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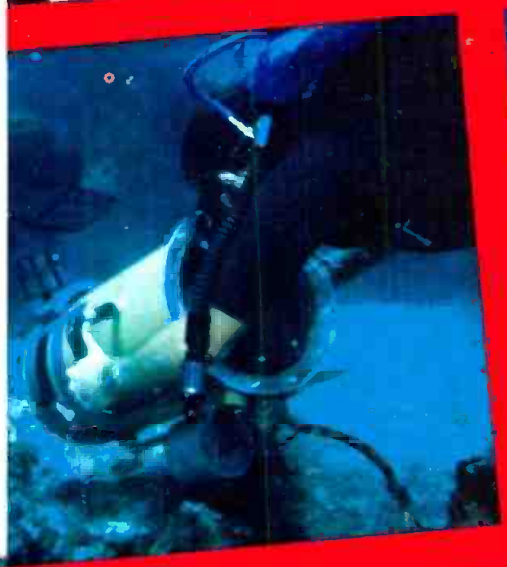

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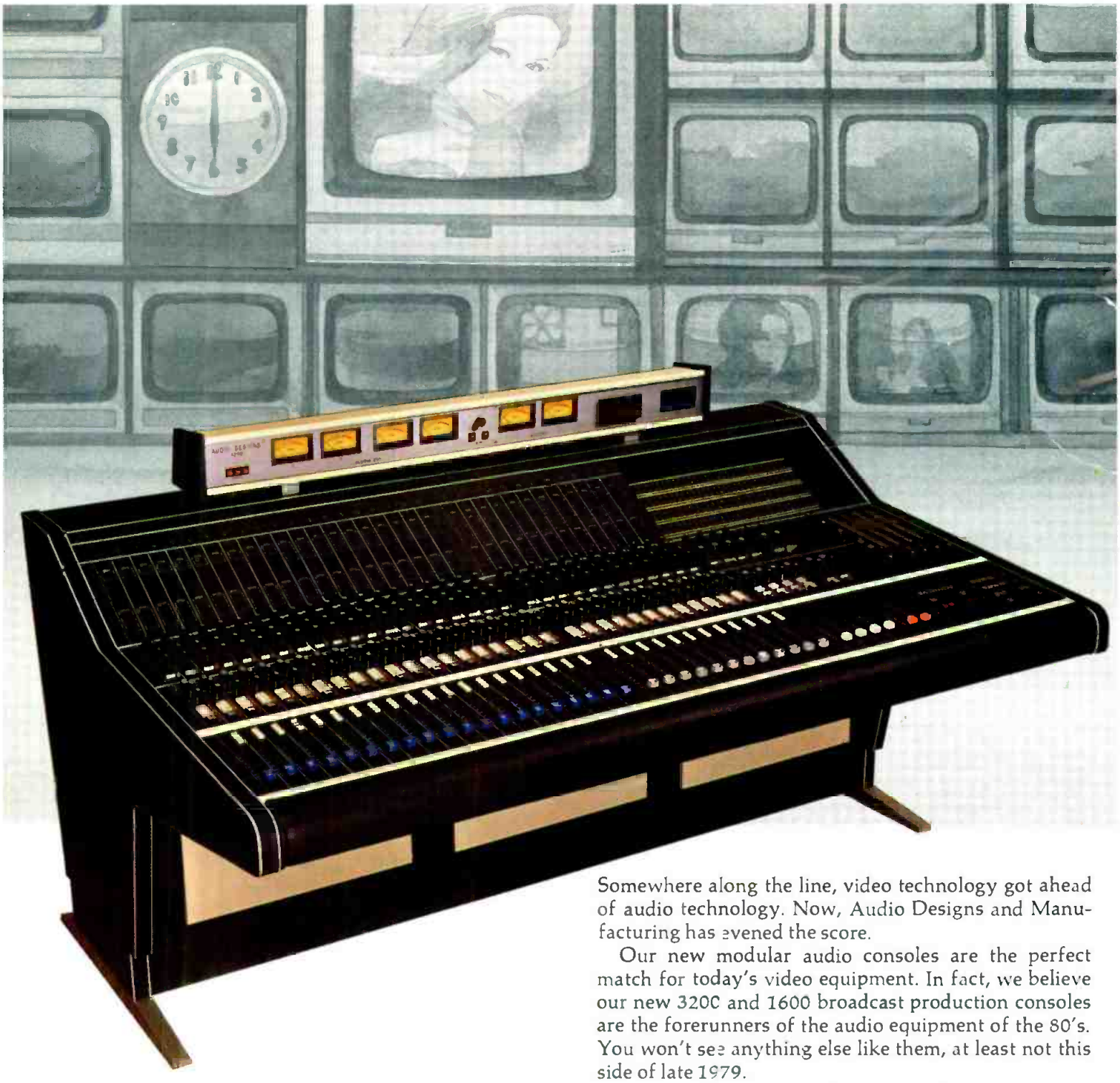

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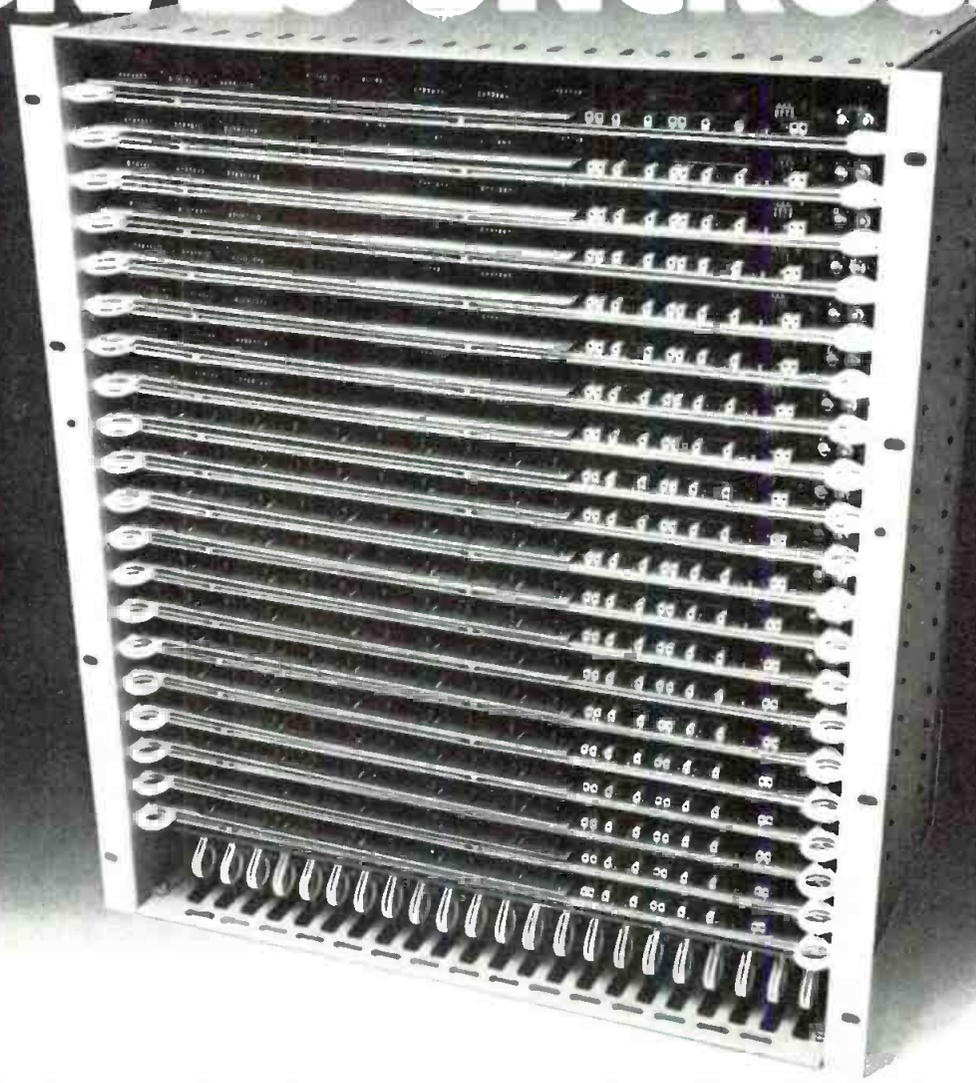

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APRIL 1979/VOLUME 15/NUMBER 4

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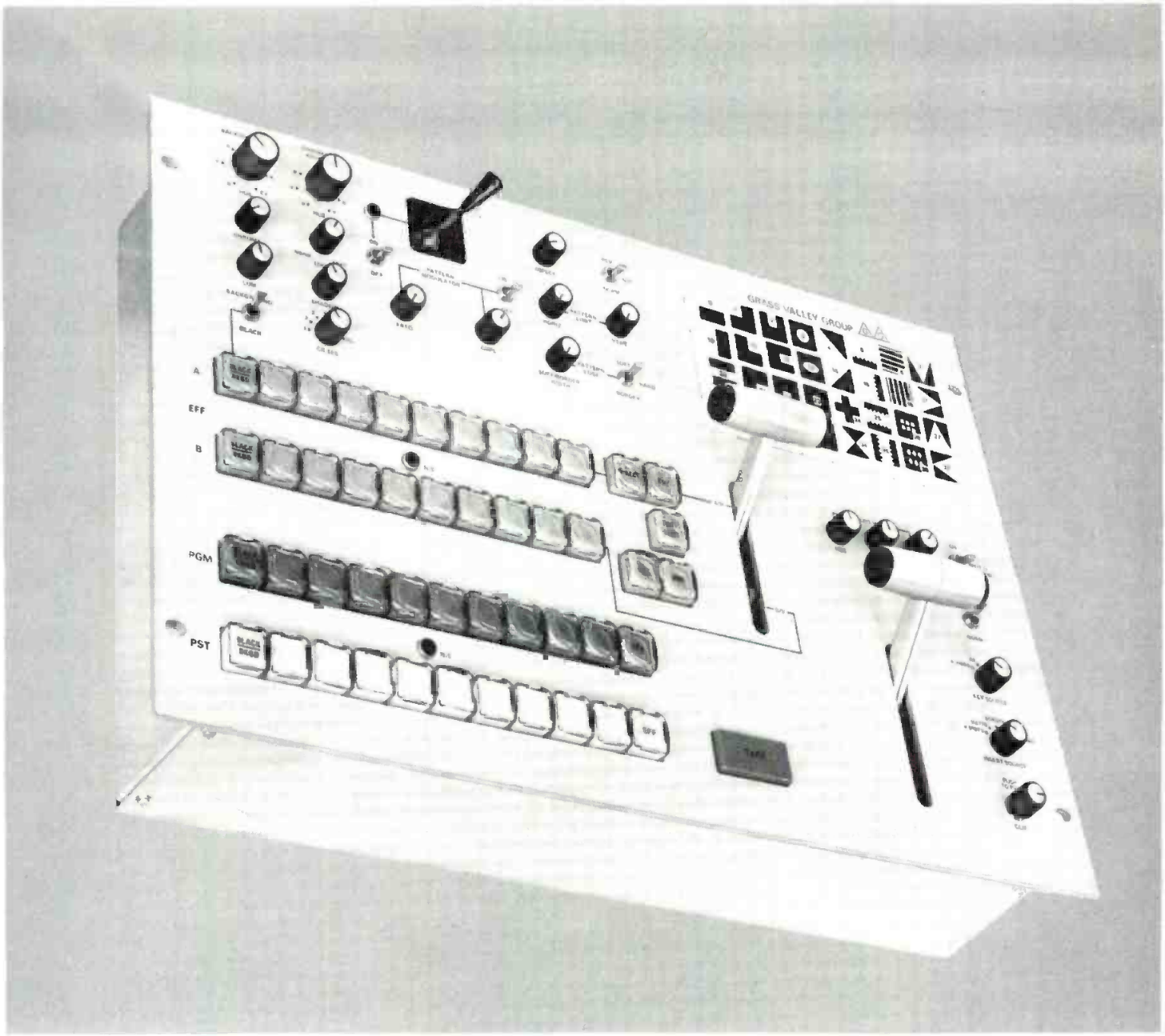

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BROADCAST INDUSTRY NEWS

UPI To Build Satellite News Distribution System

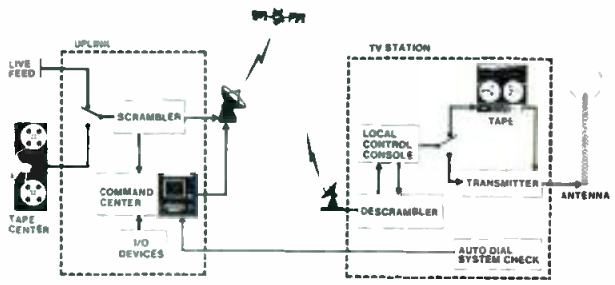
United Press International has received approval from the FCC's Common Carrier Bureau for an application to build and operate up to 30 receive-only satellite earth stations in a test system for distribution of news.

The test program will initially involve installation of terminals at UPI's New York headquarters, the Missouri state radio network, and nine radio stations — WINZ, Miami; WNOX, Knoxville, Tenn.; WHDH, Boston; WBAM, Montgomery, Ala.; KOY, Phoenix, Ariz.; KSL, Salt Lake City; KPFI, Kailispell, Mont.; KKYX, San Antonio, Texas; and WHEB, Portsmouth, N.H. Other test sites will be added as the program progresses.

RCA American Communications, Inc., and Western Union will cooperate with UPI in development of the new system's satellite capacity. Harris Corp.'s Satellite Communications Division, Farinon Satellite Systems, Comtech Laboratories, Inc., California Microwave, Inc., and Hughes Aircraft Co. will be among the suppliers of earth stations for the systems.

UPI's philosophy in the design of the system includes several concepts: that the service should deal with a common carrier; that subscribers be able to use the earth stations in any manner they desire, changing or adding services without high start-up costs; that the system be designed to accomodate service delivery changes and additions with plug-in electronic modules; and that earth stations be small and light to minimize installation expenses and simplify any necessary shielding.

According to UPI, the system should require only a minimum of government regulation, since receive-only earth stations do not interfere with other radio services. End users or common carriers will be expected to assume responsibility for resolving any local radio interference problems that might develop.



Syndicator supplies program material and coded station address to SMARTS system. Program is scrambled and transmitted to station, where it is descrambled and recorded or aired

Age Of Satellite Distribution For Commercial Broadcasters Begins

RCA Americom, Viacom, and Post Newsweek Stations have announced a major agreement to begin an experiment this year in satellite distribution of syndicated programs and other material via satellite as an alternative to traditional distribution methods.

RCA American Communications president Andrew S. Inglis outlined the plan whereby RCA will construct and maintain "receive only" earth stations, valued at more than $25.000 each, at Post Newsweek stations in Hartford, Conn., Detroit, Jacksonville, and Miami at no cost to Post Newsweek Stations other than for power and real estate on which to locate the earth stations. Viacom will distribute its programs, such as *Family Feud* and *All in the Family*, to PNS stations via RCA's Satcom satellite.

According to Inglis, the program will be supplied to an RCA satellite uplink equipped with a special command center that will incorporate a cue track and scrambling system to protect the program from unauthorized use. The cue track will contain a special code that includes an address that triggers the recording system at the designated stations. The cue track will also contain a "key" word that will allow the decoder at the receive station to unscramble the signal.

Viacom's chairman and chief executive officer Ralph Baruch, Post Newsweek Stations' president Joel Chaseman, and Inglis all seemed to believe that this experiment is a "major breakthrough" in the use of satellites for commercial television. Inglis indicated that FCC approval for the project would have to be obtained, but thought it would be forthcoming within six months. Once approved, the earth stations would be constructed and regular distribution of syndicated programs could begin before the end of this year.

RCA plans to offer similar earth stations to any television broadcaster requesting the service. The earth station would be constructed at the station with no cost to the broadcaster except for real estate and electrical power. The syndicator would bear the direct cost of the distribution.

The proposed tariff for the system, known as SMARTS (Selective Multiple Address Radio and Television System), would cost $69 per hour per station for a syndicator running six hours of programming a day to 100 stations during off-peak times.

FCC Commissioner Quello Pledges Fight For VHF-UHF Comparability

FCC Commissioner James H. Quello told broadcasters attending the annual Independent Television Association convention in Washington, D.C., "I personally am committed to UHF-VH comparability so broadcasting can provide a greater diversity and ever improved quality of service and eventual complete freedom of speech and press for all broadcasting. I pledge you my best efforts."

Pointing out that he personally and the Commission as a whole were committed to fostering the growth of UHF television, Commissioner Quello told the assembled independent broadcasters, the majority of whom operate UHF stations, that the Commission was working on such problems as improving noise figures, which he feels is "vital to comparability"; considering

continued on page 8

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new approaches in design for UHF transmitters and receivers, particularly the tuner; and the feasibility, economically and technically, of providing the power levels necessary to overcome power losses inherent in the higher frequencies.

Commissioner Quello noted, "Very few UHF stations operate with maximum power and antenna height. A quick glance at the economics of UHF television provides a ready explanation of the problem. When you consider operating costs of a UHF transmitting system, the UHF operators' disadvantage ranges from about 10–1 to 15–1 when compared with high-band and low-band UHF respectively."

"Fortunately," said the Commissioner, "there are some technological improvements just ahead which hold great promise for significant reduction of UHF transmitting costs. The key to the reduced cost and increased efficiency seems to be the klystron. Either the cost of klystrons must go down and the efficiency go up dramatically, or another means of very high power amplification must be found."

Commissioner Quello noted that the French have been working on vacuum tube devices similar to those used now in VHF. And, he said, "There seems to be some hope that this will be possible. That's good news. The bad news is that it is expected that about five years will pass before these devices become available."

Commissioner Quello ended his talk to the independent broadcasters on an upbeat note. "The future outlook for independent television stations has never been better and the present isn't bad either. UHF television is more viable today than ever before."

BM/E Announces Best Station Award Winners

Several extremely tight races have finally been resolved, and *BM/E* is pleased to announce the following winners of the 1978 Best Station Award competition.

AM/FM Radio: WBEN, Buffalo, N.Y. (entry submitted by Dave May, director of engineering).

AM Radio: KWK, St. Louis, Mo. (entry prepared from material furnished by Edward Jurich, chief engineer).

FM Radio: WXRT, Chicago, Ill. (entry submitted by Barry A. DeWolfe, public relations director, and the station staff).

Television: KCMO, Fairway, Kansas (entry prepared from material furnished by Steve Smith, director of engineering and director of television engineering for Meredith Corp.).

BM/E wishes to thank our readers for their high degree of interest in all the Best Station entries which ran in our December, 1978 issue. Congratulations to the winners, each of whom will receive a handsome plaque commemorating the award.

Entries for the 1979 contest are due by November. Contact *BM/E* for further details.

FCC Proposes Application Rule Changes

The FCC has proposed rule changes that would make it easier for broadcasters to construct or improve their facilities without interfering with the Commission's fixed monitoring stations.

At present, construction applications are reviewed after filing for conformance to FCC technical requirements for protection of the monitoring stations. If the Commission determines that an applicant has failed to meet the

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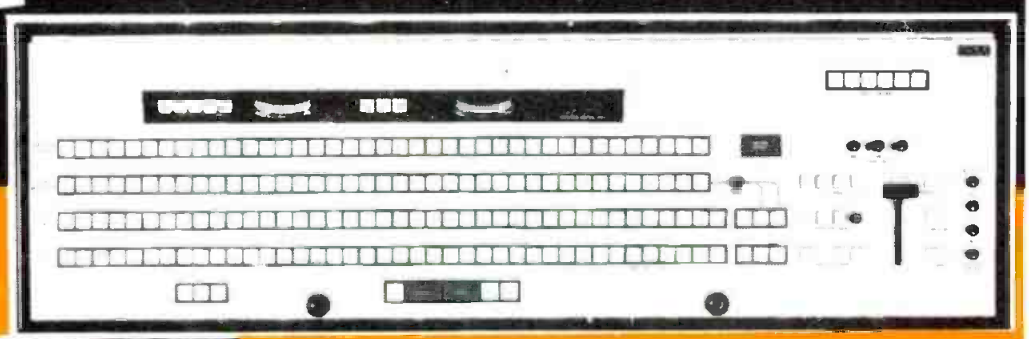

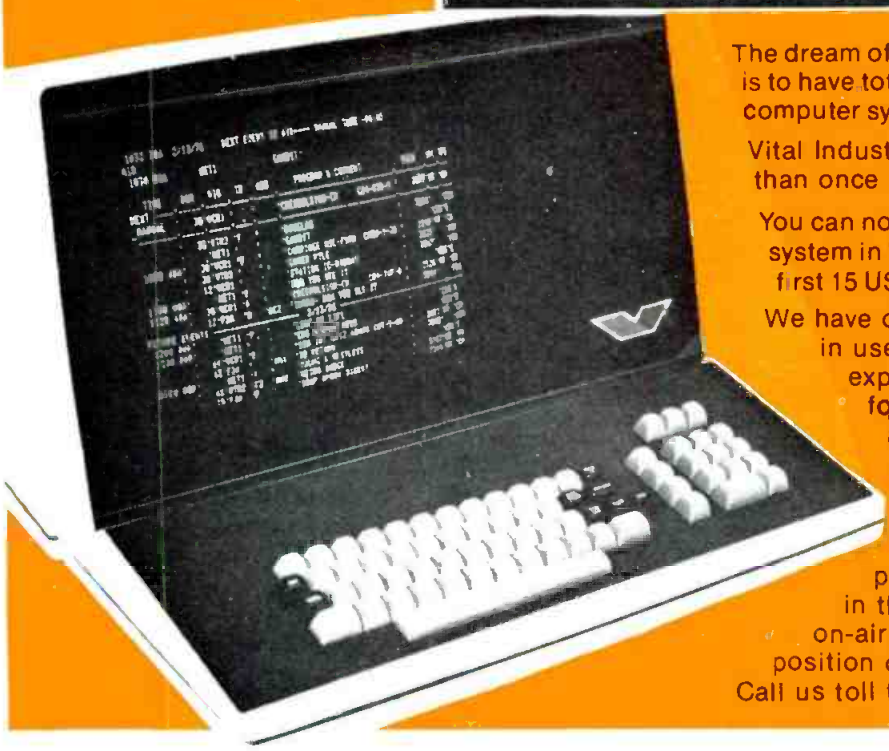

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required protection, the applicant may incur considerable expense in modification of its proposal.

Under the changes now being considered, applicants would be required to conform to the protection rules before filing for construction permits.

In a statement supporting the proposed changes, the National Association of Broadcasters noted its assumption that the monitoring stations are using the most advanced equipment and technology to insure that the public is not deprived of any proposed improvement in broadcast service. In any case where a monitoring station has become obsolete it should be moved, said NAB.

Ampex Introduces Metal Particle Tape

Ampex Corporation has announced the development of a metal particle tape which will be offered initially in audio cassettes for the consumer market. The tape uses a new binder formulation and an exclusive, highly stable metal particle developed by the company's tape division. According to Ampex, the new cassette provides high frequency (short wavelength) saturation capability more than 10 dB better than standard gamma-ferric oxides when measured at 10 kHz and more than 5 dB over high-bias formulations. Ampex plans limited distribution of the tape before the end of 1979.

A metal audio tape was shown at the Tokyo Audio Fair late last year by 3M Company (see *BM/E*, December, 1978).

D.C. All-News Stations Fail

Stiff competition, economics, Washington's distinctive demography, and changed public attitudes toward news all contributed to the demise of three all-news stations in the District of Columbia area. Independent WAVA-AM now utilizes a rock format; WTOP-AM, a CBS affiliate, remains all-news during daylight hours with heavy emphasis on play-by-play sports, but switches to talk shows at night; and WRC-AM, NBC affiliate, is almost all talk.

In interviews with top management at the stations, Lincoln Furber, acting dean of the American University's School of Communication, found that the all-news stations competed for audience and advertising with each other as well as with other area AM stations with agressive news operations. In addition, the Washington *Post*, a dominant morning paper, cuts into the a.m. news audience in the area, further reducing listener demands for radio news.

WTOP news executive Ed Tobias told Furber that all-news operations have substantial overhead because of the need for extra lines, large engineering staffs, and overtime pay for reporters. Several executives said that there wasn't enough revenue to go around and that there was a national trend away from all-news.

A major obstacle to acceptance of the format was that the three areas comprising metropolitan Washington — the District of Columbia, northern Virginia, and the nearby Maryland counties — have widely differing local interests. Furber found that the news stations never made the necessary commitments to assure listener loyalty.

Arthur Arundel, past owner of WAVA, said that a major factor in the all-news format's failure was the changing quality of news itself. From the early 1960s to the mid-70s, news was exciting enough to serve as entertainment for many people. Then, claimed Arundel, "Jimmy Carter came along, and the public returned to jukebox radio."

continued on page 12

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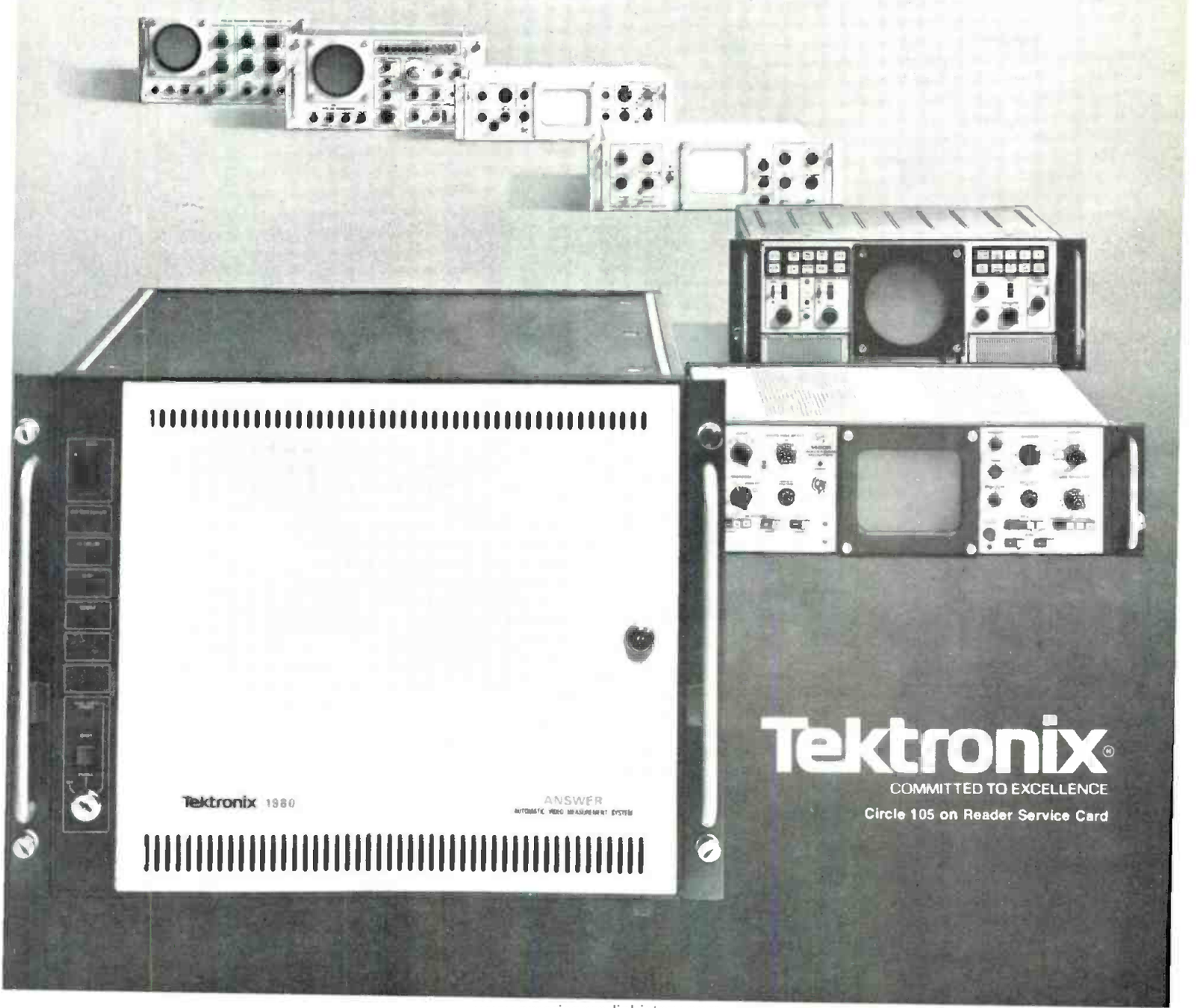

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News

Western Union To Launch Westar III In August

Western Union will launch the third satellite in its Westar system this August, pending approval by the FCC. Westar III has been a ground-ready spare for the system, but current heavy use of Westar I and Westar II convinced WU to put Westar III in the air.

Each Westar satellite has 12 transponders, each of which relays 1200 one-way voice circuits, one color TV signal, or data at up to 60 million bits per second. The Westar system includes a 9000-mile transcontinental microwave network and extensive local cable facilities, and covers nearly all of North America and Hawaii. The Public Broadcasting Service uses Westar to distribute television programming to its affiliates. National Public Radio and the Mutual Broadcasting System both plan to switch to the WU satellite system in the near future.

Westar III recently underwent an extensive checkout by Hughes Aircraft Co., its manufacturer. Arrangements have already been made with NASA for the launch.

WU, at NASA's behest, is presently developing an advanced satellite network to track and handle communications with other spacecraft in the 1980s.

In a similar announcement, RCA American Communications said that it has applied to the FCC for authority to build a fourth satellite in its Satcom series. Satcom IV will be used as a ground spare, but launch services will be requested from NASA for April 1981, pending FCC approval. The new bird will be similar to the other three Satcom satellites, the latest of which, Satcom III, will be launched in December, 1979.

White Urges Broadcasters To Support Rewrite Efforts

FCC Commissioner Margita E. White, speaking to the Georgia Association of Broadcasters, stated that the impetus for deregulation is unlikely to come from the FCC itself and that legislation, specifically the Communications Act rewrite, is necessary to insure that deregulation will take place.

