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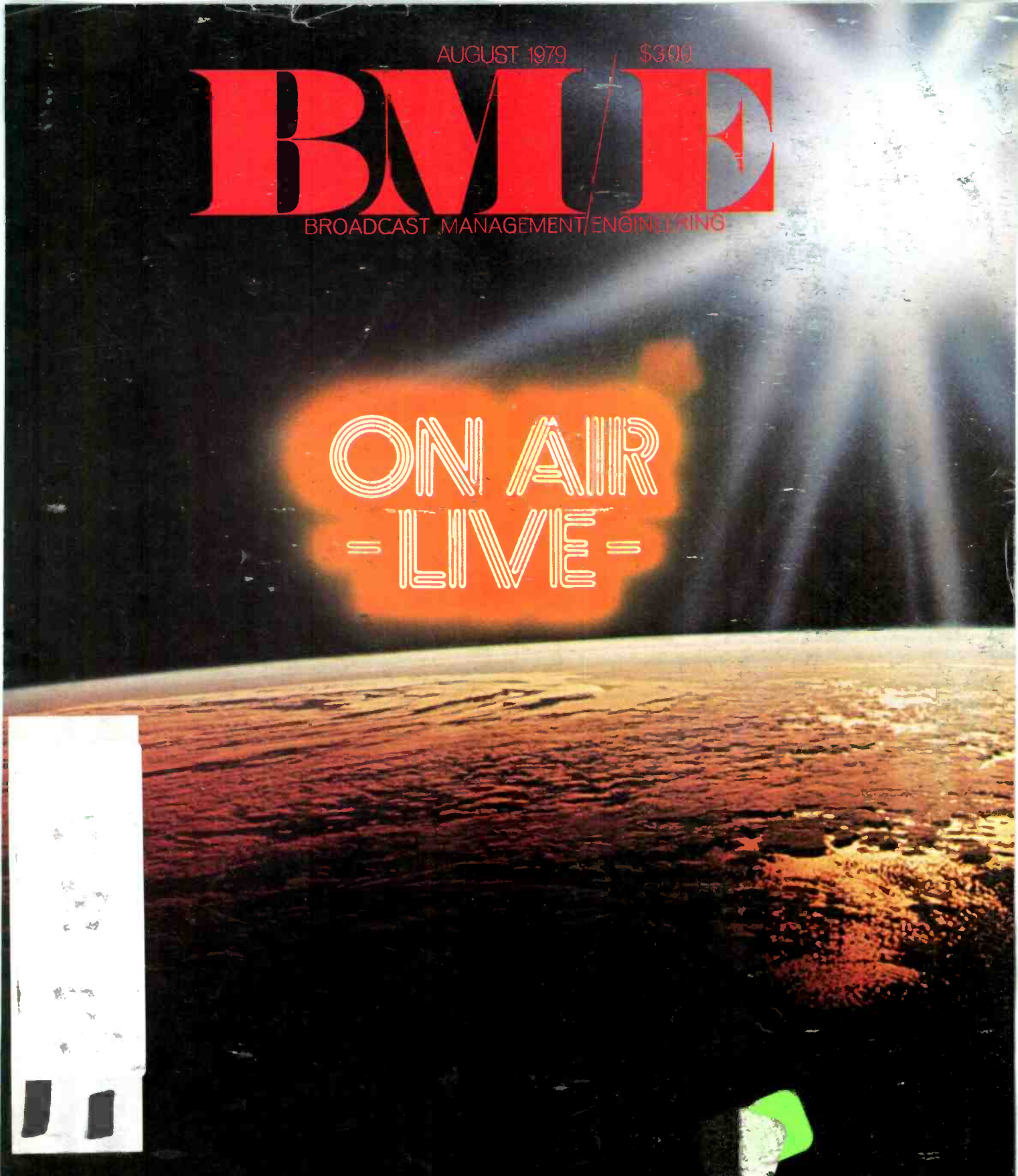

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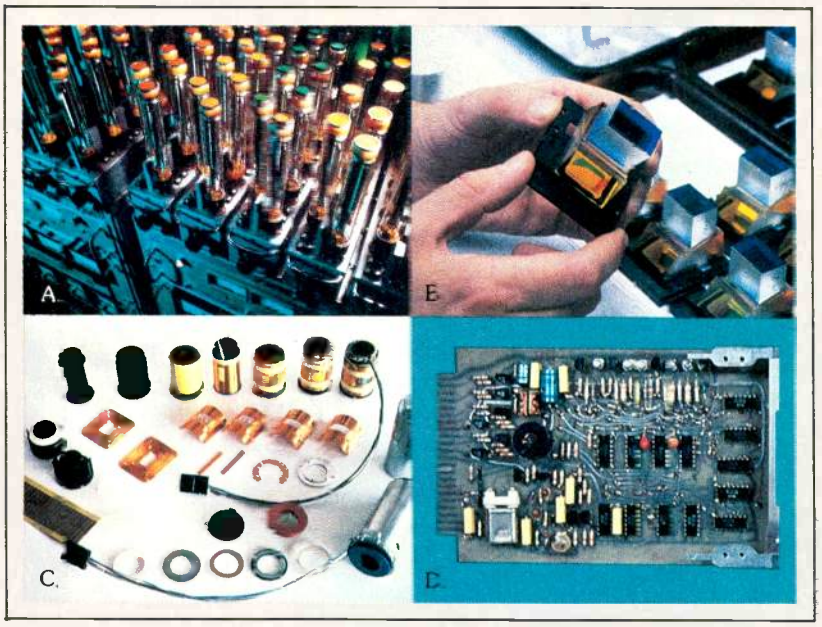

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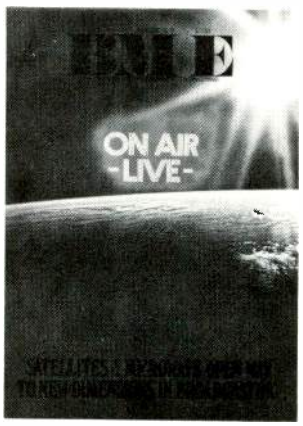

The existence of satellites can change the role played by the local station in the national broadcast scene. With the use of the latest technology for production, local broadcasters are becoming a source of live network-quality programming. The cover photograph was supplied by NASA.

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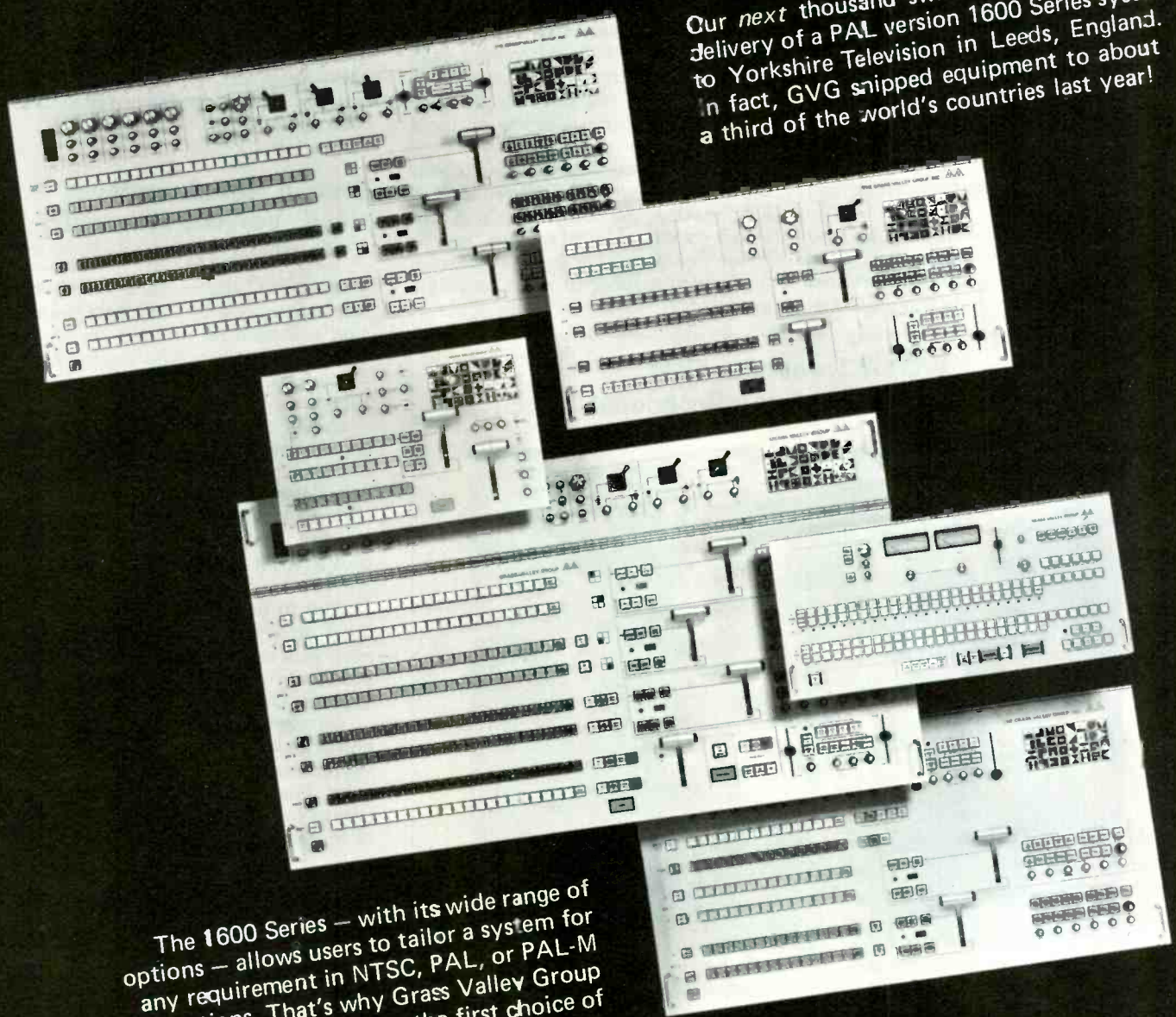

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BROADCAST INDUSTRY NEWS

Commission To Consider 9 kHz AM Spacing

In response to a rulemaking petition filed by the NTIA, the FCC has initiated an inquiry into the possibility of reducing AM channel spacing from 10 to 9 kHz. Pointing out that 9 kHz spacing is already used in ITU Regions 1 and 3 and noting that demand for new channels currently exceeds the number available, the Commission asked the public, broadcasters, and manufacturers of broadcast equipment to comment on the proposal.

Another objective of the inquiry is to provide information which can be used in arriving at a U.S. position on channel spacing at the upcoming Region 2 Administrative Radio Conference on AM broadcasting. The Commission said it was imperative that neighboring countries utilize the same channel spacing in order to avoid unacceptable heterodyne interference.

The NRBA and NAB, in separate letters sent to the FCC in February, both proposed advisory committees to study the question of channel changes. The Commission reserved action on those requests.

The inquiry includes questions on the economic impact of the conversion to 9 kHz spacing, the compatibility of AM stereo with the reduced spacing, and the feasibility of making the change given the limited number of radio engineers available.

FCC Commissioner Quello issued a statement concurring with the Notice of Inquiry, but added that he "would have preferred . . . to have acted with equal speed in establishing the advisory committees advocated by the petitioners . . . Since the Notice of Inquiry and formation of advisory committees are not mutually exclusive, I see no reason why we should not move forward on both at this time."

WQXR Transmits First Digital Audio Source Broadcast

Sony president Michael Schulhof (right) points out features on the PCM-1600 digital audio processor to WQXR chief engineer Masoomian (left) and PD Sherman

New York City classical music station WQXR made radio history on June 7, becoming the first station ever to transmit a signal using a digital audio source. Program director Robert Sherman used a Sony PCM-1600 digital audio processor to play four digitally recorded arrangements on his morning show, *Listening Room*.

Both Sherman and Zaven "Doc" Masoomian, WQXR's chief engineer, praised the sound quality achieved with the digital technique. "Even when the music stopped," said Sherman, "the absolute silence was totally unexpected." Sherman hosted the broadcast, which included an interview with Sony Industries president Michael Schulhof in addition to music by Liszt, Chopin, Verdi, and Grieg.

Clearly enthusiastic, chief engineer Masoomian said, "Digital is the way to go, there's no question about it. The Sony PCM-1600 exceeds the performance of any FM transmitter. This new technology is definitely the wave of the future."

Shiben New Broadcast Head; Verveer Moves To Common Carrier

Veteran FCC staffer Richard J. Shiben has been named to head the Commission's Broadcast Bureau, replacing Philip L. Verveer, who has moved to the top position in the Common Carrier Bureau.

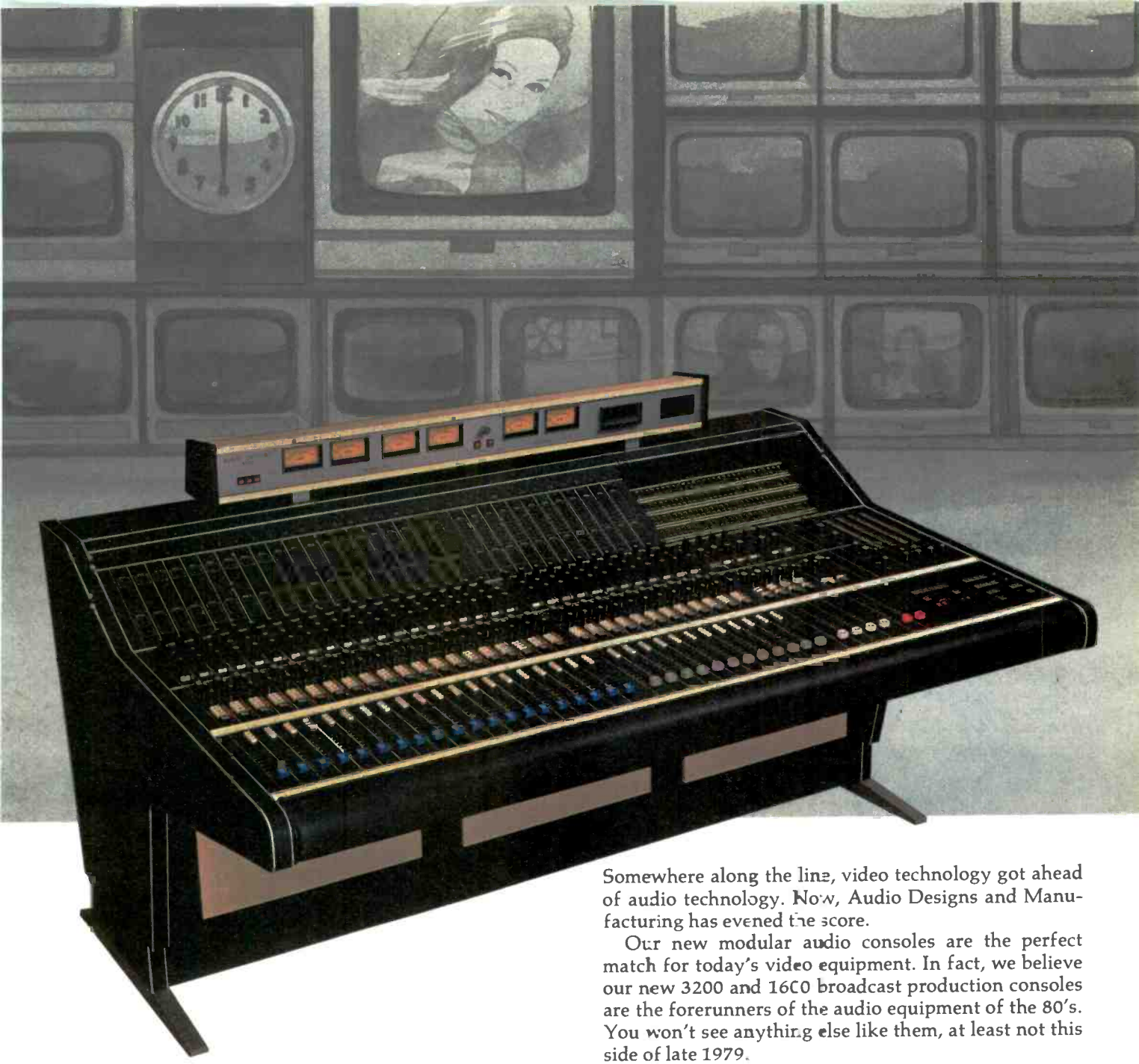
Shiben's appointment is expected by some to raise FCC staff morale, which has been running low for some time now. His promotion was approved at a closed Commission meeting June 14 and has apparently met with more approval from the commissioners than Verveer's move to the Broadcast Bureau in early May, which encountered strong opposition. Shiben has been with the FCC since 1962 and was previously chief of the Renewal and Transfer Division.

Verveer had been offered the position of deputy common carrier chief last September, but turned down the request. His appointment to chief of that bureau follows closely the resignation of former chief Larry Darby.

Justice Dept. Files Antitrust Suit Against NAB Ad Code

Commercial time standards within the NAB TV Code are the target of a civil antitrust suit filed by the U.S. Justice Department in June. According to the department, the code, by restricting advertising time, drives up advertising costs and deprives advertisers of the benefits of free competition. The suit, filed in the U.S District Court in Washington, D.C., calls for the cancellation of those parts of the code "which have the purpose or effect of suppressing or restricting the amount or format of television advertising and announcements."

The suit, which involves only television advertising, came as a complete



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surprise to the NAB as the Justice Department ignored its usual practice of negotiating with involved parties before initiating legal action. Among other government charges was that the code has the effect of standardizing the length, format, and number of commercials within a break. Kenneth C. Anderson, Justice Department attorney instrumental in bringing the case, explained the department's position as follows: "The point of the matter, so far as we're concerned, is that each individual licensee should determine what their policy should be." The voluntary TV code is currently accepted by stations serving 85 percent of television households.

Calling the action "ironic," NAB president Vincent T. Wasilewski said, "It flies in the face of overwhelming support from the public, the Congress, the courts, and the regulatory agencies for the concept of the broadcast industry regulating itself in lieu of government controls."

Although CBS and ABC did not comment immediately, NBC officials were quick to indicate their displeasure with the Justice Department action. Stating that the code has "certainly . . . served the viewers' interest," a network spokesperson continued, "We are amazed that the Department of Justice would now undertake an action so at odds with the public interest."

Format A Factor In License Renewal, Court Rules

A radio station's format must be taken into consideration when the FCC decides a license challenge case, the U.S. Court of Appeals for Washington, D.C., ruled recently. The seven-to-two decision affirms earlier rulings by the court that format is a factor in determining a station's public service.

The ruling is a defeat for present FCC policy, instituted after the court's landmark decision in a 1974 case involving station WEFM, Chicago, which decreed that unusual formats had to be considered in license challenges. At that time and again in the present ruling, the court held that substantial questions of fact material to the public interest, including public outcry over a proposed format change, require the Commission to hold an evidentiary hearing.

The FCC, in a policy statement issued in 1976, expressed exasperation at the order, claiming that it posed severe administrative problems because of the enormous variety of formats encountered. The court disagreed, pointing out that only one format case, that of WEFM, has ever resulted in a hearing. Excessive hearings will not be likely to occur, the decision continued, because hearings will not be necessary "if the abandoned format is financially unviable, if it is not unique in the listening area, or if there has been an insufficient outpouring of public protest against the change."

FCC Approves Gannett Co. Acquisition Of CCC

FCC approval was granted June 7 for the merger of Combined Communications Corp. (CCC) into the Gannett Co. The move, which involved a stock transaction of $370 million, was the largest ever approved by the Commission.

One key factor in gaining a yes vote was Gannett's sale of WHEC-TV, Rochester, N.Y., to BENI Broadcasting, a minority-owned company. The $27 million transaction, approved at the same time, makes WHEC the first black-owned VHF network affiliate.

Debate over the Gannett-CCC merger centered around the issue of

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trafficking, since CCC has owned nine of its stations for less than three years. The Commission noted that Gannett and CCC had been engaged in merger discussions when some of the acquisitions were made and that this might indicate intention to speculate in broadcast properties. Most of CCC's broadcast properties, however, were acquired several years earlier, so the Commission found that trafficking was not involved.

Another major issue was concentration of mass media ownership. Gannett publishes 77 daily and 19 weekly newspapers and owns Gannett News Service and Louis Harris and Associates, the survey firm. The transfer involves, among others, five top-50 market stations, four VHF and one UHF. The Commission found that none of those five stations dominates its market and that they are widely dispersed geographically; this, the transfer of WHEC to minority ownership, and Gannett's agreement with the National Black Media Coalition to provide greater minority participation convinced it to find justification for Gannett's claim of "compelling public interest."

The grant is subject to the condition that Gannett break up six AM-FM combinations if the Commission adopts rules prohibiting such acquisitions in the future.

Commissioner Abbott Washburn issued a dissenting statement criticizing the merger for "placing . . . the organs of information and news and opinion in this country in fewer and fewer hands." He went on to say that while this action in and of itself may not be dangerous, it is part of a trend towards the "rapid growth" of "chains in the hands of large corporate enterprises . . . the same alarming pattern now evident in the newspaper field, where there are no legal limitations on the number of newspapers which can be owned by a single organization."

Bridgeport Women Seek TV License

Eleven Bridgeport, Conn. women have become the first group of women to file for a television license in the United States. Incorporated as Bridgeways Communications Corp., the group, headed by Laurel Vlock, is seeking Ch. 43 in Bridgeport, now vacant. They plan to broadcast programming dealing with women's issues as part of the their commercial format.

The women are expected to qualify for minority status under current FCC policy because of the low representation of women in the broadcast field. Vlock, who has a talk show on a New Haven television station, told the New York *Times* that her motivation for owning a station was sparked by the International Women's Year Conference in Houston two years ago. "Impressed as I was by Houston," she stated, "I felt nothing would really change for women unless they became a part of the economic mainstream. And that's what this is all about."

Bridgeport presently has no TV station and is served by stations in New Haven, Hartford, and New York City. Competing with the women for Ch. 43 is Hi-Ho Communications, owned primarily by powerful Bridgeport businessman Fiore Francis D'Addario.

NAB, NRBA Request Inquiry On FM Allocation Proposals

The NAB and NRBA have separately filed comments with the FCC requesting that the Commission issue a Notice of Inquiry on NTIA proposals to revise

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FM allocation standards. NTIA's petition asked that a rulemaking procedure be initiated.

The NRBA, while taking a neutral stance on the proposals, commented that NTIA had performed no field testing on its advocated use of terrain shielding. The association stated, "Proper testing and evaluation must be completed to prevent losses in existing stations' service areas and the resulting chaos on the FM band." NRBA also took exception to NTIA's exclusion of receivers costing under $100 in its analysis. Figures quoted by NRBA show that the "number of lower priced radios presently being sold exceeds higher priced models by more than 80 percent."

In separate comments, NAB also asked that the FCC initiate an inquiry, rather than a rulemaking procedure, on the FM proposals. In addition, the association suggested the creation of a joint Government-Industry Advisory Committee "to prepare in-depth studies of various methods of guaranteeing that all radio stations . . . be authorized to provide full-time service without significantly diminishing service by other classes of stations." Among other questions raised by NAB were the impact of the proposals on local existing aural service, especially in rural areas; implications of upgrading FM facilities to full power and antenna height; effects of the proposals on minority ownership; and accuracy of NTIA's engineering data.

FCC Begins Blanking Inquiry, Suspends Regulations

The FCC has asked the broadcast industry to assist it in determining if current regulations concerning H and V blanking in the television signal are necessary, or if "competitive marketplace forces" are sufficient to adequately serve the public interest. In announcing the inquiry into TV waveform standards for horizontal and vertical blanking intervals, the Commission noted that blanking rules for black and white and color broadcasting were adopted in 1941 and 1953, respectively. It stated that changes in the industry since that time made a review of the regulations necessary.

Among the questions the FCC asked broadcasters was whether marketplace forces alone could be relied on to protect the public from excess blanking and, if so, how this would operate. The commission also asked about the causes of excess H and V blanking, changes or modifications to production and distribution practices that could insure compliance with transmission rules, and post-production techniques to corrent excess blanking.

Other parts of the inquiry deal with captioning for the deaf as it pertains to blanking, the advantages and/or disadvantages of using colored borders to mask excessive blanking, and the problem of archived material that may not comply with present regulations.

At the same time, the Commission stated that H and V transmission standards would not be enforced for the period of the inquiry and until further notice.

Comments in the inquiry are due December 19, 1979; replies are due February 19, 1980.

NAB Hosts Public Affairs Conference

Some 200 broadcasters attended an NAB-sponsored conference on public affairs programming in Washington, D.C., in June. About two dozen locally produced public affairs programs were

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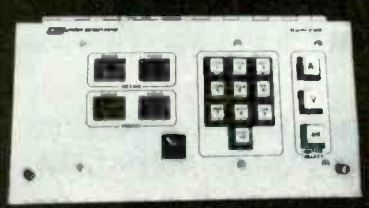

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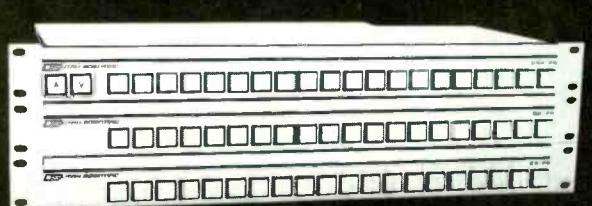

CSP-20/CX-20

Permits button-per-source input selection on assigned bus. Basic panel accommodates 20 inputs. Expansion in 20-button increments is provided by adding CX-20 slave panels. Permits fast single-stroke selection of any input. Button lamps provide both audio and video status from refresh memory while *Only* buttons permit selective audio or video switching.

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screened, and issues were debated in the conference sessions.

In separate sessions, Richard Salant, vice chairman of NAB, and Lawrence Grossman, president of PBS, gave conflicting predictions on the future of news documentaries. Salant called them an "endangered species" and expressed great concern over the trend toward docu-dramas that mix fact and fiction. Grossman, on the other hand, saw documentaries as thriving on public TV. He said that public affairs on public television was "blooming," calling it "by far the largest category of programming that we feed on PBS."

Rep. Swift (D-Wash.) pleased attendees with his assertion, "I don't like the spectrum fee [of H.R. 3333] at all." As an alternative plan, he proposed that stations be required to earmark a portion of their rate cards for public affairs programs other than news.

FCC Commissioner Quello urged TV stations to put more effort into promoting and advertising their public affairs offerings. Lack of such efforts "is probably the major shortcoming of this most powerful communications medium," he explained.

AP To Offer High-Speed TV News Service

A high-speed newswire service designed especially for television stations will be offered by the Associated Press starting in the fall, AP officials announced. The service, called APTV, will be transmitted at 1200 words per minute, more than 18 times faster than conventional services. It is scheduled to begin September 1.

AP's Broadcast News Center in New York will produce the service, using a team of broadcast journalists headed by Jim Hood, general broadcast editor. In addition, a panel of television news directors met in New York in June to help design APTV.

Roy Steinfort, AP vice president, called the service "the first . . . ever designed from the ground up with television in mind . . . For decades, we've been trying to serve radio and television stations on a single circuit, even though their needs are really quite different. APTV gives us the chance to tailor a service to the needs of television."

Standards Conversion Facility Opens In East

Marconi's digital standards conversion system (DICE) will see service on the East Coast beginning immediately with the opening of Audio + Video International (affiliated with A.F. Associates). Claimed to be one of only three privately owned DICE systems in the world (one of which belongs to Audio + Video's London headquarters), the new facility in New Jersey offers NTSC, PAL, and SECAM conversions from/to U-Matic cassettes or quad. One-inch decks will be added shortly. The DICE system and all decks are located within a single area, controlled by a central console that has routing switcher and machine control over all deck functions.

News Briefs

NAB has asked the Senate Subcommittee on State, Justice, Commerce, and Judiciary to appropriate funds for a study on ways to **expand full-time service to all AM stations.** In a letter to Sen. Ernest F. Hollings, chairman of the subcommittee, NAB senior vice president Donald P. Zeifang urged that the study be made by the FCC in coordination with a joint Government-

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News Briefs

Industry Committee . . . The NAB requested the FCC to **rescind its announcement of a condition of possible divestiture** on its approval of all applications for new and transferred AM-FM combos. The Commission's action applies to applications filed after June 7 . . . . In a letter to FCC chairman Ferris, NAB senior VP Erwin Krasnow wrote, "NAB believes the Commission possesses the ability and knowledge to issue immediately a **radio deregulation notice of proposed rulemaking . . .** It does not appear that the task at hand . . . requires any significant degree of new discussion or associated delay."

TV receivers should **reject noncommercial FM interference to channel 6,** the NAB told the FCC in recent comments. To achieve "a more immediate effect" until the adoption of this "long-term solution," the association recommended FM station assignment policy modifications, FM power limitations, FM vertical polarization requirements, and the creation of an FCC task force to consider the channel 6 interference problem and prepare a comprehensive action plan . . . . NAB also proposed a voluntary program of **AM and FM radio performance standards,** under which receiver manufacturers would voluntarily submit tests to NAB or an independent lab for analysis . . . . The FCC has denied a motion by Belar Electronics Lab, Inc., asking the Commission's Office of Science and Technology Laboratory Division to **conduct further studies of the five AM stereo systems** under FCC consideration. The Commission also denied a similar request from Magnavox.

Public television needs to place **greater emphasis on audience building,** according to FCC Commissioner Tyrone Brown. Brown told the recent PBS convention that audience building was public TV's "most pressing need," citing new technologies and the low viewing percentage during prime time as threats to PTV's future . . . . FCC Chairman Ferris told the NCTA Convention in Las Vegas last May that the **CATV industry is facing a critical point** in its history. He urged cablecasters to exercise their medium's "great potential" for new, innovative programming and said that specialization and diversity would be the themes of the communications market of the future. At the same time, he warned that the FCC would not automatically protect cable from any competitors.

Phase I of the FCC's **fee refund program** began on June 13. This phase covers only fees in excess of $20 . . . . Sen. Jake Garn (R-Utah) has introduced Senate Resolution 158, which would authorize full **radio and television coverage of floor proceedings of the SALT II talks,** scheduled to begin in September . . . . The Associated Press has applied to the FCC for the **establishment of a broadcast-quality satellite delivery system.** The system would initially involve the licensing of 15-foot earth stations in 37 cities for delivery of the AP Radio Network and certain limited data services for newspapers.

The Sixth Annual **Conference and Exposition of the NRBA** will be held in the Washington Hilton October 7 through 10. For registration forms and information, call the NRBA at (202) 466-2030 . . . . Veteran network correspondent and commentator Howard K. Smith will deliver the keynote speech September 6 at the thirty-fourth annual **RTNDA Conference** in Las Vegas. Other featured guests will include Walter Cronkite and Richard S. Salant, vice chairman of NBC and former CBS News president. For information contact RTNDA, 1735 DeSales St. NW, Washington, D.C. 20036, (202) 737-8657 . . . The Na-

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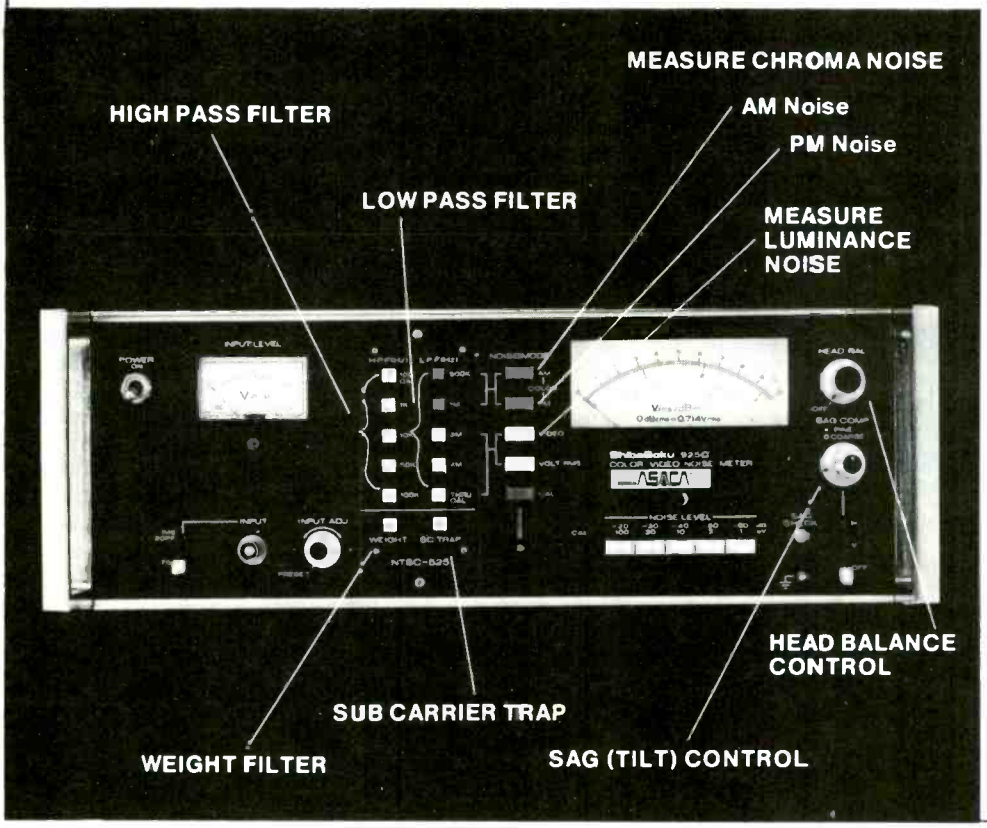

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Measure the value of this unique instrument*, Model 925C Video Noise Meter, and you'll see why it has been purchased by a major USA network. It measures chrome band noise with a single color signal of desired level that contains both a sync signal and a color burst signal. Chroma noise can even be split into AM and PM components which can be measured separately. Unbalanced 2 head of VTR can be corrected for proper measurement.

