver). Finally, the frequency response and especially distortion (both harmonic and intermodulation) of the program carried on a subcarrier are not truly of AM broadcast quality, in practice.

Since the modulation-controlling limiter for that AM station will be located at the AM transmitter, it will increase the background (residual) noise and crosstalk and so degrade the transmitted SNR of the station. The SNR of a subcarrier is typically about 45 dB in practice. This will be reduced to 40 dB by the application of only 5 dB of limiting, which degree of limiting is not at all uncommon in AM transmission; 10 dB of limiting will reduce the broadcast SNR to a mere 35 dB, which will be found to be clearly unacceptable.

Retrofitting

If an older STL is in service it may be simplest, when replacement time finally arrives, to use the same general type of system. If the old system was a dual, then the new system would be a dual. The antennas and transmission lines are installed and may be in satisfactory order. Replacing an older system with a new system of the same generic type involves little more than disconnecting the old system and reconnecting the new system.

An older dual system (which offers a form of redundancy in stereo) can be replaced by a single composite system providing there is sufficient signal strength and spectrum availability. If the older dual system is retained, or at least one of the halves of that system is retained, then that could be used as a monaural backup. This will probably involve consideration of where to locate the audio processing and stereo generator, which items are covered in the section on modulation control. Or, to restore the original redundancy in stereo, another new composite

James L. Tonne was associated with Moseley Associates, Goleta, Calif., when this article was prepared.

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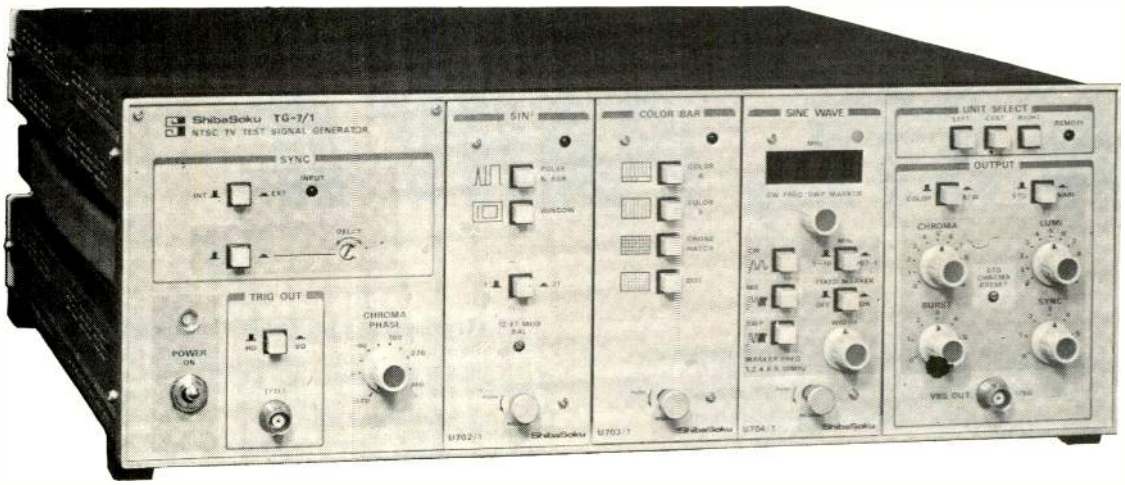

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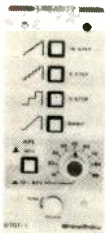
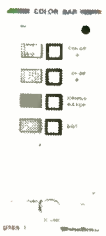
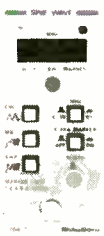


U701
LINEARITY
UNIT

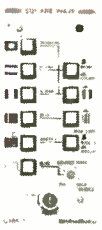
U702
SIN2
UNIT



U703
COLOR BAR
UNIT

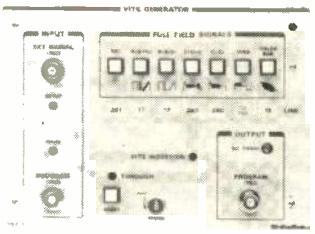


U704
SINE WAVE
UNIT



U705
SQUARE WAVE
UNIT

U706
NOISE TEST
UNIT



U707/1 VITS GENERATOR

ASACA/SHIBASOKU TG-7 TV test signal generator is a main frame which accommodates interchangeable modules, and by using it together with these modules, it generates TV test signals which are used for the adjustment, testing and measurement of video equipment.

Features

- The sync signal generator contained in the main frame allows color lock and gen-lock with the VBS or sync with color burst.
- The model contains a built-in dual axis balanced modulator and this allows the chroma phase to be varied from 0-360^0.
- The subcarrier oscillator is incorporated into an oven and its frequency stability is within ±5Hz.
- Independent output terminals provide video component, sync signal, color burst level signals to be connected to an external programmable attenuator, each output level can control with external signals independently.
- The main frame and plug-in modules are coupled with DC circuit and so there is no bounce from the signal selection.
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- The maximum variety of test signals can be generated with the minimum number of modules.
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Circle 151 on Reader Service Card

system can be added when budgetary considerations allow.

Maintenance

The dual system offers a seldom considered maintenance advantage: Should one link be defective, it can be compared with the operating link. In this manner, the operating link can be used as a "standard" for comparison. Voltage readings, oscilloscope observations, signal levels, and component temperatures can be compared.

When a composite link is defective, there is no "comparison" system to assist in maintenance (unless the system is a "hot standby" type). A way around this situation, logically, is to record in the manual received with the equipment as much information as possible for future use. This is routinely done on audio and similar equipment; it is to be encouraged on all equipment including any kind of STL. Since modern STLs have a low post-infant mortality failure rate, they are seldom encountered routinely until electrical old age. It is best to be prepared by being familiar with the equipment from the start.

Stereo generator location

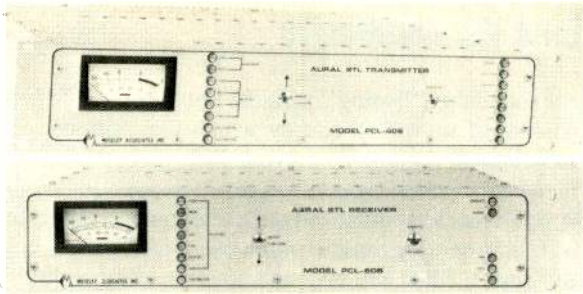
The dual system requires that the audio limiters and the stereo generator be located at the transmitter site; in general the existing stereo generator is left at the transmitter site. By having the audio limiters and stereo generator at the transmitting site, minor transmission error corrections are more difficult to make from the studio (and so are unauthorized corrections).

The use of the composite STL requires that the audio limiters and stereo generator be located at the studio to directly excite the composite STL transmitter. If an older system is being changed to allow the use of a composite STL, then a stereo generator will have to be placed at the studio. When this is done, minor corrections to modulation level, pilot phase, and so on, can be made with little effort. The studio location commonly has minimal RF interference with which to contend; such a calm environment makes signal observation and measurement easier.

Modulation control

There are two aspects to modulation control: The first is control of the modulation of the STL itself, and the second is the control of the modulation of the actual broadcast carrier. Modulation of the STL should be controlled to keep distortion in limits and to prevent interference to spectral neighbors. Modulation of the broadcast carrier should be controlled to remain audibly competitive in that market but within legal or ethical guidelines.

In a dual system, it is highly recommended that an audio gain rider, preferably one which is frequency-conscious, be placed prior to each of the STL transmitters. This will protect the STLs from inadvertent overload, which will result in distortion as well as offending a spectral neighbor. (By "frequency-conscious" is meant a device which takes into account the pre-emphasis curve used in FM broadcasting. Those which use *clipping* for high-frequency control should be *avoided*.) The use of a modern gain-rider also allows a higher average level to be applied to the STL without fear of overload. The composite system is driven by a stereo generator which presumably is preceded by a pair of audio limiters. These limiters



Moseley's model PCL 606 and aural STL transmitter (top) and receiver

will prevent overdrive of the stereo generator and hence of the STL. The use of an audio gain rider ahead of those limiters is recommended in order that the limiters may be used for modulation protection only.

If a dual system is used, the limiters for radiated carrier modulation control are located at the transmitting site, after the receiving end of the STL but prior to the stereo generator. Under these conditions the limiters at the transmitter can precisely control the radiated modulation provided there is no audio lowpass filtering past the limiter, i.e., any audio filtering is prior to or included within the limiter. If the stereo generator has audio lowpass filtering internal to it, that filtering may ring (over-shoot) on steep-sided transients or square waves and the limiter may be unable to control the modulation with precision. But the characteristics of the STL, that is, whether that link has audio lowpass filtering or not (and so whether it can overshoot or not), are rather immaterial as regards modulation control of the radiated signal.

If a composite STL is used, then the limiters are located at the studio, just prior to the stereo generator. (These limiters may be preceded by audio gain-riders as a desirable option.) In a composite system the limiters serve a dual function: They control the upper limit of modulation and so the spectrum of that composite STL, and, for all practical purposes, they control the modulation of the radiated (FM-band) carrier. The addition of the composite STL between the stereo generator output and the wideband input to the exciter will not significantly alter the performance of the overall system.

If the composite STL is tested with a square-wave test signal, the signal appearing at the composite STL receiver output may show signs of ringing. This ringing can result in overmodulation at high signal levels. Such a situation is a possibility *if and only if* the test signal would not comply with the rules as regards crosstalk from the main channel into the subchannel. If the composite STL is tested with a 10-kHz square wave, for example, over-shoot on that square wave may be seen at the STL receiver output.

But the transmission of a 10-kHz square wave in the stereo mode is clearly outside the legal limits — the amplitude of its third and fifth harmonics would grossly exceed the -40 dB regulatory limit set by the FCC rules. Such a test signal, of possible use in maintenance or other procedures, is contrived and meaningless in the real world of stereophonic transmission.

The use of the composite STL does not significantly alter the control of modulation by a good limiter, provided the limiter does not use significant amounts of clipping in its operation. Audio limiters which use considerable clipping, particularly on signals in the upper audio region, are prone to reveal the presence of overshoot on the composite STL. But such limiters are to be frowned upon not only because of their poor sound (they efficiently convert sibil-

Dual Vs. Composite

ant sounds to "lisping" sounds) but because of the large amount of unwanted energy which they produce in the sub-channel region. To prevent such energy from falling in the subchannel (which will result in poor audio quality upon stereo demodulation), an audio lowpass filter should be used after any limiter which uses significant clipping. But such a filter will ring and so allow the possibility of overmodulation, just as the composite STL can do. As can be seen, clipping is not a very good way to control the modulation level. The use of a composite-waveform clipper, sometimes euphemistically called a "controller", is to be discouraged except for transient control at the output of the composite STL receiver.

Monitors

The monitors must be located at the transmitting site for best accuracy. It is unfortunate that locating the monitors at the transmitter site can result in less convenient monitoring on a routine (day-to-day) basis in a split-site operation. A monitor located at the studio always has ahead of it or integral to it an RF amplifier to allow operation far removed from the transmitter. These RF amplifiers require selectivity to eliminate interference from local (FM-band) spectral neighbors. That selectivity always causes some degradation of the measured separation and crosstalk readings. The noise figure of the RF amplifier generally determines the degradation of the signal-to-noise ratio as measured at the studio. "Synthesized" monitors always contain an RF amplifier.

When it is time to make a precision measurement, use a monitor which has no RF amplifier and operate it, temporarily if need be, at the transmitter site. Locating the monitors at the studio is generally satisfactory for routine monitoring, and expedites the occasional readjustment of the modulation level or other transmission characteristics. If a dual STL is used, then the audio limiters and stereo generator are located at the transmitter site. When this is the case, it is more convenient when corrections are accomplished to have the monitors at that transmitting site. To experience a duplicate set of monitors (one at the studio and one at the transmitter) is to experience *joy*!

When an adjustment of modulation level or the like is required, the monitors should be located at the site where the adjustment is to be accomplished. But the monitors should always be located at the transmitter site when a precision measurement is required (i.e., for an actual proof of performance).

Frequency allocations

It is customary for the dual-mono system to share a single 500-kHz channel, with one link operating at 125 kHz below the channel center and the other link operating at 125 kHz above the center. The composite STL normally operates at the center of the 500-kHz channel. A composite STL of the hot-standby type also operates at the channel center — only one transmitter at a time operates.

Ask the manufacturer

If you are encountering an aural STL for the first time, feel free to ask the manufacturer for help. The older companies have been through both new installations and retrofits many times, and probably have the answer to what may be a difficult problem for you. They have the forms, and information on how to fill them out. They can offer comments on a path study. If a particular aspect of operation or a particular specification seems unusually important to your operation, then have that item confirmed by the manufacturer you select. If you deal directly with the factory, lean on them. If you deal with a rep, lean on him (her). It is not that uncommon for a rep, being familiar with the individual operation, to be able to work with a customer better than the factory, unless an unusually high technological question has arisen.

There is no single kind of STL which will be best for all applications, as can be seen. A station with a long path would probably choose the dual system because of its superior noise performance under those lower signal strength conditions. A station demanding the very highest quality including freedom from distortion caused by stereo crosstalk would probably go the dual route since that type of installation typically has slightly better performance in that area. A station whose transmitter uses an easily-removed self-contained stereo generator is in a good position to use the composite STL, since that system requires that the stereo generator must be relocated to the studio. If cost is the primary criterion then the composite system is the obvious choice. There is a philosophy that the general population makes the correct choice most of the time. Using this idea, be informed that about 80 percent of aural STL users choose the composite system. Finally, it is highly advisable to avoid mixing brands of remote-control and STL equipment in a radio-remote-control system. The reason for this is that some brands of equipment are compatible with other brands only after redesign by one of the manufacturers involved. **BM/E**

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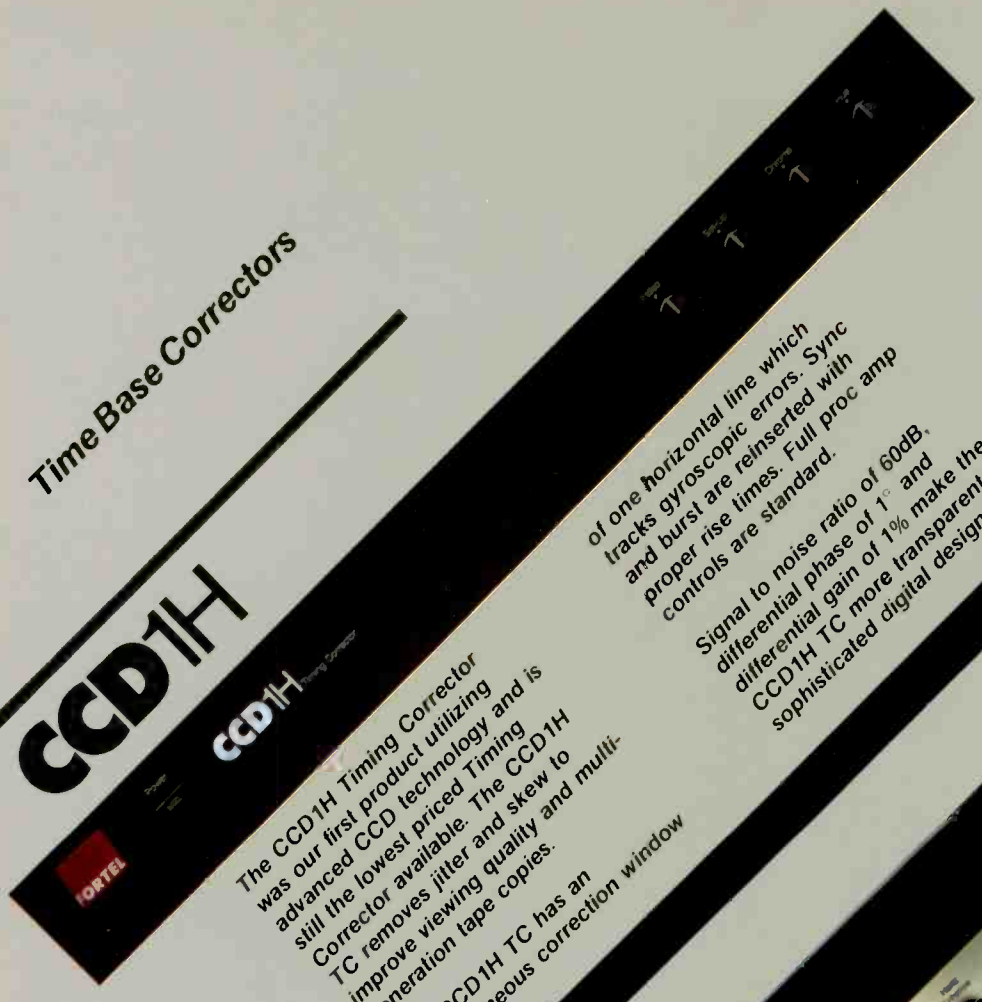
Time Base Correctors

