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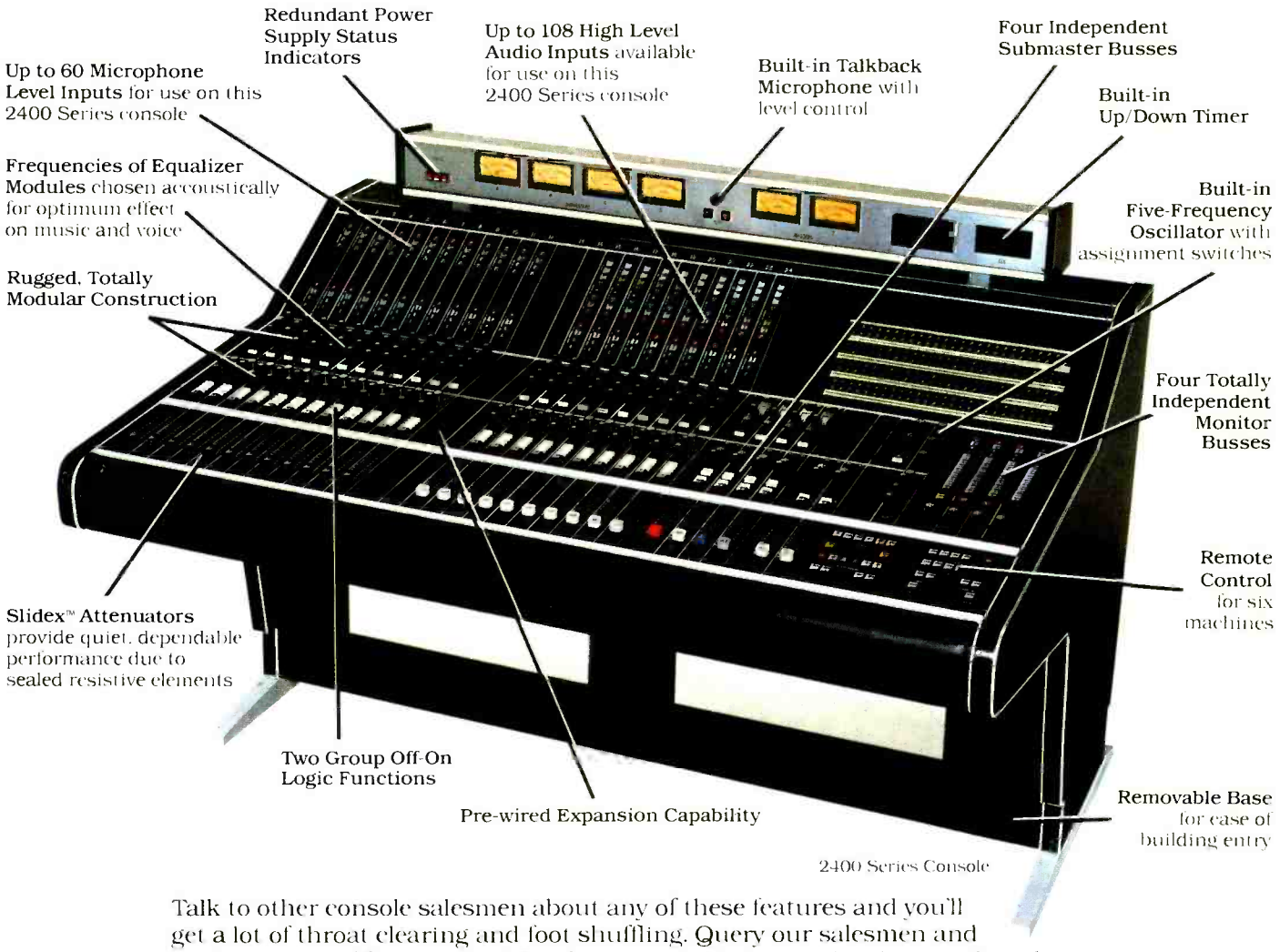

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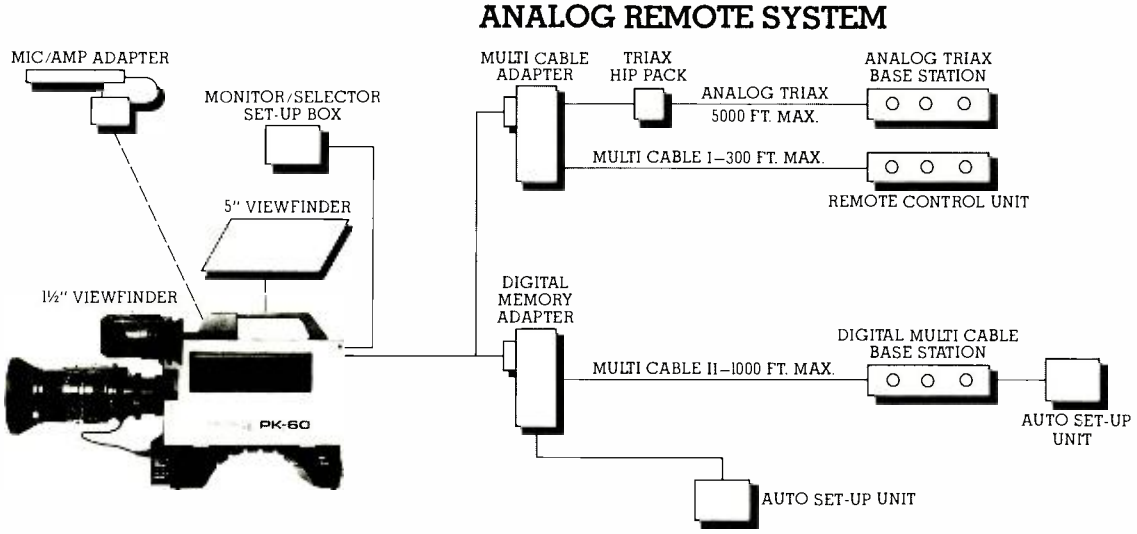

Introducing Toshiba's PK-60 ENG/EFP Color Camera. These drawings tell the story of the camera's digital and analog modularity. It features a separate digital memory with an internal microprocessor, an automatic setup unit with an 8-bit microprocessor, a digital base station and triax/wireless transmission with base station. The monitors also detail the PK-60's very modest dimensions.

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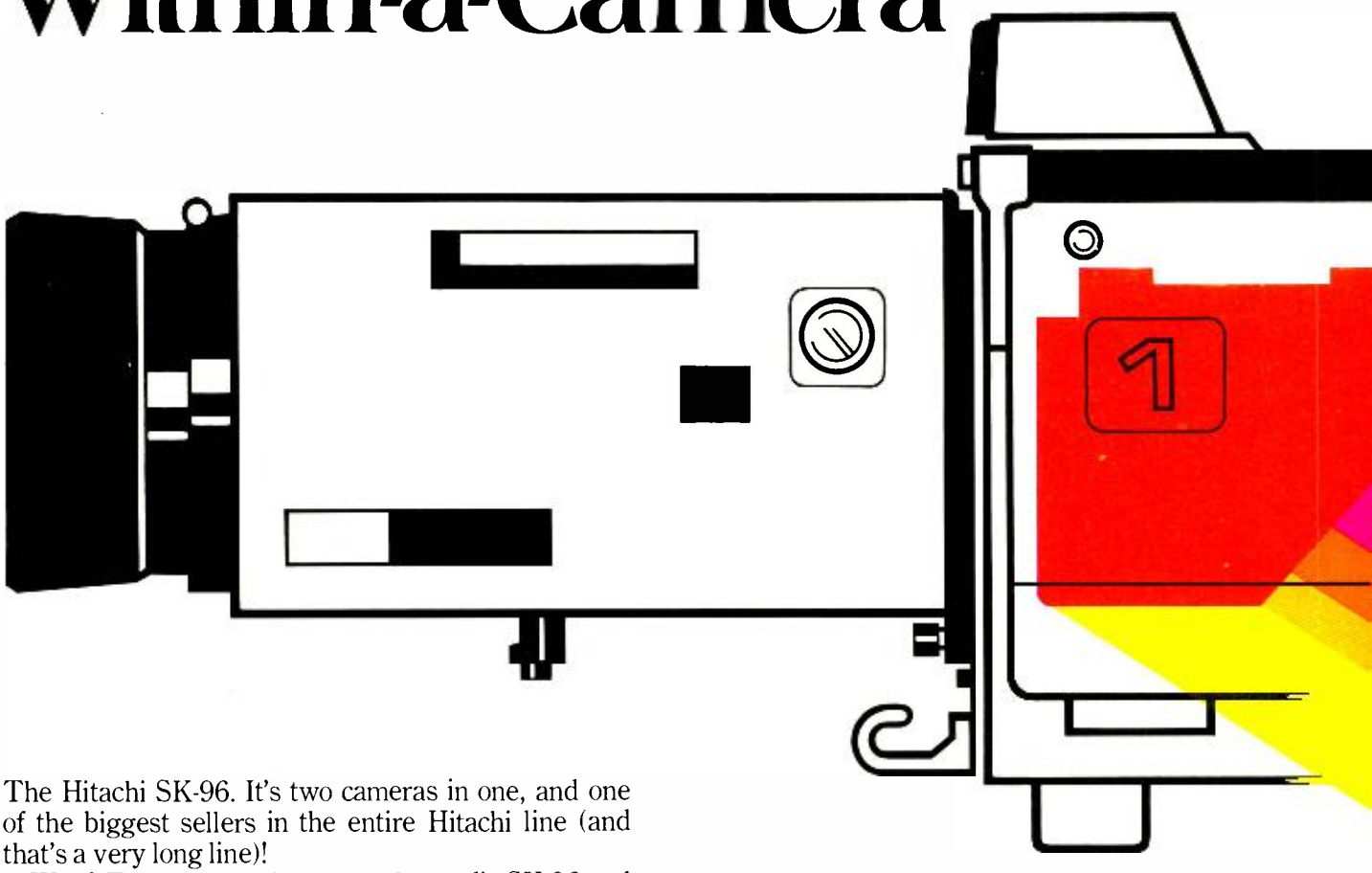
The Inside Story of Hitachi's "Camera-Within-a-Camera"



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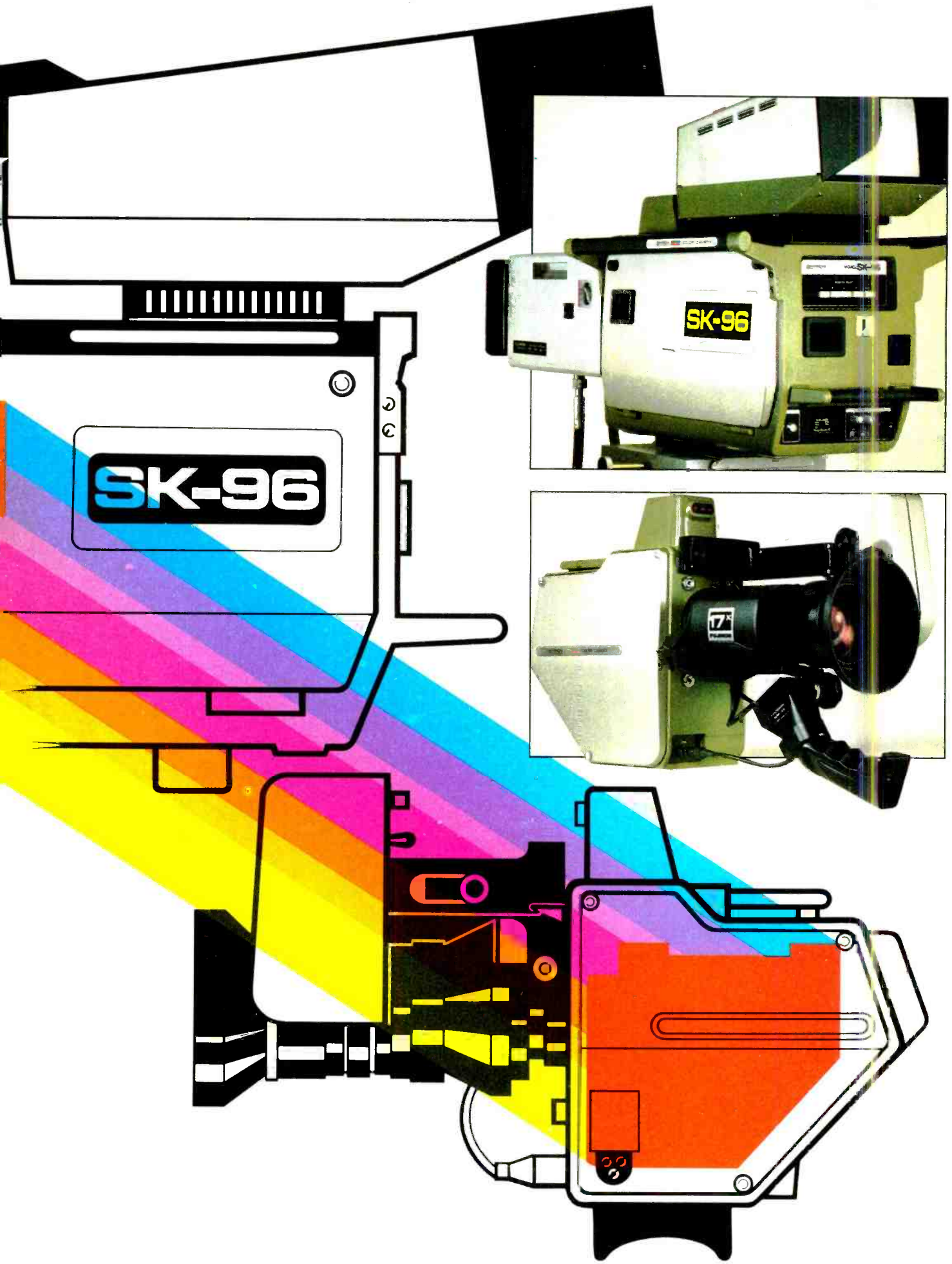

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"Cousin Jacks"

Courtesy of Searls Historical Library, Nevada City, Calif.

In 1850 a quartz vein was discovered on Gold Hill in Grass Valley, and hardrock mining soon became as important as streambed placering. In an 1851 letter from Grass Valley to his brother in Cornwall, John Roberts told of "veins very like copper lodes in Cornwall, only they lie very flat". History doesn't say his brother set sail immediately for Grass Valley, but he might have been the first "Cousin Jack" to arrive.

Legend has it that when a Cornish miner found employment in his adopted land, his next question was "Do 'e got a job fer me Cousin Jack?", and the clannish experts became known one and all by that name. A 1972 history of area tombstones revealed 28% of Cornish origin or descent!

Cornish miners worked American metal mines in the East from the early 1700s, then swarmed into the Western discoveries after the mid-1800s. The "Cousin Jacks" brought centuries of experience (Cornwall's mines predate the Roman conquest!), and technical innovations to Grass Valley such as the redoubtable Cornish Pump.

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BROADCAST INDUSTRY NEWS

New Plan May Increase TV Stations

A new plan from the FCC may add a large number of new VHF and UHF TV stations to the U.S. broadcasting scene.

The Commission voted unanimously in early September in favor of a proposal that would allow the authorization of many low-power UHF outlets providing specialized programming, and would also permit new VHF stations to be dropped in between existing ones. The action could become final by the end of 1980, with new stations in operation by next summer.

NAB was quick to condemn the idea, which would lead to increased competition within the television industry, on the grounds that unacceptable interference would result.

The "mini" UHF stations would utilize the low-power transmitters now found in repeater stations. VHF stations would have their locations and power levels calculated on the basis of a formula designed to insure that they did not interfere with existing stations more than a full-power station 170 miles away.

A possible result of the proposal could be a VHF outlet for New Jersey, which has long fought for one without success. State officials, however, were reported to be dissatisfied with the plan, which representative Andrew Maguire termed "a token effort."

Broadcasters Stung On Cable Royalties

Program syndicators will take the lion's share of copyright royalties collected from the CATV industry in 1978, while radio and television broadcasters will have to content themselves with meager pickings or bare bones. Thus hath ruled the Copyright Royalty Tribunal, in a decision that seemed designed to give the broadcast industry a mass coronary.

Only 3.25 percent of the over $14 million royalty take will go to commercial TV, with U.S. and Canadian stations sharing just under $476,000 among themselves. TV did better than radio, though. Commercial radio will get nothing at all, and National Public Radio came away with just 0.25 percent. Public television fared slightly better than its commercial counterpart, winning five percent of the pot.

Program syndicators, including the Motion Picture Association of America and the Christian Broadcasting Network, took home 75 percent of 1978's royalties. Sharing the remainder are sports and music rights groups.

Although there is no recourse at the CRT, the decision can be appealed to the U.S. Court of Appeals. Appeal will have to wait, however, until the CRT's decision has been finalized. NAB had originally set 21 percent as a fair share for U.S. television.

Actors' Strike Continues As New Season Begins

What has become the longest actors' strike on record entered its seventh week Labor Day, with 60,000 members of the Screen Actors Guild and the American Federation of Television and Radio Artists firm in their demands for a bigger share of gross revenues resulting from the sale of programs for cable, videocassette, and videodisc uses.

The outlook was gloomy at press time (early September), with most observers predicting a long and costly struggle. The movie studios have had to tighten their belts just about as far as possible, putting executives on half pay or furlough to lower expenses and invoking force majeure, a legal principle allowing them to cancel contracts in the face of unexpected, severe disruptions. Meanwhile, the networks were gearing up to begin the fall season with lots of money — since they're not spending it on programming — but plenty of worries about whether their audiences will be there.

NBC seems to be least affected since its schedule is heavily weighted with

Telepictures Making News

Telepictures Corporation is launching a $2 million daily news programming service for TV called News/Information Weekly Service (NIWS). The service will feature 15 to 20 news stories per week of varying lengths, to be supplied to TV stations starting November 3. NIWS is a joint venture of Telepictures and United Software Associates. The company is headed by David E. Salzman, formerly chairman of Group W Productions.

Designed to fit into local news programming, the service offers newsmaker interviews, finance, sports, and entertainment features including reports by Dr. Art Ulene, Bob Rosefsky, Carl T. Rowan, and Doug Llewelyn.

The NIWS staff will produce 50 percent of the material, with the other half to come from station suppliers, who are paid $300 per story. Subscriptions are on a 52-week license fee arrangement, with some subscribers agreeing to supply material. According to Michael N. Garin, president of Telepictures, suppliers include WDVM-TV, Washington; WFAA-TV, Dallas; CITY-TV, Toronto; KOMO-TV, Seattle; WBTV, Charlotte; KTVX, Salt Lake City; KOOL-TV, Phoenix; WWBT-TV, Richmond; and WSCS-TV, Charleston.

The service, which includes on-air promotions, newsreels, and "nonperishable" news, comes on the heels of the FCC's call for more local programming.

Left to right are Michael Garin, president of Telepictures Inc.; FCC Commissioner Abbott Washburn; David Salzman, president of NIWS; and Ed Jones, director of programming, WDVM-TV. Jones' WDVM will be a major supplier to NIWS. Washburn observed the proceedings as a long-time advocate of "informational programming"

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game shows and other non-theatrical material. Its blockbuster miniseries, *Shogun*, had already been filmed and was promoted strongly; it faced little real competition, although the other nets put up the best fight they could. ABC and CBS have much lower levels of programming unaffected by the strike.

Bulletin: Latest word at press time was that agreement was imminent between the parties in the SAG/AFTRA strike.

Stage hands and others out of work because of the strike have been picketing the talks, urging the actors to go back to work while negotiating.

Elimination Of First Phones Proposed

First class radiotelephone operator licenses would be discontinued under a recent FCC proposal, which also suggested an end to exams for radio and TV broadcast station technicians.

The action comes as part of a proceeding examining the FCC's operator licensing policies. The Commission, in issuing the notice of proposed rulemaking, noted that its evidence shows that the first phone exam may not accurately measure the technical competence of broadcast technicians. Direct hands-on testing, probably a surer course, would be highly impractical.

Even if such direct testing could be instituted, the Commission continued, its other rules and requirements for technicians would make it redundant. Further, the in-depth, random stations audits recently proposed by the FCC (see *BM/E*, August, 1980, p. 8) could put stations under increased pressure to hire competent technical staffs, reducing the need for exams even more.

One concern voiced by the Commission was that the examination could be excluding competent people who simply lack exam-taking skills.

In a related rulemaking proposal, the Commission suggested allowing those performing technical duties at broadcast stations to hold any class of commercial radio operator license, including the restricted radiotelephone operator permit. The rulemaking would also make licensees completely responsible for determining technicians' competence.

Calling the rulemaking "a major step forward," chairman Charles Ferris noted in a separate statement, "Broadcasters may well be able to devise their own testing procedures that are far more relevant to their own, and the public's, needs."

CBS Pushing FCC Teletext Decision

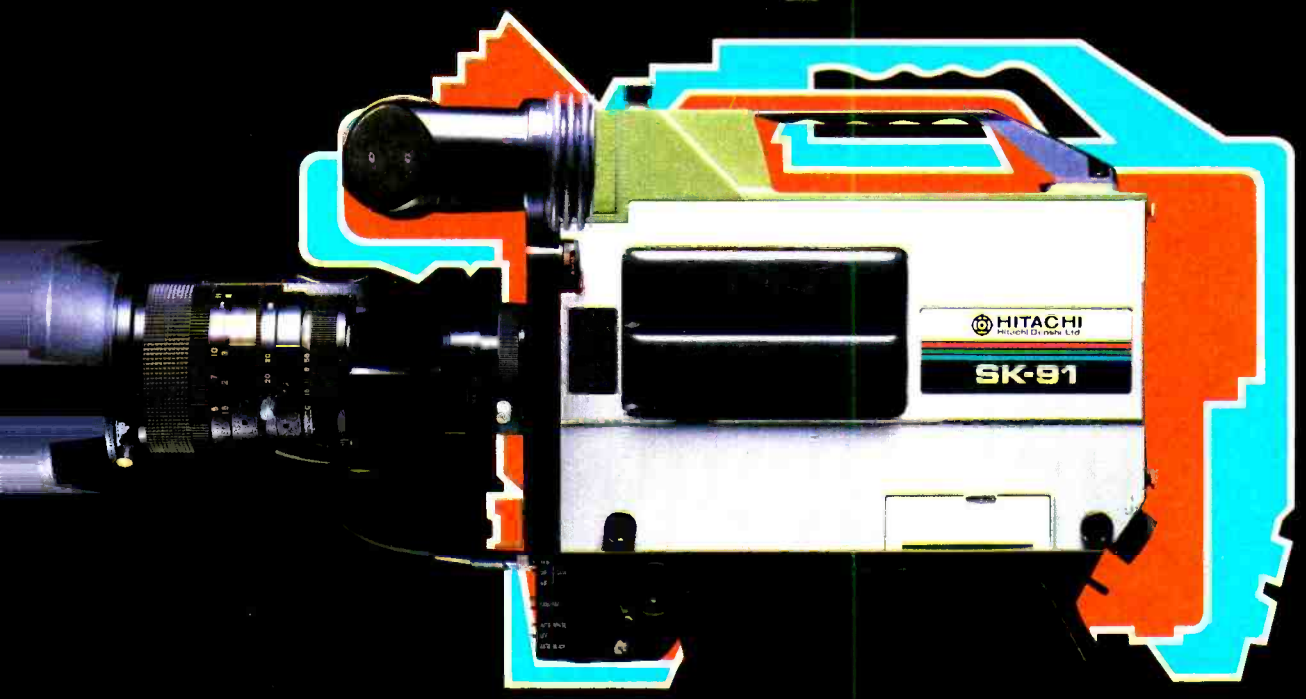
Tired of waiting for action from the EIA's subcommittee on teletext, CBS has petitioned the FCC to adopt a single teletext standard — namely, its modification of the French Antiope system. The network, one of teletext's chief U.S. exponents, has been testing the Antiope system in St. Louis.

CBS's petition called the choice of a single standard "the key to success of teletext in the U.S." Joseph Flaherty, vice president of engineering, made the dire prediction that "proliferation of non-compatible systems will result in delay of nationwide service for many years" — an idea obviously unacceptable to CBS.

Receiver manufacturers are not expected to be pleased with CBS's plan, however, because the Antiope system requires more design changes than other teletext systems. Antiope is an asynchronous or software-driven system, unlike the Oracle-Ceefax system, which is synchronous.

CBS also called teletext the best

A Broadcast Breakthrough of Minor Proportions.



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means for transmitting closed captions for hearing-impaired viewers, and cited this as another reason for swift action by the FCC.

Partners Find Cable At End Of Rainbow

Four multiple system operators — Cablevision of Long Island, Comcast, Daniels & Associates, and Cox Cable — have banded together to form Rainbow Programming Services, a new premium cable service scheduled for blast-off October 27.

Rainbow's programming, aimed at targeted audiences, will initially consist of two services. *Escapade* will feature action-oriented movies and specials, running Tuesdays through Saturdays. X-rated material will be avoided, according to Rainbow. The second service will be *bravo!*, featuring symphonies, concerts, ballet, and other cultural events, all in stereo. News of the performing arts will also be included.

A *bravo!* bonus will be Sneak Preview, a monthly movie not yet shown on other pay TV services. Audiences will not be told the title of the Sneak Preview movie, although promotional material will give them hints. Cablevision's president Chuck Dolan praised the effectiveness of the Sneak Preview approach, which he has been using on Long Island.

Although the programming will be made available to cable operators via the Comstar 2 satellite on October 27, the official launch date is January 1. Rainbow claims that it is the first pay television company to be formed by the partnership of a group of MSOs. Initial customers include the partners and United Cable TV, with others predicted to join in. Factors slowing Rainbow's growth, according to *Variety*, are a lack of dishes that receive Comstar and lack of channel space in some cable systems.

Net TV Holding Its Own Against Cable

New video technologies may be booming, but network prime time television is doing just fine, thank you. So says the Nielsen Television Index's president, Charles W. Besosa, in a report recently published in the *Nielsen Newscast*.

The net's prime time ratings have held steady over the past eight years according to the Nielsen figures, which show the average network program with a 19.4 percent rating in the first quarter of 1980, almost identical to 1973's 19.3 percent. This almost rocklike stability has occurred in the face of the rising tide of cable penetration, now almost double its 1973 level.

A report on cable viewing in the same issue highlights a few illuminating facts about cable TV households. For one thing, levels of viewing are higher in cable homes than in non-cable homes. Home stations, on the other hand, are viewed less frequently in the cable households, reflecting the increased viewing options of cable subscribers. STV was seen as having a small but growing impact on the industry; while STV outlets in Detroit and New York were described as making barely a dent in their cities' viewing levels, a Los Angeles station has achieved minimum standards for Nielsen's Viewers in Profile reports.

FCC Asks 9 kHz Advice

Announcing "tentative views" on several aspects of the complex 9 kHz AM spacing question, the FCC has asked

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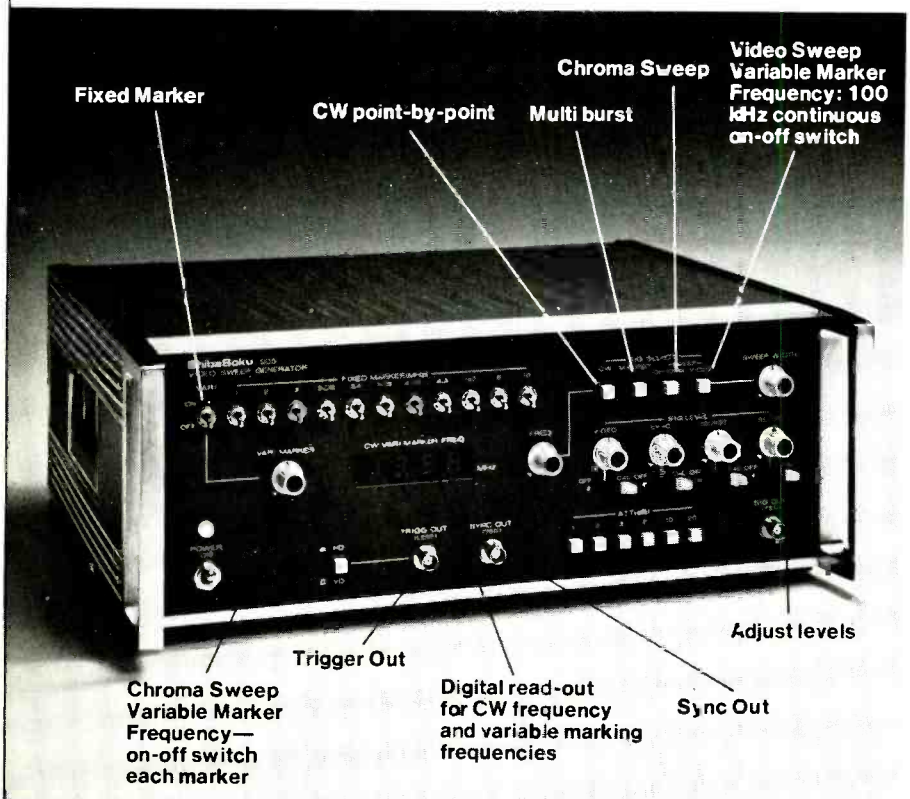

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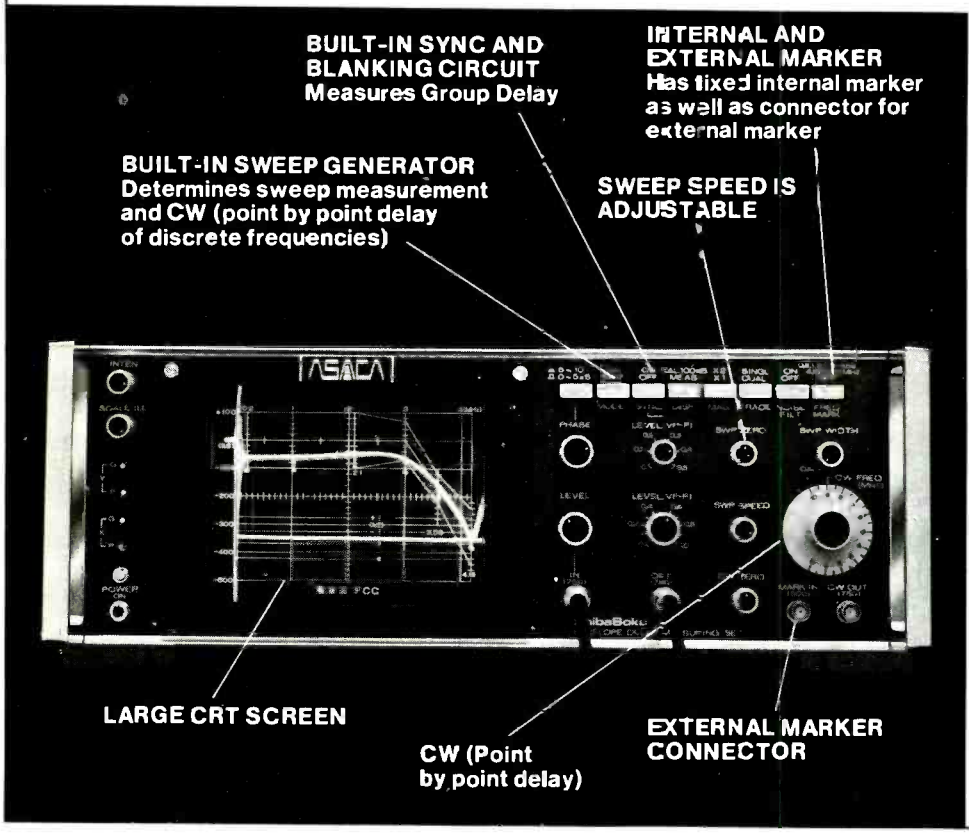

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for advice on the best uses for the estimated 300 new stations that could be created if channels are narrowed.

The Commission said it was particularly looking for input from parties considering applying for new stations that would begin broadcasting by the end of 1987, or in expanding the services of existing stations by that time. Those comments were due by October 1, as were any studies or comments on nationwide AM radio needs through 1987.

Persons filing statements of intent to apply for specific stations were requested to relate their proposals to threshold criteria, which define acceptable applications as those that would increase radio service in certain ways. Such comments are due November 1.

Several areas were touched upon in the Commission's announcement of tentative conclusions. A general power maximum of 1 kW and interference protection for a 20-mile radius, approximately, was favored; lower power and looser interference limits, such as for Class IV stations, were viewed as probably undesirable.

The Commission also said that further pursuing the question of whether there will be sufficient financial support for the additional stations was unnecessary, claiming that the Communications Act recognizes broadcasting as a competitive industry to be governed by the marketplace.

Commissioners James Quello and Abbott Washburn both took exception to the announcement of tentative conclusions, saying it was too early in the game to make any statement of views. Quello asserted that there were "too many unanswered questions"; Washburn complained that "many of these 'tentative views' . . . are based upon the scantiest of evidence."

Broadcast EEO Still Won't Include Handicapped

Denying a request for reconsideration by the California Paralyzed Veterans Association and Paula Zeller and Patty Ann Berkosky, the FCC early in August affirmed its February decision that the handicapped will not receive formal EEO consideration in the broadcast industry.

The decision has established a coordinator for broadcasting and the handicapped in the Office of Public Affairs; however, the coordinator would simply act as a clearinghouse for information, rather than having enforcement power of any kind. The Commission said at that time that it would also take findings of illegal discrimination against handicapped persons into consideration during license renewal proceedings.

The current petitioners, however, argued that by not including a formal EEO program for the handicapped, the FCC was denying their constitutional rights under the First and Fifth Amendments and was encouraging licensees to discriminate.

The Commission refuted these claims, saying that distinctions between groups are constitutional if there is a basis for the distinctions. It cited various practical barriers to implementing an EEO program for the handicapped, and asserted that it was not legally required to require licensees to provide facilities for handicapped employees. The Commission denied that by refusing to take such action it was encouraging discrimination.

Correction

Wold Communications will be exhibiting at the NRBA convention from October 5 through 8. The company was incorrectly listed in our August issue.

News Briefs

Western Union has announced plans for a **fifth Westar satellite**, to be launched in August, 1982. Westar 4 is currently being built by Hughes Aircraft . . . . Marlite TV of New York, Inc., has **appealed the FCC's recent major deregulation** of cable television (see *BM/E*, September, 1980, p. 8) in the U.S. Court of Appeals for the Second Circuit (New York City). Herman W. Land, president of the Association of Independent Television Stations, said that the INTV was "disappointed" in the FCC's action, explaining that "the threat of unlimited importation of distant stations" could make survival difficult for young independent stations. INTV will, Land stated, "pursue whatever means appear practical to ward off the threatened damage."

Wold Communications **announced a radio version** of its "Satellite Express" service during the NAB Radio Programming Conference. A satellite distribution service, the Express will offer a variety of plans with uplink from Los Angeles or New York City.

The **typical TV station** grossed $4,588,100 in time sales in 1979, NAB reports. Average profit before taxes was $1,038,700 — a 25.9 percent profit margin . . . . The high-income readers of Panorama, a new television magazine, show a **higher-than-average level of television viewing**, according to a survey completed by Audits & Surveys, Inc. . . . . CBS Radio Network is staying **on top of the ratings** with 14 of the top 20 network programs among adults 18 and over, according to the latest Radar survey.

Hispanic Americans should **take advantage of new communications technology**, FCC chairman Charles Ferris told members of Hispanic rights organization American GI Forum. He renewed his pledge that the FCC is committed to greater minority involvement in the media . . . . Telcom Engineering and Teleprompter Corp. have established **Cablevision Training Center** in St. Louis to train underemployed and minority persons for careers as cable TV installers, technicians, and linemen . . . . The National Captioning Institute has renewed its offer to **caption CBS Network programs** in the wake of CBS's teletext petition . . . . Unity Broadcasting Network, Inc., has expanded with the formation of the **American Black Information Network**, to become operational next month. The new radio service will provide in-depth coverage of news affecting Black Americans . . . . All public TV stations in North Carolina have been given **EEO goals and timetables** by the FCC.

Videotex '81, North America's first major international videotex conference and exhibition, will be held in Toronto May 20 to 22, 1981 . . . . The NAEB's **1980 Annual Conference** will convene at the Las Vegas Hilton October 26 to 30. Registration info from NAEB, 1346 Connecticut Avenue NW, Suite 1101, Washington, D.C. 20036 . . . . **Video Expo New York '80** will fill Madison Square Garden October 21 to 23. For info, contact Knowledge Industry Publications, 2 Corporate Park Drive, White Plains, N.Y. 10604, (914) 694-1070.

Daniel Schorr, CBS News veteran turned CNN Senior Washington correspondent, will be the keynote speaker at Scientific-Atlanta's sixth annual **Satellite Earth Station Symposium** October 27 through 29 at the Marriott Hotel in downtown Atlanta.

Business Briefs

A broad line of AM and FM transmitters, with related studio and antenna equipment, will be introduced by **Continental Electronics Mfg. Co.** this month . . . . General Instrument's **Jerrold Division** and Metro Cablevision have energized the first 52-channel CATV system in East Detroit . . . . Alron Electronics has joined Micro Consultants of Surrey, England. The Irvin, Calif. firm will be known as **Alron Microconsultants Ltd**. . . . Bonneville International Corp. has transferred **Video West,** the TV production division of KSL-TV, to production company Bonneville Productions. All the companies are based in Salt Lake City . . . . **Quantum Audio Labs, Inc.,** Los Angeles console manufacturer, has acquired Audio Logic, a spin-off of Uni-Sync, Inc. . . . **NEC** received its second Emmy for Outstanding Engineering Achievement last month for its DVE system.

Unitel has announced the opening of its Canadian subsidiary, **Barda Electronic, Inc.** The character generator firm is located at 5340 Coolbrooke, P.O. Box 175, Snowdon, Montreal, Quebec H3X 3T4 . . . . **RCA Americom** is expanding its facilities at earth station sites in Vernon Valley, N.J., Lake Geneva, Wisc., and Point Reyes, Calif. . . . **Tele-Measurements, Inc.,** New Jersey video equipment supplier, has opened a new office in Atlantic City.

Dietmar Zieger has been appointed vice president, marketing and product management, of **Fernseh, Inc.**. . . Charles F. Rockhill has been named marketing manager of **Moseley Associates** . . . . Kimiyasu Kobayashi has assumed the office of president of **Toshiba America, Inc.**

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new program formats is most appealing to new electronic media audiences? An analysis of these results, along with the report on the Mediastat studies in the same field, is in preparation for this column.