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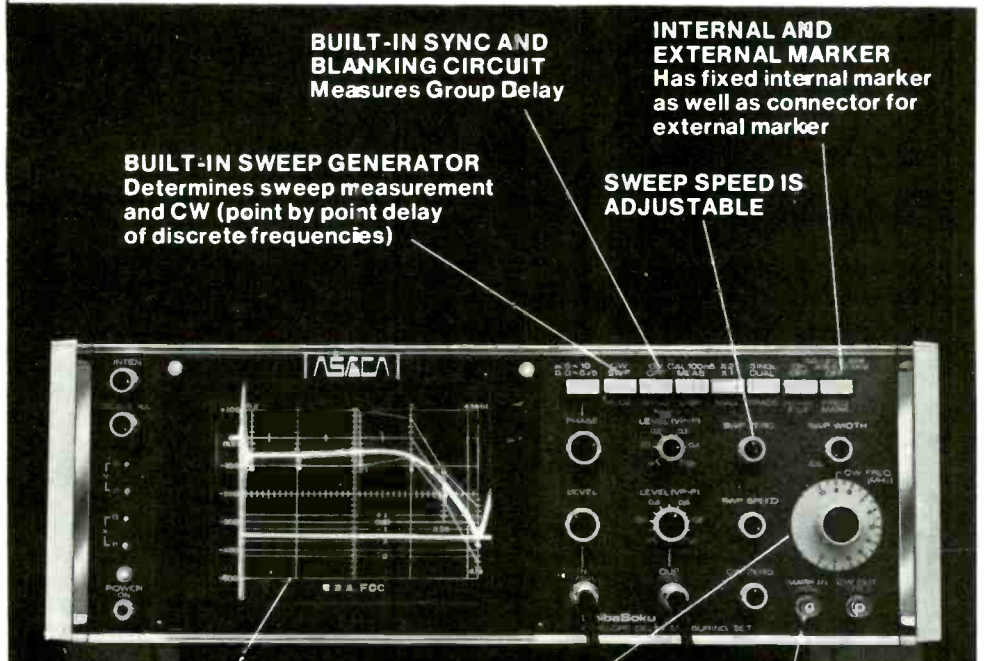

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Our envelope Delay Measuring Instruments* feature large CRT screens, built-in sweep generators and allow spot frequency delay measurements from 200 KHz to 10 MHz. Check out Models 763 NA and the new 201-1. Both are NTSC or PAL compatible. The 201-1 adds a built-in sync generator and blanking mixer.

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News Briefs

tional Association of Educational Broadcasters will convene for **Convention 79** this November 11 through 15. Applications and information on the Chicago meet are available from the NAEB Convention Office. (202) 785-1100.

Video Expo New York, billed as the world's largest non-broadcast TV trade show, will celebrate its tenth anniversary at Madison Square Garden October 16 to 18. Info from Knowledge Industry Publications, Inc., 2 Corporate Park Dr., White Plains, N.Y. 10604, (914) 694-8686. Outside New York State call toll free, (800) 431-1880 . . . . *Billboard's* first **International Video Music Conference** will take place November 15 to 18 at the Sheraton-Universal in Los Angeles. Contacts are Stephen Traiman, (212) 764-7344 and Joshua Simons, (213) 273-7040 . . . . The Society of Cable Television Engineers is sponsoring a **Northeast Technical Meeting and Workshop** on earth stations, satellite networking and CATV, August 20 and 21 at the Logan Airport Hilton Inn in Boston. Contact the SCTE at 1100 17 St. NW, Washington, D.C. 20036, (202) 659-2131 . . . . The Society of Broadcast Engineers will give its **fall certification exams** November 17 through December 8; applications must be received by October 8. For applications, Certification Program booklets, and a list of SBE chapters where the exams may be taken, write to the Certification Secretary, SBE, P.O. Box 50844, Indianapolis, Ind. 46250.

Business Briefs

Harris Corporation has agreed to buy **Consolidated Video Systems, Inc.** of Sunnyvale, Calif., for a reported $13 million cash. CVS reports current sales of about $9 million a year; its major product is a digital TBC . . . . **Conrac Corp.** has announced its intention to sell its Turner Division, located in Cedar Rapids, Iowa. Turner, which manufactures antennas and mics, has incurred substantial losses for the past year and a half . . . . **MCI, Inc.** of Ft. Lauderdale, Fla, and **EMI, Ltd.** of the U.K. have entered into a licensing agreement under which MCI will manufacture digital tape recording equipment based on technology developed by EMI. A prototype of the first machine developed under the agreement, a two-channel stereo tape recorder, was shown in June at the Association of Professional Recording Studios Exhibition in London.

Outlet Co. of Providence, R.I. is buying Detroit station **WQRS-FM** from Fine Arts Broadcasters, Inc. Price tag for Outlet's eleventh broadcast property is $2 million . . . . The FCC has approved the sale of **WCFL**, Chicago by the Chicago Federation of Labor and Industrial Union Council to the **Mutual Broadcasting System** for $12 million. WCFL thus becomes Mutual's first O&O radio station . . . . Businessman Philip R. Jonsson has purchased Tulsa station **KELi-AM** from Broadcasting Associates, Inc. . . . . **American Television and Communications Corp.**, a subsidiary of Time, Inc., is entering the over-the-air STV business with its agreement in principle to acquire 50 percent of **WSNS**, Ch. 44, Chicago.

Telex Communications, Inc. has appointed two new reps for its Broadcast and Professional Audio Products Group. LCA Sales Co. will serve greater New York City, New Jersey, Delaware, and eastern Pennsylvania; Robert Milsk Co. will serve Indiana and Kentucky . . . . **Tandberg of America, Inc.** has named Harry Rosenblum Co. its new sales rep for Metropolitan New York. Creative Marketing Associates will handle Tandberg's line in the Florida territory.

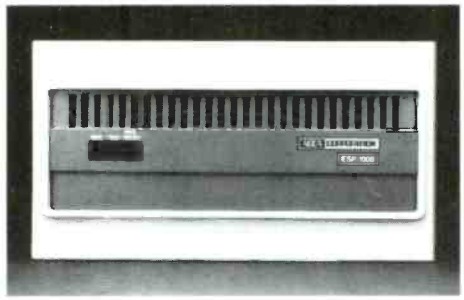
NOW EVERY STATION CAN AFFORD NETWORK QUALITY DIGITAL STILL STORAGE.

INTRODUCING THE ADDA ESP-100B. PROVEN DIGITAL TECHNOLOGY FOR UNDER $49,000.

Here's ADDA's latest digital still storage breakthrough—priced so every station can afford superior digital picture quality without slide handling problems. The ESP-100B offers performance similar to our higher cost systems, but with a smaller, rack mounted, fixed disk storage capacity of 200 frames. You can create high resolution stills from live camera, VTR, 16mm film, network, or satellite feeds. You can program still sequences in advance and change your mind while on the air—knowing a new still can be called up at random in less than one-half second. Unlike slides, electronic stills are always easily located and instantly available. Always right side up.

Now's the time to join the digital still frame storage revolution without putting the crunch on your budget. You can reduce your still handling and camera support time dramatically while saving thousands in film and processing costs. You'll love the enhanced picture quality, too!

Take a look at the ESP-100B for yourself. Call, write or check our reader service number for more information and a demonstration. 1671 Dell Avenue—Campbell, California 95008 (408) 379-1500.



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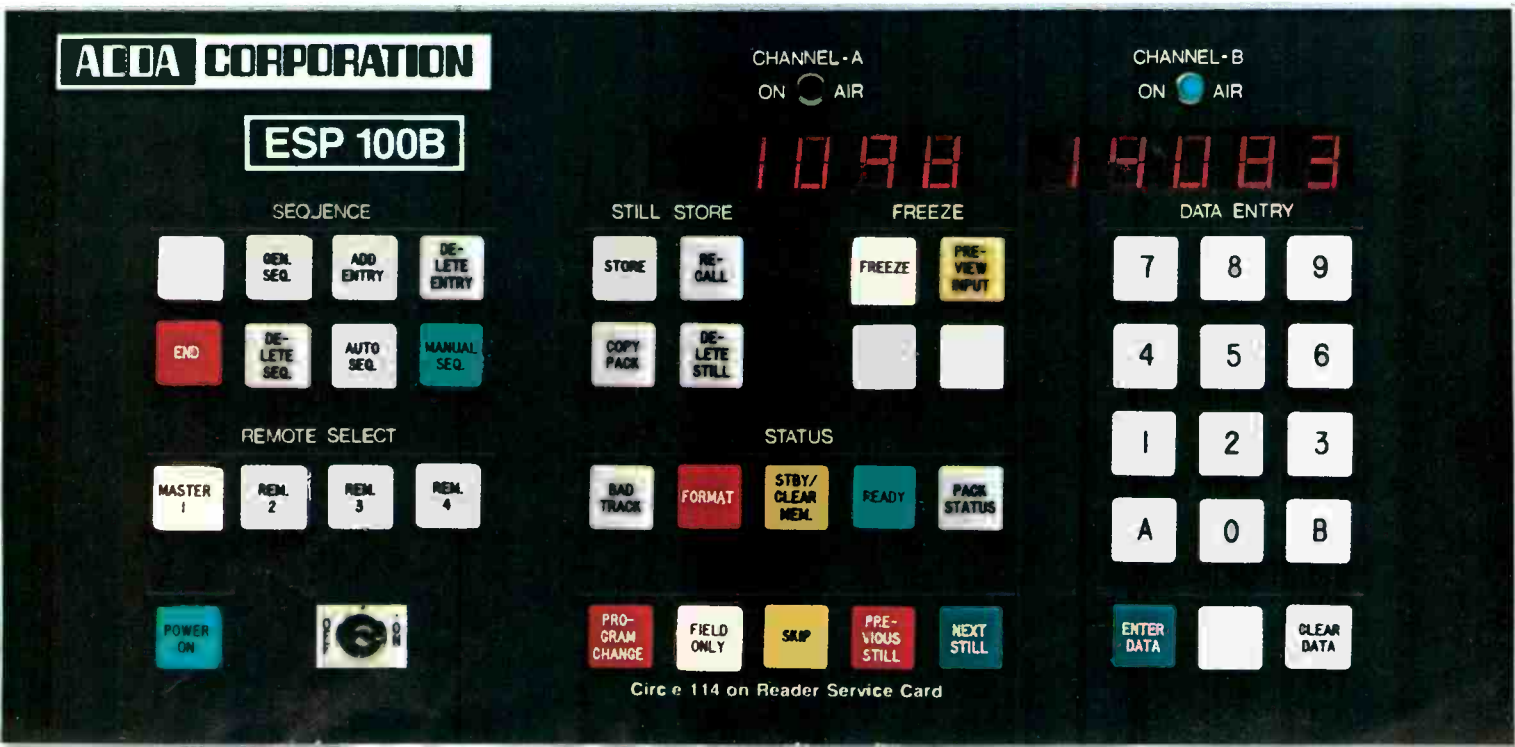

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THE PERFORMER

ATR-100

Sound is a perishable commodity, and Ampex has developed a way to keep it fresh. The way is an astounding tape recorder called the ATR-100. There isn't another machine like it anywhere in the world.

Unmatched for both audio performance and tape handling, the ATR-100 is truly transparent. You'll play back the original sounds with nothing added or subtracted by this recorder. And along with the most gentle tape handling you've ever seen on an audio machine, you'll get real time savings with the 500 ips shuttle and the Spool Mode that winds tape perfectly for storage.

Use the ATR-100 as a four, two or single-channel machine. The tape guides and head assembly change quickly when you go from mastering to mixdown, or to a dubbing assignment. And while this machine is doing the work, you'll keep your eyes on the studio action because the remote control unit contains fingertip switching and LED status indicators.

Ampex designed the ATR-100 as a simple solution to audio excellence. All signal electronics are in the overhead modular bay, and all mechanical parts are mounted on the transport deck with plenty of elbow room. (Rather than make claims about reliability, we'd prefer that you ask studios now using ATR-100s.)

No matter how you wish to measure audio tape recorder performance, the ATR-100 by Ampex comes out ahead. This is the performer that defines excellence in sound recording.

AMPEX MAKES IT EXCITING.

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Clearly the Best.

1450—The Transparent Demodulator

One thing is crystal clear. You can't buy a better television demodulator than the TEKTRONIX 1450 System M Demod. Why? Because it's "transparent." The 1450 allows signals to pass through for inspection without altering their characteristics. In other words, if you use a 1450, you'll get the true picture of your transmitter's output.

You'll want to use the 1450 for other reasons, too.

Save time (and money) on transmitter alignment

- Synchronous detection eliminates confusing quadrature distortion.
- Precise bandpass characteristic and linear detector plus flat IF and video response give faithful signal reproduction.
- Split carrier sound detection speeds troubleshooting and alignment of the aural transmitter because no vision carrier is required.

Reduce equipment maintenance costs

- S.A.W. filter IF strip requires no adjustment; extends time between normal periodic recalibrations.

Improve your program sound

- Synchronous detection and dual video detectors operating in phase quadrature facilitate measurement of the incidental phase modulation of the vision carrier that appears as noise in the received sound.

You can use the 1450 anywhere — at the transmitter or off-air at a remote site — without attenuators or external amplifiers.

If you think there's a problem with the performance of your transmitter or antenna system but you're not sure, choose our 1450. The Transparent Demod will clear the air for accurate, reliable television transmission.

Call your nearest Tektronix Field Office and ask for a demonstration of our 1450 Television Demodulator. Or, for additional specifications, write Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

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RADIO

PROGRAMMING & PRODUCTION FOR PROFIT

Authoritative Medicine; European Jazz; Business Comment; Enquirer-Style News

A RADIO MANAGEMENT that wants to balance seriousness with fun or fun with seriousness, or just needs variety or something more in the "public service" slots, can pick and choose from a heap of syndicated programs. Here are four that cover a wide range.

Medicine in its true voice

Health is one of the basic topics, and there is plenty of health information from radio program producers. Scott Broadcast Services of New York had some excellent ideas on producing a health series: Work with a top medical institution whose personnel can identify medical meetings and publications with medical findings that are important, and understandable, to the general public. Get specialists responsible for those findings, or thoroughly familiar with them, to comment in two or three brief recorded actualities. Have the actualities woven into a 90-second spot, with the facts and background described by an experienced narrator of facts for radio. Finally, get the series sponsored by a large firm with a strong interest in the health of Americans.

Scott produced their series *Medical Journal* on this plan, with Columbia-Presbyterian Medical Center as the cooperating authority, Prudential Insurance Company of America as the sponsor, and Lester Smith as the narrator. As John Scott pointed out to *BM/E*, Columbia-Presbyterian can direct Scott to important new information, often before it is revealed in public. Thus the subscribing radio station can have the spot on the air at the same time the news is released, or very shortly thereafter.

The series consists of five 90-second spots per week, with 15 spots sent out on 7½-ips tape each three weeks. Unlimited repeats are allowed within the scheduled week. Each spot carries one short tag for Prudential, but has no room for other sponsorship. Adjacencies can be sold. The series is free to the radio station, and can be exclusive in the market.

BM/E listened to several of the spots and found them very well done. Smith is straightforward and strong. Having the concerned doctors themselves carry part of the story gives the series a special assurance. For samples and info: Scott Broadcast Services, 1440 Broadway, New York, N.Y. 10018, tel. (212) 921-8280.

Jazz from abroad

In Europe jazz has never needed a "comeback"; it has always been there, and jazz festivals are common. The Broadcasting Foundation of America has brought over recordings of two recent jazz jamborees, one in Norway and one in Poland.

Co-produced by BFA and Norwegian radio are four hour-long sessions from the 1978 Molde Jazz Festival and Kongsberg Jazz Festival. In addition to the music there are behind-the-scenes interviews with the artists and descriptions of the settings. Some of the groups on the Norwegian tapes are: Joanne Brackeen and Ryo Kawasaki; Eric Kloss/Barry Miles; Gil Evans with Arthur Blythe, Kenny Wheeler, Steve Lacy, Earl McIntyre, Peter Levin, and Susan Evans; the Arne Domnerus Group from Sweden; and the Bjorn Alterhaug Quintet from Norway.

On the tapes made in Poland are, among others, the Cuban group, Irakere; the Jan "Ptaszyn" Wroblewski Quartet, and Laboratorium, from Poland.

Broadcasting Foundation has a very large library of jazz recorded at various festivals and concerts. For the full list and fee information, write BFA at 52 Vanderbilt Avenue, New York, N.Y. 10017, tel. (212) 986-6448.

Arnold launches business series

As a large producer of background music for commercials, of jingles, and of spot music programs, Toby Arnold of Dallas is reaching a great many stations (*BM/E*, May 1979). A new departure for the firm is its first public affairs syndication, *Business Today*, a five-a-week series of spots, each around two minutes long, sold on an annual basis to

Radio Programming

start September 3, 1979.

The host of the series will be Dr. John C. Caris, chairman of Isis Corporation, management consulting firm, and advisor to such firms as Du Pont, Proctor and Gamble, Texas Instruments, and many others. His *Business Today* series will take up many topics in management, employment, economics, and finances, among others. Each spot will have two open-ended commercial availabilities. Toby Arnold, president, said, "We've been planning to enter this area for several years, but decided to wait until we could supply truly superior programs. We've accomplished that goal in attracting Dr. Caris."

The series is produced by Arnold in cooperation with Marcon, Inc. Demos are available from Toby Arnold, Inc., 4255 LBJ, Suite 156, Dallas, Texas 75234, tel. (214) 661-8201.

Supermarket giant enlivens news

Just about every one of us has sampled the *National Enquirer* from the vantage of a supermarket checkout line. In recent years the old dosage of sex and horror has disappeared before an earnestness and informativeness on important topics, but without losing marvels, discoveries, and breakthroughs presented in a most lively manner.

Now that liveliness appears in a syndicated news series for radio stations, called aptly enough *The Lively Wire*. The service consists of 30 spot stories a week, including human interest bits on religion, health, film and TV stars, animals, science, UFOs, and much more — the mixture that sells around five million copies per issue of the *National Enquirer*. The spots are written especially for radio by the *Enquirer* staff, using material dug up by the paper's reporters but not used in the same form in the paper.

Makers of *The Lively Wire* say it is aimed squarely at the 18-to-45-year group, central for many radio stations. Samples and full info: Communications Capital Corporation (the syndicator), Time-Life Building, New York, N.Y. 10020, tel. (212) 245-2870. **BM/E**

BM/E's Program Marketplace

Syndicators For Radio

KUT-FM
The University of Texas at Austin
P.O. Box 7158
Austin, Texas 78712
Tel.: (512) 471-1631

ANY RADIO MANAGEMENT with a need for serious talk-discussion, science, and fine arts programs should have in hand regular information from an important group of syndicators of such material who may be overlooked: the large university radio-education departments. Programs offered to both commercial and noncommercial stations by a number of the university syndicators average high in information and entertainment quality, and are usually inexpensive to boot.

An excellent example is the program production of KUT-FM of the University of Texas at Austin. KUT has organized a group of Texas stations into the Longhorn Radio Network for distribution of many of the programs, including some available for Texas airing only. But most can be had by any station in the country that signs up on the quarterly basis established for the operation. Basic fee for commercial stations is $60 a quarter, which covers up to 26 hours of programming for which a fee is charged. Additional hours cost $2 each. Some programs are free.

Distribution is via seven-inch or 10-inch reels of mono or stereo tape (as specified in each case) running at 7½ ips. The programs are arranged for 13-week release with KUT specifying the week for each segment, but the segment may be aired on any day, at any hour, during the specified week. Tapes are returnable (in boxes provided) after the program has gone on the air.

The KUT syndication operation is growing steadily, manager William Giorda told *BM/E*, with about 500 stations, commercial and noncommercial, signed up for the current quarter, about 100 above the total during the similar quarter last year. It is obvious that the quality of the material is good enough to keep radio managements coming back for more.

Here are brief descriptions of the most popular programs of the summer quarter, 1979. All those noted will continue into the fall quarter, so any radio management interested in any of them will have a chance to pick the program up beginning October 1, 1979 (the station must sign up by September 3 for the fall quarter, through the radio traffic manager, KUT-FM).

Collector's Corner is a classical music series of distinguished recordings of the past covering the great con-

OPTIMOD-AM:
NOW IDEAL FOR OLDER TRANSMITTERS, TOO!

Announcing a new Transmitter Equalizer accessory for the OPTIMOD-AM system. It lets you correct for tilt, overshoot and ringing in transmitter/antenna systems to get the most out of transmitters using vintage modulation schemes and/or narrow-band antennas.

It's no secret that OPTIMOD-AM has best created its loud, clean, "almost high ficelity" sound with current technology transmitter plants. Our new Transmitter Ecualizer makes this super sound available to many more stations—particularly those with transmitters having enough modulator reserve to handle very high average modulation—but whose loudness (without the new equalizer) is limited by waveform-distorting tilt, overshoot and ringing.

Clean audio and a solid transmitter are still essential. But, more stations now have a fighting chance without the expense of a brand new transmitter.

The Transmitter Equalizer is standard on all new OPTIMOD-AM's. So, if you have been hesitating to try OPTIMCD-AM because of doubts about your transmitter or antenna system, relax: now s the time. And if you're already using OPTIMOD-AM with an older design transmitter, you can further improve performance by purchasing our easily- nstalled retrofit kit.

For more information on this latest refinement of the OPTIMOD-AM systems approach to AM audio processing, see your Orban Broadcast Dea er, or contact us directly.

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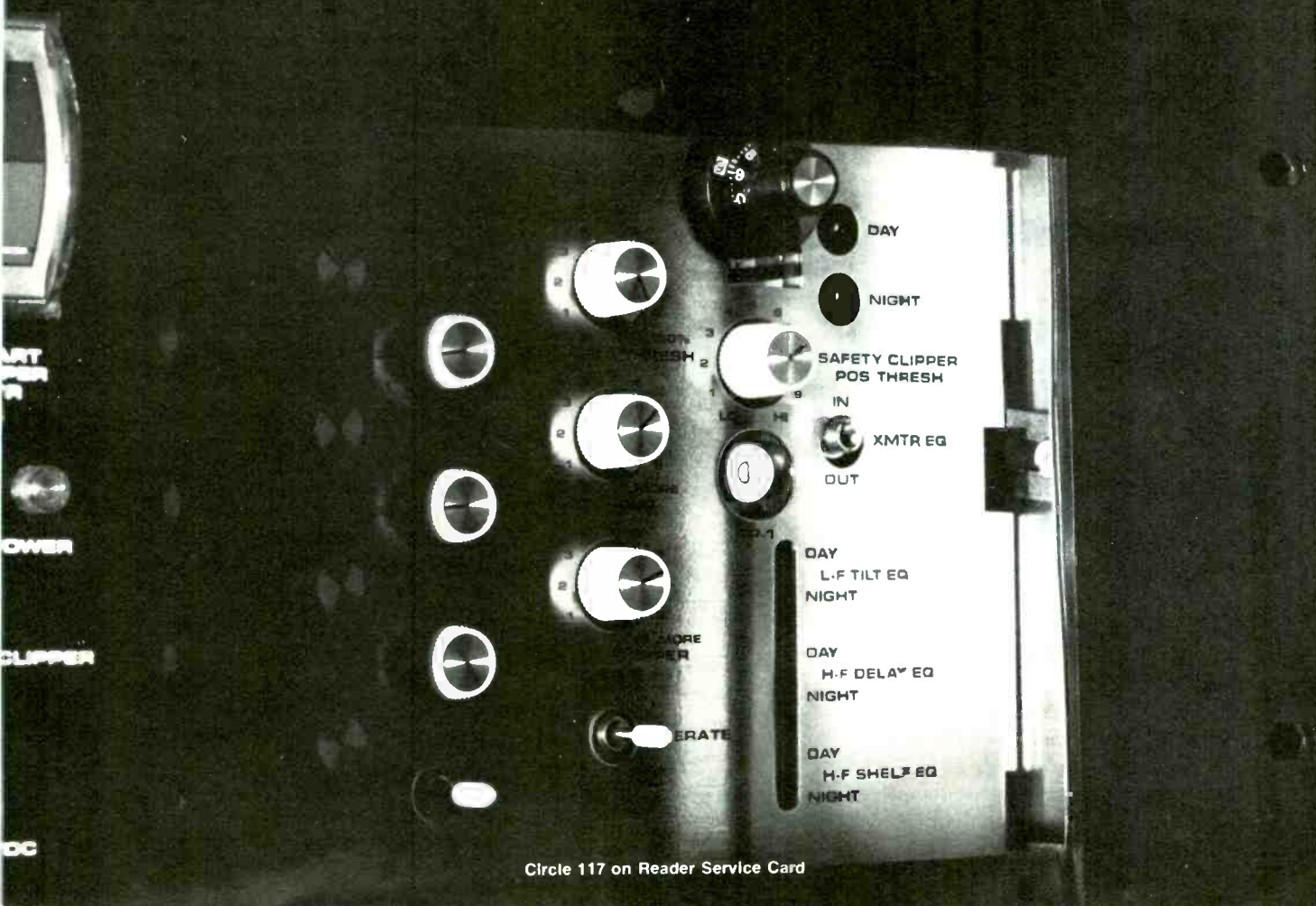


Program Marketplace

ductors, orchestras, singers, and instrumentalists, with cycles for great composers, opera series, etc., produced with commentary by Wayne Conner at WUHY-FM, Philadelphia. 60 minutes a week, 13 chargeable hours. In mono and stereo.

Consider the Alternatives is 30 minutes a week of discussion on foreign and domestic policy issues, featuring interviews with distinguished public figures. It is produced at WMMR-FM in Philadelphia and is free to the radio stations, being sponsored by the SANE Education Fund.

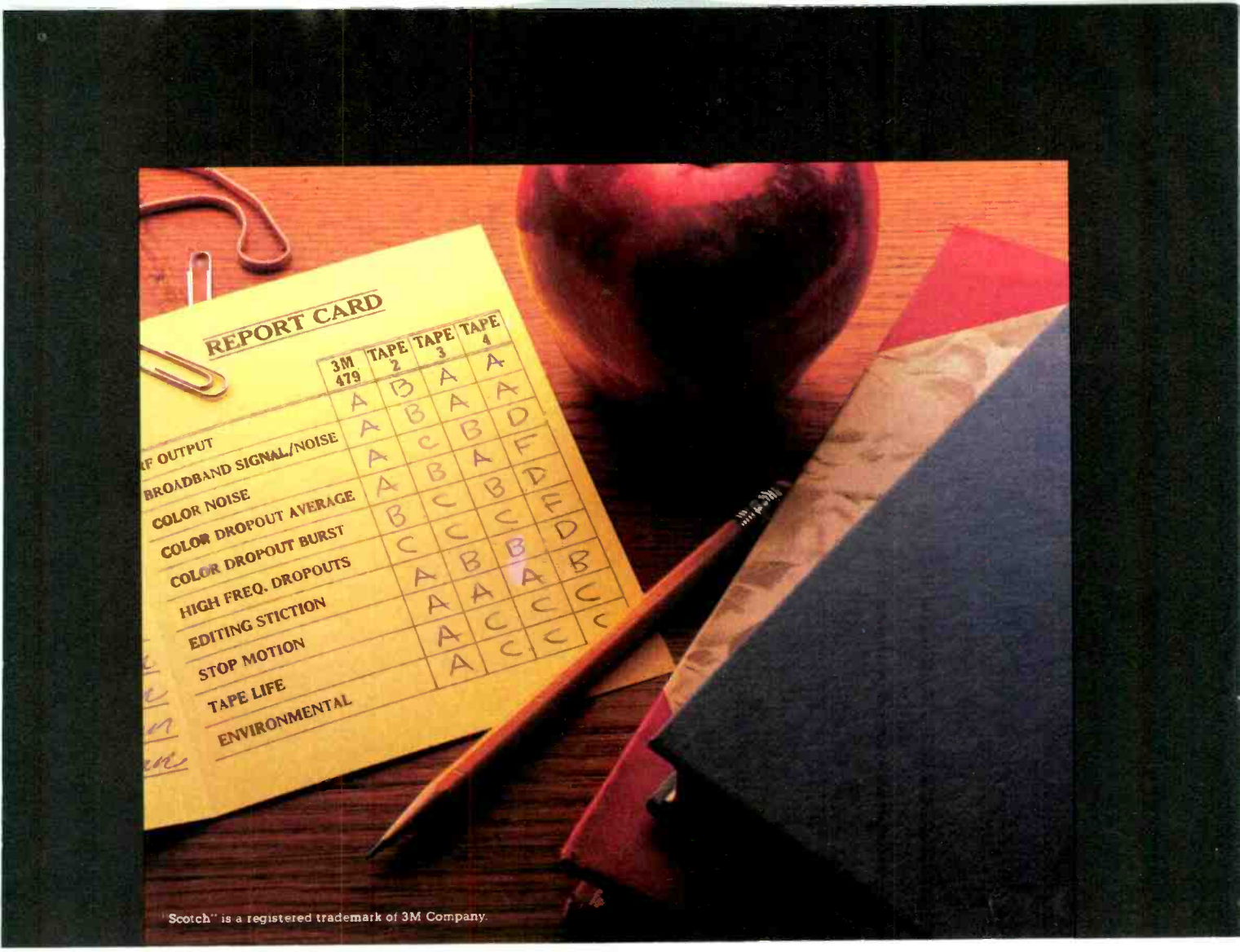
The Human Condition is 25 minutes a week on many aspects of mental health — childrearing, the world of work, social change, and special concerns of teenagers and older persons are a few of the topics discussed by specialists in the field. The series is produced by KUT-FM in association with the Hogg Foundation for Mental Health at the University of Texas. Chargeable hours, six and a half.

In Black America is 25 minutes a week of discussion of the black experience in this country — problems of economics, politics, and education, among others. It is produced at KUT-FM by Tony Lee, Clemith Houston, and Olive Graham. Six and a half chargeable hours.

Here are some more in brief: *The Inquiring Mind* is 25 minutes a week, six and a half chargeable hours, on academic research. *Latin American Review,* 30 minutes a week of reviews of the Latin American Press; six and a half chargeable hours. *The Mexican-American Experience* is 25 minutes a week of interviews with prominent Mexican-Americans on current political and social issues; chargeable hours, six and a half.

The Next 200 Years, 25 minutes a week, is discussion of the American future by distinguished scholars in many fields. Chargeable hours, six and a half. *Performing Arts Profile,* 30 minutes a week, consists of interviews with persons important in the arts — music, writing, theater, movies and others. Chargeable hours, six and a half. *Singer's World,* 30 minutes a week, brings recordings of famous singers of the past, with Wayne Conner as commentator. Chargeable hours, six and half. *Star Date,* seven programs a week of two minutes each, is a nightly spot of intriguing star information, often keyed to bodies visible on the scheduled night. It is free, and is available in both English and Spanish.

If this material fits into your station's programming plans, write KUT-FM for full information on all upcoming programs. **BM/E**



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

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

If that isn't reason enough to make us your choice, maybe this is. We're the only one-inch supplier that winds your tape onto a special cushioned flange reel to protect against shipping and handling damage. And we pack and ship our tape in a flame-retardant case to give you even more protection.

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

3M

JVC's $17,000 editing system.

If you think a third audio channel and 10 extra lines of resolution are worth an extra $6000 in a ¾" video editing system, read no further.

But if you'd like to save $6000 compared to the nearest performing competition...yet perform advanced editing functions at tape speeds up to 10 times normal (a JVC exclusive)...and produce broadcast quality tapes even if you're not an expert...then the CR-8500LU system including RM-85U Editing Control Unit is for you. It has many features you won't find elsewhere except on that higher priced system. Plus some you won't find even there.

Fast, no-glitch editing

With pushbutton ease, you get distortion-free frame-to-frame editing, thanks to JVC's built-in rotary erase head, blanking switcher and advanced servo mechanism. First, you have a choice of 11 forward and rewind search speeds, from still-frame to an unequaled 10 times normal. After picking edit points, you also have a wide choice of automatic preroll times. (The more expensive system limits you to 2 or 5 seconds.) Then you can preview your edits and adjust edit points. Preroll again, and edits are made automatically, electronically, at exactly the selected points ±2 frames—an accuracy equal to the higher priced system. There's also a horizontal sync phase compensator to minimize timing error. A patented dubbing switch for maintaining stable color. And much more.

The RM-85U Editing Control Unit has independent LED displays for player and recorder. Each gives elapsed tape time in

For those who need funds, not frills.

minutes, seconds and frames. Or, the exact length of one edit —a JVC exclusive. But wait! Maybe you don't even need a full system.

Stand-alone versatility

Let's say you just want to assemble or insert edit live material onto a tape. All you need is one CR-8500LU Recorder/Editor... which still gives you the benefit of automatic preroll. By contrast, the higher priced brand makes you buy a control unit as well.

Let a JVC dealer show you how our editing system gives you much more for your money. For the name of your nearest dealer, call one of these numbers collect: East, 212-476-8300; Midwest, 312-364-9300; South, 713-741-3741; West, 213-537-6020. US JVC Corp., 58-75 Queens Midtown Expressway, Maspeth, NY 11378.

JVC®

PROFESSIONAL VIDEO DIVISION
US JVC CORP.

BM/E-8/79

Mail to US JVC Corp.,
58-75 Queens Midtown Expressway,
Maspeth, NY 11378.

I'd like to know more about the CR-8500LU editing system including RM-85U Editing Control Unit.