According to White, the FCC, "clinging to legal precedents built on an outdated law, propelled by an institutional momentum for ever-increasing regulation, and with a mindset that the public interest is 'disserved' by eliminating regulations, is unlikely to provide for any meaningful or permanent deregulation" of radio and television.

Noting that the FCC staff is preparing recommendations to implement experimental radio deregulation in major markets, Commissioner White stated, "Experiments simply will put off forcing the Commission to explain why — in today's competitive environment — regulation of radio is in the public interest. Experiments also will put off deregulation for all broadcasters."

INTV Convention Draws Record Crowds To Washington

Robert W. "Bob" Wormington, chairman of the board of the Independent Television Station Association, opened the sixth annual INTV convention at the Shoreham Hotel, Washington, D.C., with the announcement that the convention had surpassed all previous records for registration figures, topping the 500 mark, and that the INTV association had assumed a position of major importance in broadcast industry affairs.

continued on page 14

STATE OF THE ART

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News

The increasing impact of the independent broadcasters' activities, particularly in such major issues as children's programming, syndicated programming, and improvement in technological developments, was highlighted by the presence of some 48 guests from the FCC, including 17 from the cable bureau. Two FCC members, James Quello and FCC chairman Charles Ferris, were guest speakers, and Congressman Lionel Van Deerlin was a guest speaker on a trade publications panel concerning the Communications Act rewrite.

More than 75 program syndicators were on hand for the convention, as well as a substantial number of advertising and agency people. The thrust of the four-day convention was the INTV's increasing activities in Washington, particularly in so far as children's programming is concerned, the outlook for general programming in the future, the future role of the super station, and the rapidly increasing advances in technology which are destined to benefit the UHF industry to a great degree.

Plans for the seventh annual convention, which will be held in Houston in 1980, were also announced.

News Briefs

The National Radio Broadcasters Association has announced plans for an **all-industry committee to study the effects of 9 kHz spacing.** The committee will be comprised of proponents, opponents, and interested neutral parties to determine both the benefits and detriments of reduced AM spacing. Technical consultants will also be used . . . . **The National Association of Broadcasters** has asked the FCC to form a **Government/Industry Advisory Committee to study proposals** to insure that all present and future radio stations be authorized to provide full time service without significantly diminishing service by other classes of stations. The proposed committee would compile technical and economic data on the problem and evaluate possible solutions.

NRBA president Jim Gabbert told the Wisconsin Broadcasters Association that **license security is the first step in fostering significant minority broadcast holdings.** Noting that 80 percent of a station's sale price is actually for the license, and that under present law the license cannot be used as collateral, Gabbert stated, "It's no wonder financing is so difficult to come by . . . . If licenses were secure and could be used as collateral, the number of minority owners could increase dramatically" . . . . The **NAB has objected to the FCC's proposal** to base a new fee schedule for broadcasters on anything other than application processing costs and to the Commission's recommendation that Congress impose a spectrum use tax . . . . Daniel W. Kops, chairman of the NAB Radio Research Committee, has **asked Arbitron to continue its policy against station tactics** that may distort rating surveys. Station exhortations to listeners to "cooperate with radio surveys in progress" may "distort the results of diary or other survey techniques," according to Kops.

Radio-Television News Directors Association president Paul Davis blasted broadcast reporters and technicians who "think that a grubby appearance has replaced the editor's green eyeshade as a symbol of their trade" and who "seem to have learned equipment positioning in a wrestling arena." Davis urged the offending crews to avoid "repeated rudeness and unprofessional behavior" and to act and dress with decorum while on the

continued on page 19

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Ideally then, you want a one-person camera crew that can slip solo into action — unfettered by other crew members, extra cables, or snag-prone appendages like battery cables or belts. The camera should be very light and well balanced. Ideally also, it should yield studio-quality pictures — and with unfailing reliability. All of which defines the HL-79A.

In the authentic lineage of Ikegami cameras the HL-79A inaugurates the era of one-person ENG camera crews (just as its predecessors, the HL-33, HL-35, and HL-77 pioneered ENG itself). It is now unmatched by anything else, feature for feature.

Shaped for action At 11.2 pounds for camera, pickup tubes and 1.5-inch high-resolution viewfinder, the HL-79A is lighter than any other 3-tube prism-optic, top-flight ENG camera. Its distinctive low-profile shoulder contour and low center of gravity make it the easiest to carry, aim, focus, follow action. The one-person ENG crew enjoys greater speed and mobility, far less fatigue, especially if a VTR hangs on the other shoulder.

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

Triax or multi-core cabling With triax the HL-79A can operate nearly a mile from its base station with complete remote control and power, and systems synchronization. Or use conventional multi-core cable for up to 900 ft., as, for example in EFP. Attach a studio-type 4½" viewfinder.

Automatics It has a roster of automatic features — more than a studio camera. Auto-iris for light compensation. Auto-iris closure at shut-off for positive protection of the ⅔-inch pickup tubes. Auto-white balance to correct for color temperature changes. Auto-beam control to prevent comet tailing. Auto-black stabilization against flare and dark current drift.

Shadow and contrast handling It yields usable video signals with correct colorimetry at very low light levels because it has optimized prism optics, lowest noise video preamplifiers, and +18 dB video gain available when needed. And it has level suppression, or knee control, to accommodate scenes with high contrast ratios with full resolution, but without added noise in the shadows or overload in the highlights.

A long list of other quality features ▪ Dual concentric filter wheels. ▪ Prism beamsplitter — BK-7 type glass for less shading and ghosting, better colorimetry than with high-index glass. ▪ Shading correction — for tubes and bias lights. ▪ Video matrix — corrective matrix enables matching of colorimetry to studio cameras. ▪ Detail correction — contours-out-of-green signal mixed into R, G, B channels for optimum sharpness. Two-line vertical. ▪ Program microphone and intercom amplifiers built into the camera. ▪ Gamma correction — continuously adjustable to permit easy matching to other cameras. ▪ R, G, B outputs — available individually at standard level and impedance. ▪ Meets SC-H phase criteria of EIA Standard RS-170A — to achieve correct color framing. ▪ Gen-lock — can be introduced via a BNC connector or the multipin cable connector. ▪ Return video — available in the viewfinder.

Convenience features A partial list includes blanking width adjustment, white balance memory, single polarity 12-volt power, split color bars, separate video monitor output, viewfinder peaking control. There's much more. So before you find yourself saying "The HL-79A is the one I should have bought!" request a demonstration. Contact: Ikegami Electronics (USA) Inc., 37 Brook Ave., Maywood, NJ 07607; (201) 368-9171. West Coast: 19164 Van Ness Ave., Torrance, CA 90501; (213) 328-2814. Southwest: 330 North Belt East, Houston, TX 77060; (713) 445-0100.

Ikegami HL-79A

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News Briefs

job . . . . A veteran gold prospector has **donated a 10 percent interest in three California gold mining claims to the Radio and Television News Directors Foundation,** affiliated with the RTNDA. Any proceeds from the yet unproven claims will benefit the foundation, which sponsors scholarships for students who show outstanding promise in the broadcast journalism field.

The Federal Communications Commission has granted a construction permit to Renaissance Broadcasting Corp. for a **new commercial television station** on channel 65 at Vineland, N.J. When fully operational, the station will become the second black-owned commercial television station in the U.S. The grant also supports increased TV service to New Jersey and the development of UHF service . . . . In another action, the **Commission denied a complainant's request for review of a ruling** by the FCC Broadcast Bureau. The bureau had ruled that no further Commission action was warranted on a fairness doctrine complaint against noncommercial WETA-TV, Washington, D.C. Complainant's contention was that the station violated the doctrine during coverage of a proposal to grant D.C. Complainant's contention was that the station violated the doctrine during coverage of a proposal to grant D.C. residents the right to elect two senators and at least one congressperson by not giving time to the view that the District of Columbia was legally part of Maryland.

The Christian Broadcasting Network has signed the five millionth household to receive programming from CBN Satellite Service. In less than two years of satellite operations, **CBN has become the largest cable/satellite service in the world.** Its programming is carried 24 hours a day via RCA's Satcom I; CBN also has simultaneous uplink capability with Western Union's Westar satellite . . . . **CBN has announced a joint agreement with KTLA-TV,** Hollywood, Calif., for the construction of a **10 meter satellite earth station.** The dish, which will give CBN the capacity to microwave live programming to a large section of southern California, continues CBN's strategy of installing earth stations in the top 50 metropolitan areas.

WJR-AM, Detroit, conducted a three-week long test of Belar Electronics Laboratory's proposed AM stereo system in early March. The test results will be submitted to the FCC for inclusion in the record of Docket 21314 . . . . **Deer River Broadcasting Group has acquired WFGL-AM and WFMP-FM,** Fitchburg, Mass., bring-

continued on page 20

News Briefs

ing the number of stations it owns to five. WFGL is a 1000 W full time directional station on 960 kHz and WFMP is a 50,000 W station at 104.5 MHz . . . . **CBS Radio Network has signed six new affiliates,** KYOR, Blythe, Calif., KVCK, Wolf Point, Mont., WQRA-FM, Warrenton, Va., KNCW, Grand Coulee, Wash., and KOJO and KIOZ-FM, Laramie, Wyo. The additions bring the number of CBS Radio affiliates to 280.

The fourth annual **Chicago Section SMPTE All Day Meeting** will be held on April 21 at the Ramada O'Hare Inn. Contact George Halonen, George W. Colburn Lab, Inc., 164 N. Wacker Drive, Chicago, Ill. 60606, telephone (312) 332-6286 or Edward Blasko, Eastman Kodak Co., 1901 W. 22 Street, Oak Brook, Ill. 60521, phone (312) 654-5337 . . . . **The National Press Photographers Association** will hold a **TV Newsfilm-Tape Workshop** at the University of Oklahoma, April 29 to May 4. Contact Prof. Ned Hockman, School of Journalism, Norman, Okla. . . . . **The World Broadcast Society** will sponsor six separate **one-week tours to London, England** in May, June, July, and August of 1979. Each tour will accommodate 30 broadcasters and will include seminars and tours of the BBC and the IBA (Independent Broadcasting Authority). For reservations, call Professional Travel Service, 422 N. La Cienega Blvd., Los Angeles, Calif. 90048 or telephone (800) 421-4231.

Business Briefs

Radiotelevisione Italiana (RAI) has placed two major equipment orders with U.S. manufacturers. RAI has purchased 36 **RCA** TK-76 ENG cameras, valued at over $2.5 million, and has ordered 77 **Ampex** VPR-2 helical scan VTRs. The Ampex order, which also includes TBC-2 digital TBCs and HPE-1 editing systems, is worth almost $6 million . . . . **Videosystemas,** a TV production facility in Caracas, Venezuela, **has purchased two RCA TR-600 quad VTRs** with AE-600 editing systems and a TK-760 production camera . . . . **E&O Systems, Ltd.,** New York-based subsidiary of Electro & Optical Systems, Toronto, **has been appointed exclusive U.S. distributor** for the A/V and Computer Display divisions of **Barco Electronic N.V.** of Belgium. The Barco line includes high quality color receiver monitors, portable monitors, modulators, demodulators, and consumer electronic systems.

Philips Test and Measuring Instruments has announced a **major expansion program,** to be highlighted by its entry into the electronic distributor market and extension of its current product lines. The company plans to introduce an exclusive line of low-cost test equipment which will meet the same engineering standards as its higher-priced line . . . . **Leasametric, Inc.,** has opened **three new inventory centers** in Seattle, New York, and Atlanta. The Seattle office is located at 2529 152 Ave. NE, Redmond, Wash. 98052, (206) 883-6510; the Atlanta center is at 1756 Wilwat Drive, Suite E, Norcross, Ga., 30093, (404) 449-6123; the New York inventory center is at 330 W. 34 Street, New York, N.Y. 10001, (212) 594-6900 . . . . **Scientific-Atlanta's Optima Division** has established a **West Coast stocking facility** to serve customers in California and the 10 western states.

Harris Corp. Broadcast Product Div. has entered into an agreement to market to the TV broadcast industry the UHF-TV broadcast antennas manufactured by **Andrew Corporation,** Orland Park, Ill. The agreement has resulted in several sales of Harris UHF transmitters packaged with Andrews antennas . . . . **Hughes Aircraft Co.'s microwave communications** products is offering an **optional warranty extension** on the klystron tubes used in its AML microwave local distribution system, doubling the duration of the warranty from one year to two . . . . **Sony Video Products Co. has begun delivery on the BVH-500** portable Type C VTR. Some of the first units went to Compact Video in Hollywood, Opryland in Nashville, and One Pass Productions, San Francisco . . . . **Continental Electronics Mfg. Co.** of Dallas **has received a contract from the General Services Administration** to build 11 shortwave radio broadcast transmitters for Radio Free Europe/ Radio Liberty.

The **U.S. Defense Communications Agency** has awarded the Government Systems Division of the **Western Union Telegraph Co. an $850,000 contract** for digital data transmission services via WU's Westar satellite system . . . . **GTE Sylvania CATV has received two major equipment purchase orders from Telecommunications, Inc.,** of Denver. The orders, consisting of 2000 miles of transmission electronics and 18,000 converters, will be used to update existing plant as well as to construct new systems . . . . **Microwave Associates, Inc.,** is under contract to the **Cable Satellite Public Affairs Network (C-SPAN),** Arlington, Va., to provide the microwave relay equipment for the new network's **Capitol Hill TV coverage.** C-SPAN's live coverage of Congressional debates began last month.

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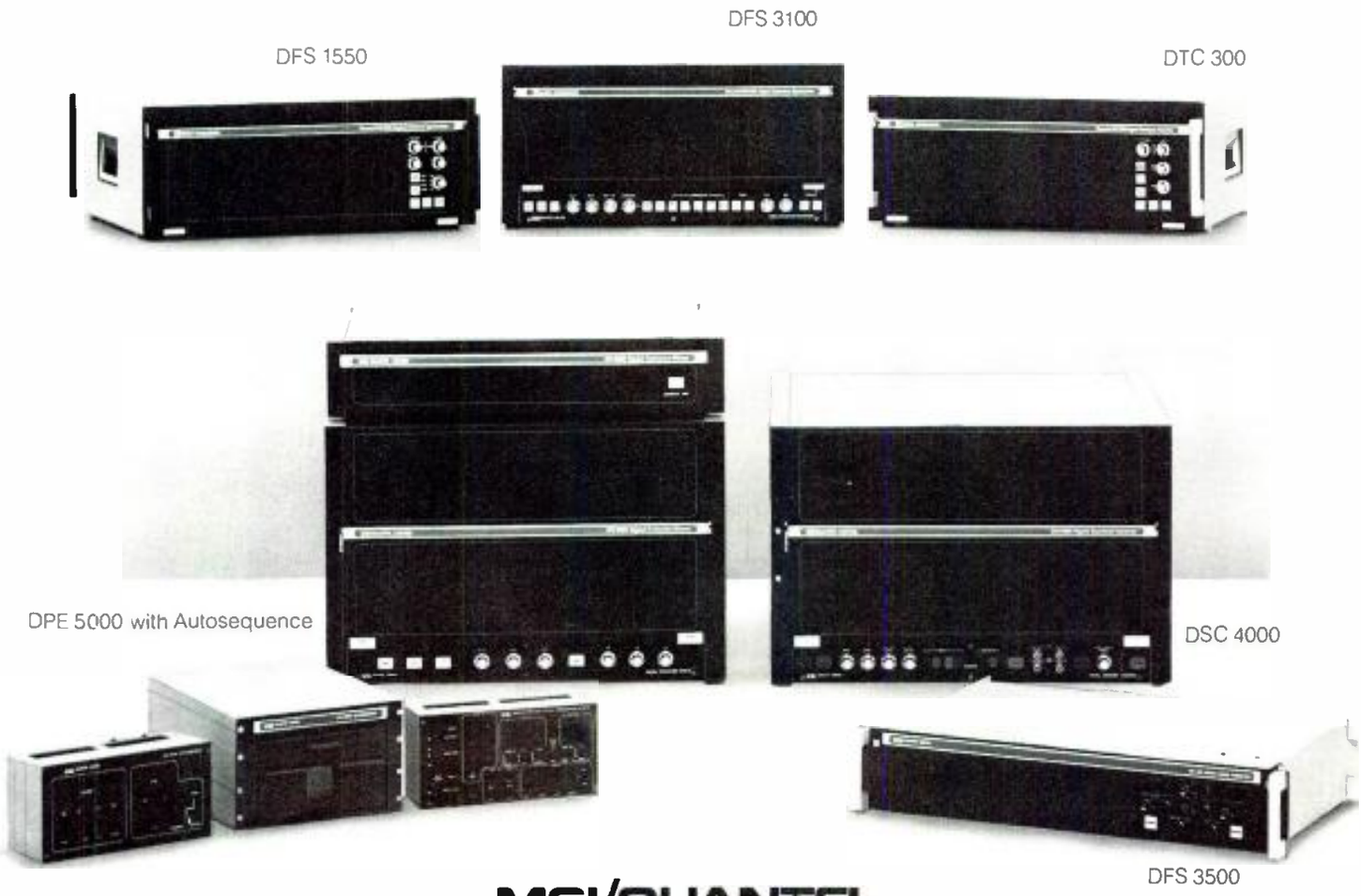

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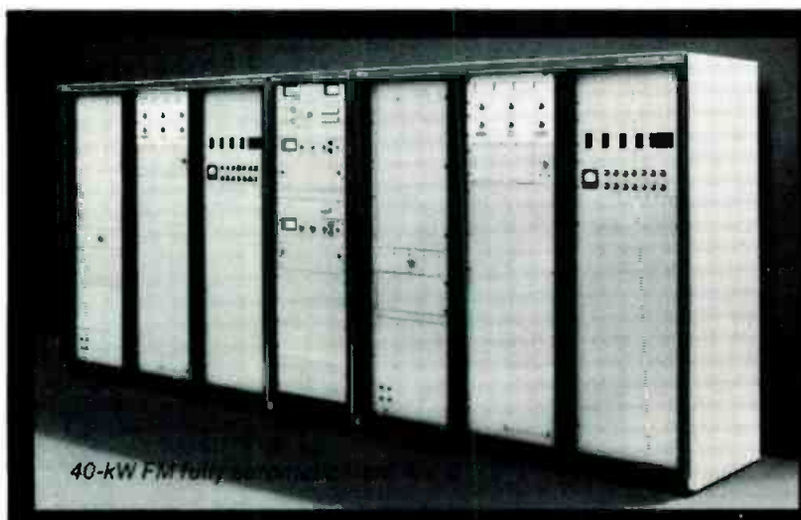

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The AP Study Is Lifting The Power Of Radio News

LAST MONTH BM/E DESCRIBED in a feature article the main findings of the study of listener attitudes to radio news made for the Associated Press by the Frank Magid research organization. This was the first comprehensive attempt to find out what radio listeners want in their news broadcasts. What those who were questioned said about subject matter, length, time, and other factors constitutes a set of guidelines for news directors more detailed and convincing than any we have had before. The overall finding: more than 80 percent of radio listeners across all age, economic, and format groups want full news programs; they want their news serious, informative, covering primarily local news but also national and international, and they want it to have real value to them personally.

The full AP report, which includes numerous breakouts of news preferences according to various demographic groupings, can be had by any AP subscriber who asks for it. A number of radio stations across the country have put to work in their own news programs one or more of the findings in the study. The following are brief accounts of the experiences of some of them.

WHBY, Appleton, Wisconsin, is an AM station licensed for 1 kW by day and 250 watts at night. It has a large urban listenership but also reaches into rich farm territory. The very successful format is MOR. News director Ray Waiter told *BM/E* the station management has been "sold" on comprehensive news handling for a long time and maintains a news staff of 5½ persons, with another, a business reporter, brought in under contract.

The AP study stimulated the station to expand and strengthen the news programming with, for example, a "heavier" schedule in the 6:00 to 8:20 a.m. period, putting news on each hour and half-hour. This is all solid information using the AP wire and radio and staff-written news for local, national, and international coverage. The positive response in the AP study to actualities, already part of many newscasts, encouraged WHBY to put more emphasis on them.

The news staff writes two to three versions of important stories so that each newscast will have a fresh feel. The writing is aimed to bring out as much as possible the relevance of each story to the station's listeners. This applies not only to local government, weather, and other obvious personal interest stories, but also to economic and business news, including regular agriculture news from the area. The question always considered with economic stories is, "What will it mean to *my* pocketbook?"

The management is planning seminars for the sales and news staffs for close study of the AP report and other material on news handling so that everyone will be on the same wavelength in preparing and selling the newscasts. The response of listeners to the expanded newscasts, Ray Waiter reports, has been extremely positive; his recent news activities have, in effect, shown with regular on-air news the validity of the AP study findings.

WAAV, Wilmington, N.C., is a 50 kW FM station (soon to go to 100 kW) in a medium-sized market with nine active stations, making it a hotly contested arena. The Bonneville Beautiful Music programming has been successful and the station is first or close to it in all important demographics.

Dottie West, sales manager, told *BM/E* how one finding in the AP study proved itself in a most positive way — in the public's response to an advertiser. A long-term advertiser, a local retailer, complained to her that the results he was getting seemed somewhat disappointing. As an experiment she shifted his spot to the period of the 12:00 noon newscast because the interviewees in the AP study picked that as their favorite time for hearing news. Within 10 days, the advertiser was back with fervent thanks: he had had an influx of new customers, and many specifically mentioned his air-time on the newscast. This indicates that combining the AP results can turn up ideas that may have a specific effect on sales.

WYBG, Massena, N.Y., is a 1 kW daytimer. Godfrey Herwig, general manager, told *BM/E* that the station, which has about 60 percent of its audience across the St. Lawrence in Canada, has relied heavily on audience research, doing far more of it than is usual for stations of that size. The target audience is the 25 to 44 group, with the 18 to 49 group the broad target. The music format is a tightly controlled Adult Contemporary.

By close study of the AP age breakouts, Herwig and his news director, Larry Schindler, have determined how to maximize the appeal of their newscasts for the listeners they want to reach. Herwig has made a number of changes in the newscasts to bring them more nearly into line with the AP findings. For example, they have decided to go into greater depth and length in their weekend public affairs newscasts; in the AP study the young adult listeners said that they do want weekend news, and they do want "heavy" topics if they have real meaning.

One important way in which Herwig checks audience response is with their "response line," a telephone line dedicated to listeners who want to request certain music, comment on programs, or offer suggestions. Whenever a call comes in, the demographics of the caller are established and the caller's general reaction to the newscasts is sought. Herwig says that their calls from listeners have lately confirmed the AP findings, as well as approving the station's refinements in its news programs. Each incoming call, incidentally, is recorded for careful study.

The news is so successful for WYBG, in fact, that Herwig is getting premium rates for spots on the newscasts. His overall objective, he explains, is radio programming that moves too fast, is too lively, to be simply "background." Good news fits right into that; it has very high attention pull if it treats the right subjects and is presented in the right way. The AP study has invaluable guidance for both facets. Herwig's firm took over WYBG in May, 1978, and quadrupled billings in the following 10 months. "Smart" news was an essential part of that. **BM/E**

Syndicators For Radio

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STRIKING EVIDENCE THAT the classicial audience is solid and is growing comes from the rapid growth of Parkway Productions, probably the top syndicator of classical music at the present time. Parkway was started on a small scale 10 years ago in Washington by Neil Currie and a group of associates. Currie, now president, had been in broadcasting for 23 years as a newsman and correspondent, working for CBS and ABC in New York, as Washington correspondent for the Westinghouse stations, and with the CBC in Montreal.

Parkway started off with "Starlight Concerts," a two-hour assembly of classical numbers with lively, knowledgeable comment by Bill Hanson, long-time CBS announcer and host of the American Airlines show. "Starlight Concert" is made fresh for each day of a five-day week and is offered to stations on a 52-week basis, a total of 260 programs a year. It caught on promptly, is still being produced, and now has a weekly cume audience, Mr. Currie told *BM/E*, of more than four million people.

That led to a number of similar "series" programs, each of which has found a satisfying number of takers among radio program departments. "Matinee" is another two-hour-per-day, five-day-a-week series, consisting of recordings of "live" performances.

Part of these performances come from the BBC, but another part represent a most significant development for Parkway: the making of their own recordings of concert performances here. It was clear to Currie and his helpers that getting together a repertory of programming large enough to make the enterprise go and constantly refreshed with new material would be impossible without a flow of new recordings.

"Matinee" proved this policy right and attracted audiences with the currency and freshness of the performances. The program is now used to the extent of about 80,000 program-hours a year.

Some of the other successful series programs are scheduled for one hour or one half-hour weekly. "First Hearing" is one, with a coverage of important new classical recordings. "The Vocal Scene" is produced at WQXR, New York, with George Jellinek, music director there, as commentator on opera and concert singers: this program won the Ohio State Award for classical programming in 1978.

An important weekly series is called "America in Concert." Each week it brings "live" an American orchestra from around the country; all the recordings are made by Parkway's own engineering team. Parkway now has 44 symphony orchestras under contract for the series.

More than 300 stations use one or more of the Parkway series programs at the present time. Currie told *BM/E* that his year-to-year series renewal rate is a splendid 99 percent, a remarkable seal of success.

Recently, Currie has moved into another form of program assembly, starting something brand new on the radio scene: a full daily classical schedule he calls the "Library Format." This was originally designed to be one of the five program choices for Warner's "Qube" cable TV operation in Columbus, Ohio, and it is running there now. Currie got the right to offer it to radio stations, and a number are using it already.

The "Library" starts off with *500 hours* of classical music, with complete announcements before and after each number. It is updated on a regular basis. The sequence is arranged so that there are no repeats in less than eight weeks.

Several stations are now using the program for their overnight air time, including WONO in Syracuse and WBHM in Birmingham. All the signs are that this program, too, will be a success; the audience for classical music is showing once again that it is real and not to be ignored. **BM/E**

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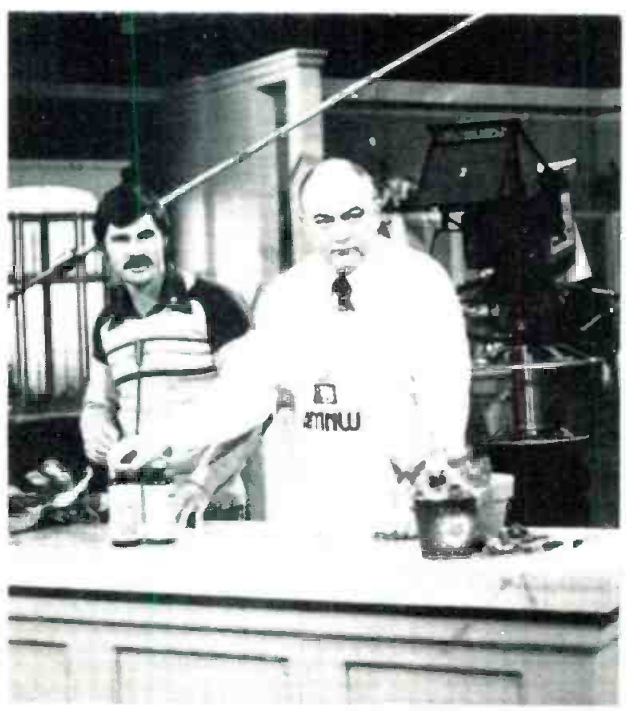
Fisher Broadcasting: Local Stations Can Compete In Quality Programming

"LOCAL PROGRAMMING" — a phrase that has often been used derisively to describe a hodgepodge of static, dull, and pat efforts in markets throughout the country — is beginning to take on a new flair and sense of excitement. The phrase has been dignified and broadened by a new twist — a philosophical alteration — "localism." Many local television managements are beginning to believe that localism is the key to a stable and vibrant operation well suited to whatever the future may hold. In a sense, "the deeper the roots, the stronger the tree." Whether future challenges come from cable, pay TV, home VCRs, video discs, or whatever, a strong local identity will secure the broadcaster's place in the American home.

The Town Hall *program aired on Sundays at 6:00 p.m. is hosted by Gerry Pratt. The show's huge ratings share indicates that public affairs can garner audience. Though not a commercial program, ratings help boost overall station profile*



Another locally produced program, AM Northwest, *is a magazine-format morning show. Jim Bosley, host (left) talks with Dennis Snodgrass, the "Plant Doctor"*

But another level of localism goes beyond the decisions on what programs to use. Stations have a wide range of sources to choose from in programming their schedules. There are syndicators, program consortiums, and, for affiliates, network programs. The localist, however, also looks in his own back yard and to his own resources for that "different flavor" that enriches his local mix.

One of the strong producers of top-quality programming, a company that has made the terms "localism" and "quality" synonymous, is the Fisher Broadcasting Company, which operates stations KOMO-TV/AM, Seattle, Wash., and KATU, Portland, Ore. In its quiet and typically conservative fashion, Fisher Broadcasting Company has dedicated itself to the concept of "localism" as a means not only of establishing its identity in each of its Northwest markets, but also of attracting advertising support. In addition, the two stations are carrying out a policy established by the company's president, W.W. Warren, which equates strong local programming with community service and civic enterprise.

How effective this approach has been is probably best demonstrated by the *Town Hall* program produced by KATU-TV. An hour-long public service program spotted at 6:00 p.m. Sunday nights, this unique show drew a rating of 20 with a 37 share in the November 1978 Nielsen ratings. It carries no commercials and its issues are closely aligned with current problems

continued on page 30

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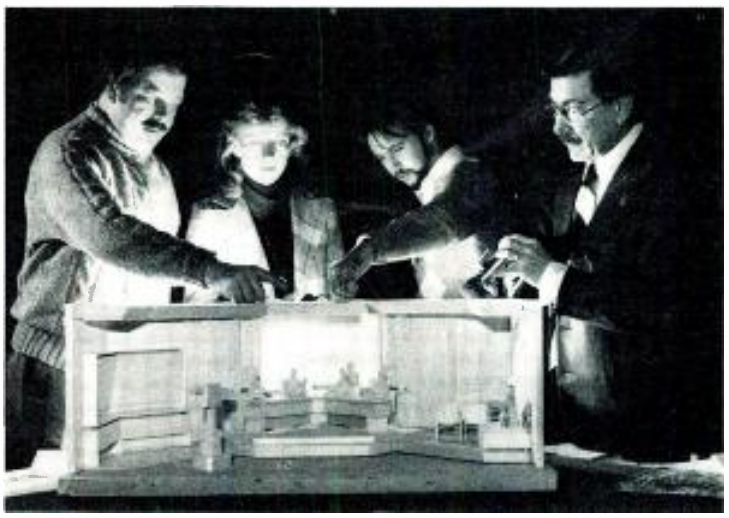
TV Programming



Model of new Channel 2 News set is looked over by (left to right) Chuck Biechlin, news director; Robin Anderson, reporter; Scott Miller, art director, and Tom Dargan, executive vice president and general manager

facing the people of the Northwest region, not just the people of Portland. In 1977 it was nosed out for the coveted "Iris" Award by WCBS-TV, New York, but has been nominated again this year.