Arbitron has recently instituted two new studies specifically for radio. The first Arbitron Farm Radio Survey was based on diaries placed with farmers in nine midwestern and southern states with farms of more than 120 cropland acres. All the standard listening questions were included, plus questions on farm production, acreage, and income.

The second new activity of Arbitron Radio is "Qualidata," which reports on detailed product usage of radio listeners, covering 15 product categories and six socioeconomic categories as well as five readership and media usage categories. **BM/E**

Syndicators For Radio: Where They Are Now

Broadcast Programming International
P.O. Box 2027
Bellevue, Wash. 98009
Tel.: (800) 426-9082
(Originally profiled in June, 1977)

THIS IS WHERE it all started, more than 20 years ago. The late Rogen Jones had developed his early radio automation systems, and he needed some music for his buyers to run on the equipment he sold them. IGM, for "International Good Music," was his creation to meet that need: it was one of the very first full-format syndicators — as far as *BM/E* can determine, the actual first.

Later Jones spun off the music business from the automation business, selling the music to the present group headed by current president Kemper Freeman. The automation equipment business stayed as IGM, and is of course still a main factor in that industry.

The music business, renamed Broadcast Programming International, grew and grew under the new ownership. BPI has been able to move with the times, in fact to lead them so well that the subscriber list keeps growing: the total is now comfortably over 200. Forty have been with BPI for more than five years, 20 others for more than 10 years, and one for 18 years!

How to stay on top

Clearly the music syndication business has changed in 20 years. So the difference between the IGM of the early years and the BPI of today should tell us something about what it takes to survive and flourish in today's marketplace.

BPI has aimed from the beginning at the station in the small or medium market, and most of the stations now on the list belong in one or the other category. For these customers, BPI has developed no less than 10 full-scale formats. Originally there was one format, *Good Music*, which evolved into *Easy Listening*; others were added over the years.

It is clear from BPI's record that the additions and changes were directly responsive to developments in the industry, keeping this oldest syndicator in the vanguard. How did BPI maintain this forward stance?

Jane Kindred of BPI in a *BM/E* interview gave some explanations. One is the addition of personnel with long background in the actual operation of radio stations in small and medium markets. A small corps of workers goes back to the beginnings of the firm; most newer ones come directly from radio station operation. Kindred maintained that a syndicator with a large number of subscribers in the smaller markets must have operating personnel with total understanding of the problems of radio management in such markets.

Full-time service: success key

This also ties in with a major change in syndicator-station relations over the years. In the earliest days many syndicators shipped out the taped programs to subscribers, and it was generally accepted that the syndicator's responsibilities ended there. Today, Kindred noted, a subscriber expects, and gets, a constant flow of advice and help on many kinds of problems — promotion, scheduling, sales approaches, and others.

However, the word "advice" is central here because, somewhat paradoxically, successful syndication in these markets depends on acknowledgement of the radio management's own expertise in the market, the fact that a successful radio management knows more about the local situation than any outsider can. Any radio management worth its salt has its own strong ideas about what it wants the station to be.

So the syndicator must operate primarily with the management's objectives as guidelines. The relation has become a partnership with each partner contributing essential skills and knowledge.

The syndicator's contribution has become music of consistent quality in the format chosen. A large proportion of radio managements in smaller markets are deeply committed to localism in many different forms. A station's success depends on close identification with the community, and the management must develop its own methods for reaching that goal.

Having music that always comes up to the mark frees the management to pursue localism at full steam — time and energy are not diverted to fixing up the programming over and over. For these needs the "live assist" system has become very popular, and BPI, Kindred said, is working with a considerable number of subscribers who use it. Live assist can be used in a number of different ways: with the station's own announcers; with BPI's announce staff for part of the day, usually through the night; or with any mixture the station wants.

The technical story: into the '80s

A number of syndicators have been among the leaders in the big upswing in audio quality of the last decade. Kindred contrasted the very early days, when tapes were sometimes "bicycled" from station to station and quality control was minimal, with today's intense emphasis on state-of-the-art technical quality.

New tape for every program distributed is now the BPI rule, as it is for many top syndicators. Quality control began to tighten early at BPI, Kindred said, and now includes 100 percent inspection of every tape. Mastering and duplicating equipment in BPI's plant is state-of-the-art, with the objective of tape quality well above conventional radio station standards.

Today's deepening interest in audio quality also means that a large section of the advice the syndicator supplies will be on technical matters. BPI now frequently aids subscribers in planning a reequipment aimed at better quality. Such advice is part of "service," and BPI, along with many other syndicators, has staff members fully competent in this area.

To sum up the "advice" story, Kindred commented that instant, competent service is an essential of syndicator success today. The syndicator must be conscious of the sense of isola-

tion a radio management in a small market is likely to have. The radio management must feel free to get the syndicator on the phone for immediate guidance at any time.

How has the music changed?

Twenty years ago *Good Music* was basically pop hits, with rock-and-roll a new excitement still on the outside track. Format lines were indistinct, or very relaxed at best.

As everybody knows, format lines tended to harden for a decade or more, and radio managements adopted one or another of the "pure" formats: MOR, AOR, Top 40, Adult Contemporary, Country, Beautiful Music, and the rest. But change is a built-in part of popular music. A syndicator must be intimate with the spring freshets and flash floods, as well as the long-term trends.

Kindred notes that keeping on top of popular music trends is a big part of the job, a job that a well-staffed syndicator can do far better than a heavily-loaded station management. Her comments on what's happening right now are illuminating: "AOR seems to be in flux, with some stations leaning toward what might be called Album-Oriented Contemporary, and others aiming toward the younger half of the AOR demographic with more 'heavy metal' and 'chainsaw' music. MOR and Easy Listening are moving toward Adult Contemporary, and Classic Rock blended with new contemporary hits is coming up fast."

She also notes a very recent and interesting trend, not yet formalized in extensive syndicated programming: more and more crossovers between Country and Adult Contemporary music, especially for stations in small markets where the appeal must be to a broad sector of the audience. She suggests that the growing sophistication of the country audience is partly responsible, and perhaps also the "back to basics" psychology that springs from the complicated economics of the period.

The complications of the popular music scene mean that a syndicator who covers so much of it must have experts in all the styles at work. BPI operates this way, and the firm's success indicates that the programming artists have been well chosen.

So the formula for staying on top for more than 20 years comes down to: get top experts in the various popular music styles; know what is happening in popular music right down to the hour and minute; give subscribers the broadest possible service at every moment, including expert advice on every aspect of station sales operation and technical equipment; and know and respect the management's own skills and its objectives for the station. **BM/E**

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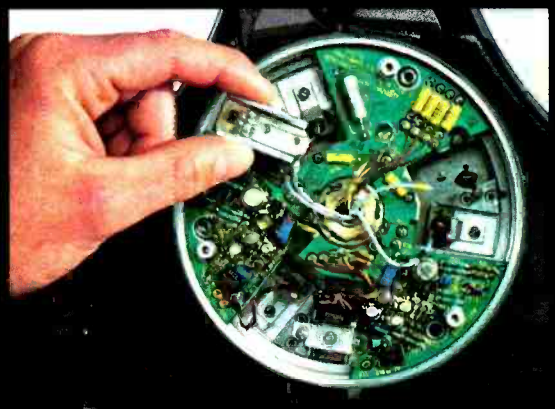

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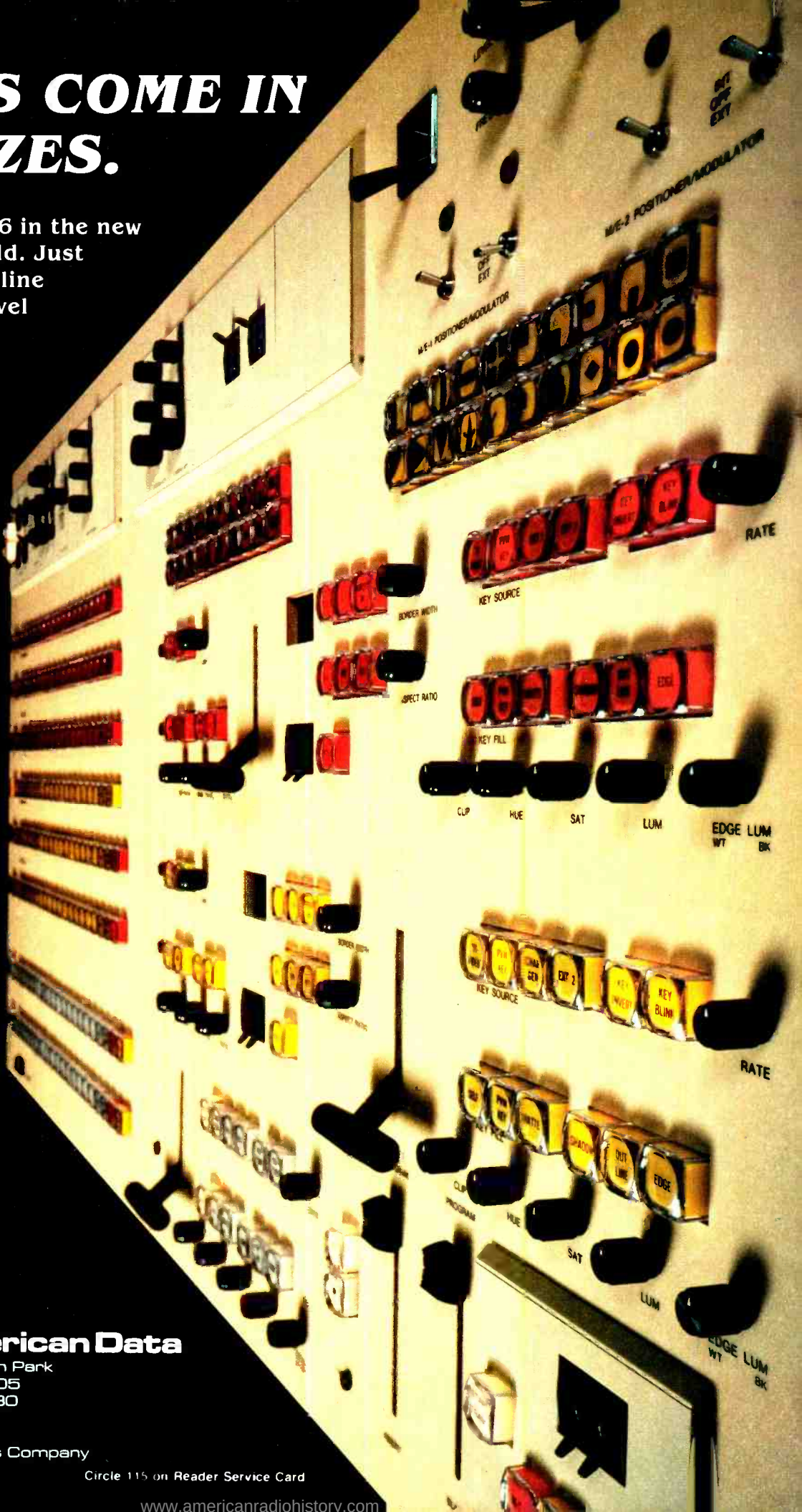

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Localizing Prime Time A Success At KSTP

WITH THE FALL TV season taking a slow ride this year due to the actors' strike, many broadcast station executives are looking harder for alternative sources for their usual prime time programming. No longer content to sit back and carry the standard network fare, many stations are developing in-house productions, carrying outside programming and devoting more time and money to local coverage.

When station KSTP-TV, Hubbard Broadcasting's flagship in Minneapolis-St. Paul, decided to carry the Minnesota State High School Hockey Championships earlier this year, its management decided to devote as much time, personnel, and technological expertise as was necessary in order to make the event a top-quality live broadcast production.

"Hockey is perhaps the most popular sport in Minnesota and this high school tournament is the hockey highlight of the year," says Stan Hubbard, company president. "We felt that our TV audience deserved the finest production presentation any station could offer."

How KSTP covered the three-day hockey tournament, held at the St. Paul Civic Center, should be of interest to those station managers, program directors, or sports fans whose home teams may be contending champions or whose local schools host sports events left largely untouched as a programming resource.

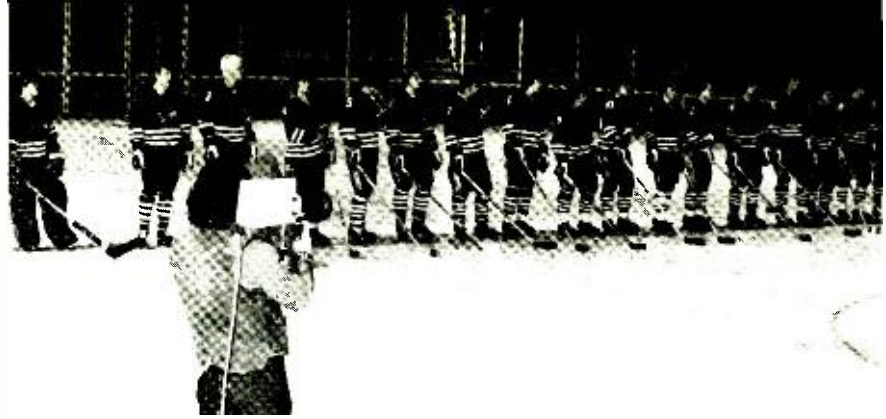
Live TV coverage of local sports means giving the action of the game, the excitement of the fans, and the personalities of the players full treatment. To accomplish this requires careful planning, coordination, and a high degree of skill on the part of station engineers, camerapersons, and directors alike.

The big question is this: can a local station preempt its regular network programming in prime time with a high school game and still get a substantial audience share?

For KSTP-TV, the answer is a proven *yes*. Not only did the station fulfill its mandate for localism, it achieved a ratings success in the process (a telephone coincidental on the Saturday night championship game showed a 22 rating and 42 share of audience against the next highest rated prime time program, which had an 11 rating and 21 share for the same time period).

"For a sporting event, that ranks with anything short of the Super Bowl," says KSTP production manager John Degan. "It's an extremely

Covering the Minnesota High School Hockey Tournament is Olympic coach Herb Brooks (right) and KSTP-TV sports director Bob Bruce. Twenty engineers handled the nine games



high rating, especially considering the fact that we're competing with network shows."

The production was not an overnight success. KSTP had covered the championships the year before and covered the home team through semi-finals throughout the state weeks prior to the tournament. The production staff had an idea what to expect and how to go about improving their coverage.

Prior to the tournament, KSTP-TV production people worked with the State High School League to find out what they could and couldn't do, where they could go, and the best ways to go about covering the action, doing interviews, and working the floor. Officials said, "Don't bother players between periods when they don't want to be bothered." The object was to cover the tournament without interfering with the games. Directors were instructed which dressing rooms they could get into and when. Fortunately, a lot of headaches were avoided since the crew had access to taped interviews with various players made prior to the tournament. These profiles were edited for later insertion into the live broadcast.

Three days before the tournament, final decisions were made on camera placement. Nine cameras were used: two TK-44s, two TK-76s, two Fernsehs, two Sonys, and a JVC camera positioned on the scoreboard at all times. One of these cameras was placed in the rafters of the Civic Center above the playing area.

"We would have liked to get someone up in the rafters working the camera," says Degan, "but because of building restrictions, we had to leave it up there running continuously."

More than three miles of wire were laid for the hookups and 20 engineers were assigned to work on the three-day tourney.

The final breakdowns came with the on-camera talent. "We used three sportscasters up in the booth," says Degan, "one below and one in the stands. So there were five on-camera people and coordinating what they were to do and what their responsibilities were was a big chore. You get so many people involved. There were close to 50 people working, and we had runners going after people all the time."

During the tournament, an associate director was responsible for switching, another director was in charge of the game itself, and a director worked on interviews, inserts, and commentary between the games. A video control engineer kept the nine cameras under control while, back at the station, another director handled the live feeds and commercials.

Twenty engineers were assigned to handle setups under the overall direction of Hugh Mulhollom, KSTP's engineering supervisor. "It was a quite a job," he says. "More than 800 man-hours of engineering time were devoted to the coverage." Almost the entire staff worked overtime during the ice hockey tournament.

Taped profiles had been taken from semi-final coverage the week before and these were edited for special inserts between periods, giving the viewing audience a personal look at individual players on the teams. These profiles, other inserts, and commercials were all handled back at the station.

Since the coverage was live, communications among the directors, engineering staff, camerapersons, and talent was of prime importance. A complex intercom system was designed and put into use by KSTP's engineering crew, including an IFB system, walkie-talkies, and two-way radio. Directors were able to talk to camerapersons using wireless radio, to talent and other directors inside and outside the Civic Center. Depending on who was talking to whom, a particular intercom was used.

"Exactly four different frequencies are used," says George Merrill, chief engineer for KSTP, "all in the 160 MHz band."

All cameras were fed to a van parked nearby. KSTP-TV had two mobile units containing microwave equipment for picking up the signals from inside the arena. One mobile van contained a new switcher, an Interface Electronics audio console, and character generator. Another smaller van contained the two slow mo machines. One slow mo was on line to play back whatever went on the air. The other slow mo was able to switch from different cameras in the arena. This way, two different slow mos were possible on every goal or each piece of the action. Engineers in the vans were able to communicate with both station personnel and crews in the arena. An audio control engineer worked from a soundproofed area inside one van.

KSTP used three ENG cameras inside the arena for roving coverage on the floor, for interviews with fans in the stands, locker room coverage, and interviews with players. TV viewers were even taken inside the scoreboard, above the arena, and behind the grandstands.

"This was the prime sporting event in the state of Minnesota and we wanted to do an excellent job covering it," says Degan. "We committed a lot more cameras than we had before. The microwave system allowed us to interview fans in the stands and talk to coaches on the sidelines. It's the biggest remote we do outside the station all year."

Ice hockey is probably the single most difficult sport to cover on television. When the object of interest is the puck, a relatively small and fast-moving object, the key camerapersons have to know what they're doing.

"The camerapersons really have to understand hockey so they can anticipate plays, know where they might be going," says Degan. "It's always a constant decision-making process. On the part of the director, decisions have to be made on whether to shoot a little bit tighter, losing a little of the flow of the play, or to stay a little wider, making people really have to pay attention to their TV sets in order to keep track of the puck. So it's a constant battle on that point. What makes it easier to do now is the slow mo and instant replay." The TV audience didn't lose sight of the puck once during three days of play. Degan says the next time, he'd like to get another extreme angle down on the ice. "There are some areas of the arena we would like to shoot from, but it's so crowded."

The Minnesota High School Hockey Championship tourney attracted over 100,000 spectators, making it the biggest high school sports tournament in the country.

"Our directors know the game," says Degan. "You've got to have an experienced crew — they know where to insert commercials so that no critical action is lost to the viewers."

The nine games of the tournament were covered from Thursday through the Saturday night final. Minneapolis, St. Paul, and Duluth all received full coverage of the three-day tournament. Rochester, Minn. took the final Saturday night game.

"We're a non-budget station," says

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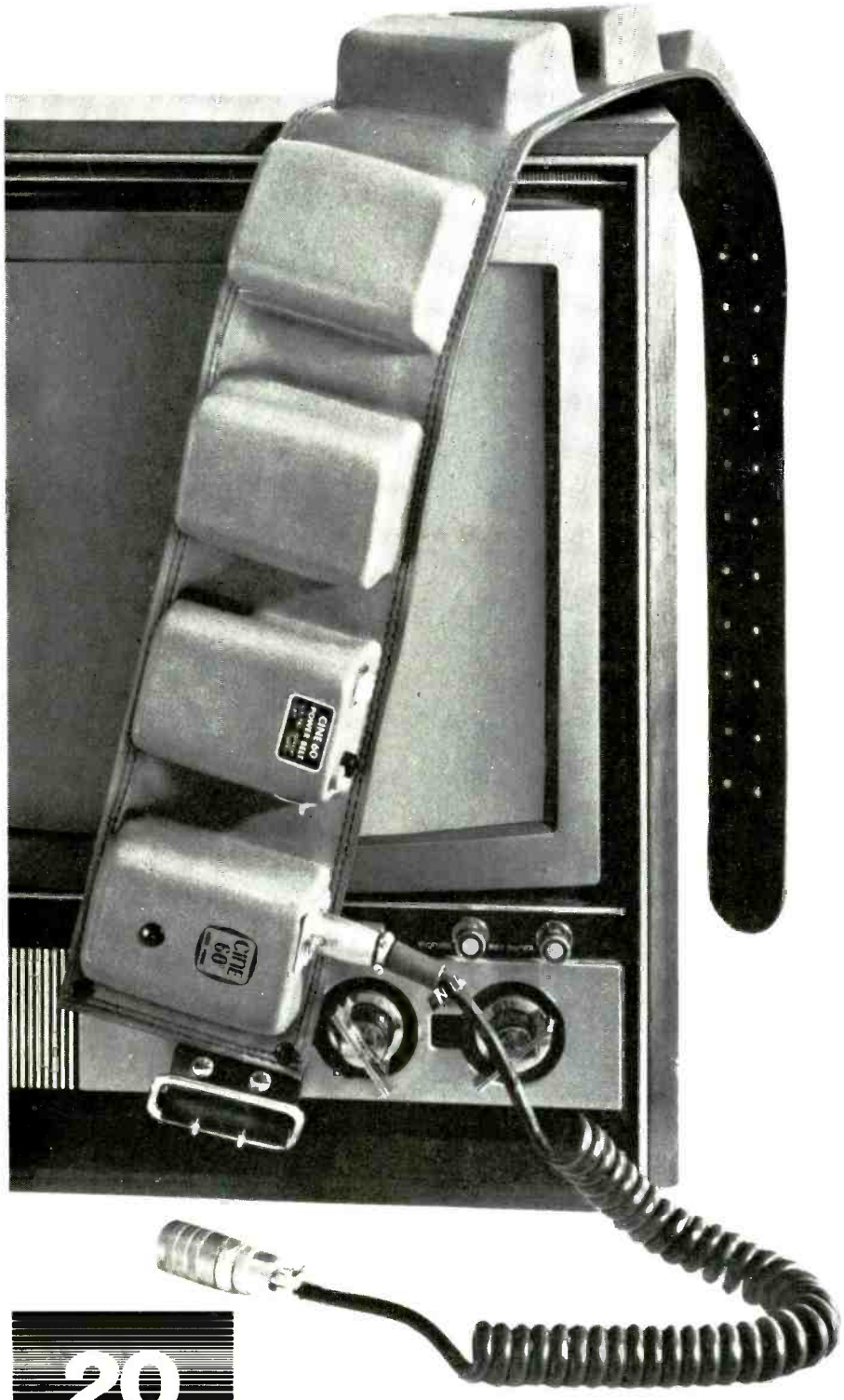

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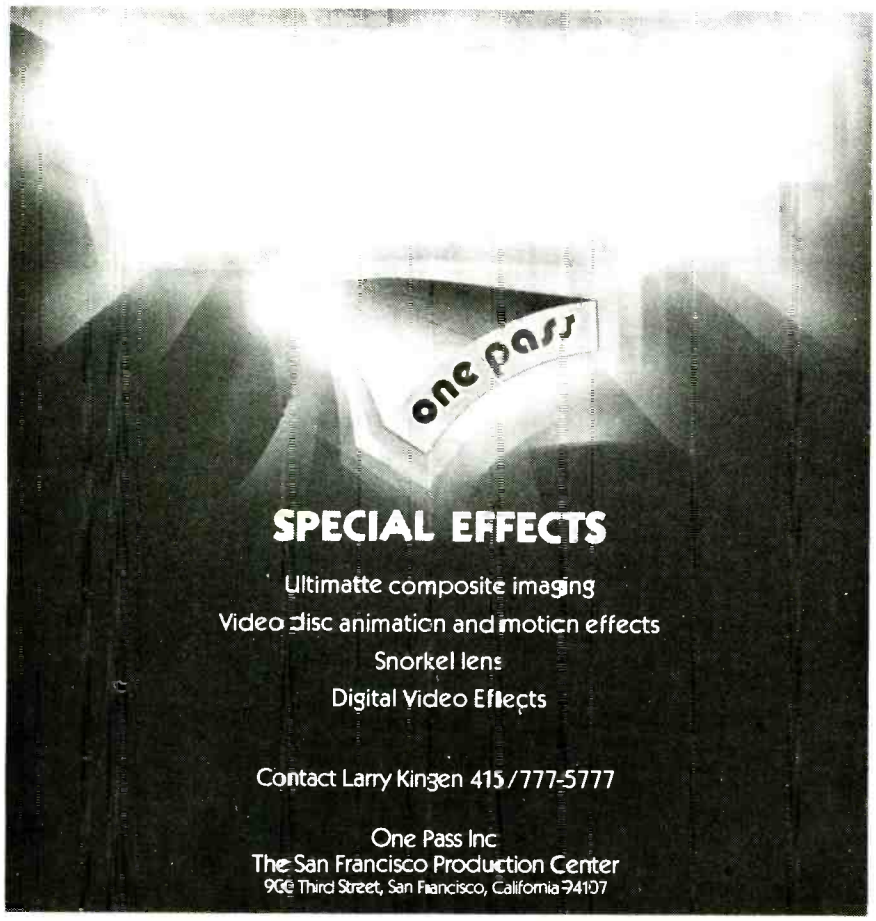

TV Programming

Degan. "We don't have budgets set up as far as this kind of coverage. We signed a contract with the State High School League to cover the tournament and that's what we did."

There are over 150 high school teams competing for the hockey championship. Only eight top hockey teams are chosen to compete in the tournament.

Commercials were sold on a sponsorship basis, using blocks of time during the live coverage, and were limited so as not to distract from the action of the games. The directors limit the number of commercials to avoid problems getting the proper times during station breaks.

Already a favorite feature during the game's half-time is a ride with the operator on the Zamboni machine, the machine which clears the ice. One of the few times the camera actually goes out on the ice, this poses some difficult maneuvering for the engineers since it means keeping the microwave from the ENG camera in line as the meandering machine takes the operator and Bob Leer, the interviewer, around the arena.

In addition to going all-out with its engineering coverage of the state high school tournament, KSTP also features some of the best-known hockey experts in the country on its on-air coverage. Herb Brooks, coach of Team America, the 1980 hockey team that won the Olympics this year, does commentary along with Bob Bruce. Another highlight is the play-by-play announcer, Al Shaver, on loan from the NHL's North Stars.

KSTP televised four of the tournament games on Thursday, March 13, two in the afternoon and two during prime time hours when they preempted their ABC-TV network programming. Two more games were televised Friday night, again in prime time, and on Saturday, three more games were aired, two in the afternoon and the championship game in prime time Saturday night.

KSTP will be covering the championships again next year. The crew is pretty satisfied that they can do the best job possible with the equipment and setups they have. Chief engineer Merrill says more wireless microphones would be helpful and perhaps an additional camera. Since the tournament, the production crew has handled a number of other live sports remotes including soccer games, golf opens, and some championship matches.

Strategy, advance planning, intercommunications, and technical know-how are the key elements which have made KSTP's live hockey coverage "the most comprehensive tournament in history." **BM/E**

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SALHANY

"Programmers have come into their own!"

Lucie Salhany, 1980 President of the National Association of Television Program Executives, is Vice President of Programming for Taft Broadcasting, with corporate headquarters in Cincinnati. She divides her time between Philadelphia and the Taft Broadcast Group in Cincinnati.

"The role of television is changing. It's becoming more informational. There's so much information available today, we can't absorb it all. We can't read enough or learn enough to keep up. So television has to help fulfill that role. Most people get their information from TV as their primary source. And that's going to increase.

"There's going to be fragmentation. We have got to respond and compete. We can't do that by buying reruns. We can go back to basics—the era of personalities, when Donahue and Douglas were local. We can go back to that era and start building new personalities in a little more sophisticated vein. Or we can go to informational programming, expand the news, a magazine format, programming that teaches in an entertaining fashion. I'd love to see a program that's segmented, with live elements, dealing with international events.

"Broadcasting must plan for the future now. At some point, home satellite receivers are going to affect us. Are the networks going to bypass the local stations and go right to the home? If that's the case, how are we going to program for ourselves? I've already done a program schedule for 1990!

"Even today demographics are changing. We see the 25 to 54 segment growing, 18 to 49 dropping back. The working woman is becoming very important. At some point, we could see the ten o'clock news on the affiliates, because people are going to bed earlier.

"Programmers have always been looked upon as people back in the control room, sitting in shirt sleeves, creating programming with no 'feel for the business.' That's no longer the case. Programmers are getting smarter. Now they are salespeople, marketers, buyers, and creative people. Programmers really have come into their own. And the smart companies are accepting that and are using them in all phases of broadcasting.

"Taft is in the family entertainment business and, of course, uses both film and tape. There is a need for film in some things that film does best, like news magazines, documentaries, and investigative reporting. Film gives us excellent sensitivity and flexibility.

"I started with an independent television station. I think there's no finer way of learning broadcasting. You become a generalist rather than a specialist. You're involved in the total station operation and an independent programs all day long, versus segmented time that an affiliate programs. If you want to get in the business, you should begin with an independent group or station."

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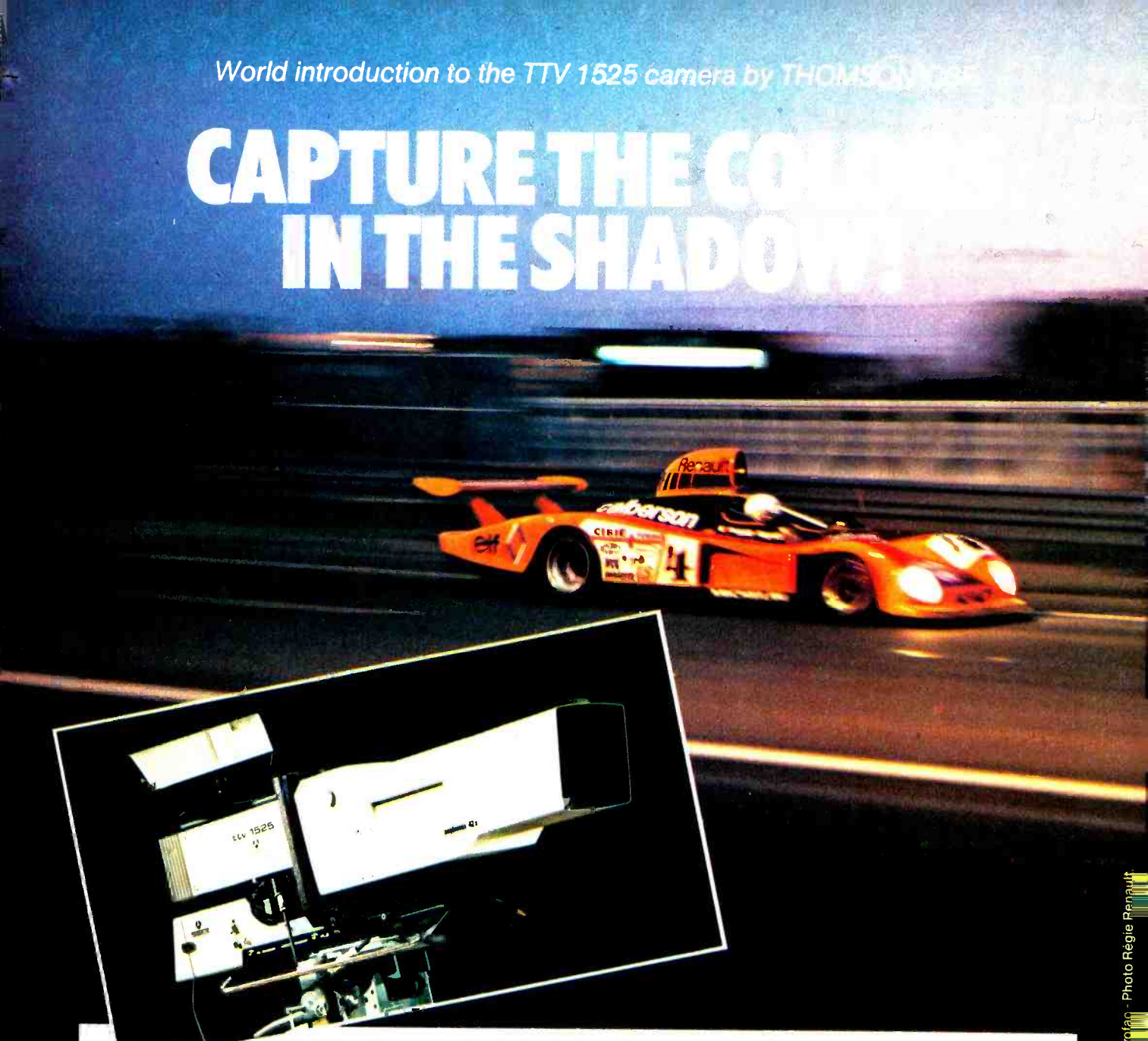

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COMMANDING THE AIRWAVES AT MADISON SQUARE GARDEN

By Bebe McClain

Live coverage of an event as large and varied as the Democratic Convention means hundreds of news people all trying to do their jobs at the same time, in different places. This requires an internal communications system that works. How the major networks did this is a study in strategy and technical skill.

ON SATURDAY MORNING, the day before the opening of the 1980 Democratic National Convention, over 600 news personnel (producers, directors, technicians, engineers, and editorial teams) gathered together for a last-minute briefing in the main sanctuary of St. John's Monastery, NBC's convention headquarters across from Madison Square Garden. This was the first and last time most would see each other face-to-face for the next five days. All knew they would be held together in constant contact by a massive, highly advanced, expertly designed. internal communications system.

Designing such a system was by far the most difficult task at the convention in terms of broadcast management. For more than a year, meetings had been held to work out problems regarding frequency assignments, site wiring diagrams, equipment, and decisions concerning just who had to be in contact with whom.

Frank Fleming, vice president of NBC engineering, said that frequencies had to be assigned from 161 MHz to 13 GHz. All these assignments were worked out by a committee of broadcasters, submitted to the FCC, and written up in a one-inch thick document supplied to everyone with RF equipment. NBC was assigned a specific number of frequencies concerning everything from wireless cameras to radio mics. That was just the beginning.

The transmitting and receiving systems for all three major networks (ABC, CBS, NBC) consisted of similar equipment, housed atop their respective anchor booths. The main reason for this was that the convention specified what amount and types of equipment could be used. Each network was allowed six wireless mics for TV, eight wireless mics for radio, and two RF cameras. In addition, six hard-wired studio cameras were allowed on the floor of the Garden. The networks differed, however, in the way those signals were routed once they were received atop the respective booths and before they were broadcast. Because the individual network setups differed so greatly, it is best to focus on one in depth, in this case that of NBC.

How the signals were sent to and from the Garden's main floor via RF systems atop the NBC anchor booth is outlined in Figure 1.

The 2 GHz microwave receive stations for the wireless hand-held RCA TK-76 cameras were placed above the anchor booth. Once the signals were received, they went to an area called the "ready room" where RF cameras were controlled. Commands were sent to the cameras from the ready room by transmitting data telemetry (iris control, color balance, etc.) from the transmitter atop the booth to a 950 MHz receiver on the camera assistant's backpack. The cameraman controlled only the focus and zoom. Also on the backpack was a 2 GHz transmitter connected to a Nurad Goldenrod antenna mounted on a pole which the assistant held in the air and pointed in the direction of the anchor booth.

Each camera had its own microwave frequency. No more than two hand-held cameras per network were allowed on the floor at any one time. Receiving antennas for the wireless mics used in the program audio were also housed on top of the anchor booth, along with an antenna for the mics assigned to NBC radio. All internal communication frequencies were in the 450 MHz low power continuous cuing range.

At the same time, CBS experimented with Ikegami HL-79 cameras, using antennas that retained memory automatically, referencing the signal electronically rather than mechanically, as in the case of hand-held antennas which have to be pointed to the transmitter/receiver. Both CBS roving cameras could be outfitted either way. During the convention these were often switched, depending upon which type functioned better in a particular situation.

As a proving ground for new microwave technology, the convention served to show what could and couldn't work. ENG cameras and new types of antennas were everywhere. Of particular interest was the QA-6 antenna being used by CBS and NBC ENG crews. These prototypes, developed by RF Technology, are updated versions of the QA-4 self-orienting antennas shown at NAB in Las Vegas. The QA-6 uses the same principle: electronic directional switching, but has six instead of four antennas housed under a radome 4½ inches in diameter on a 3½-inch stem. The change of design was due to prob-

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lems of proximity in the close quarters of the Garden.

The QA-6 configuration has worked well enough so that RF Technology will be putting the QA-6 in production by next month. The hexagonal array of the QA-6 served better than the cube-shaped QA-4 under real conditions. RF Technology's presence was felt by all three networks using various ENG gear supplied by the firm. A flux gate principle was used in a majority of the QA-6 antennas to provide orientation. A few units, however, used a gyroscopic system for orientation. The production models will probably keep the flux gate approach, since in operation operator activity seemed to work against the gyroscope.

CBS cameraman Dave Graham said the new wireless cameras worked well. "Some might disagree, but I believe they are better than the studio cameras. I really like them. We don't have to drag a cable behind us and we aren't limited to a drop. They work very well."