Name _____

Title _____

Company _____

Address _____

City, State, ZIP _____

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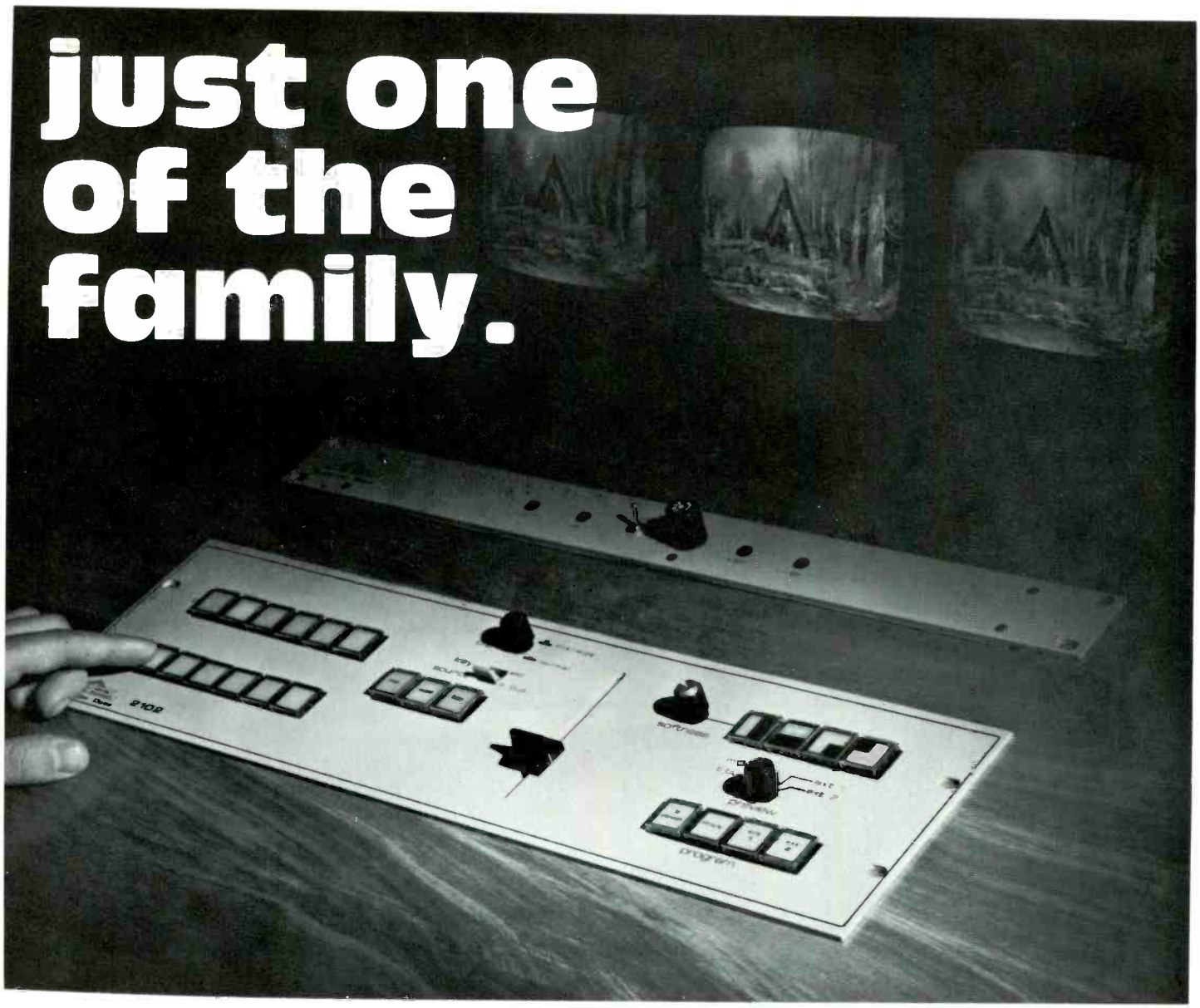

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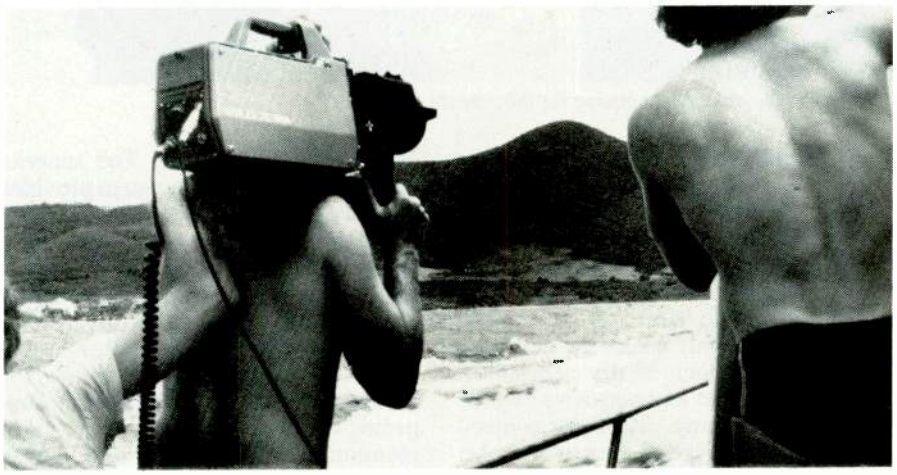

IT IS SAID that we know more about the distant planets than we do about our own oceans. Certainly this holds true when it comes to television. While billions are spent putting cameras on the moon and on Voyager spacecraft, only very recently has video begun to be used underwater.

The reasons it took so long are fairly clear. Delicate electronics are not known for favorable interactions with water, particularly salt water. Remote work at sea with video cameras necessitates a remote recorder and, until very recently, portable, high-quality VTRs that could be operated off batteries were simply not available. Designing an underwater housing for a video camera, though not significantly different from designing one for motion picture cameras, nonetheless required research and development.

The reasons for creating an underwater video system are equally obvious, particularly when video is stacked up against film. The most obvious advantage is that the director, sitting comfortably topside, can see exactly what his cameramen are shooting. The video camera can run almost endlessly, recording events as quickly as the operator can change tape rather than a diver having to surface every 10 minutes to reload. Technically, video can, with an operator riding the "paint pots," provide far more definition of colors than film which must be used with heavy filtration, cutting down the amount of available light.

Recently in the U.S. Virgin Islands, Home Box Office made a major commitment to the use of a brand new system, manufactured and marketed by Ft. Lauderdale-based Aquavision International in conjunction with Hitachi. The underwater camera, dubbed the SK-70AQ, was used with a Bosch Fernseh BCN 20 one-inch Type B VTR to record a wide variety of undersea life for a "sports format" show to air sometime next season. The show was coproduced by HBO and Aquavision, with Aquavision president Pierre deLespinois as director.

The housing, built around an SK-70 camera, drew on the experiences of several others who had already made some pioneering experiments with television underwater (especially Stuart Goodman Productions — see "CBS Makes Big Splash Underwater," *BM/E,* November, 1978).

The Aquavision housing is remarkably simple. The camera rests within a three-piece cast aluminum case in which the two side panels bolt onto the main frame. Either panel can be removed to access the camera. The doors and frame are machined to extremely critical tolerances, and a seal of petroleum jelly provides an extra measure of protection.

Two Fujinon lenses are used: a 6 mm fixed focal length lens with the depth of field set from lens contact to infinity, and a 14:1 (9 mm to 126 mm) zoom. The housing has a custom-designed snoot which slides into place on its front. To change lenses, the cameraman simply slips off the snoot, screws the new lens into place, and slips the snoot back into place; it is not necessary to open the rest of the housing.

The snoot is fitted with a high-quality glass front surface. Unlike underwater housings for film cameras, however, there is no special grinding involved. Since water refracts light differently from air, special corrective lenses are required for film cameras. Video's smaller aspect ratio, however, makes whatever distortion is present occur outside the television cutoff. The ordinary glass also makes possible half-and-half shots, with the lens positioned at the waterline so that a diver can be shown entering the water and then, in the same shot, followed down.

DeLespinois generally prefers to use the 6 mm lens for most applications since it enables the cameraman to get close enough to his subject to see the face while still providing a shot of the rest of the body. He uses the zoom lens for macro photography of undersea life. Thumbwheels on the side of the camera near the carrying handles provide servo control of the lens's zoom and focus controls.

The camera, with housing and lens, weighs over 100 pounds on land; in the water, it is completely neutrally buoyant. In general, it was designed to move effortlessly through the water in any direction so that smooth pans, tilts, and tracking shots can be done without resistance by the water.

Two cameras were used throughout the 10-day shoot (incessant rain and rough seas caused several delays): a Hitachi SK-90 for topside shooting, interviews, on-island and aerial sequences and the SK-70, which was used both in the underwater housing and as a standard EFP-type camera.

Both cameras could be controlled with Hitachi's remote process pack, positioned atop a Cinema Products Field Video Setup Module. The CP unit is built into a lightweight shipping case whose doors detach to form a hood so the screens can be seen in sunlight. The module contains a Tektronix 528 waveform monitor, Tektronix 1420 vectorscope, and nine-inch monochrome and color monitors. To this setup was added a Hitachi miniportable oscilloscope and a small switcher. Though no actual "production switching" was done, this allowed both cameras to be up and running simultaneously, with one being viewed in the b&w monitor as preview and the other signal being viewed on the color monitor as program.

All camera functions could be controlled from the video operator/director position via multi-conductor cable (200 feet on the underwater camera). While this was obviously important when using the topside camera to provide a constant check on the camera's performance and signal levels, it was absolutely critical with the underwater camera since the camera's own controls could not be accessed while in the housing. White balancing the underwater camera became a simple matter of holding up a white towel (borrowed from the hotel) in front of the lens at whatever depth it was operating at. Registra-

tion was accomplished before sending the camera down.

In addition to white balancing, the technical director, Jerry Steinberg assisted by Mike Van Roy and Bob Ramm, could also keep a constant check on the color performance of the underwater camera. Before each shot, the chroma was adjusted to take account of the changing light levels and color temperature at each new depth. Water absorbs light's wavelengths at different rates; red is the first to go, followed by green, yellow, and finally blue. At 30 feet, the color red is all but gone; by riding the chroma levels, however, Steinberg was able to amplify the reds in the picture to provide accurate rendition of the colors of marine life even to depths of 130 feet.

The process pack also proved to be an effective underwater communications device. By flashing patterns of color bars on the cameraman's viewfinder, Steinberg was able to indicate "stand by," "rolling," and "tape stopped."

Program material was recorded on a Bosch Fernseh BCN-20 one-inch Type B deck, set up in its open reel (30 minutes) configuration. For backup, a Sony BVU-100 ¾-inch deck was used.

The specially designed housing for the Hitachi SK-70

It should be noted that though neither machine is specified for the climatic conditions encountered during the shoot (temperatures above 100 degrees, with humidity at 100 percent during the frequent squalls), neither machine failed a single time. Heads were cleaned thoroughly each time tape was loaded to keep them as dry as possible and to counteract any corrosive effects from the salt spray. Steinberg conjectures that the Type B format may be preferable to Type C in such adverse conditions since there is less head wrap and therefore less chance for the tape to clog the drum.

An interesting approach was tried for audio. Rather than feeding mics directly into the VTRs or mixing them with an inexpensive mixer, all audio was first run through a Nagra IV portable ¼-inch audio deck. The superior signal handling of this system provided not only a high-quality mix to the BCN and BVU decks, but also enabled a ¼-inch track to be recorded as a safety and for double-system sound recording.

A Sennheiser 815 shotgun mic was used for most interview situations, mounted within an Alan Gordon Zeppelin windscreen. A lightweight aluminum fishpole was used during wide shots to get the mic out of the picture. The sound system, as well as lights, was supplied by John Boisseau, who acted as soundman and gaffer.

The entire system, except for the audio, was set up for dual power operation. A 2 kW gasoline generator was lashed to the deck by the bow. During waits between takes and for most of the

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Alan Sheffield (right), Victor Duncan's Director of Video Sales and Rental, seen with Dan Garcia of KVII-TV during a recent video equipment seminar held at Duncan's Dallas headquarters.

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underwater sequences, this system provided the power and would run for about two-and-a-half hours continuously without adding more fuel. During sync sound shots, however, the generator proved too noisy and the system was switched over to battery operation.

The night dive at Fredrickstead Pier

During the ten days of the production, the cameras and equipment were put through every imaginable situation, including aerials and an on-camera conference among the divers at the Anchor Inn on St. Croix. The typical day, however, began at 6:00 a.m. when the equipment was loaded onto the 50-foot cabin cruiser, patched together, and secured. By 9:00 a.m. the boat was generally at the dive site and the camera and divers in the water. Since the show was designed to present the rich variety of life found underwater, everything that caught the cameraman's eye was recorded. The cameraman or his cable-tender assistant would stick his hand up in front of the lens to signal that there was a sequence he thought worthwhile to shoot. The director would look at the shot and have color bars flashed when he wanted to roll tape.

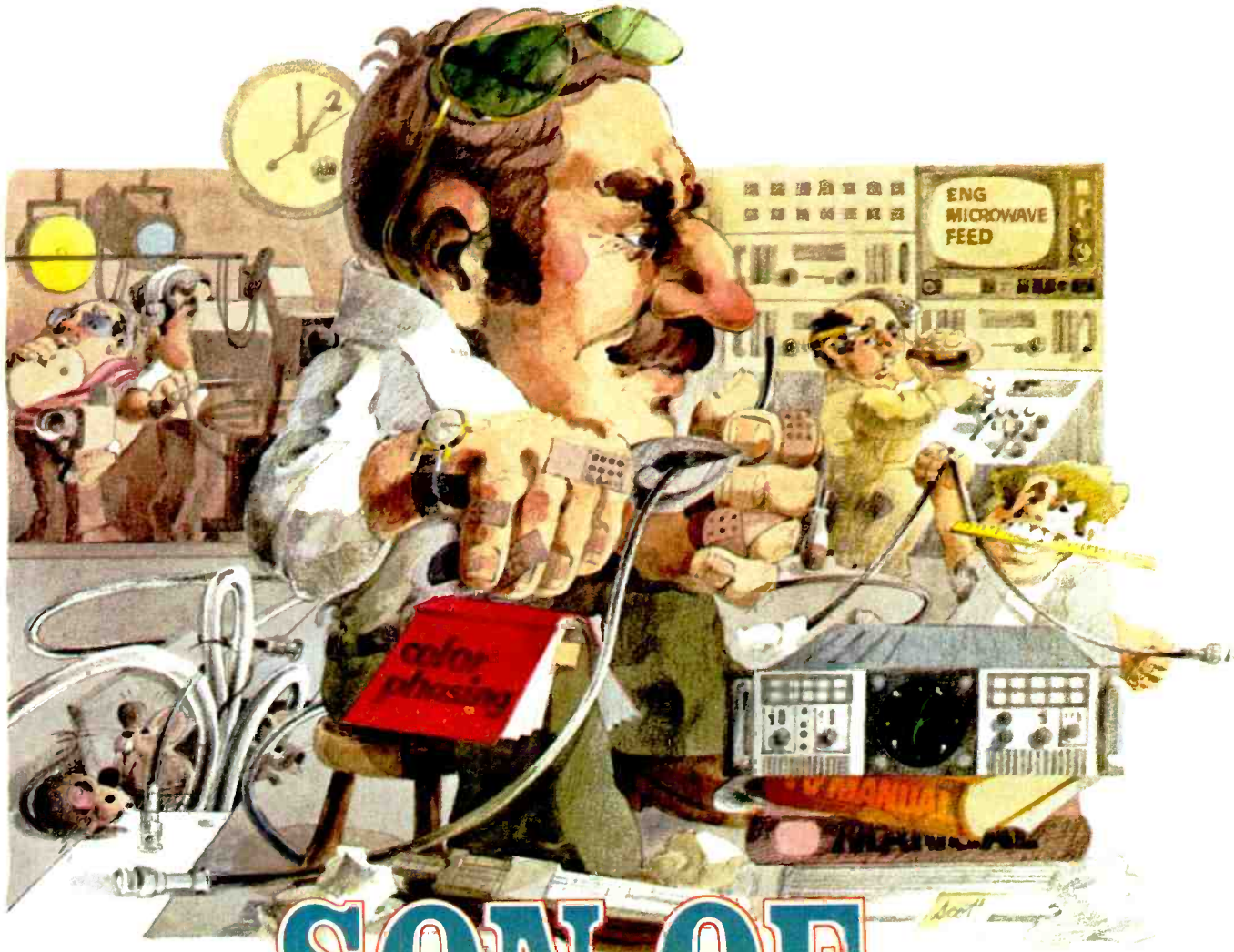
Sharks, being part of the marine environment, were given ample attention, too. Several days were spent chumming the water to attract them. Divers then engaged in a "competition" to see who could get closest to the sharks and even touch them. Reminiscent of the "CBS Sports Spectacular — Shark Tagging," the idea of the contest was to show that sharks are not necessarily deadly man-eaters, as they are often portrayed in films.

Certainly one of the highlights of the shoot was the dive, at night, at the Fredrickstead Pier — an immense concrete jetty bult to berth cruise ships. Beneath it can be found one of the most lively, colorful coral environments in the world.

The video equipment was set up in the back of a Dodge pickup, using ac power available on the pier supplemented by a small gasoline generator. The pier area was lit with a Lowel Light Kit (two 750 and one 1000 W lights set to flood for maximum coverage). Using the SK-70 in its underwater housing mounted on a Ronford tripod, the divers were shown getting into their wet suits, tanking up, and talking about the dive. They were then shot jumping from the pier into the water with a half-and-half shot that followed them down.

Though lights were never used during the daytime shooting, they were obviously necessary at night under the pier. Another new Aquavision system was tested for the first time: an underwater light consisting of four four-foot fluorescent tubes, balanced to 5800 degrees K. The lamps are enclosed within a waterproof casing that also houses the lights' ballast and makes the unit neutrally buoyant; ac power is supplied from topside. Designed to provide an even, white fill light with no hot spots, the Aquavision system provided truly astonishing images of sea creatures which are seldom seen: exquisite little yellow sea horses, octopuses which can camouflage themselves within seconds, beautifully-colored coral, and so on.

Shows made underwater will probably never become as popular as sitcoms or baseball. If you are situated close to an ocean or lake, however, it is now easier than ever to take a plunge and give viewers a look below. **BM/E**



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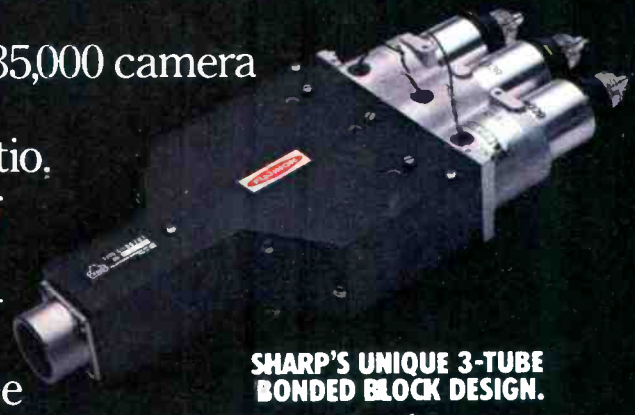

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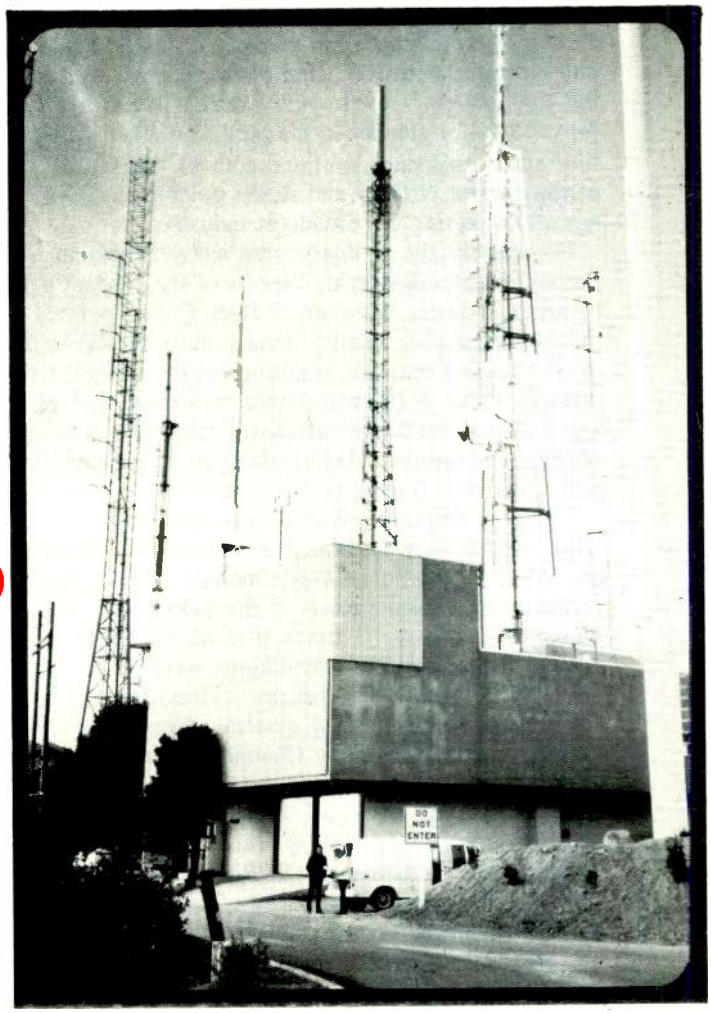
THE DEADLY SPECTRUM?

Recent government actions are a sign that the public is growing increasingly aware of the potential dangers of radio frequency electromagnetic radiation. With federal agencies preparing to adopt non-ionizing radiation levels far tighter than those now in use, broadcasters cannot help but be affected.



IN THE VERY NEAR FUTURE, perhaps as early as this fall, the broadcasting industry is likely to come face-to-face with a major controversy in public health: the possibly adverse biological effects of broadcast frequency non-ionizing radiation. *BM/E*'s exclusive investigation has revealed that several important government agencies in addition to the FCC are working on a new set of guidelines that may, in some cases, actually limit the power of broadcast operations.

This new challenge to broadcasting's "public interest, convenience, and necessity" is coming from some rather unexpected sources. Biologists and other scientists, participating in both private and government-sponsored research programs, have revealed the truth of the saying that everything good is "either immoral, illegal, or fattening." In the case of broadcasting, this comes down to increasing data indicating that at high power densities (and perhaps even moderate densities) RF radiation may be causing a public health hazard; broadcast radiation, it turns out, may not be as inert as it was once thought to be. Based on these scientific findings, both occupational and public safety groups are asking that new standards be set to prevent exposure of workers and the public to excessive RF radiation levels.

What are the actual biological and chemical effects of RF radiation? At what frequencies and at what power densities are these effects likely to be seen? Who are the greatest contributors to the overall ambient levels of RF radiation? What is the government going to do about the problem?

These issues are likely to arise in any discussion of non-ionizing radiation and its impact on the industry and the general public. As we shall see, there are no clear-cut answers, despite the attempts by some to prove compelling reasons for severely limiting RF radiation levels and the attempts by others to completely slough off the problem. One thing that is clear is that broadcasters must inform themselves about all sides of the issue so that they can respond intelligently to those who now feel that broadcasting constitutes "the deadly spectrum."

What form are the new standards likely to take? On October 5, 1978, the New York City Board of Health quietly held hearings on a proposed amendment to Article 175 of the New York City Health Code. The new provision specified that ". . . in any uncontrolled area accessible to the public, the total power density from all sources of non-ionizing radiation from 10 MHz up is not to exceed 50 $\mu W/cm^2$."

The proposal was introduced by Dr. Leonard Solon of the department's Bureau of Radiation Control. It is thought that Dr. Solon hoped to slip the legislation

through without any difficulty. The Environmental Protection Administration had recently furnished data to the city indicating that RF radiation levels were well below the 50 $\mu W/cm^2$ level. New York City would have proved itself a pioneer in the public health field by setting a standard one two-hundredth of the 10 mW/cm^2 of the current NIOSH and ANSI guidelines — without actually affecting the broadcast industry.

Fortunately the industry was ready. Providing testimony on the engineering aspects of the case on behalf of an all-industry committee, Jules Cohen pointed out that the regulation would literally close down the new World Trade Center transmitting facility before it even opened. (The WTC will house transmission facilities and antennas for some half-dozen television stations, a dozen radio stations, and hundreds of microwave links, STLs, two-way paging systems, etc.)

Using a computer program developed at RCA's near field labs, Cohen calculated that the power density in the WTC's near field (which included the observation platform on the south tower of the twin-tower complex) would be at least 10 times that of the proposed 50 $\mu W/cm^2$ standard. His calculations were for the broadcast spectrum only and did not include the STLs, microwave relays, or paging systems. Nor did it include the 1000 W translator for Channel 68 or the proposed transmitter for channel 58.

Also testifying on behalf of broadcasters was Dr. Sol Michaelson, professor of radiation biology and biophysics at the University of Rochester. Dr. Michaelson presented the growing body of evidence supporting the viewpoint that adverse biological effects from radiation in the broadcast spectrum at low power densities have yet to be observed.

On October 19, the Health Department decided to postpone its decision on setting the new standard and referred the matter to an advisory group consisting of radiation experts in the New York City area. No word has been heard from the group yet; it seems safe to assume that, for the moment at least, the 50 $\mu W/cm^2$ standard for New York City is a dead issue.

The attempt by the City of New York to set local standards and the rebuttal by the broadcast industry emphasize two key points in the current controversy surrounding RF radiation. The first is that we still know very little about the biological effects of non-ionizing radiation. The second is that national standards are going to have to be set regardless, before vigilante action on the part of local communities puts a serious dent in broadcast operations. Already there is the story of a town in Maine which blocked, for two years, a man who wanted to situate a 1 W microwave transmitter in the middle of 60 acres of empty land because residents feared the effects of "those deadly microwaves." The Oregon state legislature is ready to pass a bill limiting RF radiation levels; it is only waiting to fill in the blank in "shall not exceed ____ $/cm^2$."

What are the biological effects?

On the question of biological effects, the scientific community is squarely divided between those who point with alarm at the few effects which can be demonstrated and predict long-term adverse health problems and those who consider the effects to be virtually insignificant.

It should be noted at the outset that most now agree that high energy fields, especially those with frequencies close to that of the human body (about 75 to 80 MHz for an average person), produce what are called "thermal effects." These effects, quite simply, represent the response by any organism which absorbs electromagnetic radiation: the temperature of the body tissues rises (similar to the effect produced when the body absorbs infrared radiation from the sun or when food is placed into a microwave oven). Mammals (including humans), being homeotherms, attempt to keep their body temperatures "normal" by lowering the metabolic rate, perspiring, and so forth — basically what happens to us on a hot day. The simplest demonstration of this is to put your hand in front of an operating microwave transmitting antenna. It will feel warm, indicating the mild thermal effect, and your body will compensate with normal thermoregulatory mechanisms. When the body can no longer cope, body temperature rises. At a certain point, the body's tissues begin to "cook."

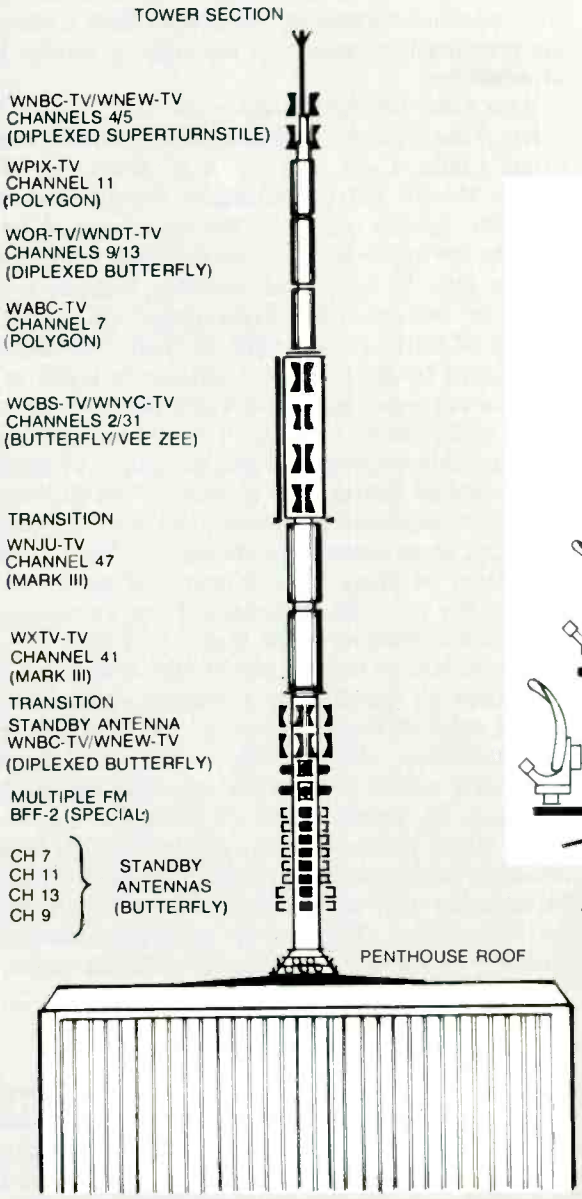
Along with the high energy fields that cause heating of body tissues are some associated effects. One of the most significant appears to be the creation of cataracts in the eyes of laboratory animals subjected to microwave intensities of 100 mW/cm^2. This is thought to occur because different body tissues absorb RF radiation at different rates, with the area in back of the eye's lens being one of the most susceptible and rising to temperatures of 42 degrees C or higher.

The ultimate question, of course, is the long-term effects of these thermal responses. While most would agree that low-powered microwave transmitters pose little threat to operators or the public, what about those exposed to the extremely high fields encountered while climbing broadcast towers or in close proximity to transmitters? Theoretically, the human body can absorb enormous quantities of non-ionizing radiation in the form of sunlight without adverse reactions. But place a rat or mouse inside a microwave oven and the results become somewhat different. In the high fields encountered alongside transmitting antennas on broadcast towers, the thermal response mechanism may simply not be adequate.

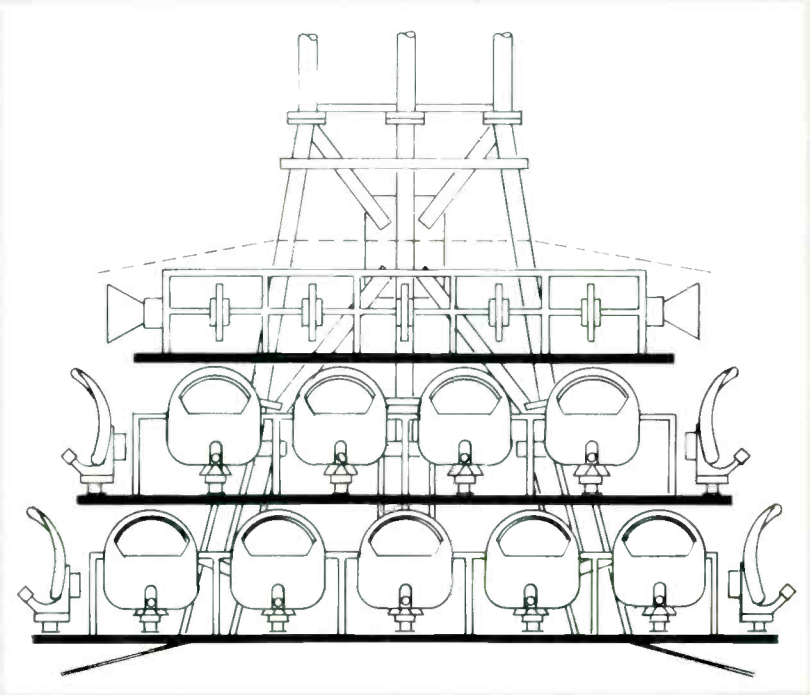
At the same time that few dispute that thermal effects are created by RF radiation, most concede that RF radiation cannot be used for "mind control" as some alarmists have postulated.

Speaking at an engineering workshop on the biological effects of radio frequency radiation at the recent Dallas NAB show, James W. Frazier, specialist in roentgenology and adjunct associate professor of pharmacology at the University of Texas Health Science Center, took strong umbrage at the claim that we know little about the biological effects induced by RF radiation. "In fact," asserted Frazier, "we know quite a bit about it. You would think that if you put enough electromagnetic radiation in one volume [such as the body] that strange things should happen. Experimentally we don't find them — except when we use very high fields and get admittedly hyperthermal reactions."

Frazier was referring specifically to the more than $90 million spent annually in government-sponsored research projects seeking to prove that RF radiation can be used to affect behavior. So far, there have been no

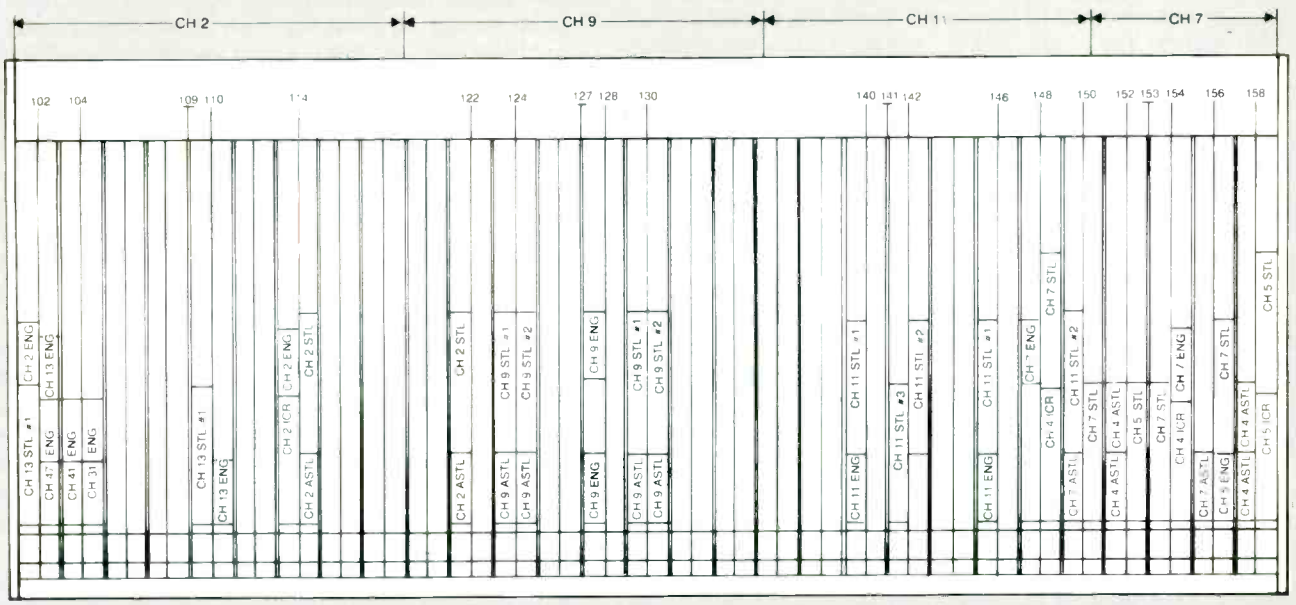


All drawings on this page courtesy Rosner Television Systems

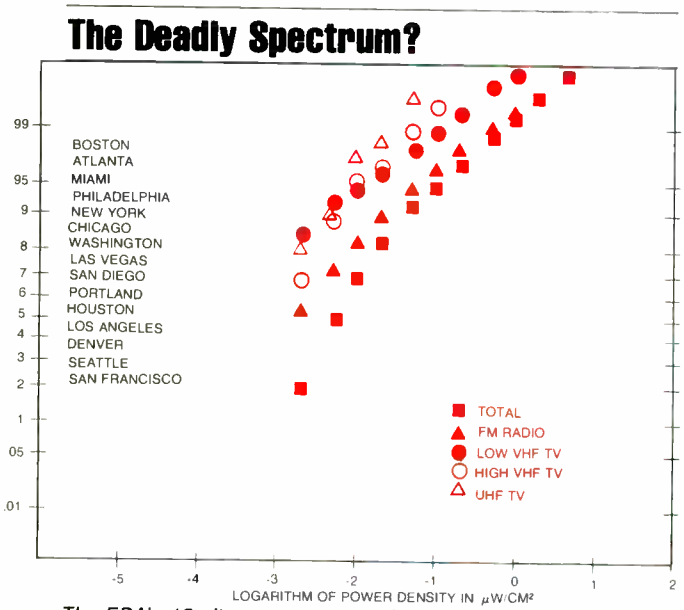


Detail of base of tower with microwave antennas. The uppermost tier contains 20 horns. The two lower levels contain a total of 35 Nurad Superquad receivers. Arrayed on all four sides of the square building, the receivers are accessible from almost any location within the city

The north tower of New York City's World Trade Center. The main mast (still under construction) rises 351 feet above the 1672-foot rooftop. All of New York's VHF stations, several UHF, FM, and AM stations will ultimately transmit from here. The RF radiation level may reach 500 $\mu W/cm^2$ in the near field, which includes an observation platform on the south tower



Detail of floors 190 and 109, looking north. Specially designed Nurad antennas fit into slots on the building's facade. STL, auxiliary STLs, and small ENG microwave antennas for all New York stations are arrayed on all four sides of the building. Open slots are available for paging systems. The 500 $\mu W/cm_2$ RF radiation density figure does not include any of these smaller transmission systems



The EPA's 15-city survey revealed a median exposure level of only .005 μW/cm². Ninety-nine percent of the population in these cities is exposed to 1 μW/cm² or less. FM radio turns out to be the greatest contributor to ambient RF radiation levels

demonstrable results. "Of course," said Frazier, "if a man were subjected to 30 or 40 mW/cm² power densities at the resonating frequency of his head [about 450 MHz for an average man], it might have an effect on the thalamus. But the guy would obviously have to be crazy in the first place to submit himself to that."