How rapidly a community issue program of this type can gain popularity was shown by Chuck Gingold, program director at KATU (and president-elect of the National Association of Television Program Executives), who noted that in 1976 when the *Town Hall* program first started, it owned a 2 rating and a 4 share of audience. Less than two years later, the program is one of the most popular and most important offerings in the entire Northwest.

"The *Town Hall* program confirms my belief that public affairs shows are definitely saleable," says Gingold. "Although we have no desire to make a commerical success out of *Town Hall*, the opportunities have been offered and we know that other public affairs efforts we produce will have great advertising acceptance."

To Chuck Gingold, the "localism" precedent set by Fisher Broadcasting head Bill Warren has had unusual and highly beneficial impact on the KATU-TV and KOMO-TV program offerings. "With bland shows being offered by many syndicators, we have concentrated on upgrading our local product and the results have been extremely gratifying in more ways than one. For perhaps the first time gifted men and women on our local staffs have had the opportunity to utilize their talents to produce programs that are educational, enlightening, and above all, entertaining. And to the delight of us all, their efforts have paid off in high ratings and higher advertiser interest."

Typical of KATU's local efforts is its *AM Northwest* show, a live, hour-long magazine type program which specializes in locally oriented issues and which has consistently been the leader in its time period, 9:00 to 10:00 a.m.

Its children's show, *Bumpity*, pulls down a 41 share of audience and a 90-minute magazine concept program, *Sunday Morning*, programmed against pro football, has enjoyed sizable audiences.

Regional approach makes sharing possible

One of the major reasons local television has gained in both quality and audience impact over the past few years, according to Chuck Gingold, is not just the sameness of the syndicated material with its heavy reliance on game show content, but the increasing expertise local producers are demonstrating in their use of electronic gear. "Station program directors and producers are recognizing," explains Gingold, "that they can utilize their ENG equipment to develop new program forms, particularly in the area of on-location, out-of-the-studio programming. It has become a creative challenge and our production people are reacting to it with new ideas, approaches, and energy."

The extent to which the Fisher Broadcasting management nourishes the innovative instincts of its production staffs at KATU-TV and KOMO-TV is best indicated by the KOMO-TV *PM Northwest*, which also is a dominant program in its time slot in the Seattle market. *PM Northwest* has a staff of 17 people and according to producer Jack Norman, the specialization and talents of the *PM Northwest* staff have helped him to develop "innovative and experimental ingredients" which have helped the program gain a major share of the access-hour audience in a relatively short time.

It isn't often that a producer of a local TV program gets the word that "ex-

continued on page 32

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pense isn't a consideration where qualtiy is concerned." Jack Norman heads up a staff that would do justice to a network program. The staff for *PM Northwest* includes an assistant producer, a full time researcher, six reporters including a reporter/host, five photo editors, one editor, and a production assistant. At their disposal for their programming segments are three ENG units and three editing rooms. "Quality is the keynote," Norman states. To insure the quality standards of their segments, many of which are shot at remote locations, Jack sends out two camera crews for double-takes and backup. About 90 percent of the shooting is done via ENG and the crews shoot three to four segments for each program. Norman notes that the size of the staff makes for a freedom of operation that is a continuing challenge to the staff to expand their creative and artistic talents. "And this is just what has happened," he says. The end result has been a string of consistently high ratings for the *PM Northwest* program, a situation that puts the following programs into an advantageous rating position as well.

The dedication of the Fisher stations to the concept of quality localism was enunciated in the initial announcement of the program by John Behnke, executive vice president and general manager: "The scope of this new project opens up an exceptional opportunity for the development of creative television and creative personnel — reporters, photographers, directors, technicains, and engineers right here in our own broadcast area — who become involved in its production."

This comment best typifies the overall concept of Fisher Broadcasting's approach to local television. It has obviously paid off inasmuch as the *PM Northwest* program has won several local Emmys for its programs, as well as a number of other awards.

The accent on quality is also stressed in KOMO-TV's highly regarded preschool program, *Boomerang*. In 1976 this unique program was one of 16 in the country to win the prestigious ACT Award "for continuous excellence in children's programming" from Action for Children's Television. In 1977 it was presented with the first ACT Achievement Award, one of that group's top honors. *Boomerang* was one of only two local programs in the country so honored. In its three years on the air, *Boomerang* has won 16 Emmys and innumerable other awards. Starring the talented Marni Nixon, an internationally known singing star and actress, the program proved so popular that it is now shown three days a week. In addition, the *Boomerang* talent has been making free, monthly personal appearances at the Seattle Center, drawing as many as 2500 children and parents.

Both corporate and station managements are proud of the track record the stations have compiled via their accents on local production. Thomas Dargan, vice president of KATU, noted that even in the news, the two stations have a flair for the unique and the innovative. One aspect of this is a dedicated line connecting the two stations in Seattle and Portland. Each day, each station sends its complete news feed for the day via its interconnection, allowing the other station to select outstanding regional stories which can be incorporated in its regular newscasts. "We've really created a Northwest news bureau," explains Dargan, "and the viewers in both Seattle and Portland have access to it all."

Throughout the entire programming policy of both Fisher Broadcasting stations runs the same thread — quality programming of a local nature. And the Fisher Broadcasting Company plans to keep it that way. **BM/E**

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NBC SHAPES UP FOR OLYMPICS

NBC describes its coverage of the 1980 Olympic Games in Moscow as the biggest production in history, bar none. Having to work with the Russian SECAM system and providing 18 full days (150 hours) of programming has placed unusual demands on both production and engineering staffs.

WHEN THE 700-PLUS ENGINEERING and production personnel finally assemble in Moscow in early July, 1980, to begin the final preparations for NBC's Olympic coverage, all agree they will be involved in the most elaborate production in history, outspending even such extravaganzas as *Cleopatra*.

The components of the $110 million-plus operation ($85 million of which constitutes the "rights" deal negotiated several years ago and includes a healthy budget for equipment rentals from the Soviets) are enough to outfit several small television stations: 37 cameras at 15 different venues, 47 Ampex one-inch VTRs with associated editing and slow motion controllers, 14 mobile vans, two studios with associated control rooms, small editing facilities at several of the venues, a huge routing switcher, five digital effects generators, four character generators, 58 waveform monitors, 28 vectorscopes, four frame synchronizers, a host of time base correctors, facilities for two simultaneous international satellite feeds and standards converters, and the ability to intercut with the Soviet's own unilateral and International Programs. On the human side, the 700 people must be fed, clothed, and housed in Moscow, and many must learn Russian. The crew size will be even larger when it is considered that NBC will use split Russian/American camera teams and Russians will man the video operator positions in the mobile vans. In short, NBC has made certain that, providing the events themselves are exciting, there will not be a dull moment during the eight and a half to nine hours of telecasts it will feed daily from July 18 to August 4, 1980.

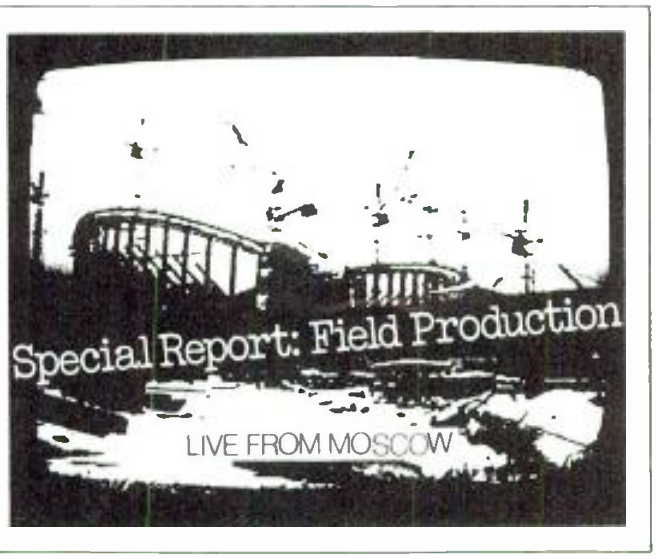
It goes almost without saying that with this much money at stake, NBC will not simply arrive in Moscow on the day of the opening ceremony and begin the telecast. By the times July 18 rolls around (the date of the "pre-Games" show), *all* production and engineering personnel will have been in Moscow for at least two weeks. In fact, July, 1980, will be the culmination of an engineering and planning effort that began almost as soon as NBC's rights to cover the Games unilaterally for the U.S. had been established; the first meeting between NBC operations people and the Soviets was back in February, 1977. Equipment installation will begin October 1, 1979, at NBC's studios in the Moscow Television Center and will be completed by March 31, 1980. Installations will then begin at the different venues, with the work scheduled to be completed by June 15, 1980. Production crews will arrive in early July. According to Jack Kennedy, VP of administration, operations and engineering, and Bernie Hoffman, executive director of the NBC event, there is very little that can prevent NBC's Moscow Olympics coverage from going on the air at this point, except, of course, a major world war.

Strangers in a strange system — SECAM

The most serious challenge to NBC engineering has been, from the beginning, the Russian SECAM television standard. Unlike NTSC and PAL, which use a composite signal in which R,G,B components are generally encoded at the camera end and then fed along to the rest of the television system as a single modulated wave, the SECAM system feeds two FM modulated color signals sequentially down the line one after the other. SECAM transmission follows the same course. In the home receiver a delay line finally brings the two color signals into line.

NBC was faced with an enormous decision. On the one hand, SECAM is considered a far superior transmission system; for one thing, there are no phase problems. NBC also wanted to be able to draw on the Russian-supplied SECAM International Programs to supplement its own unilateral coverage, particularly in certain less important events such as canoeing and kayaking where NBC will have only a single unilateral camera. The third, and possibly strongest, factor in favor of the SECAM system was that, of the 37 cameras NBC will be using to cover 15 venues, only 19 are being supplied by an American manufacturer (RCA). The remaining 18 will be manufactured by the Soviets (probably under license from Thomson-CSF, though they will bear the brand of "Soviet Industry"). Converting the RCA cameras was considered far easier than asking the Russians to convert theirs.

The arguments against using SECAM came from both production and engineering. For Hoffman, the main concern was the production switcher. When an NBC team went over to Moscow two years ago to establish the protocol that would constitute the "rule book" under



which NBC could provide unilateral Olympic coverage, they were confronted by Russian production switchers which Hoffman describes as "almost primitive" — two buses and no special effects to speak of. Despite Russian assurances that they would be able to supply full-scale production switchers for master control and the mobile vans and venues that would match current network-standard U.S. models, both Hoffman and Kennedy were skeptical.

A SECAM switcher is no easy thing to build. The main problem is that, since color signals are FM modulated, one cannot simply add them together as is the case in NTSC. Instead, the signals must first be demodulated, the individual color components treated separately, then the signals re-modulated before they are passed along. The NBC team flew to Paris where they inspected a SECAM switcher that had just been developed by Thomson-CSF and shown at IBC. They also learned of the Fernseh SECAM production switcher. With the assurance that at least one major manufacturer would be able to supply the Russians with the kind of switcher needed to cover a major sporting event, the decision to go with SECAM was finalized. (As it turned out, the Russians did, in fact, design and manufacture their own network-quality production switchers, which NBC will be using throughout its production.)

Physical facilities still under construction

The heart of NBC's operation will be located in a building still under construction in Moscow, in close proximity to a 1600-foot tower (also built around 1965) which is being modified to accept receivers and transmitters for almost 40 microwave links.

Within the new building, which will also house facilities for other international broadcasters (most of whom will rely on their own announcers to do voice overs over the International Program), NBC has two studios with associated control rooms. One of the studios is fairly small and will be used as an announce booth. The other studio, 162 feet square, will become NBC's main tape room for recording and playback. The larger studio's control room will serve as the main production control facility and also the origination point for outgoing telecasts. Four editing suites will be installed in rooms adjacent to the studios.

NBC has also leased 14 mobile units from the Russians (five large, three medium, six small) that will be deployed throughout the 15 venues located within and just outside the city. The small vans are little more than two-camera cars. Medium vans have three cameras. Even the large vans would be considered small by American standards, with barely enough room for an audio position, a video control position, and the technical director with his console. Large vans are equipped with four Russian cameras (presumably fitted with Angenieux 42x zoom lenses, of which the Soviets have bought 100) to which NBC will add a fifth hand-held or stationary camera.

Each of the 14 vans has a fully equipped microwave transmitter and two-way voice communications with the TV Center. According to Kennedy, there are virtually no land lines in Moscow at all. Signals are routed around through an elaborately planned system of microwave bounces, all of which have been carefully plotted in advance as to time and location. NBC recently asked for permission to have a portable camera crew roaming through the city streets and beaming back live signals. The request was denied on the grounds that it might interfere with the fixed microwave locations, so NBC was forced to use a portable recorder with the roving camera crew.

Microwave is also used to get signals from the mobile vans into the small recording/editing suites that are set up at a number of different venues. Equipped with two- or three-machine editors, and, in some cases, character generators and digital effects units, these on-site editing rooms get around the problem that there is no space within the Russian mobile vans for VTRs. Directors at the various venues can thus assemble their own shows on location and microwave the cut program back to the TV Center for re-recording. They can also roll directly to air from the venue. At the less important venues, the mobile van will simply relay the signal back to the TV Center for recording there. For some of the larger sites, a combination approach will be taken.

RCA cameras to see dual SECAM/NTSC use

NBC will use 37 cameras at the 15 venues it will cover unilaterally: six RCA 760s, 13 RCA TK-76Bs, and 18 cameras supplied by the Russians. In addition, the Russians will be using over 150 cameras themselves in their unilateral coverage for Russian television of 12 of the venues and also the International Programs (ranging from one feed at the smaller events to three at more important sites such as swimming and track and field.)

The 19 NBC RCA cameras will be shipped as NTSC units to the Channel Isles off the English coast in a couple of months. There, at a cost of approximately $6000, the cameras will be converted to SECAM — a relatively simple process of exchanging a circuit board, thus providing a new sync generator and encoder/decoder. The units will then be shipped to Moscow. After the Olympics, they will be returned to England for reconversion to NTSC and put into use at NBC's U.S. stations. Kennedy has already seen the results of the SECAM conversion in five TK-76Bs which the Russians bought last year and is convinced of the quality.

100 percent one-inch VTRs

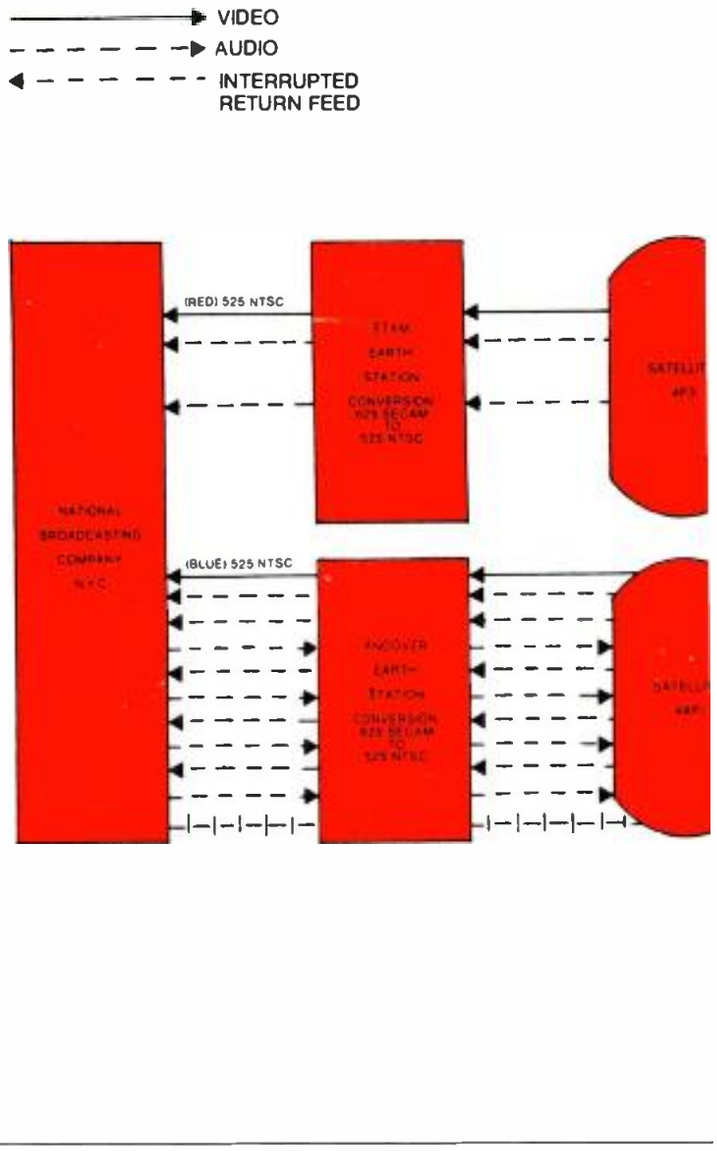
As of February, 1979, the entire NBC operation in Moscow will be recorded on Ampex VPR one-inch Type C helical units converted to SECAM. An original agreement under which NBC was to have leased 12 quad machines from the Russians has rust been dissolved. NBC will now maintain only two two-inch units at its production center in the unlikely event that a piece of Russian file tape is to be aired. The Russians are also experimenting

NBC Shapes Up For Olympics

heavily with one-inch production at the Olympics and have bought 40 VPRs from Ampex with 20 more on lease for the Olympics. Bosch Fernseh has also recently sold portable one-inch units to the Russians as part of two high-speed mobile units which will be used at the Games.

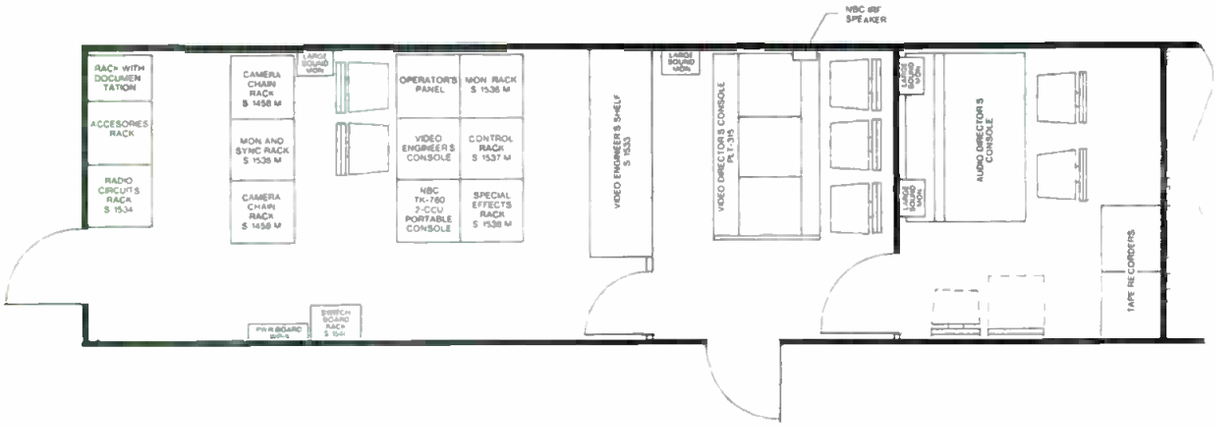
NBC's agreement with Ampex is for 49 machines — 41 VPR-2 studio units with digital TBCs, and six VPR-20 portables. Because of the complexity of designing the TBC associated with these machines to be NTSC/SECAM convertible, the SECAM units NBC will use in Russia are simply on lease. Once they have been returned to Ampex following the Games, Ampex will probably market them either to Russia or some other SECAM country such as France.

Twenty-six of the 41 studio machines will be located at the Television Center — 14 in the 162-foot square tape room for recording and playback and 12 others (four three-machine editing systems) in the editing suites. The 15 other VPR-2s will be distributed among the major venues (four for track and field, three for gymnastics, two each for boxing, basketball, swimming, and diving) where they will be configured as two- and three-machine editing systems. In total, there will be 10 two-machine and seven three-machine editing systems. The six porta-

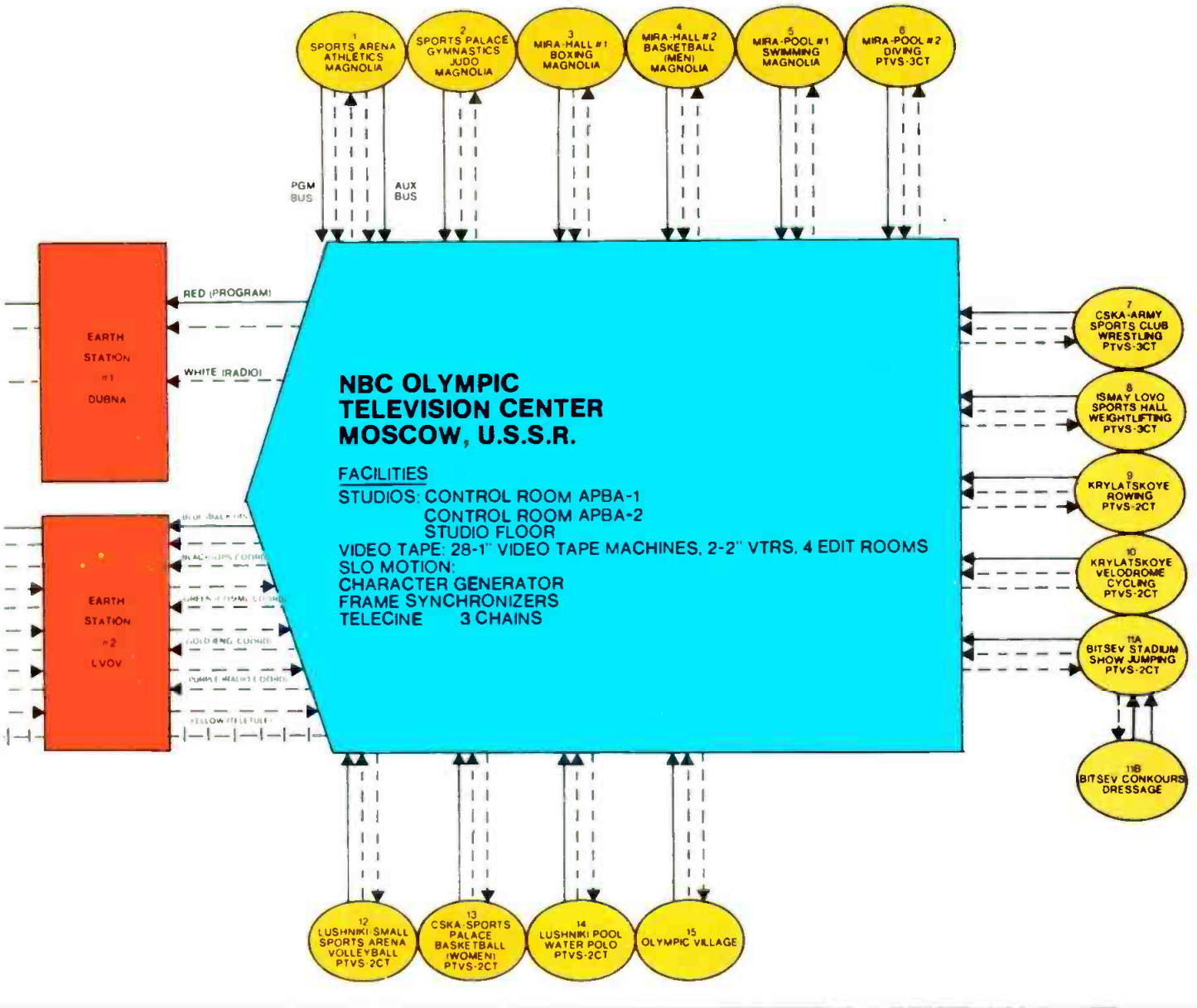


Block diagram shows coordination of transmissions from sports venues to NBC Television. SECAM signals are transmitted to earth stations at Dubna and Lvov and then to satellites. Conversion to NTSC takes place when signals are received at earth stations in Etam and Andover

Floor plan of NBC's studios in Moscow. The building, which will also house other international broadcasters, is still under construction



Layout of one of five "Magnolia" large mobile vans NBC will lease from Soviets. Normal complement is four Soviet cameras, to which NBC will add a TK-76B or TK-760



ble recorders will be used in a variety of situations. In addition, NBC has ordered from Ampex nine SMC-60 slow motion controllers and 17 HPE-1 helical editing systems.

Huge routing switcher to handle a variety of situations

Feeds will arrive at the TV Center from a staggering number of sources: 51 international feeds will consist of both switched International Programs (up to three from major venues such as track and field) and isolated cameras from the International service and the Russian unilateral coverage of 12 venues. From each of the 15 venues NBC will cover unilaterally there will be a switched program (either live from the mobile van or through the editing suite). Directors, producers, and editors can also pull in any camera being used as part of an on-site program and isolate it back at the TV Center so that it can be later intercut with an edited program. Thirty VTRs within the TV Center must be patched together. Two feeds from the studios across the street from which late-night programming will be originated must also pass through master control. In addition, there are some 21 character generators, slow motion units, digital effects generators, time code generators, and other miscellaneous units which must be distributed throughout the system.

A large number of signal feeds from the TV Center are required, too, including outputs to 30 VTRs, feeds to the Russians and to other broadcasters of NBC's unilateral programs, and sequentially coded signals distributed through the main control room's switching facilities and on to the two satellite feed networks.

The number and complexity of the different situations involved have demanded a huge routing switcher system which is being constructed by NEC. It will be installed in the master control room at the TV Center, with access throughout the system. Like NBC's cameras, the NEC routing switcher will see double service, both at the Olympics and at an NBC plant in the U.S. when the Games are over. Contrary to rumors, NBC will leave no equipment behind once the Games are completed.

The 120 input by 90 output switcher was originally designed to be installed at KNBC, Los Angeles/Burbank, where it will eventually be configured with 150 inputs and 270 outputs (40,500 crosspoints).

An interesting feature of the routing switcher is that it will have a VITS generator at every input. "We've learned from sad experience," says Kennedy, "that with a matrix this large you have to have some simple way of tracing down each channel to pinpoint the source of any error." Since the Russians do not use a VITS system, the VITS generators will be disabled once the switcher has been tested in Tokyo, then reinstated when the unit is shipped back to Burbank. NBC is currently working with the Russians on the use of a white bar reference signal which is the standard test signal in the Russian SECAM system. Since SECAM is such a stable signal and does not require the constant dynamic checks necessary in NTSC, Kennedy is confident that his engineers will be able to

NBC Shapes Up For Olympics

work with white bar. The Russian signal apparently is also used to automatically set levels, though it obviously does not include a frequency check.

Digital video effects, character generators pose greatest problems

As discussed earlier, the greatest problem faced by NBC in connection with the SECAM standard was in switching and special effects, which American audiences have come to associate with network quality sports coverage. At this point, Kennedy still has no circuit diagram of the production switchers which have been manufactured by Russians for use in the master control room and in the mobile vans and venues. Instead, he has a diagram of the switcher's control panel and an explanation by the Russians about what the various buttons will do. Both Kennedy and Hoffman are convinced, however, that the Russians will live up to their promise and deliver full-function production switchers. Hoffman says that the experience TDs will face in confronting a switcher of which they have no previous knowledge will be very much like what happens when the network rents a mobile production truck from an independent contractor.