Unlike ABC, which sent everything by telco lines to a

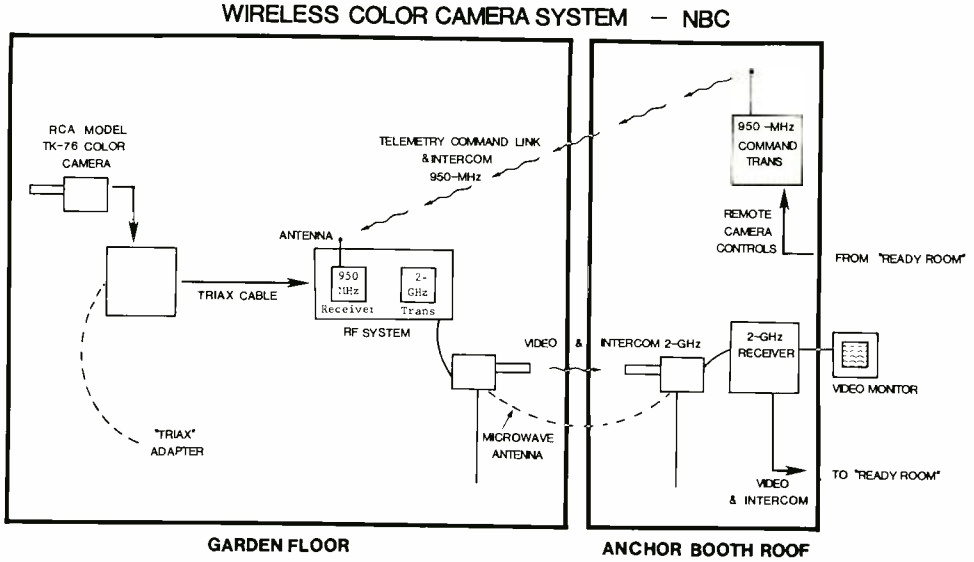
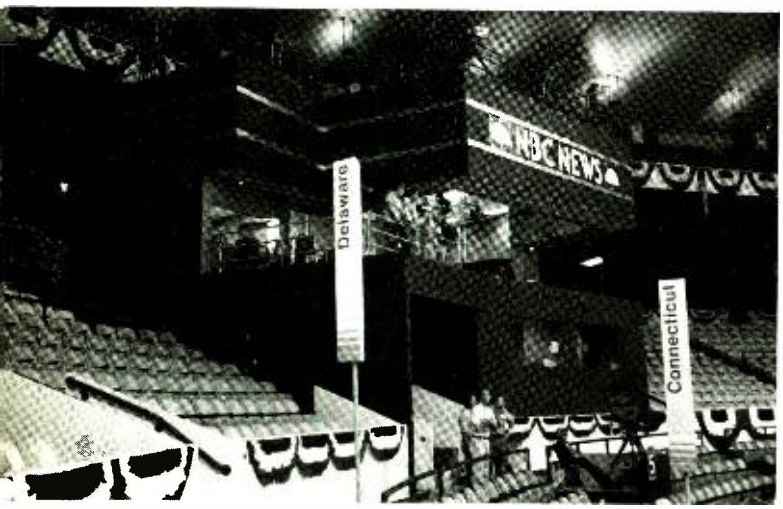
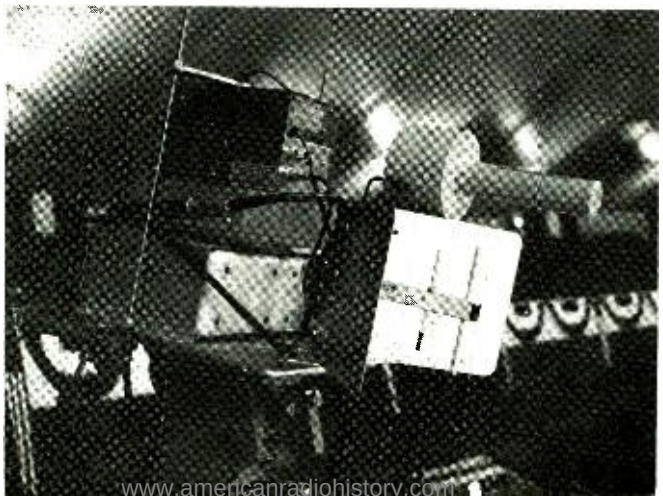


Fig. 1. The ENG camera, RF command, and microwave link are outlined, showing systems used between the Garden floor and roof of NBC's anchor booth



Anchor booth was designed with open-air deck. Note antenna equipment on roof (above)

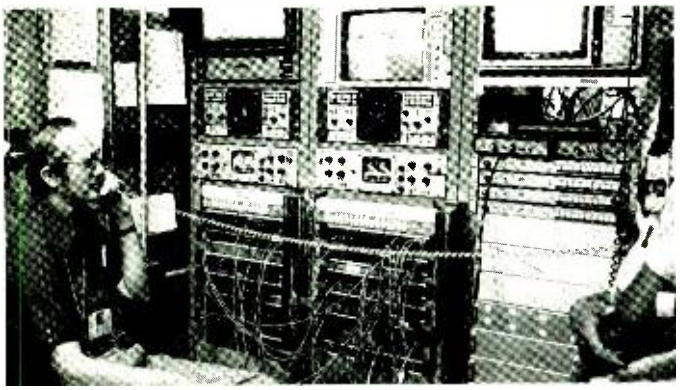
Camera crew (above) experimenting with a variety of transmitter/receiver equipment before convention begins



Antenna array on top of anchor booth (right) includes antenna designed by RF Technology

special control room at ABC Broadcast Center, or CBS, which sent all signals to a control room in an adjacent building, NBC located its control rooms in the rotunda area surrounding the convention floor. As one can imagine, these facilities accounted for a great deal of the communication system's complexity.

As Bob Wilson, director of the convention, explained, "There is much more work on internal communications than on the picture, since there are a great many more communication paths as opposed to picture paths. Designing the system is the biggest problem. Next comes expanding that system, then keeping it going. This last item is usually accomplished by putting it together correctly in the first place. Preventative maintenance is the best kind of maintenance. Debugging is very important. The main reason for the rehearsals is to check out the communications. We put everyone in position to test the whole communications system. We know the other equipment will work."



NBC transmission trailer. Engineer Bob Brink on communications system. Phone in his hand is one of many on the adjoining wall

Telephone arsenal keeps engineers in touch with virtually every part of the news gathering operation

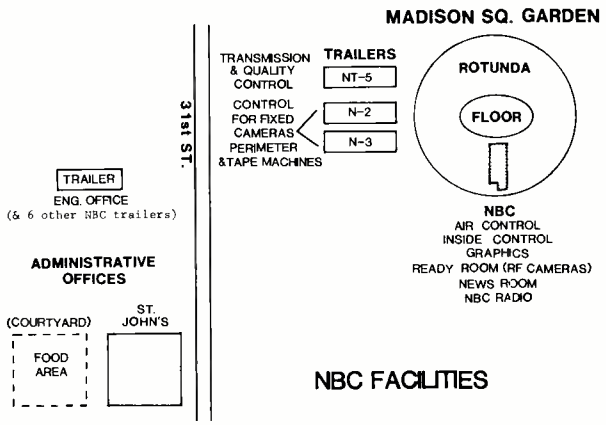


Fig. 2. NBC's remote facilities included trailers outside the rotunda for quality control and additional command offices across the street from Madison Square Garden

The NBC remote facilities included trailers in the vicinity of the rotunda area (see Figure 2). The rotunda area housed not only Air Control but also an area designated as Inside Control. This is where pool feeds, the fixed cameras, and the RF cameras were previewed and preselected before airing. Also located here was the graphics area, consisting of two Chyron IVs interfaced with four hard disc computer memory storage units and the ready room controlling RF cameras, a large newsroom, and NBC Radio.

In the perimeter area of the Garden, along the sidewalk, were a series of NBC trailers. Two of these housed camera control for the fixed floor cameras and the perimeter cameras. They also housed the one-inch tape machines. A separate transmission trailer was used for quality control of audio and video signals sent to Rockefeller Center.

Al Dodds, NBC senior staff engineer, explained the setup: "Strict quality control is exercised from here. The engineers in this area can pick up any one of over a dozen telephones mounted beside the test equipment and be in immediate contact with literally any part of the system, including other networks and the pool feed."

George Humphrey, the NBC engineer (Burbank, Calif.) who worked the area, said, "It is so important to get a hold of the right person to compare what he sees to what you see. To do this, the right people have to be at the right place. Everyone must cooperate. There are many long sessions to determine the configuration, the kind of ring the phone will have, who will be on the other end, what kind of light will accompany the ring. If there is no light and one phone on a wall with 20 phones rings, you have to feel each phone to see which one is vibrating. It takes a good deal of time to work out all these details."

Across the street from the Garden at 31 Street and Seventh Avenue is St. John's Monastery, where NBC set up administrative offices for news during the convention. Finding this facility and arranging to lease part of it was a stroke of genius. The church offices were temporarily turned over to NBC and the courtyard was a perfect place to gather during breaks and to serve meals. A trailer was set up in an adjacent parking area and served as an engineering office. The sanctuary was large enough to seat over 600 for the staff meetings.

With the physical setup outlined, the basic communications system can be explained more adequately. There were basically two groups, the production people and the technical people, that needed to be in contact among themselves and with each other in order to operate effectively. Since there were provisions enabling production personnel to contact technical personnel by switching to priority channels, the two systems working within each group should be looked at separately.

The engineering communications system is diagrammed in Figure 3. The technical support people, involved with the fixed cameras, perimeter cameras, and tape machines, were located in the perimeter vans. They had to be in contact with camerapersons and the technical director at Inside Control. In turn, the technical director

also had to be in contact with the Pool Feed (ABC supplied this service at the convention) and the RF cameras. The personnel in the ready room were in contact with the RF camerapersons. As explained, all pictures were monitored at Inside Control, where they were previewed and narrowed down before going to Air Control.

Inside Control was in constant contact with Air Control, where the final program to be aired was chosen. Both control centers also were in direct contact with the technical people at the remote pickups around New York and up in the anchor booth.

The technical director for NBC Inside Control, Heino Ripp, said he didn't let the pressure of live broadcasting upset him. "I stopped worrying about it 15 years ago. What's going to happen is going to happen. I like 'live' work. It's more stimulating. We all have to try harder so we do better work. The average person doesn't understand the difference in 'live' opposed to taping. The great thing about 'live' is that once it's over, it's over."

Ripp went on to explain that constant communication is the key element in live broadcasting. The quality control and transmission engineers were in contact with all parts of the operation. If anything looked wrong, they could immediately contact the responsible party and have it corrected before it was transmitted to Rockefeller Center. Although these technical people were strung far apart, they all maintained constant communications.

The communications system for the production end is presented in Figure 4. Again, there were additional link-ups and overrides, but the diagram outlines the basic flow.

The floor reporters spoke directly to the executive producer, located at Inside Control, who would select which stories would be used and in what order. The Inside Control personnel would then contact Floor Control, which in turn would decide which cameras were nearest the reporter and alert the assistant producer with him to hold up a card establishing their position. Then the camerapersons would train their cameras on the reporter. As the pictures appeared on the monitors, Inside Control would decide which pictures to go for. The cameramen listened to Floor Control in one ear and to Program Control in the other. Both the cameraperson and the assistant had radio. One could back up the other so that total communication would never be lost.

The executive producer would alert the senior executive producer in Air Control of the upcoming story. The senior executive producer then would tell the Air Control director what was coming up while Inside Control was

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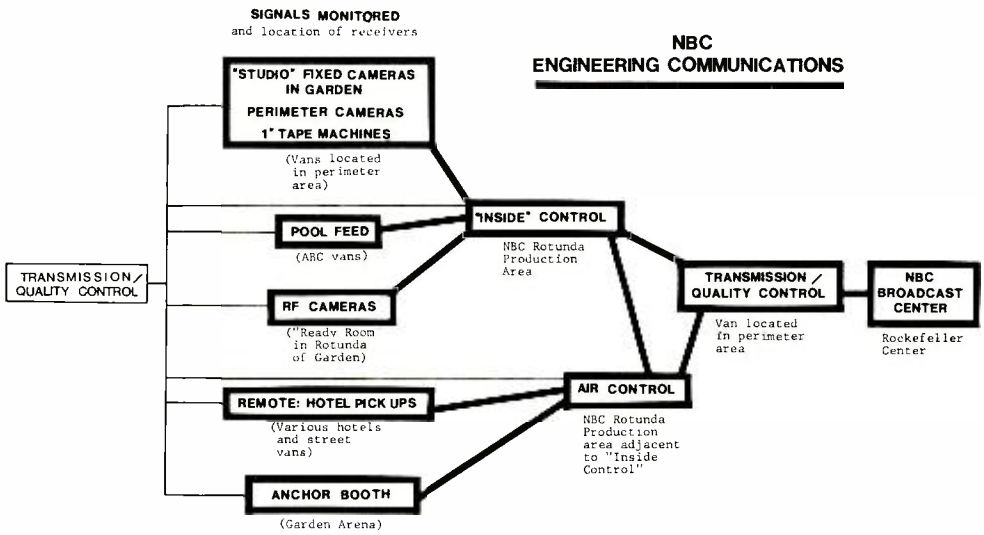


Fig. 3 (above). Internal communications among NBC's engineering staff included contact with remote facilities outside the Garden and with Rockefeller Center

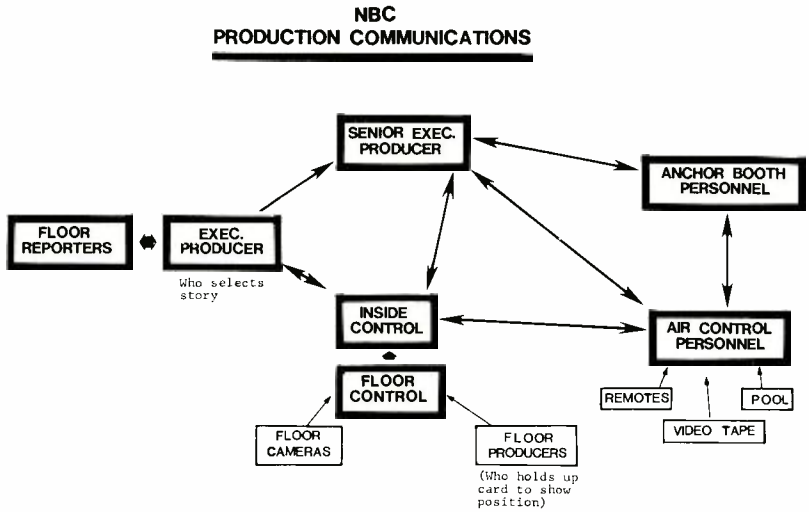


Fig. 4 (right). Production people were able to keep in touch with each other and keep the coverage rolling via a well-organized control plan

There's More Than "Two-Way" To Do A Convention: CBS

By Tom Lorenzen and Marc Wiskoff

RF communications have always tended to be an afterthought to broadcasters — and why not? The cost of two-way radio equipment will never parallel expenditures for studios, ENG vans, and editing facilities. The question, "How are we supposed to coordinate our crews and field production facilities?" always arises at the last and worst possible moment. Of course, this philosophy is changing, and communications between crew, field producers, and production facilities have jumped from a low priority to number three (see *BM/E's* Survey of Broadcast Industry Needs, February, 1980). Broadcasters are looking to RF communications to provide coordination between decision makers and their field personnel. Such was the requirement for the CBS News Division for its 1980 convention coverage.

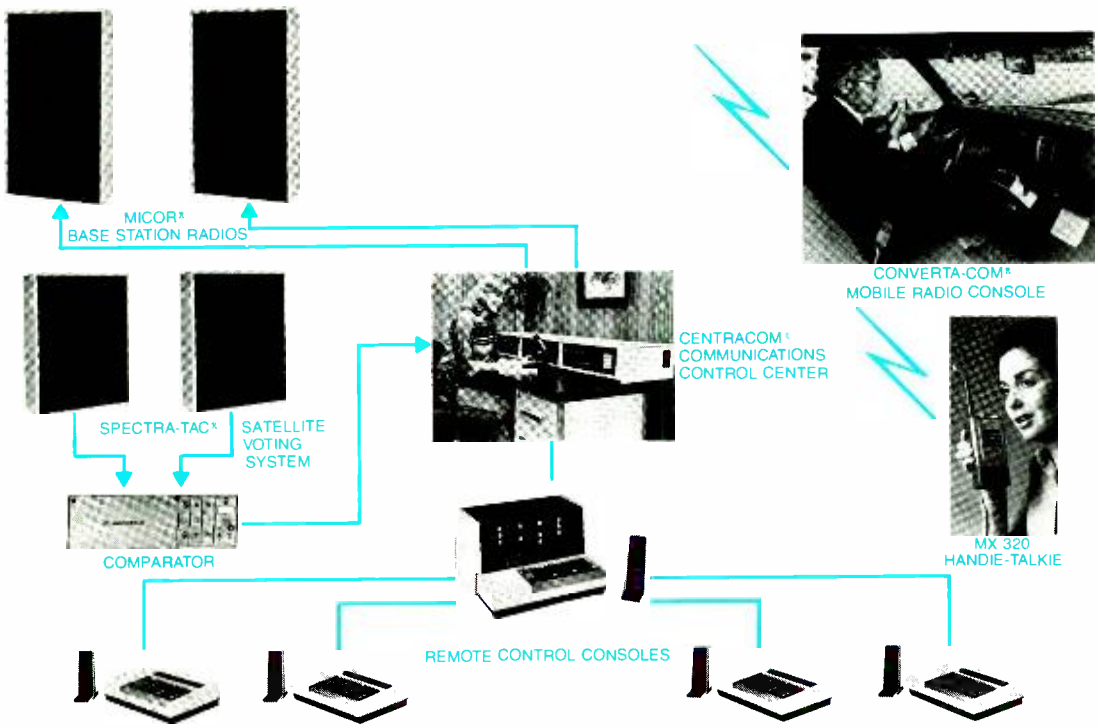
Basically, CBS News wanted a communications system that would provide total area coverage (diversity receivers), multiple frequency capability, multiple dispatch points, portable and mobile talkback capability, and central control of the entire system. Several meetings between CBS News and Motorola resulted in a more concrete concept that ultimately led to a system designed by CBS News and Motorola's communications group.

The system required multi-channel base stations with voting receivers, portable radios for both hand-held use and vehicular adaptation, multi-channel tone remote control consoles with simulcast capability, single-channel tone remote consoles slaved to the multi-channel units, and a central controller that could cross-patch channels, provide phone patch capability, indicate receiver voting channel selection, and provide supervisory control of the entire system. Its features were designed to achieve these objectives. For example, multiple channels were a must to provide the various field units with individual communications capability. Voting was required to insure that the audio with the best signal-to-noise ratio appeared at the output of the comparator. Portables in vehicles were connected to power amplifiers to increase talkback capability. To allow individual operators to gain access to individual frequencies or all frequencies simultaneously, multiple channel control was included. Single channel consoles could be dedicated to a specific frequency via the multi-channel unit. Cross patch provided additional flexibility to allow communication between two or more channels. Phone patch enabled the field to gain access to the PABX and the central controller provided priority supervision over the entire system. The central controller was located in the newsroom area.

Motorola designed the system in response to CBS News' requirements. Each Micor® base station has multiple channel capability (switched locally), is tone-controlled, includes a receiver that provides voting capability, and is equipped with full dc metering and intercom. Spectra-Tac® receivers provide multiple channel capability (switched locally) and intercom back to the control point. The MX300® Series hand-helds provide eight-channel capability and can also be utilized as a mobile unit via a Converta-Com console with accompanying power amplifier, internal speaker, and magnetic mount antenna. T1617® multi-channel remote consoles can control a single base or key all bases simultaneously. Selected and unselected channel audio allows the operator to monitor priority and non-priority communications. These consoles steer the single-channel T1604® consoles to designated frequencies. In addition, each five-channel console and single channel console can communicate with any other via the wire-line intercom network built into the system. The Centracom® control console oversees the entire system. It, too, can intercommunicate with each console; in addition, via the supervisory capability, it can take over the communications from all the other consoles with the touch of a button. The Centracom provides LED readouts for the voting system, indicates channel status (busy or clear), provides cross patching, patch transmit, phone patch, and selected simulcast like the five-channel console, and monitors selected (priority) or unselected (non-priority) channel audio.

For post-convention use, the entire system has been divided to provide subsystems for portable field communications. The systems will be used for CBS's worldwide news gathering operations.

Tom Lorenzen is with CBS Engineering and **Marc Wiskoff** is district sales manager with Motorola.



making the pictures available. Air Control was also in constant contact with the anchor booth production personnel, the videotape unit crew, and the Pool Feed people.

With such a complex system it is hard to imagine that there were few, if any, failures — especially considering that the networks were given only three weeks to install and debug their systems. Believe it or not, most of the problems that came up were human problems and not equipment malfunctions. As Bob Brink, the engineer in the NBC transmission area, put it, "The communications system continues to evolve right through air time. Unfortunately the people who have to use it can have trouble communicating their problem correctly. Sometimes it is difficult to convey exactly what you need. Technical people were brought in from all over the country for the convention. Many are not familiar with the local facilities and sometimes the lingo is different. We are completely dependent upon our internal communications system. If we can't talk among ourselves, we're dead."

NBC Unveils New Communications System

NBC picked the 1980 Democratic National Convention to unveil its newest communications system. Touted as completely wireless and wind-powered, the new system appears to consist of integrated units that emit distinct sonic signals.

NBC cameramen John Jewczyn and Don Mitchell explained the wireless system as follows:

Each cameraperson had a whistle; each whistle had its own unique sound. (Mitchell used a duck caller, another cameraperson had a goose honker, and Jewczyn had a bo's'n's pipe.)

Cameramen Mitchell and Jewczyn with whistles

The NBC crew members were easily recognized by the string of whistles strung around their necks. Each had his own whistle and the whistles of his comrades-in-arms. Not only could he identify himself and his location by blowing his own whistle, but he could also get the attention of a fellow cameraperson by selecting the whistle belonging to that cameraperson and blowing it until he was answered. The whistles could be heard above the din and roar of the convention floor.

Actually, the system works quite well and does not interfere with the other communications systems. No cross-talk!

Given all the high technology at their disposal, these ecology-minded, energy-conserving camerapersons have obviously decided to devise their own system of communication based on the age-old principle that a whistle gets attention and by using their greatest renewable natural energy source — wind. Could this be the ultimate in technology?

"Worries" Of Live Broadcasting

During the live broadcast there are worries and fears that something will go wrong. Here are a few expressed by news people at the convention.

"I worry about a system dying and not being able to take immediate action. I worry about a freak problem that I can't run down. It could happen again — anytime — and I never know when or if it will."
George Humphrey, NBC engineer

"I worry about the rain."
Bob Brink, NBC audio engineer

"I worry about the sync generator and I worry whether everyone is doing his job."
Bob Daniels, engineer-in-charge (conventions)

"I have no worries when I'm on live. It's fun."
Bruce Morton, CBS

"I worry about it all. If something goes wrong, I'm the one who catches hell — not him."
Morton's cameraman, CBS

"I worry about everything. I want to get it over with."
Charles Risner, NBC engineer

"I don't worry, I don't get ulcers. I give 'em."
Julius Barnathan, president, engineering and operations, ABC

"Spelling."
Julio Pizano, Chyron operator.

". . . someone bumping me while I'm shooting with the RF camera and losing transmission. I also worry about losing the subject, just having him go out of frame."
Robert Welsh, CBS cameraman

". . . the internal communications going out or wires getting crossed. I worry about suddenly losing everyone."
Tony Verdi, NBC news director

". . . being quick enough."
Julia Clegg, Chyron operator

"The key is not to worry about it. Be well prepared, do it, and have fun."
Garrich Utley, NBC

"I worry about some little IC. If one board decides to 'go south,' trying to find that one IC can be a long process since there are usually 100 ICs per board. By the time you find it, the show's over."
Charles Klein, NBC

"I worry about the Chyron systems going out. Electronic graphic information has become such a vital part of live coverage."
Al Dodds, NBC senior staff engineer

"I worry about my wife wanting to go out of town with me on a live remote job."
Anonymous

"I worry about every single little thing."
ABC technician

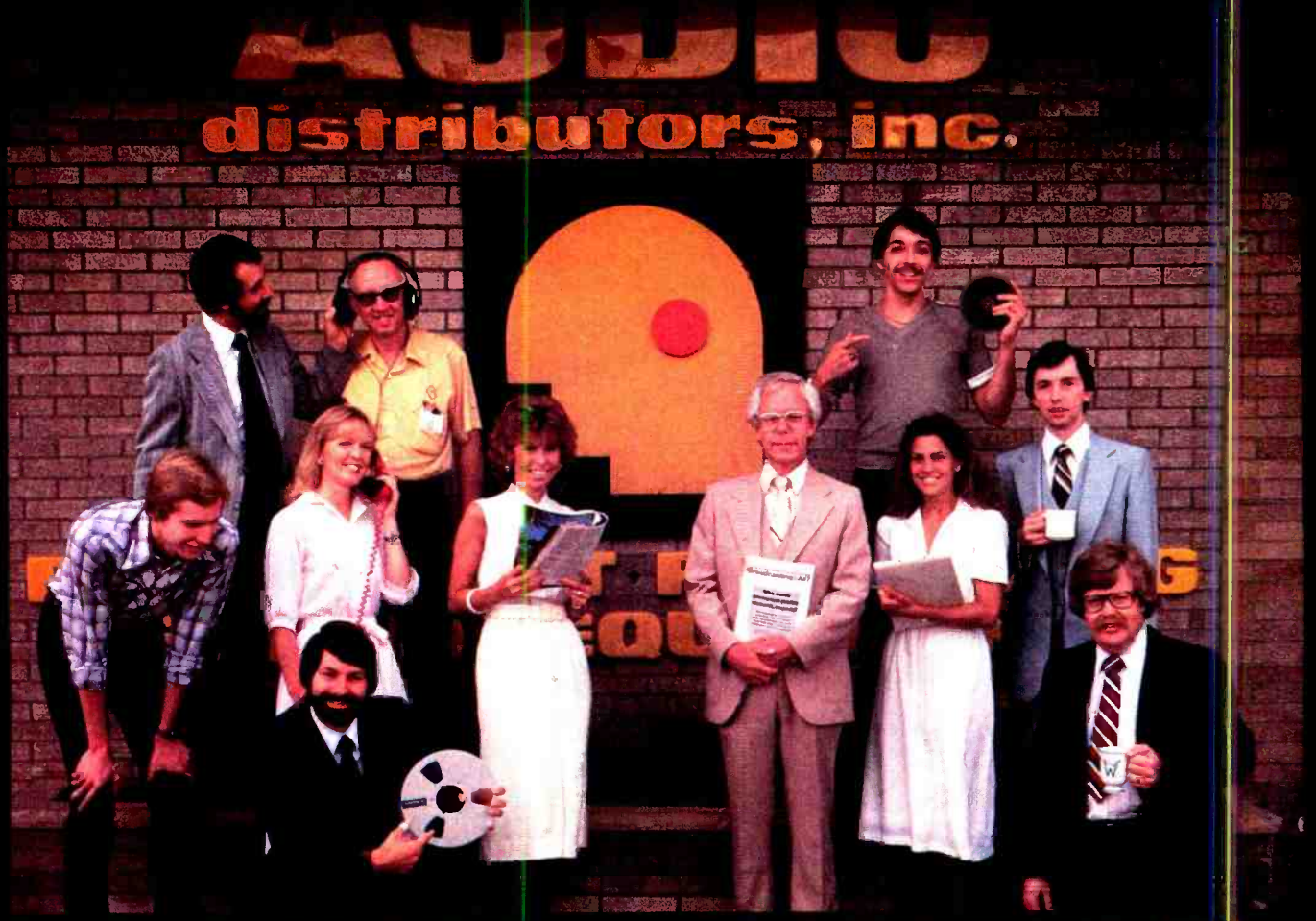
"I worry about worrying too much."
NBC engineer

Communicating effectively over the system is always a concern. Even a well-designed, well-installed system like NBC's is only effective if used correctly. Since so many people have access to the system, the fundamental rule, sometimes broken, is that of identifying oneself over the intercom lines.

A sign in the CBS control room summed up the importance of this. It read: "When God spoke to Moses He said 'I am the God of thy Fathers.' If God can identify Himself, so can you!" **BM/E**

AUDIO FILE

Meet the people from Audio Distributors



(Back row) Bob Hanrahan, Mel Bordulr, Scott Homolka (2nd row) Tom Green, Caroll Drudy, Phyllis Freeman, Dave Veldsma, Ellen Alkema, Jack Kruer (Kneeling) Dave Howland, Bob Wohlfeil

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SATELLITES AND ENG TEAM UP TO BRING "POLS" BACK HOME

In both Detroit and New York, more local stations than ever provided the folks back home with the "local angle" on national political events.

DESPITE THE SNIPING that many print journalists took at their electronic counterparts for what they considered to be "much ado about nothing," the 1980 political conventions gave the ENG people their first real opportunity to cover the activities of locally elected delegations. Some 360 radio and television news organizations went to Detroit and New York to cover the Republican and Democratic National Conventions and many more affiliated stations travelled to these cities under the umbrellas of their networks. While these numbers represent a significant growth over the 1976 convention figures (approximately 300 electronic news organizations accredited to the Republican convention), 1980 saw an entirely new approach. According to Mike Michaelson, superintendent of the Congressional House Radio and Television Correspondents' Gallery, "not only was this the largest number of credentials we've ever given out, but live TV (for other than the major networks) was a first for the gallery."

Coverage of the national political conventions has evolved from a combination of air-freighted film or tape, telco voice-over, and network feeds to a point where local stations are able to cover the action live via satellite. While most broadcasters from the television side of the aisle continued to use combinations of the former methods with the addition of piggy-backing reports live via the network system, KTRK and WFAA signalled the beginning of an era that can extend local coverage to the four corners of the earth.

KTRK/WFAA: signs of things to come

KTRK, Houston, and WFAA, Dallas, both ABC affiliates, have a long history of cooperation in the coverage of major events. In New York, 1980, this cooperation reached new heights as the two stations teamed up to present their local audiences with live coverage of the Democratic National Convention. Proving that technology is the great equalizer, both stations were able to give their markets exclusive live coverage of the convention action while greatly reducing the cost of such extravagance through the use of a Thomson-CSF Vidiplex® unit.

The Vidiplex unit is capable of multiplexing two video signals on a single channel. (First mention of this technology was presented in the February 1978 issue of *BM/E* when the unit was still in development at CBS and known then as STRAP.)

Among those organizations going live were RKO Radio Network, Storer Broadcasting, Post-Newsweek Stations (see story elsewhere in this issue), Gannett Broadcasting, King Broadcasting, WTNJ, Milwaukee, WCCO, Minneapolis, Cox Broadcasting, Cable News Network, ITNA, and Bonneville Broadcasting. Capitol Broadcast News and some other organizations were able to go live occasionally from Madison Square Garden by tagging along on established facilities. CBN, for instance, was an occasional client for KTRK and WFAA, who were live via their own satellite link. Both in Detroit and New York, local affiliated and O&O stations were able to anchor their newscasts from the "sky booths."

The two Texas television stations differed in their coverage from their fellow broadcasters largely by degree. Many network affiliates, and certainly the network O&O stations, tagged along with their parent network. The networks furnished space, often credentials, and communications channels for the individual stations to file reports of the convention.

For the first time, both political parties reserved areas on or near the convention floor for television crews to do live or recorded standups. In Detroit, an area above and behind the podium was allocated and at Madison Square

Satellites And ENG Team Up

Garden, a seating section located above and behind the main camera platform was used. According to Michaelson, "you could watch stations lining up to do two-minutes, one after the other." While most stations were hardwired due to frequency allocations, one station, WCCO, Minneapolis, was able to go "live" from the floor using a Tayburn microwave system obtained specifically for their convention coverage.

KTRK and WFAA, however, were among the few stations to set up routine "live" coverage as part of their 6 and 10 p.m. broadcasts. KTRK frequently cut into ABC's network coverage during prime time to do live reports on the Texas delegations, and both stations fed tape at various times.

In preparation for the convention coverage from New York, WFAA brought 12 people and 1185 pounds of equipment; KTRK brought seven people and 1270 pounds of equipment. The equipment complement included four Ikegami cameras, a Sony BVE and Convergence editing system, a variety of U-type recorders and editors, Shure mixers, microphones, and Panasonic WJ series switching equipment.

KTRK remote supervisor Steve Alhart and WFAA ENG supervisor Johnny Stigler arrived in New York about a week before the convention and began setting up the operation. Space was provided in the rotunda perimeter area for the stations and other news organizations covering the convention.

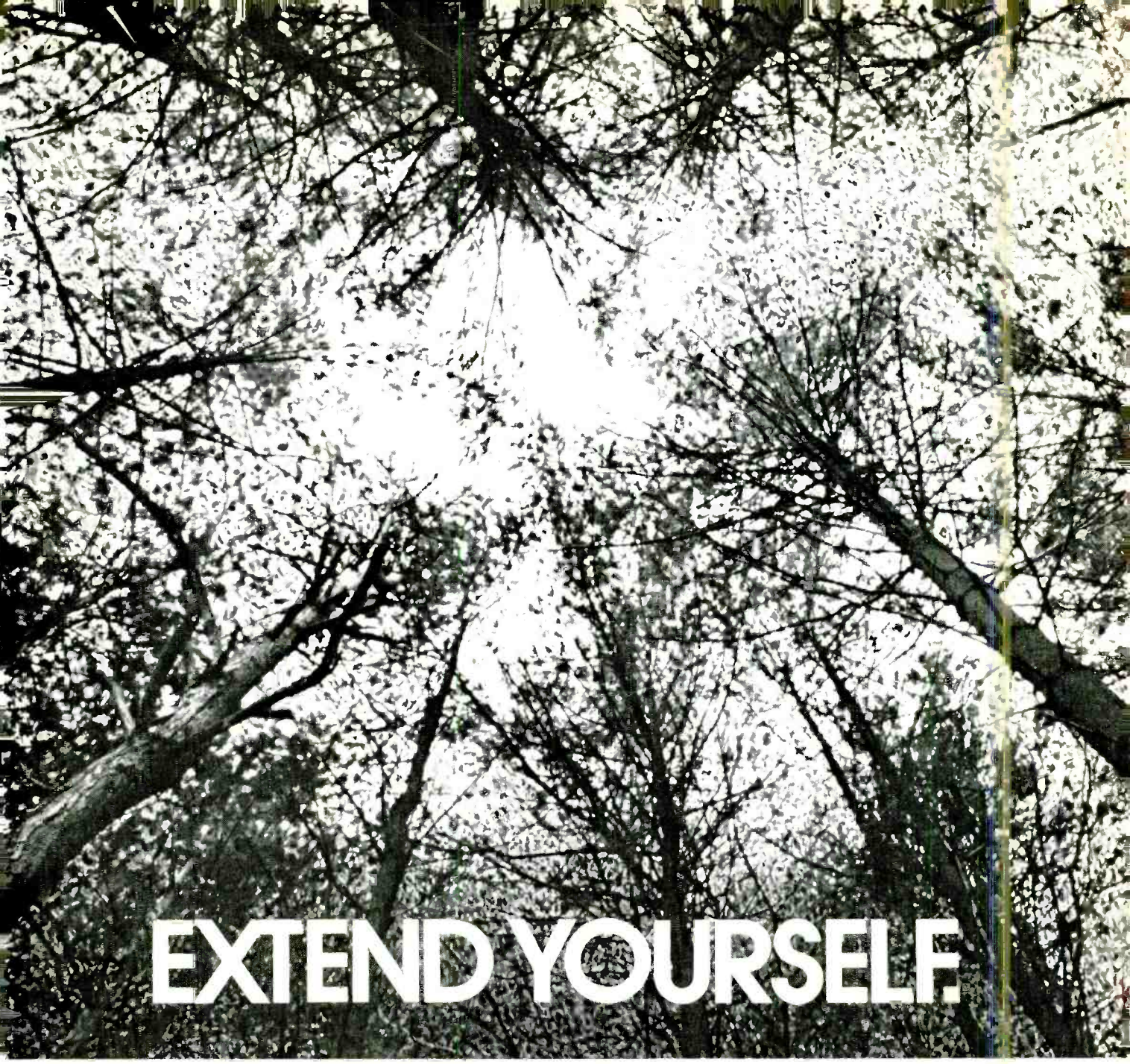
Initial set-up included laying cable, setting up the gear, and testing and checking out lines. The core of the technical plan involved the use of the Thomson-CSF Vidiplex unit, which the company lent to the stations for use at the convention. The idea was that considerable money could be saved and greater efficiency introduced to the communications system if the two stations could multiplex their video signal going home. The toughest assignment the technical crew had was to assure that all video elements for both stations were within 500 ns of perfect sync in order to utilize the Vidiplex unit successfully. Stigler and Alhart were happy to report that they managed to get to within 100 ns of perfect sync.

Both stations used multiple cameras for their coverage, often switching from the seating area, from where they reported, to the control point, where they also did live interviews. Video for the two stations was therefore switched prior to entering the Vidiplex unit. The switcher outputs were then multiplexed, field by field. Two audio channels were available in the satellite hookup so each station used one for its program audio.

The interleaved video was transmitted by telco to the Westar uplink at the Gulf & Western building in New York, several blocks north of Madison Square Garden. There, it was linked to the Westar bird, then downlinked to Dallas and fed to a CPI (a division of Western Union) TOC. CPI lines then carried the Vidiplexed signal to both Dallas and Houston, where Vidiplex decoders recovered the individualized video for use on-air.

Program audio and intercom from KTRK and WFAA back to New York were provided. WFAA used a simple dial-up telco for this purpose and KTRK used a dedicated pair.

Both WFAA and KTRK covered the Detroit convention but did not require Vidiplexing since they only fed tape. But in New York, where facilities were more re-



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Circle 124 on Reader Service Card

Satellites And ENG Team Up

KTRK's Alhart (left) and WFAA's Stigler sit at their control center in Madison Square Garden. The Vidiplex unit is revealed under the table

One of two editing systems used to prepare taped stories fed to home stations

Monitor display shows KTRK/WFAA satellite link

stricted due to the greater demand caused by the convention and the already heavy crush of traffic, the two stations wanted to be live.

KTRK personnel had seen the Vidiplex unit at the 1979 NAB in Dallas and had imagined circumstances in which the ability to simultaneously transmit two video signals over a single video-grade communications channel would be useful. There were, however, no urgent circumstances requiring that capacity until the spectre of the convention arose. A call to Thomson resulted in a quick agreement to lend the encoder and two decoders to the stations.

Thomson was, of course, anxious to cooperate with the effort since a field trial would go a long way toward showing the utility of the device. Since the introduction of the technology under the CBS mantle of STRAP, the Vidiplex has seen relatively little action. CBS has used it for multiplexing signals between its Washington and New York bureaus. Several experiments have been conducted involving the use of the device for carrying video signals to areas under-served by existing communications systems, and most notably Alaska, where a unit is used for multiplexing video signals from the lower 48 states, fitting nicely into the available communications channels on Alascom. Nevertheless, the marketplace was slow to recognize the generally applicable role which such a system could play.

The Vidiplex system time-multiplexes two synchronous video signals. The encoder section is actually a vertical interval switcher which switches between the two inputs at field rate. The result is a mixed field picture with field 1 coming from the first source and field 2 coming from the second source. Since the mixed field picture is identical to standard video and conforms entirely to RS-170 standards, all subsequent equipment in the transmission chain sees the signal as normal, though a viewer would see a picture that appears to be partly one thing and partly another.