CCD1H



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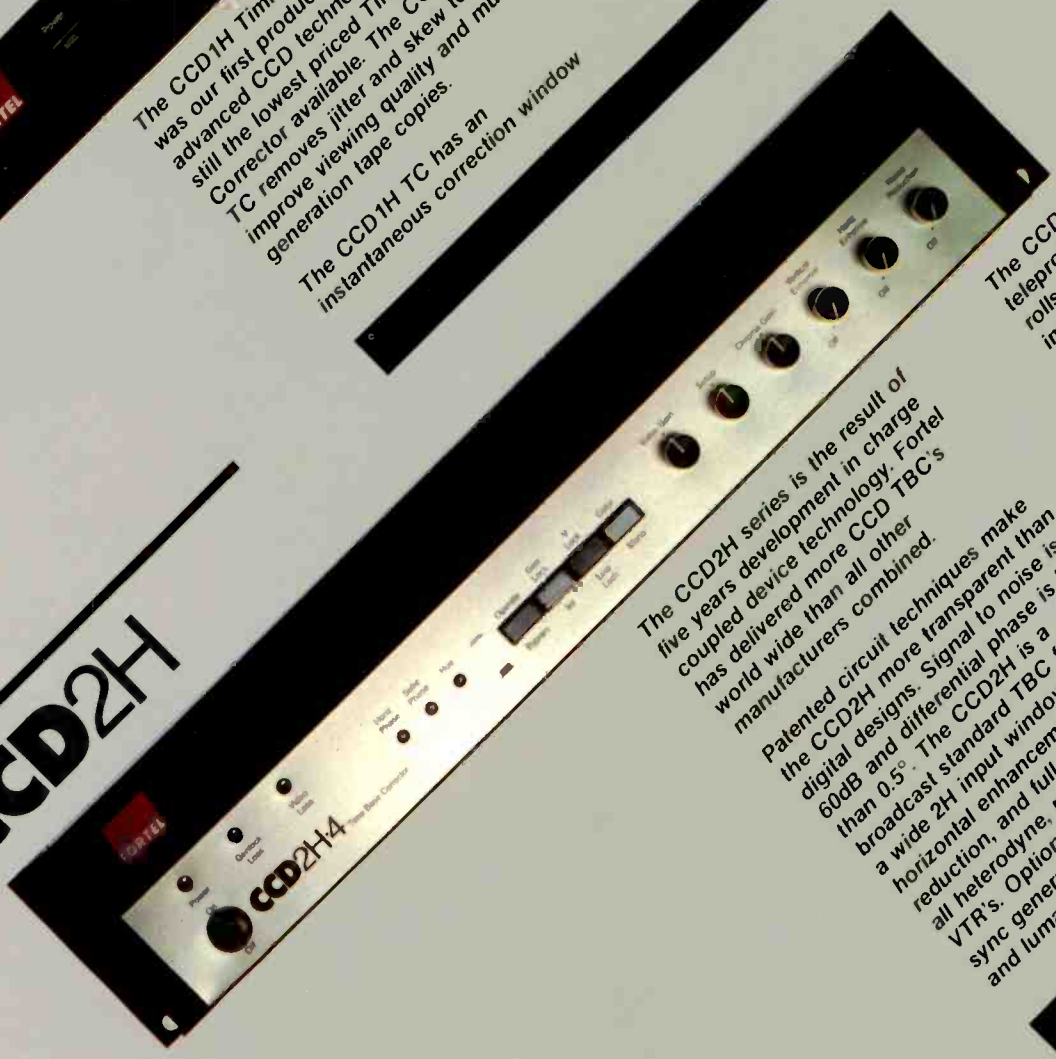

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THE ENGINEER: WHY "THE CHIEF" IS NOT ALWAYS IN MANAGEMENT'S STARTING LINEUP

By John Cummuta

After a hard look at the image engineers project, and with a sympathetic eye towards what management is looking for, engineers may understand why they don't play as important a role in management decisions as they should. While very good management may seek out its engineering talent, very good engineers may have to make their own case.

A SLEEK BLACK MERCEDES limousine pulls up at the entrance to the station and the servile chauffer draws wide the rear door. Emerging from the tufts of rich Corinthian leather stands the perfect man. His hair is styled in a fashion impervious to the breezes, and every line of his three-piece matches up. The perennial tan accents his Robert Redford smile, as he fondly acknowledges the driver — using his first name. From the three hundred dollar attache case to the handcrafted Italian shoes, you can tell — this a *Broadcast Manager*.

Meanwhile, struggling around to the back door, grinds a '63 Chevy wagon that burns more oil than a two-cycle engine. Sliding over to use the more functional passenger door, exits a bespectacled graduate of the Sha Na Na school of fashion. The flannel shirt and pinstriped pants wouldn't clash nearly so much if they weren't seized together with a paisley belt. The finest assortment of miniature screwdrivers, burnishing tools, and penlights available from Radio Shack adorn his shirt pocket, and his genuine imitation jogging shoes will protect him from serious electric shock — this is a *Broadcast Engineer*.

Are either of these descriptions accurate? Before you decide, let's look at what these two gentlemen do for a living.

After checking his desk for dust, the Broadcast Manager dictates a letter to a national advertising agency with such semantic fluidity as to confidently double the size of the account. He then scans the previous day's logs, noting any errors, and prepares for a brief staff meeting. On his way to the conference room, his sensitive hearing detects two percent harmonic distortion on the left side of the FM monitor, and he pauses to add the fact to his notes. At the assembly of department heads, our hero deftly heads off a confrontation between the news director and program director, discreetly informs the chief engineer of the left channel problem (and that plaid, pinstripe, and paisley don't go well together), and makes two minor corrections to the accountant's monthly report. Before you know it, it's time for a quick coffee with the *Wall Street Journal*, and it's off for the meeting with the mayor.

On his way back to the shop, the chief engineer sidetracks to the men's room to ponder the manager's review of his attire. After several minutes in front of the mirror, he's convinced the man must have confused him with someone else. Back in his domain, our electronics wizard surrounds himself with wiring diagrams, schematics, and maintenance manuals to gleefully chase the elusive two percent. Somewhere in the system lurks the hideous nonlinearity monster, and the chief knows that no one in five states is more capable of uncovering the fiend than he. Pulling a half-eaten bag of peanuts from behind the miniature screwdrivers in his pocket, he sets it on the only clear spot on his desk, blows out his coffee cup, and heads for the pot — this'll be a long day — and he loves it. Filling his cup to the brim (his doctor never told him why he gets edgy), he's confronted again by that fanatic new engineer, still inquiring about some kind of maintenance plan or

John Cummuta is operations manager and chief engineer at KNEI, Wankon, Iowa. Prior to joining KNEI, Cummuta was quality assurance engineer for the Collins Telecommunications Group of Rockwell International.

The Engineer

schedule. He's quickly dispatched to blow out the filters on the auxiliary transmitter.

What do you think now? Exaggerating a little? Maybe not so much? Could it be a case of how we see ourselves as opposed to how others envision us? Well, I'm going to ask you to hold that answer again for just a minute. The purpose of this article is to examine management, and in particular, the engineer's part in that process.

Webster's defines management as the act, art, or manner of managing, or handling, controlling, directing, et cetera. If we listen in on this conversation near the water cooler, we may find that there are slight differences of opinion over who contributes the most towards managing, handling, controlling, or directing the manifest destiny of a broadcast enterprise.

"I'd like to see where this joint'd be if it wasn't for the great numbers my programming is bringing in," perks the program director.

"Yeah . . . well, all your numbers would add up to zero, including the ones on your paycheck, if it wasn't for the dollars my sales force brings through the door," counters the incensed sales manager.

"I'd just like to know how your artistic programming, or your invaluable commercials would get out of the building without the rooms full of equipment that I keep running?" answers the chief engineer with the smugness of conclusion on his face.

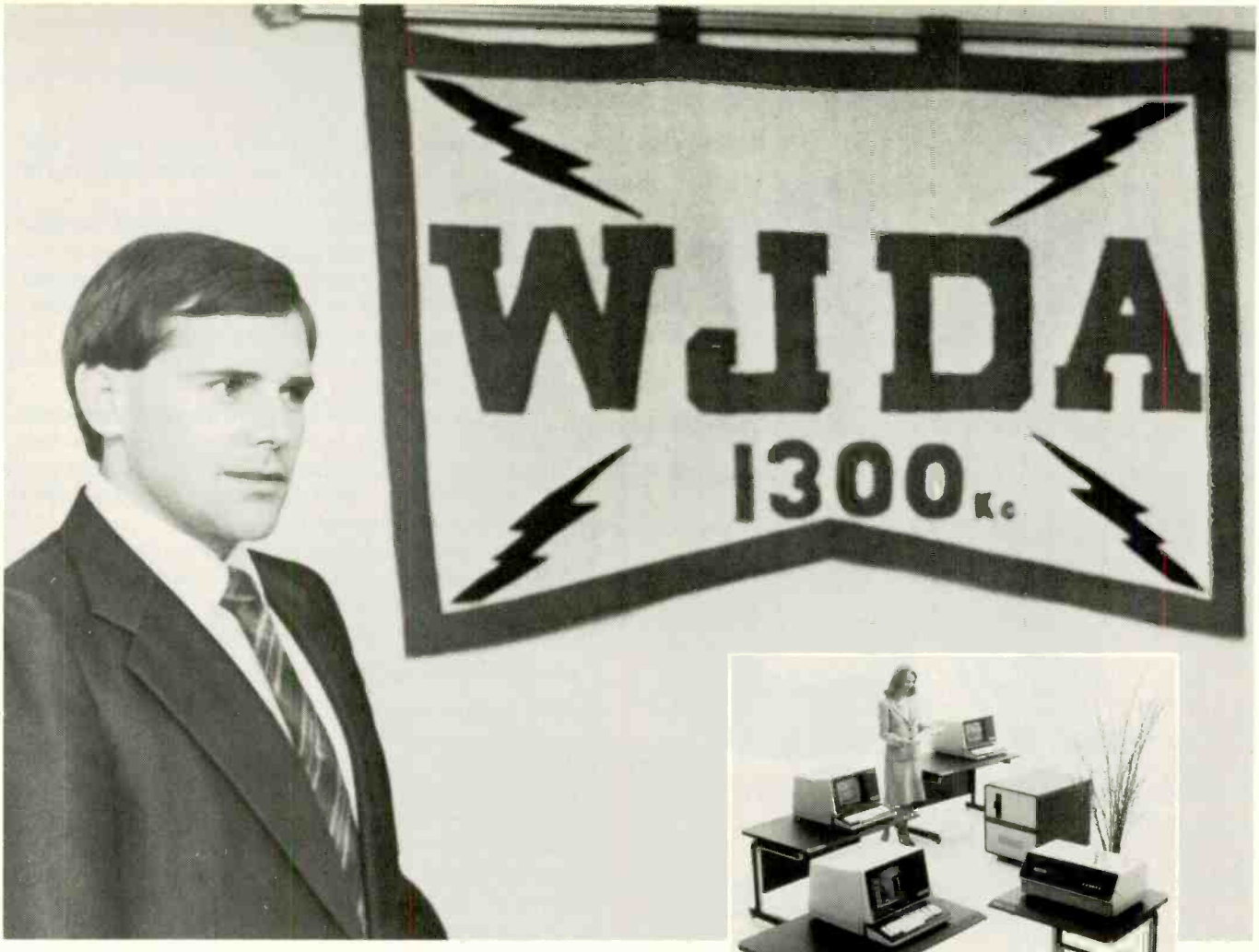
It's not a great leap in logic to agree that there's truth in all their positions, but the problem is that none of those positions get us anywhere. We need to unfold Webster's definition one more layer. What are we managing? Why are we handling it? Just what is the purpose of our efforts to control and direct?

The answer may seem trite and obvious, but we are managing a broadcast operation to accomplish its goals. Those goals differ, of course, depending on the size of the market, the target audience, whether or not the station is operated for profit (debatable even in some commercial stations), or whether or not the management has even bothered to set goals. I include the last category because setting no goals is the same as setting the goal of drifting like debris on the economic sea.

If we can assume that realistically ambitious goals have been set, then management's job is to coordinate resources and materials towards the accomplishment of those goals and, again risking triteness, that takes teamwork. We heard the various players on the broadcasting team arguing about their relative value. The fact is they are like a team which needs balance and a variety of skills. Take one of them off the field and your competition will run right through your weak spot.

Management's task, again, is to manage, handle, control, and direct the talents of each player. The critical point here is that "team strength" does indeed emanate from various departments. Adroit management of an obedient team whose every thought is squelched because it didn't come from top management will quickly be in the cellar.

Did you catch the contradiction in terms in the last paragraph — "adroit" management and "squelched" thoughts? You see, without the willing acceptance and consideration of the counsel of his department leaders, a manager can hardly be described as adroit. Here is where the chasm between engineering and everyone else begins.



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The Engineer

Two sides

There are two sides to every story, and the reasons why engineering is often not a full partner in the exercising of broadcast management are no exception.

First of all, engineers tend to feel secure in their schematics and "Technicalese", considering everyone else's bewilderment a compliment to their professional stature. It's comfortable to hover over the test equipment, and, when required, to work with management — the common attitude is to either "dazzle them with your brilliance, or baffle them with . . . "

Managers, on the other hand, are usually descendants of the sales department, and can easily fall into regarding engineers as electronic grease monkeys. This perception, however, is often as much the result of the engineer's behavior as it is of managerial delusions.

The question is: If engineering participation is essential to the comprehensive and effective management of the broadcast operation, then, "How can lead or chief engineers gain real management status?"

What the engineer needs to know

We took the first steps in answering that question in our hyperbolized descriptions of managers and engineers. Let us assume that you are a competent, imaginative, and talented chief engineer, but you've never been given co-equal status with the operations manager, or the sales manager, or even the program director. They seem to make the decisions and you're called in to execute those aspects of the new course that involve equipment.

If you haven't been totally corrupted by the "instant satisfaction" generation, you may have heard it said that you get the respect you *earn*. Managers, contrary to popular belief, don't always rely on nepotism to fill key middle-management positions. They desperately need and welcome talent manifested in their organization, and generally reward ability with responsibility. How can you earn the respect you believe your middle-management position deserves? Well, for starters, though we're admonished not to judge a book by its cover, we do — constantly — and so does everyone else. Much of the time, however, the cover does tell a lot about what's inside, or at least, we think it does. And, so does the general manager seeking competent men or women to help sculpt a successful enterprise.

Prepare to gain management status as if you're applying for a new job.

Am I suggesting that you look the part? Yes. But it's more than just appearances. Perhaps the simplest approach to gaining management status would be to consider it a new position. Prepare as if you're applying for a new job.

For applicants the idea is to be everything the boss could possibly envision as the perfect manager. You can see that this goes considerably deeper than simple accouterments; we're talking about the embodiment of a total concept. Let's look at the job applicant analogy.

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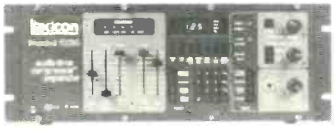

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The Engineer

The key word in what follows is, *perspective*. You may be the sharpest engineer in your market. You might be the finest paper pusher outside of Washington. You could be the best organizer in the free world. You might be so engaging that people save their money to go to Fantasy Island just to meet you. You might be all of the above. But, if you don't appear so from the boss's *perspective,* your cruise toward management status will never leave the dock.

There is another critical side to the perspective issue. Not only is it important how *you* appear to the boss, but also how the business appears from the big office. The reason is simple. How the boss perceives the proper operation of the broadcast enterprise determines how he or she perceives the perfect manager to operate a facet of that enterprise. The boss sees needs in the functioning of the station and that leaves you the opportunity to follow one axiom for success: "Find a need and fill it."

Do you agree then, that the perception from the boss's perspective is the one that really counts? Good. Because from my perspective, that shows excellent judgment.

Now, if you were our job applicant, the first rule would say: "Get to the interview *on time*". This is critically important when endeavoring to impress a senior executive with your middle-management potential as well. It's true you're not scheduled for an employment interview, but you'll be given ample opportunities to show up on time for various meetings and other station functions.

The next step in your successful acquisition of the position would be to be properly dressed. We've covered the why's of this question, but just a word on the what's. If your boss dresses better than you, dress up to his level. If he or she dresses more casually than you, or just plain sloppily — do not descend. You might play down the three-piece suits and solid gold cufflinks, but maintain a shirt and tie or whatever seems suitable to appear every bit the professional.

Know the company's goals

A real sharp job applicant researches the company he's applying to. He wants to know what the company's goals are, how it's performing fiscally, what it requires of its employees, and what's expected of the job in question. If possible, he'd also like to get a brief rundown on the man or woman who will be judging him. You have a definite advantage over the job hunter, because you have immediate access to all that information. In fact, it should be common knowledge for a person in your position — excuse me — in the position you're attempting to attain. And this brings us to a salient point.