Thermal effects are readily observed; behavioral effects are not observed at all. There is, however, a third group of responses which can be attributed to RF radiation but which may be completely insignificant in terms of biological effects. Typically they are seen with power densities below 10 mW/cm² (the level below which thermal effects are not noted), but above .5 mW/cm², which appears to be the lower limiting level for inducing biological effects in humans.

On April 9 and 10, 1979, the Committee on Public Health of the New York Academy of Medicine sponsored a symposium which brought leading scientists and researchers from around the country together to discuss these very problems. In general, their findings seem to be concentrated in three main areas: the central nervous system, the blood stream, and the body's immunological system (mechanisms for protecting against diseases).

Much of the work in the first area, the central nervous system, has been done by the Russians and Eastern Europeans, and the results, according to many American scientists, are highly suspect — particularly since the Russians are not well known for their use of control groups. Nonetheless, findings have been reported. Most seem connected with the brain's own electromagnetic activities in the sense that fields as low as 1 mW/cm² at microwave frequencies appear to interact with the rhythmic pulsing of brain cells. In some experiments, anesthesia can be produced when the right frequencies are generated. In others, changes in circadian rhythm (the internal, biological clock which, in animals and humans, generates such things as periods of waking and sleeping in the absence of external time references) have also been shown.

Responses of the blood and immunological (lymph) systems can be demonstrated at equally low levels. The findings here generally indicate a change in the composition of the various components of the blood stream (red and white corpuscles) and studies show a change in the response mechanisms of the body to various kinds of infections.

Also under intensive study in the U.S., by Dr. Ross Adey of the Veterans Administration Medical Center in Loma Linda, Calif. and Dr. Carl Blackwell of the EPA's Health Effects Research Program in North Carolina, among others, is the effect caused by extremely low intensity fields on the body's calcium exchange rate. In what most scientists concede to be a series of well-controlled experiments, the rate of exchange of calcium ions within the brain was shown to be affected by RF frequency radiation at levels so low that thermal response could not have been the cause.

All of the above findings, it should be noted again, are extremely controversial and the subject of considerable scientific debate. The findings of the Russian scientists, as mentioned previously, lack a certain credibility as true experiments. The change in calcium E-flux is considered by many to be a mere biological curiosity since it has yet to be demonstrated that the change has any effect whatsoever on the body's functions.

It must also be pointed out strongly that as yet there have been no scientifically conducted epidemiological studies either of those exposed to relatively high levels of RF radiation, such as tower workers, or of the population as a whole, to show the effects of the low-level responses. If, indeed, there are biological effects produced by RF radiation levels, should there not be some incidence of disease more prevalent in those exposed to the radiation more of the time? To date, there have been no such studies. They would seem imperative if the question of whether non-ionizing radiation causes adverse effects is to be answered once and for all.

How much radiation is there?

All of the laboratory findings indicated above are virtually meaningless unless placed into the context of RF radiation levels actually encountered in the environment. It was to determine these levels that the EPA embarked on the radiation measurement program in fifteen major metropolitan areas across the U.S. (the program which supplied the New York City Health Department with its data). Under the direction of Richard Tell, the EPA took its measuring gear into 30 to 40 locations within each of the 15 areas. Using a spectrum analyzer in conjunction with a series of calibrated antennas, the field measurements were made in conjunction with a computer to take into account the proper polarization of the incident fields, properly put these fields together in terms of a resultant electrical field value, and thereby determine the RF exposure across all the broadcast bands.

Back in the lab, the field measurements were fed into a larger computer containing a propagation model, enabling the measurements to be plotted for the entire urban area. The computer then integrated a data base containing a census tract analysis showing the geographic distribution of population. In this way, an accurate picture was formed of the actual exposure of the population to RF frequency radiation.

The basic results surprised few. The median exposure level for all 15 cities turned out to be only .005 μW/cm². Furthermore, about 99 percent of the population is ex-

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posed to less than 1 $\mu W/cm^2$. In other words, only about one percent of the population of the U.S. is exposed to levels greater than 1 $\mu W/cm^2$. Again not surprisingly, the areas which turned out to have the greatest exposure proved to be office buildings in the main path of the antennas' beams or sites close to transmitters and at the bases of broadcast towers. The EPA also concluded, again not surprisingly, that of all the contributors to RF frequencies, the heaviest concentrations were in the broadcast spectrum. (Some, finding flaws in the EPA's methodologies, point out that no measurement was made of land mobile sources such as ENG microwave vans or police vehicles.)

One surprising fact did emerge from the EPA's studies. FM stations, though not generally allocated the highest ERPs, turn out to lead within the broadcast spectrum in contributing to ambient RF field intensities. Tell suggests two possible reasons. The first is that FM antennas are more often situated closer to the ground, either on their own short towers or fixed in lower positions on multiple-use masts. The second is related to the inherent design characteristics of some FM antennas, which cause a downward-projecting lobe in the wide vertical beam pattern to be magnified by the one wavelength spacing of successive antenna bays (a phenomenon referred to as "grating load").

While the EPA's main concern is the population as a whole, HEW's National Institute for Occupational Safety and Health (NIOSH) has conducted measurements in situations likely to be encountered by tower climbers and those working in close proximity to transmitters. Here, obviously, the findings are far higher than those measured by the EPA. In one location, according to Dr. Zory Glazer (now with the Food and Drug Administration's Bureau of Radiological Health), NIOSH workers surveyed a 300-foot tower to which one main FM antenna and some 14 additional paging, microwave, and other antennas were attached. As they climbed the tower, RF radiation levels rose sharply. At a platform 80 feet above the base, they measured 85 mW/cm^2. On the other hand, measurements made in the transmitter building adjacent to the mast revealed relatively low readings — around .5 mW/cm^2.

Where do we go from here?

To put all of these findings into perspective, it should be realized that the current American voluntary standard for occupational safety, as established by the American National Standards Institute (ANSI), is 10 mW/cm^2. Established many years ago, before the current wave of research on bioeffects, the standard is considered to have been set rather arbitrarily. Beyond this voluntary guideline figure, there is no national standard in the U.S. setting the upper limits of RF radiation for either the population as a whole or broadcast industry workers.

It has become obvious to all involved in biological research and field strength measurements, and to broadcasters themselves, that some government standard must be established soon. It is also apparent that the standard will be set lower than 10 mW/cm^2. The only questions that need to be answered are the validity of the claims that low-level RF fields can cause biological effects that are,

indeed, harmful, and how low the standard should be set. Plainly, the interests of neither broadcasters nor the public would be served by imposing a standard such as the Russian 1 $\mu W/cm^2$, which would obviously cause a major impact on current U.S. broadcast practices. But neither, it now appears, is the current 10 mW/cm^2 level adequate to protect workers and the public. Somewhere between the two lies a compromise.

A number of government agencies are currently involved in deliberating standards, with the EPA providing "federal guidance to these agencies with respect to limiting intense RF field exposure of the population as a whole." Broadcasters should take some consolation in the fact that, to the best of our knowledge, no agency is currently planning to take account of the low-level, non-thermal effects, and will be considering only those intense fields which can cause thermal, tissue-damaging effects.

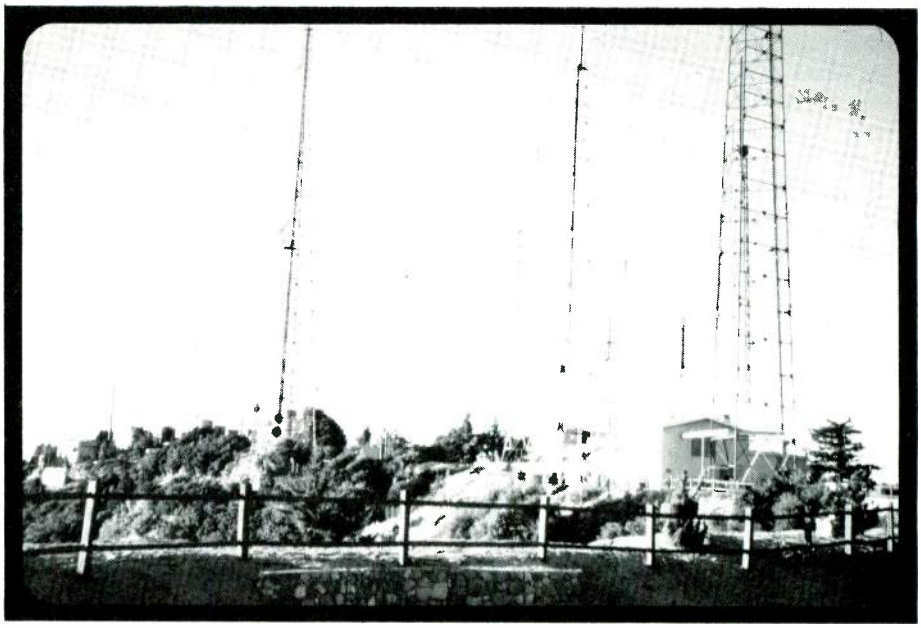
The first action we are likely to see is a reduction of the ANSI voluntary guidelines from 10 mW/cm^2 probably down to 1 mW/cm^2 in the most critical frequencies; the resonating frequency of an average person floating in space is 75 to 80 MHz (in the low VHF band), the frequency of the head about 450 MHz, and various internal organs slightly above that. The new ANSI guideline by itself is meaningless, however, since in many parts of the country workers climbing towers can be exposed to levels far above even the current voluntary guideline.

What may be more significant is that NIOSH has independently developed a draft criteria document which will recommend some major reduction in acceptable levels for occupational exposure. Some time later this year, when the draft is finally approved, it will be submitted to the Department of Labor's Occupational Safety and Health Administration (OSHA). OSHA will then assess both the ANSI and NIOSH recommendations to consider, for the first time, legislating acceptable levels for occupational workers.

The EPA, meanwhile, is working on setting levels for the general population. Tell's personal opinion is that the standard will not be higher than 1 mW/cm^2 and probably not lower than 100 $\mu W/cm^2$. "Frankly," says Tell, again speaking personally, "I can't see any real scientific justification for going less than 1 mW/cm^2 in the most critical frequency range, which would mostly affect the low VHF transmissions."

The FCC, too, has finally gotten involved. On June 14, 1979 the Commission posted a notice of inquiry to determine what its role should be in "fulfilling its regulatory responsibilities" to investigate the impact that new standards for RF radiation would have on the industry. In part the notice read: "While RF radiation health and safety standards are the responsibility of health and safety agencies, the inquiry will assist the Commission in determining whether it should take action under standards currently applied by health and safety agencies and provide documentation so that it can participate in rulemaking proceedings and ensure that any new standards take into account adequately the impact on FCC-regulated licensees and equipment, and on the public." Comments are due by December 15, 1979 and replies by March 15, 1980.

The action by the FCC, even though apparently representing its typical "wait and see" attitude, has been desired even by most broadcasters for some time now.



An "antenna farm" on Mt. Wilson, Calif., the same as shown in the photograph on p. 41. The area contains dozens of antennas, transmitters, and STLs, in addition to a U.S. Post Office and several residential houses

Though the Commission has had a Committee on the Biological Effects of Electromagnetic Radiation (consisting of representatives from each bureau and office within the FCC, chaired by the office of the chief engineer), this marks the first time that the Commission has formally recognized that there might be a problem and that broadcasters themselves must be represented as agencies such as EPA and OSHA deliberate radiation level standards. One thing that is fairly evident from the FCC's extremely guarded statements on the subject is that the Commission is not likely to set its own standards until the EPA and/or OSHA standards are set.

Its ultimate action is likely to be similar to its stance on the Environmental Policy Act. In its 1974 proceeding addressing the Act (which dealt primarily with aesthetic considerations) it stated that applicants for earth stations would be required to take necessary measurements of RF radiation levels, identify areas in which radiation hazards might exist, and take remedial action such as posting signs and fencing off dangerous areas. The standard back then was the 10 mW/cm^2 ANSI guideline. New standards will probably produce equivalent FCC actions for not only earth stations, but all transmitting equipment.

High on the list of those who will probably respond to the FCC notice of inquiry is the NAB, whose Engineering Advisory Group has, for over two years, been working on a document that will explain the problem "in layman's terms" to broadcasters.

Neil Smith (Smith and Powstenko, Washington, D.C.), consultant to the group, explains that the NAB's position in the paper will be that "radiation, in the frequencies we deal with, can clearly be hazardous." Says Smith, "It is a matter of balance, however. In the same way that sunlight can be hazardous if we have too much of it, but we would be lost without it, we have to balance the good against the bad.

"My position, which I think is the position of all who use the spectrum, is that the 10 mW/cm^2 standard is clearly adequate for the biological protection of human beings based on any real data that anybody has ever come up with. If you take conjectures and unproven assertions then the standard becomes questionable. And there are enough of those assertions that it seems we should investigate further. But the fact of the matter is that I don't think anyone has ever shown any person to have ever been bothered in any permanent way, or even in any long-term temporary way, from radiation at or below the 10 mW/cm^2 standard."

The question, for all involved in the controversy, comes down to just this: weighing the good against the bad. It is clear that the broadcast signal must be disseminated; it is also clear that, at some level, whether 1 μW, 1 mW, or 10 mW/cm^2 or higher, such radiation has an adverse effect on humans. It is in no one's public interest, convenience, or necessity to ban broadcasting, even in the light of new scientific discoveries that subtle biological changes can be induced by even small amounts of RF radiation; but neither can broadcasting proceed as if RF radiation were a completely inert substance.

Despite the NAB's position that 10 mW/cm^2 is perfectly safe, it now appears that a figure close to 1 mW/cm^2 will become the new standard — perhaps as early as the middle of next year. It will, inevitably, cause some changes to be made, including some new safety standards for those who must climb broadcast towers. It should be remembered, however, that even today over 99 percent of the American population is exposed to less than 1 μW/cm^2, the Russian standard which is the tightest in the world. Likely to be affected are only those whose towers are already close enough to the ground to be above the current 10 mW/cm^2 voluntary guideline.

Nor is it likely, if reason prevails and the standard is set closer to 1 mW rather than 1 μW/cm^2, that broadcasters will have to reduce their power. On broadcast towers it may mean evolving a plan whereby a climber does not have to enter the beam of a transmitting antenna. In high RF radiation areas now accessible to the public, it may mean additional "off limits" signs. In a few cases, it may be necessary to raise tower heights. All in all, however, broadcasters may rest assured that, despite misgivings about government agencies and an alarmist public, broadcasting will not likely be harmed. **BM/E**

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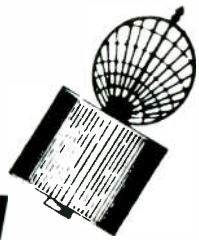

Stations around the country are becoming sources as well as recipients of "networked programs." The latest electronics for production and communication have made it possible; aggressive management has made it happen.

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Unlike the cable TV industry, which now operates more than 1400 earth stations, the commercial television broadcast industry still operates only about a dozen receive-only earth stations. The "overnight" surge of cable TV into the satellite era was largely spurred on by the presence of pay TV services such as HBO and Viacom's Showtime, which distributed their play-for-pay movies via satellite. This attractive new service caused cable operators operating in an otherwise sluggish market to quickly make the commitment to satellites.

In the broadcast industry, however, the dozen or so earth stations operated by commercial television broadcasters are mostly in the backyards of independent stations who use the ITNA newsfeed. On the other hand, both radio and the PBS systems have moved to satellite much more quickly than their commercial television brethren. The PBS network operates a number of earth stations at its local outlets and is far advanced with its DATE digital audio transmission scheme. In radio, the motive has been provided largely by Mutual Broadcasting System's commitment to satellites for distribution of its network programming. The use of satellites in radio is also encouraged by the plans of AP and UPI wire services looking for a way out of the AT&T system and by the superior audio quality of satellites, which routinely offer two 15 kHz audio channels for the distribution of stereo music. Probably the largest radio system to move to satellite for its audio quality will be NPR (National Public Radio).

This situation, however, is extremely fluid. The recently announced RCA Americom-Viacom-Post Newsweek Stations satellite distribution experiment could change the commercial television picture significantly. The RCA system, known as SMARTS (see *BM/E* April, 1979), proposes to provide a satellite earth station to any commercial television broadcaster requesting it at no charge. According to an RCA Americom spokesman, RCA has already received letters of intent from nearly two hundred television stations.

Satellites and the local television market

What does all this satellite activity mean to the local television station, its management, and its engineers? From the receiving end, it means that stations will have a wider variety of ways to program their stations and a more efficient means for doing so. The two leading satellite distribution companies, Hughes Television Network and the Robert Wold Company, already book thousands of hours annually on the satellites for the distribution of television programs.

This programming consists largely of point-to-point transmissions of sporting events and ad hoc networks of regional or national scope. In the first case, both Wold and Hughes routinely arrange to interconnect the local broadcaster via a combination of land lines and satellite channels to the away games of their local teams. This type of setup is nothing new, but rather a simple alternative to a long-standing practice. In fact, the presence of the satellite might be completely transparent to the broadcaster since the only thing he'd need do is provide a local loop to the TOC.

Ad hoc networks, on the other hand, are providing a new dimension to local stations and perhaps the most exciting aspect of this new dimension is the role of the local station as the network's source.

Though still not widely practiced, networking has become a genuine option for the local broadcaster. As George Back, chief executive of Hughes Television Network, put it, "I don't know the size of this market at this time, but I assure you that local events extrapolated to regional networks is a capability at this moment." According to Back, broadcasters ought to realize that they are the largest producers of television programming and many of the programs they produce for the local market could and should be considered for networking.

There are a large number of examples of local stations discovering and developing the wider market potential of essentially local programs. In fact, WIBW of Topeka, Kans. has annually networked the All American Futurity horserace from New Mexico using its own production

structure under the name of the All American Network. This race, billed as the "world's richest horserace," annually reaches 80 to 90 percent of the national markets.

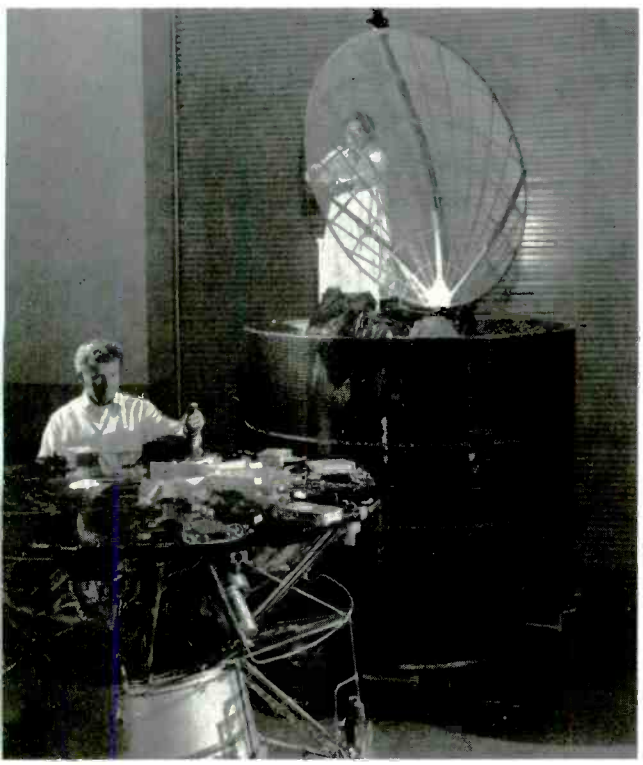
The new efforts are typified by cases such as the recent KRON-TV special, "In Celebration of Tutankhamun" (see *BM/E*, July, 1979, "KRON, Cairo Link Up For International Farewell to King Tut") and the KATU, Portland, production of "The Portland Rose Festival Grand Floral Parade." (For details on how these programs were produced see, "Television's Live Remote," page 68.)

From the networking standpoint, however, the KRON and KATU examples reveal some significant things about why and how television stations can and should network. In both cases, events of significant local importance were provided to the producing stations' cities of license. In both instances, the notion of being "live" was significant in creating the air of timeliness and excitement that go towards the success of any television program. In the case of KATU's "Grand Floral Parade," there wasn't really a choice involved in the decision to go live — a prerecorded parade simply hasn't much appeal. In the case of KRON's King Tut special, the decision to go live, especially with a live feed from Cairo, was a courageous and ingenious decision. The results? At KATU, a 47 share locally during the first half-hour and a network of some 43 stations; at KRON, a 41 share for its 90-minute special and a network of 17 stations taking a live feed with 30 or more stations taking the show on a syndicated basis.

Wayne Baruch, vice president of programming and station sales for the Robert Wold Company, which handled the interconnection of the domestic network, said of the KRON effort: "I'm sorry that KRON did not turn to the Wold Company or some other distribution company for assistance in distributing that program. Although they did a fine job of inserting it into 30 some-odd markets around the country, my opinion is that it should have played on 150 stations!"

Baruch, who termed the KRON special "a handsome production . . . equal to anything the networks could have done," was stressing the point that companies like his can offer significant assistance to local stations exploring this new area of network activity. Most broadcasters are familiar with much of what the Robert Wold Company and Hughes Television Network do. Mostly, this familiarity comes from the numerous ad hoc or "occasional" networks that both companies participate in. Both Wold and HTN operate at several levels of the television business. They handle arrangements with national and regional common carriers for the interconnection of networked stations, often produce their own programs, and often produce for other entities such as Honda in the recent Honda Civic LGPA Golf Tournament done by Wold and an upcoming rodeo being produced by Hughes for the Blair Agency in St. Louis. Both companies can produce the program, sell time, clear stations, interconnect the network, distribute the program, or perform any combination of these functions.

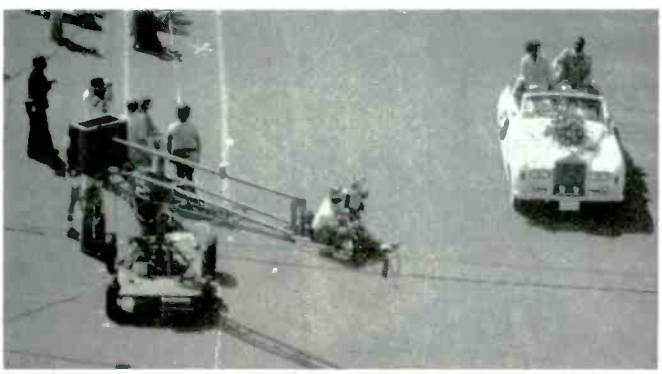
Moreover, there are several ways to clear stations. Perhaps the easiest way for HTN and Wold to clear is through the straight cash buy, in which the selected station is compensated for carrying the program. Many of the ad hoc network programs that clear an 80 or 90-plus percentage of the markets are of this cash-buy type. But even with



Elements in the KATU network: One of Western Union's Westar satellites is assembled. Another is scheduled to be launched this year while RCA plans to launch one and possibly two more Satcoms by 1980

Robert Wold of the Wold Co., which helped establish the KATU network

KATU put on a "network"-quality production using the latest technology, much of it housed in this van



Outside equipment was acquired where needed, such as this custom-built crane supplied by Video Productions

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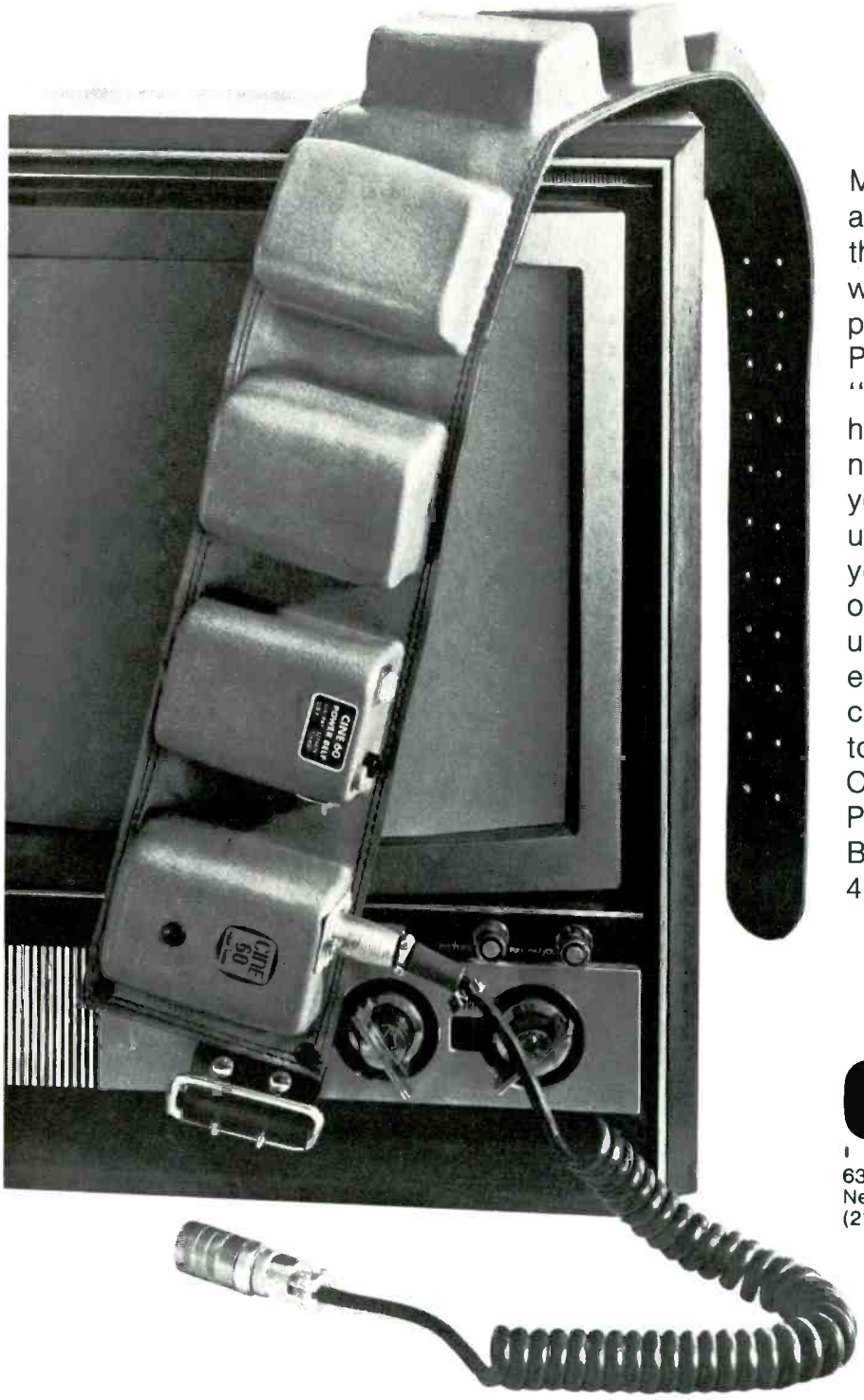

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a straight cash buy there are problems associated with obtaining the schedule preferred by the client in the markets desired. Schedule conflicts, either because of network programming offered at the same day and time or a belief on the part of the local program director that the proffered program would do injury to the station's normal program mix, often present obstacles to HTN's and Wold's efforts to put an ad hoc network together.

Aside from the marketing complexities, there are also technical complexities. Given the preferred schedule and the weight of traffic at the times desired, some markets may be difficult to gain access to through normal common carrier channels. At times like this it is men like John Tagliaferro at HTN and Bob Patterson at Wold who are knowledgeable enough where common carriers are concerned to predict difficulties in networking by looking at the station lineup and to solve problems or offer alternatives by working with the common carriers.

In short, given the complexities of marketing a product with options like cash buys, barter, and straight station sales, and the difficulties of wending one's way through the Hydra-headed monster of common carrier systems, companies like Wold and HTN play a vital role in establishing ad hoc networks.

Where local stations are concerned, neither of the two companies report a heavy business as yet in setting up station-originated networks, through both report the practice is on the increase. It is no surprise that both companies are happy to encourage this trend, but despite the obvious pecuniary benefits they would derive from increased networking, both stand ready to offer a wide range of services and considerable assistance to stations trying to break into the "larger-than-local" market.

The reasons why a local station might wish to network are numerous (see Wayne Baruch's Speak Out in this issue, page 95). In brief, the station may see an opportunity to defray some of the production costs by spreading them over the budget of more than just its own station. There is also the opportunity to increase the prominence of the station in the eyes of the national advertiser as well as polish the image of the station for its local audience. Add to these things the morale boost that a successful networking operation provides to everyone associated with the station and you get a pretty heady cup to sip from.

What goes into networking

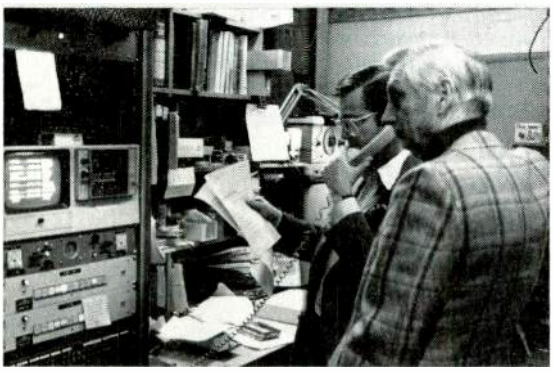
Obviously, the first thing required for a station to get into networking is a show. Live events are often naturals for networking since one measure of their attractiveness to other markets is their ability to draw large numbers of people from great distances in the first place. In the case of the Portland Rose Festival Grand Floral Parade, floats were entered from all over the country. Moreover, the week-long festival draws people from all over the northwest and western states. In the case of the KRON King Tut special, the exhibit already had a reputation for audience appeal through its much-publicized and widely attended tour throughout the U.S.

This is not to say that only live events are candidates for networking. KTLA's "Scared Straight" and the Capital Cities family specials and documentary series are examples of remarkable achievements in networking by local stations and notable exceptions to the "live event" guideline. The reason for looking at live events as targets for networking is that local station resources are probably better suited to the production of network-quality live events than they are to the creation of network-quality dramatic or comedic programs. The production of live events is a largely technological feat and local stations routinely produce live programs such as news and often sports using the full pantheon of cameras, switchers, special effects, and microwave links.

Producing live events is not without its pitfalls, however, so just as important as the events' attractiveness is the planning that goes into it. According to Chuck Gingold, director of programming for KATU and current president of the National Association of Television Program Executives (NATPE), "[Networking] tends to push you. When you know a product is being produced by a Portland affiliate, that we are originating it, you're out there to strut your stuff." Gingold feels that the knowledge that they were networking the program caused the station to go "about another third above what we thought our capacity was."

KATU assigned producer Terry Demming to the parade a full two months prior to its June 9 air date. Demming and production manager Bob Kalstad worked closely during the following weeks with Roy Cooper, KATU's technical operations manager and engineering supervisor for the parade.