Problems with digital special effects units and character generators still remain, however. The Russians were extremely impressed with a demonstration tape they saw of digital effects in sports production, but as of this date there is still no SECAM digital effects generator on the market. The problem, as presented in papers at the SMPTE Winter Television Conference (see *BM/E*, March, 1979), is that

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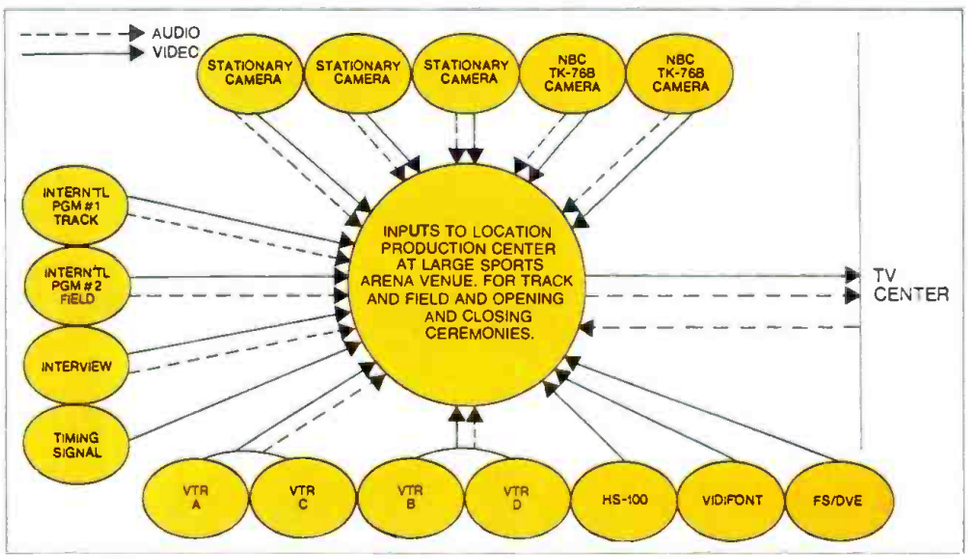
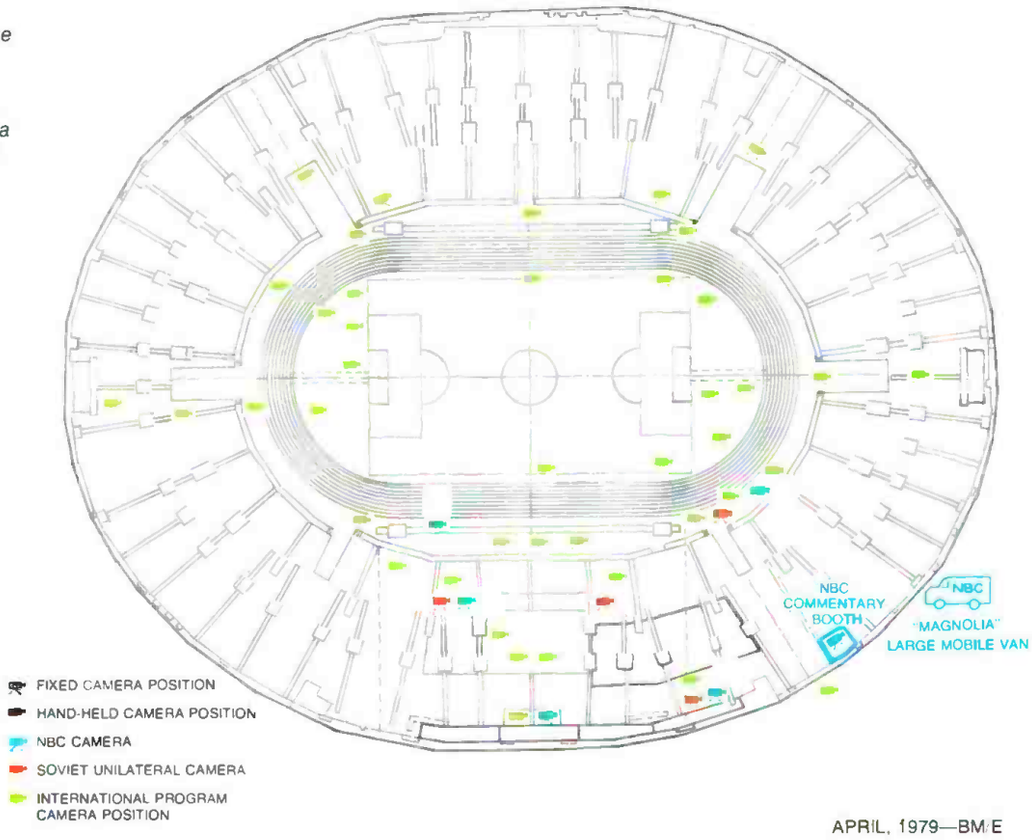


Coordination plan for track and field venue showing audio and video inputs to location production center



Plan of track and field venue shows position of NBC, Soviet, and International Program fixed and hand-held cameras, plus Magnolia van and NBC commentary booth

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Circle 122 on Reader Service Card

NBC Shapes Up For Olympics

in SECAM one must digitize the separate components of the video signal rather than a composite signal. This effectively doubles or triples the complexity of the process. In meetings between NBC and Russian engineers in September and December, 1978, the Russians promised to make every attempt to develop a SECAM digital effects system, but NBC is taking no chances. Under an agreement with MCI/Quantel (whose DPE-5000 effects system NBC uses exclusively in its U.S. plants), MCI will have five DPE-5001 SECAM units available by the end of the year which NBC will lease for $10,000 each for use during the Games.

A similar arrangement has been worked out with MCI/Quantel for frame synchronizers. Four will be leased to NBC at a cost of $6000 each. Kennedy feels that this relatively small number of synchronizers for an operation this size will work out since "the way the system is set up it doesn't look like we'll have too many lock-up problems."

Character generators proved to be almost as great a problem as digital effects generators. Under the original deal, the Russians were going to include their own character generators as part of the equipment package that went with the mobile vans (though the generators would have been installed in the editing rooms at the venues). Hoffman completely rejected their use, however, since their fonts were far too primitive for American viewers and lacked the range of colors, sizes, spacing, etc., we are used to. Consequently, NBC will be bringing over two of its own Chyron IVs for installation at two of the venues. Back at the TV Center, the Russians will be providing two Thomson-CSF Vidifont Mark IVs (part of the $30 million deal the Russians made with the French-based company for SECAM equipment at the Olympics).

Two parallel feeds insure the signal will get through

"We in no way will allow the Russians to censor anything we do," says Hoffman. "That's the understanding we have going in. We will not stand for any of the interference that people in the U.S. are saying the Russians will impose on us. We have made it clear to them that we will cover anything in sight of our cameras. The worst that they can do is pull the plug entirely. Even in this event we have an alternate plan to insure uninterrupted coverage."

NBC will not reveal the nature of the alternate plan. With cooperation between the Soviets and the U.S. on the Olympics being what it is, it is most unlikely that it will be needed; and an enormous effort has been put into insuring that the standard plan works out. In the first place, the outgoing feed through the NBC control room is immediately cloned before it is fed to the Russian equivalent of AT&T. The two parallel signals will then be fed to two Russian uplinks — again via microwave STLs — one 80 miles outside Moscow, the other some 1500 miles away close to the Polish border. Two separate transponders on

continued on page 42

NBC Sports Basic Facilities In Moscow

	Soviet Camera	NBC Camera	DPE	NBC 1" VTR	Soviet Slo-Mo	Chroma-key	Char. Gen.	Commentary Position
Large Units (Magnolia) — Five-Camera Truck								
1. Athletics	4	2-TK76	1	4	1	YES	1	3
2a. Gymnastics	2	1-TK76	1	3	1	YES	1	3
2b. Judo	(1)	(1-TK76)		(3)	—	(YES)		(2)
3. Boxing	2	1-TK76		2	*	YES		3
4. Basketball (major)	3	—		2	1	YES		3
5. Swimming	3	—		2	1	YES		3
Medium Units — Three-Camera Truck								
6. Diving	1	—		2	Share with Swimming	(YES)		3
7. Wrestling	1	1-TK76		—	—	NO		2
8. Weightlifting	1	1-TK76		—	—	NO		2
Small Units — Two-Camera Truck								
9. Rowing/canoeing	—	1-TK760		—	—	NO		2
10. Cycling	—	1-TK760		—	—	NO		2
11a. Equestrian	—	1-TK760		—	—	NO		2
11b. Equestrian								
12. Volleyball (major)	—	1-TK760		—	—	NO		2
13. Basketball (minor)	—	1-TK760		—	—	NO		2
14. Waterpolo	—	1-TK760		—	—	NO		2
Subtotal	**17**	**12**	**2**	**15**	**4**	**6**	**2**	**34**
TV Center	4	—	2	26	2		2	—
Late Night Program	4		1					
Roving Minicams	—	6-TK76	—	6	—	—	—	—
Totals	**25**	**18**	**5**	**47**	**6**	**6**	**4**	**34**

1. Slo-Mo for boxing will be either one-inch helical scan or HS-100 from another venue.
2. Gymnastics and judo are from same site and use same equipment.

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NBC Shapes Up For Olympics

Intelsat will be used to bounce the SECAM signal back to the U.S. Two downlinks — one at Andover, Maine, and the other at Etam, W. Va. — will bring the signals in.

Standards conversion will take place at the downlinks in a full-time manned operation. An MCI converter, presently in use at NBC's London news bureau, will be flown back and a new one is on order. Operators will be above to view both the incoming 625-line SECAM signal and the converted NTSC version. The two signals will then be passed along to NBC New York via standard pathways for distribution to the network. Constant evaluation will determine which of the two signals is best. The cost of satellite booking time alone is in the neighborhood of $2 million.

Though NBC is obviously striving to insure that it has a good picture at all times, Kennedy is not at all happy with the arrangements with Intelsat. The basis of his problem is that each of his signals is passing through only half a transponder — the common practice since 1974 for Intelsat, which is on a STRAP system. Kennedy, the Russians, and even the Olympic Organizing Committee have pleaded with Intelsat to provide full-transponder coverage for at least one of the NBC signals, but the matter is still under discussion. Kennedy is evaluating various noise reducers which would be installed at the New York redistribution center. Not satisfied with any of the units currently available, Kennedy hopes that by the summer of 1980 he will find one that meets his standards. In any event, it will be a compromise. Says Kennedy, "The fact is that using half transponders produces noise levels that are just not satisfactory to us."

Putting it all together — a 24-hour-a-day operation

The seven-hour summer time difference between Moscow and the U.S. means that virtually all material will be seen in the U.S. on videotape, except for some weekend afternoon programming. For Hoffman and executive producer for sports Don Ohlmeyer who covered several Olympics in the past when ABC had the contracts, this has imposed some special problems. The coverage will be markedly different from the 1968 Games in Mexico City where, because of the proximity of time zones, directors were able to program large blocks of time live, cutting from venue to venue as important events happened. On the other hand, it will be nowhere near the mayhem which surrounded ABC's telecast of the Munich games in 1972 when most material was taped, but the lack of time (only a five-hour difference) meant that the network would often have to begin its prime time block with only six minutes in the can. NBC will be able to offer eight and a half to nine hours of programming a day because it has the "luxury" of being able to edit and feed tapes during the Moscow night (U.S. day and evening), then record the next day's events in Moscow during the U.S. night.

The key to the efficient round-the-clock operation will, according to Hoffman, be the closely timed coordination between the activities at the venue production facilities and the TV Center. The job of coordinating the massive effort will fall squarely on the shoulders of Hoffman, Ohlmeyer, and Geoffrey Mason, VP of European production and coordinating producer of the Olympics. Other ex-ABC Olympics veterans on the NBC team are Christine Glidden, associate producer, and Peter Diamond, associate producer of research.

The basic plan is to do as much editing as possible at the venues themselves. Depending on the time when the tapes are finished, they can either be carried back physically to the TV Center for the satellite feed, microwaved back to the center for re-recording and later playback, or rolled directly to air if time is really tight. Since Hoffman, working at the center, has the option of isolating any camera being used at a venue and also integrating material from the Russian unilateral and International Program feeds, he also has the option of re-editing tapes which have been microwaved back for later broadcast. The same will be true for adding digital effects and titles to material which has come from venues which do not have this equipment on hand.

Generally, the less important events will play earlier in the day during the first programming block from 11:00 a.m. to 3:00 p.m. After a one-hour break, the Olympics programming will be back on the air from 4:00 to 5:00 p.m. Prime-time Olympics programming will begin at 7:00 or 7:30 p.m. and continue until 11:00 or 11:30, depending on the night. "To be perfectly honest," says Hoffman, "we'll run the stronger stuff in the evening. Of course, if an important event happens during the day we can always run it twice." Hoffman will depart from the above schedule on weekend afternoons, when the show will be carried live.

In the evenings from 11:30 p.m. to 1:30 a.m. NBC will originate an enterainment-based show, using the television studios across the street from the TV Center. The celebrity-hosted show will combine sports, the culture of Moscow, and possibly some Russian entertainment.

Unilateral audio still under discussion

As of February, 1979, all plans for NBC's coverage of the Games have been totally finalized except for the actual selection of some of the production personnel. The only question still under discussion is unilateral audio coverage for NBC. NBC's point is that, despite the attention being given by the Russians to mic placement and the quality of the Russian-supplied audio consoles, instances may arise when the background audio being supplied on the International Programs may not be adequate. Hoffman cites the example of boxing. "We have recently discovered," he says, "that the corners are good places to listen during rounds. As a matter of fact, we convinced the Russians that they ought to have mics in the corners for the International Program. But if an American is fighting a Bulgarian, which channel will they open? If the Bulgarian is saying something interesting, they'll naturally go to him. But we will want to be listening in the other corner. We are still negotiating for our right to have our own mics in certain of the venues."

Pending the resolution of this final point and the question of whether Intelsat will open a full transponder for the feeds, all plans are moving ahead smoothly. In the summer of this year, the Russians will test their facilities during the Spartikiad, the equivalent of our own pre-Olympic trials. At the invitation of the Russians, an NBC team will watch the coverage with a careful eye and critique directors, producers, and cameramen after the trials are completed. All involved feel at this point, however, that Russian technique and technology will make the 1980 Olympics coverage worth every penny of NBC's massive investment. **BM/E**

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THE VANS ARE READY TO TAKE PROGRAMMING ON THE ROAD

Radio stations are finding a greatly increased number and variety of profitable uses for studios on wheels. This article tells how five radio stations, chosen from the hundreds that use vans, built their mobile studios and turned them into successes.

THE MOBILE PICKUP UNIT OR STUDIO for radio has been with us for a long time. But lately it has evolved into a much more useful and profitable instrument of radio broadcasting than it used to be, riding recent technological advances and benefiting from new conceptions of the role a mobile unit can perform.

The technical advances include the great refinement in the last few years of VHF and UHF radio systems to link the mobile unit to the studio. As pointed out in earlier articles in this magazine and elsewhere, the new radio systems have raised the audio quality of mobile-studio links to match that of studio productions. At the same time the studio equipment itself has leaped upward, so that today it is comparatively easy and not prohibitively expensive to build a studio on wheels with superlative audio quality throughout.

This opening of all doors for top-quality mobile operations has encouraged radio managements to think of putting on regular programs from outside the studio when that seems advantageous for any reason. As the following van stories show, stations are finding good reasons for sending the whole program production process on the road from time to time.

Another fact that emerges from these stories is the variety of ways in which a station can get the van it wants. In nearly every case an outside van is built to meet the specific needs of the station buying it. The engineering staff of the station will often have the major role in designing and constructing the electronic systems in the van. For the physical construction, radio management has a number of options: altering a camper or motor home, buying a bare chassis and shell, using one of the hundreds of local camper and van builders, or getting help from a national supplier. Or the whole project can be do-it-at-home, if the needed time and skills are available on the staff.

An additional push toward the 450 MHz radio systems is coming, at least in some areas, from the increasing difficulty of getting top-grade telephone lines promptly and where needed. As one of the chief engineers interviewed by *BM/E* put it: "We are having more trouble all the time in getting from the telephone company the equalized lines we used to depend on. We are shifting heavily to our 450 MHz radio system — the quality we get there would attract us in any case." Another chief engineer said his station would put its 450 MHz system to much greater use in the future for the same reason as soon as an automatic repeater station could be installed in a tall building in the city. The repeater is necessary in this case to get the signal over path obstructions that prevent acceptable service from some points in the city.

Here are the five stations that *BM/E* found to typify these current developments in "outside broadcast." Station managements starting to think about vans of their own can probably find useful hints in these experiences.

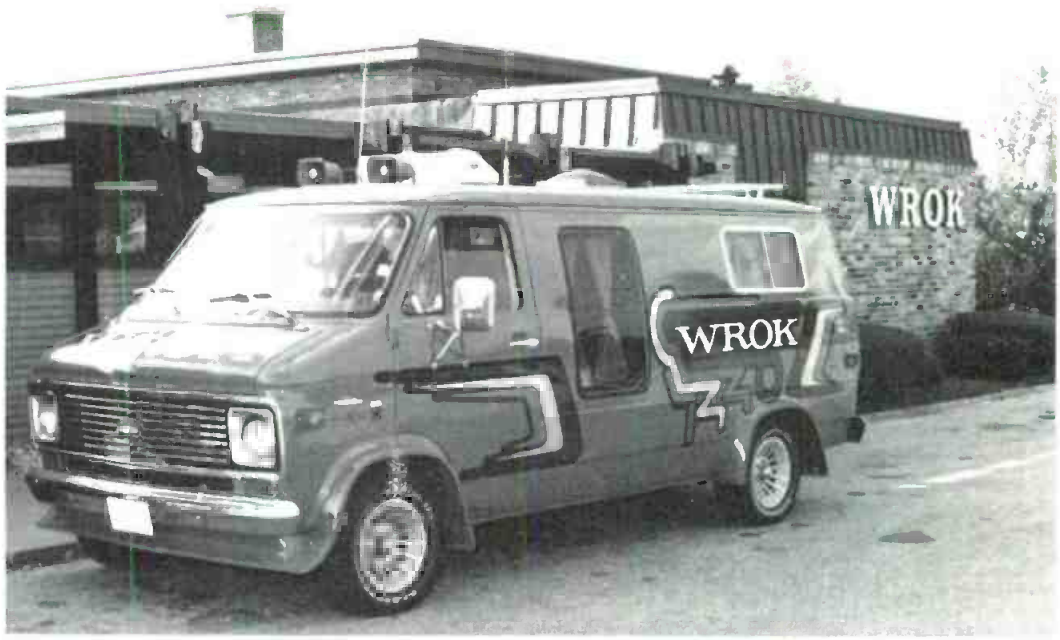
WWL started with a motor home

When the management of WWL-AM, New Orleans, veteran 50 kW clear, decided that sending a DJ and an engineer to a supermarket with a portable "board" was no longer good enough for their sponsored remotes, they bought a Fleetwood motor home on a Dodge chassis. A local van builder took out the dinette and sleeping quarters, leaving in all the other facilities. That cleared a space about seven feet square near the rear of the van. The builder also enlarged the side windows to extend them almost to the floor, so people outside would get a good view of the "studio."

The engineering staff put in the studio, consisting of an Ampro six-channel board and a Harris three-deck cart machine, recessed at the side for a clean appearance. Helping to keep the space clear was the installation of the PA amplifiers, off-air monitors, and equalizer/compressor in a closed shelf above the operating position. The PA amps feed speakers on the top of the truck which can distribute the on-air program to people outside the truck or carry announcements to them from the DJ in the van.

To get the signal to the studio, the van uses a Moseley 450 MHz system. There are two antennas for the Moseley transmitter on top of the truck, one an omni and one a directional antenna on a telescoping mast that can lift it 25 feet above the truck.

The operator can use the mics in the van, or he can



Exterior of WROK van shows attention-getting decor, roof speakers for addressing external crowd and letting them hear the program

Driver of WROK van can go on the air while underway, with all equipment, including 450 MHz radio link to main studio, of top studio quality. Note sound-absorbing material to improve acoustic quality of space.

Rear of WROK van has attractively finished walls with sound absorbing material to create good studio acoustics. Space is allowed for comfortable seating of person to be interviewed, or to deliver "live" commercial

move around outside with a GE hand-held transmitter or with a mic on a long cable which is plugged into a recessed panel on the side of the truck. There are RF boosters in the van to lift the signal from the hand-held transmitters.

WWL will install in the van about the time this story runs a cassette player/recorder system which ties in with another use of the truck: the relay of news reports from on-location newsmen. The news equipment in the main studio makes heavy use of cassettes, and the ability to record news stories right in the truck will add reliability and flexibility to the news operation.

When the van goes out on a typical remote the whole programming operation is shifted from studio to van. The DJ takes with him all the music and all the commercials he will use on carts and he airs them just as he would in the studio.

In addition, he can call people into the van from outside for interviews in a comfortable and attractive setting, or he can move around in the crowd outside for interviews. This ability to call in on-the-spot individuals serves the special announcements of sponsors at many location events and also gets into the broadcast the "color" of the event.

WWL has found the van very attractive to sponsors of special remotes and very useful for coverage of civic events. Here are some examples. At a recent Mardi Gras, the van became part of the parade, the announcer describing events as he went along; then, pulling the van off to the side, he described the rest of the parade as it passed. The

The Radio Vans Are Ready

van was driven into the Super Dome for a boat show, with exhibitors coming into the studio for live commercials, and with the announcer putting on the air plenty of public reaction to the show. On another day the van went to a golf tournament and was parked near the area where contestants registered. The announcer got a number of 30-second to 1-minute interviews with celebrities as they came in. Then he covered crucial parts of the tournament with the hand-held transmitters. Meanwhile, parts of the station's regular programming could be put on the air whenever there was time.

Another important activity in the van is the handling of telephone requests. There is a "call forwarding" system that automatically sends to the van any call made to the station's "public" number through a telco connection set up at the remote. The DJ can answer the call right at his post, putting both ends of the conversation on the air. Added to the other functions of the van, this gives the station plenty of flexibility in assigning it to outside jobs, whenever and wherever they may be.

WKY puts contemporary programming on the road

The van at WKY, Oklahoma City, 5 kW night-and-day station with a successful Contemporary format, gets a lot of use on weekends, when it is often "sold" to a supermarket or other commercial enterprise for a promotional effort. During these remotes, the regular programming of the station goes on the air from the truck. WKY started with an empty chassis and installed a 12-channel Dyma console, two Revox reel-to-reel tape machines, ITC cart machines, and two turntables. The link to the main studio is by Marti 450 MHz radio, with the Marti receiver on the station's AM tower.

The DJ takes with him (as does the WWL operator) all the recordings and commercials for his time on the air. He can call in people for interviews, put the sponsor on the air

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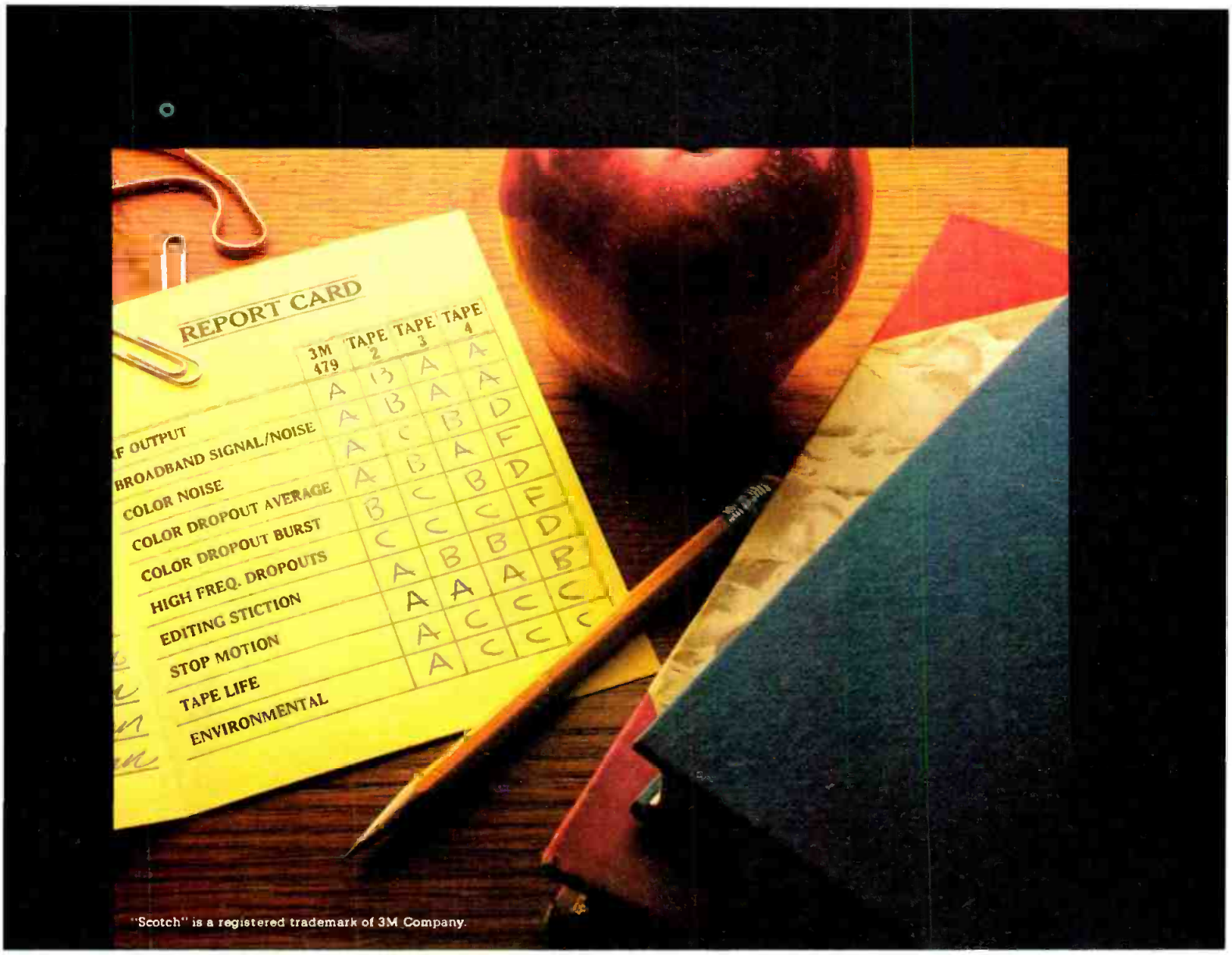
The mobile studio of WHDH has a neat exterior with large windows in the operating area just behind the driver's seat

Operator in WHDH mobile studio has easy contact with people outside the van, which was one of the objectives of management in building the van

Interior of control position in WHDH mobile studio shows control console, record racks, and receiver for link to main studio. Turntables and cart machines are on operator's left; comfortable seat to his right is for interviewees



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with a commercial, describe the "happening," let people watch the operation through the window. As on the other vans covered here, there are PA speakers on the roof so the on-air program can be fed to the crowd.

The van also has a telephone answering system much like that in the WWL van. It uses automatic call forwarding (a telco service) to send incoming calls to the van, and the DJ can put both ends of conversations on the air.

Leon Harris, chief engineer, told *BM/E* that the van, since it went on the road in early 1976, has been an outstanding success from every point of view. He says listeners don't know unless told that a program is coming from a remote; the quality is good enough to pass for the main studio, which was a main objective in WKY's design of the truck.

WHDH rides a van to meet Bostonians in person

This is another veteran 50-kW clear, and the management is maintaining a position at the top of the Boston ratings with a tightly controlled Contemporary format, plus a very strong local news and civic coverage program (*BM/E*, February, 1979). The management decided about three years ago that remotes from civic and community events, covered by the station as a means of establishing a character with listeners, would be much easier to do and stronger on the air with the help of a van.

To get it, WHDH started with a GMC motor home. The engineering staff, led by chief engineer Paul Hurd, removed all the furniture in the van's midsection. Then they put in a complete stereo studio (so the van can be used by sister station WCOZ-FM, and also be ready for AM stereo). The equipment: a UREI console, two Technics SP10 turntables, two ITC three-deck cart machines, and an Otari reel-to-reel machine. There is Marti 450 MHz radio for the link to the main studio; most remotes so far have been carried in by high-grade telco lines, but the staff expects to use the radio link more and more in the future.

Also in the van is a 600-watt BGW stereo amplifier feeding Cerwin-Vega loudspeakers on the roof. Again, the operator can distribute the on-air program to the crowd outside or make announcements to them. And again the telco connection allows phone-in requests, contest responses, and comments to be routed automatically to the van for handling there.

The WHDH management did not get the van primarily for specially sponsored events, but rather to move the regular program operation out to civic events of many kinds in order to give the station a visual "presence" and a much more intimate contact with Bostonians. The truck (as have all those described) has a smart external appearance with the station's call letters large enough to dominate the scene. When the van is used by WCOZ, the call sign of WHDH slides out of concealed tracks and that of WCOZ goes in. Thus the close and positive view the public gets of any station at a well-ordered remote was a main motivation for WHDH. As do the other stations covered, WHDH sends the DJ out with all the materials of his regular operation.

Looking at the studio operation through the windows, being interviewed by the staff, and hearing the regular program from the roof-top speakers are all activities that have proven to be highly popular in hundreds of remotes in recent years. The WHDH management believed, moreover, that their talented and personable staff would enhance the station's image in such person-to-person encounters.

Mobile studio of WHDH/WCOZ draws large crowd of students outside college on registration day. Students listen to AOR program through roof-top speakers, crowd up to van (right background) to watch operator and talk with him

Here are a few of the recent happenings at which WHDH "showed the flag" to the Boston public by sending out the van. One was a heavily attended kite-flying contest in a public park. Another was a boat show and exposition on the waterfront, covered not because of commercial sponsorship but because of very large attendance and interest. Another: registration week at Boston colleges (there are many important ones in the city), with the van feeding an AOR program through WCOZ. Parked near a registration building, the DJ could put on the air mini-biographies of new students coming in, and make them sharply aware of the station.

The management is completely satisfied that the van has done what they hoped it would. Bostonians wave cheerfully when it passes by, crowd around it when it goes into operation, and obviously enjoy their conversations with the staff. The WHDH ratings were farther ahead of the number two station than ever in the January-February sweep.

WROK built a van very easy to use

At this top-rated AM station in Rockville, Ill., on the air for more than 50 years, chief engineer John Shepler wanted a van that the non-technical on-air man could operate easily, including going on the air from the driver's seat while in motion. He got just what he wanted, using pushbuttons in easily reached panels for most of the control operations.

The van was made from a GMC Chevy camper. Its design imperatives in many respects are similar to those of the other vans described. But it was not built to put regular music programming on the air from the remote location. Its function is to allow the station's announcer to speak with studio quality from anywhere in the market, including interviewing sponsors or others in a mini-studio in the back.

The Radio Vans Are Ready

The pushbuttons that set up wanted functions are in a panel over the driver's head and also at the mic position in the back of the van. This allows the announcer-driver to go on the air while at the wheel — he has a mic mounted near him in the front. When the van is parked he can move into the back and go on the air from there, along with anyone he wants to interview.

The link to the studio is a Marti 450 MHz two-way system. The Marti transmitter is hidden away in the truck. Once the power is on the Marti receiver is in standby so the operator can get cues from the main studio.

The operator also has a Marti hand-held transmitter which can be relayed by the transmitter in the truck. Thus the operator can move around outside the truck, interviewing people on the street. The truck has speakers on top to which the on-air program can be fed for outside distribution.

A distinction needs to be made between this truck and earlier remote-voice pickups, which were telco-quality radio for decades. Every unit in the truck is at the current top quality levels — the microphones, amplifiers, UHF radio, and other equipment. The "studio" in the back has been acoustically treated so that the on-air voice will have smooth frequency response and be free of severe peaks.

This quality has allowed the truck to be used for such jobs as concert pickups, with the hand-held transmitter carried into the hall and feeding the Marti in the truck. The van, taken along with the others described, illustrates well the *flexibility* of van design today. Whatever a station management wants in a van, it can be created without too much sweat.