I distinctly heard several of you moan, "Oh, I don't care about that financial stuff." My friend, if you don't care about that financial stuff, then you don't care about getting a raise. You don't care about being able to replace worn out equipment. And you're obviously not concerned with whether or not the company will be around to help you make the mortgage payments three or four years from now. If you haven't gotten the picture yet, I'll give you one more tidbit to chew on. From his *perspective,* the boss is *really* concerned about that financial stuff, and if you ever want to impress him with your potential to help him run the station, you'd better share his concerns.

The bottom line, as it's so fondly dubbed, is how your boss is judged if he's working for the licensee, and it's how he lives if he is the licensee. The bottom line also determines whether or not he can afford to pay you what we both know you're worth; or in leaner situations, whether he can afford to keep you on at all.

Now I believe there's one more lesson we can learn from our job applicant. A common pitfall that consumes many job seekers is the failure to listen during the interview. If you don't take the time to hear what you're being asked, your chances of arriving at an entertaining answer are severely limited. This corresponds directly to any encounter situation with the brass at your station. *Listen!* No matter what you've got on your mind, from the boss' perspective, what's on his or her mind is more important. After you've understood and properly reacted to that information, you can offer up your own thoughts. But first—listen.

Organize. Another critical attribute of the up and coming manager is the ability to transform his responsibilities into a coherent system. Does your position have a position or job description? If not, write one yourself. If there is one, review it, and make sure that nothing you do is left off. This is another area where humility and a pocket full of change will get you a cup of coffee. Don't just say "I take care of the equipment." List the functions and responsibilities seperately—that's how you perform them.

As broadcasting becomes more technical, the management team contributions of engineers are critical.

Draw up an organization chart, and see if the boss will accept it as an official document of the station. If such a chart already exists, assure your position on the same level as the other department (programming, sales, administration, etc.) leaders reporting to the same management position. I advise against making this the first thing you do on your new campaign to management status, but after the first few acknowledgements of your organizational accomplishments, the boss should be in a better mood to receive the idea of documenting your value. When he sees you right up there with the program director and the sales manager, he'll likely begin to respond to you as the important resource that you are.

You may be assuming that you have to be managing people in your job to exert executive influence. But having people under you is not a prerequisite to being a valuable component of the management team. Executive influence is exercised both up and down the chain of command, and it is the results of both directions that will earn you recognition. The name of the game is to seek out problems, propose solutions, then deliver. After you deliver — make sure everyone knows it. Communicate your activities; demonstrate your competence as a manager.

The memo

We've all heard how the pen is mightier than the sword. Well, the memo is mightier than anything short of marrying the boss's daughter. It can be used for correspondence inside and outside the organization, distributing the minutes of meetings, confirming a verbal order or directive, confirming phone conversations, giving recognition or compliments, making general communications to

The Engineer

everyone in the organization, and when you can't get through to someone any other way.

The main ingredients in a successful memo are: Who it's to, who it's from, why it's been written, when it was written, and the main thoughts of the correspondence clearly and concisely delineated as briefly as possible without sacrificing the meaning. The wonderful thing about memos is that you can send a copy to the boss of just about all of them, under the guise of keeping him or her informed. What you're doing, or course, is bragging in black and white. In truth, however, you are demonstrating your organizational and communicative abilities. Both are critically important to you as a manager, and to the organization. One caution, keep copies. They may help protect an occasionally vulnerable area of the anatomy.

Which brings us back to the main point. We often tend to huddle in the safety of our main interest and disregard all the other facets of station operation, but this is counterproductive. We fail to see that the simplest way to meet all of our personal needs (as related to employment), be they more money, a good track record in preparation for a move to a bigger market, better relations at work, acceptance and respect from superiors, or recognition as a valuable member of the management team, is to be concerned about and contribute to the total success of the operation.

When the top people in your organization are looking for members of the team to help them achieve the business's stated goals, they're looking for people who can identify and solve problems. They're looking for men and women who can supply them with ideas, facts, and judgments about how to approach the future—both short and long term. They want people who can speak expertly of activity within their own sphere, sensitive to its impact on other areas of station operation.

As broadcasting becomes more and more technical, the management team contributions of engineers are critical. Perhaps if some chief engineers had been thinking as members of the management team when the "Loudness War" began, they would have foretold of the distortion and degradation of their audio quality. But more than that—if they had considered the situation as managers, rather than simply seeing it as an opportunity to play "electronics genius" and fight a "*Star Wars*" compression battle with the guy across town, they might have weighed the listener-related consequences and advised against it. Yes, such an engineer would likely have had to do combat with the program director, but such a duel could have thrust the properly prepared chief into parity as a trusted contributor to the station's welfare, and as a member of the management team.

With the elimination of the First Class license, the engineer is going to have to offer something more than a ticket. And with the changes in business tax laws and depreciation schedules, management may be more inclined to invest in gadgets. For these reasons, and for the sound future of a medium that was born in the hands of the tinkerers and electronic grease monkeys, a challenge exists for lead and chief engineers to take their places on the management team of their station—to man their positions on the bridge of the Starship "Broadcasting," boldly warping into the eighties—where no man or woman has gone before. **BM/E**

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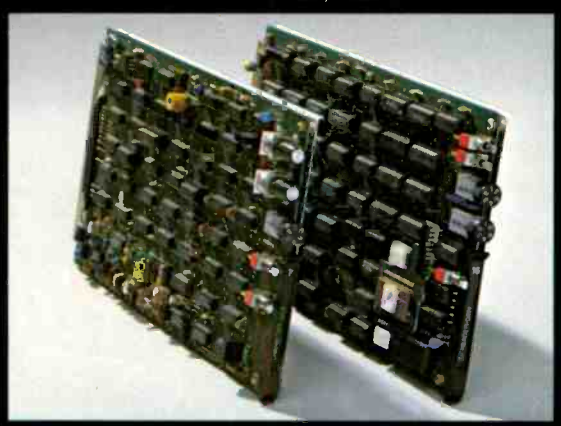
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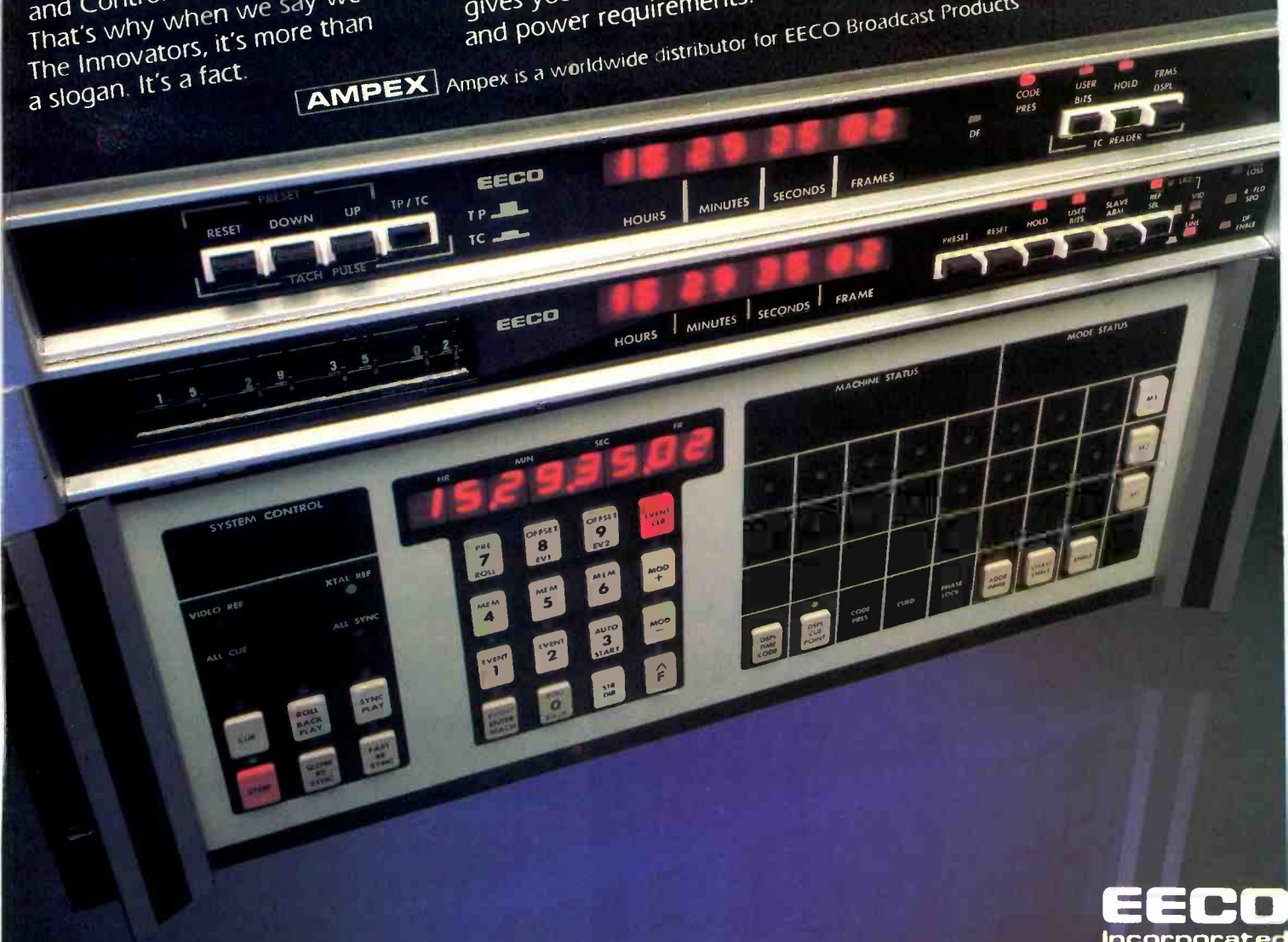

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TUNING AUDIO TO WIN THE '80S LISTENER PART I

By John E. Shepler and Neal R. Nussbaum

In many recent articles BM/E has urged radio broadcasters to commit themselves to long-range audio improvement as an essential to survival in the competitive '80s. In this first of two parts the authors supply some more how-to-do-it suggestions for cleaning up and handling audio in an AM station. Part 2 will cover improvements in FM audio practice.

WHEN RATING TIME COMES once again everyone in your station is an audio expert. For a few weeks paranoia runs rampant. Will the sound stand up to the competition?

Well, you have already changed last year's phono styli and popped a new tube in the transmitter. What else can possibly be done?

If the diaries are cruel this year (and maybe even if they aren't) the broadcaster will need to give serious thought to perking up tired audio. Great audio requires a *comprehensive, long-term* commitment. The reward is a pleasing sound that will be increasingly necessary to grab and hold listeners in radio's competitive future.

A considerable number of previous articles in this magazine, particularly those of Harvey Rees, Richard Sequerra, Charles Atwood, and the series by Mark Durenberger, have supplied valuable tips and directions on how to use today's audio technology to the best effect. We want to add our own comments and suggestions to the same end.

Proper audio levels are critical if you want really great performance. Standard test records and tapes are essential to do the job right. Cartridge and reel-to-reel tape equipment should be adjusted to approximately 0 dBm output at the standard NAB level. Some cart machines will perform best when their operating levels are set to approximately −5 dBm.

Phono preamps are usually optimum at 0 dBm for 100 percent or 0 VU at the console. In other words, various pieces of equipment have different operating levels for best performance. You must match these levels to your console input using audio "pads" if necessary. Once levels are set, they should be checked at least once a week to make sure everything is still adjusted properly.

Stereo presents some special problems. To get really great separation (40 dB or better), the two levels will have to be exactly balanced. On boards with step attenuators, mark a spot at about the one o'clock position (for rotary) and make sure the left and right channels are exactly the same and equal to 0 VU at the NAB standard reference level.

Somewhere along the line, the complete channels will have to be precisely balanced or nulled against each other. Some audio processors such as the Optimod 8000 have a meter position for doing this. In this case, the final adjustment may be made at the limiter inputs. Otherwise, use an external level meter connected between the channels or perhaps the L-R position on the modulation monitor.

Tape machinery — trouble area

The biggest audio trouble area in most stations is the tape equipment. In the '80s, we're still going to be stuck with a largely mechanical system that requires constant attention. Once again, use reference tapes to set the levels. Pay extremely close attention to the head azimuth adjustment and frequency response. The only way to get a consistent sound from carts and tapes is to make sure that every machine is aligned to the same standard and kept that way. Even a couple of dB difference in response will be noticeable when sources are played back-to-back. For stereo tape equipment, you will need to azimuth the record and play heads for best phase response using an oscilloscope.

Phono system

Whether the station is airing music directly from disk or recording to cartridge, the phono system will determine the maximum audio quality. Electronic direct drive turntables, such as those made by Panasonic, are a must for

John E. Shepler is a technical consultant, formerly chief engineer for WROK/WZOK, Rockford, Ill. **Neal R. Nussbaum** is general manager of WFRL/WXXQ, Freeport, Ill.

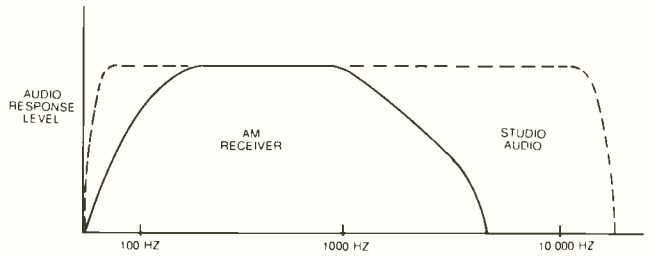

Figure 1. Response of typical small AM receiver, shown against studio response curve, shows areas that audio processing and adjustment must recover, at least in part

precise speed control and acceptable noise characteristics. The traditional "broadcast"-style phono cartridges and high-mass tone arms currently in use at many stations are totally inadequate. The only cartridge to consider is a top-of-the-line laboratory reference standard such as the Stanton 681. This type of cartridge, with a spherical diamond stylus, will give excellent frequency response and stereo separation at low tracking weights (two grams or less). Do not use elliptical or other shaped styli as they will damage records when back-cueing is used in the studio.

It is also essential to have a high quality phono preamplifier that is matched to the cartridge. Preamps that are built into control boards often require long input leads and give poor results. Be sure that the preamps will mount close to the turntables and will drive the 600 ohm load presented by the control board. For stereo applications, the preamplifiers must have individual output adjustments to balance the left and right audio channels.

Production needs TLC

The production studio should get the same tender loving care as the main studio. It is especially important to use only one type of high-quality recording tape and broadcast cart. Consistency is extremely important. Don't get the idea of using old airchecks or church tapes for production. Even the best processing scheme can't cope with this type of abuse.

A proper processing scheme, moreover, is impossible unless the audio chain is brought to a high level of performance on its own. Besides, you will notice that the equipment will be much more reliable and easier to live with when it is set up properly. Of course, to keep it running that well takes constant checking of the performance of each unit to make sure it is not "sneaking" out of adjustment.

With the station fine-tuned, you are ready to take advantage of high-performance audio processing techniques, discussed in the next section.

It has often been pointed out that processing on AM radio is tough for a number of reasons. AM is noisy, competing with dc motors, electric fences, thunderstorms, hair driers, air conditioning, and atmospheric

whistles from thousands of miles away. The band is tightly packed with its 10 kHz spacing, making really high fidelity difficult or impossible in many situations. Further, receiver manufacturers have been, at least until very recently, adverse to putting money into good receiver performance, preferring to dazzle customers with better FM stereo and cassette mechanisms.

But AM is far from hopeless. It is still the main breadwinner in a lot of markets. So we want to insure profitability by enhancing the AM sound to the fullest extent possible. Whether it is AM or FM, the objective is the same — to sound as good as possible on the radio people are listening to, or will soon listen to.

We do have a few items in our favor on AM:

- *Sound is competitive.* AM listeners will tend to judge the sound against the other AM stations as much as in comparison to FM and records.
- Nearly all AM listening is done in automobiles and on *small radios* that don't offer a lot of fidelity on either the AM or FM sections. We will be able to enhance the sound on these radios so that the differences between AM and FM will appear a lot less noticeable.
- A lot of *new technology* has become available to the AM broadcaster. We can use high-quality studio techniques developed for FM and the recording industry. We also have available new complex AM processors (such as the DAP and AM Optimod) along with high performance AM tramsmitters.

Whatever techniques are used to process audio, it is imperative that the audio chain be as good as you can make it. No matter how fancy the processing scheme, the basic sound will be limited by the audio produced at the studio. The severity of AM audio processing requires a studio signal that is *as clean as or cleaner* than the signal for high performance FM stereo. The two primary limitations to AM audio are the noise and interference on the band and the close spacing of the stations, limiting the amount of high frequency response we can have.

AM receivers generally shoot for the best compromise between reasonable fidelity and large amounts of irritating noise. As a result, the average auto or portable receiver rolls off the high frequency portion of the audio sharply.

Another fault in many AM receivers is that their inexpensive diode detectors add as much as five percent or more of distortion to the signal. This is a principal component of the well-known "listener fatigue" that compels tuneouts. The distortion is also important because in order to process the audio we will need to add certain amounts of distortion to gain loudness and signal coverage.