Another Satellite First—Spot By Satellite

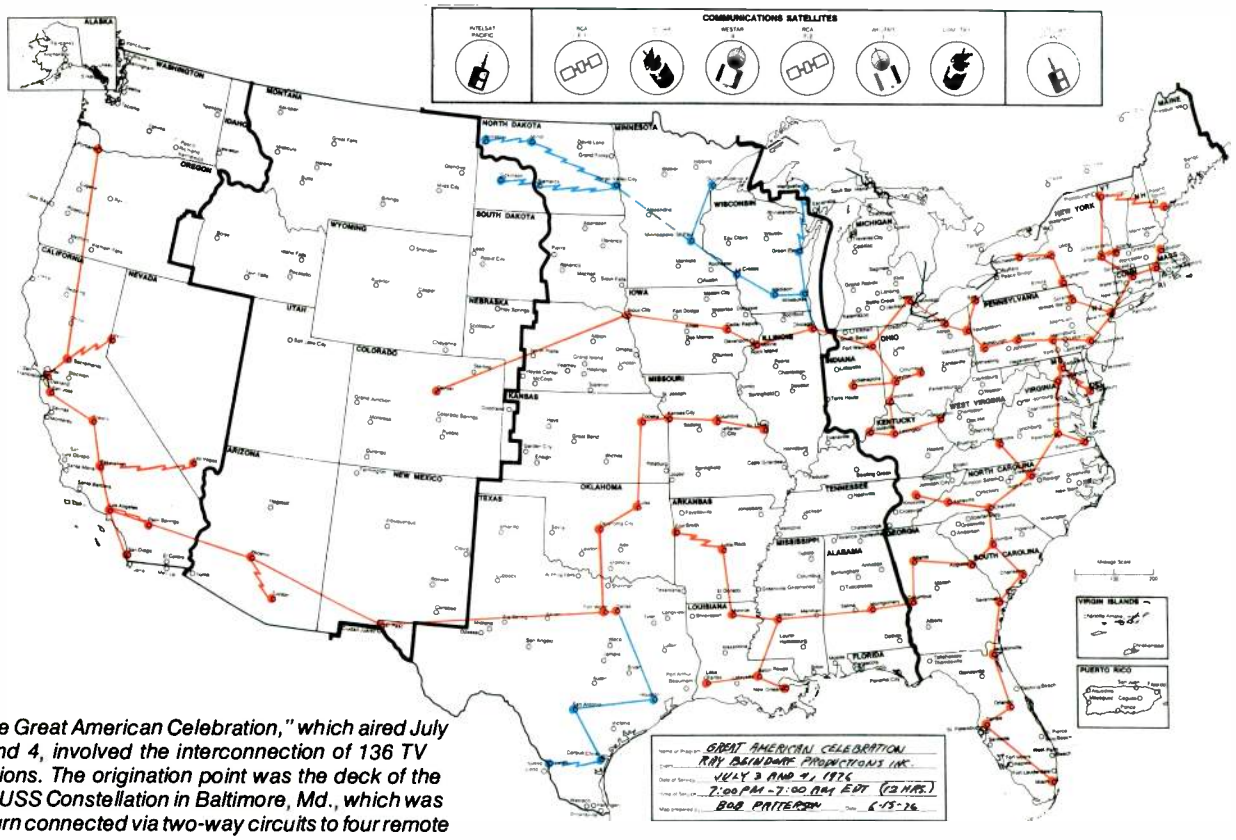


Bob Wormington (foreground) and Gary Press watch transmission of first spots by satellite

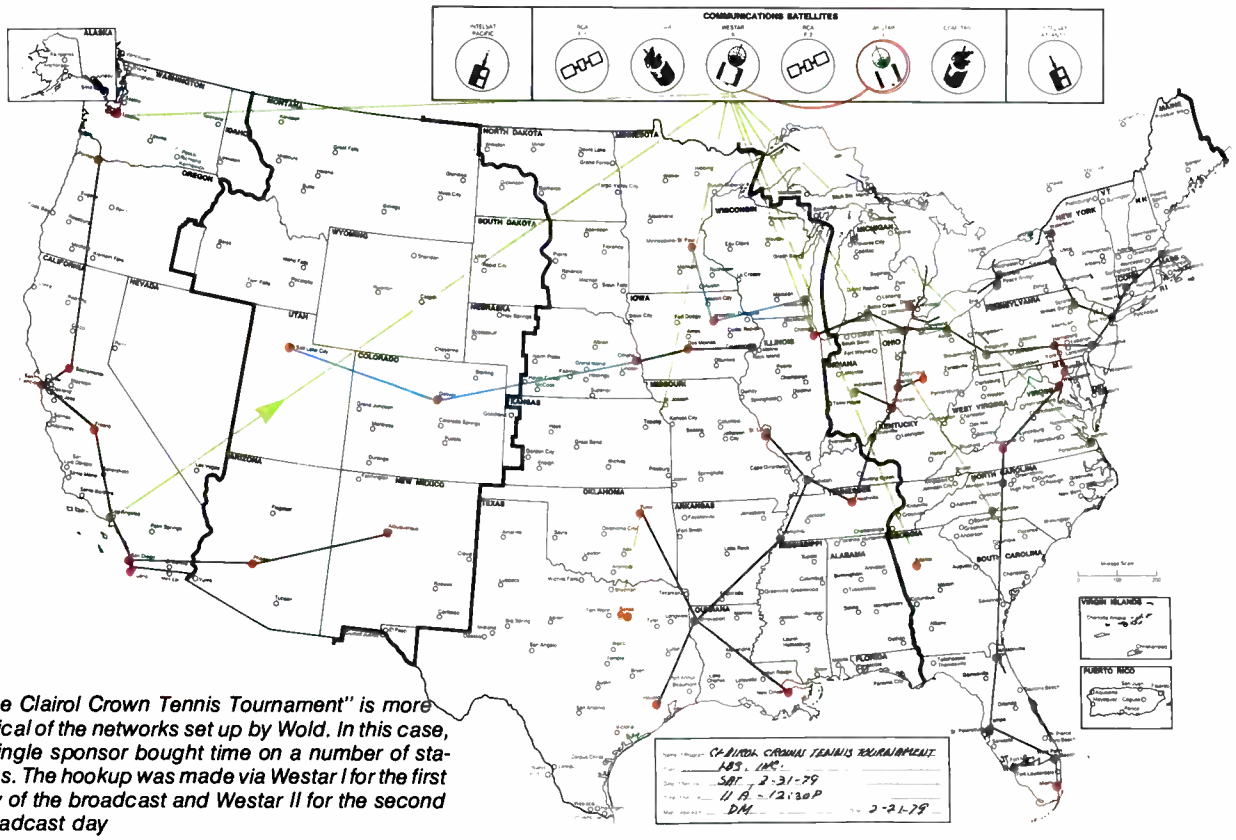
In the wee hours of the morning of March 18, Bob Wormington, president and general manager of station KBMA-TV, Kansas City, Mo., and Gary Press of the Ogilvy and Mather ad agency met in the KBMA-TV control room to witness what may prove to be a revolutionary event—the first transmission of TV commercials via satellite to a TV station. The project was initiated by Blair TV on an experimental basis and may well become the accepted method of TV commercial distribution in the near future. Hughes Television Network arranged the interconnection over Westar. According to John Tagliaferro of HTN, this three-week experiment was part of the second phase of satellite use. In the first phase, the satellite was used strictly as an alternative to land lines. In the second phase, satellites are being used for the distribution of all types of program material, including commercials and syndicated programs (SMARTS). The third phase, said Tagliaferro, will see programs developed in ways that only the existence of satellites can make possible. Cable TV has already entered this phase with pay TV. Some think that local broadcasters may be the source of the critical third phase for commercial television—a new form of program.

Live! From Your Station

An initial scouting of the parade route developed the camera positions that would be needed. Cooper began to assemble the necessary technical inventory. When KATU's own technical resources had to be augmented, Cooper acquired a mobile unit from Video Productions of Portland with its three LDK-25 cameras and turned to



"The Great American Celebration," which aired July 3 and 4, involved the interconnection of 136 TV stations. The origination point was the deck of the old USS Constellation in Baltimore, Md., which was in turn connected via two-way circuits to four remote sites



"The Clairol Crown Tennis Tournament" is more typical of the networks set up by Wold. In this case, a single sponsor bought time on a number of stations. The hookup was made via Westar I for the first day of the broadcast and Westar II for the second broadcast day

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KATU's sister station, KOMO, Seattle, for additional equipment. By the day of the parade the complement of equipment included two RCA TK-44s, the three LDK-25s, a TK-76 mounted on a Cinema Products Steadicam, and a Bosch Fernseh camera. Hovering above the parade route was the Goodyear Blimp, which provided overhead shots.

Two days prior to the parade the technical crew went through an elaborate blocking procedure using trucks to roll along the parade route as stand-ins for the floats. According to Cooper, the fact that they were to be feeding a network provided no real additional pressure on the technical crew except in so far as "we were going for a quality production and wanted everything to go first cabin with redundancy built in."

While the technical aspects of the production were being worked out, Chuck Gingold and station manager Skip Hinman worked out the network plan with Wayne Baruch of the Robert Wold Company. As soon as KATU got the rights to network the parade they contacted Baruch. Hinman had prepared a probable station lineup. After conferring with Gingold and Baruch in Los Angeles, the decision was made to go for a larger network than previously envisioned.

The Grand Floral Parade had been networked before, but this was the first attempt to clear nearly all of California and points as far east as Denver. The program was sponsored by Georgia Pacific, K-Mart, and Safeway so that it was offered to stations on a cash basis.

Baruch and the Wold staff quickly began the station clearance process. Occasionally, Hinman and Gingold would be asked to contact a "friend" at a local station in some distant market to add a little more convincing to clearance effort.

Another aspect of dealing with companies like Wold and HTN is their promotional efforts on the behalf of the program. In the KATU case, the station did the promotion and bicycled it to the desired stations. Normally, however, Wold would prefer to have more lead time in order to prepare brochures on the program and possibly a promotional tape.

By the day of the parade, June 9, an elaborate scripting plan had been developed to cover any eventuality. Pretaped material had been prepared to cover any extraordinary gaps in the parade and a course of action had been

KTXL-TV's Earth Station Reaps A Programming Bonanza

KTXL's earth station provides a new dimension to program sources

When Jack Matranga, president and general manager of station KTXL-TV, the highly sucessful UHF independent in Sacramento, Calif., decided to build an earth station over a year ago, he did it for the express purpose of bringing in the satellite-distributed ITNA news feed from Washington, D.C. Since his earth station has been in place, however, Matranga has enjoyed a veritable bonanza of additional programming available via the satellite. "I didn't realize it at the time," said Matranga, "but the amount of television programming being put up on the satellite from a variety of sources has given us a far higher diversity of programming than we thought existed."

Some of the surprises included a special presentation of the Royal Ballet, from London; the thirteenth annual Music City News Country Awards; a Mormon conference; Pac-Ten basketball games; the East-West all-star games; most of the football bowl games; and the Blair Report, which transmitted commercials via TV for the first time.

"Some of the programs were completely unexpected," Matranga stated, "but they were welcome additions to our programming plans. With more and more program suppliers looking toward the use of satellite transmission because of its relative inexpensiveness, we anticipate a growing number of quality TV programs to be emanating from the bird over the next year or so."

Jack Matranga thinks it will only be a short time before most of the independent TV stations get on the earth station bandwagon. "The growing abundance of top-notch programming material being distributed by satellite is going to provide independent TV stations with a stronger programming lineup than they've ever had before — and it's strong programming such as sports, the ballet, religious and other quality programming which will increase the competitiveness of independent TV stations in the battle for viewers in their markets."

Matranga says the addition of the ITNA news feed is well worth the price of admission for most independent TV stations — the cost of an earth station—and that the other programming that becomes available is "the frosting on the cake."

KOMO-TV's Ruth Walsh Covers Bundy Murder Trial By Satellite

The flexibility, convenience, and immediacy of satellite coverage for news events was demonstrated dramatically even as this issue of *BM/E* was going to press.

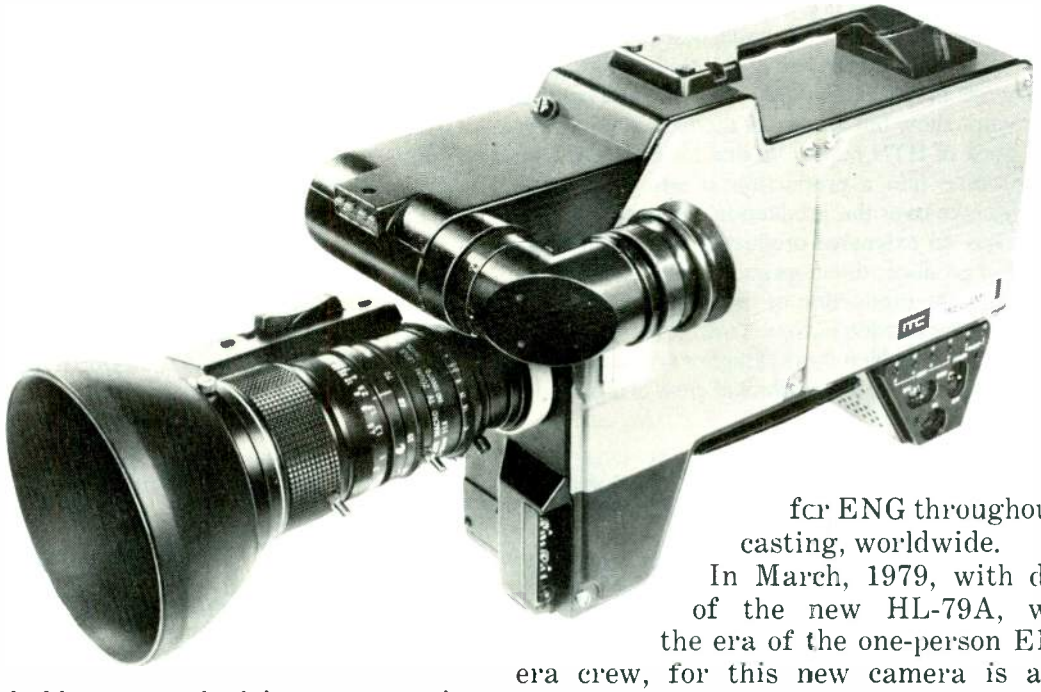
Ruth Walsh, anchor-reporter for KOMO-TV News 4, Seattle, Wash. and cinematographer Rich Crew were assigned to Miami to cover the murder trial of former Seattle resident Ted Bundy and to provide same-day satellite coverage for KOMO-TV's Seattle audience by Jim Harriott, executive news director for KOMO-TV.

Bundy charged with first degree murder, was scheduled to go on trial June 25. Charges stemmed from the murder of two Chi Omega sorority sisters in Tallahassee January 15, 1978. He has also been indicted in the murder of Lake City, Fla. schoolgirl Kimberly Leach, with trial scheduled for September in that city.

Walsh has been deeply involved in the Bundy story since she joined KOMO-TV in 1974. She scooped the nation with an exclusive interview with Bundy last August, the first interview he gave out to TV news people, when he called Walsh from his cell in Leon County jail. She has toured Aspen, Salt Lake City, and Denver locales to compile a five-part series on the story, shown as backgrounders accompanying her daily satellite reports from Miami. During those trips she interviewed Bundy's friends and relatives and received a great deal of help from people close to the alleged murderer.

Walsh filed daily satellite reports during the trial, and the six-minute backgrounder series on Bundy was shown during the first full week of the murder trial for the benefit of KOMO-TV's Seattle audience.

Ikegami inaugurates the era of one-person ENG camera crews.



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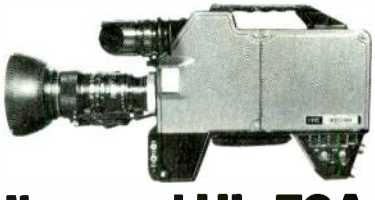

Ikegami HL-79A

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planned in case of minor trouble. To fill time during a breakdown of one of the floats, KATU had stationed its news van and camera along the parade route to do interviews with spectators and parade participants. There was one nine-minute breakdown in which this technique was resorted to, and in combination with a reshuffling of commercial breaks, the gap was successfully covered.

To keep participating stations fully apprised of commercial timings and cues, KATU had sent extensive information via TWX. As a result, when the breakdown did occur, the receiving stations knew exactly what had taken place and never missed a beat.

Can any station do it?

Assuming that a station has the show, the likelihood that it can be networked is pretty good. One of the principal decisions that has to be made is how much of its resources the station wishes to pour into it. Some station managements may feel that they have an ideal candidate for a network show but are shy of the resources required. George Back of HTN points out that his company stands ready to come into a production at any point and, if necessary, take over the production. Hughes Television Network has an extensive production arm including its own staff of producer/directors and engineers. HTN regularly handles the production of programs coming out of Madison Square Garden in New York. If the location of a show is distant from New York, Hughes will utilize a local production company for its technical crew and provide its own executive producer and possibly director.

The same setup is essentially true of the Robert Wold Company, though in every case where Wold does the production the technical crew is specially assembled. In some cases the local station's involvement can be limited to obtaining the rights and then turning over all responsibilities to Wold or Hughes.

Normally, however, HTN or Wold would prefer that the station come to them with its financing in place. Neither company is particularly anxious to go about obtaining sponsorship for the program in question. Both companies, however, will offer extensive consulting services in production and marketing. As Baruch put it: "One of the most valuable services we offer is one that we don't charge for." The Wold organization will consult with the station on how to "generalize the production" for wider audiences, research the viability of the concept in other markets, and come back to the station with a fairly comprehensive report upon which a go/no go decision can be made. Similar services are available from HTN.

The decision by a local station to network opens up a bright new future for local broadcasters. As receiving stations, the local licensee has a wider selection of program sources to choose from and his reliance on the networks for programming is reduced — a major desire of FCC Chairman Ferris. As an originator, the local broadcaster gives his station's staff a new challenge, his station a new image, and his industry a new way of facing the future. As Joel Chaseman, president of Post Newsweek Stations, said in a recent speech: "Where technology and the marketplace join, all sorts of futures become possible." **BM/E**

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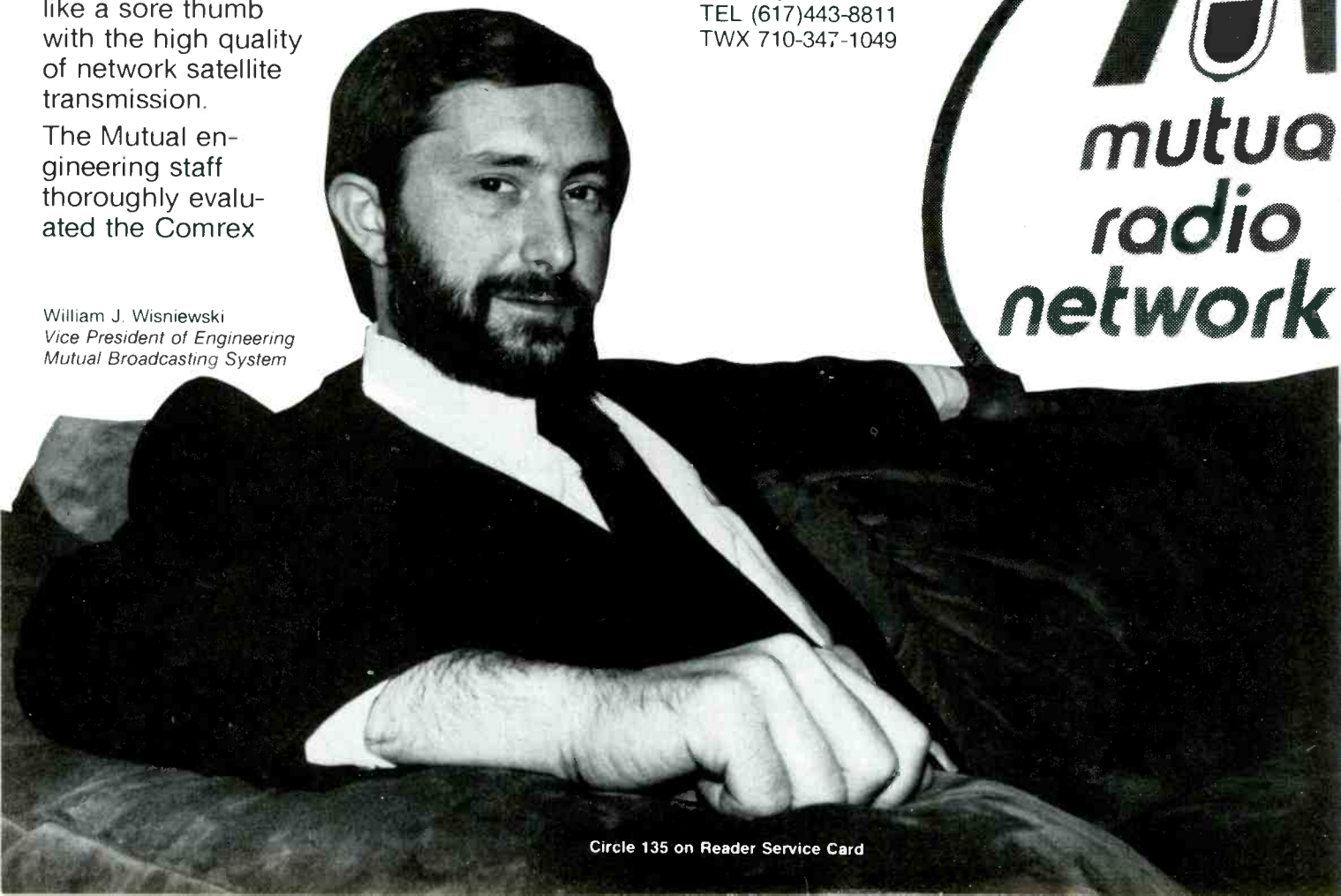

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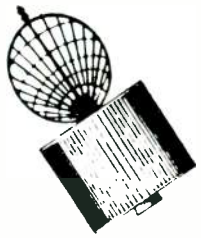
NEW LIVE POWER FOR RADIO GIVES PROGRAMMING AN UPLIFT



Satellites, microwaves, and new ways of using telephone lines are enlarging the capacity of radio to get material on the air live from pickups around the country. Stations taking advantage of this increasing "live power" are giving their programming excitement that wasn't there before.

WHEN ALL-TALK STATION WITS in Boston wanted to give their Red Sox-hungry listeners an early start on the baseball season (season games are fixtures of WITS programming), the management asked the R.E. Wold Company if the station could get a dedicated two-way satellite circuit to Winter Haven, Fla., the Red Sox camp site.

Wold set up a circuit which went by land line to Atlanta, up to Westar, down to New York, and by land line to Boston. WITS moved to Florida a cadre of the engineering staff plus some regulars from the daily talk shows, and set up a temporary studio in a motel near the Red Sox camp. There, for several weeks, the major part of the WITS programming originated in Florida — it went far beyond coverage of the Red Sox training experience.

The Red Sox coverage included on-the-spot interviews with players, coaches, and managers as well as accounts of practice games. The whole away-from-home operation was immensely popular with WITS listeners.

Most commercials were aired in Boston and the down circuit acted as the essential cue line, among other functions. Chief engineeer George Watson told *BM/E* that everything worked beautifully. The hookup cost considerably less than dedicated land lines with the same capacity. WITS greatly expanded its "you are there" coverage, injected some freshness and novelty into the programming.

Las Vegas by wire

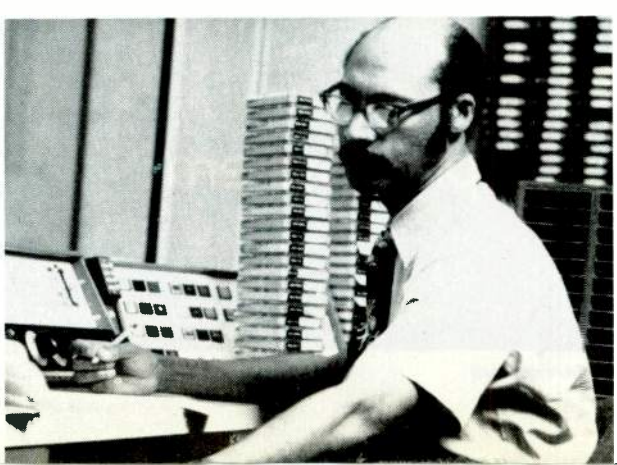
In a series of remotes sponsored by a travel agency, WPRO in Providence showed another way new technology is giving "live" new attraction. The agency programs were built around a travelog consisting of on-the-air visits to the places being promoted for the tours.

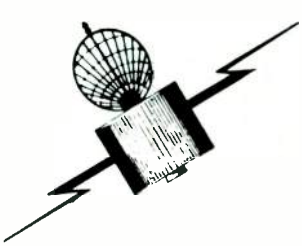
For a convincing "trip" to Las Vegas, WPRO sent a crew there with a Comrex low-frequency extender connected into an ordinary dial-up telco connection (which cost straight long-distance rate) to the Providence studio. At the studio end of the line was the Comrex decoder. The narrator of the visit was put on the air over this circuit with a freshness and immediacy that added greatly to the force of the program.

These are just two cases of a spiral in radio development, an upward circle carrying radio at least part way back toward the pre-tape pattern when radio was basically live morning, noon and night. But "back" has the wrong context; as these examples and others to come show, radio is moving ahead on a wave of new technology to a new kind of "live" that easily embraces a city, a state, the whole country, the overseas.

The differences between this new live and the live that has been going on for a long time are mainly two: today live is technically and economically feasible for almost any remote or *combination of remote pickups* that a station management believes would be attractive to listeners; second, live becomes central and easy for *distribution* of programming to networks of stations, including any ad hoc network set up for specific events.

As other articles in this issue point out in describing the swing to live television, the major technical spur to the back-to-live spiral is the explosive spread of satellite distribution, with its economy, flexibility, and high technical quality. As the experience of WPRO shows, there are also other advances that are making live easier and cheaper.





Arthur Godfrey (right) sits in CBS headquarters, New York, acting as host on music program at KMOX in St. Louis (left), with two-way satellite circuit putting him, in effect, in the KMOX studio

Live Power For Radio

But the means to do it would not be enough without the motivation, and that is coming on strong in the reactions of radio audiences. Live is popular with listeners, and is therefore popular with radio managements in competitive markets.

Take the case of KMOX-AM, the CBS O&O in St. Louis. The program mix of news, information, sports, and entertainment includes over 300 play-by-play sports pickups during the year, a large number of call-in programs with experts answering questions on a variety of topics; music shows with top show personalities as hosts; and a periodic "town hall meeting" originated from different sites in the city, with the Mayor or other top official to answer questions both from citizens assembled at the pickup and from callers by phone.

Edwin Karl, technical director, gave *BM/E* some instructive examples. Recently the host and commentator for a KMOX-AM music show was the original Mr. DJ himself, Arthur Godfrey, who sat at a microphone in New York at the end of a two-way satellite and land line circuit. He got his cues on the St. Louis-to-New York circuit, injected typical Godfreyisms at the appropriate points, heard the music as it went on the air from the turntables in St. Louis, and had his say about it, all with the expected fresh and entertaining result.

Of course, this kind of thing has been done occasionally for years, but in earlier periods it had more the character of a stunt. Today the available equipment makes such assembled remotes easier, cheaper, and higher in technical quality, so that radio programmers can put them on as frequently as seems worthwhile. The satellites make long interconnection circuits economical. Improved means for coupling into remote lines are helping too. (A batch of new hardware of this kind for radio appeared at the Dallas NAB show — see May Show-in-Print issue).

KMOX uses the news gathering facilities of CBS in Washington to help put on another kind of live show: a call-in for St. Louis residents with public personalities in Washington answering questions just as though they were in the KMOX studios. Again, the satellites and new kinds of hardware are making the show practical and effective, with calls to the station's St. Louis number automatically routed to the talk-show site in Washington.

KMOX is part of the back-to-live spiral in another important way: radio networks which take the KMOX sports pickups throughout the Southwest are being expanded with the aid of satellite circuits. Some really spectacular enlargements of the quantity of live radio programming are coming with the major radio satellite networks now in the making, both commercial and noncommercial.

KGO, the ABC O&O in San Francisco, also has an all-talk format, with heavy emphasis on interview programs involving newsworthy and expert persons who answer questions from listeners. KGO has been heavily involved in ENG around the city for a number of years, with 450 MHz radio getting live material back to the studio.

To get a live question-and-answer program to San Francisco from Washington, say, KGO has recently begun to use satellite circuits. The satellites carry the

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A Tradition On The Move!

Live Power For Radio

telephone calls directly to the host; the interviewee's answers are brought back over the same route. Recently a program of this kind with Owen Spahn in Washington generated very strong listener response. Popularity of the scheme, according to Robert Leverage, chief engineer, is encouraging KGO to plan more "live remotes" like the Washington one. Satellites will be used when the distance to the other city makes them attractive.

As the accompanying box describes, one problem that may come up with such satellite circuits is accommodating the delay in the signal making the satellite trip. Various ways this problem appears, and some solutions, are covered in the box.

The Mutual Broadcasting System, as noted often in earlier issues, is pushing toward its vast network of some 600 or more satellite-served stations. The programming projected will include much beyond Mutual's long established staple of live sports: live concerts and live "events" of every kind will help fill the multiple channels that Mutual affiliates will have. Interestingly, Mutual spokespersons at recent meetings have said that the Mutual network will be open for use on a spot basis by other program producers, who will be welcome to negotiate with Mutual for single-program or series coverage to any selected group of stations or area that is wanted.

Another kind of "networking" which we must include under "radio," at least provisionally, is the first radio "superstation," WFMT in Chicago, an operation now getting underway as described in the news column of this magazine last month. United Video, a Tulsa, Oklahoma

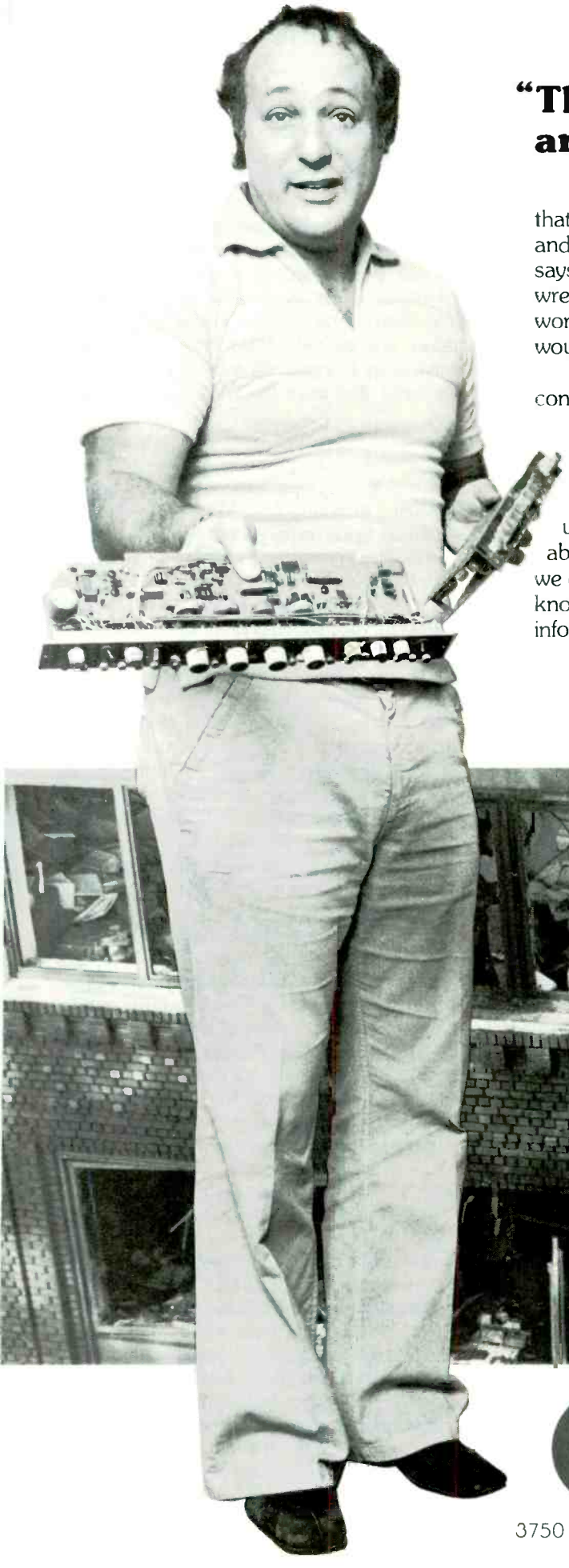
Up To The Satellite And Back Takes A Little Time

A minor problem that develops in some radio satellite circuits is the delay caused by the time it takes the signal to go up to the satellite and back. This delay may cause trouble if, for example, a part of the material comes by a shorter route, or if talent at one end of the circuit depends on listening to the other end for cues. Radio engineers will readily think of other situations in which the delay, which may be somewhere between three-fourths of a second to a second or more, must be taken into account in one way or another.

Several of the satellite remotes described in the accompanying article had the problem, and they handled it in different ways. Ed Karl at KMOX says that the on-air talent on his remotes learned to allow for the three-quarter-second delay in their timing of responses, etc., so that no other special adjustment was needed. George Watson of WITS, on his remotes from the Red Sox training camp in Florida, had about 1½ seconds of delay to handle, and therefore did not use any "foldback" to the on-air talent — they did not have the disruptive experience of hearing themselves repeated at such a long interval.

On the KGO interview shows which were brought in from Washington, chief engineer Robert Leverage says that the host on the show had to be keyed out of the return circuit when he was speaking, again to avoid a delayed repeat. But here the problem was a little more difficult because most of the call-in program naturally had to be forwarded via the satellites to the Washington pickup point.

These examples show the kind of usually simple precautions needed to avoid delay trouble on satellite circuits for radio broadcasters. There will be many cases in which the delay causes no problem of any kind: radio engineers can easily anticipate the troublesome situations.



"These Auditronics 501 modules are all that survived the fire...

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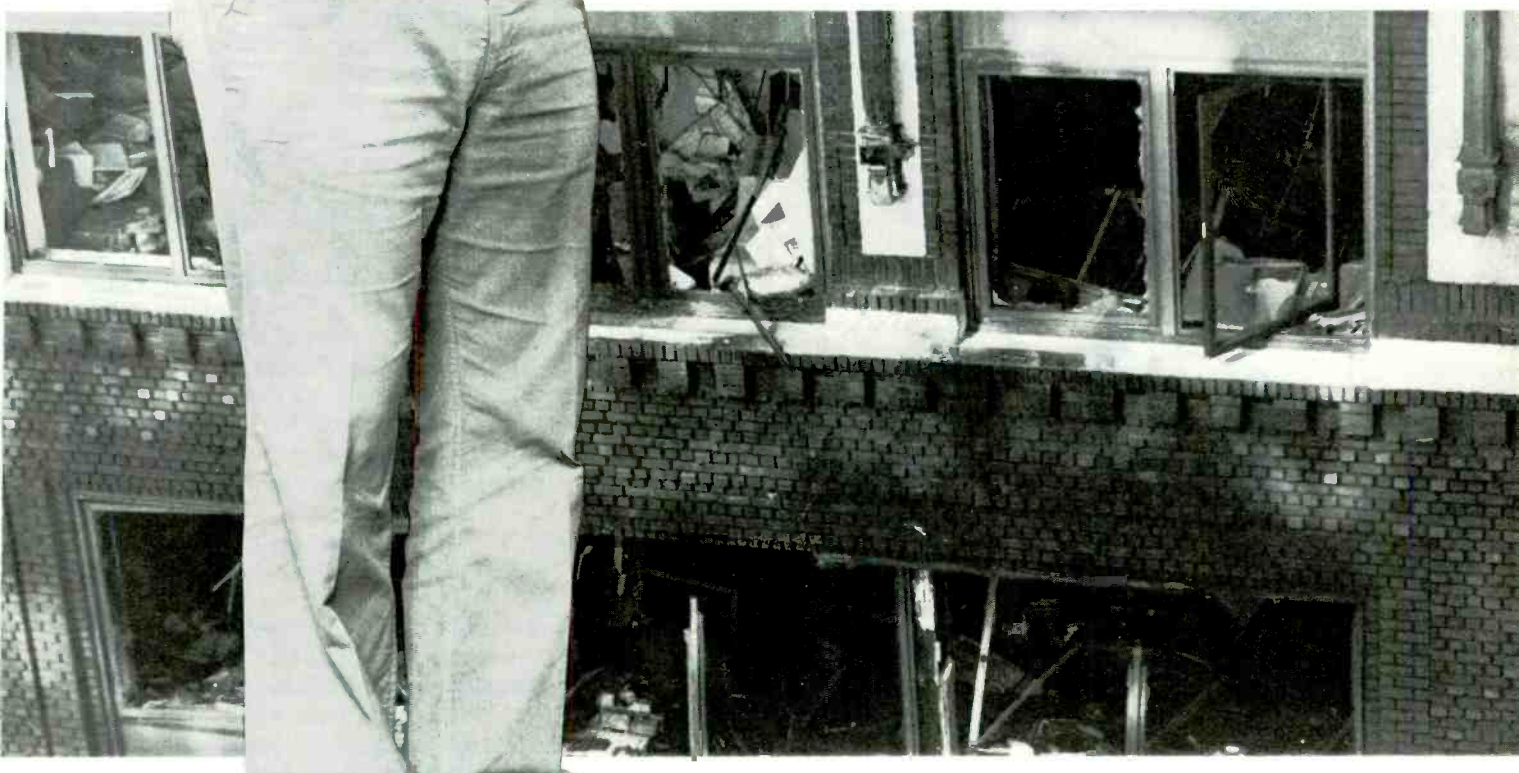

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Live Power For Radio

outfit which is called a "resale common carrier," is offering WFMT's entire programming to cable systems with earth stations. United Video takes the WFMT signal to the RCA Satcom satellite through the uplink in Lake Geneva, Wisc.; subscribing cable systems then bring it in wherever they are.

Dave Schroeder, marketing director at United Video, told *BM/E* that initial response to the WFMT programming from cable systems has been almost unamiously positive and subscriptions are coming in at a rate that means a big success for the venture: nearly 90 percent of cable operators approached so far have said "yes." WFMT's outstanding fine arts mix evidently fills a slot in many communities that can't be filled from any other source.