WKY's enormous mobile studio is used extensively for commercial production. Large glass windows permit public to watch operation

Bobby Riggs (left) broadcasts with WKY's Danny William from inside the mobile studio

WBAP sends out a two-man crew on remotes

This country-and-western station located in Fort Worth, Texas, is a long-time leader in the state. The management wanted a van that could put programs on the air from remotes (like the first three vans covered here). They bought a Mobile Scout motor home and took out the kitchen and a little of the furniture. In went a Russco five-channel board, two Technics turntables, an internal monitor and cue system, and a Marti 450-MHz radio, including two RPT-25s for redundancy. There are two receivers on the station's 1100-foot antenna: the van-studio link has plenty of backup.

The operation uses an engineer to operate the board and put the records on the turntable, and a DJ with the mic in an acoustically isolated space for the voice material. All the records for a program period are carried in the truck. The engineer tells the DJ what the upcoming record is with a chalk board, visible through the plexiglass door that cuts the DJ off. There is also a 250-watt amplifier feeding speakers on the top of the van. The DJ can also go on the air from outside the van, with the mic cable plugged into a panel on the side of the truck.

Another operation aid: a pair of clocks, one on the inside and one on the outside of the truck, the latter so the DJ outside can time himself accurately.

Tom Green, chief engineer, told *BM/E* the van is being booked heavily by advertisers, with at least two remote operations every weekend and others earlier in the week. One example: the country music the station puts on the air is popular with truck drivers, and especially high with them is country DJ Bill Mack, whose show runs from midnight to 5:00 a.m. , a period during which men on the road obviously welcome some over-the-air companionship. A major area truck stop has several times sponsored a midnight-to-5:00 a.m. visit by the van and Bill Mack.

The program fills the truck stop from the roof-top speakers; Bill Mack invites truckers in for interviews. The van visit is announced several days in advance, and many truckers go far out of their way to be on hand to hear the music and talk to Bill. That's all to the good for the truck stop, for WBAP, and for the "knights of the road" too. **BM/E**

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RF MICS OFFER EXPANDED COVERAGE, MORE FLEXIBILITY FOR BROADCASTERS

With FCC approval of clear VHF channel use by low-power transmitting devices such as wireless mics, radio and television broadcasters are finding ever-increasing uses for these versatile production tools.

Editor's Note: Material for this story was supplied by Wayne Hogan of the Florida State Football Network, Homer Haines, chief engineer of WGLF-FM, Tallahassee, Florida, Erwin Fickas, production manager of KFMB-TV, San Diego, Cal., and HM Electronics.

IN BOTH RADIO AND TELEVISION one of the most useful production tools to have come along in recent years is the radio (or "wireless") mic. Available in a number of configurations (from one to five or six channels per receiver) from a number of different manufacturers, they afford to the production team a new ease of operation. No longer does the mic boom operator have to worry about setting up each shot so that his extension arm isn't in the picture. No longer does the cameraman have to avoid shooting the ground for fear of seeing mic cables. The audio engineer simply attaches a small electret mic to the talent's clothing, turns on the tiny transmitter situated in the talent's pocket or taped to his back, then walks back to the receiver to set audio levels and feed to the recorder. RF mics have become as integral to EFP as lightweight cameras.

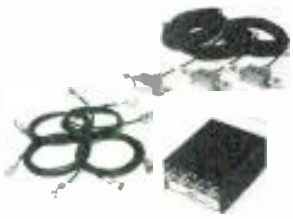
Sports production is one major area where RF mics are seeing ever-increasing use. Radio station WGLF-FM in Tallahassee (38 kW, 104 mHz) is the broadcasting station for the Seminoles, football team of Florida State University, as well as the flagship station for the Pick of Dixie network. This network covers every major marketin Florida, Georgia, and Alabama, and has been tapped by other stations for high-interest events like the Navy/Florida State game, which was broadcast to about 75 radio stations as far north as Maryland and Virginia.

Up to now the games have been covered by three men: Wayne Hogan, producer/engineer for the 42-station Florida State Football Network and liaison between the school and the station, Bob Schackleton, play-by-play announcer, and Bill Peterson, "color analysis" man. In addition to Schackleton and Peterson, who work from the booth, the station decided to add a third announcer on the sidelines who would be able to paint a more vivid word picture. This announcer would cover the plays from the vantage point of the scrimmage line, or end zone in the case of field goals and conversions. Knowing full well that all 48,000 fans immediately turned on their car radios to catch the post-game wrapup, the station also decided the lockerroom would be a good place for live interviews with coaches and players.

Dr. Bernard Sliger, president of Florida State University, was the major force behind the decision to go to the field announcer. Even after considering the extra cost of

Mobile recreational vehicles are the anathema of RF mics because of their reflective surfaces. KFMB-TV solved the problem with an HME antenna diversity system. Note lighting stand-mounted antennas to right of camera and by refreshment booth.

adding one more man to the announcing team, Dr. Sliger decided the fans would appreciate this extra perspective on the game and authorized the filling of this position. Beginning last season, Jim Crosby became the on-field announcer for the Seminoles.



HME's System 22 wireless transmitter and receiver (above) and AD-10 antenna diversity system (below). The system averages the signals received by the three antennas, which are best arrayed as a semi-circle about the talent. Antennas mount easily on lightweight stands

The decision to use a wireless microphone was simple. A traditional microphone would have involved thousands of feet of cable, with attendant physical and electrical safety hazards. Ground loops and hum would have also made the use of a traditional microphone problematic.

The choice then, was clear. WGLF purchased a wireless microphone for their sideline announcer and have found, according to Homer Haines, chief engineer, and Hogan, no additional problems.

Not only has the use of an RF mic eliminated the technical and logistical problems, but it has also enabled Crosby to get into situations that used to happen out of the range of the listener. Now the WGLF listener is brought right into the field activity. He can hear the call of the coin-toss and the introduction of team captains and officials, and from the sideline vantage point, the listener also gets the added dimension of the sounds of contact.

There are, of course, sounds that WGLF doesn't want to get on the air. To avoid expletives from the sidelines or unwanted crowd noise, WGLF equipped their HME System 22 with a Shure unidirectional microphone.

Crosby's cues are usually taken from the announce booth. At home games he has a headset monitor which receives the actual broadcast, allowing the booth announcers to go to his reports. At away games where the local station does not carry the WGLF broadcast, a walkie-talkie with earphone is used for communication between

Divergent Viewpoints On Diversity

That diversity reception systems increase the potentials for RF mics is not disputed. A serious question has arisen, however, over which type of diversity systems offers the best results.

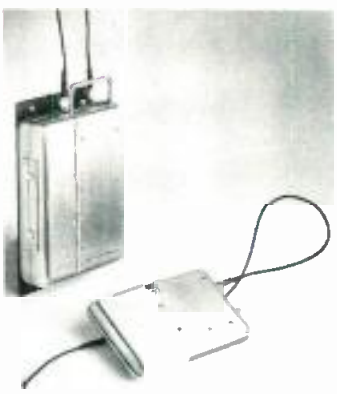
The diversity system discussed in the accompanying article, manufactured by HM Electronics, is the "combining type," in which signals from three antennas are combined and averaged to provide the best possible signal from all three sources. A somewhat similar system, only employing two antennas positioned so that one will fill in the area not covered by the other, is the Swintek Mark 9 and 9B.

A totally different approach to diversity is taken by Vega. This is a *switching* diversity system in which the signals received by two parallel receivers are compared for strength and the stronger signal passed through. Similar to the systems used by the military for HF transmission, diversity switching systems offer the advantage of providing truly null-free operation.

A slightly different approach to switching diversity is taken by RF Technology in its 950 MHz diversity system, available in one, two, and five-channel systems. At the receiver, the audio output from each demodulator is preamplified and fed to a high speed, inaudible switch. The system automatically diverts the audio from the main path to the diversity path whenever the S/N in the main path drops below 60 dB. The logic circuit inhibits the return of the signal to the main path until a 3 dB improvement in S/N is sensed.

The principal difference between this system and that offered by Vega is that whereas the Vega selects whichever of the two signals is stronger, the RF Technology system's circuits switch automatically as soon as the threshhold is reached. This somewhat less costly technology can lead to occasional problems, however, insofar as the automatic switchover to the diversity circuit may occur at a point when, though the main circuit is below 60 dB, the diversity circuit is far worse.

Arguments rage back and forth about which type of system is best. Vega, on the one hand, claims that the combination system is little more than can be achieved with an array of phased antennas similar to a transmission antenna network. Like a transmission network, the array is almost



RF Technology's RM-101 wireless mic transmitter and diversity receiver with dual antennas. Compact receiver automatically switches to diversity circuit whenever main channel reception drops below 60 dB

bound to have a directive effect with nulls within or outside the pattern of the antennas, especially between the antennas.

The combination systems, on the other hand, offer both cost and complexity savings in that they use multiple antennas rather than multiple receivers. Swintek also points out that, in a switching system, a low carrier signal is completely rejected while the remaining signal is totally accepted, even though it may not be of good quality in the first place; a combination, it argues, would be able to combine the two and achieve better results than either. Swintek also points out that switching diversity receivers may lock onto a reflected carrier rather than the primary signal, thereby passing through a signal which has interference "buzz" caused by modulation of the reflected carrier.

Yet another claim by manufacturers of the combination systems is that switching between receivers can introduce switching noise. This does not appear to be borne out by engineers we spoke with.

Probably neither system can be proved ultimately superior. If field tests with the combination system prove it acceptable for your purposes, then its lower cost will obviously become the deciding factor. If, on the other hand, the elimination of occasional nulls by the switching diversity system is important to you, it may well be worth the extra cost.

the booth and Crosby. Though they have had interference problems with the walkie-talkie system, they have never experienced interference on the wireless mic. WGLF is licensed to operate the mic on TV channel 8, which has been a clear channel everywhere they have gone.

Freedom of movement for sideline announcer

Crosby moves the entire length of the field on the sidelines. For field goals and conversions, he runs to the end zones and often beats the officials to the call. When an end sweep moves his way, he is in an excellent position to call the action and can pick up the sounds of contact if he wishes. He has been known to interview officials during time-outs and get additional information on previous penalties or other rulings. The fans love it.

The receiver is located in the booth on the 50-yard line, some 60 feet above ground. Although only a single dipole antenna is used on the receiver, there are no on-field radio dropouts. Haines and Hogan both report that the locker room interviews astound them; radio transmission is very satisfactory, even though the 50 milliwatt transmitter is 500 feet from the receiver, in a subterranean concrete structure, between rows of steel lockers! Crosby monitors his signal by listening to himself being broadcast over his headphones and avoids what few multipath radio dropout spots there are by moving out of them.

Hogan says several other schools have noticed the mobility Crosby has, and have expressed interest in the system. Hogan will use the wireless mic for this spring's opening baseball season "for dugout interviews, maybe even to talk with fans in the stands. I don't know what we'll use it for, but we'll use it. It adds a lot of color, and it really is fun." WGLF also uses the mic for parades and mall pickups, according to Haines.

CBS affiliate turns to RF diversity system

"If you have a situation in which you're shooting at a local car dealer's lot and the script calls for the announcer to walk through rows of cars, then get into one and drive away, you obviously need an RF mic," says Erwin Fickas, production manager at KFMB-TV, San Diego. Fickas, who has received three Emmy awards for cinematography and editing in the 23 years he has been with the station, produces 25 to 50 commercials a month.

While RF mics give the announcer more freedom, however, they can in turn lead to another problem: multipath cancellation and its subsequent dead spot or dropout. This is caused when a secondary radio wave from any FM transmitter (including an RF mic) bounces off a reflective surface and arrives at the receiver out of phase with the primary radio wave, causing a phase cancellation and the resulting audible dropout. This problem can become extremely serious when working, as Fickas does frequently, around automobile showrooms or in appliance stores where the glossy metal surfaces become perfect RF reflectors.

Fickas evaluated several different types of RF microphones with diversity receivers — systems designed to overcome the multipath problem by using multiple antennas to achieve the best signal strength. Fickas decided on an HME System 22 which operates on the combining diversity principle.

The system uses three antennas, which Fickas generally arrays in a semicircle around the action. Each antenna has a 20-foot cable. The antennas all receive signals from the RF transmitter simultaneously. The diversity system then

KFMB in the field for Lamase RV, a local recreational vehicle dealer. Diversity RF mics are essential in situations like this where cameras must shoot wide and reflective surfaces cause severe multipath problems

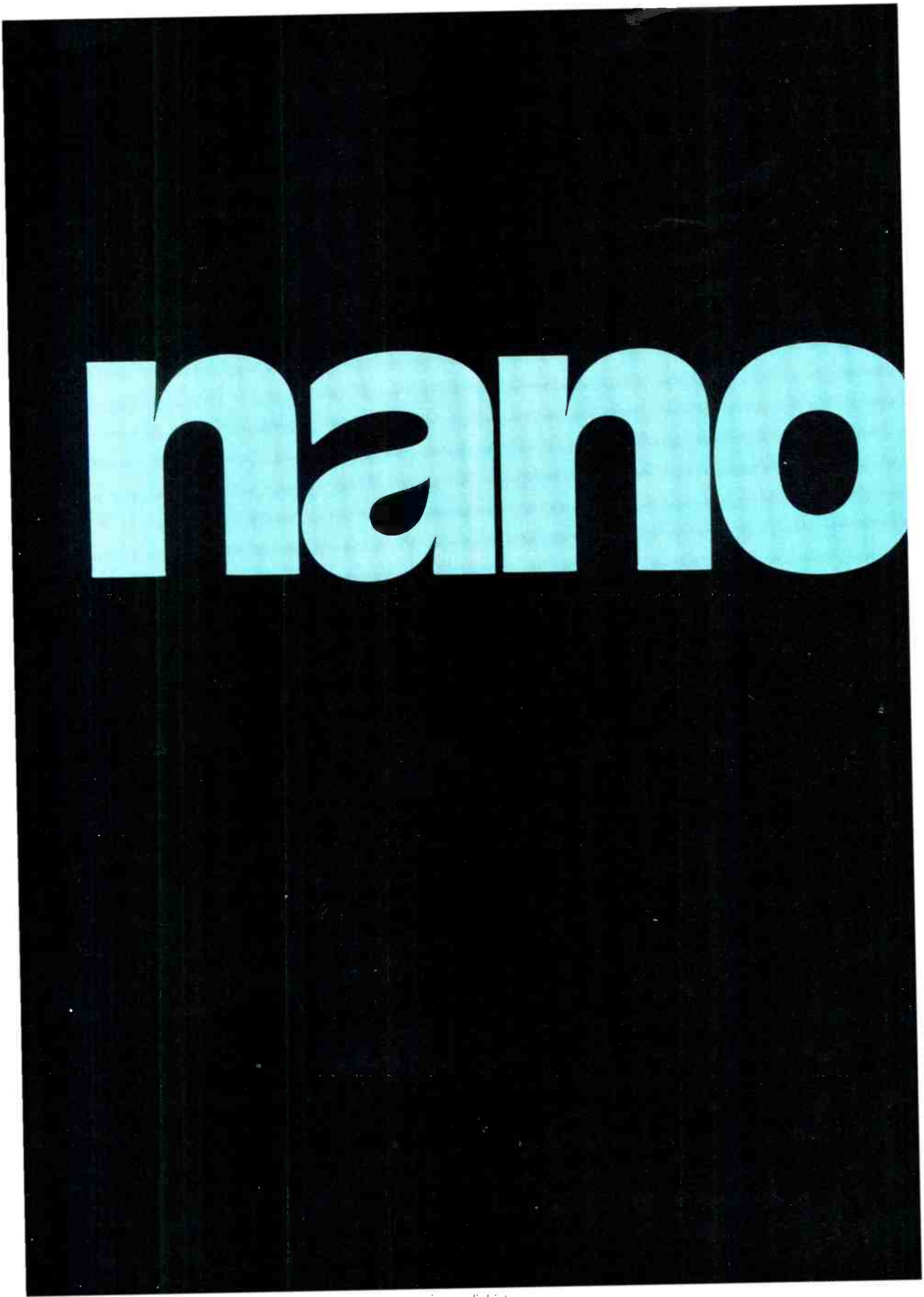
combines and averages the signals, simplifies the combined signal slightly to offset system signal loss, and then sends the signal on to the receiver. The use of three antennas has proven effective in eliminating almost all phase cancellation; the only time cancellation can occur is when two antennas are cancelling out each other completely and the third antenna is crossing through the zero point. The odds against this are astronomical and the situation only lasts as long as the signal sine-wave remains at the zero crossover.

Another feature Fickas considered important in the selection of a new RF mic is that the transmitter operate for long periods on standard alkaline batteries. The station's older RF units used rechargeable Ni-cad batteries which only lasted three or four hours. When depleted, they had to be recharged overnight. The HME receiver also has provisions for internal or external battery operation, which allows remote all-day operation completely free from ac power requirements or the need to turn the transmitter on and off to save batteries. Fickas has found the best power source to be a standard lantern battery.

Fickas varies his micing technique to suit the circumstances. If a hidden or lapel mic with omnidirectional properties is desired, the Sony ECM-50 is usually chosen because of its "hotter" than usual output. Sometimes a hand-held dynamic mic is chosen; the wireless transmitter can be used interchangeably, and the electret mic can be bias-powered directly from the transmitter's battery.

Future plans for the wireless mic at KFMB are used on *Sun Up*, a morning variety show, and on station promotions. Fickas selected the four-channel antenna diversity system, which provides simultaneous diversity reception for up to four separate receivers operating on different frequencies, all sharing the same three antennas. This means that up to three more wireless mics can be added to the existing antenna diversity system at a relatively low cost. Channel separation is 40 dB, eliminating cross-talk.

Whether used for the production of sports or commercials, by television or radio stations, the RF mic is finding an increasing role as a way out of difficult situations. Diversity systems expand the potential of these mics even further. It is probable that soon a wireless unit will be as integral a part of a mobile van as the recording decks themselves. **BM/E**



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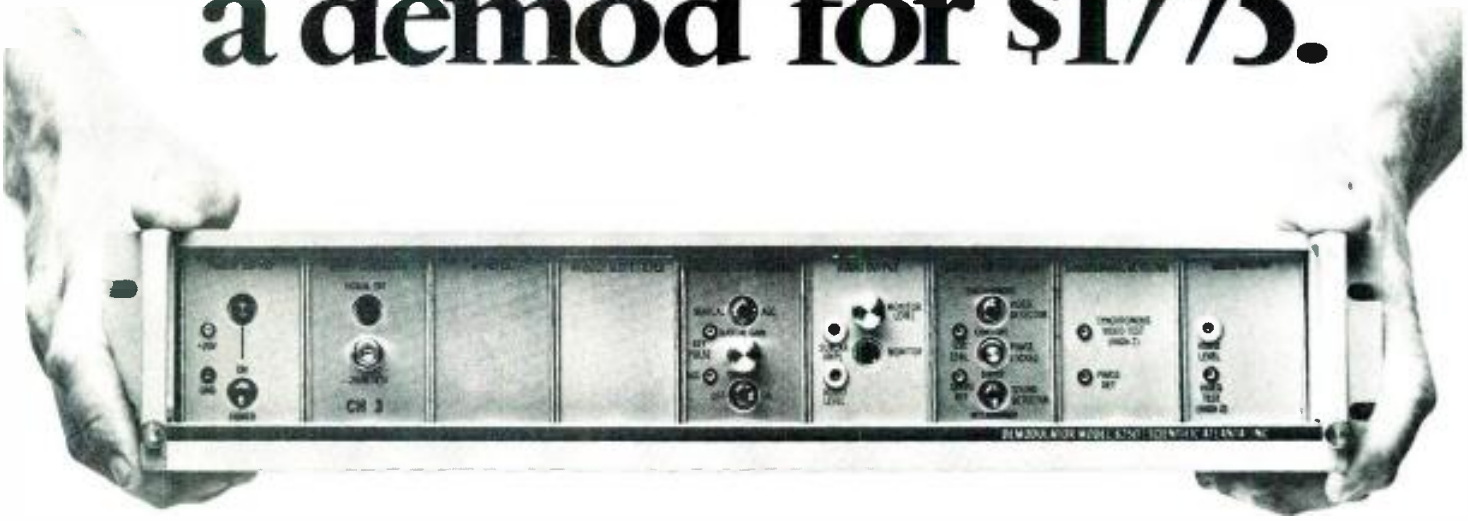

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KSL VIDEO: A BANNER YEAR WITH ONE-INCH MOBILE PRODUCTION

By
Alan Henderson

KSL Video Production in Salt Lake City was established when KSL-TV found itself swamped with too much commercial production. After just one year, the commercial production company has turned a profit. A big factor has been the use of a custom-designed one-inch mobile van.

AT A TIME WHEN MANY videotape production companies are just starting out, there is the encouraging news that a new one-inch facility has just completed its first banner year in, of all places, Utah.

Why one-inch technology? How can all this happen in Utah?

It is all part of a long tradition that began over thirty years ago when Hollywood first came to Utah in the era of John Ford and Cecil B. DeMille. Utah's spectacular scenery and accommodating climate helped create the image of the "old West" which most pervades our thinking.

The second era was the film-and-video era, the television era, the time when producers from all over America learned about the attractive production-value versus production-cost formula characteristic of Utah — along with a tremendous variety of locations, lower costs, easy access, and full production facilities. During these two eras, more than 200 features were produced.

Little wonder that this tradition of production orientation spawned KSL Video Production, a full-service video tape company. KSL Video Production is a division of KSL Television, Salt Lake City, a CBS affiliate which covers a seven-state viewing area. KSL-TV in turn is a division of Bonneville International Corporation, a nationwide organization with broadcast properties in New York (WRFM), Los Angeles (KBIG/KBRT), Chicago (WCLR), San Francisco (KOIT), Dallas (KAFM/KAAM), Seattle (KSEA/KIRO/KIRO-TV), and Kansas City (KMBR/KMBZ). Bonneville also controls Bonneville Broadcast Consultants, Tenafly, N.J.; Bonneville Data Systems, Salt Lake City; Bonneville Productions, Salt Lake City; Bonneville Entertainment Industries, Encino, Calif.; Radio Data Systems, Mt. Laurel, N.J.; and Torbet Radio, New York City.

KSL Video Production's mobile van with Ampex one-inch recorder. VTR is mounted on a dolly, together with color monitor, and can be hoisted out of the van with a permanently installed winch, then wheeled to the location. VTR is powered from batteries or external ac

KSL Video Production began operation in November, 1977, specializing in commercial spot production. The organization offers mobile production, full studio facilities, and post-production capabilities. Work is now produced almost exclusively on one-inch videotape using the new Type C format Ampex VPR-2 recorders equipped with TBC-2 digital time base correctors.

Alan Henderson is manager of KSL Video Production.

One-Inch Mobile Production

Automonous production house that shares some station facilities

The KSL production house has its beginning in the fall of 1976 when the station found itself swamped with commercial spot production. Studios and portable equipment were scheduled beyond their capacity. It was impossible to maintain the "personal service" and the quality which had always been a trademark of the KSL organization. Management decided to form a small, semi-independent production company to help accommodate the work load and at the same time improve the profit picture in the production area. The operation was to be separate from the television production department of the station, although certain personnel and facilities would be shared.

The initial objective was to grow only as the amount of business grew, and to add personnel and equipment only as needed. A computerized cost accounting system was designed and put into action. This system was instrumental in achieving accounting visibility between the television operation and production company.

KSL Video began by taking over all remote production for the television station operation. Along with the three-camera quad mobile unit, a small single-camera one-inch unit was added. Studio production was booked in one of KSL-TV's production studios. A CMX editing system was ordered to handle post-production editing, with film-to-tape transfers and dubbing handled through the operations department of the television station. KSL Video finished its first year of production with a net profit.

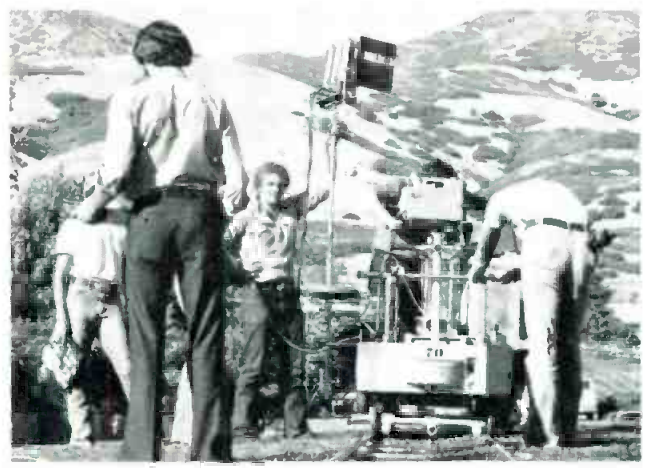
One-inch equipment a key factor in profitability, production versatility

One of the reasons behind the rapid success of KSL Video was the one-inch recorder. The small, single-camera mobile unit was built in January, 1978. An RCA TK-76 camera and Ampex VPR-1 VTR were installed. The one-inch format was chosen because of its quality, size, profitability, and cost. With the TK-76 and VPR-1, the van offers the highest quality pictures at any location, combining the speed of video and the portability of film, and stretching clients' production dollars further than ever before.

The one-inch recorder is extremely portable because it can be disconnected from the van. The machine is mounted on a dolly, along with a color monitor and color converter. In normal situations, the dolly is lifted out of the van and lowered to the ground using a small electric hoist which has been permanently installed. This is a simple, one-person operation. The VTR dolly can then be

KSL Video's camera operator Paul Roden makes some last-minute adjustments to the RCA TK-76 camera before a helicopter shoot

KSL Video's repertory includes a wide variety of production techniques for both commercials and industrials



Utah's magnificent scenery is responsible for the image many have of the "old West"; over 200 feature films have been shot in Utah, many of them Westerns. Here KSL Video's production team uses a track dolly for local TV commercial

wheeled to the remote location and powered from standard 110 V ac lines. When the machine is operated from inside the van, power is supplied from batteries through a power converter, or from a small gasoline generator, or from lines to the nearest ac.

Under normal shooting conditions, a TBC is not included with the VTR because of costs and decreased portability. If still frame or slow motion playback is needed on location, a TBC from the station's post-production area is borrowed. The van has been put into service as a slow motion unit during numerous sporting events.

How portable is the one-inch machine? KSL has used it for a 60 m.p.h. traveling car chase segment for an industrial client, for battling 50 m.p.h. winds atop a 26-story building, and for shooting segments of a *Donny & Marie* show for Osmond Productions in near zero-degree weather high in the Utah mountains.

Cost effective one-inch production

KSL Video's van had a starting capital investment of $90,000. During its first year of operation, it grossed approximately $250,000 in location shooting.

Besides versatility and portability, what are some of the other advantages of one-inch over quad? The capital investment is 40 percent less than two-inch. One-inch technology uses far less videotape stock than two-inch, meaning important savings relative to rental or purchase cost, storage, shipping weight, and container cost. One-inch uses less power to operate. This saves on electrical budgets, which continue to rise. It requires no air compressors, saving on noise, power, and other problems associated with compressed air. One-inch requires less space to operate. This saves cost and improves mobility in mobile units and post-production areas.

Special production features include automatic scan tracking (AST), making still frame and slow motion capabilities possible. If a production company does not have time-code editing, then the ability to "hand rock" one-inch VTRs allows multiple frame animation. Also, it provides the "confidence" feature of being able to see playback while recording. Another feature is the advantage of two full tracks of stereo audio, plus time code.

KSL-TV's "cuts only" editing bay. KSL Video will shortly be adding a computer-assisted CMX system, interfaced to a Duca-Richardson switcher and MIC/Quantel DPE 5000 effects generator. The one-inch VTRs, however, enable "movieola-style" editing even without a computer

Future plans to include computerized editing

Within the next few months a CMX-340 editing system will be installed, with a Duca Richardson switcher, Tele-Mation Compositor I character generator/graphics system, and three Ampex VPR-2 recorders. With this new production capability will come state-of-the-art computer-assisted editing. The editor is liberated from all manual tasks and functions only as an editor, with the entire system at the fingertips. A small insert stage will be added to accommodate product displays, graphics, or table-top shooting. In the studio production control room a Duca Richardson 4000 Series switcher will be added, along with digital video effects provided by a Quantel DPE 5000. The new Ampex BCC-10 studio cameras with servo zooms and Vinten pedestals will increase studio capabilities.

KSL Video has structured itself so that imagination and the creative process will not be interrupted or hampered by the problems of production engineering. In the design of the CMX editing suite, special care was taken to make a creative atmosphere for the client, who can come in, sit down, and understand what's going on without being overpowered by all the equipment.

One-inch production minimizes setup time

One-inch machines have been responsible for the recent "video film-style" revolution, a phrase coined by Steve Michelson and Buck Lindsey of One Pass Video, a San Francisco teleproduction company. This single-camera production style uses source lighting, sophisticated audio techniques, and moviola-style video editing with lightweight, portable, flexible equipment. With one-inch VTRs and lightweight portable color cameras, it takes only a few minutes to set up. Equipment can travel to and shoot almost any location imaginable. There are no large, clumsy cameras, miles of cable, or heavy recorders. "Video film-style" means achieving a dynamic picture that plainly says "on location," not "in the studio."

All of these elements characterize KSL Video's approach to production. What have the one-inch machines really meant? More convenient video services, better production results on time and on budget, low-cost special effects capabilities such as still frame and slow motion, keeping ad agency producers satisfied by using more film techniques with videotape, and above all, cost-effective production techniques. KSL Video Production offers proof that a full-service teleproduction company can grow out of a TV station operation as many have suspected and more and more stations are seeking to prove. **BM/E.**

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MICROWAVE - TEAMED WITH THE RIGHT VEHICLE - BRINGS IT BACK ALIVE

The urge to carry "live" program segments within news and magazine shows, and the tendency for news to break out any time, anywhere, is leading to a wide range of outside broadcast vehicles. Stations around the country are taking microwave on the road, off the road, and into the wild blue yonder.