Transmitters

Not all problems with AM are on the receiving end. Many older style "plate modulated" transmitters have inherent characteristics that prevent full use of processed audio. The massive iron components tend to introduce discrepencies such as "ringing" and low frequency phase shift into the audio signal.

The newer generation of transmitters, such as the Harris MW I and a number of others, employ recently developed technology that helps to maintain the integrity of highly processed audio. With tighter control of signal levels, we can modulate much nearer to the maximum limit of 100 percent (125 percent positive peaks) with a corresponding increase in loudness on the dial.

Tuning Audio

If you are stuck with one of the old "iron monsters," you can greatly improve your modulation by use of a transmitter equalizer or compensator such as the one incorporated in the Orban Optimod-AM or Gregg Labs processor. These devices allow you to tune out low frequency phase shift and high frequency ringing, which are the two most common difficulties with plate-modulated transmitters.

We cannot compensate for the higher distortion characteristic of the old transmitters, however. This is usually not a tremendous problem but does inhibit ability to get maximum performance from audio processing.

The three main goals of AM audio processing schemes are:

- Restore, as much as possible, the fidelity that is lost because of receiver roll-off.
- Produce a loud, consistent signal that will be easily identified.
- Increase transmission range as much as possible.

Here is a summary of how the standard processing techniques move the signal toward these goals:

AGC or automatic gain control has exactly one purpose —to keep the overall audio levels constant, just as a really conscientious board operator would. This is usually the first device in the processing chain and should add no "coloring" of its own to the sound.

Equalization can put back much of the lost treble, using the high frequency boost. Flat audio from the AGC will be boosted in the range of 1000 to 10,000 Hz to offset the receiver dropoff (shown in Fig. 3). We will need a boost of 6 to 10 dB at 10 kHz to give a clear, balanced sound.

Frequencies below 100 Hz and above 10 kHz are of no use because they will not come through in any case. Since there is no point in wasting transmitter power on these signals, we will use the equalizer to filter them out. Another good reason for filtering out the high frequencies above 10 kHz is to avoid the "splatter" or adjacent channel interference that high energy processing would tend to cause.

The situation is really a little more complicated than this. While the response of an AM radio may be very similar to what we've shown in Fig. 1, in real radios the small speakers will more noticeably roll off the low and high frequencies, giving an upper mid-band or "tinny" sound. As a result, a lot of our processing efforts will be lost, although there will still be a noticeable improvement compared with other stations not using equalization.

We can do some additional doctoring of the sound by adding more boost to the upper mid-range of frequencies (3 to 6 kHz). This will make the voices crisper and more defined and will put some of the sharpness back in the music.

Correspondingly boosting the low frequencies may produce a better balanced sound. Be careful here, though! While many AM receivers have similar high frequency rolloffs, the bass response is likely to vary quite a bit between a small portable and a big, boomy car radio. Boosting a low mid-range value of 300 to 400 Hz may improve the sound of the small portables, but will make

the sound "mushy" in the car. A good compromise is a slight boost (2 dB or so) around 100 Hz. This will add some punch to the larger receivers but will not hurt on the smaller sets.

Compression

Up to this point, we've been concentrating on improving frequency response or tonal qualities. Equalization can make the station sound much better, but it won't improve the loudness or station coverage. A denser signal will sound more powerful and will also use transmitter power more efficiently by raising the average modulation.

This technique can be carried too far, however. Excessive compression will create a very harsh, blasting sound that will rapidly wear on the listener's nerves. The split-band compressor is better on this score. It allows the use of

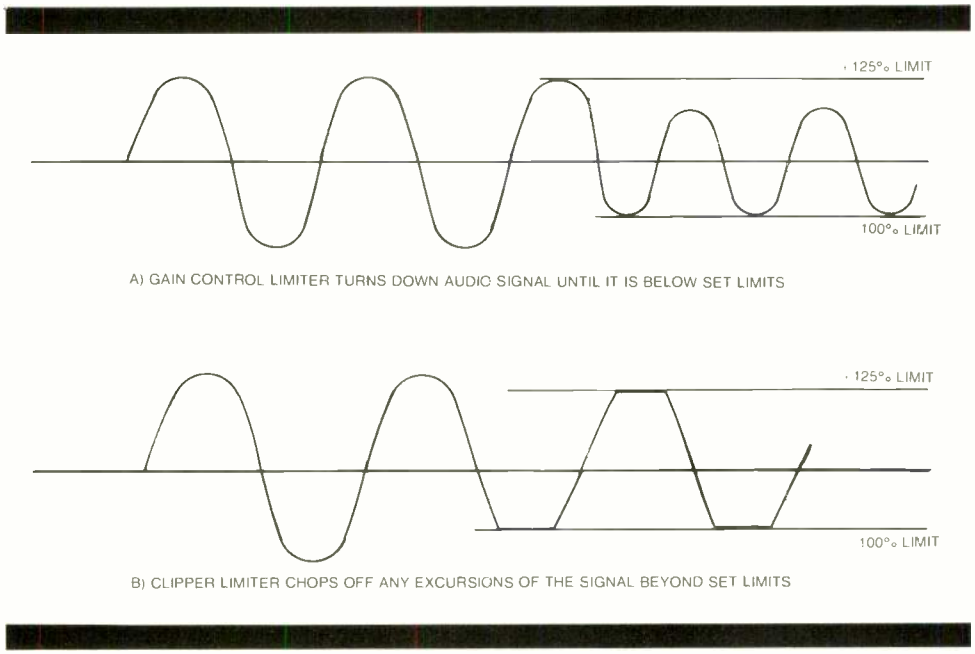

Figure 2. The two principal ways of preventing overmodulation by peaks in the signal are diagrammed at the left

much greater compression but keeps the irritating effects of each audio band from affecting the others. Generally, the more compressor bands available, the denser the audio.

Multiband compression will also have an "automatic equalizer" effect. Each of the bands will attempt to maintain a constant output despite the different content of various sources. Thus, the overall sound will be more consistent.

In some cases, as in the Dorrough 310, the balance

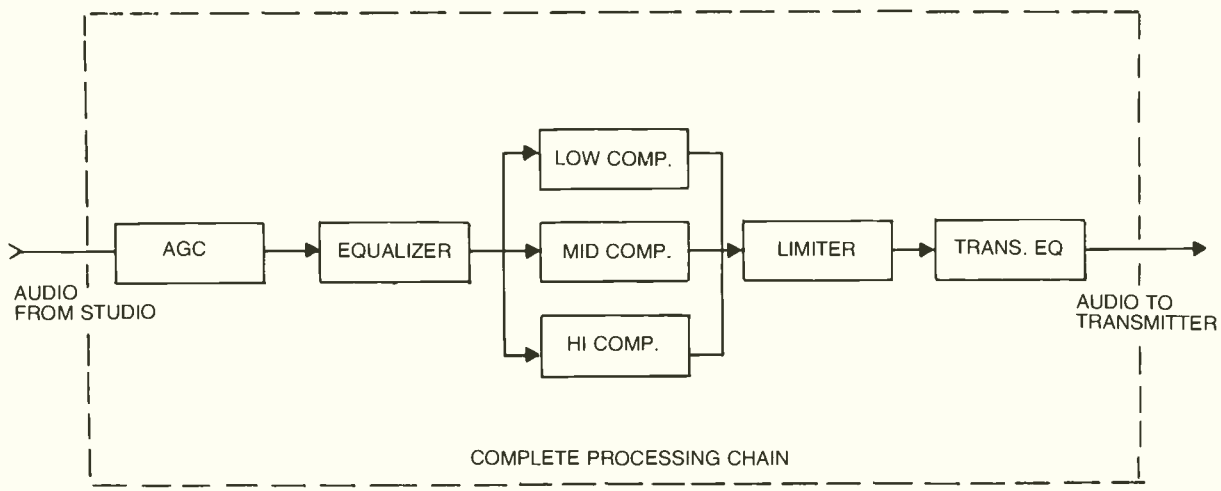

Figure 3. An audio control and processing chain for maximizing signal quality is shown in block diagram above. All the functions indicated may be in a single assembly, or some may be in separate units. With the functions shown, signal quality as delivered by typical AM receivers can be greatly improved

between the outputs of each compressor may be adjusted much like the individual adjustments on an equalizer. One final advantage of a multiband compressor is that it prevents one frequency range from pushing out the others. This helps to prevent pumping caused by bass notes and high frequency losses when strong mid-band signals (like vocals) are present.

The next stage of the processing scheme will be a peak limiter to prevent occasional peaks in the audio from holding the modulation level down. As we know, peaks that don't show on the VU meter can overmodulate the transmitter unless the entire audio level is reduced. Compression pulls them down, but the peaks can still be troublesome.

We want our peak limiter to level out these peaks without destroying the dynamics of the program material. We also want to take advantage of the fact that we are allowed an extra 25 percent modulation on the positive peaks.

A valuable device to incorporate into the processing scheme is a phase sensing and reversal circuit. This device will adjust the phase of processed audio so that the peaks will be predominantly in the positive direction. This allows us to use much less limiting to control the peak excursions.

There are two kinds of peak limiters. The first is a "gain controlled amplifier" that actually turns down the level of the audio during the duration of the peak. This is a low distortion technique but causes us to lose loudness.

The second is a "clipper" circuit that simply chops off any peaks above a given level. While this may seem like a harsh way to treat the audio, remember that the peaks from the compression circuit will have already been reduced considerably. Also, the human ear will tolerate considerably more clipping-type distortion than the mushy IM (intermodulation) distortion that faulty amplifiers and overloaded transmitters produce. Fig. 2 shows how the two types of limiters operate.

The most irritating side effect of too much clipping is the raspy "essy" sound particularly noticeable on voices. As with other processing techniques, though, the cleaner the signal is to begin with, the less offensive will be the aural results of clipping.

Fig. 3 shows a complete processing chain. The dotted lines indicate that all these circuits may be incorporated into a single, complex processing box such as the Orban Optimod-AM. Also note that the transmitter equalizer is a separate unit from the program equalizer and usually contains a sharp high frequency filter to prevent splatter. Following this stage, the audio is ready for transmission.

Any broadcaster undertaking to "tune" the station and set up audio processing will notice very quickly that the effects are subjective and often hard to control. The sensible approach is to set up a plan for achieving the sound you want. It's best to use a variety of radios for comparison and most importantly reference your adjustments to the stations on the dial that you consider your toughest competition.

Again, the results will depend on the quality of the audio from the studio, the quality of its processing equipment, and the quality of the transmitter. Generally, any effort put into improving any of these will allow stiffer processing and thus louder sound without losing overall fidelity. **BM/E**

CURRIE

"Incredible opportunities are coming for the local programmer!"

Steve Currie, 1981 President of the National Association of Television Program Executives, is Manager of Broadcast Operations, KOIN-TV, Portland, Oregon.

"NATPE does quite a bit to help improve local programming. Sponsoring the IRIS Awards, for example. They're only for *local* programming, and there's no question that they've become a major award in the TV industry. NATPE-sponsored workshops and general sessions deal with the problems of local stations and those of the local programmer. The exchange of ideas and information from around the country helps us all.

"The role of Program Director is difficult even for NATPE to define, because responsibilities vary from station to station. It started out, in many cases, that the Program Director was merely an operations clerk who shuffled paper, took the network schedule, and filled in the half-hour hole on Saturday or Sunday. Most of the actual program decisions were made by the General Manager, Sales Manager, or a combination thereof. As Program Director here, I have responsibility for the on-air look of the station. I don't control the journalistic aspect of the news, but I am involved in how the product looks on the air. Attitudes toward the Program Director are changing, too. There is a great realization that if you have a good programmer who is doing a good job, you're going to get your ratings.

"I think that as our industry develops, the local station with local studio, talent, and expertise is going to become a major supplier to other groups, whether they be a low-powered station in our own market, a cable channel, the video market, whatever.

"Right now it's easier to go out and buy a syndicated series than it is to create your own local programs, but it's not necessarily better. We have a program here called *Northwest Illustrated*, which precedes *60 Minutes* on our station. It's a magazine half-hour similar to *60 Minutes* —on a local level—and has won a number of awards, including a DuPont Columbia award. This show is, to a great extent, produced on film. We shoot on Kodak film, because we want a clean, finished look—one that sets it apart from some other news programming you see on the air. It's our showpiece and has to have the right look. Kodak film gives that to us. I'm very proud of the show, because the station is not only providing a service—we're doing something of quality.

"If I see any coming trend, it's that of more news and informational shows done on a local basis. This will help local stations maintain their local affinity. And it's a great opportunity for us. Look, it's seldom that a local station can go out and do a dramatic presentation, a sitcom, or a movie. It's just not in the cards. But here is the chance to have something truly unique for our market. It's where we have our expertise. It's where we have the ability to really excel. There's a lot of opportunity coming for the local station, and I think that's something we all need to keep in mind."

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MAINTAINING MODULATION FOR TOP TV PICTURES

By Dane E. Ericksen

Undermodulation of the visual transmitter may not only make you a violator of FCC rules, but may also give your audience a poor picture, a prelude to tune-out. Dane Ericksen of the FCC explains how modulation in television is measured and how to judge when it is set correctly.

ON DECEMBER 19, 1979 the FCC amended its operator rules to allow persons holding any grade of commercial radiotelephone operator license or permit to act as the operator on duty at television broadcast stations. The influx of new operators which this deregulation is bringing suggests that it is time to review the basics of measuring visual depth of modulation, and also to give a method for checking the accuracy of the demodulator used to observe visual modulation.

FCC rules[1] require that the blanking level be maintained at 75 percent of peak carrier level and the reference white level of the *luminance* signal be maintained at 12.5 percent. The allowable tolerance for both parameters is 2.5 percent. The setup level must also be maintained at 7.5 IRE units plus or minus 2.5 IRE units.

Before we proceed further, let's make sure we understand the scales and units. The percentage scale has a range of 0 percent to 100 percent.

The IRE units scale, on the other hand, ranges from 0 to +120 and 0 to −40. The 0 IRE level is referenced, or clamped, to the blanking level. If everything is adjusted properly, 0 IRE will correspond to 75 percent of peak carrier level and 100 IRE will correspond to 12.5 percent of peak carrier level. Also note that the blanking and white levels are defined in terms of percentage of peak carrier level rather than IRE units.

Finally, let's clarify the difference between percentage of peak carrier level and modulation percentage: 100 percent of peak carrier level corresponds to *zero* percent modulation; 75 percent of peak carrier level corresponds to 25 percent modulation; 12.5 percent of peak carrier level corresponds to 87.5 percent modulation; and zero percent of peak carrier level corresponds to 100 percent negative modulation. It's OK to talk in terms of either percentage of peak carrier level or modulation percentage, as long as you are careful to differentiate between the two. Since the FCC rules talk in terms of percentage of peak carrier level, that frame of reference will be used in this article.

The zero carrier reference

In order to properly adjust the gain and vertical position of the waveform monitor, a zero reference signal, or chopper pulse, is required. Most demodulators generate a zero carrier reference signal electronically by momentarily biasing the IF amplifier to a hard cutoff, simulating where carrier cutoff would occur if 100 percent negative modulation were allowed to exist. Early diode demodulators used a vibrating mechanical switch to momentarily interrupt, or "chop," the video signal to generate a zero carrier reference — hence the term "chopper."

The zero carrier reference signal is mandatory if accurate depth-of-modulation measurements are to be made. The waveform monitor vertical position and vertical gain controls must be adjusted so that the zero carrier reference

[1]Title 47, CFR, Sections 73.682(a) (12, 13 and 17).

Dane Erickson is an FM/TV specialist with the FCC Field Operations Bureau in San Francisco. The views expressed are those of the author and do not necessarily reflect the views of the FCC Commission.

Production Studio. WRBR-FM. South Bend. Indiana.

Electro-Voice's Greg Silsby talks about the Sentry® 100 studio monitor

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

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

The Sentry 100 also had to have a tweeter that wouldn't go up in smoke the first time someone accidentally shifted into fast forward with the tape heads engaged and the monitor amp on. This meant high-frequency power handling capability on the order of five times that of conventional high-frequency drivers.

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

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

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

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

And for a close I told E-V's engineers that a studio had to be able to purchase the Sentry 100 for essentially the same money as the current best-selling monitor system.