The most complicated portion of the Vidiplex system, as well as the most costly, is the decoder. The decoder digitizes the mixed field signals and separates them, routing all the fields from source 1 to tape (or to air) and all the fields from source 2 to another recorder or air destination after D to A conversion. Of course, the resulting picture is not full frame, but of field resolution. To compensate for this, a comb filter/chroma inverter in the delay path interpolates the received information in order to average the "missing data" and fill in the gaps.

According to Stigler and Alhart, Dallas and Houston reported very acceptable video, "tending toward a 'film' look." To the educated eye the only noticeable problem was a slight smearing of background motion. All concerned, however, expressed confidence that the slight background smearing was unnoticeable to home viewers. Of course, when the background was motionless, there was no problem at all.

Dave Glodt, KTRK executive producer for the convention coverage, was deeply impressed by the Vidiplex device. Since WFAA and KTRK frequently find themselves cooperating in the coverage of Texas news when one of the stations is closer to the action, Glodt can see using the Vidiplex over microwave links so that both stations can go live simultaneously rather than having to get in line. Moreover, Glodt said, "I don't see why I wouldn't be able to do a quickie two-camera shoot by multiplexing the output of two cameras on location and microwaving it back to the studio where it can be switched after decoding." There are also times, he said, when the desire is to send tape at the same time as a live transmission. This, too, could be easily accomplished.

In a sense, the KTRK/WFAA experience at the Democratic National Convention was atypical, but the "can-do" attitude of their management and staff, like the attitude of the others who were there, drove stations to take even greater advantage of ENG and satellite technology in order to bring the news back alive. **BM/E**

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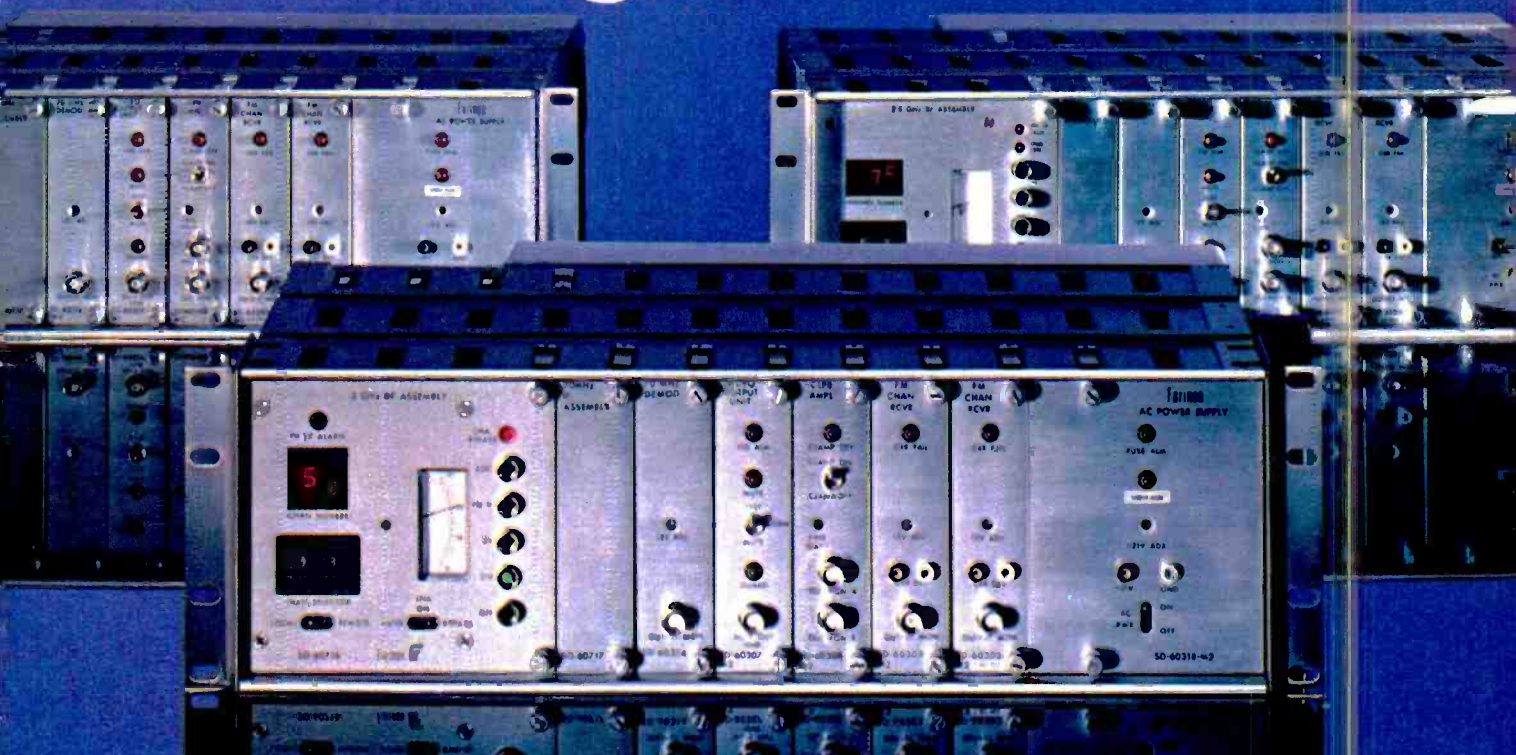

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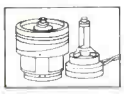
The precision of direct drive.



Check out the excellent stability and precision of the AU-700's direct-drive video head cylinder and capstan servo motor. The superb performance and durability of our crystal-oriented HPF™ heads. All combine to produce an outstanding picture with horizontal resolution of 260 lines color, 330 lines monochrome and S/N ratio of 46 dB color, 50 dB monochrome. You'll also get an edit with less video noise because video head switching has been moved to the vertical interval so it never shows up in the picture. At the same time, we incorporated DUB IN and DUB OUT connectors with separate Y/C signals and a flying erase head. And to keep that good-looking picture looking good, all circuitry is mounted in a durable annealed aluminum die-cast chassis.

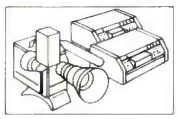
The speed of microprocessors.

Another touch of ingenuity is the AU-700's microprocessor controls. Designed to work perfectly with the AU-A70 editing controller, they give you the speed, accuracy and versatility of full-logic, mode-to-mode switching. The AU-700 will accept SMPTE time code on a separate track or on audio track one as well as standard CTL pulses. And its electronic

Shown from left AU-700 editing recorder, AU-A70 programmable editing controller.

digital tape counter displays LED readouts of CTL pulses in minutes and seconds—even in fast forward and rewind.

Multiple source versatility.



With our AU-A70 editing controller not only can you generate and read time code pulses, microprocessors let it perform up to 20 time code edits automatically. Add an AU-J10 multiple source adapter and it will accept inputs from two source decks and one live line plus perform A/B rolls. Microprocessors also let you automatically go to specific tape locations. You can also search both ways at speeds of 1/20X, 1/5X, 1X, 2X, 5X plus pause with picture. Other features include program check, program exchange, insert programming and overflow indication. For editing convenience, separate address time and lap time indicators are included. The AU-A70's error codes pinpoint any procedural errors to avoid incorrectly programmed edits. The AU-A70 can also be used with any Panasonic solenoid-operated ¾" and ½" VHS™ decks. For worldwide versatility, there is a built-in voltage selector that is compatible with 100V / 120V / 220V / 240V AC, at either 60 Hz or 50 Hz.

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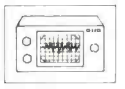

When it comes to servicing and maintaining the 700 B-2 Series, Panasonic backs you with a full network of B-2 dealers, equipped with total service capability. Each has the parts, test equipment and technical expertise professional applications require. For further information, call your regional Panasonic office: Midwest—(312) 364-7936; Northeast—(201) 348-7620; Southeast—(404) 923-9700; Southwest—(214) 356-1388. The new 700 B-2 Series Time Code Editing System. Only from Panasonic

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TOMORROW'S ELECTRONIC JOURNALISM: INFORMATION AT ABC'S CONVENTION SITE

By John E. Congedo

EJ/ENG is taking on a whole new scope to include the gathering of data, the writing of stories, and the management of personnel. While cameras, lights, and microphones are gathering sights and sounds, computers are gathering ideas and information.

WHILE CARTER AND REAGAN marshalled their forces in the quest of their parties' nominations, the networks marshalled theirs in search of increased audience shares for the conventions and future news events. In the behind-the-scenes struggle for the public's attention the race goes not only to the fleet but also to the best informed. To be best informed, the networks had gathered vast quantities of historical information regarding the campaigns, candidates, and issues. Equally important as gathering this information was being able to deliver it when and where it was needed.

To achieve these goals, ABC News asked me to help develop a sophisticated electronic editorial system that would make vast amounts of information available virtually instantaneously to the army of reporters working the conventions. Not an easy task! Six weeks from the opening of the Republican convention, for example, a key part of the system — the data communications network — wasn't functioning right.

For the data processing expert, the data communications portion of a computer-based information system becomes more important by the month as more organizations go to distributed data processing (DDP). Putting computer power out into the field and into the hands of the user has been made possible by the rapid decline in costs of data processing equipment. For example, it cost $1.26 to do 100,000 calculations on a computer 20 years ago, while now it costs well under a penny. Broadcasting has been quick to seize the opportunity provided by the rapid developments of the DP industry.

Distributed data processing has shifted the spotlight from the central processing unit (CPU) to the data communications network, the part of the system that ties all the parts together. Since DDP is so new, however, the whole of a network is often less than the sum of its parts. Integrating terminals, modems, multiplexers, and related equipment into a smooth-functioning, reliable team is painstaking business. The problems we faced in setting up our dispersed system were not all that unusual. Unfortunately, we did not have the luxury of lots of time, so the problems were magnified — after all, we couldn't ask the Republicans to delay their convention while we perfected our system.

As anyone in my position knows, the ideal DP system would have terminals compatible with the central computer. In the real world, however, terminals are bought at different times for different purposes and, in a temporary system like the one at the convention, they don't all fit into a nice, neat system.

The terminals we found ourselves having to work with included CRTs manufactured by Beehive International, Teleram's bureau model, and Telcom Industries' portable model. To cut costs, we wanted to tie these terminals — up to 70 in number — to our computer 800 miles away in New Jersey via statistical multiplexers. Statistical multiplexers combine data from a number of terminals and send them through a greatly reduced number of phone lines. The cost savings obviously can be substantial. In addition, the multiplexers handle every bit of data coming through the system and can be used in network management and control functions.

Out of chaos comes order

Our quandary developed when it became obvious that the statistical multiplexers we had chosen could not marry all the terminals to the system. In addition, they did not have the sophisticated management features we needed for a system where we just weren't going to get a second chance.

The manufacturer tried to rectify the problem, but given the capabilities of his "stat mux" (statistical multiplexer), it became apparent he couldn't give us what we needed. With precious little time remaining, I cast about for a replacement. Believe it or not, I leafed through an electronics directory and called a multiplex company I dis-

John Congedo (left), data processing manager, ABC News, and Jeff Miller, assistant manager, operations, program part of ABC's electronic editorial system from the front panel of Series II Microplexer prior to the opening of the Democratic Convention

John Congedo is data processing manager for ABC News.

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covered in New Jersey. I called them because they were close by and I thought I could beat on them easily if I had to. No need, as it turned out.

Timeplex, Inc., of Rochelle Park, N.J., less than a year ago had introduced a very sophisticated statistical multiplexer that was exactly what we needed. This multiplexer not only could handle the different terminals with ease, but had more management and control features than I thought possible. We eventually installed 11 Timeplex Series II Microplexers: six at the convention site, four in New Jersey, and one in New York. We also had two spares for backup.

The result was we needed only six high-speed phone lines to move mountains of data between all our sites. Even more important, convention coverage was greatly enhanced and our audience share was excellent.

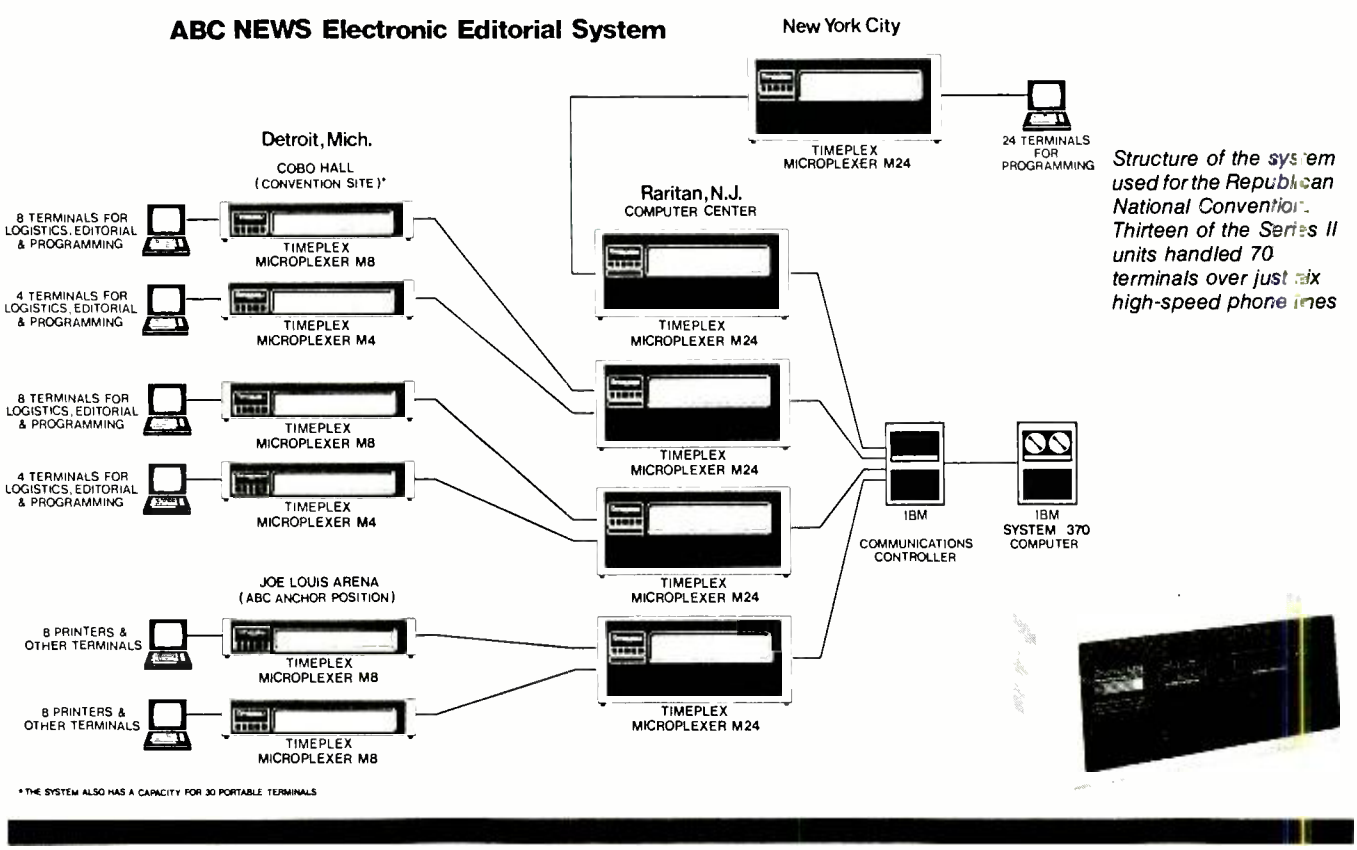
The new system gave anchormen Frank Reynolds and Ted Koppel instant answers on a video display unit in front of them to questions obvious and arcane. "Who is that delegate who switched to Kennedy?" We had the answer, however obscure the delegate was. The data bank ABC had been building since the New Hampshire primary contains biographical data on thousands of greater or lesser politicians, along with numbers and voting patterns for all of the primaries, the year's accumulation of political news, and a catalogue of available videotapes. Viewers did not see Reynolds or Koppel typing out requests on a computer terminal; that was done by the director elsewhere. The anchormen's desks have room only for the video display.

The data communications network linked the convention floor, the anchor positions, reporters running around town with portable terminals hooked up to available telephones, the New York Assignment desks, New York, Washington, London, and Chicago news desks, and the computer center in New Jersey. The system had three basic assignments:

- *Editorial research material*: Giving needed facts both to the on-the-air anchormen and to other reporters putting together stories. For the latter, the stories were written and edited on the terminals and transmitted to the news desks. The portable text editing terminals were generally connected to a hotel phone for transmission, with a regular TV set used for video display.
- *Communications*: The movement of scripts, assignments, instructions, messages to where needed.
- *Logistics:* Which of the 900 ABC employees was where, had a rented car, was on what assignment at the moment, and so on.

The key to this was the multiplexer. In a multiplexer, individual frames of data (complete units, consisting of the bits, or electronic impulses, which go to make up a character and include instructions and error detection bits) from different channels are interspersed with each other on a single phone line.

Statistical multiplexing refines this further. The Series II Microplexer is really a microprocessor that is programmable. Unlike the older time division multiplexers, statistical multiplexers, or stat muxes, as the professionals call them, ignore channels that are not sending data at any particular instant, thus increasing line capacity still further. Buffers — small memory units — hold data until there is room for it. In addition, the Timeplex stat mux has the unique capability of monitoring the entire system from a supervisory port that functions as a "window" into the network. One operator can monitor the system while it is running and reprogram as necessary without interfering



Structure of the system used for the Republican National Convention. Thirteen of the Series II units handled 70 terminals over just six high-speed phone lines

with the operation, all from a single central location. In an application as crucial as broadcasting, where seconds are worth lots of money, that's critical. Each model of the Series II also has upward capabilities so that as the network changes we can easily upgrade. In all, the Series II can handle up to 24 channels.

ABC time-shared on IBM computers (IBM System/370, models 155, 158, and 168) in Raritan, N.J., owned by Johnson & Johnson, the bandage makers; our own data center in Hackensack, N.J., is used mainly for corporate accounting and is not up on the 24-hour basis the election coverage requires. The IBM computer is desirable for its almost billion-character in-core storage capability and its speed. It get things to us fast.

But the IBM 3705 communications controller will, on time sharing, only accept a dedicated private line for a dial-up. The Timeplex multiplexer turned out to be the only one that could fool the system into giving us a clock at the master location, the computer, while the terminal clocks the multiplexer at the other location. Clocks are required on both ends of the line to synchronize the multiplexing of the input and the demultiplexing of the output; frames of data from different channels are interspersed on the line on a time basis, so they must be sorted out at the other end on the same time basis.

In setting up a complex data handling system for a short but critical operating life, a natural worry is that it will malfunction just when it is needed most. Lines may turn out not to be as good as had been hoped, configurations programmed into the system may turn out not to be what was wanted. It is extremely difficult to get a feel for traffic patterns ahead of actual usage. Guesses as to what traffic will be on a given channel could be way under, leading to filled buffers and spilt, perhaps even lost, data; while on the next channel the guess could be way over, wasting transmission capacity that should have been made available.

To avoid this, we closely monitored the supervisory port. The amazing supervisory port monitored such factors as the condition of the lines and hardware, the current programming for each mux channel (which channels have higher priority, interface arrangements, clocking, data speed, etc.), and how close each channel was to capacity. When necessary, I reprogrammed from the front panel of the microplexer — a simple task.

The system was first used by ABC News in the California primary in June. Hours before the coverage was to begin, the California data system operator discovered that 10 of the 12 channels had been set at the wrong speed and came close to panic. But I was able to change the speeds on the California multiplexer from our supervisory port on the New York machine. "John," California typed back, using the supervisory port's communications mode, "it's almost like a miracle. Those boards are coming up one at a time and I haven't done anything!" I even impressed myself: I'd first seen the Timeplex user's manual 10 minutes before.

In previous conventions, background material was on cards, pulled out of file boxes by behind-the-scenes help. Movement of scripts has generally been by fax, with late-breaking stories often hand-written. ABC-TV was the first broadcasting company in the U.S. to use a computer display directly on the air, during the 1972 elections.

ABC anchors Ted Koppel (left) and Frank Reynolds were able to deliver vast quantities of background information as part of their coverage

It avoided the use of a digital display — the peculiar lettering style which is associated with computers — because it didn't want the public to know this was what it was doing. The aim there was to save the cost of building electromechanical boards for displaying election results in the studio, a task which tied up the biggest New York studio for two months, and consumed considerable expensive labor.

In 1976 and 1978, some ABC correspondents had portable terminals through which all of the election results were available. Many of the reporters had unexpected luck getting top interviews: the politicians wanted to get a look at their screens.

Yet to come

The flexibility and centralized system control available in these new-generation multiplexers will make feasible the next step: the world news network. As I visualize it, correspondents would have portable text editors instead of typewriters. Ideally, they would have triple screens: two TV sets plus the five-to-seven-inch display that comes with the portable terminal. On two screens, they would scroll through relevant AP and UPI stories (which have been fed directly into the data bank) and other research and background material provided by the central computer in New Jersey. On the third screen they would write and edit their stories and deliver them to the news desks in London, Chicago, and Washington (the three anchor positions) and New York. Assignments and other communications would be sent the same way.

ABC's radio news network, which broadcasts news 13 minutes out of every 15, for 24 hours a day, has an even greater need for such an electronic data system. Much of their news comes from stringers who are paid by the word or minute. Aside from editing and moving the stories themselves, the data system will tell editors more about the stringers themselves: how reliable they are, what kind of contracts they are under (a marginal story may be less worth using if it is going to be costly), and so on. On a fast-breaking story there might not be time to check this out manually.

At ABC we are now working on writing a generalized program for this news network. We are aiming at distributed data processing: we want to keep as much of the work to be done as possible within the individual terminals rather than in the central computer.

ABC News does not have a timetable at present for going ahead with the electronic news network. But I think we have the hardware we need, and the two conventions and November election will prove it out operationally. Thus, it may well be that whatever news the next U.S. president makes will come to ABC-TV viewers and radio listeners in a whole new way. **BM/E**

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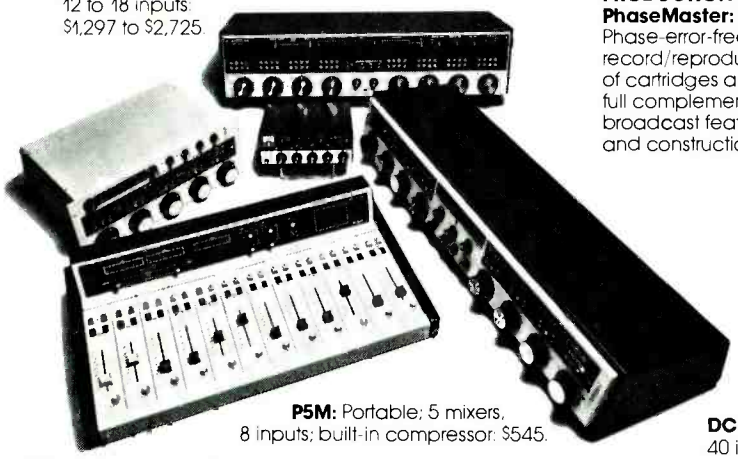

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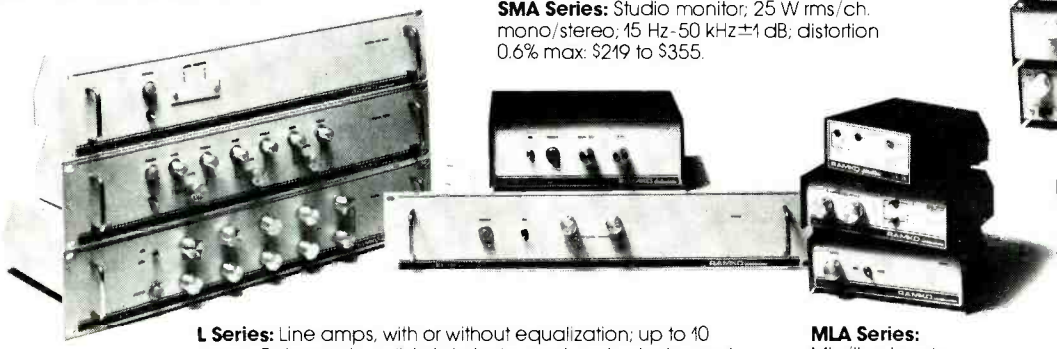

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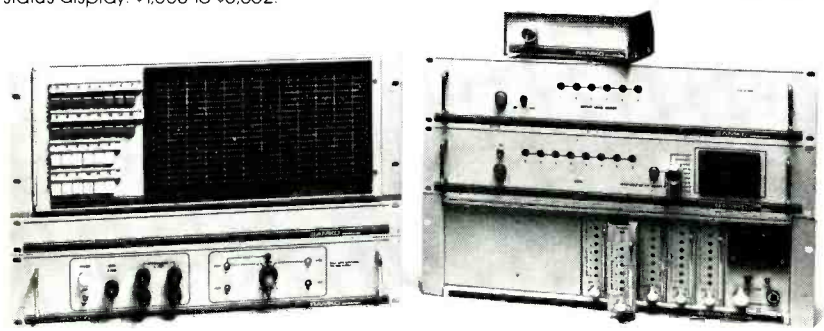

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LIVE ON THE SATELLITES, A GREAT RIDE FOR RADIO

The parade of the satellite nets into radio broadcasting, and the new emphasis on live program pickup, are jointly raising the power of radio for the program producer, the broadcast station, and the listener. The changes can be seen in the early stages of both the public and the commercial satellite nets.

THERE IS A NEW POWER in broadcasting, and it goes by the name of "network." The broadcasting network, of course, is more than 50 years old. Everybody knows its constitution: central production of studio-finished programs for a fixed group of affiliates. This "old" network is still very strong.

But there is a new network, just getting underway, certain to grow to tremendous power and to change broadcasting substantially — eventually, in fact, to transform the old into the new. The new network takes full advantage of the potentials of satellite distribution for a flexibility, immediacy, and sparkling technical quality that are fresh in broadcasting.

With the help of the latest program pickup equipment, the new network is removing the technical and psychological limitations on live pickups of every kind of program. As some of the stories that follow illustrate, station managements are feeling limitations and boundaries on live broadcasting drop away. They can do it whenever they want; the gains are very large.

New net paths: anywhere to anywhere

The limitations and boundaries are just about gone, too, on where a net program can start and where it can go. The low cost of satellite distribution and especially its total insensitivity to distance make it easy to set up any group of stations for a program. The ad hoc network has been around as a sideline for many years; now it is moving toward the front.

At the sending end the combination of simple access, with the proliferation of scattered uplinks and especially the mobile uplink, have made it possible to start a net operation from anywhere. And the simple, inexpensive access is having one great result: a stimulation of software activity on many fronts. In both the public and the commercial nets the broadcast management with an earth terminal is fast getting to feel like the 10-year-old turned loose in the candy store. New technology is bringing in what FCC rules have fought for with only moderate success: a sharp increase in the variety of broadcast programming.

The story is similar for television, too. We consider what the new network is doing in television in a separate article. In this article *BM/E* reports on conversations with several managements at radio stations already on the new networks. How is the experience affecting them, and their listeners? For the long-range health of radio, the story is positive indeed.

National Public Radio: full operation

The new network, the new power in broadcasting, has been fully born, almost without the industry's noticing, in one organization: in National Public Radio, with its satellite system. The plans for the NPR net became reality beginning in the fall of 1979; as this is written the 200-plus stations originally slated for the net have all been equipped with earth terminals and regular programming is going out over the net. Many additional public stations, originally negative, are now clamoring to get in, which will take some doing because their earth terminals must be funded, designed, and built outside the original NPR contract with Collins Radio.

Highly significant in the operation are the 17 regional uplinks, planned to allow local stations around the country to supplement NPR's Washington-based programming, giving the net a broader base for program creation. A certain amount of idealism and hope went into the regional uplink idea; it has been almost embarassingly successful, as some of the stories that follow demonstrate.

Basically, of course, the NPR net is showing what satellite power can do in regular, full-scale day-to-day programming for a radio net. It's the future already here.

What have we learned from the NPR experience? We

have learned from actual examples the truth of the prediction that satellite networking will go from anywhere to anywhere. The experiences of KSJN, public station in Minneapolis, show this and a number of other excellent results of using the new network.

KSJN goes to New York, London, Aspen

William Kling, president of KSJN and a mover and shaker of the NPR operation, gave *BM/E* some excellent insights into the effects of the net on radio. He pointed to a recent feeding of a music festival in Aspen, Colo. to the NPR net as showing several important factors. The operation used a mobile uplink developed for the Public Service Satellite Consortium. Although the uplink had a temporary breakdown that forced the operation to go to a taping mode for a while, with the tapes taken to a permanent uplink, this did not alter the main conclusion: the mobile uplink frees satellite networking from almost any restriction on pickup location. The net can start from anywhere. (Some commercial operators, in particular Satellink, are abundantly proving the same point: see the story on television satelliting.)

KSJN has further demonstrated this new freedom in a number of other cases, including a pickup of the Santa Fe Chamber Orchestra in New York's Lincoln Center in late August and a program produced jointly with the BBC from Cambridge, England, "A Festival of Lessons and Carols," which came to the NPR net via international satellite. Bill Kling noted that the Aspen pickup was important because it was the first one using a mobile uplink for the NPR net. The essential success (not marred by the temporary breakdown) has had a strong psychological result, he said: a sense of freedom, a willingness to take risks in satellite pickups.

Receiving earth terminal used at National Public Radio stations on satellite net has antenna 4.5 meters in diameter, overall structure height of 20 feet. More than 200 stations have the terminals, and more are joining steadily

Bill Kling also noted that originations like the Aspen one show the great power of combining the excellent equipment now available for live pickup with direct feed to the satellite net. This allows the full flavor of the activities to reach the radio audience, with all the comment, background noise, and atmosphere, in addition to top-grade transmittal of the music. It is now certain, he said, that really live has a special ability to engage and hold the attention of the listener. There is a strong psychological plus in live, a stimulation for the listener that comes through especially well with the high quality of satellite distribution.

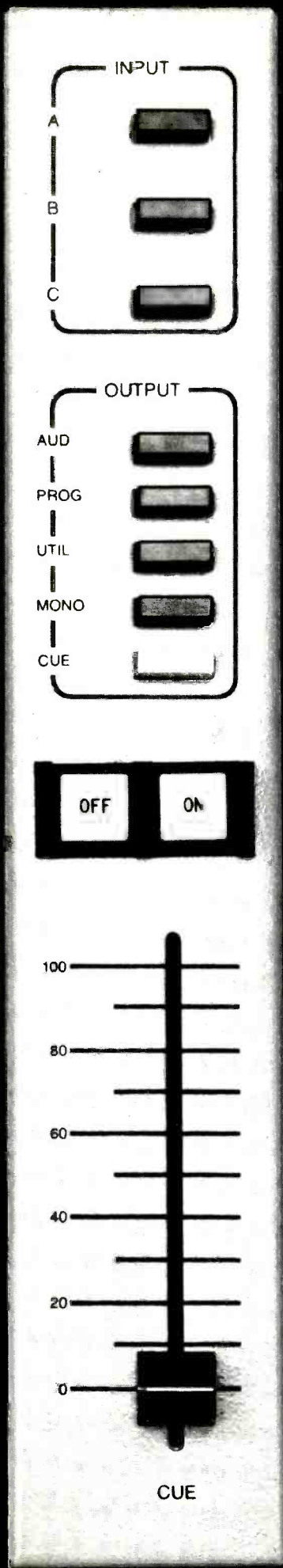
As a receiver of net programs, the KSJN management is delighted with the sharpened variety and increased quantity of the fare: "There is more programming, lots more," Kling noted. The "candy store effect" is present, but the KSJN management is happy to work through a short period of a little confusion with the knowledge that experience will give them the skill to make choices. Having too much is clearly far better than not having enough; the combination of satellite distribution with the regional uplinks and increasing use of mobile uplinks will keep increasing the richness and variety of NPR programming.

Nicholas Nash, vice president for programming of the Minnesota net, pointed out that the proliferation of programming is strongly shifting program choices to the managements of the local stations, and also creating a new problem for the uplink stations: how to make other operators aware of the nature of the programs? A kind of "marketing" has become necessary, and relevant personnel in NPR are now examining this question, along with a new look at NPR basics, accompanied by some audience research.

As an originator — KSJN is one of the uplink stations — the management has been feeding the net important programs from the station's own long-standing local programming. This includes many concerts of local musical organizations, such as the Minneapolis Symphony and the St. Paul Chamber Orchestra. Another KSJN program already picked up regularly by more than 90 NPR stations is the *Prairie Home Companion*, a humor and anecdote series put together with salt and wit by Garrison Keeler. This midwest-oriented material has the regional strength that NPR was looking for in the uplink plan.

Beyond all that, KSJN is now looking forward to the origination of programs specifically for the net. One part of the planning for this is a new studio setup now under construction that will add a studio large enough to hold a moderate orchestra and put it on the net directly from a space with proper acoustics and state-of-the-art pickup equipment. The new studio is scheduled to go on line in December, and Kling has already planned one regular series for it: a chamber music concert each Sunday morning, *The St. Paul Sunday Morning*, fed direct to the uplink.

Kim Hodgson, general manager of KUOW in Seattle, which had the first operating uplink of the NPR system (October, 1979), confirmed the positions taken by Kling



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and Nash. Hodgson noted that one regular contribution to the net by KUOW was a series of local news bits for *All Things Considered*, the very popular NPR news-in-depth program. KUOW also put on the net live performances of the complete Wagner "Ring" operas, produced by the Seattle Opera Company; nearly 40 NPR stations took the whole series. Regularly fed to the net now are live broadcasts of the Seattle Symphony and of the regular opera season.

KUOW also has demonstrated the usefulness of feeding in material for specific groups of stations: live pickups of the sessions of the state legislature went to a number of stations elsewhere in the state.

Kim Hodgson noted some problems. With a program coming in over the line live the receiving station must be ready to air it or record it (often both) without the internal scheduling flexibility that tapes in the mail allow. This demands extra recording equipment ready to go at all times, and personnel similarly on deck whenever the whistle blows. Internal operating procedures have had to be tightened, basically a welcome result. The recording responsibility, Hodgson says, has in large part been shifted from NPR headquarters to the operating stations.

He too welcomes the greatly expanded variety of the programming he can use. Inevitably, not every item is fully top-grade or suitable for a particular station's needs, but that is in the essence of a system giving the user very wide choice. Hodgson gladly accepts the new necessity to become quite selective, even hardnosed, about the material his earth terminal can bring in.

The point of view of an NPR station with a downlink only was given to *BM/E* by Don Glass, manager of WFIU in Bloomington, Ind. Glass agreed with the others that the live feeds from the earth terminal would create an operational nightmare without upgrading of internal procedures, and that the abundance of new material is giving the station management many tough choices. He praised the very high audio quality of the NPR material and noted that a sizeable volume of mail came in when WFIU started on the net, remarking that the sound was "different," generally "clearer." After a few months listeners were used to the new quality.

Even more important, his listeners are pleased with the broadened variety of the programming and especially with the many live feeds from concerts and other public events all over the country. As Bill Kling said, live has a magic when the whole transmission path is top grade. The NPR operation is proving this day by day.

Commercial nets: on the verge

As already noted, the commercial radio industry is now being equipped for satellite networking on a very big scale, with Mutual putting in 600-odd earth terminals, AP more than 400, Enterprise Radio several hundred, and others about to move in. With a large part of this hardware already in place the satellite era will come to radio in a rush in a matter of months.

Thus radio broadcasting in general is going to enjoy the advances that NPR has pioneered: easy, high-grade networking from anywhere to anywhere; the tremendous variety of programming that the easy networking stimulates software producers to create; the excitement of live pickups transmitted at top quality.

Already, a number of organizations are proving the value of the live pickup in what might be called "pseudo-satellite" operations — that is, the pickup is state-of-the-art and the network is ad hoc, using AT&T's new high-grade Siemens lines (which reach about 50 cities). The nature of these live-pickup operations is such that they will surely shift to the satellites as fast as that becomes practical; they demonstrate a kind of program activity that will be a prominent part of the satellite era.

One of the most successful operations of the kind is that of Starfleet, a Boston-based corporation. *BM/E* talked with Jim Slattery and Sam Kopper, founders of Starfleet, which was recently bought by the John Blair Co. of New York. Starfleet operates a large van which combines a 40-input mixing facility with a control console and monitoring room for putting the mix on the air, including announce booth. The van is sent to, for example, a concert of the Charlie Daniels Band in Hartford, Connecticut. Starfleet sets up the mics with the van just outside the hall. In advance, Starfleet has reached a complement of radio stations in the cities linked by the AT&T high-grade lines and cleared each one for the concert. The local telephone company provides the 15 kHz stereo loop into the intercity lines.

In such a case Starfleet acts as agent or partner of the band management, or may become the software principal. These big-band live pickups have become immensely popular with radio stations with popular-music formats. They give the station a special that can often be sold at premium rates. The live quality, and the high-grade stereo transmission, attract many new listeners to the station, which hopes to hang onto some of them. The concert can be used in strong local promotion for the station. Starfleet has to been able "fill up" the AT&T stereo lines repeatedly, with 50-odd stations in the ad hoc net.

The van can be used another way: to carry out remote pickups for specific stations. The complete announce and on-air control facilities let the station put its own on-air personnel in the van, and the program can be structured to sound as though the station's studios had moved to the pickup spot.

Starfleet has worked with many radio stations, either in supplying remote pickups or with the station as the head of an ad hoc network program: a few of them are WDVE in Pittsburgh, WBCN and WCOZ in Boston, and KQRS in Minneapolis. Both Slattery and Kopper emphasized the necessity of having truly high-grade audio control and processing equipment in the van, with expert mixing skills on tap.

Big bands from Mutual, RKO

Very much the same kind of live band concert will be prominent in the satellite-carried programs of Mutual and RKO. RKO has already carried a half-dozen or so in the early stages of its satellite operation, with about 100 stations on line. (See story on the RKO net in the September issue.)