WTAE's first ENG/EFP mobile unit was fabricated at the station. This typical van was one of the first to be adapted to the new role of mobile repeater station

IF THE AVERAGE BROADCASTER WERE ASKED to envision a mobile television unit, the picture most likely to form in his mind would be a van. If, on the other hand, he were asked to envision a dramatic news story he'd like to cover, he'd probably see a location his van couldn't get to.

To solve this problem broadcasters are settling on two primary strategies: developing vans into microwave relay units, and putting microwave gear into exotic vehicles that can go almost anywhere. The former solution has several versions which usually involve a van equipped with microwave receive and transmit gear in two different frequency bands, or use of two different channels in the same frequency band. The choice of antennas for these mobile relay stations is often one set of Nurad Dual Goldenrods and a dish in order to get the slightly higher gain required for certain circumstances. In the latter case, microwave gear is finding its way into every manner of transport from helicopters to all-terrain vehicles (ATVs).

There is also a hybrid solution which is gaining increasing popularity: the use of a four-wheel drive vehicle (often a four-wheel drive Suburban) equipped as both a basic ENG unit and as a microwave relay station.

At stations we talked to, some of the solutions used were peculiar to local conditions, and some general enough for application almost anywhere. At WTAE-TV, Pittsburgh, for instance, the station's two vans now carry transmit/receive 2 GHz equipment so that the units can operate in tandem. When, as frequently occurs in the hilly terrain of western Pennsylvania, a clear shot to WTAE's fixed repeater station or studio cannot be achieved, one van is located at the scene and one van is located at a point mutually accessible to the first van and repeater station or studio receive antenna. The signal is beamed to the repeater van on one 2 GHz channel and relayed out on a second 2 GHz channel.

At WMAQ-TV, Chicago, a four-wheel drive Suburban is used. According to director of technical operations Bill Marshall, one of the primary reasons for choosing the Suburbans was their size and four-wheel drive capability. The relay system at WMAQ involves the use of 7 and 2 GHz microwave systems. Both 7 and 2 GHz units are transmit/receive units so that the operators have an option as to which frequency they will come into the Suburban with and which they will relay on. According to Marshall, the Suburbans have economy advantages too, since they cost about one-third of what a similarly equipped van would cost.

Another popular four-wheel drive vehicle is the Chevy Blazer, such as the ones in use at KPRC-TV, Houston. According to Dave Stickley, assistant chief engineer at KPRC, one advantage of four-wheel drive is the ability of the units to overcome minor obstacles common to news

WTAE's second mobile unit is a Wolf Coach-fabricated mini-van. The units have been equipped with dual transmit/receive microwave transmitters so they can function as repeater stations for each other. Interior of the mini-van (left) represents one design philosophy in which a strong EFP production capacity is placed in the van. Other stations such as KPRC and WMAQ prefer a streamlined news-only approach

locations such as curbs and fire lines which often prove insurmountable to vans. KPRC currently operates some eight Blazers, two of which are microwave-equipped. The Blazers are not equipped as repeater stations, though they are used to feed prerecorded tapes from the non-microwave-equipped Blazers.

Though KPRC's Blazers are small in comparison to larger vans, they contain a potent production capacity including Microwave Associates MA-2EP 2 GHz transmitters, Nurad Dual Golden Rod antennas, Ikegami HL-77 camera, Sony BVU-50 and BVU-100 VCRs. Four-wheel drive overcomes nearly all of the common obstacles vans often find insurmountable

Perhaps the most exotic microwave repeater unit we came across will soon go into service at KTAR-TV, Phoenix, Ariz. KTAR is currently equipping its Hughes 500B jet-powered helicopter to operate as a flying repeater station. According to news director Al Buch, KTAR decided to "get into the helicopter business" some time ago as the result of competitive considerations. Another reason was that Phoenix is a far-flung city and nearly devoid of major arterial highways, making it hard to get around town. The new unit, dubbed Sky 12, has been in service for some time now with pilot/photographer/reporter Jerry Foster at the controls. Reports from the unit are already a regular part of KTAR's *Action News* program. Foster, who came to KTAR from KOOL-TV, where he flew that station's chopper, is well-known for his aerial reporting. Currently he photographs while flying by laying the chopper over at a 45 degree angle and pointing his Sony DXC-1610 camera out of the sliding plastic porthole. He narrates the sound track and then returns to the station to edit and add to his piece.

According to Buch, it was determined early on that "to put something up in the air that couldn't send back pictures was silly." So now, Sky 12 is being outfitted with a unique microwave system, engineered by Tayburn Electronics. Aboard the chopper will be a 2 GHz two-channel transmit/receive unit to pick up transmissions from the ground through a retractable omnidirectional antenna located on the bottom of the aircraft's body. The transmissions from the chopper will be through either a forward-mounted or aft-mounted fixed horn antenna with a practicable range in excess of 120 miles. There is also a second retractable omnidirectional transmit antenna with a range of 60 miles. The central element of the system is an Auto Tracker station located on South Mountain. This Auto Tracker will track the chopper by maintaining the attitude of the dish for maximum signal strength.

The plan calls for a photographer to accompany Foster on his assignments. A ground crew will go to the news scene by van and set up a microwave uplink. The microwave system aboard the chopper will be remotely controlled from the receive station. The director at the studio will thus be able to switch between both the ground

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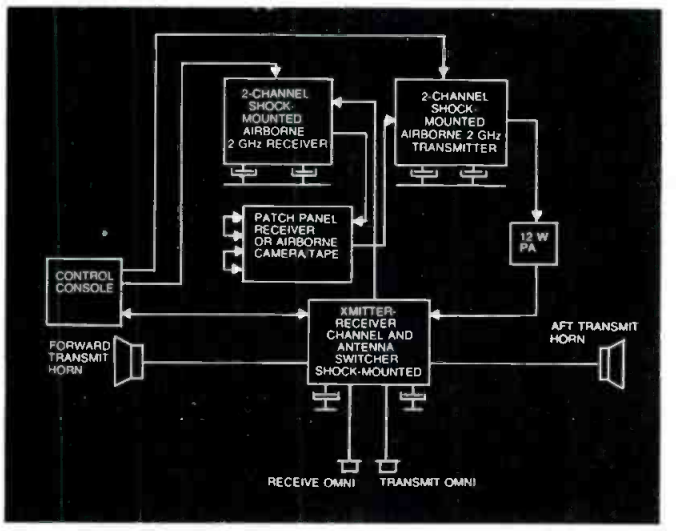
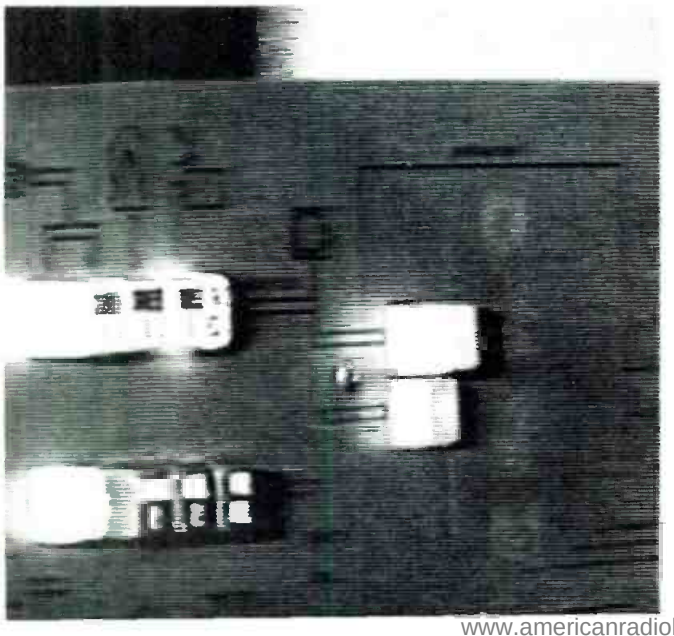


Sky 12, KTAR's airborne ENG craft, will provide aerial pictures and relay pictures from the ground to the Auto Tracker ground station on South Mountain (upper right). Block diagram (right) shows the signal path of the helicopter system

The Suburban used by WMAQ, Chicago, as its main ENG vehicle carries both 2 and 7 GHz microwave transmitters/receivers. The 2 GHz antenna is mounted forward and the 7 GHz dish is mounted aft. The routing of the signal is handled by an ENG Manufacturing-built assignment switcher (below). The switcher matches the source with the desired output and matches source and output with either frequency microwave unit



camera and the aerial camera. In some cases when a van cannot get into a location, Buck anticipates dropping in a ground crew and microwave gear by air with the chopper, then returning to the aerial repeater position. Buch also feels that the chopper will be able to fly to news locations far out of microwave range, record the story, and beam it back to the tracking station as it returns toward home base.

A setup of this complexity is not cheap. Buch estimates that the basic chopper cost about $225,000. By the time it is fitted out with an extra fuel tank, Avionics communications systems, 40-channel CB, Bearcat programmable scanner, assorted police and fire receivers, the Sony DXC-1610 camera, BVU-50 and BVU-100 VCRs, and assorted microwave gear, the unit will cost somewhere in the $300,000+ range.

But versatile ENG transport doesn't have to be that expensive. At WEHT-TV, Evansville, Ind., the problem was the occasional need to go where vans could not go. The solution was the MAX II All Terrain Vehicle. The MAX II is a completely self-contained mobile unit capable of carrying two persons and going almost anywhere. Even loosely packed snow will not stop the MAX when used with the optional tank treads. The unit is transported on a tilting trailer, and all WEHT news vehicles are fitted with trailer hitches for pulling the MAX. The MAX is amphibious, capable of 15 to 20 m.p.h. on land and 5 to 6 m.p.h. in water. Cost of the unit was $2,870, and the trailer ran an additional $400. According to Elmer Chancellor, VP and director of engineering for Gilmore Broadcasting Corporation, "We do not anticipate that we will be using the MAX often, but on those occasions when it is needed it will be invaluable to us."

The gear for the MAX consists of a Sony five-inch black and white monitor, a Microwave Associates MA-2CP transmitter, and a recently added MA CP an-

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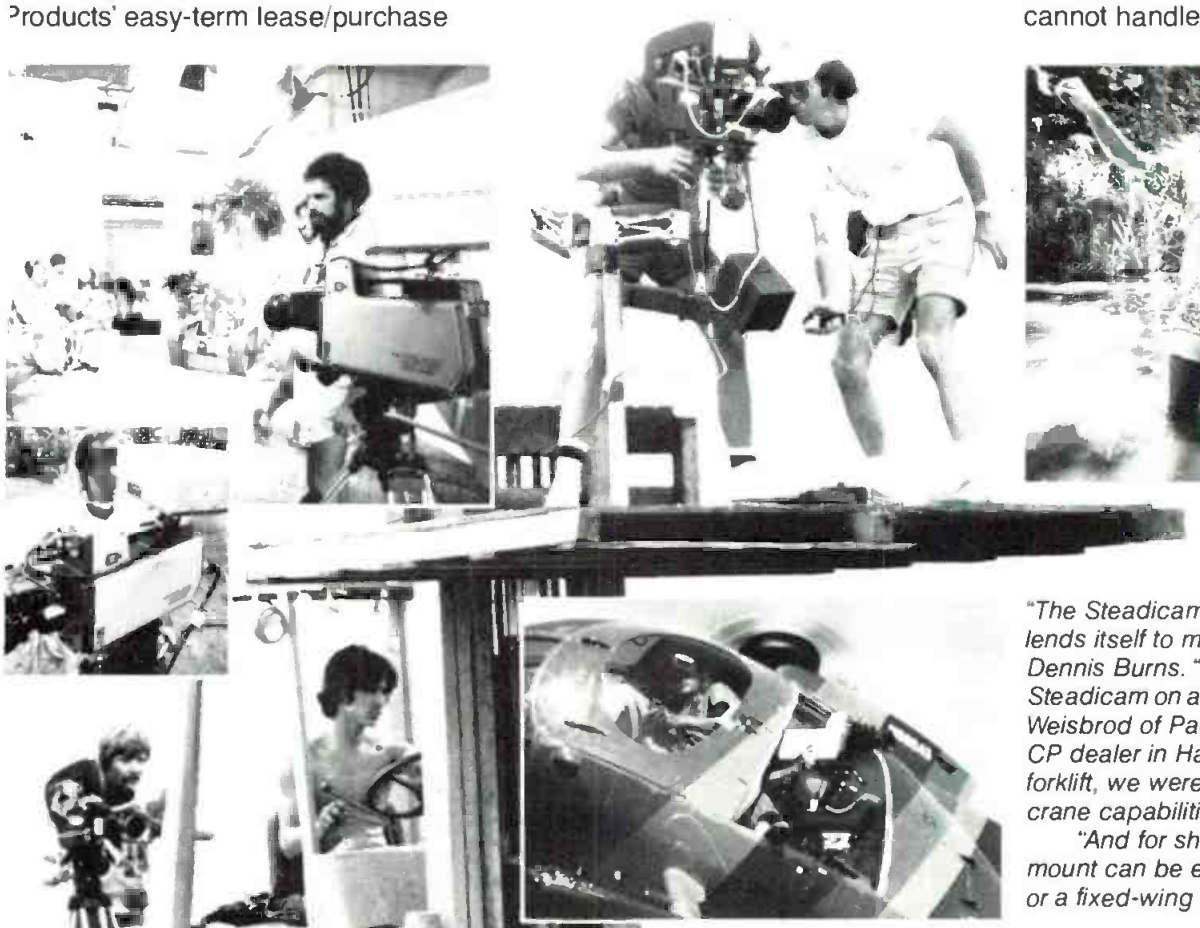
In addition to its existing CP-16R camera equipment, Pacific Focus has recently acquired two MNC-71CP video cameras with all the ancillary equipment needed to convert them to MNC-710CP studio/field production configuration.

"We shoot video or film, depending on what would best serve the needs of each particular project," says Dennis Burns, award-winning producer/cameraman and president of Pacific Focus. "In Hawaii, though, we produce on location almost entirely. So it's important that our broadcast-quality MNC-71CP cameras are rugged enough to take the kind of abuse that the CP-16R can take.

"Combined with the versatility and cost savings provided by Steadicam, which can be used interchangeably between our CP-16R and MNC-71CP cameras, there's no assignment we cannot handle!"



"The Steadicam camera stabilizing system lends itself to many innovative uses," says Dennis Burns. "For instance, by placing Steadicam on a special mount (built by Bud Weisbrod of Pacific Instrumentation – the CP dealer in Hawaii) and rigging it to a forklift, we were able to simulate boom/crane capabilities.

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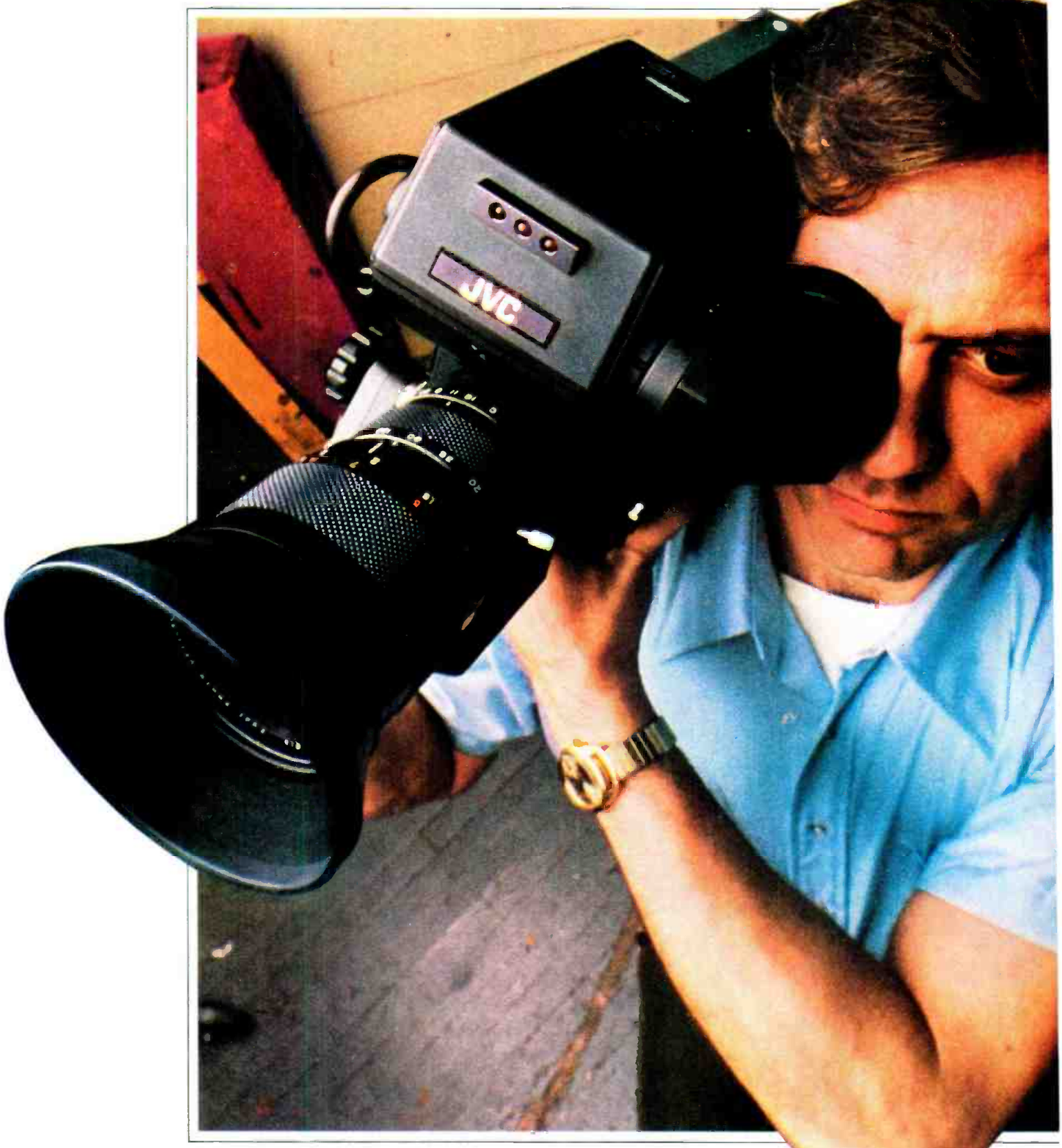

Compare JVC's $23,000 CY-8800U portable ENG camera to the most widely used competitive camera. Theirs has a lot more of one thing: cost. About double, in fact.

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"Putting it simply, the results were excellent," says well-known Producer-Director/Cameraman Lon McQuillin in his review of the CY-8800U. "Color quality is marvelous...There are few ENG cameras at any price that can top the JVC's performance, and then only when pushed into very poor lighting conditions...

It may well set the standard for the rest of the cameras in the category."

Behind that performance are high sensitivity and S/N ratio (50 dB). 500-line resolution. Sensitivity doubling (6 or 12dB). Auto white balance. And horizontal and vertical contour correction.

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The CY-8800U even has some features that the high-priced camera doesn't have. Such as level control compensation for hot spots. Internal time lapse meter which indicates tube life. Plus a moistureproof, rugged, sleek case that you can rest on your knee or the ground.

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Microwave

tenna on a nine-foot telescoping mast. This equipment is mounted on an ENG cart which snaps into the MAX. Power for the unit is derived from either a 2 W battery unit on the cart, the ATV's own 12 V battery, or a gasoline-powered Honda generator that delivers 400 W ac or 12 V at 8 amps. The generator can operate four hours on a on a half-gallon of gas. Chancellor has also built a 14-foot aluminum collapsible mast for the antennas.

The ATV currently can operate within a 10 to 20 mile radius of the station's tower where the signals are received on Nurad Super Quad horns at the 750-foot level of WEHT's tower. The station's vans will soon be equipped with transmit/receive microwave units so that they will be able to operate as relay stations for the MAX, thereby extending the useful range of the unit.

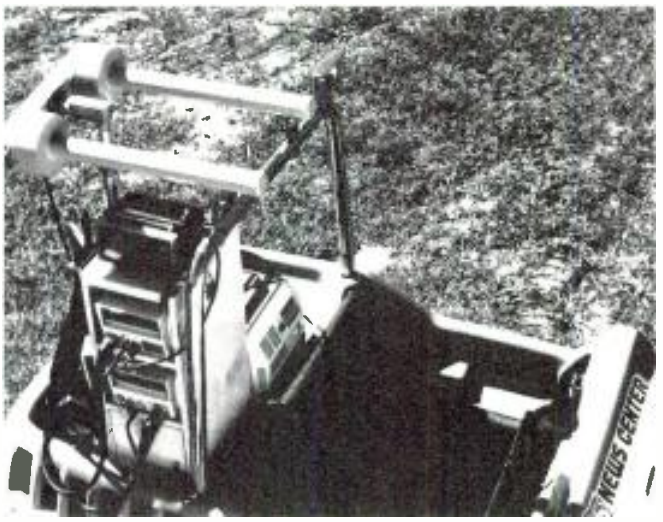
As the units pictured here indicate, the combination of transportation engineering and broadcast engineering makes a powerful tool for getting to the news wherever it may be. Some of these units are not just for news, however. The WTAE van, equipped with a small switcher, TBC, sync generator, and other production equipment often sees more use in recording WTAE's *AM Pittsburgh* show than it does on the evening news. This additional production capacity often comes in handy for accomplishing the station's heavy commercial production commitment. Even the smaller units like the Blazers at KPRC find their way into production. Recently, according to Stickley, a remote had been set up at a Houston theater for the production of several *Phil Donahue* shows. When the on-location VTR went down, they switched quickly to a microwave link they had installed for transmitting the show to the studio for backup. When that microwave linked failed, they quickly called for one of the Blazers. Within minutes, the Blazer was on the scene transmitting

High Quality Monitors Come Into EFP

A number of manufacturers will have introduced high quality field monitors at this year's NAB, but as of this writing (late February) the top of the line appears to be a recently introduced monitor from Barco.

The CM 33 is one of the first studio-quality monitors specifically designed for field use. Though at just over 30 pounds the CM 33 is a bit of a heavyweight, its design is intended for van use and not for hand-carried portability. A new picture tube delivers a 14-inch screen area from an in-line black matrix system. The design is completely modular and field serviceable. All electronics, exclusive of the tube, are on nine plug-in modules. The color temperature of the monitor is balanced for 6500 degrees Kelvin and should remain stable for months, according to the manufacturer. The overall dimensions of the CM 33 are approximately 10½ inches by 16 inches by 15¼ inches. The peak brightness of the tube is 220 Nits and the monitor comes equipped with a sun screen for outdoor use. Already in use in Europe, the CM 33 will operate in NTSC, PAL, or SECAM with the use of the appropriate color system module. The price is expected to run around $1800.

The two-man Max of WEHT goes anywhere. Pictures from the Max can be recorded with on-board VCR or transmitted live. The equipment pictured below will soon be replaced by an MA-2CP and the van will be equipped as a repeater station in order to extend the range of the Max

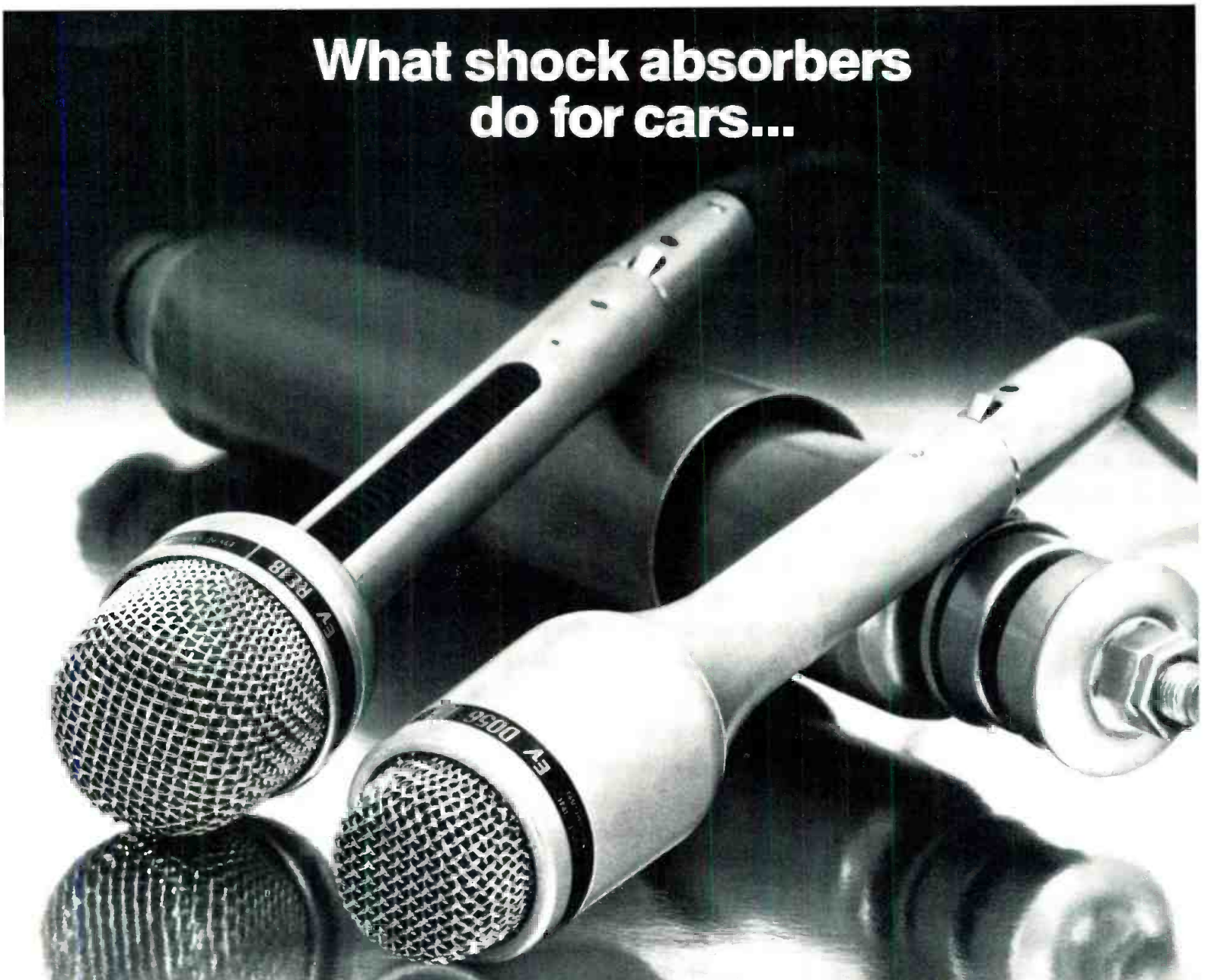


the *Donahue* show to recorders back at the studio.

At WMAQ and KTAR, the philosophy is a little different. Both stations tend to keep their units strictly for the news. WMAQ's Bill Marshall was specifically looking for a mobile unit that would be exclusively for news when he settled on the Suburban. "It's just too small," said Marshall, "to put much production equipment into." Earlier last year, while looking for a small unit that would fulfill WMAQ's news requirements, Marshall came across E-N-G Manufacturing's News Sedan (se *BM/E*, April, 1978) and purchased this uniquely equipped Ford LTD. Later, however, the sedan proved to be too small, and without four-wheel drive to break through Chicago's harsh winter snows the sedan was too limited. But the compactness and maneuverability Marshall was looking for in the sedan led him to the Suburban, which Jack Harris of E-N-G Manufacturing says is an increasingly popular choice among stations in the northeast and midwest.

With the latest in microwave equipment and transportation there are fewer and fewer places where television stations can't get to do their job — whether for news or production. **BM/E**

What shock absorbers do for cars...



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For Good Audio Quality, You Must Control These Parts Of Your Operation: Part 2

By G. Mark Durenberger

In the second installment of this series on the technical factors that must be controlled in a radio plant to get the audio quality to a high level, the author discusses turntable systems, cart and reel-to-reel tape machines, and distribution systems.

IN THIS SECOND INSTALLMENT of my series, I will start looking at the system, dealing with each source one at a time, carefully stroking each input for maximum performance. First, mic preamps.

Most broadcast console mic preamplifiers are fixed-gain devices, usually delivering about 40 dB gain. Older designs have a maximum output of about −10 dBm. This means a high-output dynamic or a condenser mic usually overloads the preamp. A good clue to the problem, if you can't really hear it, is to see where the mic fader is set — if it's below 10 o'clock, you could have overload.

Short of replacing the preamp, you can improve the situation by altering the gain of the preamp in its feedback loop. In many popular recording consoles, the opamp preamp gain is controlled by a gain-trim pot connected as a rheostat across the feedback resistor. But to maintain the speed and performance of the opamp over the entire range of the control, it should be inserted in the feedback *shunt*. And the associated blocking capacitor must be made large enough to handle the low end under conditions of maximum current flow.

If your preamp is the discrete type, whether tube or solid state, and there's no obvious way to change the feedback without causing instability, the alternate approach is to install a resistive pad in front of the mic input transformer. Many excellent transformers work well at levels of −40 or so, but give up 20 dB later. This consideration may be one argument for placing a pad ahead of the transformer — but remember you're degrading the S/N of the preamp by the amount of the pad.

Best solution: A new mic preamp

It's going to be a trade-off and if you're really serious about making an improvement, it'll pay you to investigate buying or building a new mic preamplifier stage. Today's designs allow for a minimum of 25 to 30 dB headroom, maximum input level approaching 0 dBm, and maximum output of at least +24 dBm.

The use of an output transformer with two or more windings solves another problem in the stereo console. How many times have you found the mono mic is simply tied to both mic preamp input transformers in parallel? The mismatch is obvious and some mics really hate this kind of loading. A three-way pad is the minimum cure you should effect. A better approach is to feed the output of a single mono preamplifier to both channels, but watch the impedance matching.

In analyzing your mic preamp, as with all other audio devices, don't be afraid to stick a square wave through it. Remember that any phase shift caused by equalization in the circuit under test will invalidate a square-wave check, but the test *is* valid for looking at transformer ringing and optimum load conditions.