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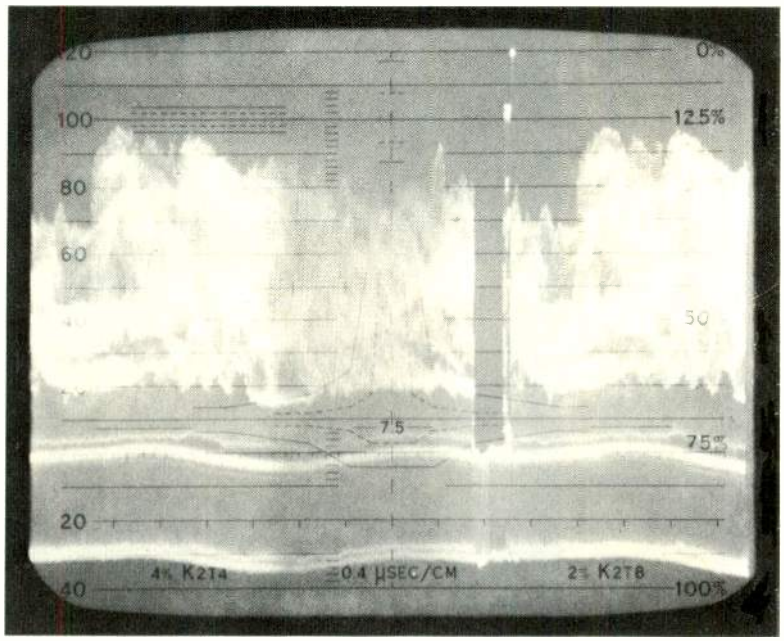


An improperly adjusted waveform monitor. Although the zero carrier reference is still properly set at + 120 IRE, sync tips are no longer at − 40 IRE. Blanking level is not really 0 IRE (75 percent) as a casual glance would first suggest

is at precisely 0 percent (+120 IRE units), while the synchronizing pulse tips are at 100 percent (−40 IRE units).

Because most waveform monitors have dc restorers that clamp to the blanking level, operators sometimes adjust the monitor with the zero carrier reference at +120 IRE, the blanking level at 0 IRE, and the synchronizing tips at whatever level results from the first two adjustments. This is incorrect. This method will result in an accurate reading *only* if the video/sync ratio is precisely correct. An example of an *improperly* adjusted monitor is shown in the photograph. Note that the sync tips are no longer at −40 IRE units.

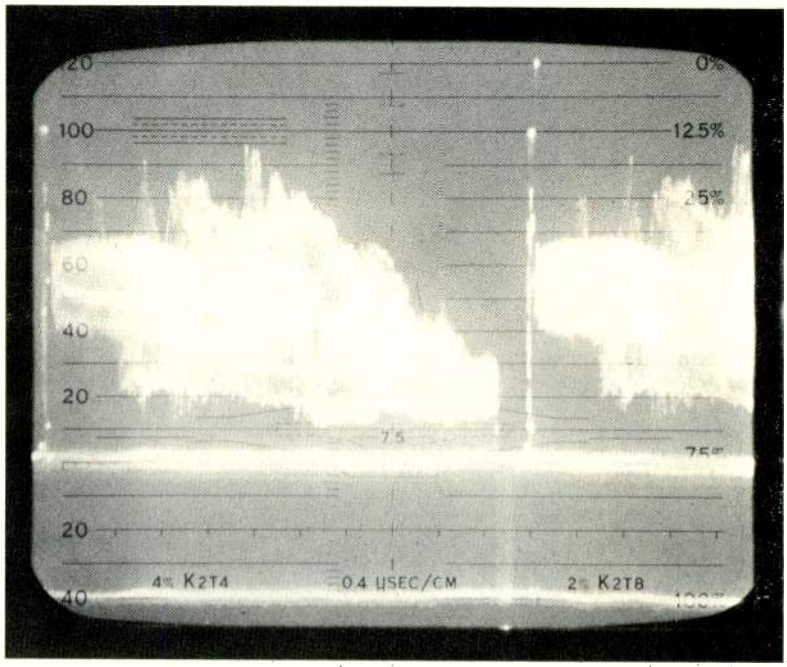
Wideband versus IRE response

Although the blanking level may be measured with the monitor's response in either wideband or IRE rolloff, measurements of white level and setup *must* be made with the monitor in the IRE rolloff mode. This is because these signals are defined in terms of the luminance signal only; therefore, the chrominance, or color signal, must first be filtered out. If attempts are made to read the white level or the setup level in the flat response mode, it will be impossible to differentiate between the luminance and chrominance signals. Whereas chrominance components may exceed reference white or go below blanking, and in fact will do so on strongly saturated color signals, the luminance signal should never exceed the reference white level or go below the setup level.

Visual transmitter undermodulation will be likely to exist if one attempts to adjust visual depth of modulation in the flat response mode. Why? By limiting the total video signal (which includes the high frequency chrominance components) to a 7.5 to 100 IRE window, the luminance signal will always vary over a lesser range (for example, 20 to 80 IRE). This will result in poor contrast and loss of dynamic range between an all-white picture and an all-black picture. With proper adjustment, video components will go below setup and blanking in the flat response mode, but not in the IRE rolloff mode. The second photograph shows an *undermodulated* signal. Note that both program video and the white flag vertical interval test signal indicate undermodulation.

Parallax errors

Parallax error often occurs with waveform monitors with graticule overlays rather than internally etched



A properly modulated television signal in the IRE rolloff mode. Only the luminance signal is passed — chrominance has been filtered out. Note that video ranges from 7.5 to 100 IRE, but does not exceed 100 IRE or go below 7.5 IRE

graticules. If the monitor is not viewed perpendicular to its face, the graticule lines can appear shifted with respect to the trace. On some monitors this can easily cause a six percent (or 10 IRE unit) error. This is especially true if the monitor is mounted off-axis to the operator's line of sight. Stations with waveform monitors mounted at awkward heights or angles for the operator on duty are asking for problems.

Net versus local

A problem in maintaining proper depth of modulation occurs when stations switch from network to local or vice

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versa. There has been a disturbing rise in the number of stations tolerating long-term visual undermodulation while in network programming — FCC rules require you, the operator on duty, to maintain proper visual depth of modulation; this may necessitate checking and adjusting video gain when entering or leaving the network (or after any other change in video source).

Video from different sources should be normalized for 0.714 V, making readjustment of depth of modulation (or "video gain" or "white clip") unnecessary; if it is necessary, however, the operator on duty must be alert to the reference white level, setup level, and blanking level, and make necessary adjustments. Observing the waveform monitor at the start of a shift and once every three hours during meter reading won't keep the station in compliance if the incoming video levels are changing with program source. Also remember that any adjustment in overall video gain will probably also require readjusting the blanking (sync) level.

The automatic video corrector trap

Another danger area is over-reliance on automatic video correctors. AVCs are great when they are working correctly and when the Vertical Interval Reference (VIR) signal accompanying the program is an *accurate* certification of the program's video levels. If you become too reliant on the AVC, you may fall into the trap of not checking white level, setup level, and blanking level (and with reasonable care — simply glancing at the waveform monitor from across the room and noting that it's glowing green doesn't suffice). If the AVC is accidentally left in bypass mode, or the VIR certification is flawed, you may find yourself transmitting out-of-tolerance visual modulation for substantial periods. Besides violating FCC rules, this degrades your picture quality and robs your viewers of the dynamic range they are entitled to see.

Low whites and high setup — the "maybe's"

Excessive white levels or insufficient setup levels are always violations of FCC rules, and enforcement action will be taken if these conditions are observed for extended periods. FCC inspectors will allow an operator on duty reasonable time to observe and correct a problem; what *will* trigger enforcement action is a visual modulation problem observed over an entire 30- or 60-minute program.

The inverse conditions, low luminance or high setup levels, are ambiguous errors and judgment must be exercised. There is no requirement that a signal contain reference whites or saturated blacks; perhaps the producer *liked* mild whites or nice grays. If a VIR signal is present and has proper luminance and setup levels (50 IRE units and 7.5 IRE units), this goes a long way in suggesting that visual depth of modulation is properly adjusted and the reason for the "low whites" and "high setup" is simply that the program does not contain reference whites or saturated blacks. On the other hand, if an hour and a half of monitoring shows *no* luminance excursions above 80 IRE (25 percent carrier level), even during commercials with white lettering or during soap opera scenes showing a nurse's white uniform in a brightly lit hospital room, then

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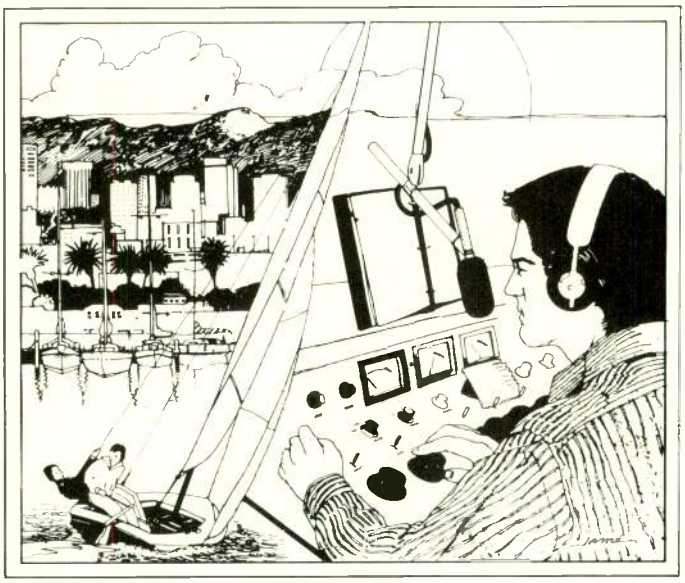

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Bob McKay is Program Director at KCBQ. He also gives the 317C-2 high marks:

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"We do a lot of audio processing, and the transmitter handles the processing very well. In my opinion, it does a superior job of covering the mammoth San Diego County. I think the 317C-2 is an outstanding performer for us. It's excellent equipment."

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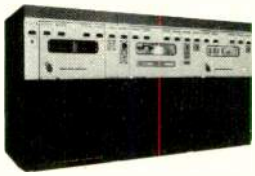

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Maintaining Modulation

even a "proper" level VIR signal will not hide the fact that the transmitter has been undermodulated.

One check of whether a visual undermodulation problem exists is observation of the signal when a station switches from network/afternoon movie/syndicated program to local news. A dramatic increase in luminance levels from nothing over 70 or 80 IRE (even on commercials) to 100 IRE leaves little doubt that the problem was one of transmitter undermodulation rather than low dynamic range video. It also produces a rather dramatic improvement in contrast.

Demodulator accuracy

Let's assume that you have taken all the preceding to heart: You've designated a chief operator as required for TV stations employing lesser-grade operators; your chief operator has carefully instructed those operators in their duties, and has posted upper and lower limits for white level, setup level and blanking level; all of your operators are dedicated types who constantly and accurately read and adjust modulation. Your worries are over, right? *Wrong!* There's one more area that needs to be covered to insure that you are operating in compliance with FCC rules — demodulator accuracy. The most dedicated operator won't be able to assure proper visual modulation if your demodulator is not accurate.

Although all television broadcast stations are required to have some form of visual modulation indication, there are no FCC standards for demodulators. The decision as to the adequacy of a demodulator/waveform monitor combination is left to the judgment of each licensee. Most stations now use a professional quality television demodulator and a television waveform monitor to observe their visual depth of modulation. Two critical requirements for the television demodulator are good linearity and a highly accurate zero carrier reference ("chopper" pulse). The demodulator must have good linearity to avoid sync compression errors or white level errors. This is especially true for excessive whites where the signal is approaching carrier cutoff, and diode non-linearities near cutoff can cause significant errors.

The spectrum analyzer as a tuned receiver

One method of cross checking demodulator accuracy is to view the visual carrier directly at rf using a spectrum analyzer in the "zero scan" mode — that is, as a tuned receiver. This will then allow comparison of depth of modulation between the analyzer and the conventional demodulator/waveform monitor combination. If the two measurement techniques do not agree within 2 percent (and preferably within 1 percent), investigations should be made as to the cause of the disagreement.

Necessary conditions

Using the spectrum analyzer as a secondary instrument to check depth of modulation is easy, but several conditions must be met for the measurement to be valid. The step by step conditions which are given apply specifically to the Tektronix 7L 13/7L 12 spectrum analyzers, but the principles behind the steps can be applied with equal validity to any laboratory grade spectrum analyzer.

The steps are as follows:

1. Perform the manufacturer's operational calibration.
2. Tune the analyzer to the visual carrier. Set scan width to 1 MHz/div; vertical gain to 10 dB/div; bandwidth (resolution) to 3 MHz; CRT to non-store mode.
3. Insure that the visual carrier is centered.
4. Uncouple the scan width/resolution knob. While leaving resolution at 3 MHz, decrease scan width to zero (that is, go from frequency domain to time domain).
5. Change vertical gain to linear mode.
6. Turn the base line clipper to zero (full CCW).
7. Momentarily remove the input signal; confirm that the resulting baseline is exactly at the bottom graticule; adjust the vertical position control if necessary; re-apply the signal.
8. Adjust the variable gain control so sync tips are exactly at the top of the screen.
9. Set trigger source to internal.
10. Adjust the trigger control for a stable waveform; set sweep rate to 2 ms/div for a field rate display; set sweep rate to 10 μs/div for a line rate display.

Interpretation of the display

At this point you should be seeing a display similar to the photograph if you have selected a line rate (10 μs/div). There are several serendipitous factors which combine to tailor the display to FCC standards. First, due to the 3 MHz bandwidth selected, no chrominance components are displayed. This is fortunate, since the reference white level is defined in terms of the luminance signal only. Second, there are eight major divisions and 40 minor divisions vertically; each major division then corresponds to 12.5 percent modulation intervals and each minor division corresponds to 2.5 percent modulation intervals. These intervals are very convenient considering the reference white level specification of 12.5 percent ±2.5 percent and the blanking level specification of 75 percent ±2.5 percent. Third, the white flag portion of the vertical interval test signal (VITS) is definitely observable. Fourth, field rate distortions (for example, hum or vertical interval clamping problems) can clearly be observed and therefore serve as a cross check to verify that field rate distortions seen on the waveform monitor (that is, demodulated video domain) are really present and not due to a field rate response problem in the demodulator or waveform monitor.

The last photograph shows a television signal viewed on a spectrum analyzer in zero scan mode. Note that the white flag is two minor divisions below the first major division from the bottom (that is, the ⅛ or 12.5 percent line); this corresponds to 7.5 percent white level.

If the visual depth of modulation observed using your analyzer and your demodulator agree within 2 percent, you can be assured that your demodulator is giving a truthful indication of your depth of modulation. If a discrepancy of more than 2 percent is observed, check your demodulator's zero carrier reference pulse to insure that it really represents 100 percent negative modulation. Also check to insure that you are not overdriving the demodulator with too much signal. Insert attenuating pads in 10 dB steps (through at least 30 dB, or until obvious noise is seen in the demodulated signal), and check to see that no changes in the video/sync ratio occur. **BM/E**

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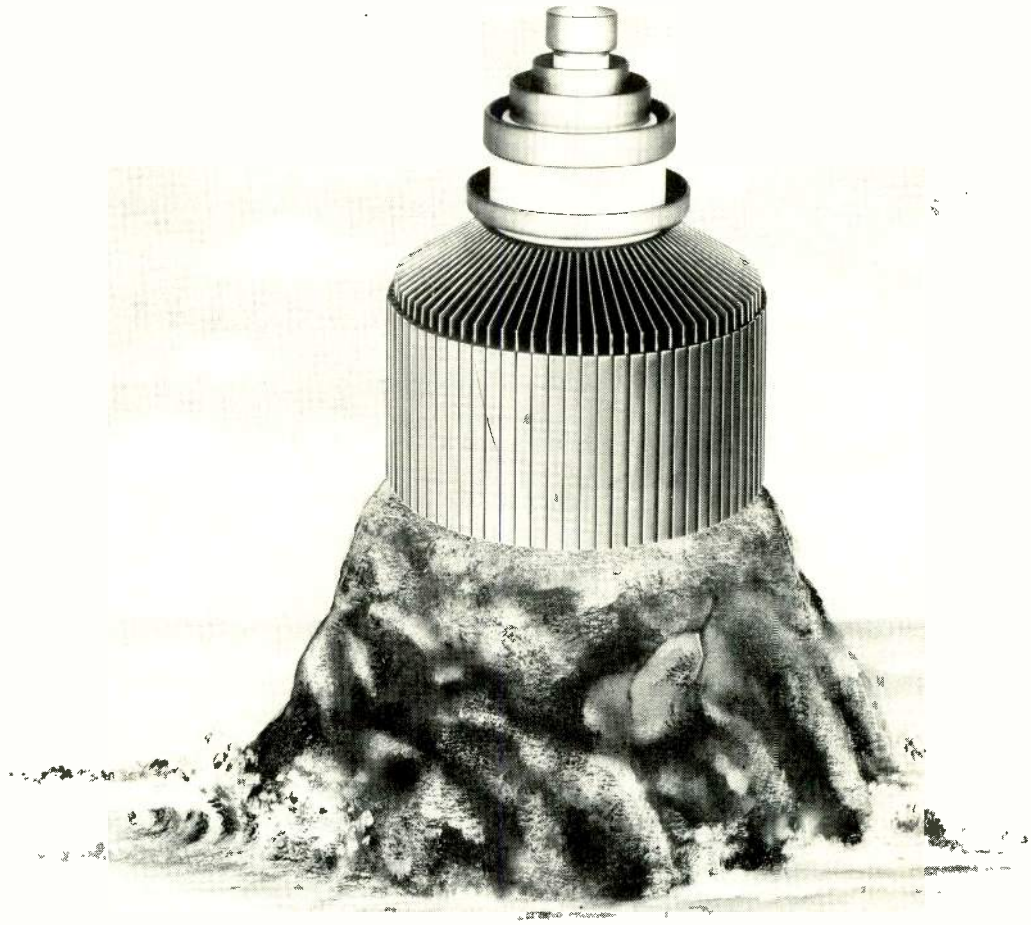

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BM/E NEWS FEATURE

Abolishment Of First Phone License Could Hurt Small Market Radio

MOST ENGINEERS regard the latest FCC deregulation move — the elimination of the Radiotelephone First Class Operators License — variously as a slap in the face, a knife in the back, or if not a personal affront, a stupid move sure to deteriorate the quality of American broadcasting. Those attending the first Annual WOSU Broadcast Engineering Conference, July 15-16, spent the better part of an afternoon decrying the latest FCC decision which became effective August 7, 1981, 30 days after the notice was published in the *Federal Register*.