Will the old standard radio nets go to the satellites? Will the old net be transformed into the new? It seems to be inevitable. If and when they do, and when the many other independent software producers now stirring around the satellite idea get going, the program producer at a radio station with an earth terminal (most will have them) will *really* be loose in the candy store. Choices will be harder but the results for stations and for their listeners should help keep radio healthy for a long time. **BM/E**

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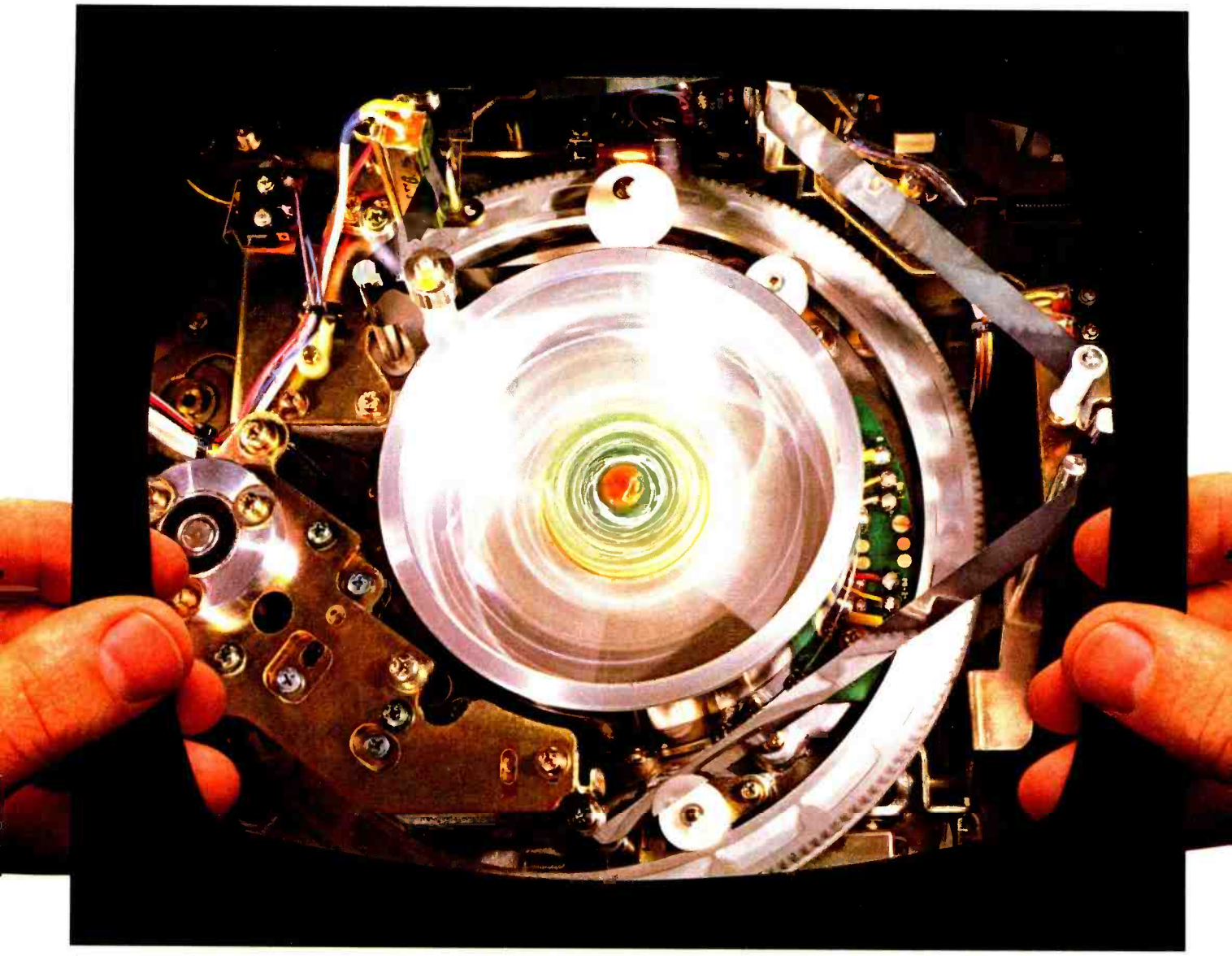

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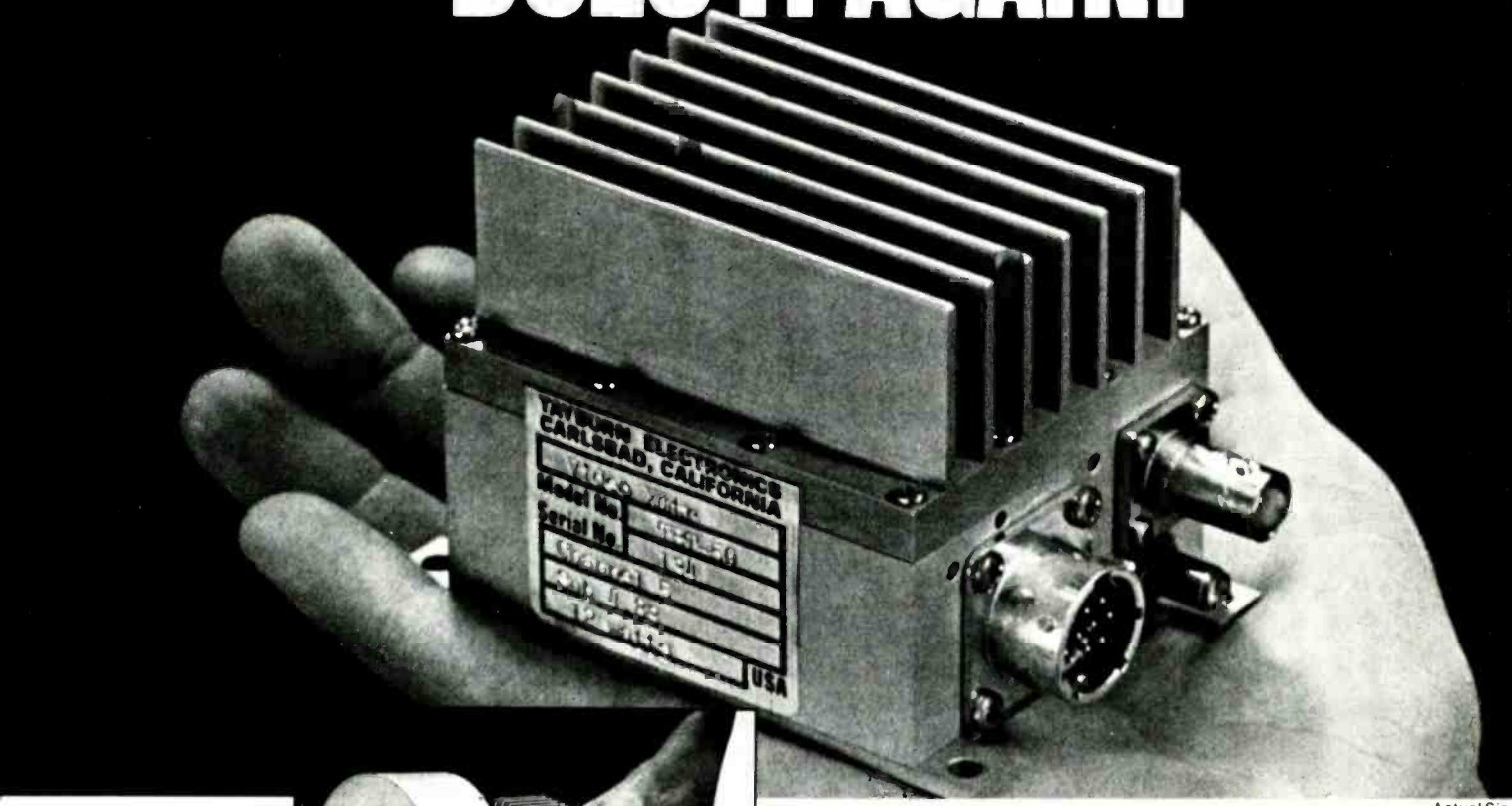

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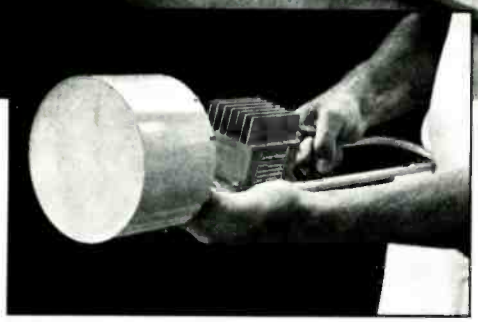

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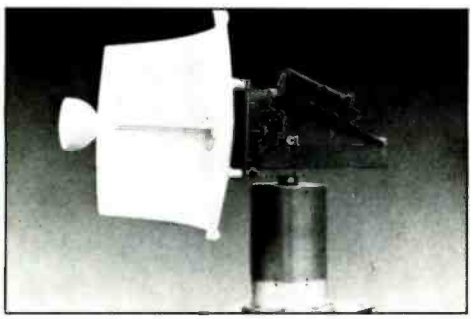

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BROADCASTING LIVE STYLE

THE SATELLITES ARE MAKING LIVE TV BIGGER THAN EVER IN HISTORY

At national political conventions, for every kind of news pickup, the satellites are making it easier and cheaper than it ever was to pick up live material and get it wherever it can be used, whether next door or a thousand miles away. Here are a number of cases that show how the new "live" is enlivening television.

"LIVE" HAS MEANT "GOOD" in television for a long time, but the satellites are giving the word fresh meaning. With the help of satellite feeds a television management, for example, can now successfully confront the question, "Shall this remote be ours, or the network's?"

The low cost, the high quality, and the technical simplicity of satellite distribution have brought this about. Distance, of course, has disappeared as a factor in planning remotes. Once a signal reaches the satellite, it comes down anywhere and everywhere in the "footprint" effectively, and with no cost differentials.

The way in which the satellites have enlarged the reach of "live" for local TV stations was spectacularly demonstrated at the recent political conventions (see article on the Democratic Convention elsewhere in this issue). The new "live" appeared in a particularly pure and successful form in the coverage of the Democratic Convention in New York by the Post-Newsweek stations. The results were highly positive for the station managements, for their respective viewers, and for the communities they serve.

The four Post-Newsweek television stations are WFSB, Hartford, Conn.; WJXT, Jacksonville, Fla.; WPLG, Miami; and WDIV, Detroit. Under the RCA "SMARTS" program reported in *BM/E* earlier, each station got a satellite earth terminal in July of this year. The use of these terminals was still, at the time of writing this article, on an experimental basis with the FCC, with the main ongoing "experiment" the distribution to the stations of the Viacom *Showtime* program — this was just getting underway in early September.

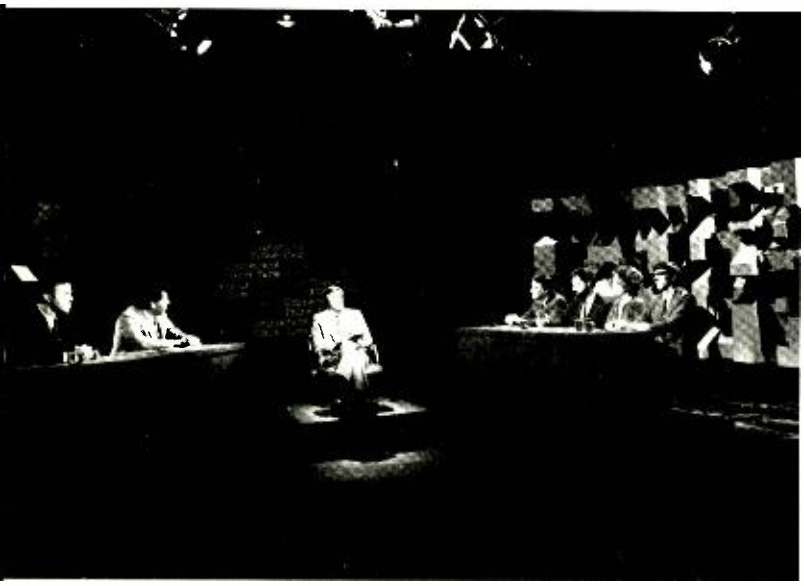
The stations were allowed, however, to use the system for such news events as the political conventions. The Post-Newsweek management started planning early in the summer for the Democratic Convention. This meant the dispatch to New York of two cameras, microwave intercom equipment, and recording and editing equipment. It meant getting a dedicated video line to the New York television operating center, and a line from there to the RCA satellite uplink in New Jersey. It meant getting hotel space for the editing and recording equipment (in this case, at the Statler-Hilton), because the convention hall had no room for such activities. In fact, a general complaint of television crews in the New York hall was that they were badly cramped during all their normal operations. The Detroit hall used by the Republicans got higher marks on this score.

The general planning for the Post-Newsweek operation was the work of Ken Middleton, with Bill Latham, director of engineering for the group, as technical planner. Each station picked its own camera and news crews, and each gave the crew its directions for the pick-up.

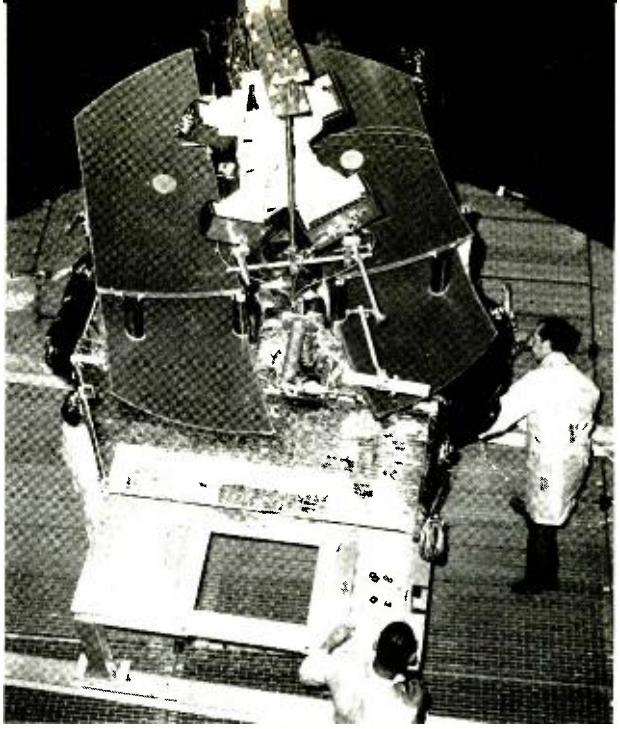
The stations took turns as originators, one for each day of the convention. The three in "stand-by" could use the coverage to whatever extent each chose. The general scheme was built on a camera crew plus newsmen on the floor, and a camera crew plus anchormen on the balcony level overlooking the convention. The microwave system provided cuing and talkback between floor and balcony.

WDIV, Detroit, sent two two-man camera crews, two anchormen, and three floor reporters. In addition, Jim Snyder, the station's news director, was on hand, and

Satellites Are Making Live TV



A political debate in studio of WEDH, Hartford, Conn., goes via the station's uplink to the PBS satellite net for Prime Time Special Report, *available to all stations*



RCA Satcom antenna is lowered into test chamber at RCA's Princeton laboratory. The Satcoms are serving many satellite nets, including the "SMARTS" program covered in story

Steve Wasserman of the news staff acted as executive producer. WDIV during its day naturally emphasized the activities of the Michigan delegation, while covering the convention as a whole.

Luckily this tied in with news imperatives because the Michigan delegation, with many UAW members, was originally split between Carter and Kennedy supporters. There was a considerable amount of suspense, drama, and importance in the activities of the delegation.

Steve Wasserman told *BM/E* about two of the high points. The first came in the voting on the question of an "open" versus a "closed" convention. Mayor Young of Detroit and other pro-Carter delegates were seen on screen in the stages of intense "politicking" among members of the delegation, to muster support for the closed vote. It was graphically live coverage of a real, important event as it happened.

Another high point was the announcement of the roll call on the nomination, by the chairwoman of the Michigan delegation. A WDIV reporter was among the delegates, and could speak with individuals as he wanted. The camera was in a high position pointing down on the chairwoman as she made the announcement. After the vote was called, other members of the delegation could be seen; the camera caught their immediate reactions before any careful response was developed in answer to reporters' questions.

In addition to the live coverage, the Post-Newsweek news directors could insert recorded material whenever they wanted, using recordings made at the position in the Statler-Hilton Hotel, or other material. The coverage was treated in each case at "home" as a regular newscast, with the 6 to 7 p.m. and 10 to 11 p.m. news periods as the main slots, and special bulletins for other spots during the day.

For all the stations, the operation was a success on several fronts. Each one pulled audience response well above normal for the period. Viewer comments were uniformly enthusiastic. The local media praised the results highly — newspapers in Detroit, for example, called the WDIV coverage the finest yet seen of a political convention.

The Post-Newsweek management was enthusiastic about the performance of the satellite loop, and will certainly carry out similar operations in the future for events that justify the effort and expense. As Ken Middleton said to *BM/E*, "We did a good job, and we learned a lot: the next one will be even better." He praised highly the technical quality of the picture that reached the four stations.

The Post-Newsweek earth terminals will be used for a number of purposes besides great-event news remotes. The management is eyeing several of the programs that are now or soon will be available from various satellite feeds. A spokesman told *BM/E* that they were also studying the technical and contractual feasibility of adding steering to their earth terminals so they could reach other satellites. The study would compare this possibility with the installation of a second dish for other pickups. (Some cable television systems are already using two dishes, as *BM/E* reported earlier.)

Another result of the success of the operation is a Post-Newsweek decision to expedite the establishment of satellite feeds from the Washington news bureau now being expanded to serve all the stations. "Live from Washington" will become a staple of the individual stations' newscasts. The satellite will again make newscasts far sharper in impact and more informative with the easily-carried live material that is a satellite speciality.

TV nets: on the verge

The satellites are expanding "live" among television broadcasters in other ways. One is the encouragement of TV stations and software production organizations to develop more live programming. Program producers are losing their fear of live material as a part of programs developed for large groups of subscribing stations, the *ad hoc* nets that are on the way (see article in this issue on radio's new nets, mediated by satellite distribution).

The full effect of satellite distribution has not yet arrived in this area; many more earth terminals at television

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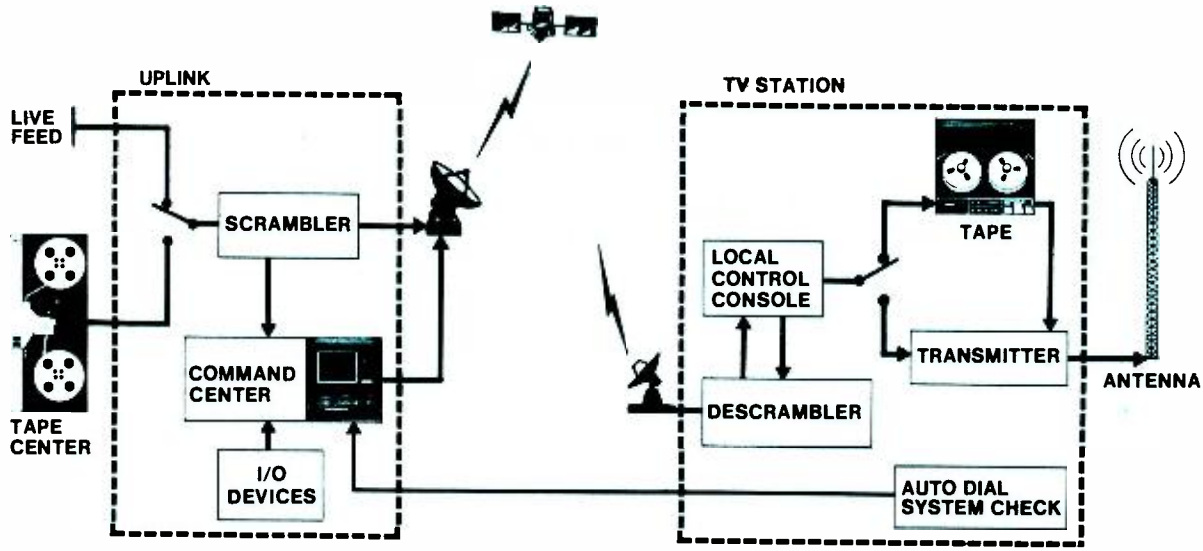
Satellites Are Making Live TV



Method of feeding programs to stations, in experimental phase of the RCA "SMARTS" operation, includes scrambler at the uplink, and de-scrambler at each station with an earth terminal supplied in the experiment. Post-Newsweek stations are included (see story)

stations are necessary to bring it in. But many organizations are readying for that; they are acting as though satellite distribution were just around the corner.

One kind of operation in this group is exemplified by Capital Cities Television Productions (CCTP), a subsidiary of the Capital Cities group of stations. For a number of years CCTP has been creating TV specials for distribution to *ad hoc* networks of TV stations, as described in an earlier issue.

Within the last year CCTP has been using satellite feeds more and more to reach the nets set up. The feeds have been put together by the Robert Wold organization, using satellite linkage wherever it was advantageous and AT&T land lines for the rest of the haul.

William Mulvey, in charge of marketing for the operation (getting station clearance) and also of finding sponsors, told *BM/E* about some of the most recent programs. Two, "Teen Age Runaways" and "Energy: Light At The End of the Tunnel," were each taken by about 195 stations. CCTP produces about six such serious, hour-long studies a year, reflecting the belief of the Capital Cities management that television has a strong responsibility to inform viewers on serious issues.

Mulvey pointed out that the satellites are making it progressively easier to reach the stations in each net with high-quality signals; there is less and less hesitation about doing live material in the programs. Already, he said, about a half-dozen stations are being reached by direct hop from satellite to station earth terminal; and this number is going to grow rapidly in the coming year. The most recent hook-ups have reached 96 percent of the continental United States, plus Alaska and Hawaii. The coverage is sure to move close to 100 percent as earth terminals become general.

Station groups: better linkage

Another kind of operation in which the satellite-and-live combination is slated to grow is in linkage among group-owned stations that want to exchange or share programs, and this applies to many groups. One of many examples: Metromedia station KTTV in Los Angeles has for a long time been picking up the Rose Bowl parade, with cameras in the street providing live coverage. It was sent to the other Metromedia stations on land lines, after recording and careful editing.

Recently Metromedia has been using a Robert Wold satellite and land line combination, and this is going to move toward 100 percent satellite distribution. As it does, the original live pickup becomes more feasible as the distributed program, more appealing to the recipient stations and their viewers. Other Metromedia stations can be originators, using land lines to the nearest uplink or Satelink's mobile uplink, to get up to the satellite. The same rationale applies to dozens of other active station groups; it is another reason that the TV satellite downlink is one of the explosive growth businesses of the period.

Religion, sports, night clubs, etc.

Also delighting the manufacturers of satellite downlinks are the literally scores of software producers who are coming in from outside the broadcast industry, to make every satellite a cake loaded with programming plums. The several religious organizations now full time on one satellite or another put out a lot of live material: religious singing groups, interviews, "testimony meetings," and all the rest. They are now mainly reaching cable television systems, but the TV broadcaster is obviously a main objective for them.

Similarly swarming onto the satellites are the sports pickups, and these are live by definition. Just one operation, Enterprise Network's 24-hours sports coverage, is going to serve up more than a thousand live sports events in a year. At least a half-dozen other organizations will be sending up to the satellites sports pickups in the scores and hundreds.

"Live" on this gargantuan scale is the creation of the special qualities of satellite distribution. We may begin to wonder how many sports events the American viewer can

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But viewers who reach their limits on sports will see many other kinds of live programs, as soon as their local TV stations get earth terminals into operation. Night club acts, concerts of both serious and popular music, and governmental bodies at work are among prospective offerings.

PBS is already there

In the foregoing we see commercial television, generally speaking, just on the forward edge of the satellite era. That era has arrived with a flourish in the Public Broadcasting Satellite Net, with 240 stations equipped for satellite reception, and seven regional uplinks to feed programming into the system from around the country.

The general result has been similar to that of the NPR satellite installation, with the stations on the net getting a greatly enlarged volume of program choices, and with the superb quality of the PBS DATE (digital audio) system enhancing concert programs. PBS has found it necessary to set up an Interregional Program Service, which assembles information on all the new programs being fed to the net and gets the information to member stations to help them with their choices. The PBS satellite story is complicated and exciting, with the fact emerging that the PBS lead in getting a complete system in full operation is attracting commercial users, who have access to the net on a "share-the-cost" basis.

Earth terminal antenna is mounted at station WGTV, public station of the University of Georgia at Athens. The earth terminal is one of more than 200 forming PBS satellite net

For example, in a mingling of commercial and PBS responsibilities, a system is being set up for delivery of commercial matter through the Western Union satellite, down to the PBS antennas at the various stations, to Western Union downlink electronics, and to each PBS station's recording facilities. Each station then has the job of delivering the material to commercial subscribers in the station's area.

One kind of material already planned for this public/commercial enterprise are broadcast commercials, in a fast delivery service being set up by Blairsat, division of the John Blair Company. Getting recorded commercials to all parts of the country for national advertisers, on time and in good condition, has always been troublesome. The Blairsat-PBS entente promises to speed things up tremendously while raising the quality of the recordings to new heights.

Another plan for using the PBS system for distribution is in the works at Vidsat, which will contract to get syndicated programming around the country faster than it ever went before — and again in top shape. Satellite distribution looks most attractive for the syndicator, and we can guess that the Vidsat plan is just the first of a number.

Getting news out of a "hot" city

On track again with the live-on-the-satellite story, an excellent example of what is happening can be seen at the Detroit PBS station, WTVS. Dennis Dunbar, director of engineering, told *BM/E* that the large volume of nationally important news events in Detroit has put a heavy burden on all facilities for getting news out of the city. Labor unrest, racial troubles, auto industry economics, and other such subjects have created a lot of news that agencies all over the country want as fast as it happens.

WTVS has two vans with ENG crews and equipment, and goes to news events of importance on an instant-ready basis. WTVS also has one of the seven PBS regional uplinks (installed in July of this year) and puts a mixture of live and recorded news on the PBS net nearly every day, in several regular news slots and on an emergency bulletin basis. The WTVS material often becomes part of the news regularly distributed to PBS stations, in a daily "exchange feed." With the other regional uplinks also feeding in more and more live material, covering the important news in each area, the PBS newscasts are becoming more and more attractive to member stations, a direct result of the satellite net design. The net also feeds news into ITNA and into the Cable News Network (CNN). Dunbar gave the opinion that CNN is doing an outstanding job; he recently visited the CNN plant in Atlanta.

Among the other kinds of "live" that WTVS puts on the net are a call-in talk show and a series of interview programs.

Live television, we can see without a doubt, is in for its greatest period. It has always been there, but the satellites are in the process of making it faster, much easier to do, and bigger by far than it used to be. **BM/E**

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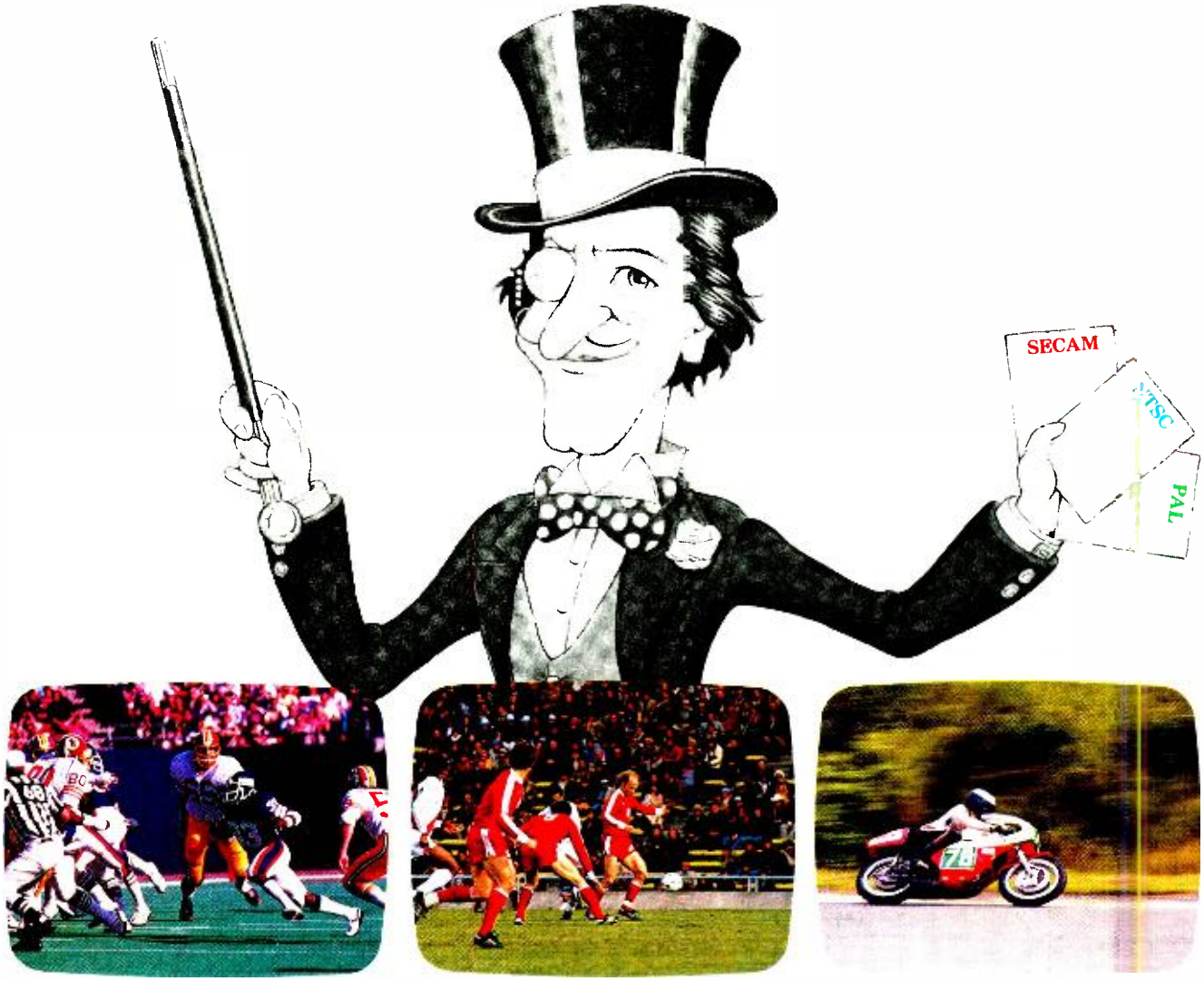

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AIRING THE BIG BAND REMOTE

By George Nicholas

The technical problems in putting a band on the air from a shopping mall include getting a high-quality signal to the studio and providing for a multi-mic mixdown, talkback for the conductor, cues for the MC, and a feed for the on-the-spot P.A. system. Here is how KLEU of Waterloo, Iowa, did it.

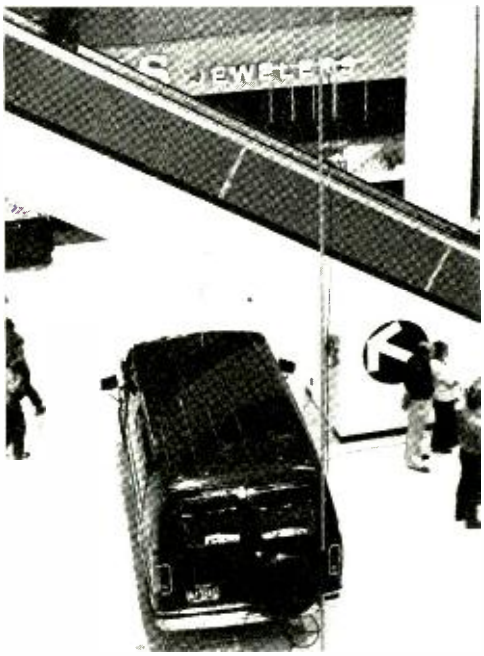
WITH THE RESURGING POPULARITY of the Big Band format, many radio stations are trying to recreate the spontaneity and excitement of yesterday's radio. This includes the latest syndicated music formats, on-air promotions, and live big band itself. Radio station KLEU of Waterloo, Iowa, recently held a promotion that included a live remote broadcast of a big band orchestra from a local shopping center.

Since KLEU broadcasts remotes quite regularly, its management installed a Marti RPU transmitter to reduce remote costs. Until recently KLEU, like many other radio stations, relied on local telephone company broadcast loops for remotes. Often the lines were poorly located, noisy, and generally lacked the fidelity of studio lines. Add to that the cost of installing and maintaining a telco line, and a VHF-type remote transmitter seemed to be the better bargain. KLEU found fidelity to be the greatest advantage of the Marti transmitter.

In initiating the planning phase of the remote, the project was broken down into four categories: (1) orchestra mixdown/transmitter feed; (2) public address system; (3) monitor for MC/station personnel; and (4) final preparations.

For the orchestra mixdown, a local recording studio was retained to set up microphones and provide the station

George Nicholas has been on the engineering staff of KLEU, Waterloo, Iowa.

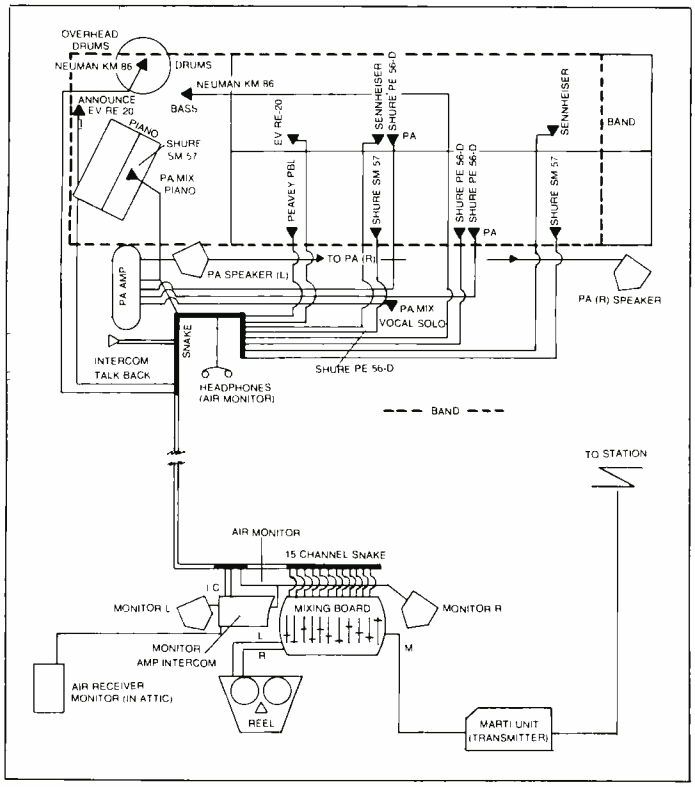


Van with mixing and monitor facilities, plus remote transmitter, was parked in mall near concert

The band was put at foot of enlarged stage, with column P.A. speakers out to left and right. Some of drums were on stage above the band. Only a part of audience can be seen; total reached more than 400

Operator inside van has mixing console for the 15 microphones used in the pickup. He had intercom to band leader, monitor circuits for all pickups

Airing The Big Band Remote



Overall wiring diagram shows positions of microphones, P.A. and monitor speakers, remote transmitter, and cuing receiver. System provided both P.A. and air feeds

with a quality monaural signal to feed the Marti transmitter. Because the broadcast would require 14 mics, a professional recording engineer with a musician's background was hired. It was his job to mix all sources down, and monitor both the feed and off-the-air to make sure all levels were proper.

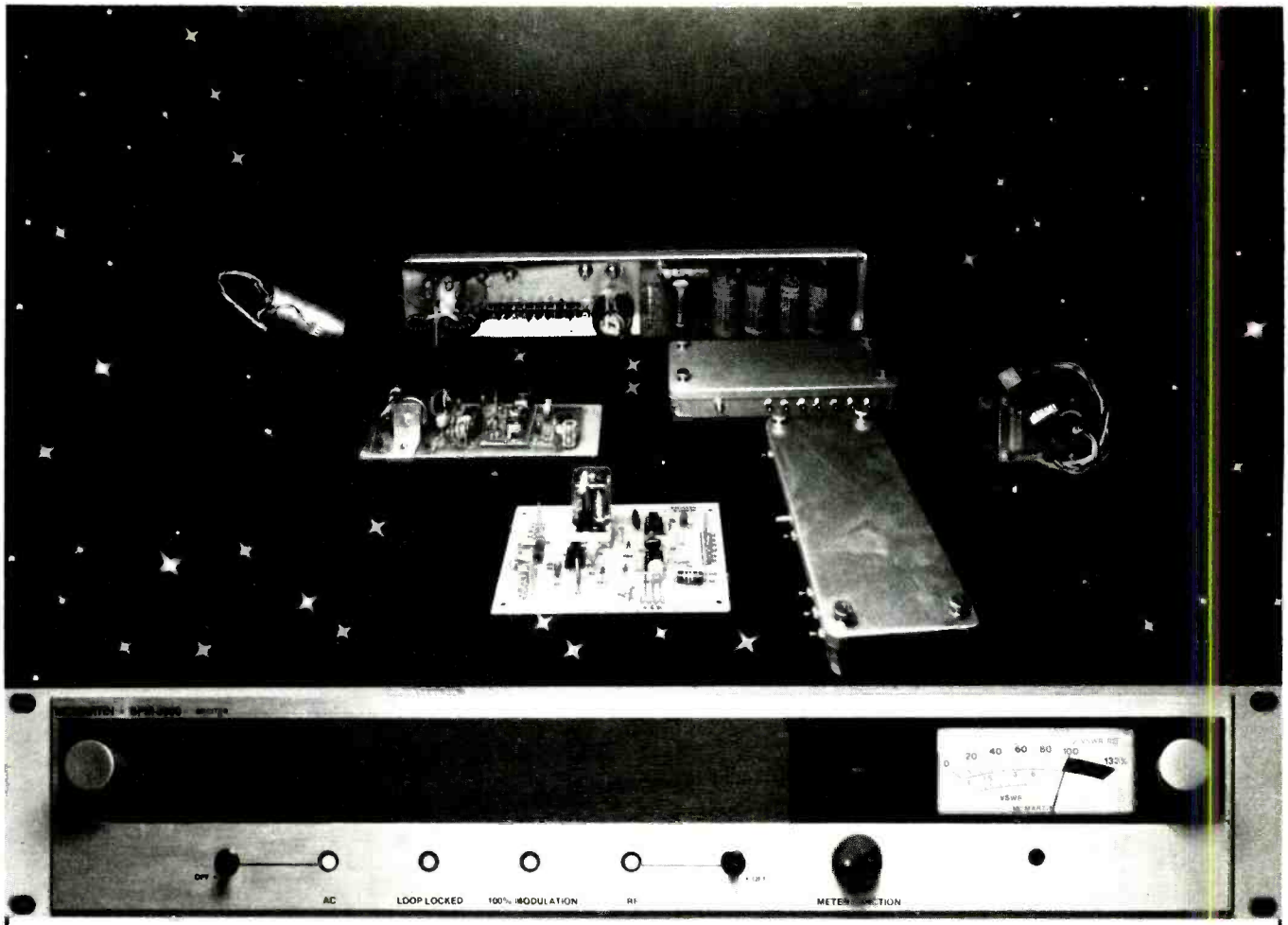
Because the station van, the project headquarters, was located about 60 feet from the stage, a microphone "snake" was utilized to eliminate dangerous and unsightly mic cables. The snake terminated inconspicuously on stage, convenient to the wiring of mics.