Watch out for processing headroom

If you're using processing in your mic channel, the headroom requirements exist not only for the preamp but for the compressor or equalizer as well. If both are used, the preamp feeds the compressor, which feeds the equalizer, which feeds the fader. Chances are the mic preamp can be bridged by the compressor, where there's usually lots of gain. Be certain the compressor output is optimum, using a pad if necessary before the equalizer for best noise performance. Equalizer headroom must be adequate for any severe boost that takes place, and its output must be able to look at the mic fader (usually low-impedance).

Whether you purchase a modular opamp/transformer package on a small plug-in card (and there are some extremely good ones available from such makers as Automated Processes, Pacific Recorders, Modular Audio Products, or the new Trans-Amp), or you "roll your own," tremendous improvements will be realized in mic preamp and console program amplifier applications. An old console can sound great!

Next . . . the reel-to-reel recorder

The state of the art tape recorder has constant tension on the reel motors, capstan servo drive for closed-loop control over speed and minimum flutter, a wide range of bias adjustment to take advantage of newer high-output tapes, and excellent phase response and phase-jitter specifications. But let's assume you must also deal with the older tube-type units. The most important step you can take is to standardize on a single type of tape, bias all machines for this tape, and *use nothing else*. This is hard to accept when you've been reusing old agency tapes, and it's not unusual to find a seven-inch reel with three or four different tapes spliced together.

But think about the fact that high-end response may vary by as much as 6 dB from the start of that reel to the finish because of different bias requirements. If you're serious about a consistent sound from your machines,

G. Mark Durenberger is broadcast salesman for AVC Systems, Inc., Minneapolis.

Audio Quality: Part 2

you'll find several durable professional-grade tapes which don't cost an arm and a leg. They include 3M 176/177/206/207 and Ampex 406/407, to name a few. If you want the added dynamic range and headroom, you might move to 3M 250, Ampex 456, or Agfa — but your recorder must be able to deliver the extra bias current needed to overbias these tapes.

Your recorder must be able to perform at accelerated flux levels of +3 to +6 dB over the old Ampex operating level or NAB Zero (185 nWb/m). If the electronics headroom doesn't exist, the additional investment in high-performance tape will be wasted and the performance may actually deteriorate.

Set your VU meter for +4 dBm

While you're studying headroom it's wise to modify the VU meter pad so the recorder output can be brought down to +4 dBm, getting in line with the new industry standard (long the recording studio standard). The 4 dB added headroom in the output stage is important — someday even broadcast console manufacturers will catch on to +4 dBm!

You would double tape cost, but if you haven't already done so, it's time to take a serious look at moving to 15 ips for all production work. Today's spectral distribution of music energy means more high end. Because of the recording preemphasis, 7½ ips simply isn't fast enough and tape saturation often results. Aside from the obvious editing advantages, 15 ips also insures fewer dropouts and a better S/N.

Recorder alignment for best performance

We're not going to spend a lot of time on alignment — the instruction manual is usually the best aid. Mechanically, brake adjustment can be quick-checked by putting two 10½ inch metal reels on your old 351, getting both reels running full speed, pushing stop, and seeing that they coast to a stop together. Make sure the capstan solenoid travels freely and doesn't bottom out.

Check the pinch roller not only for proper pressure but for alignment. A quick check is to loosen the cap and play a tape with the pinch roller deliberately moved up the shaft a bit. See whether the roller tends to creep in or out. It will be a clue to improper pinch-roller/capstan alignment.

Take a careful look at tape path. Remember, the fixed tape guides are your reference. Reel tables are moved in or out so tape winds onto the reel an even distance from both flanges. Heads are also adjusted to fit the path created by the guides.

When replacing heads with severe wear patterns, *all* heads will usually have to go. A record head with a bad wear pattern, even though it performs well, must be replaced because it will have control over how the tape passes over the other heads. If you go through a lot of heads, investigate replacement with the new long-wear types such as the Nortronics Duracore, which will give you more than 10 times normal headwear at a small increase in cost over the standard replacement. But be prepared for some small head bumps in record/play response.

Test Tapes can mislead on azimuth

The biggest problem with test tapes is quality control, and there are some test tapes whose azimuth varies from

reel to reel! A quick check on proper azimuth can be made by playing the tape through the back side after the head is aligned to see whether the azimuth holds up. A dual-trace scope is necessary for truly reliable stereo azimuth adjustment, using a full-track recording. For alignment of full-track machines, MRL offers a "Difference Method" alignment tape to provide an absolute azimuth standard. Machines with cue or sync functions allow you to azimuth the record head using the test tape, but it's a good idea to then verify azimuth via the record/play approach. Any substantial difference might be a clue that something is wrong in the tape path.

Test tapes are great as wow and flutter test sources, used with a scope, or as machine speed references when used with a frequency counter. The usual frequency-response section of the tape can be considered valid for 30 to 50 plays, depending on how well you care for your alignment tapes. Usually, head-bump and fringing effects which appear in you measurements are explained by the test tape manufacturer.

For some recorder performance checks, you can get around the test tape by use of a flux loop driven by an oscillator or pink noise generator. You can measure distortion, phase shift, dynamic range, and transient response of the playback system more accurately than you can by going through the record/play process. Frequency response can be measured, too, if you have a play-equalization curve to refer to.

Bias waveform: prime source of noise and distortion

While measuring record/play response, it's a good idea to look at the bias wavefrom on a scope to insure that the signal. A highly distorted bias waveform is one of the prime cause of high record/play noise figures and distortion. When measuring, you're probably going to need a bandpass filter to remove bias from the audio. A pink-noise check ought to be included in your daily maintenance right after you demag everything.

An electro-mechanical consideration is scrape flutter. It can usually be detected by listening to playback of a 6 to 10 kHz tone, varying back and forth. The best term I can think of for the sound is a scraping noise. It's minimized by the installation of a small roller, called a scrape flutter idler or filter, somewhere in the tape path near the heads. But this roller itself can be a cause of scrape flutter if bearings get dirty, and it seems the roller is in the perfect spot to absorb shed oxide particles. This roller and any other mechanical motional impedances in the tape path must move smoothly to avoid adding flutter.

The dual-trace alignment procedure will insure good mono reproduction from multi-track machines, but it's a good idea to have a switch on your two-track machine if you're playing a lot of mono material. The upper track is switched to feed both playback amplifiers — a superior mono performance is insured.

Keeping carts up to snuff

It may well be that the cartridge tape system is the weakest link in your audio chain, but here, too, improvements are being made, both in the manufacture of cartridges (usually the limiting factor) and in design of the machines themselves. Capstan servo machines are now on

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Audio Quality: Part 2

the marketplace. Electronics have more headroom, better noise performance, and biasing capability to allow you to get the most out of the new "hot" tapes.

As with reel-to-reel decks, it's critically important to settle on one type of tape. It may mean winding that tape into your favorite cartridge shell, but it's worth it.

Whether you buy carts or wind them institute a quick quality check. A sweep generator is ideal for checking response. Pink noise is fastest, but just a couple of simple tones will do the job. It only takes a few seconds to run a batch of carts through a record/play process with 400 Hz or 1 kHz at Zero VU. Establish your own window of acceptability — it might be as tight as± .5 dB. Then do the same with 10 or 12 kHz, recorded at −10 VU. Here a realistic window might be about ± 1 dB or so.

You may end up discarding a couple of carts in every 10, but some manufacturers will replace them. Just as important as employing good styli in turntables is a constant check on cartridge condition. Look at carts that have been in the control room for a year or more. Chances are they'll need replacement. *Every* cart should be checked prior to reuse.

Improper biasing or use of several different types of tape is just one source of the trouble that deteriorates cart sound. Too high an output level is a major cause of distortion. It's unfortunate that until recently, the most popular cartridge reproducer system had a maximum output of± 15 dBm. Unless these machines were adjusted for Zero dBm output, there simply wasn't enough headroom.

How to dub onto carts

If you're heavily into music-on-cart, a dubbing chain should be established, direct from turntable preamplifier through a fader to the cart machine. The console is used strictly for monitoring of the playback, listening for splices, etc. A relay is connected to the play circuit so that in stop or record-ready, you're listening to the turntable preamp (for cueing) and the instant you start the deck, the relay switches the console to the cart output. This also makes for a handy A/B comparison of sound.

To provide for some control over cart recording levels and to slightly improve the S/N of the system, a slight amount of compression may be used ahead of the recorder. To further combat noise if you have a lot of decks winding all the time, why not connect one of the auxiliary cue tones to function as an audio mute after the cart has played? Speaking of tricks, if you're a stereo station playing carts back-to-back in a commercial cluster, why not shift alternate machine levels slightly left and right of center with the output level controls? A 5 dB balance shift to left or right will give the illusion of stereo to even a mono commercial, while not significantly disturbing the mono loudness. This is also a handy way to keep those clusters a bit below music loudness, if that's your aim.

Phase shift is a problem still

Stereo phase shift is still the biggest drawback to the use of stereo cart machines. The mono FM listener hears some really weird things happening under severe conditions. Some broadcasters get around the problem by encoding sum-and-difference information onto the cart, using a matrix derived from transformers, or employing an active device such as the Ampro Monomax. But attention must

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Audio Quality: Part 2

be paid to headroom, particularly in the L&R channel.

On the bench, remember to demag not only tape heads, but any other metal parts in the tape path. As with reel-to-reel machines, remember that too strong a field can cause permanent magnetization. Heads must be replaced all at once, including dummy heads, and the comments about long-life Duracore heads apply as well.

The dual-trace scope is invaluable in alignment of stereo machines. Wow and flutter tests can be made by recording a frequency of 3150 Hz on a half-track reel-to-reel recorder of known low flutter, then winding this lubricated tape into a couple of shells, playing them and A/B comparing to the oscillator itself.

Remember, demagging of play-only machines isn't nearly as important as a mechanical inspection. Heat rise when machines are in a cluster can be a problem. So is hum pickup because a play head is too close to a power transformer somewhere. And before we leve the cartridge, remember a poorly erased cart can cause severe IM. The low-frequency thumps may not be audible, but they can screw up the audio passing through the machine.

As with all other sources, the cart system should be checked from recorder through playback, should have a minimum of 15 dB headroom at 1 kHz, and a frequency response standard of ±1 dB from 50 to 15 kHz is not unreasonable.

Next . . . turntables

I know some engineers who won't put a test record on a turntable because they know it won't measure satisfactorily and they're not sure what to do about it. Unless you're totally automated or do nothing but live remotes, the turntable is your most important source.

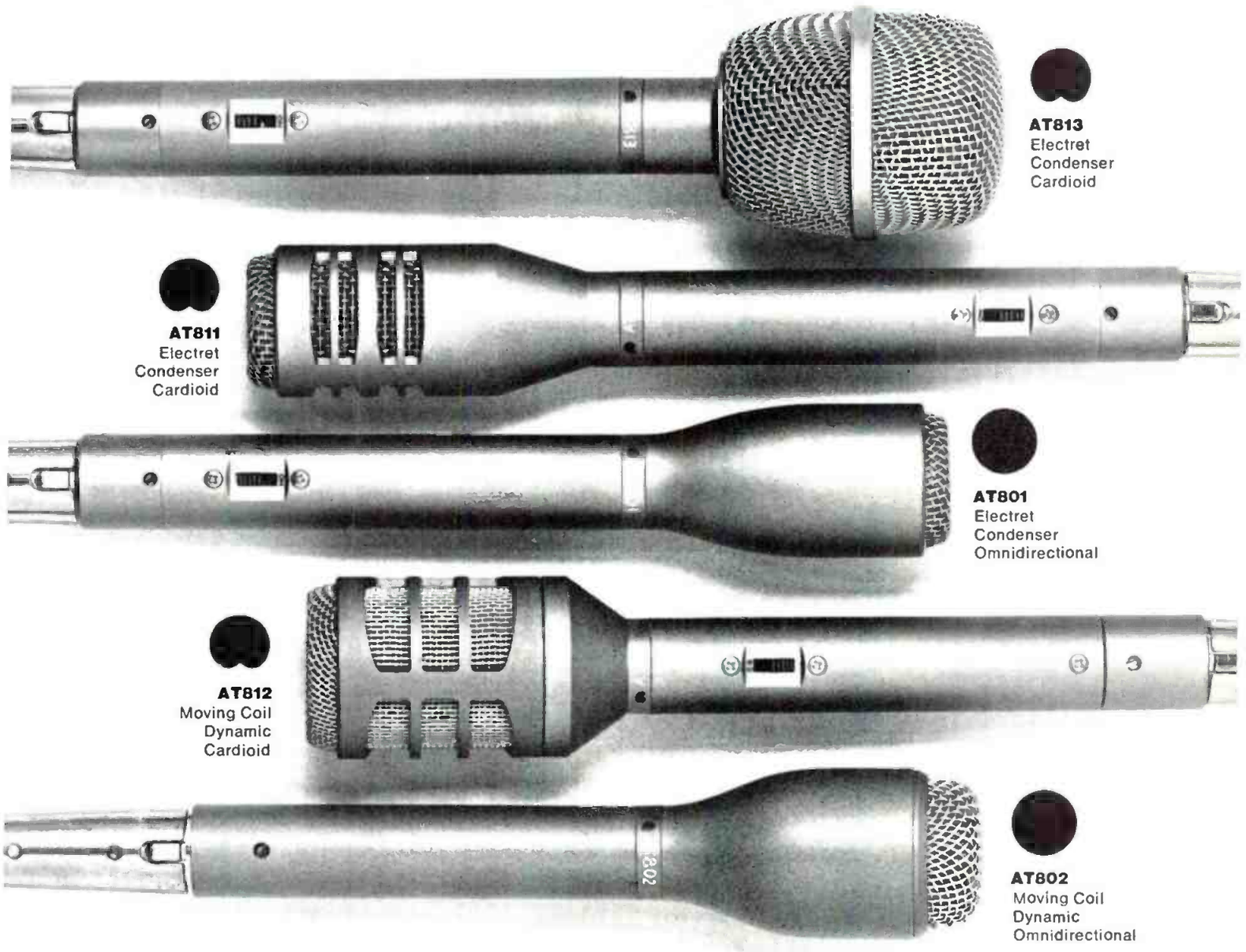
Nowhere in recent years has there been a more dramatic improvement in performance. With the advent of servo direct-drive instant-start tables, rumble has been reduced from a once-acceptable −35 dB to levels in the −60s. Noise at the new low level is necessary with today's home hifi equipment. Performance is tops and maintenance is almost insignificant. Pickup arms and cartridges seem to get more fragile as they get better, but the new breed of arms, carts, and preamps, when properly installed, can outperform the best audio tape recorders.

But there are sill a lot of rim-drive turntables in the real world — maybe with splicing tape over the pulley to speed the music up a bit. With luck there's a stereo pickup cartridge (although there are a lot of VRIIs around), but maybe the pickup arm is barely acceptable for playing old mono transcriptions. And when was the last time you received a new mono LP from the record companies?

At the very least you should be playing your records with a high-compliance stereo pickup (diamond needle) in a lightweight tone arm. If you're playing records in mono, you still employ a stereo preamp with the outputs carefully combined in a pad. *Never* simply strap the cartridge outputs together! The preamp output is adjusted to provide about 20 dB headroom over the standard recorded level derived from the test LP. (This allows headroom for 45s.)

Once this is done, the out-of-phase band of the test record is played and one of the preamp level controls adjusted slightly to null the tone. This will insure absolute minimum vertical rumble pickup and brightest mono sound, taking into consideration the cartridge, arm, suspension system, preamp, and all. **BM/E**

Audio-Technica introduces five new microphones... and a pleasant surprise.



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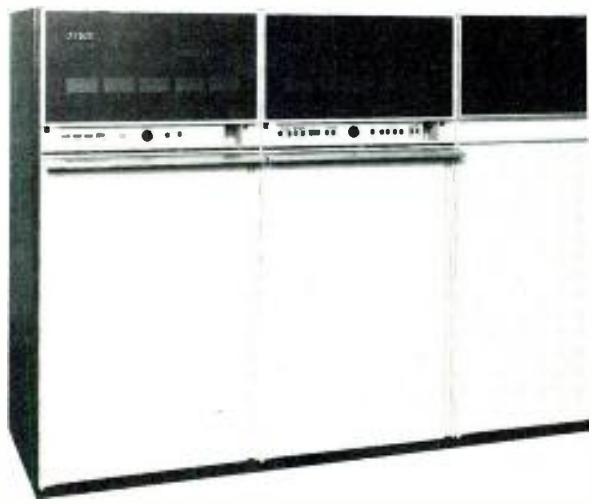

A TRANSMITTER DESIGN PHILOSOPHY FOR THE 80's AND BEYOND

The familiar TTF Series of RCA VHF television transmitters has finally seen the end of the road. With major advances in high power solid state devices, SAW filter technology, and improved broadbanding techniques, RCA is ready to face the remainder of this century with the TTG series.

THERE IS BOUND TO BE SOME SMUGNESS in the ranks of the major television transmitter manufacturers now that RCA has finally turned to IF modulation as most of them did several years ago. But RCA is refusing to apologize for holding out so long, stating plainly that their earlier design was so reliable and performed with such good signal-to-noise figures that they did not want to go to IF modulation until they could improve television transmitters on many more counts.

There is, of course, another factor in the delay. As Verne Mattison, manager of RCA's TV Transmitter Product Management group, points out, "Transmitters have a manufacturing life of about 10 years, and a useful life of about 20 years." So, in a sense, the TTF series was simply ready to be retired from the manufacturing system in order to make way for a new design that would address the needs of the marketplace through the 1980s and provide service to broadcasters through to the end of the twentieth century.

So what does the new series of transmitters reveal about what RCA thinks of the next 20 years? Quite a bit. First, it reveals the importance that RCA is placing on the rapidly developing international broadcast marketplace. The new series of TTG transmitters is a family of transmitters with design features and power capacities particularly suitable to the international market as well as the U.S. market. Four solid state power amplifiers which provide 400 watts of power each can be configured to offer transmitters with 16 kW or 30 kW power ratings. In parallel, the TTG Series can offer up to 60 kW. These denominations are a little more appropriate to the international market than were the old TTF 25 kW and 50 kW transmitters. For the domestic market, RCA sees the advantage in these denominations in that they offer U.S. broadcasters greater headroom so that transmitters can be operated more conservatively, thereby extending tube life and the life of other consumable components. Moreover, the higher power should be useful for broadcasters going to circularly polarized transmission.

One of the major advances apparent in the TTG Series of transmitters is the reduction in the number of consumables. Every component in the transmitter is solid state, with the exception of the single visual tube and the single aural tube. The only moving parts are the two direct drive blowers that cool the power amplifiers and the power supply.

In addition to the solid state components, the TTG Series also groups these components in modules so that all RF components, with the exception of the tubes, are simple plug-in devices. Moreover, great strides have been made in the development of broadbanding techniques for these devices, making it possible to manufacture a transmitter which contains a nearly identical parts list regardless of channel assignment, high-band, or low-band, whether for use in NTSC, PAL, SECAM, or whether the electrical system is 60 or 50 cycle. The channel identity of any TTG transmitter is achieved with a single universal crystal and a frequency synthesizer which handles any channel. The TTG Series conforms to all CCIR transmitter standards.

Besides the manufacturing and service economies that can be achieved with this approach, RCA also believes that the design reflects what it sees as a trend towards ATS (remote control already being a major factor) and the increasing scarcity of trained technicians able to properly maintain a transmitter. It is not, says Mattison, that there are fewer trained and knowledgeable technicians in absolute numbers, just that there is more competition from other industries for these technicians and that those that do

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go to broadcasting face an increased demand on their attention from increasingly complex production systems. The ease of maintenance and operation which RCA hopes it has achieved with the TTG transmitter should also increase its appeal to the international market since the scarcity of technicians is even more severe in some other areas of the world.

Features for the future

So what are the features of the TTG transmitters that RCA thinks will stand it in good stead for the next 20 years? For one, the TTG uses an all solid state driver to its

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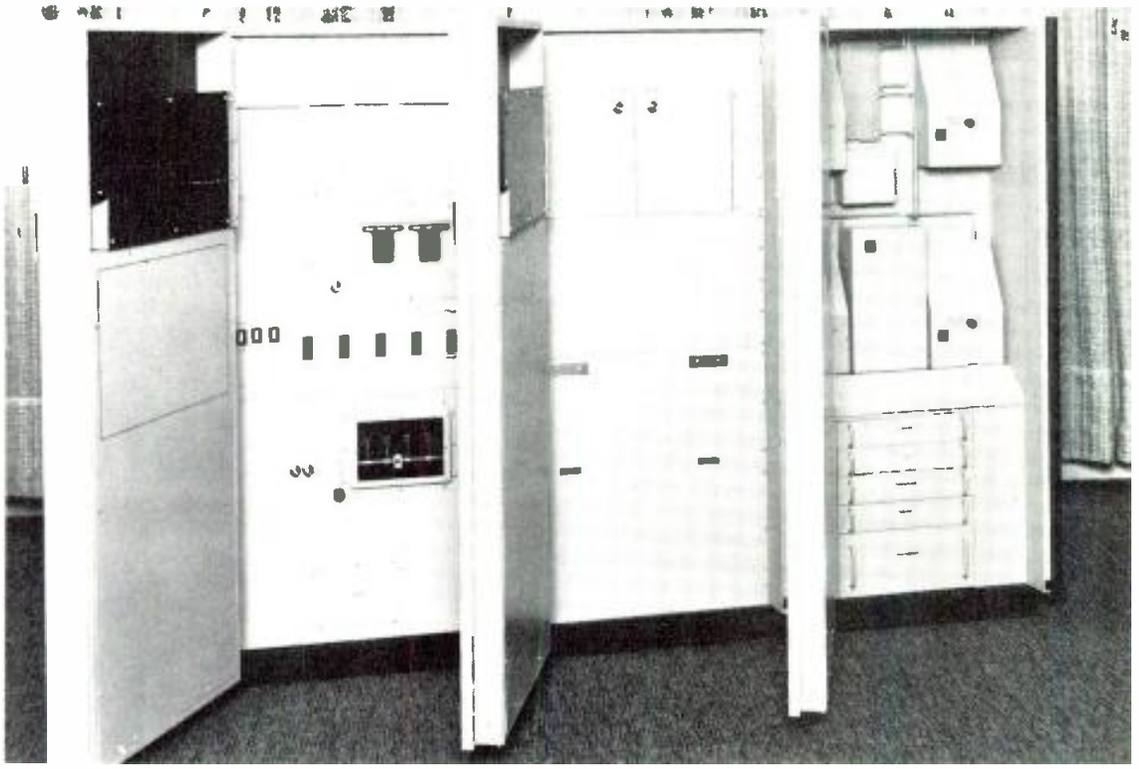
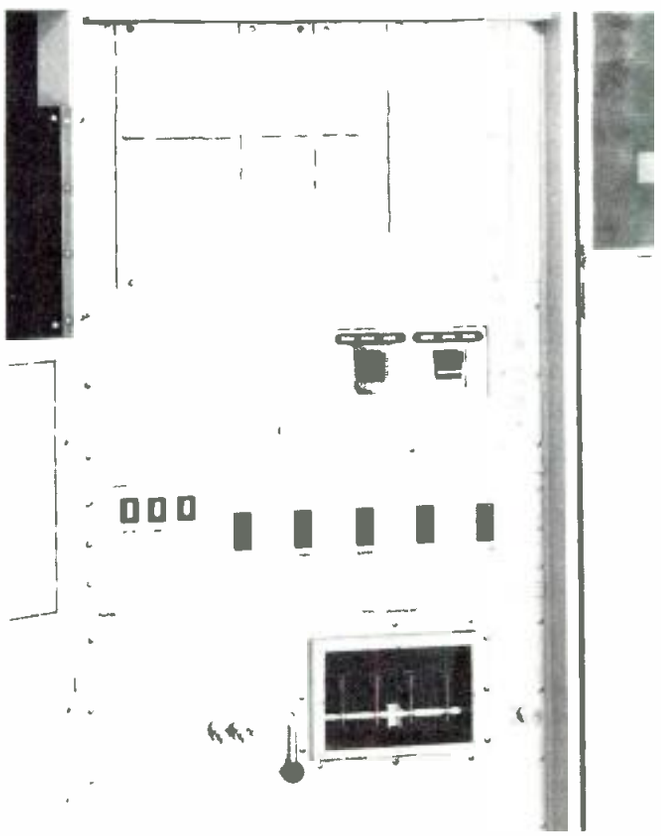
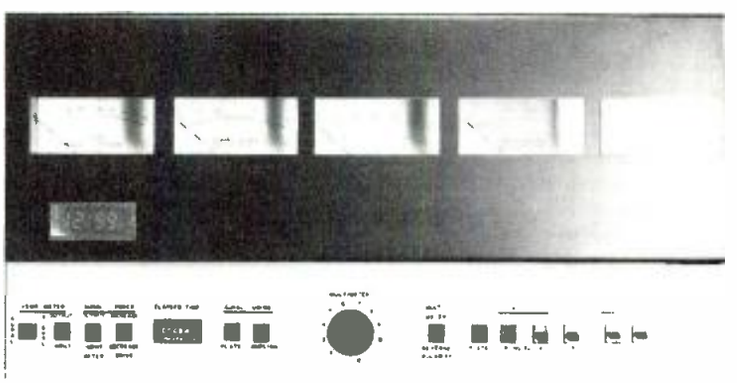


The new TTG Series VHF television transmitters consist of (from left to right) a power supply section, a power amplifier section with a single visual and single aural tube, and an all solid state driver stage. IPAs, visual stripline combiner, visual predriver, and aural solid state amplifier are all plug-in modules



Visible in the lower section of the power supply cabinet are two of the safety features included in the TTG Series. To the left of the interlock grounding switch are two keys which must be used to gain access to the power amplifier stage. Once removed, all power to the amplifier stage is turned off. Further, to gain access to the interior of the power supply or power amplifier, the interlock grounding switch must be thrown



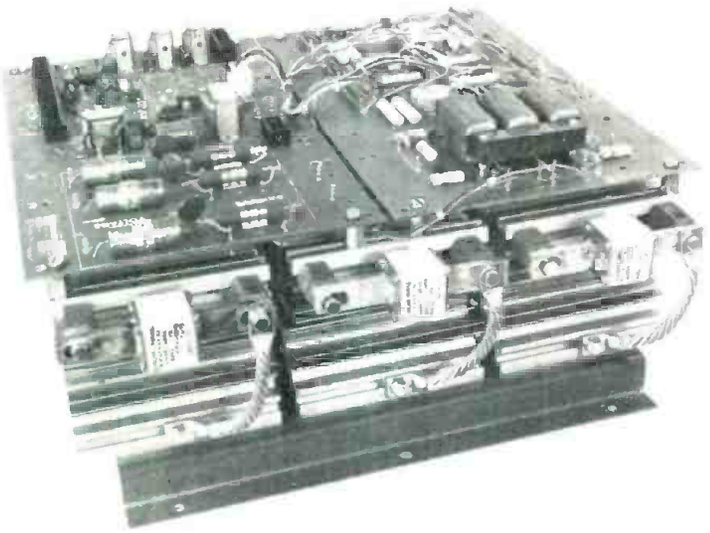
Metering for the power supply and for the power amplifier stage (above) is visible through the front door of each cabinet

Newly designed tubes for the TTG include the aural tube (left) and the 30 kW visual tube. The cavity remains cool to the touch, according to RCA

Transmitter Design

1.6 kW visual stage tube and its 100 W aural tube. These two tubes are the only tubes in the transmitter. Since the driver is entirely broadbanded, there is no tuning of the driver and therefore no mistuning. Moreover, the entire exciter/modulator cabinet contains no voltage greater than 45 volts.

For another thing, the TTG transmitter is extremely compact. The basic 30 kW model is contained in three cabinets. The power supply is in one cabinet (36 inches wide), the visual and aural power amplifier stage is in a second cabinet (also 36 inches wide) and the exciter driver is in a third cabinet (28 inches wide). When the transmitters are arranged in a parallel configuration a single combiner cabinet is added for a total of seven cabinets.



The solid state contacter controls the primary voltage supplied to the high voltage power supply. The resulting soft turn-on protects the power amplifier filaments from mechanical stress

The power supply utilizes the latest high power solid state devices so that the transmitter features a "soft turn-on." Power is applied to the PA tubes slowly in a controlled fashion that avoids sudden mechanical stresses on the tube elements. Normal filament warmup time for the tubes is two minutes, though when power is interrupted, the return to air time can be as short as four seconds if a manual override of the time delay circuitry is used. Normally, however, a 15-second return-to-air time is recommended.

The power tube stage is the only transmitter section that requires tuning. The visual and aural tubes are both of new design, as are the cavities. The same cavity is suitable for either of the two visual power tubes available, low-band and high-band. The same aural tube is used for either high or low-band transmitters.

Aural and visual power levels are stabilized by a solid state, closed loop control system which functions automatically. This Automatic Power Control feature prevents power output variations when outside factors vary. Thus, the transmitter is relatively immune to line voltage fluctuations, power company reduction, minor load variation and amplifier gain variations caused by temperature variations, and component againg. Another aspect of the Automatic Power Control is that it permits continued on-air operation at reduced power if VSWR increases under deteriorating load conditions.

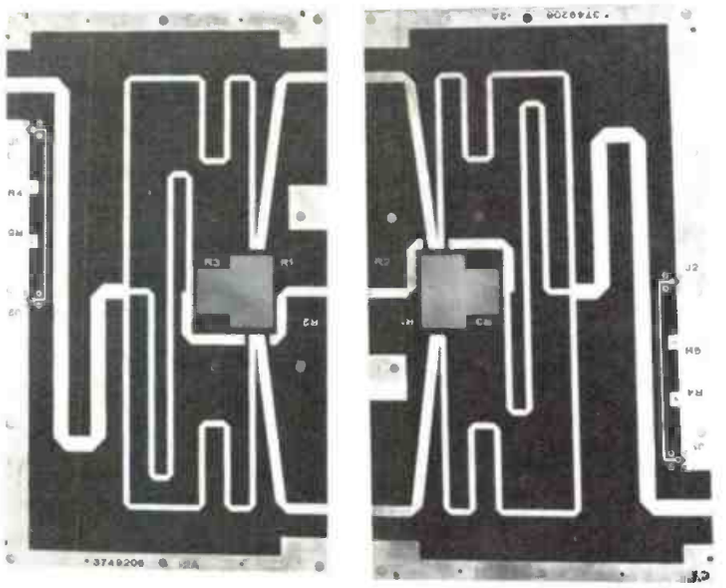
Another first for the TTG transmitters is the use of a heat pipe cooling system for the RF amplifier transistors. Though heat sink techniques have been applied in other

systems, this is the first time that they have been successfully applied to broadcast transmitters.