Bearing the brunt of the criticism at the Columbus, Ohio, meeting was John E. Reiser of the Policy and Rules Division of the FCC's Broadcast Bureau, who appeared on an FCC and industry panel discussion. Reiser acknowledged that he has been receiving as many as 50 to 60 wrathful calls a day from engineers upset with the ruling.

Reiser said the Commission found insufficient evidence indicating that issuance of the first class ticket *per se* contributed to a station's meeting FCC technical standards. On the other hand, there was plenty of testimony indicating that the holder of a first class ticket is not necessarily qualified to work on transmitters since the test ascertains only knowledge of theory and has no component to test "hands on" competence. The FCC concluded that too little is gained by the process. Further they concluded, based on the comments of many broadcasters, that market forces will guarantee that stations put out a high quality signal.

Hereafter, only General Radiotelephone Licenses will be granted. The exam will be that now used for Second Class Radiotelephone Operators. Under the new ruling, any person holding any class of commercial license, including the Restricted Radiotelephone Operator Permit, can install, maintain, or repair radio or TV broadcasting equipment. The only exception is a Marine Radio Operators Permit.

Rule change calls for chief operator

In abolishing the first class license requirement, several part 73 rules were changed including the addition of a new part, 73.1870, calling for licensees to designate a station chief operator who will be responsible for some of the duties heretofore given to the first phone operator. A new inspection schedule was issued (73.1580) and requirements for maintenance logs (73.1830) were revised.

Although the FCC found insufficient evidence to support continuing the present first class licensing procedure, it does feel that industry groups such as the NAB and the SBE might devise a means of screening and identifying who is qualified to do technical work. At the WOSU meeting, an active SBE member and consultant from Pittsburgh, Hank Kaiser, said qualified engineers would take up the challenge to prove how they can help managers save money and not spend it. Kaiser supported NAB-SBE action. The preponderance of opinion at the WOSU meeting, however, was that technical standards of most small market radio stations would deteriorate because management will no longer have to listen to a first phone operator's advice.

Dan Case, an FM engineer from WQLN, Erie, Penn., went so far as to predict the disappearance of small market radio as we know it today. Without some kind of mandatory requirements imposed by the FCC, station managers will run the station into the ground, he said. Without qualified technical people on the job keeping an alert eye open for such things as frayed or broken antenna guy wires, towers will literally fall to the ground, he predicted.

Under the new rules, there is no need to have technical personnel around to take transmitter measurements or to sign the maintenance log. This, coupled with the FCC budget restrictions which have cut field inspections to less than 10 percent of the total in any given year (a fact verified by Irby Tallent, Jr., FCC inspector, Detroit), means managers can shrug off observing the rules that do exist if they wish.

Engineer after engineer at the WOSU conference marched to the microphone to "tell it like it is." Without the threat of an FCC citation, too many managers will not invest in adequate monitors or test equipment, they said. In the past, this possible citation was the only clout engineers had. With their services no longer mandatory, many wondered aloud if they should not seek employment in other fields.

The engineers present were skeptical about market forces properly regulating the industry. Managers will permit overmodulation or at least serious clipping just to get the loudest signal to the detriment of the public, they reported, and without inspections and enforcement one station can interfere with another with impunity.

Speaking from the panel, Wallace Johnson, retired Broadcast Bureau chief and now executive director of the Association for Broadcast Engineering Standards, said he was alarmed over the Commission's obvious loss of interest in technical matters. The FCC is so intent to "shoe horn in" more stations that they disregard interference that may be set up, he said. In the past, broadcasters had some sort of assurance that they could provide quality service because they would be protected from interference from other services. But the Commission no longer shows a concern for this quality, Johnson said, and the trend to lower standards is obvious as a result of relaxed operator standards, short form renewals, and reduced field inspections. With such an attitude at the FCC level, "management won't want to spend a buck on equipment," he said.

In response to questions from the floor, Reiser said it was true that the station janitor could make transmitter adjustments or log entries so long as he held as little as a restricted license. But

he stressed that the license was responsible for the outcome, and must designate a "Chief Operator" who must hold a commercial radio operator license of some class (other than a Marine Radio Operator Permit). The hours that a chief operator must be on duty can pretty much be designated by the licensee. If the station is a non-directional AM operating below 10 kW or an FM station, this function can be performed on a contract basis.

The designation of the chief operator for a station must be in writing, Reiser said. Among this person's duties are conducting weekly inspections (monthly for ATS plants), calibrating systems, and making repairs or adjustments as necessary. The chief operator must also make or supervise periodic AM field monitoring point measurements or other tests as required and review the station operating logs at least once a week. This person must make or supervise entries in the maintenance log, too.

Reiser pointed out that those directional AM stations now exempt from antenna field strength measurement or proofs of performance as a result of having first class license holders on duty at all times are still exempt from such measurements until such time as a rule modification covering this situation is made.

Although it did not come out at the WOSU meeting, the FCC does feel it has investigated all of the presumed benefits of the first class licensing procedure, and it analyzes them in the discussion section of the 15 pages appearing in the *Federal Register*. The points considered were: (1) The promotion of a greater awareness of the FCC's rules and standards; (2) the transmittal to operators of some electronic theory; (3) the installation of a sense of pride in one's work; (4) a heightened concern for adherence to rules when operators find equipment running outside of the parameters set; (5) the value of the test as a screening device, particularly for small market stations.

The FCC dismissed the first two arguments on the grounds that competition for jobs in the larger markets meant operators would learn about the rules and theory on their own. In smaller markets, stations have come to rely on consultants and will continue to do so. Regarding the pride an operator felt in holding first class license, the FCC said it could not measure that feeling. The FCC said it thought the prospect of an "unscrupulous licensee" operating outside of the bounds of the rules, were it not for a first class operator, blowing the whistle, "a most improbable scenario." There is too much to risk, the FCC said (despite anecdotal submissions to the contrary) for a station to disregard the rules.

The FCC said the benefits of the test as a screening device was one of the most often cited in comments made. But because the test is so limited and does not measure practical abilities, this benefit "contributes very little." The FCC concluded that the broadcast environment included enough other factors that facilitated or encouraged operation within the rules thus providing protection for both the station owner and public. These are, in addition to increasingly automated and accurate equipment, type acceptance of transmitters and type approval of monitoring equipment, the maintenance of logs and records, and mandatory periodic monitoring. Thus the first class licensing procedure was basically redundant, the commission ruled, and not needed. **BM/E**

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BM/E NEWS FEATURE

The 123rd SMPTE Technical Conference To Be Held In Los Angeles

SMPTE'S FALL CONFERENCE, filling Los Angeles's Century Plaza Hotel October 25 through 30 (with additional functions to be held at the Beverly Hilton), is expected to be the largest in SMPTE history. The exhibitors' area, which has been sold out for weeks will feature equipment from more than 120 companies. It will be open daily from 10:00 a.m. to 6:00 p.m. beginning Tuesday,

EXHIBITORS — 123rd SMPTE CONFERENCE

BOOTH	EXHIBITOR	BOOTH	EXHIBITOR	BOOTH	EXHIBITOR
101	Marconi	436-437	F & B/Ceco		Systems
102-103	Dolby	438	Comprehensive	548-549	Harris/Farinon
104-105	Canon		Serv. A/V	550	Arvin/Echo
106-109	Orrox/CMX	439-440	Hazeltine	551	Chyron
110	L/W International	441-444	KEM Editing	552	Comprehensive
111-113	Fujinon Optical	445-447	Belden		Video
114,	Magnasync/Moviola		Communications	553-554	Gray Engineering
425-428	"	448-449	Soremec-Eclair	555	OSRAM
116	RCA	450	Angenieux	556-558	Merlin
124	Microwave	451-452	Anton Bauer	559-561	Vital
125-126	Westrex	453-454	Sylvania/GTE	562-564	Electronic Appl.
127-128	Grass Valley	455-456	O'Connor	565	Cinecare
129	Oxberry	457-460	Mole-Richardson	566-567	Century Precision
130-131	Matthews	461-462	Hollywood Film	568	Teledyne
201-204	JVC	465	Nagra	569-570	Cinemills
205-211	CDL/Philips, ADC	466-469	Multi-Track	571-573	Microtime
212-213,	Ampex		Magnetics	574-575	Listec
219,	"	473-475	Lipsner-Smith	576	Cetec Vega
228-229	"	476-477	Nurad	577	Bolex
214	Aaton	478-479	Toshiba	601-602	Historical Display
215-216	Agfa-Gevaert	480-481	MCI/Quantel	603-604	Bogen
217	Eastman Kodak	482-483	Carter Equipment	605-609	Alan Gordon
225-227	Compact Video	484	LaVezzi	610-618	Arriflex
230-237	Panasonic	485-488	KLM/Oldelft	619-623	Cinema Products
238	Kliegl Bros.	489-494	3M	625	Skotel
239-240	Fuji Photo	495-496	Lowel-Light	626	Pioneer
241-244	Fernseh	497-499	PRC		Marketing
301-307,	Sony	501-503	TV Equip. Assoc.	628	Christy's Editorial
316	"	504-505	Coherent Comm.		Film
308-314	Hitachi Denshi	506-507	Birns & Sawyer	629	Clear-Com
324-325	Berkey Colortran	508-510	NEC America		Intercoms
326-327	Animation Video	511-512	Peterson	630-632	Videomedia
328-331	Convergence	513	Mitchell	633	Sennheiser
400-404	Ikegami	514-515	Lab Methods	634	Miller Prof. Equip.
405-406	Goldberg Bros.	516-517	Houston Fearless	635-636	Union Connector
407-409	Rank Precision	518-520,	Datatron	637	Hudson
410-414	Steenbeck	534-536	"		Photographic
415-416	Cine 60	521-522	Tele-Cine	638	On Location
417	EEV	523-524	Thomson-CSF	639-640	Rosco
418	Pace Int'l	525-529	ADDA	641	Snook
419	Wide Range	530-531	Rohde & Schwarz	642	Videotek
420-421	Bell & Howell	532-533	System Concepts	643	Control Video
422-424,	L.T.M.	537-538	Lenco	644	Edutron/Fortel
470-472	"	539	Eigen	645	Brumac
429	Frezzolini	540	Telescript	646	Q-TV
430-431,	Strand Century	541-543	ASACA	647	Cool Light
463-464	"	544-545	Commercial	648	R-Columbia
432-434	Magna-Tech		Electronics		Products
435	Allen Products	546-547	Harris Video	649	Unidek

October 27, and running through Thursday, October 29.

Technical papers covering SMPTE's usual broad range of topics will be read at the sessions, starting Monday afternoon, October 26. That session will highlight Lighting and Projection Practices. The Monday afternoon session deals with Laboratory Practices. The Tuesday morning sessions will look at the International Scene and delve further into Laboratory Practices. Tuesday afternoon sessions will focus on Film Technology: Production and Post-Production and Health, Safety, and Environmental Practices. The two Wednesday morning sessions will discuss Laboratory Quality Control and Sound. Micro-Electronics in Motion Picture Use and the second session on sound, will take place on Wednesday afternoon.

Thursday will see a morning-and-afternoon session on Advances in Television Camera Technology. Also that morning is a session on Digital Videotape Recording Technology. The second afternoon topic will be Film and Tape Interface. Friday will feature the second International Scene session in the morning, paired with Computer Graphics. The single afternoon session will be on Digital Signal Processing.

As this is being written, the list of papers to be read has not been finalized. Among the expected topics are the single-piece camera/recorders (Sony and RCA have submitted papers on their Betacom and Hawkeye systems respectively), the latest on CCD color cameras, current developments in pickup tubes, high definition television, electronic opticals for film and television, and the latest on approaches for digital videotape recording.

The annual awards luncheon will feature Academy of Motion Picture Arts and Sciences president Fay Kanin as guest speaker. Kanin is well known for scripts of such notable projects as the Emmy-award winning TV movies *Friendly Fire, Hustling,* and *Tell Me Where it Hurts.*

For history buffs, there will be a display of early television equipment. It can be seen in the exhibition hall during the same hours as the exhibits can be viewed. **BM/E**

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BM/E NEWS FEATURE

RPC IV: Winds of Change

RADIO BROADCASTERS attending this years' fourth annual NAB Radio Programming Conference in Chicago (Aug. 16-19) luxuriated in the warmth of deregulation and looked skyward not only to thank heaven for relief from the paperwork but also to catch a glimpse of their future in satellite communications.

Broadcasters were told in sessions and workshops how satellites would bring them new program services, enhance their on-air image, provide higher quality audio, and reduce their operating expenses. They were also told that satellites might well bring them new competition from cable radio and were advised on how to work with these new forces to their best interest.

ABC Radio Network personality, Paul Harvey, managed to touch on all these subjects in his keynote address. Harvey enthusiastically praised the Reagan administrations' deregulatory fervor and belief in "supply-side economics", but warned that if broadcasters lost sight of their public interest obligations, "As Washington loosens the leash, we will behave or we will be damned . . . ."

FCC chairman Mark Fowler also reflected the Reagan economic and political policy in his address to the convention as he stated his intention to continue the deregulatory trend. Fowler, time and again, mentioned his belief that "the market is the way people speak." Fowler noted that a deregulation working group has been established to study all FCC rules and regulations in an attempt to broaden the scope of deregulation.

On matters of the First Amendment, Fowler promised to make a major statement in September but hinted that his position would be more favorable to the electronic media than that of past commissions. Fowler accused the commission of encroaching on freedom of speech in the past.

The commissions' abandonment of the 9 kHz spacing plan was cited by Fowler as an example of current commission policy which relies on the marketplace to spur growth rather than government edict.

Nevertheless, throughout the conference, caution was advised on deregulation. Commissioners, consultants, and lawyers, told broadcasters time and again, that without legislation, the current deregulation policy is nothing more than a relaxation of rules which can be tightened by yet another shift in the political winds. Michael Bader of Haley, Bader & Potts (Washington, D.C.) noted ten rules of self-discipline that broadcasters should follow. Each of the rules really reflected the need for broadcasters to continue following existing FCC guidelines on programming, ascertainment, and public service which, while no longer mandatory, will be prudent.

Mark Fowler, FCC chairman, gave the closing address at the recent NAB Radio Programming Conference

Satellites on their minds

While broadcasters seemed relieved by the relaxation of rules, there was a discernable excitement in the air whenever satellite technology was mentioned. Clearly, radio broadcasters see the appearance of satellites as a powerful new tool for their industry.

Larry Patrick, senior vice president, research, of the NAB, told broadcasters that "In the next two years, we will see more changes in the technology of radio than ever before." Patrick said that satellite use holds important potential for radio broadcasters and that this potential has triggered "a mad scramble for space." In fact, at one session on satellites, a show of hands revealed that of the six hundred or so in attendance,

nearly 100 radio broadcasters already had R/O dishes and that about one-quarter to one-third were interested.

Most broadcasters at the conference wanted to know what programming was available from the birds, or were concerned by the advent of cable radio and wanted to know how to compete against it. The best advice seemed to be not to compete directly against it, but to emphasize and build the station's local identity while taking advantage of satellite programming to bring better and more diverse programming to the local audience. Cable radio would lead to many more opportunities for simulcasting and some broadcasters could find themselves supplying this new medium. By and large, however, discussion left many questions regarding cable radio unanswered.

A record number of exhibitors — 78 in all — filled the 70,000 sq. ft. exhibit hall

Localism was cited repeatedly as a component of the new mix. Satellite feeds will not be something that a station has to do all day. Representatives of satellite programming services, Rick Sklar of ABC Radio , Dwight Case of Transtar, Craig Hodgson of Continental Radio, Kent Burkhart of Warner Amex's Satellite Music Network, and Marlin Taylor, of Bonneville Broadcast Consultants, each, in his own way, pointed out the need for local identity for client stations.

With the plethora of programs becoming available on satellite, many broadcasters were concerned about getting "married" to single bird or service. The best strategy offered to broadcasters seemed to recommend building at least two receive only earth stations rather than the possibly more expensive construction of fully tunable earth stations.