The orchestra leader also wanted a stereo tape of the performance. Since KLEU needed a monaural mixdown, the monitor feed from the Peavey mixer was used for the air signal. This allowed independent master controls of the recording and the broadcast.

The second task was to provide P.A. sound for the audience. Since the levels of specific instruments were different, a separate system was necessary, as opposed to amplifying the radio broadcast over the P.A. system. This also eliminated the risk of feedback.

The engineers elected to mic just the solo instruments, the piano, and the vocalist for P.A. purposes. By using bridging transformers and Y-adapters, one microphone could be used to feed both the P.A. and the broadcast system. This eliminated the need to double-mic for P.A. and for broadcast.

The third and most difficult problem concerned the monitor system. The monitor system was necessary so that the MC on stage could receive cues on-air from the station — from start, to commercial breaks, to finish. The steel-span structure of the shopping center prevented any



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Airing The Big Band Remote

AM broadcast signals from penetrating the walls to the mall area. An AM/FM stereo receiver was placed in the rooftop of the mall, near a plexiglass skylight, to receive the station. A line-level feed was then run from the receiver to the van, to be distributed to the air-monitor circuit. This provided an excellent quality signal to the engineer. The air signal was also fed down an open line in the snake to provide the MC on stage an air-monitor and give him insurance against dead-air.

Close-up of section of band shows microphones near trumpet players. Others were placed through the band, at the piano, the drums, the vocalist's position

The monitor system was finally completed with the addition of an intercom/talkback system between the stage and engineer. A separate telephone was placed near the van, and along with the intercom unit, communications between the station and stage were simple and quick.

Final preparations included setup and erection of the directional yagi-type antenna for the Marti transmitter. Even though the non-directional whip antenna penetrated the mall quite well, the yagi provided a better overall signal and added to the aesthetic value of the broadcast.

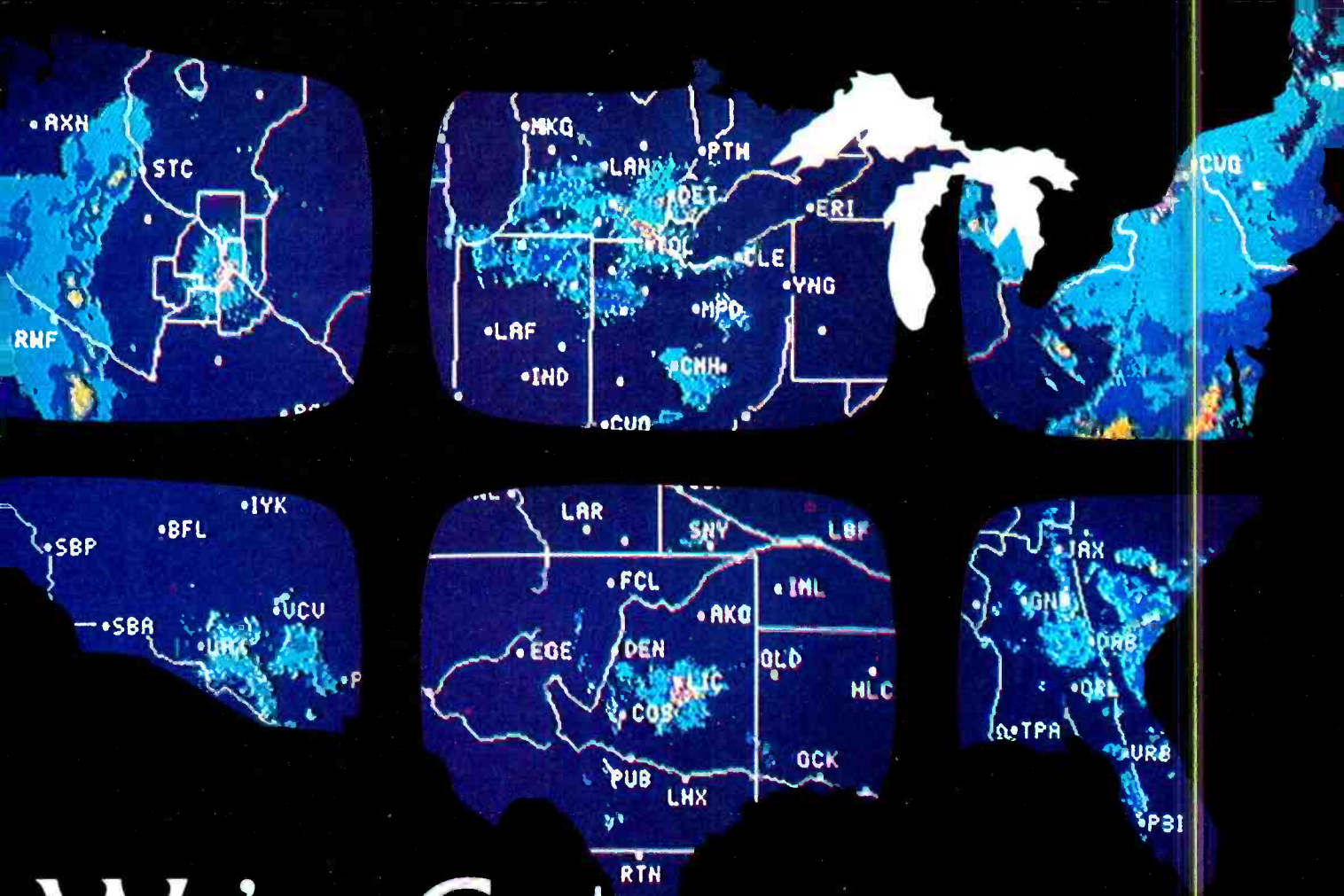
Setup of the entire operation took over two hours, including testing and final preparations. Just prior to the start of the concert, the MC, engineers, and band leader exchanged final information, including a song list with solos outlined.

The concert started at 1:00 p.m., with the live broadcast to start at 2:00. This gave the mixdown engineer time to set broadcast levels and the P.A. engineer time to balance P.A. levels.

The broadcast and concert ended at 5:00 that afternoon, before a crowd of more than 400 people. Striking the equipment after the broadcast took just 30 minutes.

Due to the great success of this promotion, the concert will now be billed as a semi-annual event.

Live big band can be as simple or elaborate as necessary. With careful planning, implementation, and review, the technical aspect of the operation should become easier every time. And the better the broadcast is, the better image your station will have. **BM/E**



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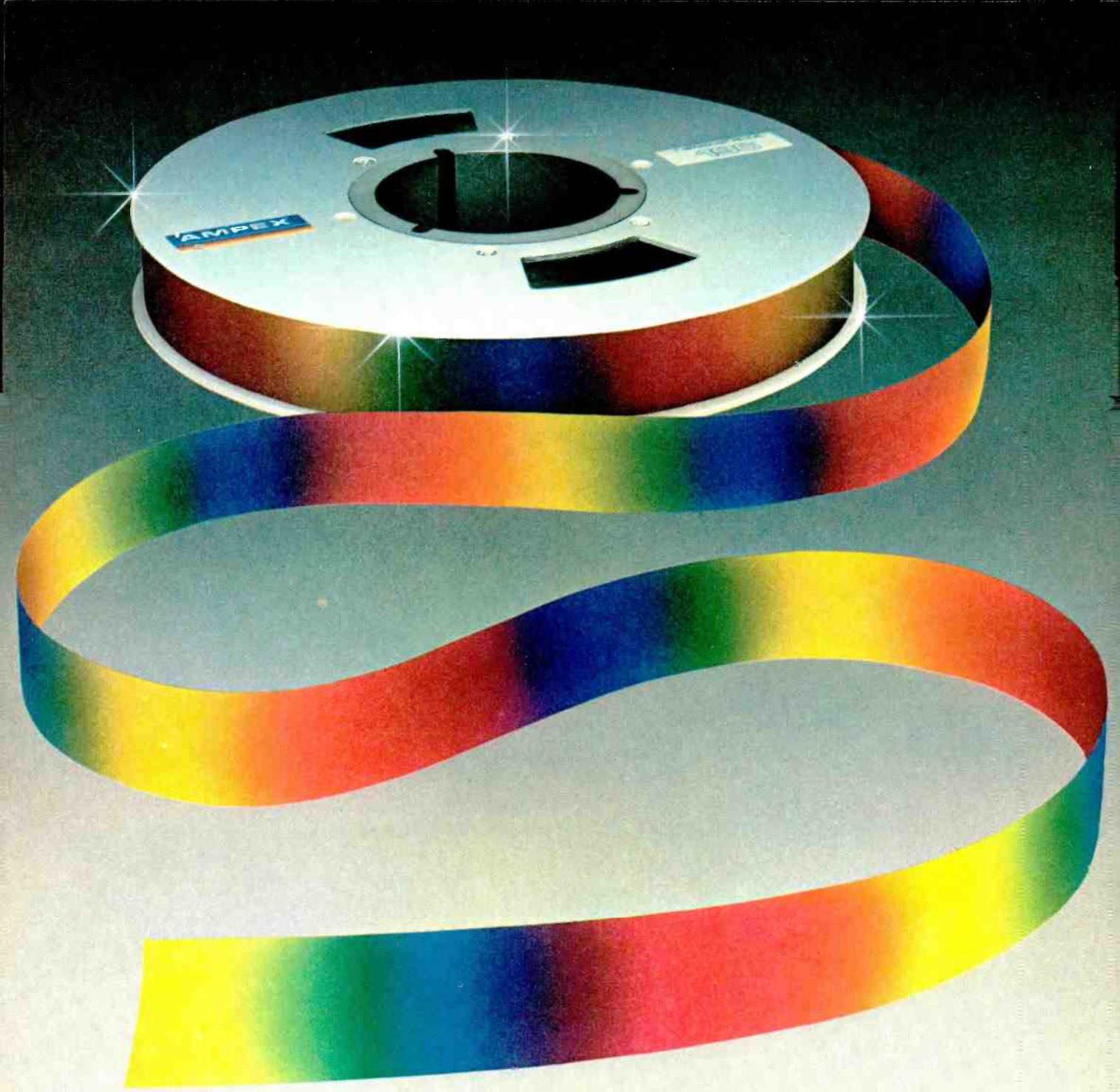

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FIELD LENS CONSIDERATIONS

Outdoor events, particularly sports, introduce a number of variables worth considering when choosing lenses. A comprehensive selection of lenses is an important inventory for any station.

Editor's note: This story was compiled by Jack Dawson, director of advanced development, Fujinon Optical Inc. While examples in this story are based on Fujinon products, several other lens manufacturers make comparable optics.

COVERING SPORTS EVENTS and other types of "field" broadcasts has challenged the capabilities of camera operators and engineers for years, largely because of the varied lighting conditions and weather extremes in which broadcasts are usually made.

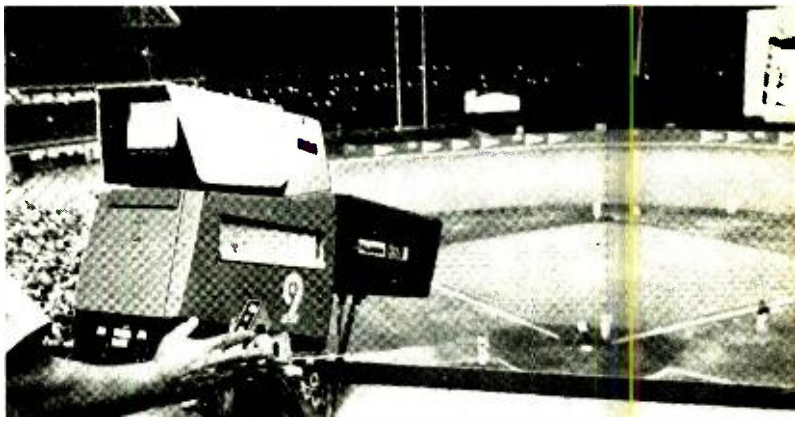
Compounding the problem is camera location. Since much of the action takes place at some distance from the cameras, extreme zoom capability is a necessity for total coverage of an event. Unfortunately, in achieving needed focal length under lighting conditions designed for the audience and teams rather than camera crews, ramping, or loss of aperture can become a major obstacle to obtaining consistently clear, high quality pictures.

Compensating for these operating difficulties requires careful equipment selection. With the broad spectrum of cameras and lenses on the market today, however, this process can be a somewhat confusing and difficult task.

Operating requirements

To facilitate the evaluation and ultimate purchase of broadcast equipment, a careful analysis should first be made of operating requirements, needed image quality, and budget available. Specifically, this analysis should encompass an in-depth review of the conditions under which the cameras and lenses will be performing. For example, if the majority of telecasts are baseball games, and the cameras are placed far above the playing field at the stadium's press box level, longer focal length lenses would be necessary than for football coverage in which cameras might be positioned directly on the field at the end zones and the sidelines.

Coverage required by the program director must be factored into the analysis as well. If many player closeups are scheduled under minimal lighting conditions, fast lens speed is a must to maintain needed image brightness. At the same time, the size image required at various focal lengths must be considered for proper lens selection. The location of planned shots should be evaluated. If the close quarters of the locker room are highlighted frequently, a wide angle lens is needed. If emphasis is placed on player, spectator, and coach interviews, smaller, lightweight lenses suited to the highly portable ENG cameras should be chosen.



The duration of sports events may require a lens to operate in low light as well as at high noon

Picture quality must also be considered. What camera size — *i.e.*, large field cameras in one-inch or 1¼-inch formats or ⅔-inch ENG/EFP units — and lens capabilities will be needed to provide desired resolution, color, image clarity, and brightness under the existing operating conditions? Finally, each of these considerations must be tempered by the budget available for the equipment.

Lens capabilities

After operating requirements and budgetary restraints are established, an evaluation of zoom lenses for use with the cameras selected can be conducted. The two major features to consider are focal length and f-stop; once these capabilities are matched to operating requirements and cameras, additional features can be evaluated to further narrow the selection, including auxiliary equipment such as extenders and servo units, and the color tracking, resolution, light transmission, and minimum object distance (MOD) of the lens.

Focal length

In deciding what focal length is needed for a lens, several factors should be kept in mind:

- As focal length or magnification of a lens increases, so does its size, weight, and cost.
- A zoom lens maintains focus over its full zoom range but is designed for optimum performance when focused at infinity.

The result: in selecting a zoom lens, its placement with respect to the events being broadcast must play a major role in determining how long a focal length is needed. If a lens is to be used predominantly for nearby shots, a short

Field Lens Considerations

range zoom lens or a fixed focal length lens should be selected. If many distance shots are needed, a long range lens is a necessity.

For example, at Shea Stadium in New York, Mets baseball games are covered by WOR-TV using six 1¼-inch BCTV microprocessor-equipped cameras with 30x lenses that feature built-in diascopes for fast, easy registration. Three cameras are located at the press box level, approximately 75 feet off the field and over home plate and first and third bases. Two cameras are positioned on the ground behind home plate and third base and the last is in the scoreboard beyond center field.

The full zoom capability of the 30x lens, which goes out to 1240 mm, permits long shots to be taken throughout the stadium. Distant field positions, dugouts, bullpens, and the surrounding stands are shot from the press box level; the scoreboard camera provides home plate coverage. At the same time, with an MOD of 2.5, the 30x lens can handle interviews conducted within the confines of the press box.

While the large 30x lenses are perfect for the fixed position BCTV cameras at Shea, WTOG-TV in Tampa, Fla., utilizes a combination of smaller lenses to provide needed shooting flexibility, versatility, and economy. Because the station handles local and network broadcasts of a variety of Tampa area sports events, it must have portable equipment that provides quality results. Using ⅔-inch EFP and ENG cameras with 14x, 17x, and 22x zoom lenses is the answer.

When broadcasting Tampa Bay Buccaneer games for CBS, for example, the WTOG crew places two cameras 100 feet off the field and about 100 feet back from the playing areas, in the press box. One camera is equipped with a 22×12.5 mm lens with built-in 2x extender for tight shots out to 550 mm. The second has a 17×9 mm lens and extender for wide shots out to 306 mm. A 22x lens is also used in the end zone; the golf cart camera has a 22x lens to provide closeups of individual players during the game. In addition, a hand-held camera is equipped with a 17x lens to cover wide angle closeups of the crowd, coaches, and players. To supplement these lenses, a 6 mm ultra wide angle fixed focal length lens and a 14×9.5 mm wide angle zoom with adjustable back focus to permit quick, easy lens changes are used on the ENG cameras for special effects.

In selecting lenses to provide quality sports programming, the different equipment combinations are virtually endless. But, by tailoring lens choices to the unique operating requirements of each situation, excellent results can be achieved.

F-stop

Particularly for late afternoon and evening games, when shadows and high-contrast artificial light conditions hamper production of consistent, bright images, lens f-stop ranges are critical. To provide the greatest shooting flexibility, a lens should maintain its largest aperture to a 10x zoom, with minimum ramping out to the maximum focal length (see Figure 1). WOR-TV's 30x lenses, for example, remain flat with a constant f/2.2 out to 418 mm, or out to 880 mm with a fast f/4.4 when the extender is engaged. With this speed, a full zoom can be used even during Shea night games at which light levels drop to 75 fc in the outfield.

In analyzing ramping, it should be remembered that most TV camera zoom lenses are designed for optimum performance with the iris down two f-stops. If ramping is a problem, the lens might only be used at shorter focal lengths during variable or poor lighting conditions. The cost of unusable zoom capability could be unjustifiably expensive.

Special effects

For added shooting flexibility, several lenses should be considered to supplement existing equipment. A 3.5×6.5 mm f/1.7 wide angle lens, designed for use with ⅔-inch ENG/EFP cameras, permits wide angle shots in close quarters at low light levels. It is ideal, therefore, for two-person, player/announcer interviews in the locker room.

The 14x lens used by WTOG offers speed and light weight to facilitate wide angle game coverage. The 2.2 kg lens has a 2x extender. It maintains a constant aperture to

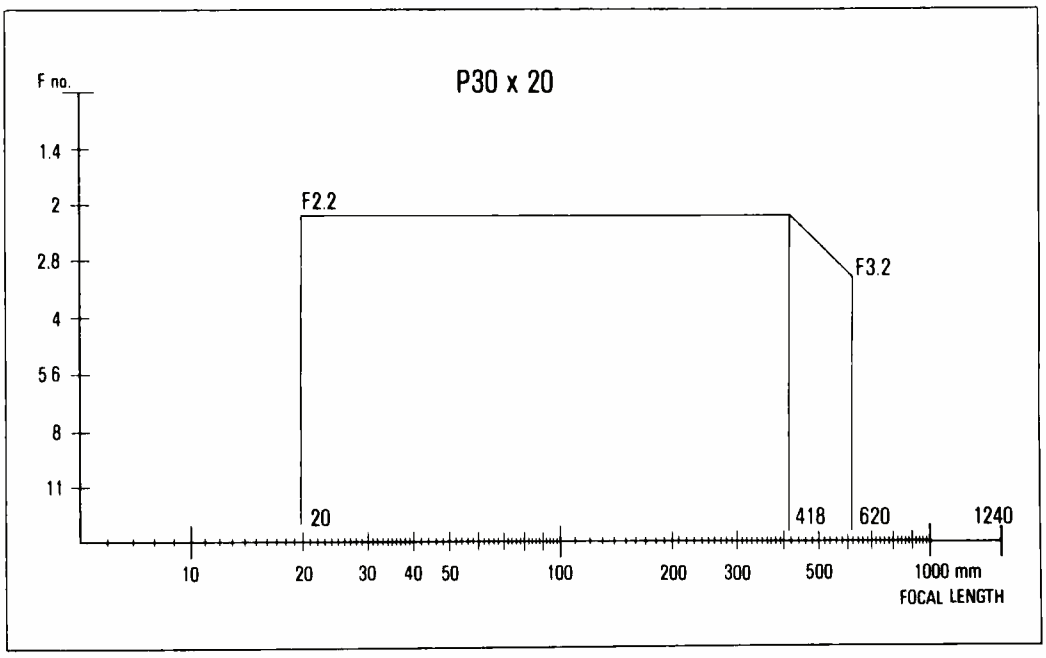


Fig. 1. Ramping characteristics of a 30x lens

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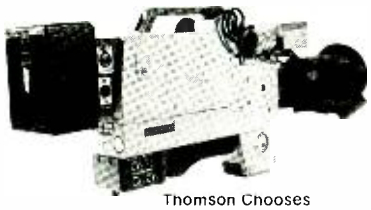

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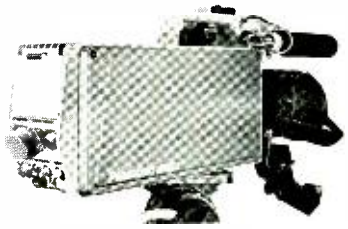

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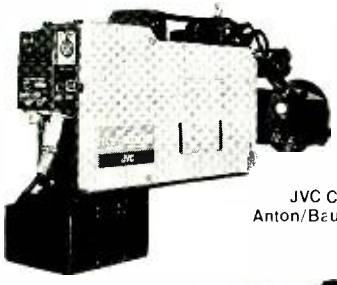

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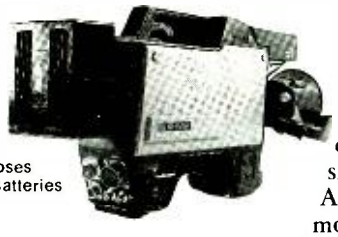

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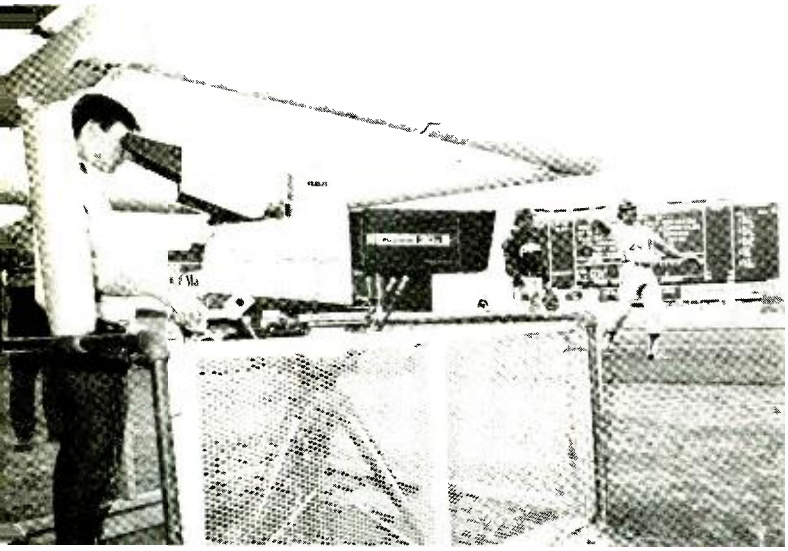
Field Lens Considerations

108 mm (11.5x zoom) and drops to only f/2 at 133 mm (14x).*

To complete the lens combinations at WTOG, its 6 mm super wide angle fixed focal length lens permits a 73-degree horizontal field of view that is especially useful for shots in which objects must be covered from close range and remain in focus to infinity (MOD is 0.2 m).



WOR-TV, New York, uses cameras both near the field at Shea and high in the stands

For other kinds of special effects, filters can be added to the camera's filter wheel to provide:

- four-, six-, and eight-point stars in various configurations;
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- center focus in which the edges are soft while the center object is sharp;
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- color correction by adjusting color temperature when it is necessary to shoot under varied lighting conditions.

Lens camera compatibility

Once lens capabilities are matched to operating requirements and the size camera is selected, one last consideration is important. The lens should be compatible with the camera's optical system to produce quality images. Therefore, when possible, the complete optical chain, including lens, filters, prisms, and image tubes, should be coordinated to optimize quality under a variety of shooting conditions.

Unfortunately, there is no one perfect lens/camera combination, since each field telecast is made under different lighting and weather conditions. However, if a lens features focal length and f-stop capacities that work together to answer *most* of the operating needs established through the initial analysis, it will work with the camera selected to upgrade broadcast quality — even under the unusual shooting conditions facing the field camera operator. **BM/E**

*A new model of this lens features a built-in diascope for use with EFP microprocessor-equipped cameras.

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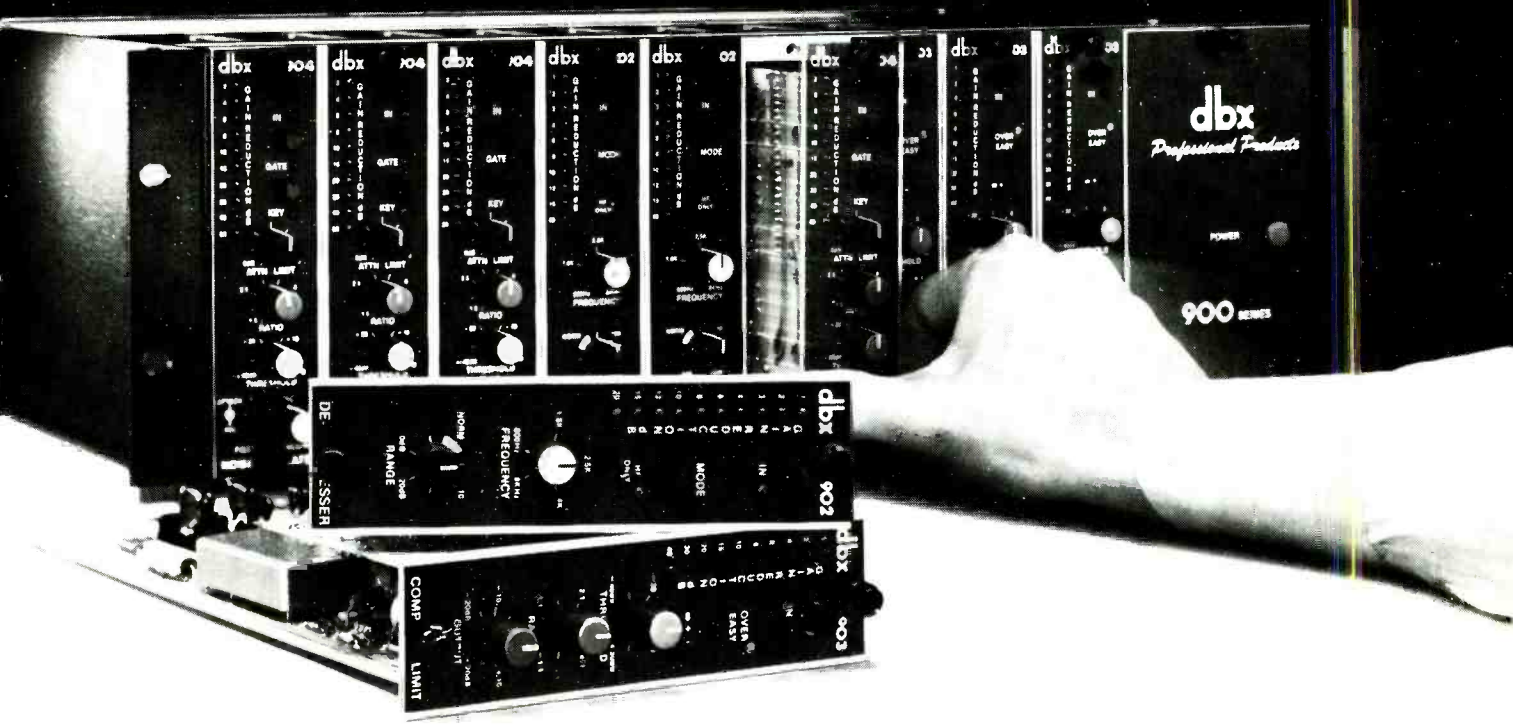

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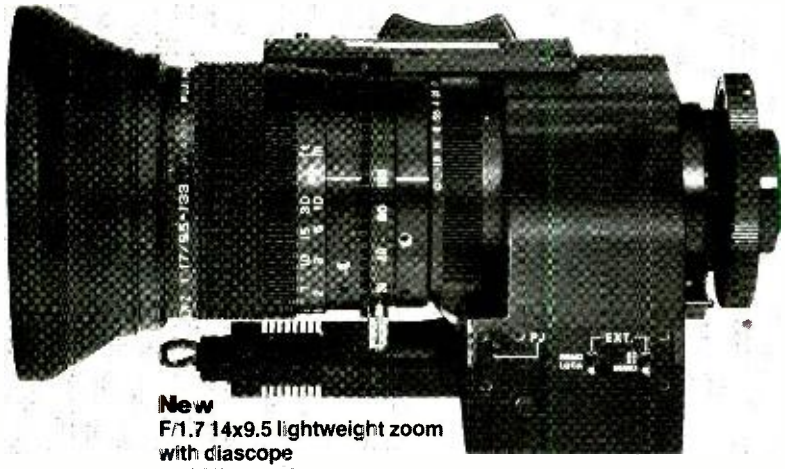

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HOW MUTUAL INDUCTANCE AFFECTS COIL PERFORMANCE

By Grant Bingeman

Careful design must be used to take account of mutual inductance in networks using adjustable coils.

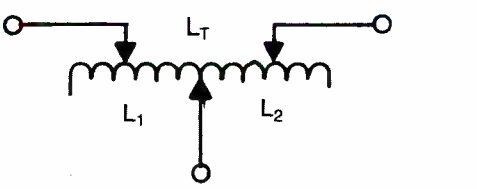


Fig. 1. When a single coil functions as two separate coils, impedance matching is complicated

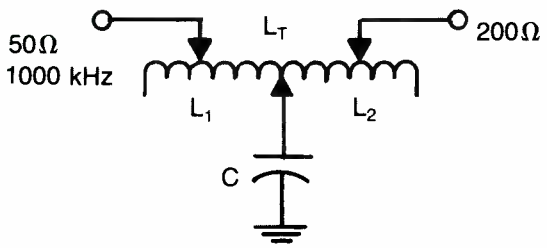


Fig. 2. Diagram shows a coupled coil system with shunt capacitor; text describes how impedance of system is matched

FORCING A SINGLE coil to perform the function of two separate coils (Figure 1) complicates the impedance matching process both from a design standpoint and from an adjustment standpoint. The inductance of a single-layer, air-core coil can be calculated using Equation 1. It is then a simple matter to calculate the mutual inductance between coil sections using this same formula and Equation 2. The coefficient of coupling is defined by Equation 3.

Equation 1:

$$L = \frac{R^2N^2}{9R + 10NS}$$

Equation 2:

$$L_{12} = \frac{L_T - L_1 - L_2}{2}$$

Equation 3:

$$K = \frac{L_{12}}{\sqrt{L_1 L_2}}$$

Where:

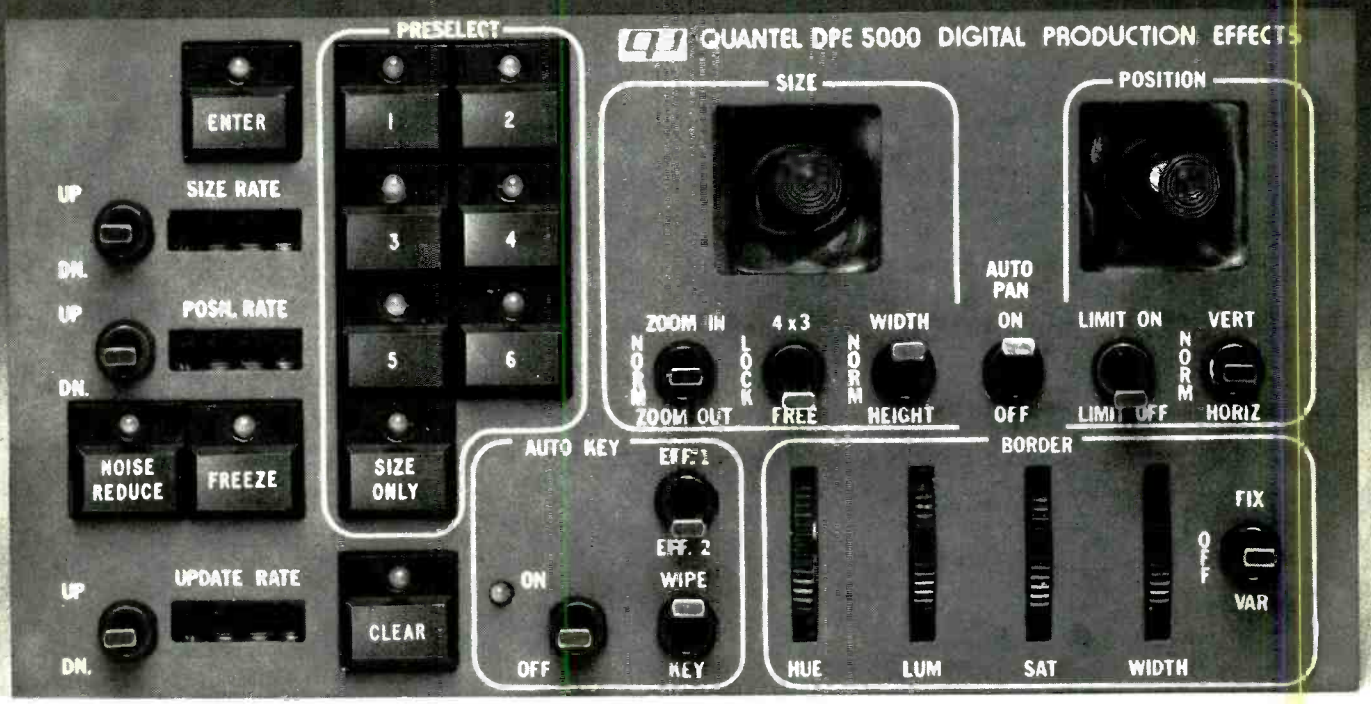
L = inductance in μ-Henries
L_{12} = mutual inductance between coils 1 and 2
R = mean radius of coil in inches
S = spacing between turns in inches
N = number of turns

The following design example brings out some of the pitfalls of coupled coil sections (Figure 2). To obtain the desired impedance transformation at a phase shift of −110 degrees and zero coupling, the following values are required:

$C = 1500$ pF
$L_1 = 19.83\ \mu H$
$L_2 = 28.52\ \mu H$

It might appear that a 50 μH coil would do for L_T, but such is not the case. To be specific, if the coil mean radius is three inches and the turn-to-turn spacing is one-quarter inch, then N_1 becomes 10.94 and N_2 becomes 14.02 from

Grant Bingeman is with the Broadcast Products Department of Continental Electronics.



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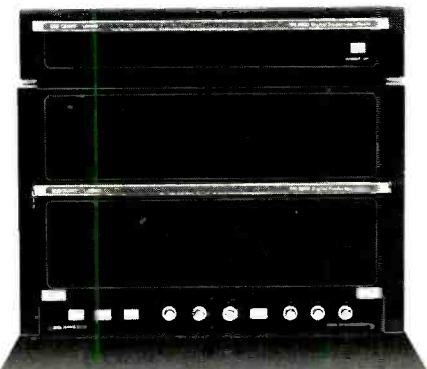

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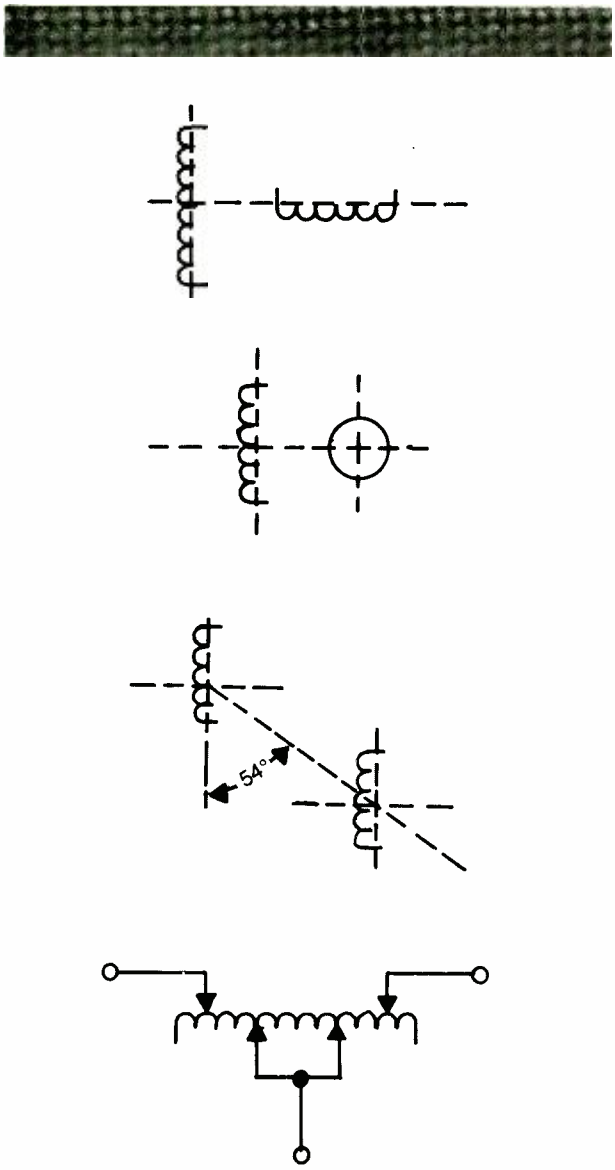

Fig. 3 (top left): coils are disposed for minimum coupling, orthogonally on coil centers. Fig. 4 (center left): diagram shows minimum coupling for parallel axes, by staggering at 54 degrees. Fig. 5 (bottom left): turns in center are shorted to increase separation between sections

Equation 4. It then follows that $N_T = N_1 + N_2 = 24.96$ turns, $L_T = 62.8\ \mu H$, and $K = 0.305$.