The importance of this to the "live" story is that among the most popular of WFMT's programs are live pickups of many kinds of music — symphonies, the opera, chamber music, and recitals, to name a few. Moreover, WFMT is putting the satellites to use on the pickup end, too: recently the station put the San Francisco Symphony on the air live through a satellite circuit from that city. In this case WFMT hired a television channel and used only the two audio subcarriers for their stereo pickup, since audio-only circuits were not available at that particular time. Not so incidentally, United Video is similarly using, for the WFMT carriage, the audio subcarriers on its video channel for WGN, Chicago TV independent which United Video is converting into a TV superstation.

In public radio the effects of the satellites on the availability of live programming will also be spectacular. As described fully in the October, 1978 issue, National Public Radio will have its satellite net, reaching more than 200 stations, in operation early in 1980. The change from NPR's pre-satellite distribution of programming will be dramatic in the extreme: from stereo tapes sent out to member stations by third-class mail to instant net-wide connection via 15-kHz low-noise stereo channels capable of taking top-most grade live material to anywhere in the country an earth station is set up. This capability will be used: the public stations find live programs of many kinds valuable and attractive to their listeners.

Moreover, live pickup has been a strong policy of the leading public-material originators for years. For example, WGBH in Boston has broadcast live locally a wealth of music from the leading Boston organizations, but was forced onto tape to get this material out to other stations. NPR will give WGBH, and a number of others stations like it, a wide-open pathway for live material to all other public stations.

The NPR net will be highly significant in another way that deserves some attention. William Oxley, NPR vice president for distribution, pointed out in a recent meeting that the NPR satellite system, built with public money, must under its charter eventually be available to all other "nonprofit telecommunications agencies." This means that the NPR net can play a very large role over the years in extending live programming capability to a wide range of program producers outside the stations of the public net. Like the Mutual Net on the commercial side, the NPR net will be open to many kinds of users and will be a national resource in a broad sense. The future of live programming in radio could hardly look brighter. **BM/E**

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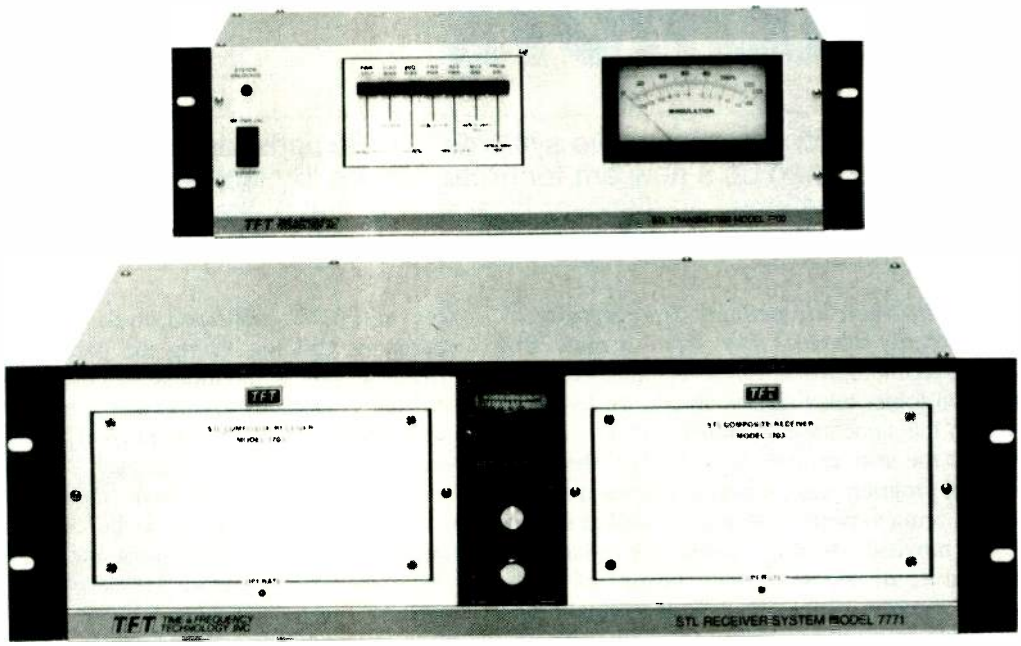

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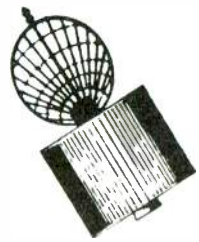


Technological advances in microwave systems, mobile vans, and production equipment have opened up a new era for broadcasters. By looking to their "own back yards," stations can discover local events that make for exciting new program potentials.

TELEVISION STARTED as a live medium. The perfection of videotape temporarily steered it away from its roots. But today, thanks to technological advances in microwave and other production tools, television is able to do live programming with the same ease as edited shows.

Coupled with the new technological ability is the realization that local programming, especially when it is produced live, can bring viewers in at least as well as sitcom reruns and old movies. Sporting events such as baseball and football have, of course, a long history of being covered as live remotes. But even stations in small markets where there is no large team, or those who are competing against other stations which carry big-time sports programs, may find they have a gold mine in their own local community. If your city puts on a parade; if you have a state fair nearby; if there is a rodeo or bicycle race or marathon in town; or even if there is nothing more elaborate than people having fun on Memorial Day or July 4 — why not make a program of it? It appears that even the economics are right.

The following are some case histories of successful live remotes produced by stations around the country. As you will see, they represent a wide variety of production techniques, styles, and types of events covered. One thing that unites all these experiences, however, is a deep commitment to locally originated programs and, in almost every case, careful advance planning.

WFSB and the Travelers Criterium

For the second year in a row, WFSB-TV, the Post-Newsweek station in Hartford, Conn., took its mobile truck to Bushnell park for the Criterium bicycle race sponsored by the Travelers insurance company. The show was carried live from 1:00 to 2:00 p.m. on Saturday, June 30.

Producer/director Bob Pronovost used four cameras to cover the roughly square park, which is lapped 37 times. Three were cabled directly back to the mobile van using Belden #9265 piggyback cable, which carried both video and an audio pair. Two cables connected each camera. One video cable sent the camera's signal to the truck and the other was used as an external sync input to the camera; a TBC genlocked the three cameras and was set to delay the black burst signal from the camera furthest from the truck — some 1500 feet. One of the audio pairs was used for communication between the truck and the camera, one for program audio from the camera position.

A real innovation this year was a fourth camera, an Ikegami HL-77 positioned on the balcony of a highrise apartment building facing the park. This camera, microwaved back to the mobile van using a Microwave Associates window microwave unit operating on the 13 GHz band, supplied what had been sorely missed the previous year — a master shot. "Last year," explains Pronovost, "we used one camera at each 'corner' of the park. We would pick up the cyclist as he came into a camera's range, follow him until he passed out of range, then pick him up on the next camera. However, this proved confusing since it was difficult to tell who was in front or what the relative positions of the cyclists were. The high-angle camera this year gave us an excellent view of the entire back side of the park, so we were able to cut back to it between shots from the 'game' cameras."

Working from inside the truck, Pronovost had three forms of communication: the twisted audio pair to the hard-wired cameras, a walkie-talkie to the high-angle cameraman, plus a telephone link to a director working in the studio. Pronovost set up and mixed live material at the site, and the signal was microwaved back to the studio. At the same time, Pronovost was directing, over the telephone, the rolling-in of prerecorded program material. This consisted of a half-dozen interviews done in the studio the day before with top contenders in the race, plus edited segments from the women's and junior bicycle races microwaved back to the station and recorded earlier in the day. The races held earlier in the day were used to break up the monotony of the Criterium. "Once we had established the leaders," says Pronovost, "we went back to the other races; there's just so many times you can watch the same guys racing around the same park."

At the same time that Pronovost was communicating with the studio control room, a production assistant, on a separate telephone, was talking with a Chyron operator, also back at the station. A "leader board" was programmed into the Chyron, and the operator updated it based on information from the PA. This information was then mixed with the live signal.

Audio was mixed in the mobile truck on a small 12-input GE mixer (the 40-foot truck was originally configured for an entire GE system, including large studio cameras). Some seven mics are used: two to pick up ambient sound, one each on the announcer, color announcer, and guest position desks, plus a Vega 6677 two-channel wireless system for interviews after the race.

According to Pronovost, viewers really eat up this kind of programming. It makes sense economically, too, espe-

cially since the program is presold to the race sponsor, Travelers Insurance Company, which used one minute of the six two-minute commercial breaks for its own commercials and placed PSAs in the remaining time.

PBS and Lincoln Center go live

Local sports events are only one area broadcasters can explore; local cultural events are another. The production of *Live from Lincoln Center,* now going into its third season, may be slightly beyond the scope of some smaller broadcast operations. It nonetheless provides a sterling example of how to go about covering events such as symphony orchestra recitals, ballets, or opera.

According to the program's technical designer, Mark Schubin, the show is designed to give viewers at least as good a "seat" as if they were front row center in the hall without interfering with the performers or the live audience. Camera placement is therefore critical. Generally six cameras are used to cover the actual event while two roam backstage to show the performers entering, between-scenes activity, etc.: four RCA TK-46s, three RCA TKP-45s, and an RCA TK-44. For operas, one camera is placed at each side of the orchestra pit pointing up at the stage, two cameras in the first balcony (also to the sides and pointing at the stage), and another camera in the center of one of the upper balconies to give a master shot of the whole stage. For symphonies, the main cameras are situated smack in the middle of the orchestra itself; the cameras and supports are covered with black velour, and the camera people wear tuxedos to blend in with the orchestra members. Additional cameras are placed at the stage-right door (pointing in at the orchestra) and dispersed throughout the house. Again, one camera is placed in an upper balcony for a master shot. For ballet, the camera placement duplicates the best viewing angle, and the two main cameras are placed front row center, positioned low enough so that the audience in back of them can see clearly. Other cameras are stacked up in the balconies pointing toward the center of the stage.

Live from Lincoln Center *provides viewers with "the best seat in the house" without interfering with the live audience. This requires cameras and cameramen dressed to be as unobtrusive as possible, and long, high-resolution lenses such as the Rank MRL, specially adapted for use with portable cameras*

Rather than using pedestals, Schubin relies on Elemac dollies, which offer a good range of heights while being compact enough to be maneuvered into extremely tight places (such as between the rows within the orchestra). Generally the dollies are not used to track. For the occasional tracking shot, such as when a camera in the upper balcony moves along a row of audience heads with the stage in the background, an Elemac mini-gib is used. The camera person has a range of eight feet and can handle the move by himself; a single person operates each camera at all times.

Equal attention is paid to mic placement since musical performances are carried in stereo simulcast. The audio system is remarkably simple. For symphonies and ballet, four mics are used. In ballet two Sennheiser hypercardioids at either side of the orchestra pit pick up the music, while Sennheiser shotguns in back of the hall pick up ambience. In symphony presentations, four mics are placed within the orchestra. For opera the situation is a little more complex, since both orchestra and singers must be picked up. Three to four mics are generally used for the singers, four for the orchestra. The stereo audio mix is done on a Yamaha PM-1000 board situated within Lincoln Center itself. The stereo mix for simulcast is recombined for the mono feed — at least 3 dB down to prevent center channel buildup.

The audio mixer has a full range of video inputs to assist him. In addition to the program mix, he sees the closed-circuit picture Lincoln Center feeds to areas where latecomers wait for intermissions. Also in the audio booth are monitors displaying prerecorded tapes of interviews and other material used to fill in during intermissions. Sound is recorded double-system on two-inch quad and ½-inch audio decks with a time code track so the audio man can sync up the tracks.

Although the audio is mixed within Lincoln Center itself, video is mixed outside the hall in a mobile truck rented from Reeves Teletape. The truck contains a small CDL switcher with a special effects package, although almost no effects other than dissolves are used during the production. A key feature of the truck is joystick-controlled CCUs for the cameras. A team of video

The Travelers Criterium bike race in Hartford, Conn. provided WFSB with an hour-long live remote on June 30. Three cameras at the "corners" of Bushnell Park were supplemented by a fourth in a highrise apartment building, microwaved back to the remote van

operators works throughout the show, prompted by a technical consultant who generally has seen the show and has a marked copy of the score or script. In this way, abrupt lighting changes on stage can be anticipated and the video operators paint the images accordingly.

Lighting has proved to be one of the most problematic areas faced by *Live from Lincoln Center*. "When we first started the productions back in 1976," says Schubin, "it was not uncommon for us to have to live with lighting designs that had a 300 fc spotlight in the middle of a 1 fc stage. But now we're finding the lighting designers a little more cooperative. We don't like to interfere with their work, but if we have a severe problem we ask them to modify their designs a little." In general, the shows are shot with an average of 25 to 30 fc, though scenes have been shot with as little as 10 fc.

According to Schubin, high-quality lenses are of almost as much importance as the cameras in the low light, long focal length conditions in many performances. For the portable cameras he has been using primarily Rank Precision Industries' Varotal Multi-Role Lenses (MRL). The lens, originally intended for use with studio cameras, was adapted especially for Lincoln Center's use with portable cameras. The lenses have snap-on front elements offering a range of from 10:1 to 52:1 along with high resolution and wide aperture. Fujinon zoom lenses are also fitted on some of the cameras, though very few zoom shots are used.

Any broadcaster planning to cover an event such as a concert should take the cue from *Live from Lincoln Center* that careful rehearsal is the key to success. Immediately after the show's producer John Goeberman has decided to do a particular performance (sometimes three months in advance), the director is called in to watch a rehearsal and make an inexpensive black-and-white videocassette of the performance. The director then takes the tape home and goes over it in detail, planning his shots. When the production goes into technical rehearsal, associate producer and production manager Peter Scharff becomes fully involved in designing the video production. There are no surprises when the show goes on the air. There is even a score reader/production assistant sitting alongside the director and TD in the truck giving countdowns in time to

ABC On The Road

Commercial network coverage of live events is becoming increasingly popular, with leader ABC continually expanding its repertory.

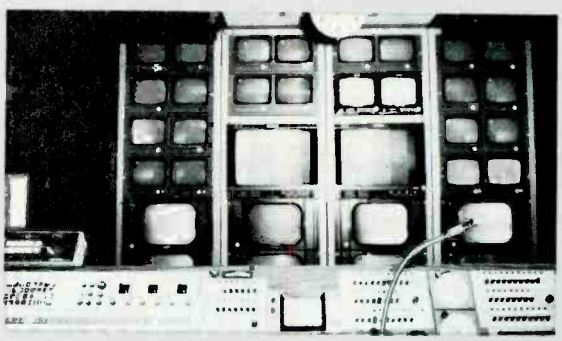
When ABC goes out on a live remote, it does it in style, often in large mobile vans designed and built by A. F. Associates. Currently under construction at A.F., according to systems engineering manager Bud Pearson, is MVC-3P — the production van half of a mated production/tape van pair that will replace a unit already in the field.

Following the ABC philosophy of not having an interconnecting passageway, the 40-foot custom-built Gerstenslager trailer has three separate compartments with separate entrances. Up front is the production compartment, with stations for the TD, director, and producer and a bench for other production personnel. They face a large wall of monitors containing screens for eight cameras, color program and preview, and 24 utility monitors (two of which are in color). In front of the monitors is a Grass Valley 1600 switcher with several aux buses. Incorporated within the switcher is a control head for a Quantel 3100 effects package, plus a cable interconnect for a DPE-5000 digital effects unit that the van shares with the tape half of its mated pair.

The next section back is the audio position, which is raised slightly to give the mixer a better view of the monitor wall through the glass partition. A 24-input Ward-Beck console supplies four outputs plus one master mono mix. The position is large enough to accommodate two sound people if necessary.

In addition to being able to see the monitor wall, the mixer controls an aux bus on the switcher and is able to monitor either the program output or any switcher input.

The audio room also houses the patching system for the elaborate Ward-Beck intercom that connects the cameras with the production and tape trucks. Within the production van itself, there are intercom positions for the TD, director, producer, audio person, transmission operator, and senior video operator. A unique feature of the intercom system is its ability to break off the cameras or combine them in any of its four buses. The intercom system is also used to send interrupted feedback (IFB) to talent positions (permitting monitoring of program audio interrupted by the producer's or director's instructions). The IFB can be fed several different sources from the audio system so that different talent can be on different circuits. IFB is transmitted to the remote positions via two UHF transmitters located under the wall in the production compartment, but with remote control at the audio position. A VHF transmitter is used for general communications.



Interior of A.F. Associates' production van built for ABC. Over 30 monitors, a GVG 1600 switcher, Quantel digital effects, and Ward-Beck mixing and intercom systems are among the outstanding features

The third compartment is for video and transmission. The truck is designed to handle up to ten cameras — eight PC-100s with full remote control and coloring and two Ikegami HL-77s with base stations in the video operator area. The senior video operator sits at a console with joystick controls for painting, in addition to clip level controls for camera inputs; in the ABC setup, the SVO selects the images for chroma keys. The SVO also has control of an aux bus on the switcher and can monitor any input's waveform and vector pattern. He can also delegate control of any camera to the other video operators when, in complex productions such as golf tournaments, many different cameras are in use simultaneously.

The interior floor of the truck is raised about a foot (similar to a "computer" floor) to allow for cabling. Two four-ton units provide air conditioning; one, fed down from the ceiling, provides forced-air cooling for the equipment while the other carries air for personnel comfort. A single return duct runs down the center of the ceiling.

The matching tape van contains two compartments. Forward is a room containing two Chyron IVs. Aft is the tape room with four VTRs and three slow mo units. Between the two is a small post-production area with its own small production switcher, audio mixer, and control heads for digital effects (either Quantel 3100 or 5000).

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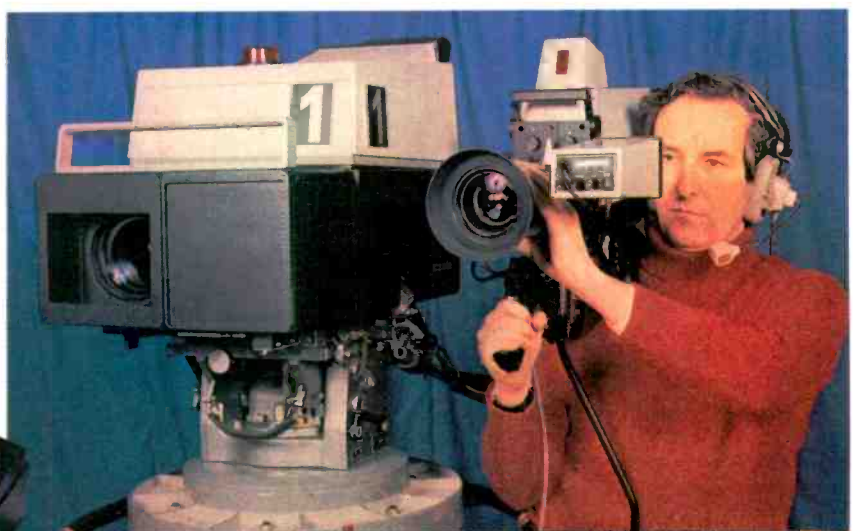

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the music.

KPNX takes to the air

On Memorial Day you won't find KPNX-TV (formerly KTAR) in Phoenix, Ariz. sitting around idly showing old movies. The staff is out in force providing live remotes from areas all around Phoenix showing what people are up to. One of the most exciting projects this year was an airborne helicopter the station used both as a microwave relay and an airborne camera platform to cover activities at a lake some 30 miles from the station.

The live pickup — from an area previously dark to microwave transmissions — was accomplished with a relay system designed by Tayburn. The talent and cameraman stood at a boat dock on the lake (which is surrounded by high mountains). Using a 12 W two-channel transmitter in the 2 GHz band, they sent their signal up to the helicopter which hovered anywhere from 200 to 300 feet overhead up to four miles away. The helicopter's omnidirectional receiving antenna picked up the signal, then repeated it again with a 12 W two-channel transmitter in the 2 GHz band via an omnidirectional antenna, to the mountaintop receive site.

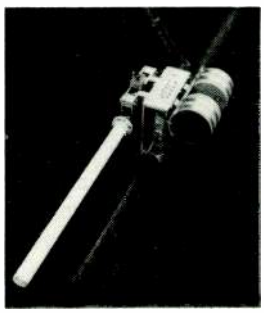
At the receive site, using a six-foot dish, the Tayburn system automatically locked onto and tracked the microwave signal from the helicopter, then fed it through an eight-mile downlink to the KPNX studios.

For Leon Anglin, assistant chief engineer, the system's main advantage lay in the helicopter's being able to fly without the pilot having to worry about the microwave system. The pilot simply turned the system on, lowered the two-foot plastic tube (the last 18 inches of which project below the Hughes 500's skids) containing the omni antenna, selected which frequency to receive and transmit on, and then flew the helicopter as if the microwave system weren't even on board. The automatic tracker followed the signal with the helicopter flying in any direction, in any configuration, up to a 45-degree bank.

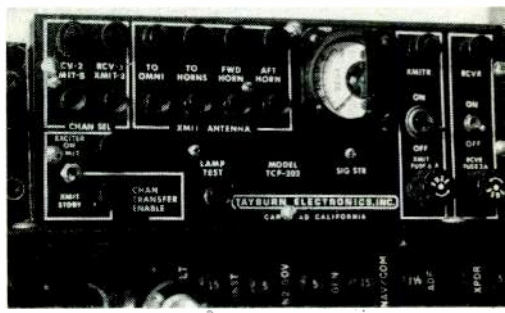
This ability is critical when the helicopter is used as a camera platform as it was on Memorial Day. The helicopter pilot, on-air personality Jerry Foster, was able to act as his own cameraman. A two-piece Thomson-CSF minicam was hand-held so that Foster, or another cameraman if available, could get the camera into any position possible. A small Switchcraft switcher, mounted alongside the flight controls, selected whether the helicopter would transmit a relayed signal or the on-board camera and, further, whether the signal would be sent back live or recorded on a Sony BVU-100 for later transmission.

Foster and the system got a real chance to test their versatility last winter when the river rose and threatened to flood the city. Foster, working with the police, would get an emergency call and speed off to the rescue. There was usually time enough to drop a cameraman on relatively dry ground with a camera and the relay system. Foster would then perform the rescue — pulling people off the top of a house, for example, switching between his minicam and the ground camera as he flew. The material was generally recorded on his on-board VTR. The tape would then be transmitted back to the station; when out of range of the omnidirectional antenna, Foster could use forward or aft Nurad horns to achieve a range of over 65 miles. The tapes were edited back at the station, then rolled in during the newscast. Foster had a standard Sony receiver on board, and would do a commentary live from the helicopter as his tapes aired.

KPNX, Phoenix, uses its Tayburn-designed helicopter microwave system as both a repeater and a camera platform on Memorial Day to cover activities on a lake



The pilot operates the microwave system from a small panel alongside the flight controls



The repeated signal from an omnidirectional antenna on the helicopter's strut is tracked automatically at the receiving site

Personally, Anglin is not certain how much viewers in the Phoenix area understand the complexity of the airborne relay system. Nor is he certain that it would make any difference if they did. Speeding off to a story that breaks fifteen minutes into a newscast and being able to send back live pictures before the show is over is certainly a potent news gathering tool, however, and the possibilities it opens up for more extensive live remotes are large indeed.

WBZ runs away with Boston Marathon

A large-scale public event such as the Boston Marathon (held April 16 this year) attracts considerable attention from the public and also from television. WBZ-TV, Boston, drew away from the crowd with its outstanding live coverage of the race's start, finish, and intermediate stages by combining coverage from the ground with helicopter aerials.

For the start of the race in Hopkinton, Mass., two RCA TK-76 cameras were used, both microwaved back to WBZ's small ENG truck on 13 GHz window microwave units. The first camera was on the ground; the second was in a Bell Jet Ranger helicopter that then followed the runners along the course. The signals were run through a frame synchronizer, mixed on a 10-input 3M audio-follow-video switcher, then transmitted with a 12 W, 2 GHz microwave system to one of WBZ's two microwave receive sites. From this tower, some eight miles outside the city, a 6 GHz STL carried it back to the station, where Chyron graphics were added.

Once the race was underway, the helicopter became the

main camera position and transmitted a number of 10-minute live reports. WBZ's weekend anchorman rode in the helicopter and did some of this reporting on-camera, lit by a small Cine 60 sungun. The cameraman sat in the rear seat next to the anchorman and was able to shoot both the talent and the action on the ground with ease.

For the first leg of its journey, the helicopter used a standard 2 GHz horn and directed it toward the television tower. As the race and the helicopter neared the tower, however, it switched to Microwave Associates' small omnidirectional antenna. Even though the system only put out 2 W, the chopper was able to use it throughout the remainder of the coverage. (Normally the portable Microwave Associates microwave system is used with an ENG van where the 2 W amplifier is boosted to 12 W before transmission.)

For the conclusion of the exciting race, the chief anchorman who had started the race was ferried to the finish line where another TK-76 combined with the helicopter for dual-camera coverage once again. The ground camera microwaved its signal to WBZ's second repeater station, on the John Hancock tower, while the helicopter continued to use the television tower. Trials with the system had shown that since both the helicopter and ground camera transmissions were on the same 2 GHz frequency, considerable reflections were experienced between the two repeater stations. An additional 13 GHz receiver was added at the Hancock tower, therefore, and the ground camera used a 13 GHz window unit to get up to it. The signals from the two cameras were mixed at the station.

According to Richard Ade, chief engineering coordinator for the Marathon coverage, and Don Ross, news director, the half-hour coverage of the finish was nothing short of spectacular. The helicopter, hovering overhead, picked up the runners as they came up a hill toward the corner leading to the finish line. The anchorman in the air would turn it over to the main anchor at the finish line where the camera picked up the runners as they rounded the corner and headed down the last stretch. Viewer response to this exciting coverage was "overwhelming," according to Ade and Ross.

WBZ also capitalized on its coverage throughout the day. Its noon news show was co-anchored from the site of the race. The station also had several cameras scattered along the race course and in a press truck which moved along just ahead of the lead runner. This material was taped and integrated with recorded material from the live cameras, then used as highlight material.

A final interesting note concerns audio coverage. The soundman in the helicopter, using a small Shure mixer with a Comrex radio mic, was able to pick up one of the women runners who wore the small transmitter. Though the helicopter was sometimes 800 feet in the air and up to two miles away, there was a useable audio signal. Ade attributes this to the helicopter's receiver always being above the transmitter. On the ground, of course, the range of the system would only have been 300 to 400 yards.

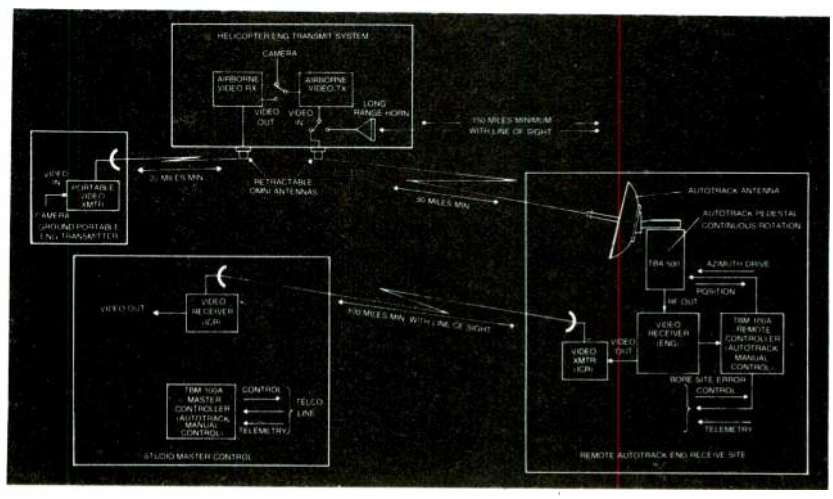
WRTV qualifies at the Indy 500

The situation at WRTV, Indianapolis, is typical of what a station without the resources of a network can do with large-scale sporting events. WRTV covers the Indianapolis 500 auto race not, as is the case with ABC, during the race itself, but for two weeks prior to the big event when the qualification heats are on. It may not net millions in revenues, but it doesn't cost millions to produce.

The station actually does three separate shows from the track daily throughout the two-week period. During the noon news there is a live feature, generally three minutes long. For this the station uses its Instacam truck — a small mobile van capable of microwaving back the signal from an RCA TK-76 camera or prerecorded material from an on-board ¾-inch VCR. The signal is transmitted on 2 GHz back to the Indiana National Bank building, from where it is sent on 13 GHz to the station.

Each evening there is a 10-minute trackside show, also carried live. For this, assistant director of engineering John Guion utilizes the station's 2.5 ton International Harvester mobile truck. Two cameras are used for this show, which is hosted by Tom Carnegie (local sports director, track announcer, and "a very popular man in Indianapolis"). An RCA TK-44, situated in the paddock, is hard-wired back to the truck. In addition, an RCA TK-76, hand-held, is situated in the pits. This camera is then microwaved with a small 13 GHz window unit back to the truck where the signals are mixed. Indiana Bell then microwaves the signal back to the studio for retransmission.

The most complex shows are the actual speed trials themselves, which are networked to four or five other stations. In addition to the two cameras described above, additional TK-44s are placed at two turns in the course and



Tayburn's helicopter microwave repeater system as used at KPNX. Ground camera transmits to helicopter up to 20 miles away (left). Pilot receives signal on an omnidirectional antenna and either repeats it on another omni antenna or records it on an on-board VCR. Omni antenna range is 50 miles; optional horns achieve a range of 150 miles (above). At receive site, remotely controlled automatic tracker locks onto the helicopter's signal (right)

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Television's Live Remote

WRTV produces three separate shows from the Indy 500 track for two weeks prior to the main event

an additional TK-76 is used to cover the "flag shot" at the finish line. The three TK-44s and one of the TK-76s are hard-wired back to the van by Indiana Bell, while the second TK-76 is again microwaved back. The program is switched in the truck, then microwaved to the studio where it is recorded and edited. The truck itself, however, has a two-inch quad deck so that it, too, can record and play back.

Guion sees a "big future for this kind of programming," both for news and for full-fledged remotes. Already the station is using a field anchor person for its 5:00 news who reports from wherever the action is hot. The station has also experimented with a helicopter, and will shortly add this new live capability to its coverage. "We're actively involved in taking our shows out of the studio," concludes Guion, "and locating them wherever the action is happening."

KATU comes up smelling like roses

Seeking to emphasize their station's firm reliance on locally originated programming, Roy Cooper, engineering supervisor, and Chuck Gingold, director of programming, at KATU-TV, Portland, Oregon, decided to produce a week-long series of live remotes which began with the crowning of the Rose Festival Queen (two-and-a-half hours live in prime time) and culminated with the Portland Rose Festival Grand Floral Parade. "The Grand Floral," as it is better known, aired on Saturday, June 9, from 10:00 a.m. til noon.

This was a big remote by local standards; since KATU was the origination point for an occasional network (see "Live! From Your Station," elsewhere in this issue), they were anxious to look as good as they could. A total of eight cameras was used for their coverage, which picked up the parade just as it was leaving the downtown staging area: two RCA TK-44s, three Philips LDK-25s, two RCA TK-76s, and a Bosch Fernseh camera shooting with a 30:1 zoom lens from the Goodyear Blimp.

The cameras were deployed to give as wide a variety of shots as possible. One camera was on a six-story building looking down the parade route; one was on a seven-foot, nine-inch scaffold that could shoot the on-air talent and the parade over their shoulders; a Cinema Products Steadicam with one of the TK-76s stood right in the middle of the parade route. Other cameras, on smaller scaffolds, were situated throughout the area. One of the most effective shots turned out to be that from a custom-designed crane supplied by Video Productions, Portland. With an operating range from 18 inches to 18 feet above the ground, it could shoot a band coming at it at eye level, then boom up as the parade passed underneath.

In addition to its "game" cameras, KATU had its ENG single-camera (TK-46), microwave-capable news vehicle standing by to do crowd interviews and provide a little local color in case a problem developed with the parade. As it turned out, this was a wise move. A float stalled out, bogging the parade down for nine minutes. Several commercials were ganged together. Director Lee Petrick and producer Terry Demming then went to the live news van for interviews.

To handle all the CCUs, switching, etc., two different mobile vans were tied together. Borrowed from KATU's sister station KOMO was a truck with controls and limited switching for the TK-44s. This was slaved to the main truck, rented from Video Productions. This truck contained controls for the LDK-25s (the 76s were run on straight coax), a Grass Valley switcher, audio mixing board, and other equipment. The camera from the blimp was microwaved back to this truck on a 13 GHz link; the camera on the six-story building was on a 2 GHz window unit. Both signals were synchronized with a frame syn-

CBS Tests Fixed-Wing Microwave Repeater

CBS has recently tested a new microwave repeater system that may have far-reaching impact for broadcasters planning live remotes. The system involves a microwave repeater incorporated within a fixed-wing airplane which is capable of offering an enormous coverage area.

Richard Harvey, associate director of relay systems at CBS-TV, outlined the experiment at a meeting of the IEEE's Vehicular Technology Group in late June. The system was tested at CBS's KNXT, Los Angeles, which hopes to have the system on-air by this October.

The microwave transmitter/receiver system was developed by RF Technologies. On the ground, the cameraman uses a 1 W ac/dc operated transmitter with one video and two program audio channels (one of which incorporates a mic-level AGC). The airplane (a modified crop-duster) utilizes a Nurad omnidirectional antenna fixed between the landing gear. The receiver, mounted inside the fuselage of the plane, offers -97 dBm for a 32 dB S/N. Another omnidirectional antenna sends a 12 W signal back out to one of KTNX's microwave receivers, two of which have automatic tracking systems. Both the transmitter and receiver are frequency agile and carry three channels, either full or split. The channels for receiving and switching are instantly changed by the operator or remotely controlled through a BCD input.

The great advantage of the system is that, by using omnidirectional antennas and the automatic tracker at the receive point, the plane can circle for hours 18,000 to 24,000 feet in the air anywhere within a 150-mile radius of the receive tower. In the Los Angeles area, where a number of important "news spots" are blacked out because of the terrain, the range of news crews is significantly increased. Further, the single aircraft can serve as a repeater for the many different news crews the station typically disperses around its coverage area to make sure a crew is on hand if a story breaks. Normally, of course, these crews would have to begin driving in towards the station before they were in range to send their signals back, probably having to abandon the event.

chronizer before being fed to the switcher.

Also in the truck was an extensive videotape area with three Sony one-inch decks and a two-inch deck. The two-inch deck was cued with playback material, including a promotional spot from the City of Portland to be used as a buffer in case extra program material was required. One of the one-inch decks was used for slow motion effects, and could be run with a slow motion controller or manually.

The remaining two one-inch decks were used to create distinctive buffers around commercial breaks. On one was loaded some fairly elaborate graphics that had been created a few weeks earlier by an outside post-production company. On the other were freeze frames created during the preceding 10 minutes of the parade. The videotape area was under the control of a separate director and video operator who would take over when the producer called a break. The signals from the two VTRs would be mixed to key the graphics into the freeze frame. In this way the program director did not have to be directly responsible for the somewhat complicated mix to achieve the buffers.