Engineering sessions

The good news is that the NAB RPC gathered together an impressive panel of engineering talent to discuss two major topics important to radio management. In the first session, engineers attempted to tell management how to get the most out of the engineering talent in a manner useful to management. Clearly, engineers put themselves at blame for their lack of involvement in station management. Too often, it was noted, engineers retreat to "technicalese" or disappear into the equipment racks when management issues are brought up. Nevertheless, management is guilty of not placing enough value on what engineers can do to help a station achieve its goals. Harrison Klein, chief engineer for WIND, Chicago, put the ball onto the engineers' court and suggested that engineers must make themselves more visible and become

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The bad news was that when the engineering discussion turned to proper audio processing a traditional battleground between engineers and managers, managers left the session in droves. This discussion, more than any other, according to participant Durenberger, pointed up the importance of the relationship between manager and engineer. The frustration of engineers was clear from the floor as time and again engineers told of how they were forced to drive audience away with audio processing techniques that they knew were inappropriate. Said Durenberger, "If managers had stayed for the second session, they would have learned what they were supposed to learn in the first session".

NAB Radio Board chairman, Cullie Tarleton (left) chatted with vice chairman William Stakelin (right) and ABC news commentator Paul Harvey

For programmers, variable results

Program syndicators, for whom the show has the inherent promise of special relevance, varied in their experiences. One of the best-established syndicators told *BM/E* that the show was "dreary." Another, with very much the same format as the first, told *BM/E* of doing more business at the show than at any previous convention, which led to a decision to concentrate on the NAB RPC in the future in preference to other meetings with the radio industry.

A third successful syndicator complained that traffic seemed light, but also reported good business among those who did come, making the show a "plus" for the exhibitor. Other syndicator exhibitors were also quite variable in their reports, but the cumulative result was consistent with the day-to-day business climate in radio syndication over the last two years — strongly upgrade.

A number of programmers praised the "new product syndicator breakfast," held on Monday morning, as giving them a good chance to talk things over with a number of radio executives at once. A few new programs were announced, but this new event did not seem to have taken over as "the" place to announce program innovations. Perhaps it needs a couple of years to establish such a character.

Moreover, with less than 20 of the leading syndicators on hand, the show has quite a way to go before winning the central role in bringing syndicators face to face with potential customers. Of those who came, nearly all praised the organization of the show and the quality of the talk sessions and panel discussions. From that angle, the show was a splendid success. Whether or not that can be translated into a general gathering-in of program syndicators in future shows, is still an open question. **BM/E**

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INTERPRETING THE FCC RULES & REGULATIONS

Commission Changes Filing Procedures

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

THERE ARE MORE CHANGES in FCC regulations to discuss: This time, changes in application processing regulations. In articles in the last few months, we have discussed major initiatives by the Commission to deregulate the broadcasting and cable television industries. For the most part, the changes have been significant structural shifts affecting the whole nature of the regulation of communications. However, there also have been major procedural changes. These might not have the same glamour as efforts to deregulate FM, TV, cable TV, and the like, but they are of more day-to-day importance to individual broadcasters.

More than two years ago, the Commission drastically revised its many regulations governing the processing of broadcast applications. The Commission did this in order to standardize its broadcast procedures and to speed the lengthy process of applying for a new station, or a modification, renewal, transfer, or assignment of an existing license.[1] The FCC has now decided to modify these regulations further. Specifically of interest to broadcasters, in a decision this June, the Commission changed its "cut-off list" and local notice rules and engineering screening procedures.[2] This article will briefly review these three changes below.

Application cut-off lists

Periodically, the Commission publishes lists of applications that in Commission parlance are "ready and available for processing." These lists are the "cut-off' lists. In the case of an "A" list, they contain the list of new and major modification applicants, their file numbers, and a date by which all *competing* applications or petitions to deny must be filed.

Sections 73.3571-3573 of the rules provide for a cut-off date at least 30 days after publication of the cut-off list in the *Federal Register,* the U.S. government's compendium of official, public notices. The Commission has now decided to abandon its reliance on *Federal Register* publication of the cut-off list.

In order to publish in the *Federal Register,* the FCC had to allow for a time lag of some 15 days beyond the date the agency released the list and the specified cut-off date, resulting in a period of 45-50 days rather than the regulations' 30-day period. Thus, from now on the Commission will rely solely on release of the cut-off list in an FCC Public Notice. In the future, the running time for the filing of competing applicants extends from the date of the release of the public notice until 30 days thereafter.

The Commission acknowledged the importance of the cut-off lists in the past to those parties that might be interested in filing competing applications but felt there were enough other sources for them to learn of the cut-off dates:

> "It is our experience that an interested party is alerted by a combination of an applicants's local publication of notice and filing (Section 73.3580 of the rules) and the Commission public notice of the cut-off list and *not* for publication in the *Federal Register.*"[3]

Local notice of filing

In order for any broadcast application to be accepted for filing (and, therefore, be placed on a cut-off list), the rules require that an applicant must furnish proof that it has published a notice of filings application in a newspaper of general circulation in the proposed community of license.[4] At present, the applicant must furnish proof to

[1] *Report and Order, Revised Processing Broadcast Applications,* General Docket No. 79-137, 72 FCC 2d 202, 45 RR 2d 1220 (1979).
[2] *Second Report and Order, Revised Processing of Broadcast Applications,* General Docket No. 79-137, FCC 81-276, 49 RR 2d 1219, Adopted: June 19, 1981; Released: June 30, 1981.
[3] *Id.,* 49 RR 2d at 1220.
[4] 47 CFR S73.3580.

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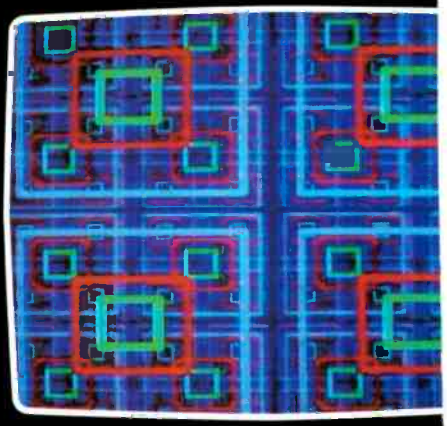

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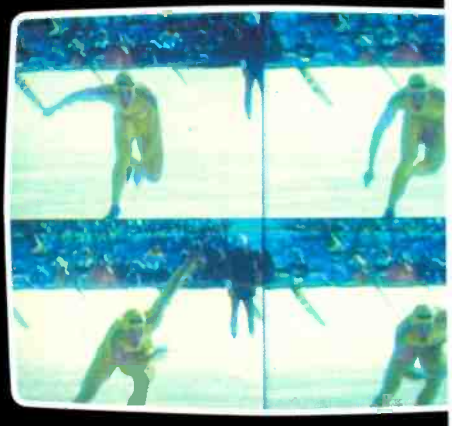

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the Commission *after* it files its application. This process requires an amendment to the application.

Section 73.3580 of the rules presently requires that proof be filed within 30 days of filing the application. However, the Commission has found that in practice, applicants furnish proof of filing their notices long after the expiration of the 30 days. Tardy publication and, in turn, tardy filings with the Commission, delay the processing of all applications.

The Commission determined that the way to expedite matters would be to require in the future that an applicant file its public notice immediately *prior* to the filing of the application and include the proof of publication with the application. Thus, the Commission modified the local notice requirement so that henceforth, an applicant must provide proof of publication of local notice when the original broadcast application is tendered. Since the trigger period for cut-off lists will be somewhat shortened, this will also have the effect of alerting interested parties sooner than might otherwise have been the case.

Pre-engineering review

The Commission's rules and regulations require that an applicant submit at least a "substantially complete" application when filing for a broadcast facility. This requirement holds no less for engineering information required by FCC application forms than any kind of corporate or financial disclosures. Seriously defective applications are supposed to be returned to the applicant.

Up until now, the Commission's staff has conducted thorough engineering reviews of all applications tendered for filing. These reviews could consume anywhere from two to 80 hours of staff time before an application is even accepted for filing. Whenever the staff might find defects that would not warrant return of an application, it would send deficiency letters requiring an amendment of the application within a certain specified period of time. In the case where an application was mutually exclusive with one or more applications, rather than send deficiency letters, the defects would be specified as engineering issuues in the Hearing Designation Order.

The Commission found that the present procedure

> ". . . has contributed to a less than optimal quality of engineering by effectively shifting the burden of thorough technical analysis from the applicant and his hired consultant to the Commission's expert staff."[5]

Furthermore, the deficiency letters and requisite amendments to correct defects resulted in significant processing delays.

Therefore, the Commission has determined to streamline its pre-acceptance engineering reviews. The Commission warned that clearly deficient applications will be returned. Please note that in a mutally exclusive situation, return of the application will result in effective dismissal because more likely than not, cut-off dates would long since have passed before the application is returned. The Commission believes that this warning to applicants will encourage an optimum qualilty of engineering. However, the Commission reserves its rights under section 73.3564 of the rules to return an application even after acceptance for filing if major engineering defects are subsequently detected. Some examples of these major deficiencies would include substantial prohibited overlap, insufficient information to determine an antenna pattern, and a short-space proposal not accompanied by a proper waiver request.

In part, these changes in the engineering procedures are necessitated by executive-level decisions that the Commission allocate engineering resources to those areas where they might be used more effectively to speed the processing of the many applications the Commission receives. In particular, pre-acceptance of FM and TV applications will be simplified, since the Commission has found fewer problems with FM and TV applications. The FCC speculated that this results from the existence of the FM and TV Tables of Assignment for allocation purposes. Unlike the AM broadcast service, these Tables of Assignment provide more clearly defined perimeters for applicants' engineering proposals. By abbreviating the amount of staff time spent on these pre-acceptance matters, the Commission will free engineers' time for more complex matters confronting the staff, including AM applications and newer services like low-power TV.

Conclusion

We have outlined above the most recent in what would appear to be a deluge of changes in FCC rules and procedures. If you plan to file any application in the near future, please be sure that you comply with these regulatory changes. We will keep you abreast of further changes as they are reported. In the meantime, please consult with your communications counsel if you have any questions on these matters. **BM/E**

[5]*Second Report and Order, op. cit.*, 49 RR 2d at 1221.

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GREAT IDEA CONTEST

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

Editor's Note: Before attempting to implement any Great Idea involving the modification of equipment, station personnef 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.

22. Cart Auto Synchronizer

Bill Croghan, Chief Engineer
KCEY/KMIX-FM Turlock, Calif.

Problem: To provide consistent cue lengths on carted music and improve "tightness" when recording to cart.

Solution: This circuit automatically starts a cart deck at a preset time after a turntable starts, making consistent tight cues possible when carting music. Although some of the functions would have been performed with solid state electronics, this circuit can be built and maintained by novices.

The heart of the circuit is relay K2, which closes only after C2 charges through R1. Values selected provide ample time for the turntable to make speed. If your turntable does not require a continuous closure, the self-latching function of K1 can be eliminated, but the start button must be held down until the cart starts. The function of K1 could be performed with a DPDT switch, either momentary or latching, depending on the TT's need. If your

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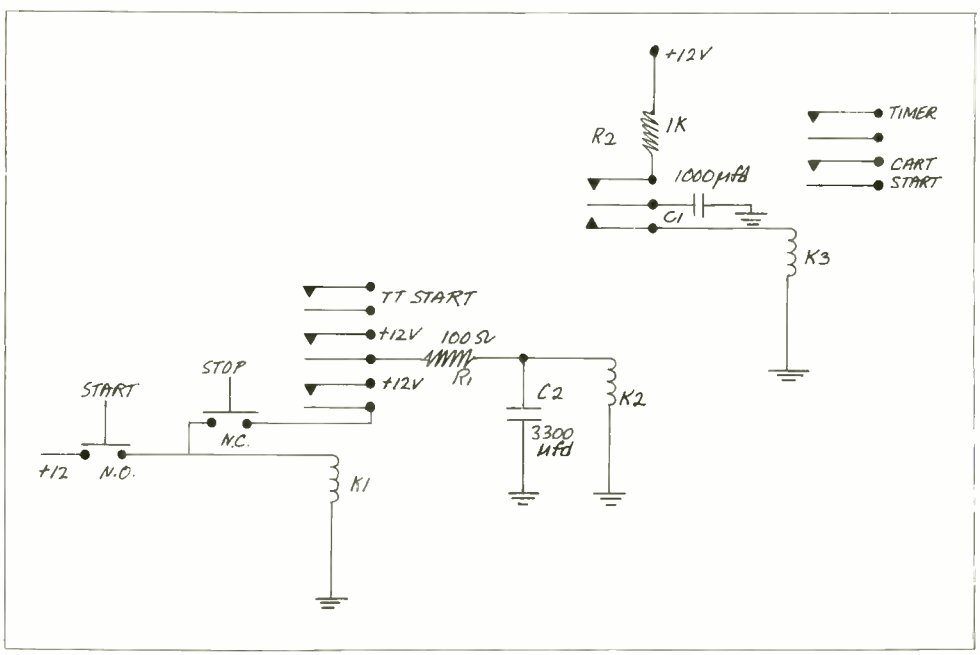
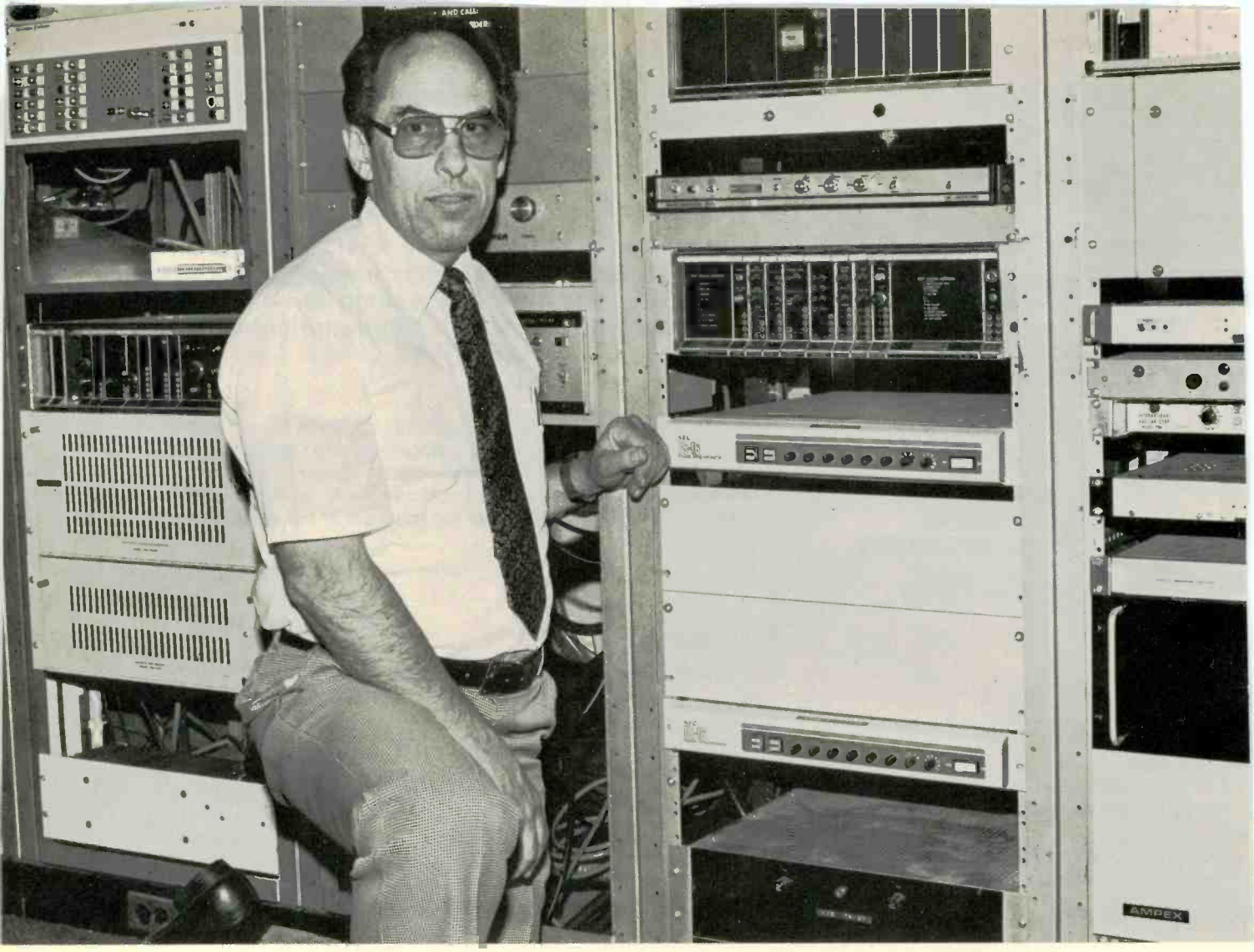


Diagram of Croghan's cart auto synchronizer



HOW THE FS-16 GETS THE SIGNALS STRAIGHT ON 71 SPORTS & NEWS FEEDS

WKBD has consistently been one of the top 10 Independents over the years. Not by accident. They combine quality production and high-appeal programming to maintain their healthy audience share.