Equation 4:

$$N = \frac{5SL + \sqrt{25S^2L^2 + 9R^3L}}{R^2}$$

Equation 5:

$$Z_{in} = j\left(wL_1 - \frac{1}{wC}\right) + \frac{\left(wL_{12} + \frac{1}{wC}\right)_2}{R_2 + j\left(wL_2 - \frac{1}{wC}\right)}$$

But is 62.8 μH enough? The answer is *no*. Exact modeling of the circuit (including the mutual inductance) shows the input impedance of Figure 2 to be 102 − j19 ohms when k is .305. Obviously L_1 and L_2 are no longer the correct value for a 50 ohm match when mutual inductance is present. By iterating L_1 and L_2 in Equation 5, a good match was eventually obtained when L_1 was 27 μH and L_2 was 57 μH. L_T was then calculated to be 102 μH, and the phase shift across the network was seen to be −140 degrees! Thus the current in the capacitor is higher than anticipated and the bandwidth is degraded.

It is commonly held that coils should be configured orthogonally (with their axes at right angles) in order to minimize coupling. Actually, the only time this rule is valid is when orthogonality occurs on coil centers (Figure 3). Besides, the position of the coil center depends on how many coil turns are being used, which is often difficult to predict.

It has been shown[1] that coils with *parallel* axes have zero coupling when staggered at an angle of 54 degrees (Figure 4). In fact, if the coil axes in Figure 4 were orthogonal, maximum coupling would occur — just the opposite of what the orthogonal rule implies. Fortunately, because most coil windings sit inside of their supporting frames it is difficult to position the windings close enough to incur much coupling. For example, the greatest coefficient of coupling I was able to obtain between a 17 μH, half-inch tubing coil and a 10 μH, ⅜-inch tubing coil was 0.02 (−37 dB), and this was with the coil frames touching.

However, we have seen that coupling between sections of the same coil can be high. How can we minimize this coupling? One method is to short out some of the turns in the middle of the coil, thus increasing the spacing between active coil sections (Figure 5). Also, a coil with greater turn-to-turn spacing can be selected. It is also useful to know that coupling decreases as N_1 and N_2 increase. Ultimately, maximum isolation is obtained with separate, shielded coils. Such a situation may be called for in a diplexer or combiner design having a high isolation spec.

[1] Everitt, *Communications Engineering*.

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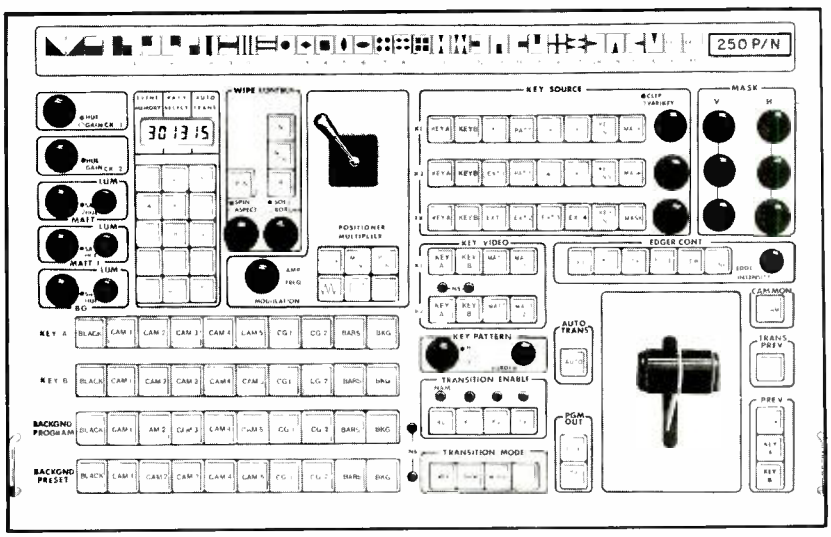

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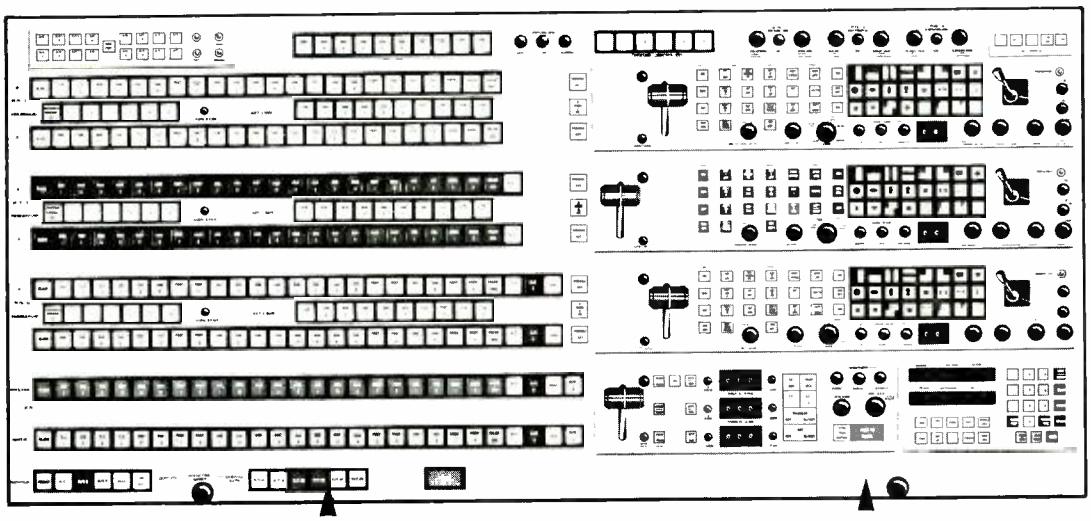

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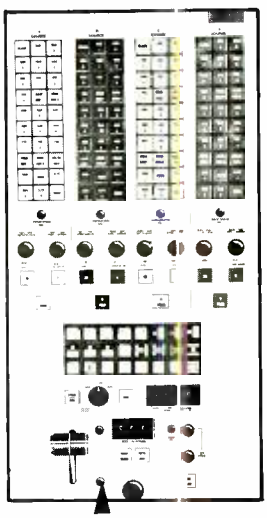

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Mutual Inductance

The next design example shows some beneficial effects of coil coupling. A shunt power divider of the type often used in phaser designs (Figure 6) normally employs a single variable coil for each tower. A certain amount of coupling occurs between the sections of coil on either side of the roller. This coupling tends to increase the input resistance and decrease the input reactance. This means lower Q and reduced input current. Coupling also reduces the phase shift across the power divider, thereby reducing the interaction between phase adjustments and power division adjustments.

k	Z_{in}	V_2
0	29.8 + j15.9	54.3 ∠ −23.0°
0.26	32.5 + j13.6	54.2 ∠ −17.5°

There are a number of other devices that exploit mutual coupling. A good example is the Shiffman shifter used in circularly polarized television antennas. So although there are many situations where coupling between coils or coil sections is especially undesirable, there are other situations where the magnitude of the effect is not significant, or where it is actually salutary. **BM/E**

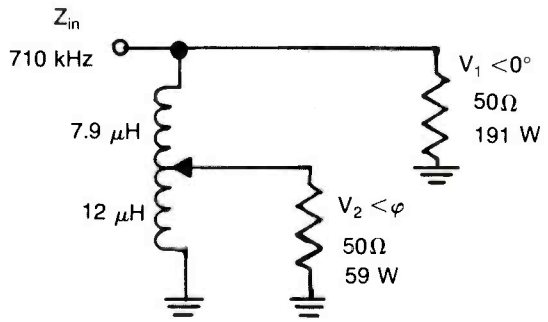
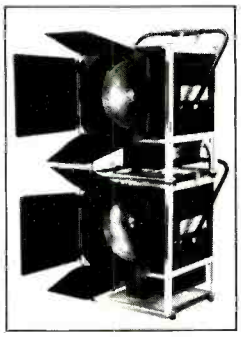


Fig. 6. Shunt power divider for antenna phaser has coupling between sections of coil on two sides of roller. This increases input resistance, for lower Q and reduced input current

"Working as we often do under less-than-controlled circumstances — where power is sparse, cables have to be stretched across large areas, and there are large crowds to contend with — we've come to appreciate the enormous versatility and rugged reliability of the RDS/HMI Fresnels," says Bill McManus, president of McManus Enterprises, the prominent production lighting design company (based in Bala Cynwyd, PA) and member of the official 1980 Winter Olympics lighting team.

"I applaud their original and innovative design!" says McManus. "Their unique cube-shaped design and rugged modular construction provide RDS/HMI Fresnels with distinct advantages over other HMI lights currently on the market.

Stackable



"An obvious advantage is that several luminaires can be vertically stacked for ease of transportation and convenient storage. It allows you to cut down on the size of the truck you're taking along... Stack them three or four high at the edge of a tail gate and strap them to the truck. When you pull up to a location, just undo one strap and start handing the lights off. This makes setups real quick and easy.

Convertible

"Another important feature is that RDS/HMI luminaires can be easily converted to incandescent Fresnels by simply replacing the HMI insert assemblies with optional insert assemblies which accept standard tungsten-halogen lamps. That means a lot to a company like McManus which is involved in both sales and rental of equipment, because shelf space is so valuable.

Wider Focusing Ratio

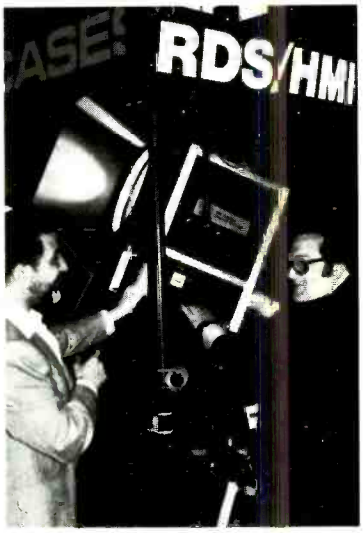
"The lights have such long range, such reach, we were able to use them at Lake Placid from the roof tops of two hotel buildings as if they were regular follow-spots!

"And the specially designed RDS/HMI Fresnel lens provides a smoother field of light as well as a wider focusing ratio from spot-to-flood.

Safe, Rugged and Reliable

"The entire RDS/HMI insert assembly — including lamp socket, ignitor circuitry and switches — can be removed easily without the use of tools for safe, convenient relamping.

"At Lake Placid, a couple of lights were knocked down accidentally. In both instances the lamps were not broken, and the fixtures fired right up within minutes of the accidents. I credit this to the specially designed, shock-mounted heat sink lamp sockets. We had no major breakage, no downtime, no leaks, and no loss of life to the lamps!"



Bill McManus (right) with Joe Tawil of The Great American Market, one of Cinema Products' major dealers for RDS/HMI 575W, 1200W, 2500W and 4000W Fresnel spotlights.

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IS THAT EXPENDITURE A REPAIR OR A CAPITAL INVESTMENT?

By Mark E. Battersby

Make the most of the Asset Depreciation Range (ADR) method of allocating your expenditures — including those mandated by safety laws!

SINCE THE ENACTMENT of the Federal Occupational Safety and Health Act of 1970, many employers have found themselves faced with the need to make substantial expenditures relating to the health and safety of their employees. Today's manager must not only be aware of those safety rules but also know how to finance those mandated changes. And, in this day and age of sky-high financing costs, what better financing tool than a reduced tax bill?

Obviously, when faced with unavoidable expenses, the most reliable source of relief is our basic tax law. Even this normally helpful safety valve, however, can't offer quick relief from the additional financial burden mandated under these proliferating laws. It all boils down to whether those required expenditures may be currently deducted in computing your tax bill or whether they must be capitalized and recovered through depreciation.

Under our voluminous tax laws, the reason for the expenditure is not relevant. The fact that it is forced does not make it currently deductible if it is otherwise a capital expenditure. Thus, whether a particular expenditure for health and safety is currently deductible depends solely on the nature of the expenditure.

As anyone who has ever tried can attest, it is difficult to state a general principle or principles by which current business expenses can be distinguished from capital expenditures. However, many experts feel that a capital expenditure is usually one which results in: (1) the creation or acquisition of a new asset with a life of more than one year; or (2) an increase in the value of an existing asset or a prolongation of its useful life; or (3) the fitting of an existing asset to a different use.

If (2) is taken literally, it could conceivably be argued that the fitting of a safety device to equipment rarely increases its value or prolongs its useful life. Indeed, the result is all too often a loss of operating efficiency.

Unfortunately, this sort of argument has not been accepted by the Internal Revenue Service nor by the courts. In fact, in one case involving safety devices on elevators, one court stated, "It is not necessary that the monetary value be increased or that the life of the asset be prolonged; a betterment of operating conditions, whether voluntary or involuntary, is a sufficient reason for capitalization."

The attitude of the courts appears to be this: the fact that the expenditure relates to another asset and does not increase its value or its life is irrelevant. It was made not for that purpose, but to protect workers, customers, or the public from injury. The expenditure resulted in an asset (the safety device itself) with a useful life of more than one year, and therefore must be capitalized.

Generally, then, if an expenditure for occupational health and safety is, under the usual tests, a repair, it is currently deductible. If under those same tests it is a capital expenditure, then the cost must be recovered through depreciation. But don't forget the repair allowance rules, under which anyone choosing the ADR system of depreciation may obtain current deductions for expenditures that might otherwise have to be capitalized.

Under the Asset Depreciation Range (ADR) system of depreciation, a taxpayer may continue to handle his expenditures for repairs, maintenance, rehabilitation, and improvement of his property as he has always done. He can continue to fret over whether to capitalize or currently deduct an expenditure on the basis of whether it appreciably prolongs the life of an asset, materially increases its value, or adapts it to a different use.

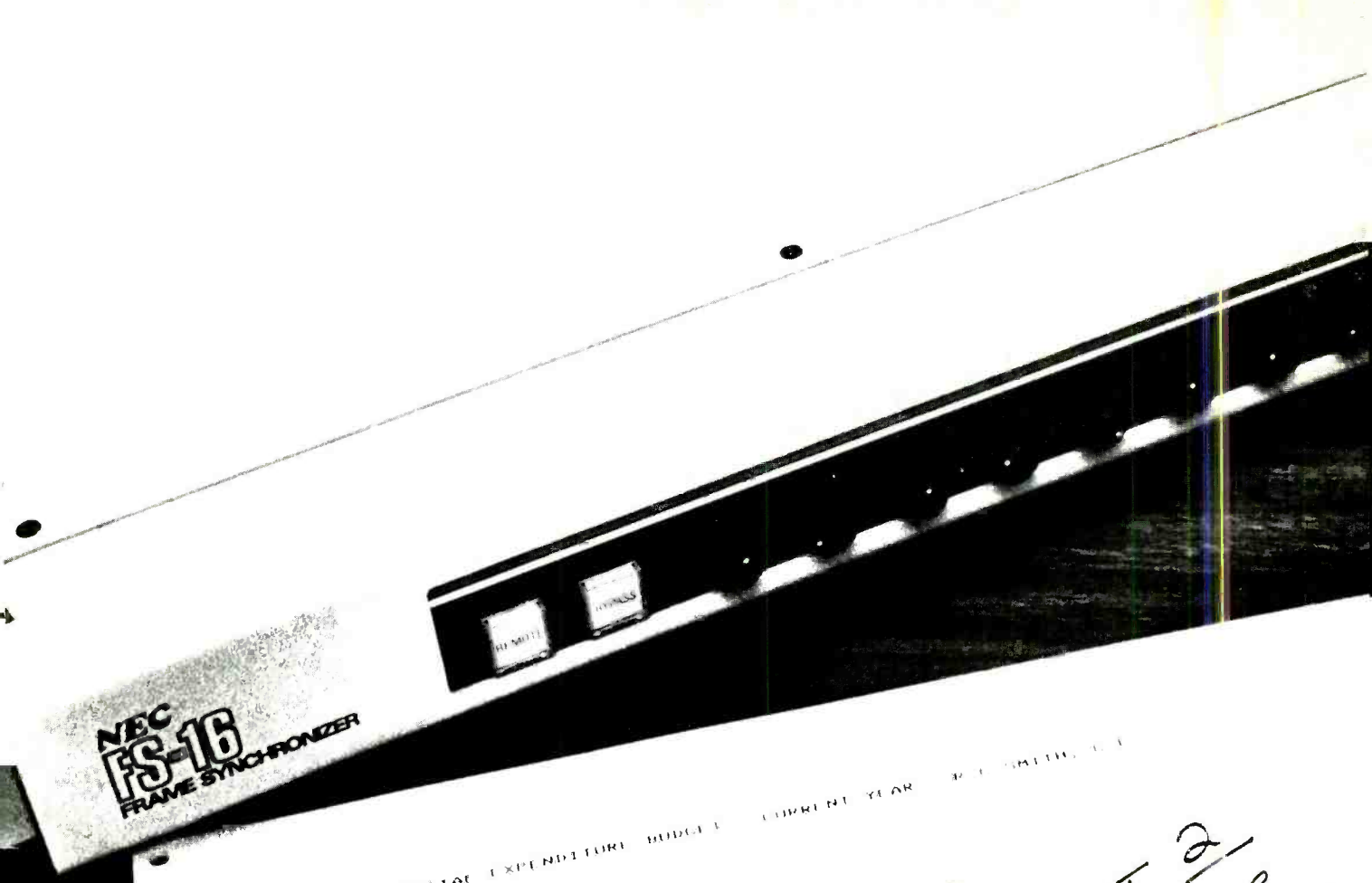
This decision, as pointed out, is a difficult one to make: the IRS and many taxpayers often disagree over whether those expenditures are repairs as opposed to capital expenditures.

However, should you elect the ADR system for the tax year you have the option to also choose the percentage repair allowance rule. This rule was designed to reduce the repair-capital expenditure question to a mechanical computation and thereby minimize the IRS-taxpayer controversy — at least in this area.

Under this rule, all expenditures for the repair, maintenance, rehabilitation, or improvement of the so-called "repair allowance property" that are not clearly capital expenditures are treated as currently deductible repairs to the extent that they do not exceed the repair allowance. The excess of expenditures over the allowance is usually treated as a property improvement for tax purposes.

For example, the normal useful life of assets employed in the radio and television broadcasting industry is six years. By electing the ADR system of depreciation, the

Mark Battersby is a tax and financial consultant specializing in broadcast operations. He works in Ardmore, Penn.



ENGINEERING CAPITAL EXPENDITURE BUDGET - CURRENT YEAR

QTY	ITEM	COST
1	FRAME SYNCHRONIZER	$ 26,000.00
1	SPARE KLYSTRON	55,000.00
1	DIGITAL EFFECTS	74,000.00
6	AUDIO DA'S	1,200.00
1	CHROMAKEY GEN.	6,800.00
4	VIDEO DA'S	1,800.00
3	TYPE C VTR'S	135,000.00
1	VIDEO SWITCHERS	3,000.00
2	CHARACTER GEN.	50,000.00
1	SERVICE SCOPES	8,000.00
2	A/V ROUTING SWITCH	31,600.00
1	ENG/EFP CAMERAS	88,000.00
2	PORTABLE MICROWAVE	17,000.00
1	CONDENSER MIKES	800.00
2	PORTABLE LIGHT SETS	1,600.00
8	ENG VANS	19,000.00
2	GAS GENERATORS	6,000.00
2	HEADSETS	2,000.00
2	DIGITAL TBC	13,000.00
10	3/4 VTR'S	6,000.00
1	AUTO DELAY LINES	5,500.00
2	AUDIO AMPS	1,500.00
2	AUDIO DECKS	10,000.00
3	AUDIO MIXERS	900.00
2	AUDIO CONSOLE	22,000.00
1	STUDIO LIGHTS	6,000.00
18	PROM PROGRAMMER	2,000.00
1	WORK BENCHES	1,200.00
4	WORK STOOLS	500.00
4	RF GENERATOR	3,200.00
1	FREQ. COUNTER	8,000.00
1	SWEEP GENERATOR	3,000.00
1	DIGITAL VOM'S	1,800.00
3	AUDIO CART MACHINE	1,500.00
1	AUX BUS FOR SWITCHER	10,000.00
1		

TOTAL DEPARTMENT BUDGET	$ 410,800.00
TOTAL SPENT TO DATE	335,684.50
REMAINING BALANCE	75,115.50

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taxpayer can select a useful life that ranges anywhere between five and seven years. In addition to a wide choice of unquestioned lives for equipment, the taxpayer electing ADR can also elect to use the repair allowance, which happens to be 10 percent in this area. Thus, any expenditures up to 10 percent of the value of his repair allowance property may be claimed as an immediate repair deduction, unless they are *clearly* capital expenditures.

Remember, though, that the repair allowance may not be used unless the taxpayer elects ADR for the year involved. Even though he might not have any asset acquisitions for the year, it appears that he could still elect ADR for the year solely in order to qualify for the repair allowance.

The repair allowance for a class is obtained by multiplying the repair allowance percentage in effect for that class of assets by the average unadjusted basis of repair allowance property in that class. For instance:

Our broadcaster has an average unadjusted basis for its production assets of $100,000. With a 10 percent repair allowance, the broadcaster's repair allowance for that class is $10,000 (10 percent of $100,000). Thus, expenditures for repairs, etc., to repair allowance property in that class will be currently deductible to the extent that they do not exceed that $10,000. Any excess will, naturally, be treated as a property improvement.

In applying the percentage repair allowance (PRA) rule to real estate, each building is treated as a separate class. But two or more buildings operated as an integral unit, which would otherwise be in the same class, shall be treated as a single building and included in the same class for the PRA rule. Apparently this integrated treatment will apply for the PRA rule even though the buildings being operated as an integrated unit are of different vintages.

The average unadjusted basis of repair allowance property referred to in the rules and to which the repair allowance percentage is applied is simply the sum of the beginning and ending totals of the unadjusted basis of all the repair allowance property in a particular class divided by two.

We still have the question of whether or not those expenditures mandated by a variety of laws and regulations might be immediately deductible under the repair allowance rules. Thus, we need take a closer look at the tax law.

The percentage repair allowance applies only to expenditures for the repair, maintenance, rehabilitation, or improvement of so-called "repair allowance property." Repair allowance property includes all assets eligible for ADR depreciation and all assets that would otherwise qualify for ADR depreciation but were placed in service prior to the 1971 creation of ADR.

The rule: any expenditures that are clearly capital expenditures are not covered by the percentage repair allowance rule. Such expenditures are called "excluded additions" in the tax regulations. In other words, the percentage allowance rule specifically does not apply to an expenditure:

- that increases the productivity of an existing identifiable unit to more than 25 percent over its productivity

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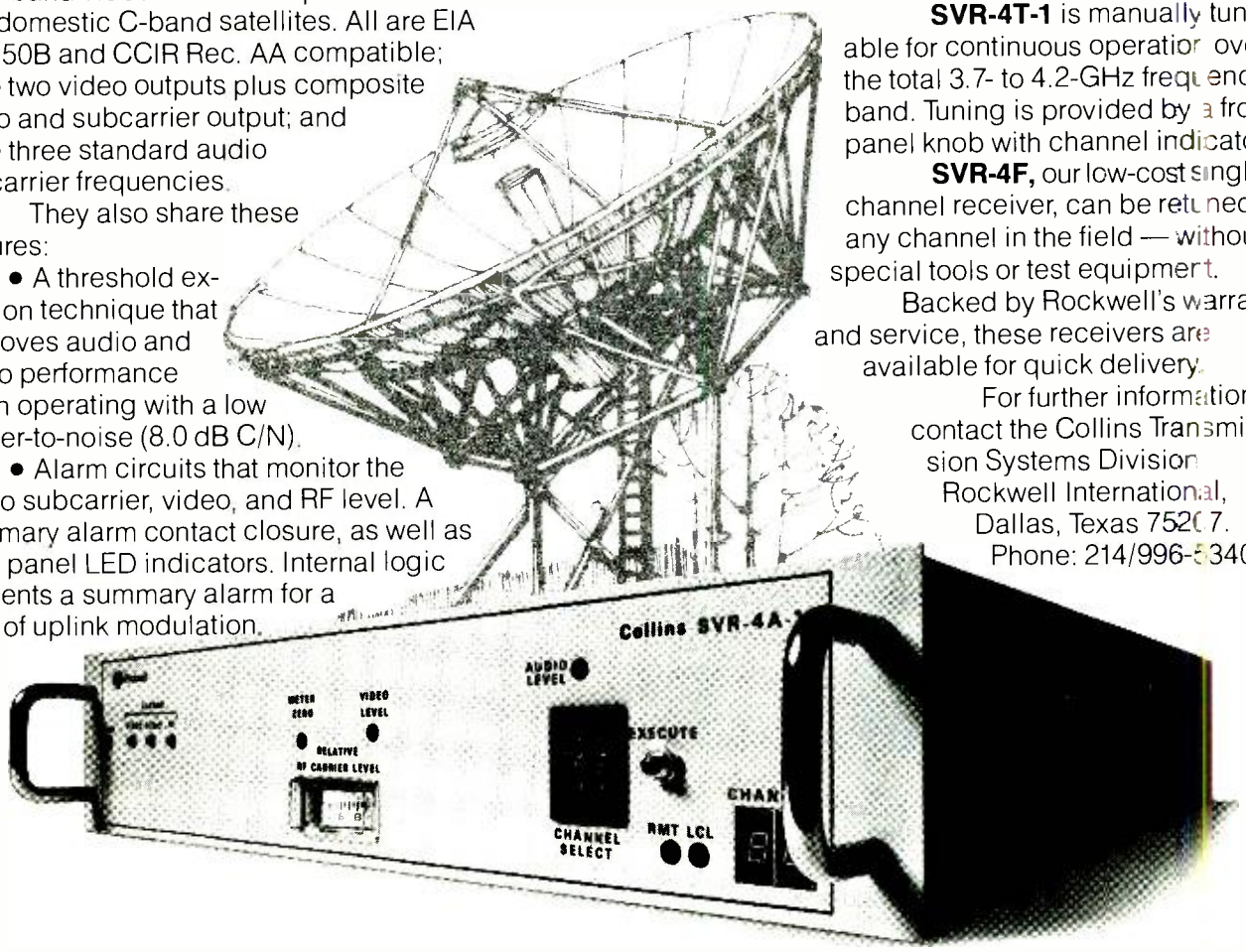

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Repairs, Investments

when first acquired (this does not include an expenditure extending a unit's productive life);

- that modifies an existing identifiable unit for a substantially different use;
- for an identifiable unit of property that is either an addition or a replacement; or
- for additional cubic or linear space in a building or structure.

In the case of machinery and equipment, a unit of property for purposes of the above categories is generally a piece of equipment or machine that performs a separate function and that one usually acquires, installs, and retains as a unit. As to buildings, a unit of property usually includes each building and all its structural components.

Should you choose the percentage repair allowance rules for those required or mandated expenditures that qualify, the rules are quite emphatic about the records that you must maintain. Quite simply, the repair allowance can be elected only if the books and records maintained are adequate to supply the information needed to support it.

Generally the records must be sufficient to identify the amount and the nature of the expenditure for specific items or groups of similar properties in the same class. In some cases where it is not always feasible to make specific identification, the amount of such costs may be allocated among the various assets being serviced by any method, as long as it is consistently applied. This may be the situation where expenditures relate to property that is partly in one class and partly in another, to property that is partly repair allowance property and partly not, or to assets of different types in the same asset class.

Naturally, where an allocation is made because specific identification is not feasible, the reasonableness of the allocation will depend on the past experience of the taxpayer, the relative bases of the assets in the class, the types of assets involved, and the relationship to specifically identifiable expenditures.

If you choose the percentage repair allowance rule, whether for mandated improvements or in the normal course of your tax planning, the excess of the expenditures for repair, maintenance, rehabilitation, and improvement of repair allowance property over the repair allowance is called a "property improvement." This excess is capitalized in a so-called "special basis vintage account" for the tax year. Its unadjusted basis (the amount capitalized) is depreciated over the depreciation period for this special basis vintage account.

Should you choose to follow the general rule for repairs and capital expenditures, each item determined to be a capital expenditure is also called a property improvement. It is capitalized in a vintage account for the tax year and depreciated under the ADR system.

To summarize, the law often requires the modification of your assets. This often expensive process has been determined by the courts to be, usually, a capital expenditure. However, in any case where there might be any doubt, using the percentage allowance rules under the Asset Depreciation Range system may help you reduce your out-of-pocket expenditures with an immediate tax write-off for "repairs." When all else fails, the depreciation write-off provides slower relief from those costly new laws and rules. **BM/E**

Don't let your station sound like a phone booth.

Every broadcaster knows the problems of on-air telephone links. The garbling when announce-feeds go out simultaneously through the board and the phone. Or the mysterious cutoffs in the middle of an important interview when line noise or sibilants generate 2600 Hz for a disconnect signal.

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BM/E NEWS FEATURE

NAB Radio Programming Conference Offers Marketing, Management, And More

MORE THAN 1600 radio broadcasters, about half of them program directors, came to New Orleans in late August for NAB's Radio Programming Conference, which many observers believe will become *the* annual radio event.

While Wayne Cornils, NAB's radio vice president, and other NAB officials declined to describe the NAB RPC as a direct competitor to the National Association of Radio Broadcasters' upcoming conference, the organizations' 1981 conferences will go head-to-head (September 20 to 23). NAB's RPC will be held on those dates in Chicago while the NRBA meets in Miami Beach. While not yet as big as the NRBA conference, NAB's RPC reached new records this year in the number of delegates, number of exhibitors, and number of hospitality suites.

Moreover, the general character of the exhibits, while still focusing on software, showed significant participation from hardware exhibitors including Harris Corp., LPB, Broadcast Controls, Broadcast Electronics, Pacific Recorders, Audio & Design Recording, Ursa Major, and some eight others. Though participating manufacturers were limited to displaying equipment in the program chain (no RF), the large automation systems, consoles, turntables, and cart machines lent an air of "technology" to the otherwise heavy concentration of research companies, promotional novelty companies, program syndicators, and promotion/marketing firms. Since few engineering personnel attended the RPC, several hardware manufacturers related humorous stories of explaining complicated technology to program directors who tended to lose track of the discussion just after the model number was mentioned. Nevertheless, there was a general feeling among the hardware exhibitors that the show was worthwhile since it gave them an opportunity to discuss their products with general managers and program directors whose operational needs often influence final purchases.

As if to underscore this situation, a session on "Engineering for the PD" led to a lengthy discussion by panel members of what they saw as the primary block to productive relations between programming and engineering. Tom Rossback of Harris Corp., one of the panelists, said that he had been keeping track of PD language and that the latest term he's been trying to translate into engineering is a sound quality called "cosmic." The problem of language seemed generally to be the single greatest concern of panelists and members of the audience. One audience member, however, touched on a complaint of radio news departments and stations that use a talk format. Said the delegate, "There doesn't seem to be any attention given by manufacturers to the needs of news/talk radio." He complained of a lack of truly integrated and high-quality systems comparable to systems designed for television ENG.

Exhibits offer some new things

While NAB has been the traditional launching pad for major new products, the NAB RPC had its share of new product introductions. Harris demonstrated a new option for its 9003 automation system: a memory backup permits full recovery of memory contents within a few seconds of a complete computer memory crash. LPB showed its new Citation Series console, which offers groups of six, eight, and 10 mixer dual stereo configurations. With many top-of-the-line features, the consoles represent a move by LPB to go after large market stations, suggests LPB's Harry Larkin.

Sono-Mag offered the RPC-100, a live assist-oriented microprocessor controller for radio automation. The theory behind the RPC-100 is that many stations are eager to replace older and larger systems, but that the new large automation systems are simply too expensive. The $4000 RPC offers simple operation and is user-installed. With it, the operator can step through events one at a time in manual operation, or walk away from it, allowing the digital clock system to step through long sequences of events.

Audio & Design Recording said that it would shortly introduce a new multiband processor, to be manufactured in the U.S. This change results from the observed habits of stations using ADR's splitter/combiners in such a way as to achieve the multiband effect.

Exhibits got good attention for their services and products

Harris's 9003 was one of several hardware exhibits taking part in the largely program-oriented conference

Another unique approach to semi-automation, or live assist, was shown by Cliff Gill Enterprises. This small microprocessor-based controller is designed to operate with the Eumig stereo cassette player/recorders. According to Gill, this system (the one shown used six Eumig cassette units) offers a very low-cost high-quality automation system with up to 10½ hours of total automation. Each of the Eumig decks costs about $1580, the amp and preamp section costs about $1100, and the controller will go for $1000. Total system cost would therefore be about $11,580.

The sessions on "People Manage-

ment'' got uniformly high marks. Radio, like other areas of the broadcast industry, has begun to work on the problems of growth. Since program directors and others have come from areas related more to talent than managerial skills, many feel the need for professional development in these areas. Workshops were well attended and reaction to the programs was favorable.

Radio, coming off one of its best years ever and looking forward to even more profitable years, has entered what is generally referred to as the age of marketing. Promotion, sales, and market research are getting more attention than ever, with particular attention being given to more professionalism in the marketing and promotion areas. As panelists at the promotion sessions indicated, station promotion directors have for too long gone unrecognized for their contribution to their stations' image and marketing efforts. One certain key that promotion directors are looking to is good market research.

Several companies exhibiting at the RPC showed new approaches to promotion and marketing, often including in their programs complete television, outdoor, print, and radio promotion campaigns. Increasingly, these campaigns are tied to solid market research and careful analysis of the station's market position. ABC Radio Marketing Services leaped into this area with a new project called ListenerScan. This research service is designed to offer data on target audience habits and attitudes gathered through scientific telephone survey approaches. ABC hopes to implement ListenerScan in any market where it can establish four or more clients. Also available from ABC is a carefully designed image campaign including all media and careful ''tip'' information for the client.

The Webster Group, New York, was one of several companies offering an amalgam of research based on Arbitron data. Using a special program, The Webster Group will offer copious reports to its clients analyzing Average Quarterly Hour trends, demographics, listening habits, and other data. Client stations can select from a number of program reports that will tell them how their performance compares to their projections or how competitors are doing.

With several companies offering a variety of research based on Arbitron ratings, and several more offering computerized research on play lists, program directors and managers will receive enormous help as they enter radio's age of marketing. **BM/E**

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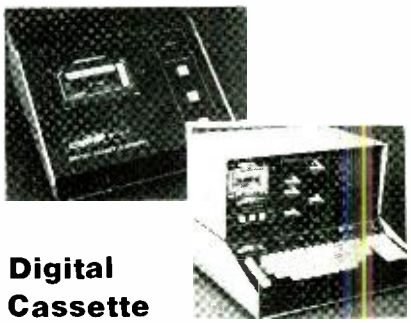

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BM/E NEWS FEATURE

SMPTE's Fall Conference Is Largest In New York

THE 122ND Technical Conference of the Society of Motion Picture & Television Engineers is being held November 9 through 14 at the New York Hilton Hotel in New York City. The 300-booth exhibition space, already sold out, will be occupied by 144 companies, representing most of the major manufacturers and suppliers of professional movie and television equipment. The exhibit is the largest SMPTE show to date and will open Tuesday, November 11. Both video and film equipment will be on display under one roof.

In addition to the exhibition, the SMPTE conference will feature five days of sessions on new developments in film and TV technology and applications.

The first session, held Monday afternoon, will discuss "The History of British Television," with papers read by Phil Sidey and Robert Longman of the BBC, with David Glencross of the Independent Television Authority.

Tuesday morning's sessions will be on "Motion Picture Film Production" and "Television Transducers," with papers on the following topics: "Videodisc Replication with Photo-polymerizable Resins," by Don Kerfeld, 3M Company; "Design of a Television

continued on page 106

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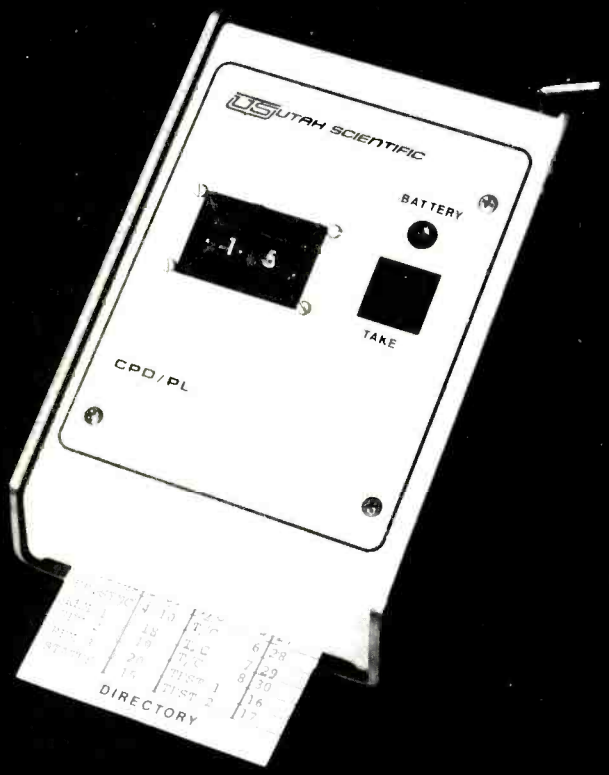
TIRED OF PATCHING FEEDS TO THE GM'S OFFICE?

(OR TO OTHER OFFICES, CLIENT VIEWING ROOMS, EDIT SUITES, ETC.?)



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Utah Scientific's new CPD/PL control is a **Party Line** panel with a single coax control connection — no bulky cables to install. It is powered by a transistor radio battery providing many years life expectancy. It features a pull-out directory to aid the operator in source selection.