From the truck the signal was carried back to the studio via telco landlines, commercials were inserted, and the signal fed back to the network via satellite.

Except for the stalled float, the two-hour presentation went without a hitch. A valuable lesson to be learned from the KATU experience by stations planning coverage of events such as parades is the amount of preplanning that was done. Almost as soon as KATU had secured the rights to network the event from the Rose Festival, a team from the station went on a scouting mission. They took along a camera and a "scissors" scaffold and were able to determine where and how high they wanted the camera placement and scaffolds to be. The producer and a production assistant were assigned to the project a full two months in advance. Then, two days before the event, engineering, and production under the supervision of production manager Bob Kalstad, ran through a full rehearsal, including shots from the blimp. The camera people were rehearsed over and over again to develop a prearranged sequence of wide, medium and close-up shots for each group that passed by; even if the communications equipment had broken down (which it almost did), the director would have had eight different, intercuttable shots at all times.

Another factor that should be considered, if possible, is the extent of cooperation by those organizing the parade or festival. In the case of KATU, this included two-way communication with one of the directors of the Grand Floral in the staging area. The director would tell him when they were going out for a commercial break so that the parade could be held up until they returned.

The ultimate measure of success, in addition to the smooth-running operation, was, of course, the ratings. For the first half-hour of coverage, the show pulled a 47 share in Portland; for the second half-hour, a 37 share. The station also received numerous phone calls and letters from viewers, all of them favorable.

Says Gingold, summing up the KATU experience as well as the experiences of dozens of progressive broadcasters around the country, "We're keyed into localism. We feel that this kind of project is extremely important to our television station and our community. It offers programming diversity, sales potential, and also a tremendous promotional advantage." **BM/E**

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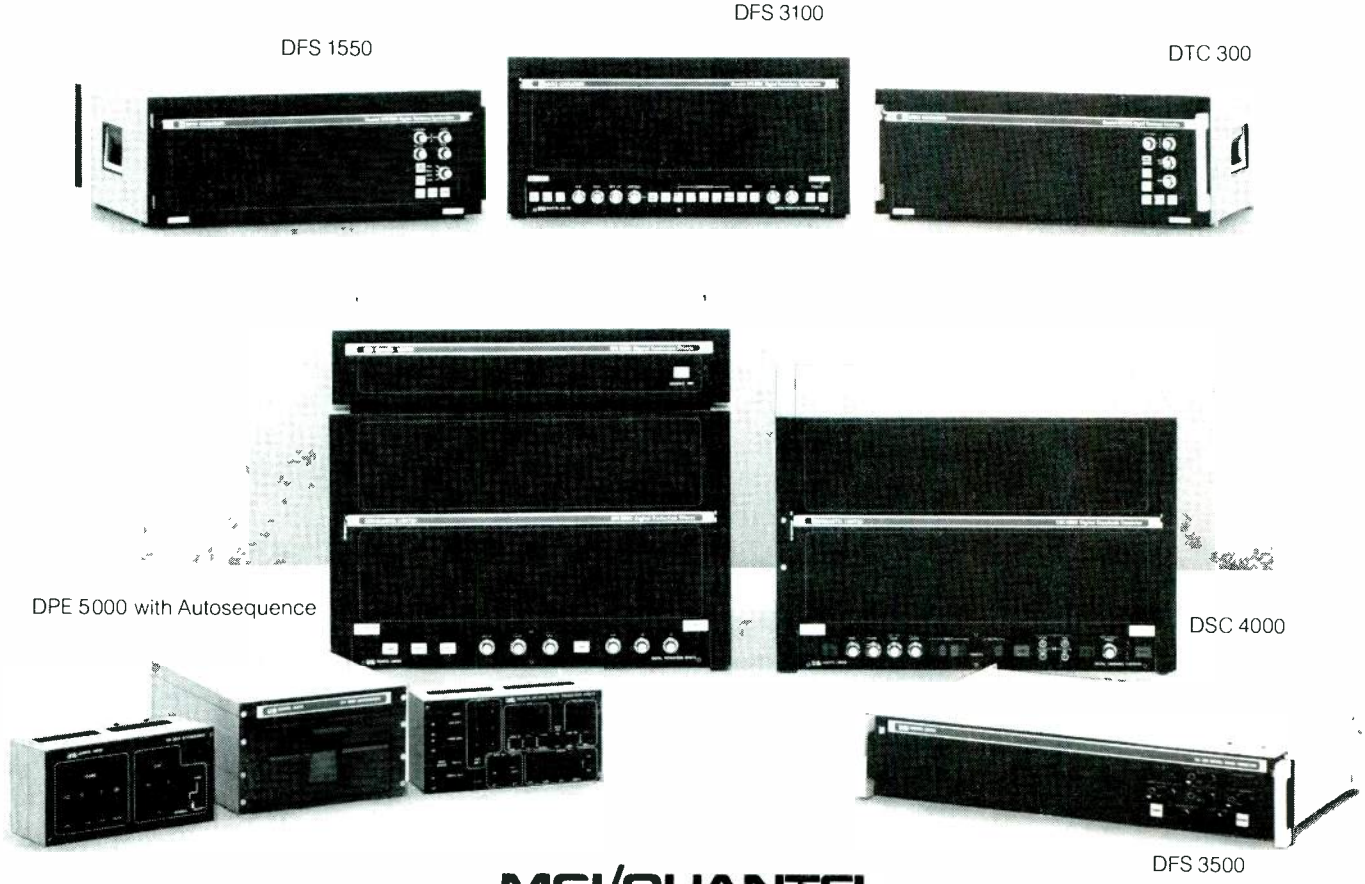

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The digital video people

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Digital Technology And Satellite Broadcasting Capture International Symposium In Montreux

TWO MILESTONES were noted at the Eleventh International Television Symposium and Technical Exhibition in Montreux, Switzerland. First, an unqualified commitment to digital broadcasting. "All of the major TV studios of the world are either using or committed to using digital video effects systems," declared Richard Taylor of Quantel, Ltd. during a panel session on digital TV. Second, the beginning of the era of direct-to-home satellite transmissions. "This year at Montreux we are discussing results, not plans," said C.A. Sioccos of the Canadian Broadcasting Corporation.

The inevitability of digital broadcasting despite lagging international standards was indisputable. On the exhibit floor digital black boxes were everywhere, commercially available digital audio tape recorders were shown by two manufacturers, and Ampex, Bosch Fernseh, and Sony showed experimental digital VTRs. From the sessions came the news that digital transmission of television signals via cable and radio relay was ready to begin regular service in the U.K. Digital transmission of TV via satellite has already been practiced. The major deterrent is the lack of international standards, but progress is being made on this front, said Y. Guinnet of Telediffusion de France, who is on both EBU and CCIR committees.

Success is being scored in Japan now that the launch of direct-to-home broadcast satellites last year leaves no doubt that 12 GHz transmission to the home is practical. N.Imai confirmed at Montreux that preliminary tests results of their BSE satellite system using inexpensive, simple terminals produced excellent high quality color television pictures. R.Collette of the European Space Agency predicted several European coutries will announce timetables for direct-to-home satellite systems this year.

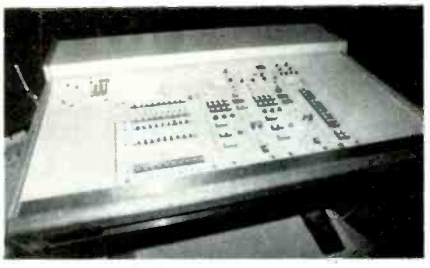
Still other technological changes were reported at Montreux. Fiber optics is already being applied in camera to base links and will soon be tied to production switchers. Use of the fiber optic technology in CATV trunk distribution systems is spreading as well. Digital systems and devices that enhance and sometimes simplify the post-production process are here and now with yet more sophisticated systems such as a Betamax-based light pen editing system in the wings.

Though the Montreux Symposium is primarily technical, the future of programming was not ignored. Keynoter Marcel Jullian, former president of Antenne 2, France, said more services and more alternatives in program choices must be offered. For those countries providing only governmental broadcasting services he suggested letting private sources into the act. For those countries with primarily commercial broadcasting he recommended greater support of public broadcasting systems.

Approximately 2500 delegates from 53 countries attended the sessions and nearly 10,000 persons visited the technical exhibits that constituted the television meeting held in Montreux during the last week of May. While the numerous papers and panel discussions focused largely on where television technology is headed, the 155 manufacturers that exhibited at Montreux focused on where television technology is. While current technology is clearly compatible with the vision of the future that emerged at Montreux, it is clear that many thorny issues remain to be resolved in the coming years.

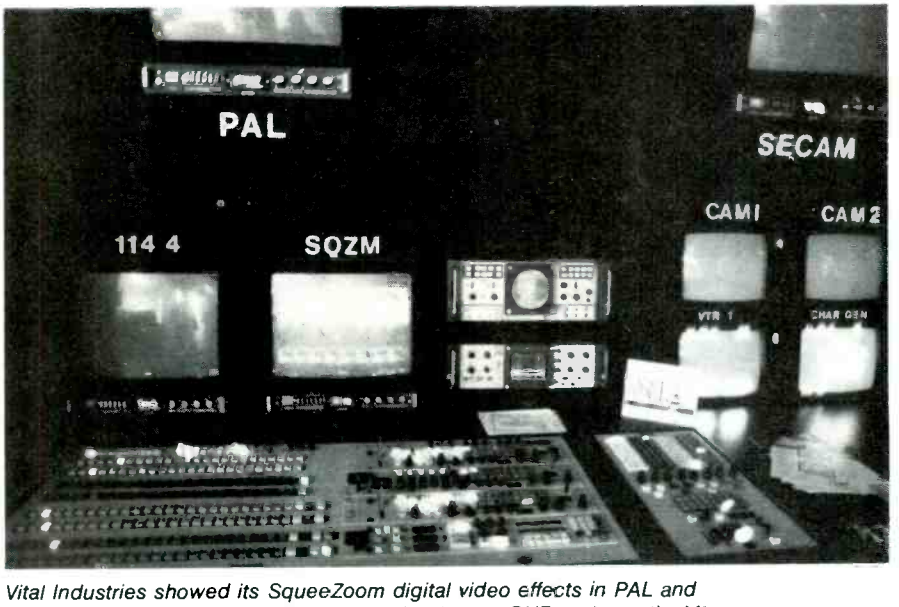
Digital systems and the digital plant

With Ampex, Bosch Fernseh, and Sony

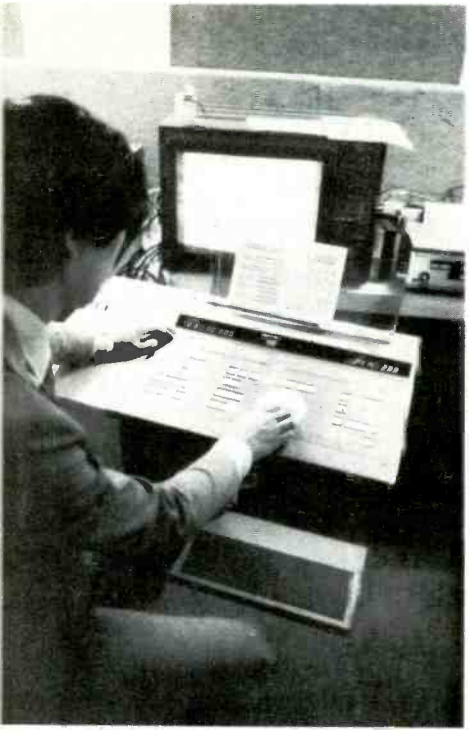


Thomson-CSF showed its experimental digital video switcher in SECAM

CDL showed its SFX-480 switcher in both PAL and SECAM. Many manufacturers familiar to the North American market showed products introduced at the Dallas NAB in PAL and SECAM versions, including Vital, CVS, American Data, Hitachi, Ikegami, NEC, RCA, Recortec, Shintron and System Concepts



Vital Industries showed its SqueeZoom digital video effects in PAL and SECAM versions. The Grass Valley Group has its new DVE package, the Mk II, operating with its GVG 300 switcher, introduced at NAB



Sony showed its Digital Audio editor (upper left) and a line of companion products for its PCM digital audio recorders (below). 3M also showed its digital audio recording system (above). Another company that perpetuated the digital audio trend was EMT-Franz, which showed a digital signature tune repeater

Mosley showed its microprocessor-controlled remote control unit, (right) first shown at NAB, and claimed that the unit is capable of handling up to 9216 remote sites. Time and Frequency Technology also showed its line of remote control systems

IVC's exhibit featured its cameras and a new I-11 one-inch helical VTR and the 2002 TBC

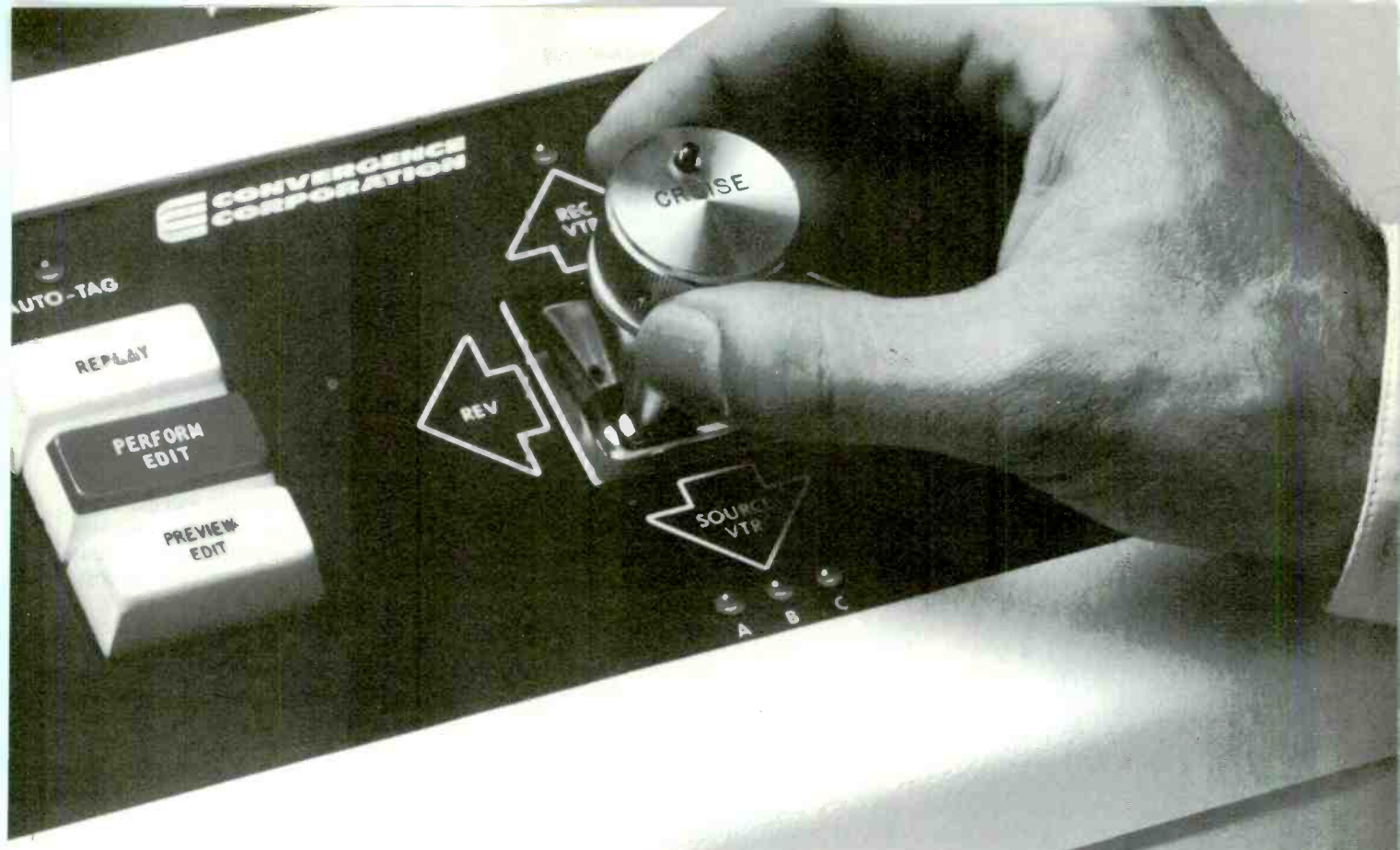
showing experimental digital VTRs (DVRs), delegates could not help but wonder if a practical DVR might not be closer than the oft-cited five year time frame. Nevertheless, discussions held on the related topics of post-production, digital systems, and the digital plant helped crystallize the difficult barriers yet to be overcome before the manufacturers or the industry is ready to jump into the era of the DVR.

The experimental digital VTRs demonstrated at Montreux all adapted existing analog tape decks. The general thinking apparently is that if the existing analog machine can be modified to work in the digital format, machine redesign time has been saved and costs will not be exorbitant. Thus Ampex used a quad deck (AVR-2), Bosch Fernseh used a BCN Type B mechanism, and Sony a Type C helical approach. By selecting different scanners, each had certain advantages and disadvantages to contend with.

Ampex could get a high writing speed (53 m/sec) without trouble. To get a high packing density Ampex used narrow tracks (50.8 microns) with very small guard bands (30 microns). Ampex opted for a full PCM recording with a sampling rate of 4 f_{sc}. This approach gave the widest possible bandwidth so degradation upon dubbing would be minimal. Ampex writes with two heads in parallel to achieve the 135 Mbit/sec data rate. A total of eight heads are needed, however.

Bosch Fernseh, starting with a slower B format tape writing speed, increased the scanner rotation to end up with something similar to Ampex —48 m/sec. Bosch elected to work with a single bit stream at a rate of 80 Mbit/sec, applying the IBA technique of sub-Nyquist sampling (2 x subcarrier) using block code techniques. The resulting tape speed was only 12 cm/sec, affording three hours of playtime from a standard one-inch, 90-minute tape reel. Bosch said any dropouts were made subjectively less apparent by scrambling techniques which were distributed over the entire picture area. Error concealment methods, drawing from neighboring lines, were used to substitue for missing information.

Sony felt the excellent tracking accuracy achieved with the BVH-1200 Type C machine (without dynamic tracking) would be more than adequate, even if the track width and guard band were reduced about a third (down to about 70 microns, PAL) to increase packing density. The C format has a relatively slow head-to-tape speed of 21.39 m/sec. Since Sony elected to use a block encoded sub-Nyquist approach to record PAL, which calls for an 80 Mbit/sec bit rate, it needed to increase either the head-to-tape speed or increase the number of heads. It chose the latter.



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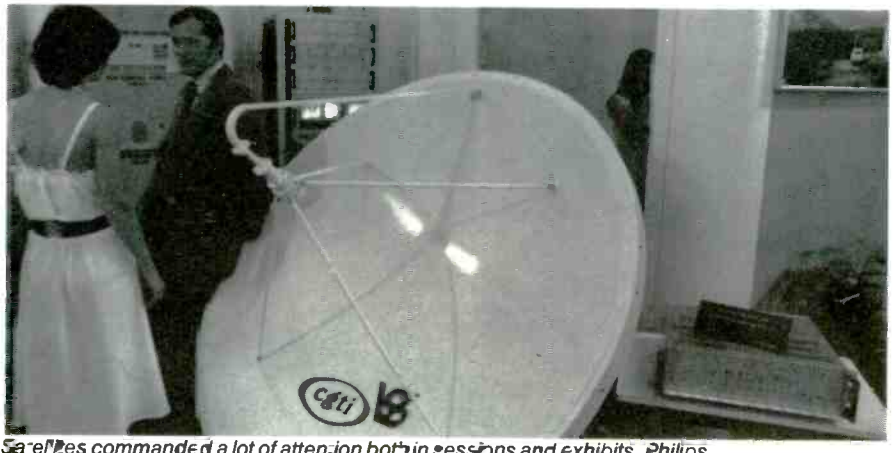
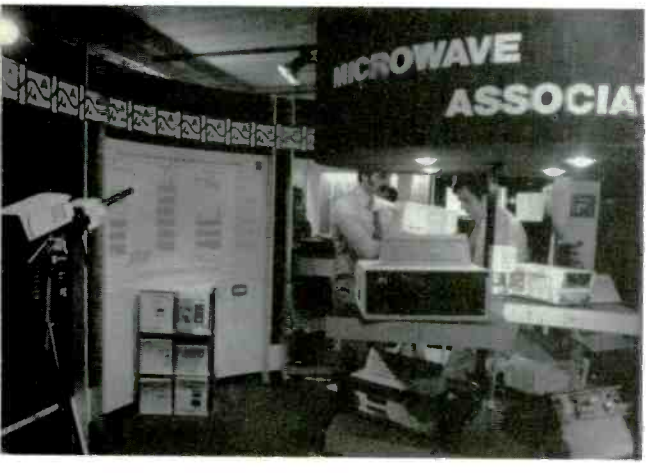


Satellites commanded a lot of attention both in sessions and exhibits. Philips (top) and Velec Sefat (bottom), a French firm, exhibited earth station equipment



American ENG technology was displayed by Microwave Associates (left) as well as Farinon and Nurad

Eastman Kodak showed a new telecine (below) especially designed for high speed news film. Resolution lost due to pushing is restored in this new unit

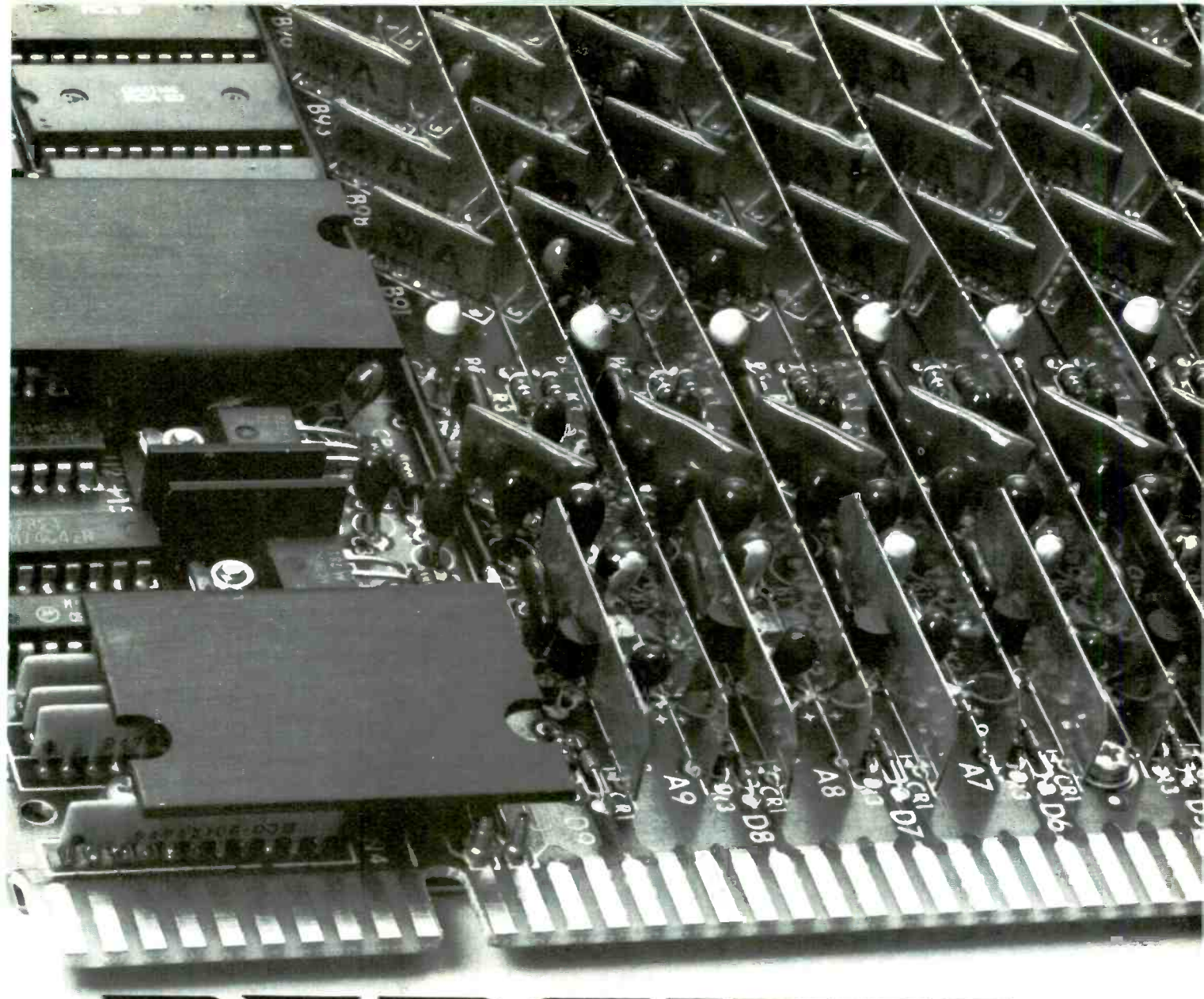
The decision was to use three single crystal ferrite heads provisionally, allowing two heads for video and one for audio. The three heads take up 130 microns (the same as one NTSC analog track). Sony said that success in rotary transformer design and head winding has resulted in a system capable of 120 Mbit/sec processing (the NTSC machine shown at Dallas accommodated 3 x f_{sc}or 115 Mbit/sec). Sony said many coding strategies have been devised, each with some shortcomings. In its experimental recorder it used an 8-10 block code following the IBA route. (In a paper on the subject, Howard Steele of Sony said the best coding strategy is not a property of the code and the video signal alone but is strongly dependent on the recorder's performance. It is premature to identify any code as best, he said.)

In the panel discussions on the topic of DVRs, concern was expressed over the absence of standards. Since this was an international meeting, the discussion of standards went beyond the technical problems of recording and reproducing pictures and sound in the digital domain to the issue of DVRs in the NTSC, PAL, and SECAM systems.

Throughout the panel sessions on digital topics, it was clear that digital technology is being looked at as a possible solution to the long-standing problems of different color television standards. Where the DVRs are concerned the papers and demonstrations were convincing in that they showed it is possible to record bit rates of 140 Mbit/sec without increasing tape consumption. With near 140 Mbit/sec rates realizable, sampling rates of 4 f_{sc} are possible and component encoding can be practiced, eliminating obstacles to recording in SECAM. Thus it seemed evident that a single set of digital standards could be adopted for NTSC, PAL, and SECAM.

Dominique Nasse of the CCETT, France, said that the EBU has come up with a proposed component system (essential for SECAM) that provides both picture quality and compatibility with composite PAL signals at 4 f_{sc}. During the panel discussion comments from the floor described the swing to component encoding as desirable.

In this system all of the samples (and sampling clock) are derived from an orthogonal grid at 1136 times the horizontal frequency (which is close to 4 f_{sc} PAL without picture tilt). Alternate samples are selected for the luminance based on a line-quincunx structure, but unlike the 2 f_{sc} PAL approach, the same samples are used in every picture resulting in a stable pattern with a 25 Hz repetition rate. The alternate luminance samples are very close to 2 f_{sc} for luminance and 1 f_{sc} for color difference, which accounts for the system being referred to as a 2+1+1 system. (This



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amounts to a bit rate of 142 Mbit/sec). Since 4 f_{sc} PAL and 2+1+1 components can be handled, a compatible machine can be envisioned with only minor differences in the error concealment systems and in the processing of input/output data and references. Though this approach seems promising, many more conditions remain unsettled. Since the goal is a standard that allows direct interface between digital equipments rather than successive conversions between analog and digital domains, an alternative to the 70 Mbit (sub-Nyquist) approach may be needed.

While agreement on a DVR encoding standard may be nearing, agreement on an overall digital standard for signal processing and control seems far off. The objective of this quest for standards is the digital plant as well as a form of "worldwide" color television standard.

It was pointed out at Montreux that transmission of television signals digitally by cable, radio relay, satellites, and fiber obtics has been tested and proven. Various countries are planning a switchover from analog modulation to digital modulation but the change will occur slowly. Since television programs are exchanged daily in all parts of the world, an international standard would seem necessary before a wholesale switch to digital transmissions could be accomplished.

Time and again at the symposium, calls for such standards were made. The fundamental disagreement seems to be over component vs. composite coding. While the NTSC position, presented by R.S. Hopkins of RCA, clearly states its preference for composite encoding, most representatives of PAL and SECAM countries spoke out in favor of component encoding. Hopkins, however, in exchanges with panel members and in response to questions from the floor, indicated that while current thinking in the U.S. leans towards composite encoding, there is also considerable interest in the development of a "worldwide" standard and movement towards this goal might be compelling enough for the U.S. to change its position.

While digital standards remain a sticky problem for the advance of digital technology, operational problems clearly present in the post-production area give more evidence that operational improvements in VTRs will have to accompany technical superiority before the introduction of a practical DVR.

Post-production

The two primary concerns regarding post-production that surfaced at the meeting were costs and alienation of the editor. Charles Anderson of Ampex pleaded for a "much better man-machine interface" in post-production. "Simple things like comfort would help," Anderson noted, and added ominously, "We have moved the editing function from the artist to the technician, who has become the editor." He pointed out that with the high hourly cost of editing consoles, the man behind the machine is given little or no chance to contemplate an artistic decision. "The poor guy doesn't even have the chance for a cigarette; he can't have the opportunity to think about a particular solution to an artistic problem."

Several potential solutions to the post-production dilemma were discussed in Montreux. William Nicholls of the CBS Network outlined an editing system for single camera production that is nearing completion at CBS and is expected to go on-line later this year.

Designed around six Sony Betamax units, the low-cost system permits search among a wide variety of camera angles, allows action at each edit point to be matched and previewed, and provides the first practical real-time replay

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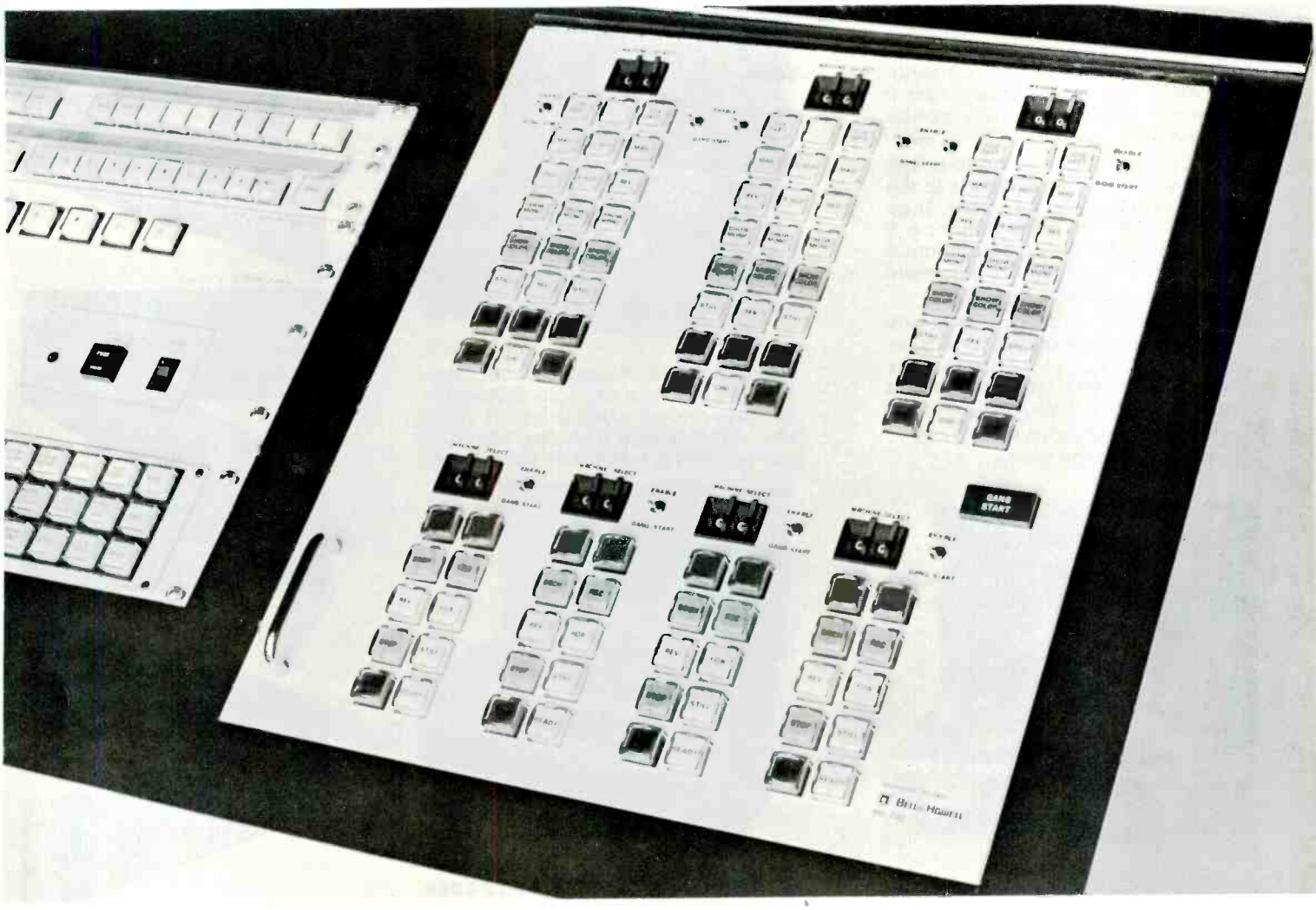
on video tape. The highly modified Betamax machines, in which solenoids have been eliminated while new spooling motors and belts have been added, operate not only in normal functions but also in five times play speed, one-fourth play, and one-sixteenth play in both directions. The microprocessor-based control system includes an audio/video switcher designed by CBS. All editing control is designated with a light pen.

Nicholls claims that real-time replay is possible thanks to edit revisions that are, in most cases, replayed at once. Takes from the single camera are recorded "one to a cassette," which offers both maximum flexibility and a minimum of familiarization for the editor. The light pen coupled CRT display provides fast and convenient control of the editing process. Computer calculations are reduced by a binary time code in the vertical interval. The software, newly written by CBS and unique to this system, contains information picked up over many years of videotape editing experience.

Eventually, the network plans to develop a single camera editing system based on video discs rather than cassettes, but until the video disc recording process is less expensive, the approach remains impractical. CBS also expects to take advantage of SMPTE/EBU time code user bits eventually to store scene-take information.

While single-camera production with a compatible post-production system remains attractive to many television producers convinced of the artistic superiority of the technique, some broadcasters at the conference wondered if the benefits of the approach were not outweighed by its costs. Robert Longman of the BBC pointed out that two-camera is more cost effective in terms of post-production. Now, some 20 percent of the BBC's production output is shot on location and Longman thinks that figure is likely to grow. He noted that for a 50-minute production, the BBC takes five days to shoot; yet, when the corporation attempted a two-hour production with a single camera, shooting took 28 days. "This is not cost-effective for a broadcast organization," said Longman.