"We carry 70 sporting events that come in on the long lines," relates WKBD Director of Engineering Al Martin. "We can't gen-lock our studio to those remote sources. Instead we synchronize the incoming signal through one of our two NEC FS-16's."

Al uses the second compact frame synchronizer from NEC on a roll-around rack to synchronize WKBD's Independent Network News feed nightly. "We pick it up from the Western Union satellite to our earth station eight miles out. From there it comes into our station where we run it through the FS-16, tape it, and delay it for 45 minutes before rolling on air at 10:00 P.M.

"We're real happy with the job the FS-16 does for us. We chose it basically because of its cost, size, and performance," reports Al. "We've also been using three NEC Time Base Correctors which is how we first found out about how their equipment performs. They've eliminated the need for 5 other pieces of equipment. The whole play-back mode is now processed through the TBC's. The third Time Base Corrector is used on the output of a 3/4" tape machine to upgrade the signal to broadcast quality."

Find out how NEC can help you get your signals straight. Call today for a hands-on demonstration of the NEC FS-16 or Time Base Corrector.

Pictured: WKBD-TV Director of Engineering Al Martin.

NEC

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Broadcast Equipment Division
130 Martin Lane
Elk Grove Village, Illinois 60007

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cart/timer works well with continuous closure, the pulsing circuit (R2-C1-K3) can be eliminated, and contacts on K2 used for cart start and timer.

After construction, experiment to find the optimum cue for the turntable at all speeds used. With our Harris turntables and RCA cart recorders, we use the back left corner of the TT for 33s and back right corner for 45s. The record is backed from these points to the stylus. Changing R1 or C2 would permit tighter or looser cues. Changing the amount of back cue on the record is easier.

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23. Automatic Network Delay

Bill Glenn, Chief Engineer
KALE-FM, Tri-Cities, Wash.

Problem: To automatically delay NBC Sources newscasts for our automated FM, using an ITC Net Delay cartridge machine.

Solution: The NBC Source newscasts vary in length each day according to the commercial content, which is cleared immediately following each newscast.

The ITC delay cartridge machine is designed to record and delay programs of fixed length as predetermined by where the secondary tone is placed on the cartridge. The ITC machine has an erase oscillator, which is used to erase the audio track when in the record-delay mode. There is a second output on the erase oscillator, found at pin 14 of the bias erase card. This should be hooked up to the unused erase head of the record-erase head assembly. This will allow erasure of the cue track of the cart. The series resistor may have to be changed to obtain correct erase current. Next, swap the record head and play head on the deck so that the play head sees the tape before the record head. This allows the cart to recycle to the stop tone before it gets to the erase head. Now remove the black ground wire at the record-delay switch so that cue tones can be recorded in the delay mode.

With the ITC delay machine thus modified we are able to start it in the record mode using a time-controlled command from our automation. After the entire content of the program has ended, we use a second time-controlled command to place the secondary tone on the cartridge. Sine both audio and cue tracks are erased each time the machine records, we get a new clean newscast each hour that is ready to play back at the automation's convenience.

24. "Off-Air" Monitor Switch Position For Console

Marshall P. Brown, Engineering Director
KCEE, Tucson, Ariz.

Problem: The Broadcast Electronics 5M150 that KCEE uses as a news delivery console did not offer an uncommitted switch position for selecting the "off-air"

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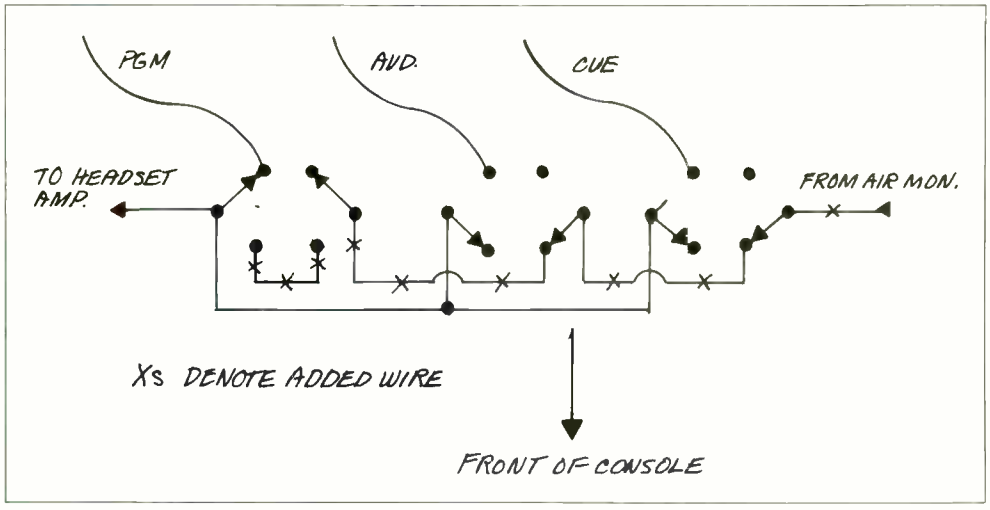
monitor for headphones.

Solution: The three interlocking pushbutton switches (program, audio, and cue) are DPDT and so offer several unused contacts. We elected to allow each to continue to perform its original function while causing the "off-air" monitor to feed the headset when all were in the released position. This was accomplished by connecting the "off-air" monitor audio to an uncommitted swinger contact. The contact normally made when this switch is released was then connected to the next switch's uncommitted swinger contact, and so on in "daisy chain" fashion. The last switch then had its two uncommitted fixed contacts tied together. The end result allows the depression of any headset select switch to interrupt the "off-air" source and perform its normally assigned function. Releasing all switches, then, feeds the off-air sources to the headset.

Brown's "off-air" monitor switch position for consoles



Rules for BM/E's 1981 Great Idea Contest

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

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

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

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

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

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

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New York, New York 10017

1981 Entry Form

Name _____ Title _____
Station Call Letters _____ City _____
State _____ Zip _____
Telephone No. _____
Licensee _____
Class of Station at which idea is used (check one)
TV _____ FM _____ AM _____
Category: Audio ____ RF ____ Video ____ Control ____

Objective or Problem: *(In few words; use separate sheet for details)*

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

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

Signed _____ *Date* _____

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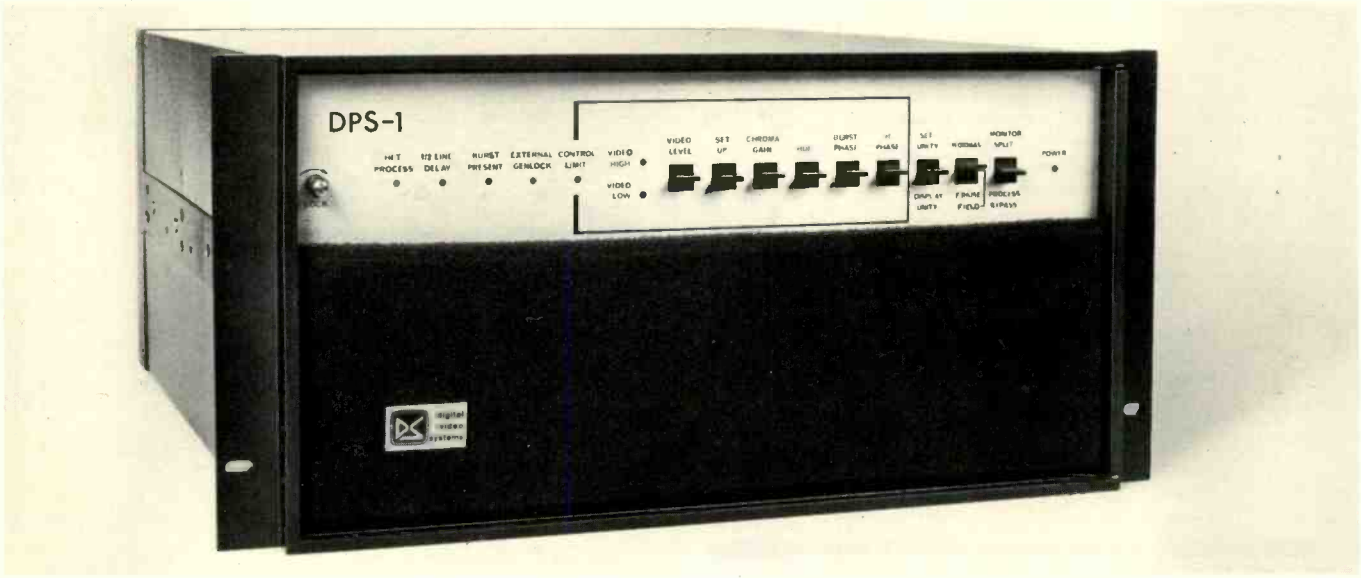

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BROADCAST EQUIPMENT

Video Animation System 250

The VAS IV broadcast video animation system, with a microprocessor-based animation controller, incorporates a vertical frame code generator/reader to assure failsafe frame-by-frame video recording and editing. It records camera-ready artwork, models, or computer-generated grapics at either 24

or 30 fps directly onto ¾-inch U-Matic or one-inch Type C video formats. Features include updating monitor display of all animation operations, simple editing and replacement of single or multiple frames, automatic search and cue, SMPTE time code display, remote recorder controls, RS-232 compter interface, artwork register, camera mix (rotoscope), and scene and individual frame numbering laid down in the vertical interval. The exclusive Vertical Interval Frame Code maintains field-to-field accuracy and prevents the loss of even a single frame whether the tape is stopped or in motion, according to the manufacturer. Available as a complete system or in components, VAS IV consists of the microprocessor-based animation controller, Ikegami camera, studio monitor, professional animation stand, and optional VAS-CS four-axis computerized motion control system. Controller alone, $15,000. LYON LAMB.

Programmable Cassette Recorder 251

CueSette is a professional-quality cassette tape recorder that offers two tracks for stereo sound plus a discrete third track for program control. Sound tracks feature Dolby noise reduction, and its control-track can handle complex digital data without crosstalk into the sound system, the manufacturer states. Other features include a built-in PA mixer, internal 1000 Hz synchronizer, and 150 Hz tape auto-stop system with provision for remote tape restart. Stereo power amps provide 5 W rms per channel and 20 to 14,000 Hz frequency response with 120u recording tape. An independently controlled 2¼-inch monitor speaker is mounted on the face panel, and stereo pairs of line and speaker outputs are available on the rear panel. $995. SPINDLER & SAUPPÉ.

Condenser Microphone 252

Model LC-25 is a new transformerless condenser microphone with line-level output (0.775 V into standard 1 ohm mic inputs). It runs on 48 V power

supplies and draws about 15 MA of current. The capsule has a large-diameter circular element, isolated from shock and vibration. The pattern is cardioid with front to back ratio of better than 25 dB at 1 kHz; dynamic range exceeds 130 dB SPL. Frequency response is 20 Hz to 20 kHz. MILAB.

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

Post-Production Video Editor 253

The Z6000-D low-cost post-production videotape editor is described by the maker as the first A/B roll editor on the market with multibus, multiprocessor control, allowing users to intermix SMPTE time code, control track, and Micro-Loc, the manufacturer's high-

SM85
a studio quality condenser microphone that's not "studio bound"

This new high technology Shure microphone will change the way people think of condenser microphones. The SM85 is designed especially for on-stage, hand-held use. Its sound is unique—far more tailored to the special needs of the vocalist: sizzling highs and a shaped mid-range for superb vocal reproduction, and a gentle bass rolloff that minimizes handling noise and "boominess" associated with close-up use. Ultra-low distortion electronics make the SM85 highly immune to stray hum fields. An integral, dual-density foam windscreen provides built-in pop protection.

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performance code. Distributed intelligent interfaces control the transports; each transport is therefore controlled by its own microprocessor and is not subject to timing discrepancies. The unit performs all post-production data manipulations, including integrated graphics control, full switcher control, full-function transporter control, four-way split edits, auto extend, auto tag, four-event swap/recall, and selection of in and out points on the fly. From $22,500. VIDEOMEDIA.

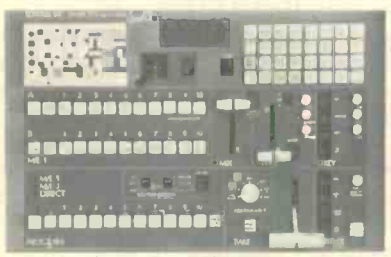
Microphone Stands 254

Omni Series are "angulated" mic stands including a floor model for stand-up use, lectern height for table top use, and optional horizontal boom extension. The stands have adjustable fulcrums allowing for 90 degree (straight up) position or other angles for the main support, giving controlled microphone proximity. The floor-stand model, OS-12V, has a wear-proof grip action clutch, to give tube heights from 12 to 61 in. Lectern model, OS-8V, has the adjustable support angle, with the tube assembly variable from 12 to 24 in. ATLAS SOUND.

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

Production Switcher 255

Model SE/3 is a microprocessor-based production switcher with transition-centered architecture and programming flexibility. The built-in microcomputer controls all switching and effects and



Broadcast Equipment

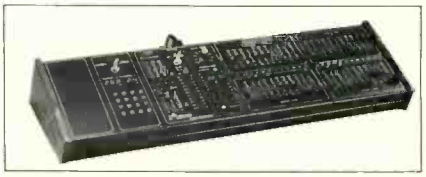
to 24 points and a data loss. An internal buzzer is triggered when any point or data loss is activated. Both central and remote units have push-to-test button for on-site testing. From $572. MODULATION ASSOCIATES.

Auto Video Phasing System 270

The Auto Sync Phasing System sends a 1200/1800 Hz frequency shift keyed encoded correction signal to remote video sources to bring them into synchronization at a central point. The aim is to avoid timing problems when several video signals from remote sources are brought together, and to supply rapidly an automatic and accurate line-up of the sources. A sending unit, the VPC175P, produces the correction signal. Individual sync information from each remote source is brought into the VPC185P for comparison with an internal timing reference. Correction signals are developed and sent out to the remote units for timing correction. SELTECH EQUIPMENT, LTD.

Lighting Control Console 271

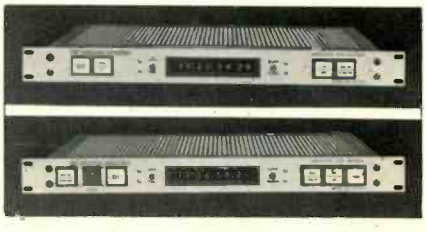
Mantrix™ is a manual four-scene preset lighting control console that controls the maker's CD80 dimmers in both permanent and portable configurations.



Features of the modular console include eight submasters for control channel grouping, dipless split crossfader (timed or manual), grand master, B.O. switch, and Matrix patch for grouping up to 228 2.4 kW dimmers to 84 control channels. STRAND CENTURY, INC.

Interval Encoder/Decoder 272

Model VIE-124 encoder converts and displays any SMPTE longitudinal edit code input to Vertical Interval Time Code (VITC) for use on any combination of vertical interval lines from 10



through 20 on both fields. The incoming time code is updated before modulating the video to maintain real time. The circuitry provides time base correction so that there is only one set of data per incoming code frame whatever the edit code speed or phase. The Model VID-125 decoder decodes both longitudinal edit code and VITC on a composite video signal. A new SMPTE edit (cue) code is transmitted with the data derived from one of the two incoming codes, selected automatically. The unit can also demultiplex 320 separate user bits of longitudinal or VITC, every ten frames. GRAY ENGINEERING LABORATORIES, INC.

Wheeled VTR Console 273

Model 3101-T VTR console features an adjustable height overhead bridge and rotating VTR turntable for ease of viewing and maintenance. Upper bridge includes a 12-inch monitor rack space and two half-rack spaces for waveform monitor and vectorscope. Bridge adjusts up or down in one-inch increments. Roll-around base cabinet has 19¼-inch rack space for TBC, master on/off switch, and storage drawer for tools and service manual. Other configurations are available. WINSTED CORP.

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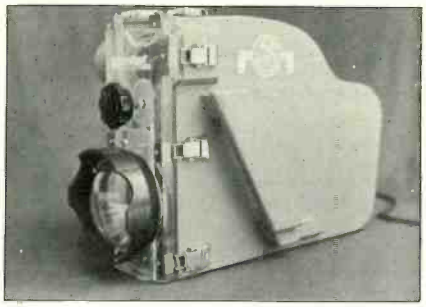
Underwater Camera Housing 274

Sea-Cam II, designed for broadcast applications, is a watertight underwater video camera housing molded from clear plexiglass so that the interior of the housing conforms to the exact dimensions of the camera, eliminating excess air space and unwanted buoyancy. On-board batteries provide the power, leaving only one coaxial video cable linking the camera to the surface VTR. Camera can be installed or removed from the housing in minutes, according to the manufacturer. Housing includes necessary controls for power, auto white balance, zoom, focus, iris, and macro. High-pressure video connectors, water intrusion alarm, internal thermometer pressure regulation valve, camera mounting hardware, and tripod mount included. $4995. SEA-CAM, INC.



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