One more innovation that RCA is betting on for the future includes the fixed, passive sideband shaping achieved through the use of a surface acoustic wave filter (SAW). According to RCA, the new SAW filter eliminates large band-edge delay excursions, provides flat response to the band edge with extremely low "ripple" distortion, and has extremely low internal reflections to avoid ghosting.

Added to these performance features are a host of safety features which reflect the increased concern in this country for industrial hazards and the tougher safety standards that prevail abroad. First among these features is a key interlock system. The power amplifier stage cannot be accessed without first unlocking the cabinet using a set of keys locked into the front panel of the power supply cabinet. These keys, in turn, cannot be removed from the power supply cabinet without turning off all power to the amplifier stage. Nor, for that matter, can power be reapplied without reinserting the keys into the power supply cabinet. An electrical interlock system prevents removal of the rear access panels unless power is off.

This new generation of RCA VHF television transmitters is just the first family in the community of transmitters likely to be rolling off the production lines of other manufacturers in the coming years. Great strides have been made in high power solid state devices and the dream of the completely transparent transmitter is just one step nearer. American manufacturers like Harris, Continental, CCA, and others who have led the way with IF modulated transmitters, and overseas manufacturers like Thomson-CSF, Pye, Philips, Telefunken, NEC, and others will no doubt be learning from RCA as RCA has learned from them.



Broadbanding techniques such as those used in the micro-strip splitter circuit and combiner circuit shown have allowed the tuning stages of the transmitter to be reduced to one

It is too soon to tell if the new TTG series of transmitters will live up to their advanced billing, though indications are reasonably good, and it is much too soon to tell if their performance and features will outdistance the competition when all factors are considered. But it is certain that the TTG transmitters represent a significant change in RCA's transmitter design philosophy, and we have undoubtedly embarked upon a new era that will see even more reliable and efficient transmitters. **BM/E**

SPEAK OUT

" 'Poor Man's Diversity' Is Not Diversity," Says Bill Sien

William L. Sien, a former radar specialist with the military, now runs Systems Wireless, Ltd., of Reston, Va., specializing in renting, custom designing, and servicing multiple wireless installations.

Editor's note: For other viewpoints on diversity systems, see story on RF mics, p. 53, and accompanying box.

MOST USERS OF RF MICS have, from time to time, experienced the annoying "swishing" sound that appears when the person on mic is silent. It seems that this is an inevitable price the audio engineer has to pay when being adventuresome and using an RF mic in close rather than a shotgun or a boom. The cause of the situation is not nearly as mysterious as some make it out to be, however, and the remedy is quite simple.

The cause turns out to be the very elements that make for high overall production value: multiple source lighting, placed where it is most effective, two or three cameras, attractive scenery and props all make ideal reflecting surfaces for RF energy and the resulting interference with the primary transmitter/receiver pathway.

A surface of constant phase, such as a crest or trough of a periodic wave, is called a wave front. The wave front radiated by a single small source in three-dimensional space is a spherical surface. When these wave fronts are propagated from a point source as in the case of a wireless mic transmitter, they travel as a spherical surface in a straight line. When encountering objects such as scenery, cameras, lighting fixtures, and the like, very complex reflections occur — dependent on the studio dimension, transmitter frequency, and source dimension, as well as reduction of energy through eddy currents and dielectric losses.

These reflections are the undoing for RF microphones. As the waves reflect, the reflective wave fronts and incident wave fronts combine vectorially. The receiver must contend with this vector summation. If the two wave fronts are in phase with each other or only shifted a small amount, the receiver will be able to handle the reduced signal strength quite adequately. If, on the other hand, the vector summation is appreciably small or, in the worst case, at or near zero, the receiver is out of luck even though either signal acting alone would be of sufficient amplitude.

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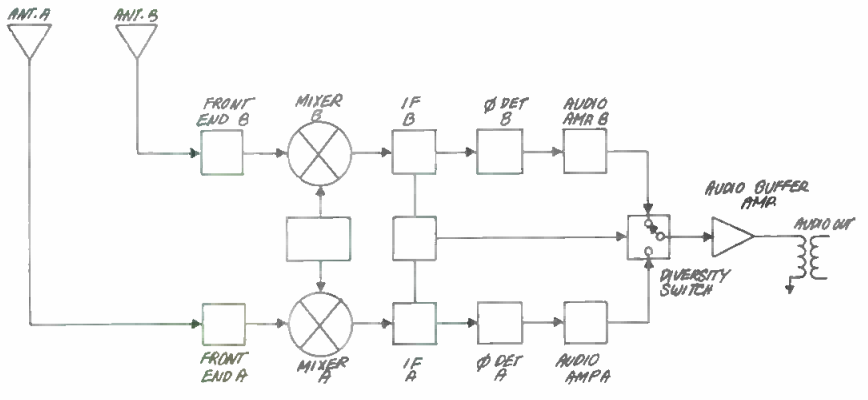

Schematic diagram of Vega wireless microphone switching diversity system

WWDL-FM and WICK-AM

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Speak Out

When the vector summation is very small the receiver RF gain is wide open, attempting to amplify a very weak signal. In the process of amplifying the weak signal the noise level in the receiver is also amplified. It is this noise level that we hear as "swishing" sounds. The people at Vega have appropriately coined the phrase "noise ups."

An even worse case occurs when the two wave fronts are of equal amplitude and 180 degrees out of phase. In this case, the vector summation is zero and the actual signal level drops below the receiver's 20 dB quieting point; the receiver is squelched. This is a total dropout. One might think that in a sterile TV studio with a minimum of equipment to cause reflections, noise ups or dropouts could be avoided or at least minimized. However, reflections will also occur off floors, ceilings, and walls.

The noise ups and dropouts of a single RF mic statistically occur about 2 percent of the time, dependent on the studio configuration; perhaps in some instances one can live with the situation. However, when several wireless mics are operating together on separate frequencies, the problem is considerably compounded. A statistical analysis was done on this several years ago by an engineer with the BBC using the Gaussian Bivariate Density function showing the percentage of transmitter location which will give signal levels equal to or less than the chosen deviation from the mean signal level.

Now that we've isolated the causes of the "swishing" sounds the audio engineer hears, we can proceed to solve the problem.

During the second world war the U.S. military was having the same problem as our TV engineer of today. Our military communications over long distances would fade in and out due to the shifting of the earth's ionosphere. Their brilliant solution was to have two receivers separated so that what one receiver missed, the other would get. Vega decided that since it was dealing with the same laws of physics as the military, why reinvent the wheel?

Vega's Model 63 is a diversity receiver which consists of two completely separate receivers on the same frequency in one package, with only the local oscillator in common. The reason for the common oscillator is to avoid two oscillators from beating against each other. The receiver has a comparator after the audio amplifier that selects the receiver with the better RF level by 6 dB and directs it to the receiver's amplifier and audio output. By separating the receiver's two antennas by more than a half wavelength (about

36 inches in the VHF band), noise ups and dropouts are minimized.

In addition to separating the two antennas to achieve spacial diversity when connected to two separate receivers, the audio engineer ought to place one antenna vertically and the other horizontally to provide polarization diversity, the second of three types of diversity. The third type of diversity, frequency diversity, is not practical since it would involve one microphone feeding into two transmitters on separate frequencies. The optimum, then, is to have both spacial diversity and polarization diversity.

Diversity in the true sense implies two complete receivers as described above. The industry is always trying to build a better mousetrap, as it should. However, whatever kind of mousetrap one builds, it must be within the constraints of the laws of physics. We are only deceiving ourselves to think it can be otherwise. There are several manufacturers of RF mics who claim to have a diversity system which in reality is a single receiver with a multiple antenna system. A multiple antenna system is an improvement over a single receiver system using a single antenna, inasmuch as the antenna surface area is increased. However, it still falls short of its intended goal of avoiding noise ups and dropouts; the RF signal of each antenna must still be summed vectorially at the antenna combining point and the signal level can easily be at or near zero, meaning our noise ups and dropouts are back with us. These systems are sometimes referred to as a "poor man's diversity" because they are obviously less expensive.

Other manufacturers have taken the multiple antenna system one step further and have fed their multiple antenna system into an RF switching junction such that if the RF level drops below a predetermined level on one antenna it will switch automatically to the second antenna. The problem here is twofold. The first is the difficulty of switching low RF levels with low noise. The switching is invariably heard. The second and larger problem is that when the system switches from the first antenna to the second, there is no way of determining if the second antenna has a better signal level than the first. Worse yet, the switch will stay on the second antenna even if it is worse until the detector on the first antenna gets above the predetermined level.

Vega has gone the whole 10 yards in providing a complete dual diversity receiving system with two full channels that prevents any of the problems described above. While it is true that a full diversity system costs more, one must remember that one can't get something for nothing — it defies the laws of physics. **BM/E**

INTERPRETING THE FCC RULES & REGULATIONS

FCC Amends Its Equal Employment Rules And Annual Employment Report

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

RECENTLY, THE FEDERAL COMMUNICATIONS COMMISSION released its *First Report and Order* concerning the Annual Employment Report,[1] FCC Form 395. The *Report and Order* amended certain aspects of the form and consolidated the rules.[2] This article will examine these changes and discuss the various comments filed before the Commission.

The broadcast EEO rules forbid discrimination in employment "because of race, color, religion, national origin, or sex." Also, these rules affirmatively require all broadcast licensees and permittees to "establish, maintain, and carry out a positive continuing program of specific practices designed to assure equal employment opportunity in every aspect of station employment and practice."

Stations with five or more full time employees must file the Form 395 Annual Employment Report, giving a breakdown of employees by several job categories and by specified race and ethnic groups and sex. Also, these stations must file *a written EEO program* that covers the specified race and ethnic groups and women. This must be done in applications for new stations and in assignment and renewal applications. Stations with 50 or more employees must fill out a section of the written EEO program showing a list of all job titles within each Form 395 category and showing the number of incumbents in specified race and ethnic groups by sex. Stations with five or more but fewer than 50 employees must file an updated Form 395 with these applications.

The Commission uses the data from the Annual Employment Reports to issue statistics on employment in the broadcast industry and in reviewing the EEO programs of individual stations. In addition, members of the public, seeking information on a station's employment practices, consult the forms.

The instant *Report and Order* has resulted in two particular changes that are of importance to broadcasters. First, the Commission decided to change the race and ethnic terminology used in its rules, Form 395, and all other forms to the following:

> "American Indians or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; Hispanic; and white, not of Hispanic origin."

This change was in accordance with the Office of Management and Budget's (OMB) revised "Race and Ethnic Standards for Federal Statistics and Administrative Reporting."

The second amendment adopted by the Commission changed the instructions for completion of Form 395. The new instructions detail job descriptions that are to be included in job categories, as follows.

Job categories

Officials and Managers. Broadcast licensees may include in this category the following: presidents and other corporate officers, general managers, station managers, controllers, chief accountants, general counsels, chief engineers, facilities managers, sales managers, business managers, promotion directors, research directors, personnel managers, news directors, operations managers, production managers.

Professional. Broadcast licensees may include in this category the following: on-air personnel, correspondents, producers, directors, writers, editors, researchers, designers, artists, musicians, dancers, accountants, attorneys, nurses, publicists, film buyers, ratings and research analysts, stage managers, cinema photographers, senior staff assistants, personnel interviewers, continuity directors.

Technicians. Broadcast licensees may include in this category the following: all engineers, technicians and engineering aides, including transmitter, studio, maintenance and master control engineers, and news camera, news sound, film lab and drafting technicians. Also film editors, projectionists, software specialists.

Sales. Broadcast licensees may include in this category the following: all sales account executives, sales analysts, account representatives, sales trainees.

Office and Clerical. Broadcast licensees may include in this category the following: all secretaries, production assistants, traffic managers,[3] traffic department employees, telephone operators, junior rating and research analysts, assistant camera technicians, news and feature assistants, billing clerks, mail clerks, messengers, cashiers, typists, key punch operators, bookkeepers, phot lab assistants, librarians (music, film or other), readers, administrative assistants,[3] tab operators, TWX operators, PBX operators, printing and duplicating operators, production coordinators, ledger clerks, operations assistants, pages and guides, stock clerks, office machine operators,

[1] *Amendment of Broadcast Equal Employment Opportunity Rules and FCC Form 395, First Report and Order,* Docket No. 21474 (January 29, 1979).

[2] The EEO rules for the various broadcast sources were Sections 73.125 (AM), 73.301 (FM), and 73.680 (TV). These rules were identical. Therefore, the Commission consolidated them into one rule, Section 73.2080.

[3] The positions of traffic managers and administrative assistants have been included in the office and clerical category because in most instances they are not truly managerial positions. However, those stations that require managerial functions of either position (director of a full department or special phase of the firm's operation) may include it in the officials and managers category.

including computer console operators.

Craftsmen (skilled). Broadcast licensees may include the following: electricians, machinists, building construction workers, hair stylists, carpenters, painters, makeup artists, wardrobe mistresses, hearing and air conditioning mechanics.

Operatives (semi-skilled). Broadcast licensees may include the following: chauffeurs, mobile messengers, drivers, apprentice carpenters and painters, scenic artists, film department assistant, material handlers.

Laborers (unskilled). Broadcast licensees may include the following: studio grips, property men, laborers performing lifting, pulling, piling, loading, etc., car washers, setup helpers.

Service Workers. Broadcast licensees may include the following: cooks, counter and fountain workers, elevator operators, guards and watchmen, doorkeepers, stewards, janitors, waiters and waitresses.

Minority group identification

FCC Form 395 provides for reporting American Indians and Alaska natives, Asians and Pacific Islanders; Blacks, not of Hispanic origin; Hispanics; whites, not of Hispanic origin; wherever such persons are employed. The category which most closely reflects the individual's recognition in his community should be used to report persons of mixed racial and/or ethnic origins.

In deciding to adopt a modified version of the proposal submitted by the Broadcast Bureau, the Commission stated its belief that the new instructions would be clearer and easier to follow than the present instructions for broadcasters. However, the Commission stated that it did not wish to change the form radically and advanced two reasons for this sentiment. They were:

> First, we do not wish to destroy the data base which has been built up for the industry and for each individual station over the past several years . . . Second, the great variety of comments has convinced us that it is virtually impossible to define each job category so precisely or to furnish so many examples of job titles and functions as to assure that each employee is placed in the ideal category by that means alone.[4]

Therefore, while the Commission agreed that some modification was in order, it felt that a drastic change would be counterproductive.

The Commission recognized that the use of function and job titles may not be the most direct manner of arriving at the status of an employee. Indeed, the Commission pointed out that the use of salaries may be the most effective manner of evaluating an employee's status. However, the Commission cautioned that it was clear that it must "avoid unwarranted intrusions into the privacy of individual employees and unreasonable public disclosures of confidential business data." In view of this quandary, the Commission decided that it would issue a *Further Notice of Proposed Rule Making* in the near future to develop another verifying method.

Form 395 and the Commission's Equal Employment Rules will certainly be the subject of future Commission consideration. When this does occur, broadcasters should inform the Commission of their experiences and suggestions. This will help to insure changes that are not only workable and practical but foster the Commission's equal employment policy. **BM/E**

[4] *Amendment of Broadcast Equal Employment Opportunity Rules and FCC Form 395, First Report and Order, supra* at 7.

Great Idea Contest Winners For 1978

All of the reader votes for our 29 Great Idea Contest entries for 1978 have been tallied. The three top winners in the AM Radio, FM Radio, and Television categories are:

AM Radio: David C. Williams, director of engineering for KULA Broadcasting Corp. (KGMS-AM, Sacramento, Calif.), for his "Simple Device for Matching Impedance" (January, p. 103).

FM Radio: Alan S. Joffe of WCAU-FM, Philadelphia, Penn., for his "Variable Equalizer for Telephone Lines" (January, p. 100).

Television: Francis E. Hertel, manager of transmission at WNIN-TV, Evansville, Ind., for his "Inexpensive Non-Composite Black Burst Generator (January, p. 102).

Each first prize winner will receive a Texas Instruments Scientific Calculator.

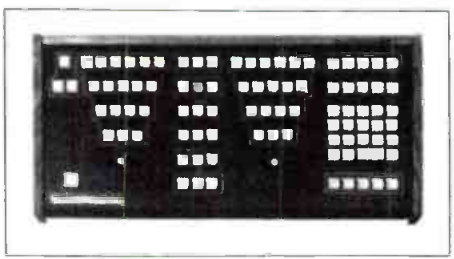
Eight runners-up will also be rewarded for their Great Ideas with pocket calculators. The winners are: **AM RF**: Jack Vinson of WACO-AM, Waco, Tex., for his "Determining Direction of Receiving Antenna" (January, p. 100). **AM Control**: Jim Purcell of WFHR-AM, Wisconsin Rapids, Wisc., for his "Delayed End-of-Message Pulse" (February, p. 99.) **AM Audio**: No entries. **FM RF**: Steve Bridges, chief engineer of KYKX-FM, Longview, Tex., for his "Getting Enough Voltage to the Power Output Meter" (August, p. 98). **FM Control**: James E. McKay, engineer at WSB Radio, Atlanta, Ga., for his "Maximizing Variety of Cuts On a Multi-Cut Cart" (February, p. 98). **FM Audio**: Daniel Patterson, chief engineer of KSCC-FM, Berryville, Ark., for his "Feeding Mono Source into a Stereo Input Making Two Channels in Phase" (February, p. 98). **TV RF**: David H. Kaun, engineering supervisor at the Teleproduction Center of the University of Wisconsin, Stout, for his "Automatic Record TW Phase Correction to Compensate for an Untimed Video Source" (November, p. 101). **TV Control**: Carl Roszczybiuk of WSNS-TV, Chicago, for his "Manual Operator Control of TCR-100 Event Sequencer" (February, p. 98). **TV Audio**: No entries. **TV Video**: S. Mazzara, TV Engineer at the United Nations, for his "Multiple Images Without a Frame Store Device" (August, p. 97).

Congratulations to all winners. The 1979 Great Idea Contest is under way, but there is always room for another entry. For details, see *BM/E*, January, 1979.

BROADCAST EQUIPMENT

Editing System 250

The Z-6 is a microprocessor-based editing system that provides frame-accurate editing and a 99-event memory without the need for SMPTE time code. Its Z-80 microprocessor control works on industry standard S-100 bus electronics. The Micro-loc feature enables the Z-6 to sample with total accuracy at any speed without the 80-bit word requirements of SMPTE code and without the addition of a 16-bit proc-



essor. Interface requires no mechanical modifications to VTRs, and Micro-loc can coexist with SMPTE time code if necessary. Other standard features of the Z-6 system include: bi-directional shuttle controls; auto search; cruise control; event tag; rehearse, perform, and review edit; prompting for proper entries; and error message with keyboard lockout to prevent mistakes. The Z-6 is capable of consecutive event mode changes; simultaneous tape searching; event memory recall, automatic computation of times and durations, and automatic return to last event edited. VIDEOMEDIA.

Audio Consoles 251

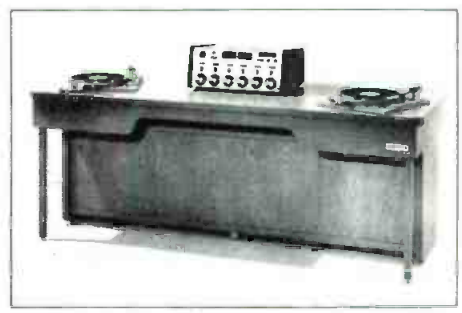
The Microtouch line of moderately priced full-function audio consoles features electromechanical switching to replace old-fashioned lever key switches. Compact packaging allows five channels in 21-inch width and eight channels in 26-inch width, making units suitable for small to medium studios, newsrooms, and remote vans.

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

The unit is available with up to 21 inputs in five and eight-channel rotary and linear fader configurations with dual mono and dual stereo outputs. It is styled with a black matte finish panel with permanent anodized markings, stainless steel top, walnut end panels, and padded armrest. $1495 to $3495. AMPRO BROADCASTING.

Audio Control Center 252

The "S" System is a packaged six-channel conventional broadcast system providing turntables, turntable preamplifiers, interconnecting wiring, and the Model 6618 six-channel audio control console in a 30 by 80-inch operating desk. The system provides space for accessory cart machines on the desk top, plus two compartments of 19-inch rack panel space in the base pedestal, accessible from both front and rear of the system. An additional 32-inch wide by 17½-inch high center panel space is available for equipment requiring low accessibility. Optional turntable and tape recorder cabinets are available to mount equipment off the



main desk. The 6618 console, included in the system, features six mixing channels, 18 inputs (three per channel), stereo and mono outputs, built-in 10 W monitor amp, and selectable muting, switch selected. MICRO-TRAK.

Switching Units 253

The D-4300 series of video and audio switching units are intended for aux-

iliary switcher and small routing switcher applications. They may be used for: input preselects to production switchers to expand their capacities; switching inputs to vectorscopes and monitors; adding preview buses to existing switchers; and VTR input

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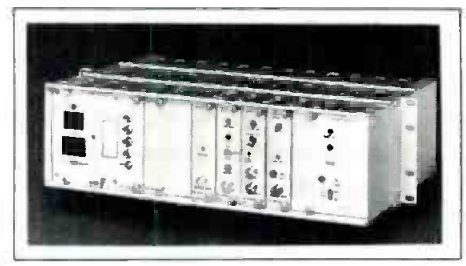
Broadcast Equipment

selection. The units are available as 6 by 1 video, 6 by 1 audio, 16 by 1 video-audio, 20 by 1 video, and 20 by 1 audio. They may be used for a single output bus or stacked for multiple output buses by looping inputs between units. They may be used to make up small, economical routing switchers and may be easily expanded. All units are designed for remote control panel operation, but local control is available if desired. Control is carried out by means of RG-59/U coaxial cable with BNC connectors. Each unit has its own power supply and utilizes plug-in printed circuit modules. DATATEK CORP.

ENG Central Receiver 254

The FV2CR is designed to minimize the problems of weak signals and distortion related to ENG transmissions. It has a dynamic range of 82 dB (−5 to −82 dBm) and compensates automatically for varying signal strengths. It can

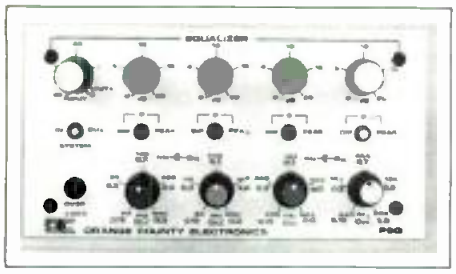


operate with a minimum system fade margin of 20 dB for transmission distances up to 300 miles. Transmissions originating as close as ⅛ mile do not overload the receiver's front-end and cause distortion. The FV2CR operates from 1.99 to 2.11 GHz. Twenty-one synthesized, phase-lock channels are selected remotely or manually. A unique narrow-band IF SAW filter (standard 10 MHz, optional 15 MHz) provides maximum adjacent half-channel selectivity of more than −45 dB with minimum transmission degradation. RF noise figure is 3.0 dB. Standard audio subcarrier frequency is 4.83 MHz; optional is 6.2, 6.8, or 7.5 MHz with 15 MHz IF filter. The unit's standard 19-inch rack-mount configuration occupies three rack mounting spaces. FARINON VIDEO.

Parametric Equalizer 255

The PEQ module is a four-band parametric equalizer with center frequencies variable from 20 Hz to 20 kHz in overlapping five-octave (32:1) ranges. Each section tunes over a 40 dB control range. Bandwidth is variable from .15 to three octaves. All controls

are non-interacting. Specifications include S/N of 110 dB with all sections in 20 dB boost, THD 0.05 percent at 18 dBm output, and output capability of +30 dB (10k load) or +24 dB (600



ohm load). Standard balanced or unbalanced operation is available. An overload indicator warns of excessive levels in any stage of the module. The PEQ is designed to be used as either a mono or stereo parametric in the manufacturer's standard rack frame. ORANGE COUNTY ELECTRONICS INTERNATIONAL, INC.

Modulator/Demodulator 256

The SMR-1 IF Modulator and the SDR-1 IF demodulator are intended for narrow-band FM services using a maximum 5 kHz audio bandwidth in a 52 MHz to 88 MHz frequency range. The SMR-1 produces an audio response of 50 to 5000 Hz, ±1 dB, with a ±10 kHz frequency deviation. It is capable of RF output up to +10 dBm into a 50 ohm load, and its S/N is 60 dB minimum. The SDR-1 delivers at least 33 dB S/N for a carrier-to-noise ratio of 14 dB in a 25 kHz predetection bandwidth (equal to a C/KT of 58 dB) and a ±10 kHz deviation. Distortion limited performance with high carrier-to-noise is greater than −60 dB. It will acquire, track, and relock a signal even when transponder frequency error is ±50 kHz or more. Both units feature deviation envelopes from ±10 kHz to ±75 kHz, and will interface with FSK, printers, and most RF systems. MCMARTIN INDUSTRIES.

Mini-Oscilloscopes 257

The Series 1020 mini-portable 12 MHz single and dual-trace oscilloscopes measure only eight inches wide by 7⅜ inches deep by 3¼ inches high and weigh only five pounds, but offer professional-grade performance capabilities. Sweep rates are from 100 ns/division to 100 ms/division in 12 calibrated steps. A continuously variable x10 magnifier is standard. Circuitry employs standard TTL and CMOS elements for low quiescent current drain and low dissipation in operation. Special highlight output CRT has a low 1 kV accelerating potential that minimizes dissipation in the HV power supply and CRT control circuits. The Series 1020 therefore requires less than 10 W, with a nominal temperature rise of only 7 degrees C, which eliminates the need for a cooling fan. The scopes operate on 12 V dc at less than 1 A; plug-in ac power converters permit operation for 120 or 140 V, 50 to 400 Hz ac line power. Durable case can withstand rough handling. All potentiometers and switches are sealed at the panel. Response on dc is at least 12 MHz (−3 dB); on ac, 5 Hz to at least 12 MHz (−3 dB). $785 and $595. BALLANTINE LABORATORIES, INC.

Mixer/Equalizer 258

The PMX-9000 professional quality mixer/equalizer features two sets of switchable line and phono inputs, each with its own slide level control, and a transition slide for cross-fading between inputs 1 and 2. It has complete cueing capabilities with level control and selector switch for previewing all inputs and cueing in program output of simultaneous monitoring. Complete microphone facilities provide for: normal operation through the regular microphone input channel; standby operation by presetting the microphone slide with the mic out of the system; and talkover operation with the mic fading into the circuit while dropping program

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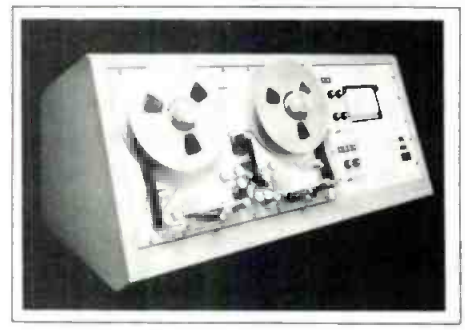
Broadcast Equipment

14 dB. Other features include five-band graphic equalizer with bypass switch, switchable signal processor loop, rack-mount panel, master level control, two sets of stereo main outputs, preset level indicators, and illuminated VU

meters. Preliminary specifications include S/N better than 76 dB below 10 mV, subsonic filter at 18 dB octave below 30 Hz, input impedance of 47 K ohm, and maximum input capability of 220 mV at 1 kHz. GLI: INTEGRATED SOUND SYSTEMS.

Tape Cleaner/Evaluator 259

The Elcon Magnatek Tape Cleaner/Evaluator, Model 2000, certifies new and previously used quad videotapes in a fraction of the time required for real time evaluation (10 minutes for a one-hour tape). It provides a three-pen



graphic profile of video dropout, control track, and audio damage on a minute-by-minute basis. The printout also indicates the location of any physical splices on the tape and times the tape. Unit can be supplied to clean and evaluate two-inch and one-inch tape, A wind and B wind. TELEVISION EQUIPMENT ASSOCIATES.

Prompter System 260

The Data-Prompter is a character generator system for prompting designed to replace the camera and moving paper systems now in use. It features continuously variable roll speed with manual control and Auto-Time, an automatic mode which compares the length of the copy with entered time and sets the roll speed to pace the copy for the announcer. Auto-Time has an override to speed up or slow down the roll.

When override is released, the system will recalculate the roll speed required to make the spot time out. BEI (BESTON ELECTRONICS, INC.)

Multi-Speed Color VCR 261

The TVO-9000 VCR utilizes ¾-inch videocassettes and is capable of recording in six time modes (72 minutes, 12 hours, 24 hours, 48 hours, 72 hours, and 96 hours). It features still frame, slow motion, and step back capability during playback. A specially designed head drum allows clear playback of picture material free of guard band noise. Manufacturer's suggested applications include use as a station logger. $7500. SONY VIDEO PRODUCTS CO.

Editing System Keyboard 262

The E/D (expanded/dedicated) keyboard is applicable to all existing 340X editing systems and greatly improves their operation, according to the manufacturer. It features a more organized, human-engineered layout and improved software requiring simpler commands. All operational parameters are now directly accessible through the keyboard without the need for a lengthy initialization dialogue. A separated left side keypad deals with the decision list and auto assembly functions. CMX SYSTEMS.

Head Degausser 263

The QM-380 is a highly effective broadcast cartridge degausser designed to remove residual magnetism from cartridge machine heads. The unit develops a powerful magnetic field of 400 gauss which will completely degauss heads regardless of the type of material

from which they are made. The QM-380 operates on standard 110 – 120 V ac, 60 Hz power and incorporates a thermal protective device which shuts off the unit when temperature rises due to prolonged use. NORTRONICS.

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

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