Consensus among the symposium panelists and delegates to the post-production sessions was that manufacturers, technicians, and broadcasting bookkeepers should be fighting to provide producers with equipment that can be used for creative ends. Paolo Zaccarian of Italy's RAI said he thought the CBS approach was moving "in the right direction" in terms of a man-machine interface. Others noted that a



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Sony Corporation of Japan's president, Kazno Iwama (left) and Howard Steele of Sony UK Ltd. headed that company's delegation to Montreux

The International Symposium drew delegates from all over the world including these representatives from the People's Republic of China who confer with another Symposium delegate

Supplying the Moscow Olympics was a major theme sported by a number of manufacturers, including Marconi (left) and Ampex

move away from keyboards and toward a light pen or joystick approach to editing console control might be advisable, adding that digital visual effects and frame store applications will enhance television creativity.

Exhibits confirm trends in engineering

With the Montreux exhibits following on the heels of the NAB in Dallas by just two months, few of the American manufacturers or manufacturers familiar to the American market displayed much in the way of new technology. One definite exception, however, was Bosch Fernseh, which used the Eleventh International Television Symposium and Technical Exhibit to help celebrate its fiftieth anniversary. Bosch Fernseh brought out a dazzling array of new products, most of which used rather advanced electronic designs.

Among Bosch Fernseh's new products were a new telecine using a CCD sensor and digital storage, a new KCA 100 lightweight portable camera with automatic focusing, a new field synchronizer for PAL and SECAM, a new version of its BCN VTR intended for archival uses with its six-hour recording time, and a working model of its BCN-100 one-inch multicassette recorder/player. This latter unit will randomly access up to 32 cassettes.

Though Bosch Fernseh's new product introductions were impressive to American delegates, the European delegates also saw many products that were new to them. Ampex, RCA, Thomson, Sony, Convergence, Vital, CDL, and many more companies familiar to Americans showed PAL and SECAM versions of equipment introduced earlier at NAB in NTSC. In some cases, companies such as Thomson-CSF and Marconi, which have long been more familiar to Europeans than Americans, showed new products that came from their European-based parent companies. Thomson-CSF, for instance, showed a new digital video switcher that captured a lot of excitement with its spectacular performance. The British company, Quantel, took the opportunity not only to introduce PAL and SECAM versions of its popular lines of digital equipment but also to announce a new development bound to have significant impact on the American market.

The new Quantel DVP-5000 Plus system offers digital effects on up to five channels. Essentially, what Quantel has done is to multiplex the LSI-11 computer that controls its frame storage memory system and add three additional frame storage systems. By dealing with the stored information in a hierarchical fashion, the DVP-5000 Plus becomes a multi-channel effects system.

Other new products introduced by Sony, IVC, Canon, and others and will be featured in editions of *BM/E's* Survey of Broadcast Equipment over the coming months. **BM/E**

INTERPRETING THE FCC RULES & REGULATIONS

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

Ascertainment And Finance Requirements Eased

RECENTLY, THE FCC AMENDED its procedures governing the processing of contested broadcast applications. The purpose of these amendments was to reduce the unwarranted delays associated with processing new applications. These changes resulted from a report made to the Commission by Mr. Max D. Paglin. The *Paglin Report* evaluated existing Commission policies and made recommendations for specific changes. This article will review the ascertainment and financial showing requirements adopted by the Commission.

In 1971, the Commission adopted the *Primer on Ascertainment of Community Problems by Broadcast Applicants*[1] as a statement intended to clarify and provide guidelines concerning the Commission's policies and requirements in the ascertainment area. The Commission stated that it was striving for "a degree of flexibility" and that "guidelines that are too specific may result in too rigid an approach." Subsequently, in applying this principle, the Commission articulated a policy of "substantial compliance" with the *Primer* guidelines. In a 1974 decision concerning an applicant's ascertainment study, however, the Commission concluded that the study was defective because it did not include consultations with leaders of a significant interest group in the community to be served. This was the much criticized *Voice of Dixie, Inc.* case.[2]

As a result of the *Voice of Dixie, Inc.* decision, great emphasis was placed on "strict compliance" with all provisions of the *Primer*. The *Paglin Report* stated that under these conditions, ascertainment surveys were often the subject of many item-by-item attacks by opponents on the basis of sufficiency, compliance with the Commission requirements, and precedent. In addition, ascertainment studies often became the subject of cross-examination during the hearing. Further, even after the hearing and initial decision, questions as to the adequacy of the study conducted by the winning applicant were the subject of extensive review by the Review Board. In sum, Mr. Paglin and the Commission felt that ascertainment studies had become the source of much nit-picking in competitive multi-party cases.

For these reasons, the Commission determined that the practice of determining strict compliance with the *Primer on Ascertainment* should not be the criterion for passing upon the adequacy of an applicant's showing. Therefore, the Commission returned to the *previous* body of law which identified substantial compliance as being sufficient. This revised standard was made applicable immediately (1) to all levels of the Commission's adjuciatory process, (2) to all pending applications, *contested and uncontested*, and (3) to proceedings where ascertainment questions arise. This change will be welcomed by most new applicants and those involved in Commission's hearing process. However, it remains to be seen how this new standard will be applied at the lower levels of the Commission.[3]

The *Paglin Report* recommended that the Commission adopt an approach in the financial qualifications area similar to that adopted concerning ascertainment. Although the Communications Act provides that the Commission must make an affirmative finding that the applicant is financially qualified to construct a proposed station, the Commission's policies as to what showings are required to meet the basic test of financial qualifications have varied over the time.

The *Paglin Report* stated that although an applicant's financial showing is not one of the categories of comparative criteria in multi-party contested cases, the present procedures permitted some competing parties to attempt to raise questions about their opponent's finances which could only be characterized as litigation of trivia. The *Report* asserted that this process prejudiced those applicants who had limited resources, namely minority groups and small applicants. Mr. Paglin also asserted that, in his view, the matter of financial qualifications was a matter solely between the Commission and the applicant.

Hence, Mr. Paglin suggested that the Commission adopt a procedure similar to that suggested for ascertainment studies, whereby the financial qualification showing would be removed from the hearing process, absent the demonstrated existence of defects in the applicant's proposal. As a result, the mutually exclusive applicants would be required to make a threshhold showing in their application of compliance with the Commission's requirements, as contained in the application forms and declared policies — namely, financial capability to construct and operate the proposed station. This showing would then be reviewed by the staff in the course of processing the application. If found to be satisfactory, the statutory findings to the effect that the applicants are financially qualified would be recited in the designation order and this occurrence would dispose of the qualification factor. If the staff review showed the applicant's financial proposal to be defective, a hearing issue in that regard would be specified, and if not cured by the post-designation amendment, the issue would go to evidentiary hearing.

The Commission agreed with the findings in the *Paglin Report* regarding the problems created by the current procedures in this area and adopted a recommendation to institute the "threshhold showings" criterion set forth in the *Report*.

It is significant to note that these changes only apply to new applicants. Therefore, the standard applicable to renewal applications remains unchanged. **BM/E**

[1] 27 FCC 2nd 650 (1971).
[2] 45 FCC 2d 1027, *recon. denied*, 47 F.C.C. 2d 526 (1974).
[3] The Commission stated that it believed "that the above-cited cases (those cited in the Commission Order) and other prior processing experience provides sufficient guidance to the processing staff and to the public as to how the term (substantial compliance) will again be construed in ascertainment examinations."

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SPEAK OUT

Sharing The Wealth With A National Audience

By Wayne Baruch

ONCE UPON A TIME (about five years ago), disgruntled television viewers were apt to complain that national programming decisions were the too-exclusive province of a select few network executives sitting in the proverbial ivory tower somewhere. Those executives (it was said) could not accurately gauge the diverse tastes and requirements of the massive American televison audience, and as a result were delivering "homogenized programming" that didn't always satisfy the public's wants and needs — not to mention the public's curiosity.

This attitude was overly harsh. Network television is, after all, a mass medium that lends itself best to programming with a "common denominator" approach. Furthermore, I don't think the major networks have ever really been given proper recognition by their critics for the scope and variety of the programs that they do present. The networks cannot be all things to all people, and criticism of their national approach to programming is not unfounded, but rather misdirected.

Until fairly recently, both network affiliates and independent stations have done their best to live up to their local responsibilities by producing programs that deal with a variety of local or regional interests. In doing so, however, even the stations in the larger television markets have operated within the constraints of limited production budgets. After all, how can any individual broadcaster afford to spend the enormous amount of money that is normally required for the production of a national telecast in order to provide programming for the audience in one market? It's virtually impossible. Thus the individual viewer instinctively recognizes the two major differences between local and national programs: the subject matter, and the limits of production. (It's amazing how far a local station producer can make the dollar stretch in pursuit of a quality product.)

The situation is beginning to be very different. An innovation in local broadcasting is in full swing, thanks to the aggressive marketing attitudes of some local station managers, as well as the increased availability of satellite services for domestic broadcast purposes.

Some local stations have drawn the conclusion that they can equal or exceed the production values of a national telecast, provided they can infuse enough production capital into the project at hand. The simple extension of that conclusion is for individual stations to arrange for distribution of their product to other markets around the country, thereby amortizing the extra costs of production. The satellite system enables the producing station to distribute special programs to other markets at a lower cost than was possible through the exclusive use of terrestrial facilities.

The results have already been impressive. For example, KRON-TV (NBC) in San Francisco wanted to salute the arrival of the now legendary King Tut exhibit at a local museum. Although the Pharoah's roadshow had come to its last American engagement in San Francisco and had already been the subject of several award-winning local documentaries in other markets, KRON was determined to create an unprecedented television special to commemmorate the visit. KRON presold the program to close to 40 television stations around the country, thereby dramatically increasing the production budget. Produced by Ziggy Stone under the supervision of program director Charles Snyder, the KRON Tut special turned out to be a tremendously creative, informative, and entertaining 90-minute masterpiece. The most significant production device involved a split-screen effect with simultaneous live reports from San Francisco at mid-evening and Egypt at dawn. KRON's efforts were immediately rewarded by a 40-plus share of audience in prime time in the local market.

Other examples: The Capital Cities broadcast group, working out of flagship station WPVI in Philadelphia, has produced several public affairs specials dealing with energy and inflation. Each special has been topical, well-crafted, and expensive. The production wherewithal has been provided by clearance of the programs in upwards of 150 markets, which in turn supports sales to several national advertisers.

KATU-TV (ABC) in Portland, Ore. produced a two-hour live special telecast of the seventy-first annual Portland Rose Festival Grand Floral Parade on behalf of the Portland Rose Festival As-

Wayne Baruch is vice president of programming and station sales for the Robert Wold Co.

Speak Out

sociation. The program was simultaneously carried on a western regional network of approximately 40 stations and sold to several advertisers. The resulting production fund enabled KATU to attract the Goodyear Blimp, to deploy a complex hookup of video and audio equipment, and to secure a nationally known host (Kelly Lange) for the telecast.

Lest it be thought that this system can be initiated only by large-market stations, I would cite the example of the All-American Futurity telecast, which is produced and marketed by WIBW-TV (CBS) in Topeka, Kansas (market #136). For several years,the "world's richest horse race" has been seen in prime time on Labor Day by audiences in markets covering approximately 85 percent of the nation. WIBW executives Jerry Holley and Dick Siley (and a large and capable staff) have consistently delivered a telecast that is every bit as colorful, thrilling, and informative as any horse racing special ever seen on network. (It seems almost miraculous that a horse race of approximately 20 seconds' duration can be the subject of a gripping one-hour special). The Topeka audience is the direct beneficiary of WIBW's expertise and enthusiasm, but so are millions of other viewers across the country.

These are but a few cogent examples of the abilities of local stations to deliver programming to a regional or national audience. I believe that the pace will quicken in the next few years to the point that national network programming will be consistently supplemented by all manner of specials and series produced by local stations.

Any local station has a chance to concoct a special with national implications; the recipe is simple. Choose an event or issue that is of strong interest to the local market, examine its implications for wider distribution, and (if necessary) seek outside guidance on the question of marketing to other stations. (The Wold Company, which has been involved with all of the specials listed above, is pleased to encourage the proliferation of station-inspired programming. As a result, we are happy to offer as a courtesy the best marketing advice we can give to any station that wishes to pursue the possibilities.)

What are the benefits? Increased variety and quality of service to the community of license. A possible profit center for the local broadcaster. National recognition among sponsors and ad agencies. A boost in morale for the local production staff. The satisfaction of a significant accomplishment. Best of all, a positive answer to the critics who decry "homogenized programming." **BM/E**

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GREAT IDEA CONTEST

18. Auto Phone Answering Unit

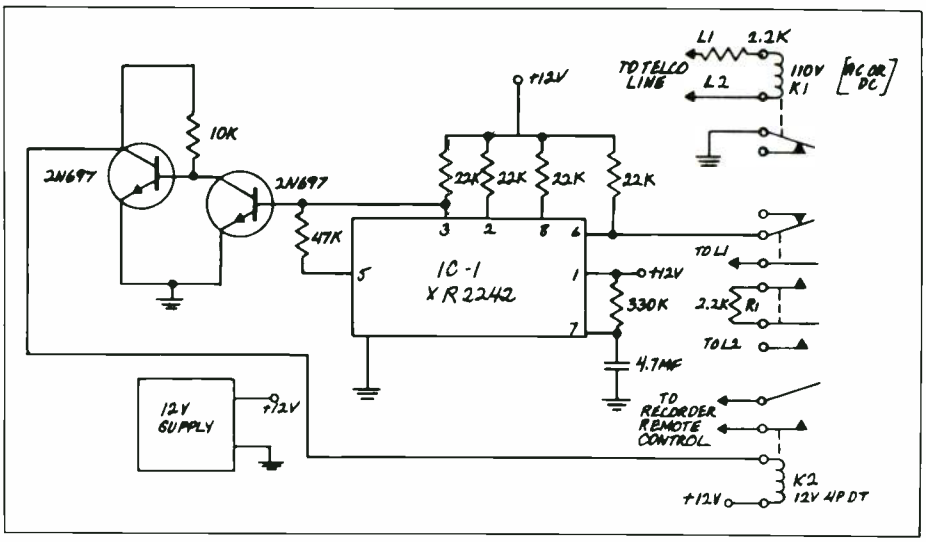
Jim Purcell, WFHR/WWRW, Wisconsin Rapids, Wisc.

Problem: To record air-quality telephone news reports at night without burdening the night announcer with one more job.

Solution: Although our "Code-A-Phone" will automatically record incoming telephone news reports from reporters on the night beat, they are not of air quality. So we needed an automatic unit that would "answer" the phone line and roll a tape recorder. The circuit in the schematic will do this.

Ring voltage on the phone line causes the 110 volt (ac or dc) relay, K-1, to pull in, unshorting the trigger input of IC-1, which is a solid state timer. The timer's cycle starts and its output goes low, causing K-2 to pull in by way of the two transistors. One set of contacts is in series with the IC trigger input, preventing false retriggering of the IC. Another set of contacts is connected to the tape recorder, which then starts to record. The recorder's input is also connected to the phone line by voice coupler or other method.

Finally two more sets of contacts dump a 2.2K resistor across the phone line, which has the same result of picking up a receiver, thus stopping the ringing. When the timer's cycle ends it drops K-2 and everything goes back to standby mode. The values shown give a timing cycle of about three minutes. To change the timing cycle divide desired time by 128. The result is equal to R × C.



Circuit for Purcell's phone answering unit

19. Automatic Cart Machine Sequencer

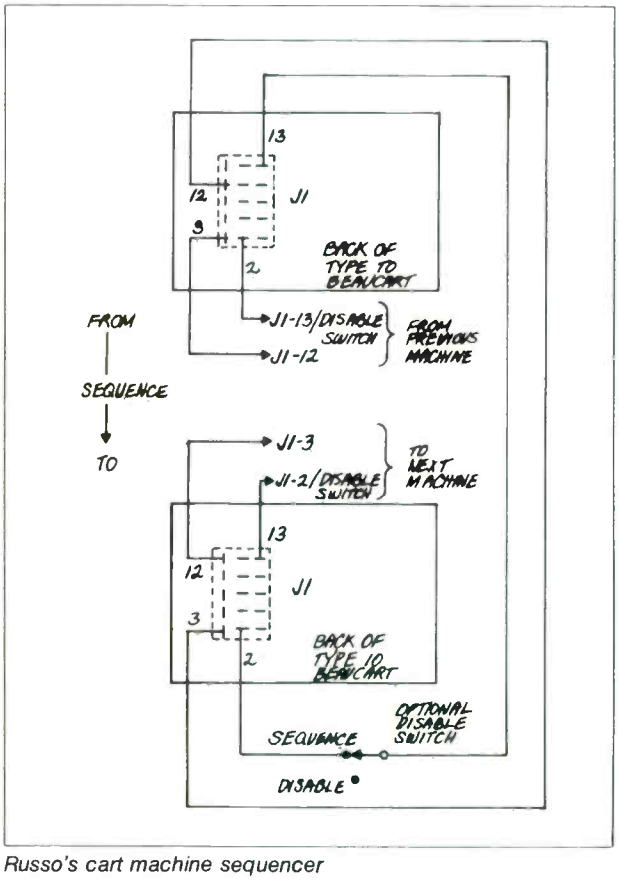
William A. Russo, Chief Engineer, and William C. Howe, Engineer, WEIV-FM, Ithaca, N.Y.

Problem: To tighten up segues between tunes in music sets and between spots in spot clusters, at minimum cost.

Solution: When WEIV switched to a contemporary all-music format last year, we needed to tighten up the timing on segues and to free them from the vagaries of human judgment. At the same time, we wanted to release the announcers from the need for excessive button-pushing. We had to do this with minimum monetary outlay. With all of our music and most of our spots on carts, we found an easy method for interconnecting our UMC Type 10 Beaucarts so that they automatically segued when desired.

To make our sequencer work, we record a tertiary cue at the end of every cut at the precise time at which we want to segue. Then, via remote connectors J1 on the Beaucarts, we "feed" a relay closure (tertiary cue switching, pins 12 and 13) from the machine that is running to the remote START input (J1 pins 2 and 3) of the machine to be segued. Our machines are stacked in groups of four and the sequence runs from the top down. The fourth machine controls the first to complete the sequencing loop.

There are two ways to end a sequence. The simpler way is to leave unloaded the cart machine following the last one to be played in the sequence. When the sequencer tries to start that machine, nothing happens. This method is most practical when there are more than four machines in the loop. The other way, most feasible when four or fewer machines are in the loop, is to use a multipole switch to break the inter-machine connections when sequencing is not desired. This DISABLE switch can be mounted in any convenient place. Using this method, you need one switch



Russo's cart machine sequencer

pole for each cart machine in the loop. Or, you could use a single-pole switch along with an external multipole relay and power supply; the relay contacts could then be wired to do the necessary inter-machine switching. To start or restart the sequencing, push the START button of the first machine to be played and reset the DISABLE switch, if you're using one.

Any kind of cable will work for the interconnections, and the wiring can be quickly unplugged for servicing. If preferred, secondary cue switching (pins 10 and 11 of J1) may be used in place of tertiary cue switching. This scheme will work with any cart machines having appropriate remote connections.

20. TCR Problem Alarm

Carl Roszczybiuk, Maintenance Supervisor, WSNS-TV, Chicago, Ill.

Problem: To devise an audible alarm that warns TCR operators of misthreads and "bin empty" situations, among other things, and ignores temporary instability indications during normal loading.

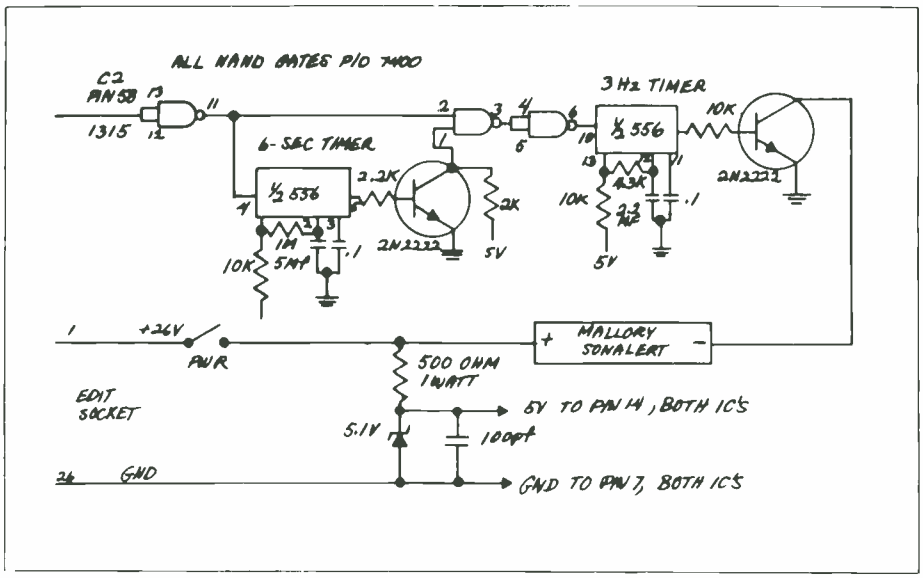
Solution: TCR 100 operators not in the immediate vicinity of the machine are often not aware of conditions that could be remedied in time to save a spot. As delivered, the TCR-100 contains a remote provision for indicating that a trouble light is on at the main unit. If a "BIN EMPTY" signal is added to this line, providing a delay to ignore temporary instabilities which occur during threading, this signal may be used to activate an audible alarm.

The level at C2-pin 56 is normally HIGH, but goes LOW to indicate a malfunction. As shown in the diagram, it is isolated and inverted by the first NAND gate and used both to inhibit the second NAND gate (and following circuits) during normal times and to enable that NAND

gate and activate the six-second timer when trouble occurs.

For the first six seconds after an indication is recieved, the second NAND gate has a negative signal on its second input (pin 1); thereafter, it goes on and off every six seconds. The second timer is therefore activated six out of every twelve seconds and drives the SONALERT during ON periods at a 3 Hz rate. The sound produced is very distinctive. No reset is needed; the alarm goes off when the problem is cleared. The circuit may be built separately and mounted on any convenient blank panel space, with the SONALERT and power switch accessible and the simple electronics just behind.

To add the "BIN EMPTY" signal, connect a jumper from pin 20 of B3(820) to pin 13 of C14(1312). In MASTER KIT installations only, it will also be necessary to remove the connection to pin 3 of C5; otherwise, the alarm will sound whenever MASTER IN USE indicates that the associated reel-to-reel machine is operating. Since these are the only changes required, operation of the indicators on the TCR is unaffected.



Roszczybuik's TCR problem alarm

Rules for BM/E's Great Idea Contest

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

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

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

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

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

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

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New York, New York 10017

1979 Entry Form

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

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

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

BROADCAST EQUIPMENT

Radio Automation System 250

System 7000 is a sophisticated programming and management automation system for radio stations. Based on the Z80 microprocessor, the system is designed to expand as needed by the user. Memory is expandable to 10,000 events, 1000 at a time; the system will accommodate as many as 64 audio sources, four separate CRT channels, and an unlimited number of terminals. A logging system and a real-time clock subsystem may also be added. Dedicated CRT terminal may be located anywhere that is convenient; video terminals may be added for different functions. Terminal keyboards are color-coded and interlocked. All entries and system responses are displayed in broadcast English, and the system verifies entries step-by-step. The program sequence display looks ahead to 19 events at once. In the editing mode, the display shows five events ahead and five behind. Other features include error detection and display, dual stereo program buses that automatically balance voice over music, "debug" card, and remote control options. Audio characteristics are as follows: frequency response, ±1 dB, 50 to 15,000 Hz (including 25 Hz filtering); THD less than 0.5 percent at +18 dBm (typically 0.1 percent); line output, 600 ohms balanced (stereo at +8 dBm), adjustable −20 to +8 dBm out; S/N, −69 dB below +8 dBm (not including audio source noise). CETEC BROADCAST GROUP.

Digital Video Effects 251

The DVE Mk II digital video effects system was designed to complement the manufacturer's 300 Series switchers and incorporates the NEC Model DVP-16 digital video processor. Features include: continuous, smooth picture expansion from zero to over 4x size; picture freeze (field or frame selectable); multiple freeze, allowing the user to deposit four, nine, or 16 frozen images on the screen at preselected intervals; auto freeze, providing silent motion picture effects; progressive freeze, the ability to freeze the area revealed by a moving wipe pattern; horizontal and vertical picture inversion; and horizontal and vertical picture flips. The unit has push-on/push-off and simultaneous push-on/push-off capabilities plus "special defect," strobe action, and tracking chroma key. It also includes a noise reduction system. Operation and maintenance training will be available to purchasers. THE GRASS VALLEY GROUP.

Audio Tape Recorder/Reproducer 252

This ¼-inch digital audio tape recorder/reproducer system, introduced at the AES show, features four digital audio channels plus three additional longitudinal channels for analog recording. A monolitic A-D, D-A converter has 16 bits quantizing

accuracy and operational speed sufficient for wideband audio applications. The tape transport system features a closed loop capstan for constant tape tension. The system is engineered to use only as much recording medium (tape) as a half-track analog system operating at 15 ips. Other specs include: tape speed, 15 ips; maximum recording time (10-inch reel), one hour; bandwidth, 20 Hz to 20 kHz within ±0.5 dB; dynamic range, 90 dB minimum; THD, less than 0.05 percent. TECHNICS.

Video Production Switchers 253

The 1200 series is designed with a "building block" concept; units feature from 12 to 20 tallied inputs and from one to three M/E amplifiers with or without an additional mix keyer. Units incorporate a 32-pattern generator with a pushbutton and assign delegate system using LED readout of the chosen pattern. Each M/E includes electronic spotlight (zero to 100 percent video level attenuation), mix or wipe to preset limit, and auto transition. Also standard are separate colorizer for each M/E, selectable fade-thru-black using

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

synchronous or non-synchronous sources, pattern rotate and modulate, and hard, soft, and bordered wipes. "Tandem keying" allows a primary key (luminance or chroma) plus the addition of a second key (with outline, shadow, and border) in each M/E. Options include encoded, RGB, and shadow chroma keyers, one bus quad split, pointer generators, and various types of routing matrices and input selectors. $12,500 to $39,615. INDUSTRIAL SCIENCES, INC. (ISI).

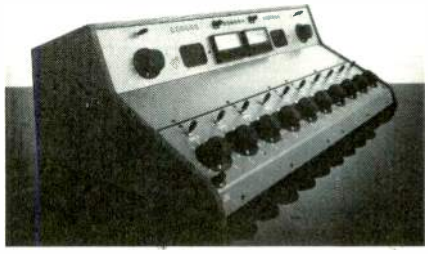
Random Access Controller 254

This electronic slide/slow-motion disc recorder combination features random access of 600 electronic slides along with full "Instant Replay" slow mo-

tion. A keyboard control addresses any location in the disc chassis, typically locating it within a second. Once located, a sequence can be played as single steps, animation crawl, or at speeds up to full motion in either direction. Each new image is a vertical interval switch, giving a clean transition. Single images may be displayed as either fields or frames. A single switch converts the slide unit to a full slow-motion "Instant Replay" disc. The 14-inch high, 100-pound unit will fit in a sports van; it draws 4 amps. Suggested applications include sports and election coverage, as well as commercial production. $27,500. EIGEN VIDEO.

Audio Console 255

Model 7000 is a stereo console with mono-out capability. It handles 22 inputs through 12 channels. Audition output is stereo, with specifications identical to program. Audio mixing is dc voltage-controlled; the dc control



system allows the use of more economical parts in non-audio areas of the console. The console contains full RFI protection. Electronics are all balanced-in/balanced-out. Standard features include stereo cue speakers, program VU meters, six selectable inputs for channels 1 and 2, switchable LED level display, and control room monitor level. Frequency response is rated at ±1 dB, 20 Hz to 20 kHz at normal maximum output for all outputs; distortion for all outputs is 0.09 percent or lower, 20 Hz to 20 kHz. Noise for all circuits is claimed as better than −70 dB below normal maximum output, WTD, RMS (ASA). Standard 19-inch rack-mount chassis. $3995. HOWE AUDIO PRODUCTIONS, INC.

Audio Distribution Amps 256

Models 7821 and 7822 achieve claimed low distortion and noise with MAP audio opamps in a completely transformerless bridging input, differential amplifier configuration. Model 7821 provides eight balanced outputs from one input; Model 7822 has 16 balanced outputs from two separate inputs. All outputs are 600 ohm at up to +20 dBm level per output with a minimum of 80 dB of isolation between outputs and from output to input. The units may alternatively supply 16 and 32 unbalanced outputs, respectively. Inputs can be strapped for a single source feed, and the amps are internally protected against short circuit and input overload. All controls, including a power circuit breaker, pilot lamp, and switchable I/O VU meters, are located on the 1¾-inch high front panel. MODULAR AUDIO PRODUCTS.

ENG/EFP Zoom Lens 257

This new 17X ENG/EFP zoom lens, introduced at NAB in Dallas, offers an F/1.7 aperture and built-in 2X extender, giving it a total range of 9 — 306

mm. The wide angle can be increased with an optional adaptor to 7 mm; at the other extreme, the tele adaptor gives it a maximum 550 mm focal length. The 17x9 lens weighs 2.5 kg. Standard features include servo-controlled zoom and iris with manual overrides and adjustable back focus. The manufacturer also offers a full range of accessories for converting the lens to studio use. FUJINON OPTICAL, INC.

Preamp/Mixer 258

The 3990 preamp/mixer for creative audio and disco format broadcast use features three sets of line and phono inputs, each with its own rotary level control. The unit has complete cueing capabilities for previewing all inputs and program output for simultaneous monitoring. Complete microphone facilities include balanced differential input, bass equalization, and optoelectronic talkover with adjustable program mute attenuator. Other features include two sets of stereo main outputs and a monaural output, switchable signal processor loop for connection of effects device or equalizer. Frequency response for all sections is rated at ±.25 dB, 20 Hz to 20 kHz. Distortion for phono section is less than .01 percent harmonic and IM and signal-to-noise ratio is 80 dB below 10 mV, unweighted. GLI INTEGRATED SOUND SYSTEMS.

Single Yagi Antennas 259

The PD-156S and PD-1158S single yagi antennas are designed to complement the maker's PD-390S five-element array. The 156S is a four-element array with 7 dBd gain available in the 66 to 88 MHz band and 144 to 174 MHz range. The 1158S is a six-element yagi with 9 dBd gain, available in the 144 to 174 MHz band. Bandwidth of both antennas is 4 MHz at 150 MHz for 1.5:1 VSWR. They feature a 20 dB minimum front-to-back ratio and are supplied with 36-inch flexible jumpers of RG-8A/U with type N male terminations. Designed for front-end mounting, they many be mounted either for horizontal or vertical polarization with the hardware supplied on up to 2⅜-inch OD tower leg. PHELPS DODGE COMMUNICATIONS CO.

Harmonizer 260

The Model H949 harmonizer can change the pitch of an input signal by three octaves (one up, two down). It has two outputs, each with 400 ms delay. Frequency response is 16 kHz and S/N is 96 dB. The unit's capabilities include flanging, repeat, random delay (for automatic double-tracking), and reverse, described as an entirely new effect. The micro pitch change function allows precise, stable settings and is designed for tuning in a late addition to a mix or for adding "body" to a vocal or instrumental sound. The user can select from two different algorithms to handle the pitch change glitches. Delay is selected by incremental pushbuttons; pitch change is controlled either by a knob (manual mode) or by the HK940 keyboard, which varies the pitch in discrete musical steps. The unit is switchable for 115 or 230 V. $2400. EVENTIDE CLOCKWORKS, INC.

Sibilance Controller 261

The 526A Dynamic Sibilance Controller performs de-essing of vocal material to reduce excessive sibilance to natural levels in recording and broadcast applications. According to the manufacturer, the technique used does not degrade intelligibility or presence and adds no distortion or other processing artifacts. The unit features a threshold-tracking circuit which maintains a constant level of de-essing in spite of input level variations. A set of lamps monitors both the de-essing action and the output level. The input is transformer-coupled and will accept mic or line levels through a built-in XLR-style connector. Output is transformer balanced and floating. $399. ORBAN ASSOCIATES, INC.

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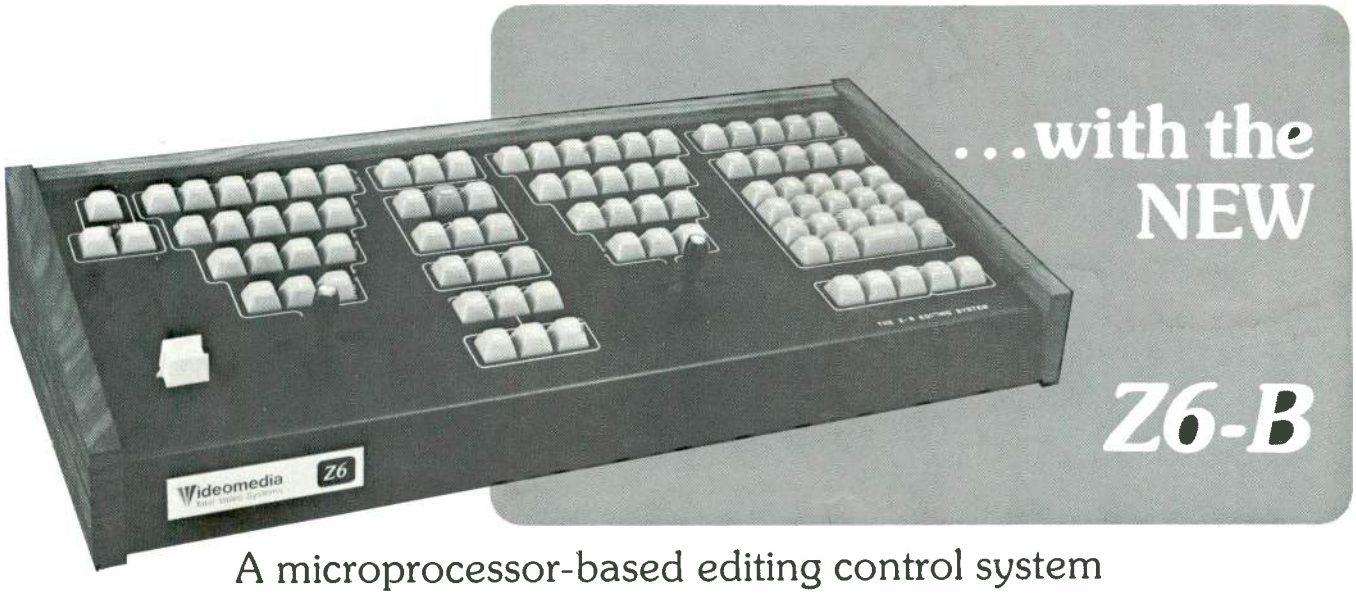

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