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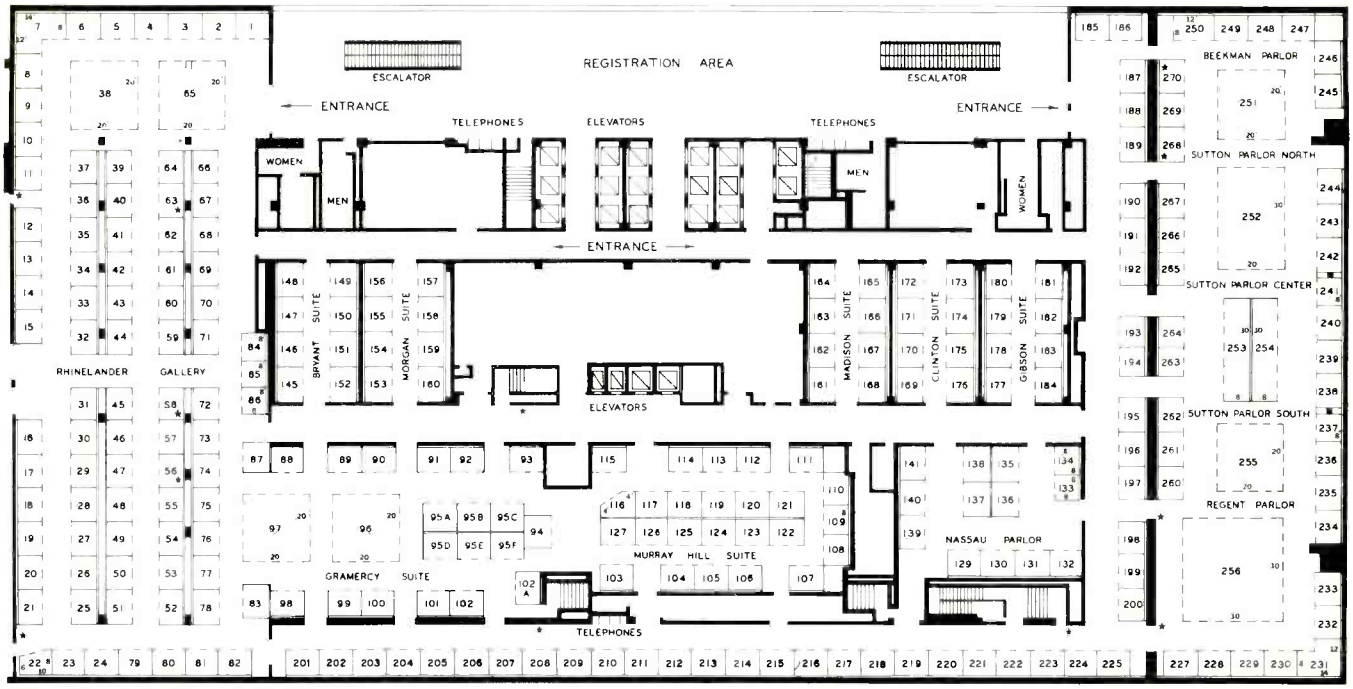
Monitor: A New and Accurate System for Lining Up System Timing and Subcarrier Phase," by a representative of the Lenco Company; "A Primer on TV Pickup Tubes," by Greg Murphy of Amperex; and "Current Developments in TV Camera Tubes," by K. Blair Benson of Videocorp of America.

On Tuesday afternoon, sessions will be held on "Computer Graphics." A

Map To Exhibition Floor, New York Hilton



See directory to booth numbers, p. 104

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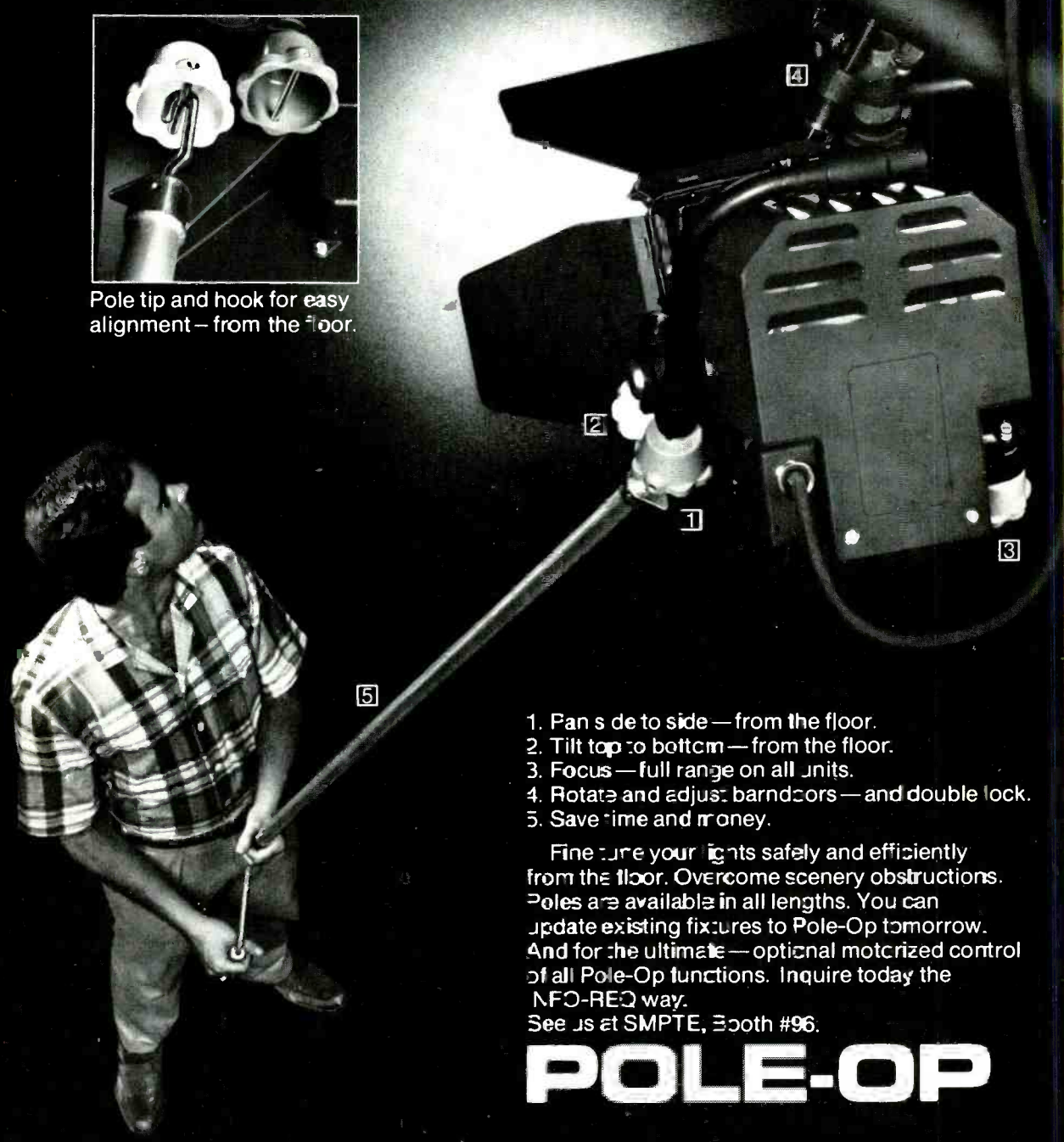

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paper will be read on "Character Generators and Allied Species" by E. Leonard of Da Vinci Research Group.

Wednesday morning's session will cover "Television Production and Post-Production," and a paper by Donald Fink of IEE on "The Forces at Work Behind NTSC Standards" will be read, as well as a paper on "Productive Coding of Composite NTSC Color Television Signals." The Wednesday afternoon session will deal with "Problems of Maintenance"; a paper on "Diagnostic Techniques" by W. Welland of Systems Concepts is the focal point.

Thursday morning's session will cover "Lighting and Sound for Television and Motion Pictures." The afternoon session will deal with "Video Tape Recorders." A paper will be read by Charles Ginsbury of Ampex.

Friday morning, a session will be held on "Digital Television" and the current developments in this field.

Two other papers of particular interest to broadcasters are "Design of Equipment" by B. Williams of Ampex and "Design of Plant" by Steven Smith of Broadcast Technology Corporation.

This year's SMPTE exhibit is larger than ever, with 144 companies showing film and video equipment

Numerous social activities are planned including a Sunday evening gala, Monday Awards Luncheon, Wednesday Cocktail Party and Banquet, plus a full week of activities for guests.

Further information about the Conference and Exhibit is available from SMPTE, 862 Scarsdale Avenue, Scarsdale, New York 10583. **BM/E**

Budgeting For a "Super Editor"?

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You don't have to spend a fortune to get the creative flexibility, speed and convenience that you want in a videotape editor.

Over 400 Tempo 76 and Vanguard editing systems are in service at post-production facilities all over the world. No one else in our price/performance bracket has more editing systems in operation.

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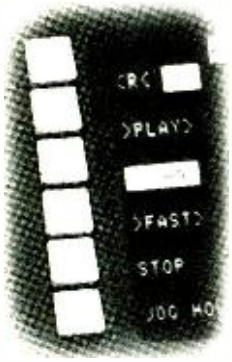
CMX SETS ITS MARK ON FAST, EASY EDITING

Watch Our SMART KEYS Give You The Edge.

Imagine a revolutionary new editor with a set of function keys that actually run along the edge of the CRT with the CRT itself labeling the keys. Press the right key for the function you want it to perform; then watch it take you through the editing process. Gone forever is the editor's search for a small key-cap legend on a complex keyboard. The editor/machine interface is reduced to the point of transparency. We call these keys SMART KEYS.™ We call our new editor THE EDGE.



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The EDIT mode describes the type of edit—video, audio 1, audio 2, transition type, split, and two general purpose interfaces (GPI's) for control of external automatic switchers, character generators, digital video effects and still stores.

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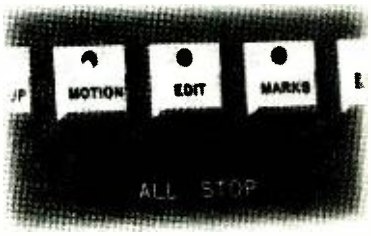
The MARKS mode allows full access to time code numbers including set, trim, backtime, and transfer when you need them, yet another CMX exclusive.



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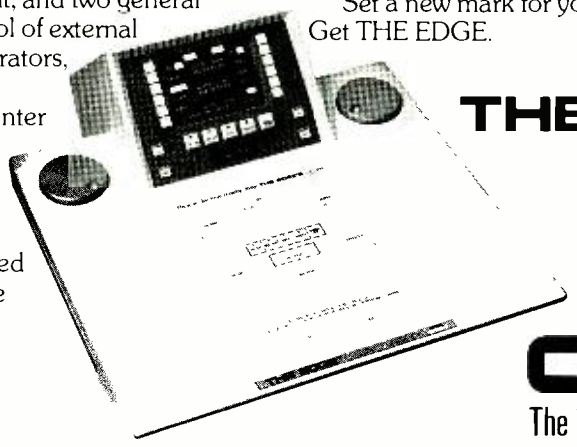

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Circle 168 on Reader Service Card

BM/E NEWS FEATURE

AES Reaching Out For The Eighties

THE SIXTY-SEVENTH CONVENTION of the Audio Engineering Society is running from October 31 through November 3, 1980 at the Waldorf-Astoria Hotel and has been greatly expanded since last year to include 72 technical papers describing the latest research and development in audio technology along with 10 hands-on workshops and 10 technical sessions, plus a full range of exhibitors.

Of particular interest to broadcasters will be the session on Monday morning November 3, during which the following papers will be read:

"Engineering an LEDE Control Room for a Broadcast Station" by Don Davis; "Television Speaking to Deaf Americans" by John Ball; "The Conversion from Power-matched to Voltage Audio Distribution Systems" by Richard Hess; "A High-Quality Multichannel Digital Audio Transmission System for Television Networks" by Ed Williams; "The Subjective Effects of Phase Shift in the Monophonic Reproduction of Stereophonic Sound" by

List Of AES Exhibitors

AMPRO/SCULLY
ANALOGIC CORPORATION
ANVIL CASES, INC.
APHEX SYSTEMS LTD.
ASHFORD AUDIO PROD. CO. INC.
ASHLY AUDIO, INC.
ASSOCIATION OF SOUND & COMMUNICATIONS ENGINEERS
AUDICO, INC.
AUDICON MARKETING GROUP
AUDIOARTS ENGINEERING
AUDIO & DESIGN (RECORDING) LTD.
AUDIO DEVELOPMENTS
AUDIO KINETICS (UK) LTD.
AUDIO PROCESSING SYSTEMS, INC.
AUDIO-TECHNICA U.S., INC.
AUDIO BY ZIMET, INC.
AUDIOTECHNIQUES, INC.
AUDITRONICS, INC.
BASF SYSTEMS
BEYER DYNAMIC
BGW SYSTEMS, INC.
B&K INSTRUMENTS
BOSE CORPORATION
THE BTX CORPORATION
CADAC/IRV JOEL
CALZONE CASE CO.
CERWIN-VEGA
CETEC GAUSS
CETEC VEGA
COMMUNITY LIGHT & SOUND, INC.
CON BRIO
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CONVERGENCE CORPORATION
COVER PUBLICATIONS
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CROSS COMPANY LTD.
CROWN INTERNATIONAL, INC.
DAVID LINT ASSOCIATES, INC.
dB-CASSETTE
dbx, INC.
D&D ENGINEERING
DELTALAB RESEARCH, INC.
DESIGN ELECTRONICS
DOLBY LABORATORIES, INC.
EASTERN ACOUSTIC WORKS, INC.
ELECTRO-HARMONIX
ELECTRO-VOICE/TAPCO
EMILAR CORPORATION
EMPIRICAL AUDIO
EUMIG (USA) INC.
EVENTIDE CLOCKWORKS, INC.
FAIRLIGHT INSTRUMENTS
FURMAN SOUND, INC.
GOTHAM AUDIO CORPORATION
GRANDY, INC.
HARRISON SYSTEMS, INC.
HEINO ILSEMANN GmbH
HEWLETT-PACKARD COMPANY
H.H. ELECTRONICS, INC.
HM ELECTRONICS, INC.
HUTCO
INFONICS
INOVONICS, INC.
INSTITUTE OF AUDIO RESEARCH
INTERFACE ELECTRONICS
INTERNATIONAL AUDIO, INC.
INTERNATIONAL CONSOLES CORP.
ITAM
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Mr. Vogelgegesang; "The Pressure Zone Microphone Technique for Broadcast and Television" by Kenneth Wahrenbrock and David Andrews; "Controlling Audio Quality in a Complex Broadcasting System" by Richard Knowles; and "The Peak Program Meter and the VU Meter in Broadcasting" by Hans Schmid.

Workshops stressing the practical approaches to modern technology will include "Digital Editing," "Sound Reinforcement," and "Audio in Medicine" (the bodily effects of sound), all being held Friday, October 31. The following Saturday, there will be a workshop on "The Potentials of Personalized, Private Recording Studios"; an Educational Fair during which various educational institutions will present their communications programs; and a workshop on "Video for Audio." Sunday, two workshops on "High-Speed Duplication and Microphone Techniques" will be held, followed by a social hour and awards banquet. On Monday, two workshops will deal with "Multitrack Recorder Maintenance," during which representatives of various manufacturers will be on hand to give instruction and advice.

Exhibits will include those of manufacturers from all over the world

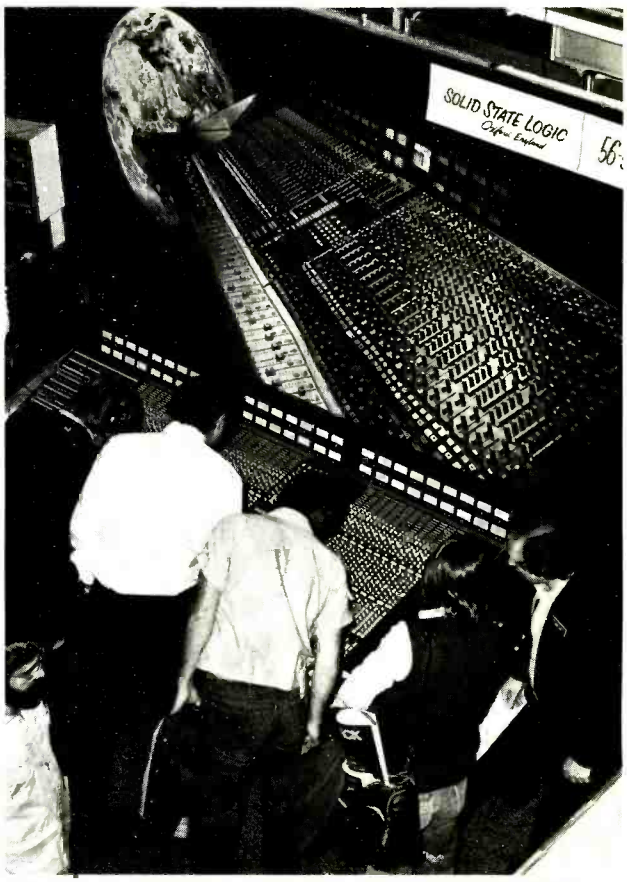
Technical sessions will include "Transducers, Audio Recording and Reproduction," "Studio Technology," a two-part "Signal Processing and Microprocessor" workshop, "Sound Reinforcement and Acoustics," and "Instrumentation," "Digital Techniques," "Broadcast Audio," and "Electronic Music." Two workshops of special interest for the broadcaster are "Practical Video for the Audio Engineer" and a special workshop on microphone usage.

Sunday morning at the Waldorf, a lecture and demonstration of antique musical instruments by noted authority Lillian Kaplan is planned.

The convention also is featuring studio tours of some of the most advanced recording studios in New York City, a visit to the Metropolitan Opera, and a scenic trip of the lower Hudson River Valley. Entertainment during the AES Awards Banquet on Sunday night will be music by the Darius Brubeck Group, fusion jazz ensemble, atop the Starlight Roof of the Waldorf.

More exhibitors will be on hand than ever before, with approximately 180 companies showing the latest in audio products in an expanded exhibit area. These will include companies showing new digital product entries on five different levels of the convention hotel, including demonstration rooms.

For information and reservations contact Tim Cole, Audio Engineering Society, Inc., 60 East 42 Street, Room 2520, New York, N.Y. 10165, (212) 661-8528. **BM/E**



This year an expanded exhibit area will present new digital product entries and the latest in audio equipment

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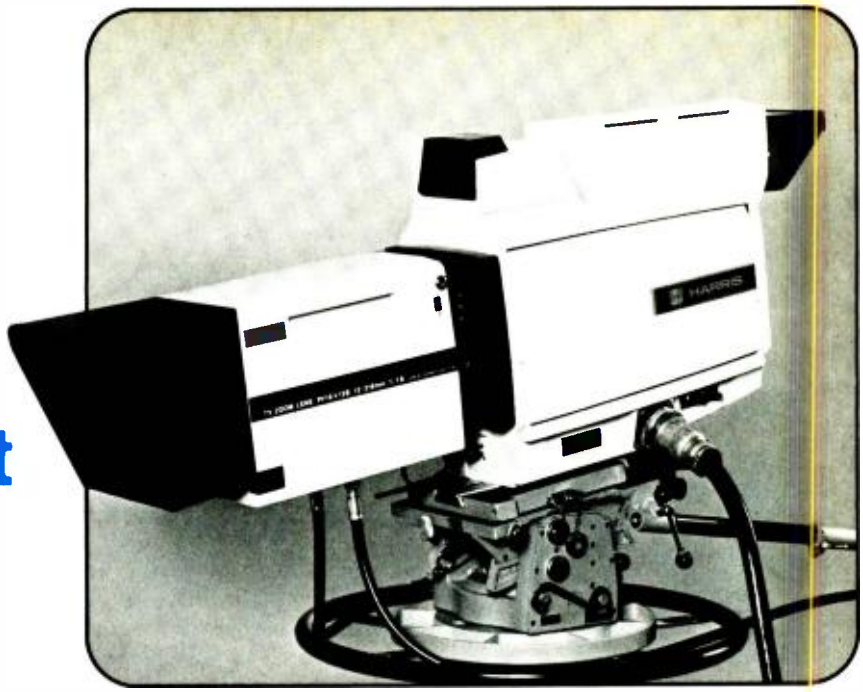

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INTERPRETING THE FCC RULES & REGULATIONS

Candidates And Section 315: Broadcasters Beware

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

DURING THIS ELECTION YEAR, candidates will spend more money buying commercial time from broadcasters than any other single campaign expense. This is particularly true with respect to television. The role of television in presidential campaigns has prompted the U.S. Court of Appeals to declare in a recent decision that "there can be no doubt that we are in the era of television campaigning."[1] Broadcasters must tread carefully when confronting the responsibilities imposed on them during elections by the Communications Act and the Rules and Regulations of the Federal Communications Commission.

Perhaps one of the more controversial portions of the Act is Section 315(a), the so-called "equal time" provision. Much of the recent campaign reform legislation, as well as Federal Election Commission regulations, requires many things of candidates and their organizations. Section 315 places responsibilities on you, the broadcaster. Recently, the Court of Appeals decided a case involving Section 315(a) brought by the Kennedy for President Committee[2] against the FCC. This article will briefly examine the case and outline some steps broadcasters can take to avoid potential difficulties.

Section 315(a)

Section 315(a) of the Communications Act, as amended,[3] requires that broadcasters give all legally qualified candidates[4] equal opportunities to use these broadcasting facilities once an opposing candidate has been allowed to "use" the facilities. Four types of appearances are exempted from this requirement: (1) newscasts; (2) news interviews; (3) some news documentary programs (see note 3); and (4) on-the-spot news coverage.

The Kennedy case

On February 13, 1980, President Carter called a news conference, his first in many weeks. Ostensibly, he wished to discuss such issues as the hostages in Iran and the economy. The New Hampshire primary was February 25, 1980, less than two weeks away. The Kennedy Committee wrote the three major networks, seeking an equal opportunity to present the Senator's positions. The networks refused the request. In letters to the networks, as well as subsequent complaints to the FCC and the brief to the Court of Appeals, the Kennedy Committee argued that President Carter's press conference was not entitled to an exemption as a bona fide news event. Rather, the press conference was a partisan, political attack on Senator Kennedy, which sought to maximize viewer interest prior to the New Hampshire primary. This was said to be a "use" in violation of Section 315(a). As evidence, the Kennedy Committee cited the example of a Providence, Rhode Island television station which discontinued the telecast because the general manager felt the press conference was addressing campaign issues. As such, the Committee argued, Senator Kennedy was entitled to an equal amount of free time to respond.

Following the network refusal, the Kennedy Committee complained to the FCC. Their petition was dismissed at the staff level and by the full Commission. The Kennedy Committee subsequently appealed.

The court decision

The Court of Appeals refused to accept the arguments of the Kennedy Committee and upheld the Commission decision. The court affirmed the Commission's decision that President Carter's news conference constituted a bona fide news event and, therefore, was exempt from the equal opportunities provision of Section 315. The issue was whether the networks had independently exercised "good faith journalistic judgment" in concluding that the press

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[1] *CBS v. FCC* ___F2d___(D.C. Cir. 1980), quoting Wick, "The Federal Election Campaign Act of 1971 and Political Broadcast Reform," 22 DePaul L. Rev. 582 (1973).

[2] *Kennedy For President Committee v. FCC*, No. 80-1482, Slip Opinion, (D.C. Cir. August 6, 1980).

[3] 47 U.S.C. §315(a) reads: "If any licensee shall permit any person who is a legally qualified candidate for any public office to use a broadcasting station, he shall afford equal opportunities to all other such candidates for that office in the use of such broadcasting station: provided, that such licensee shall have no power of censorship over the material broadcast under the provisions of this section. No obligation is imposed under this subsection upon any licensee to allow the use of its station by any such candidate. Appearance by a legally qualified candidate on any (1) bona fide newscast; (2) bona fide news interview; (3) bona fide news documentary (if the appearance of the candidate is incidental to the presentation of the subjects covered by the news documentary); or (4) on-the-spot coverage of bona fide news events (including but not limited to political conventions and activities incidental thereto), shall not be deemed to be use of a broadcasting station within the meaning of this subsection. Nothing in the foregoing sentence shall be construed as relieving broadcasters, in connection with the presentation of newscasts, news interviews, news documentaries, and on-the-spot coverage of news events, from the obligation imposed upon them under this Act to operate in the public interest and to afford reasonable opportunity for the discussion of conflicting views on issues of public importance."

[4] The definition of "legally qualified" is an issue all of its own. Please consult the FCC's political primer, "The Law of Political Broadcasting and Cablecasting," which the FCC has said it will mail to all broadcasters.

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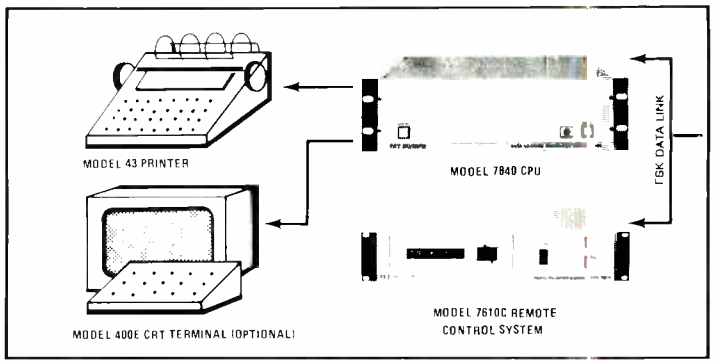

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conference was newsworthy. According to the decision, the Commission properly honored previous court decisions that, absent evidence of the broadcaster's intent to advance a particular candidate, the judgment of newsworthiness of an event is left to the reasonable judgment of news professionals, i.e., the networks and licensees. In all such cases, the absence of good faith by a broadcaster must be proven by the candidate who seeks an equal opportunity to respond. In this case, the Kennedy Committee failed to prove that the networks had not shown good judgment.

The court noted that President Carter's press conference met the three criteria set by the Commission in its *Aspen*[5] ruling on candidates' press conferences: (1) whether the conference is broadcast live; (2) whether it is based upon the good faith determination of the broadcaster that it is a bona fide news event; and (3) whether there is evidence of broadcaster favoritism.

In *Kennedy* the court wrote that:

> "There is no suggestion that in any instance the press conference was not broadcast live, nor even so much as a whisper of network bias in favor of the President. Both the Broadcast Bureau and the Commission thus correctly perceived the only issue to be whether the networks had exercised good faith journalistic judgment in concluding that the event was newsworthy."[6]

The court also dismissed as irrelevant the Kennedy Committee's assertion that the President's press conference was:

> ". . . orchestrated as a partisan political event designed to gain maximum political exposure in the New Hampshire primary and subsequent election — a fact recognized here and throughout the country if not at the Commission."[7]

The court noted here that in its *Chisholm* decision, which upheld the FCC's *Aspen* ruling, "we fully explained the insignificance of the candidate's motivation in appearing on the broadcast program."[8]

Conclusion

The court sanctioned the Commission decision denying Senator Kennedy equal opportunity to respond to the President. However, it did affirm that the candidate's access rights under Section 315 are "self-executing and mandated for all legally qualified candidates" once another candidate "uses" a station appearance outside of the provisions of the rule. Responsibility rests with the broadcast licensee and his agents to see that when a candidate appears on the station, either (a) the appearance falls within one of the four exceptions or (b) opposing candidates are given equal opportunities to broadcast air time.

Please note that the equal opportunity provision places a heavy burden on broadcasters to exercise their judgment carefully. Broadcasters are strongly urged to review the Commission's Political Primer[9] and discuss these and all related matters with communications counsel. **BM/E**

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[5]*Aspen Inst. Program on Communications and Society*, 55 FCC 2d 697 (1975), *aff'd sub. nom. Chisholm v. FCC*, 538 F2d 349, 176 U.S. App. D.C. 1, *cert. denied*, 429 U.S. 890 (1976).

[6]*Kennedy v. FCC supra*, Slip Opinion at 18-19.

[7]*Id.* Slip Opinion at 26, quoting Brief for Petitioner, Kennedy for President Committee.

[8]*Id.*

[9]See note 4.

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

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

20. Frame Synchronizer Remote Freeze

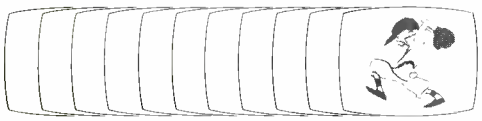
Jeff Corwin, Maintenance Engineer
WJZ-TV, Baltimore, Md.

Problem: We needed the capability of freezing (freeze field) or "unfreezing" our ADDA VW-1 frame synchronizers from either the frame sync itself in ENG Control or from a remote position in Studio Control.

Solution: The freeze field switch on the VW-1 is a latching-type switch. When pressed, a ground closure is routed to three modules in the frame sync to generate a freeze field command. I needed to replace the mechanical switch latch with an electronic latch that could be toggled from more than one location to freeze or unfreeze the frame sync.

I replaced the latching SPDT switch on the front panel with a momentary SPST type. To provide an electronic latch, I used half of a 74LS76 flip-flop. When all inputs are tied high except the clock input at pin 1, each low-

ANIMATE STORE STILLS SQUEEZE IMAGES RECORD AND PLAY-BACK IN REAL TIME TO SINGLE FRAME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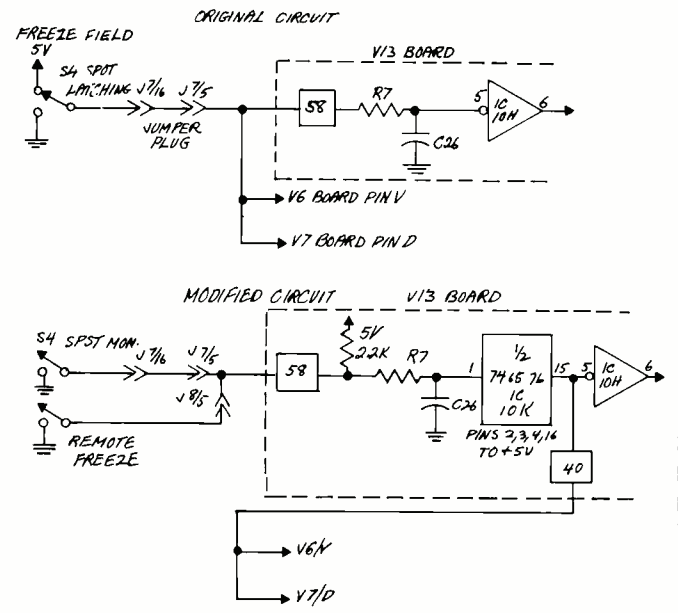
going pulse (switch closure) at pin 1 toggles the flip-flop. I installed the EC in unused position 10K of board V13 (memory control). This is a wire-wrapped board, making the installation much easier. The switch closure enters the board at pin 58 and then goes to a debounce circuit consisting of R7 and C26. I inserted the toggle circuit, with an input pull-up resistor, between the debounce network and IC 10H. The output of the toggle was connected to unused pin 40, and from there routed to boards V6 and V7. To drive a freeze lamp in the remote freeze switch, I connected unused pin 1 of a front-panel connector V7J1 to the freeze field switch lamp terminal. This made the freeze lamp available at pin 1 of the remote connector. The lamp driver, located in board V7, consisted of a 2N3906 transistor (Q3) switching 12 V to the lamp. I replaced it with a 2N2907A to handle the higher current needed.

The remote freeze switch is connected to remote connector J8, which is a 37-pin type D connector. The freeze switch contact is at pin 5, the lamp output at pin 1, and ground for the switch and lamp at pin 6.

Although I added one remote freeze switch, any number of switches could be paralleled as long as lamp drive current is taken into account. Also, freeze frame rather than freeze field could be used if desired by accessing the proper pins.

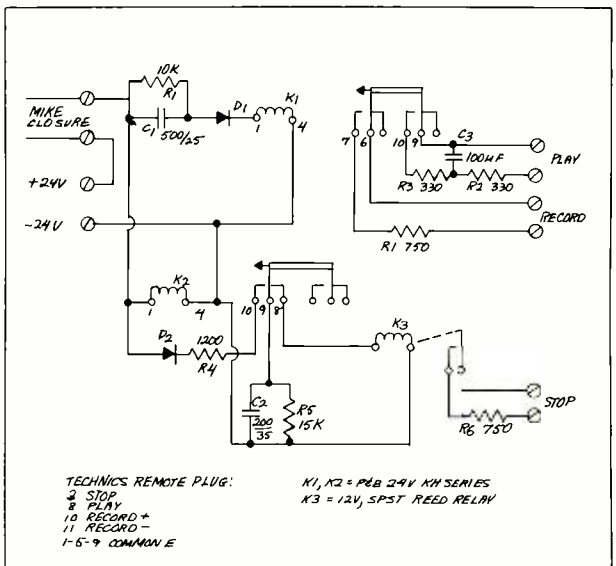


Corwin's remote freeze for frame synchronizers

21. Cassette Skim Closure

Robert M. Crotinger, Asst. Manager of Engineering
KFMB-AM/FM, San Diego, Calif.

Problem: We have been using various consumer-type cassette machines for "skimming" the announcer's voice for several years. Recently we purchased two Technics R5-M85 machines for this purpose. They are great machines, but the remote control plug pin functions seem to be a secret. The circuit shown is presently in use at KFMB



Crotinger's cassette skim closure circuit

for these machines and is, of course, adaptable to other machines as well.

Solution: When the mic relay closure occurs, 24 V dc is applied to R1, C1 in series with diode D1, and relay coil K1 in series. Charging current causes closure of K1 on a momentary basis. Resistor R1 limits the logic current drawn from the machine to only that necessary to close the RECORD function. With this machine it is necessary to close the RECORD function prior to the play function. R2, R3, and C3 provide the necessary delay for the play closure. C3 capacity can be decreased if a shorter delay is desired.

While the mic is on, the closure of 24 V remains and relay K2 also remains closed. This relay establishes a charge path for C2 and R5 through steering diode D2 and current limiting resistor R4, the path being provided through 9-10. Once the charge has been established, D2 prevents its flowing back in the reverse direction later.

When the mic circuit is opened and the 24 V removed, relay K2 falls out, closing 8-9 and dumping the charge from C2 into the reed relay coil K3. This causes momentary closure of K3, the contacts of which close the cassette REMOTE STOP function.

22. Stretching Edit Stock

Charles Hintz, Engineer
KRON-TV, San Francisco, Calif.

Problem: Videotape editors tend to "park" the record machine at the edit decision point. With the VPR-2 and Scotch tape, this leads to some stretching as the VPR-2 takes 4.5 minutes to time out, default to E-E, and relax tension. In searching through a playback tape, the record machine can time out several times. We use the ECS-103 editor and rehearsing the edit leads the recorder into the whole time out cycle repeatedly.

Solution: The timer is on A17 (machine control). It consists of A3, A4, and A10 (with parts of A5, A22, A24, and reset parts A11 and A21). A3 is a 74LS393 binary counter with outputs QD (pin 6), QC (pin 5), QB (pin 4), and QA (pin 3) in the section we are concerned with.

If we look at Ampex's schematic for the machine, we

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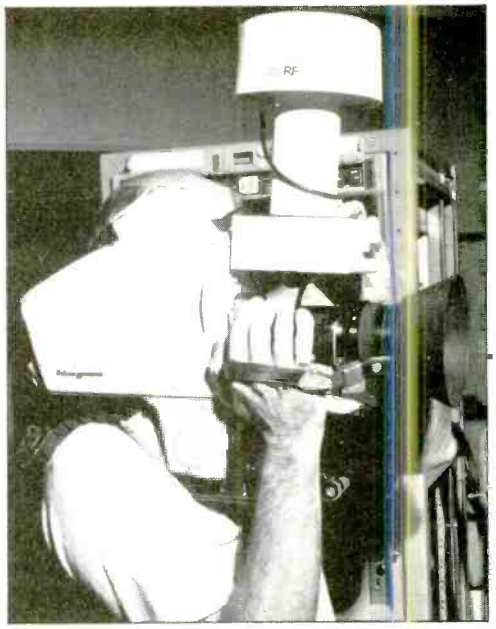

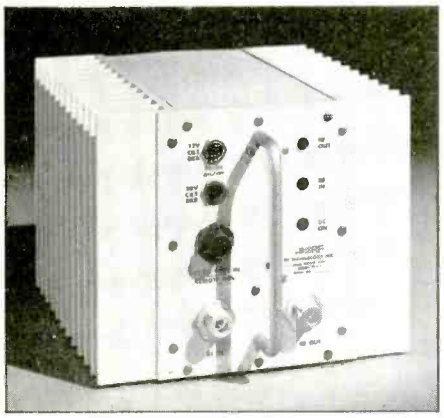

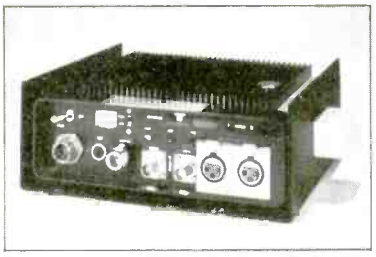

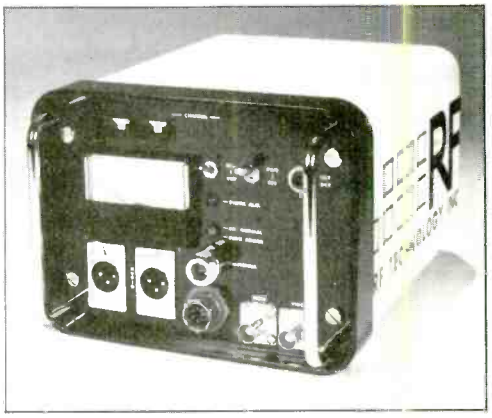

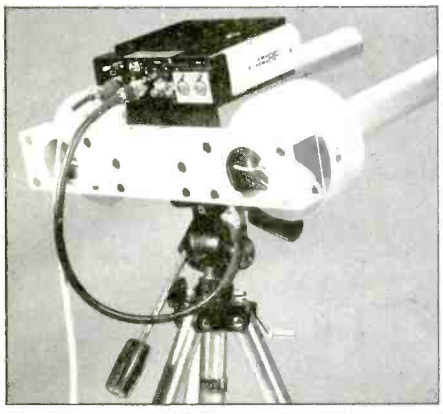

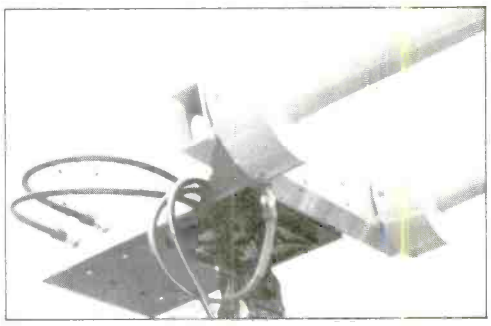

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- RELIABILITY—RF microwave in use by all major networks and many private broadcasters.
- AVAILABILITY—RF microwave is available now.

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Circle 176 on Reader Service Card

see that pin 6 (QD) goes to pin 13 (input of section 2). Pin 8, the QD output of the second section, goes into the count of the next chip, A4. The first section of the first chip is the easy fix-it because the rest of the circuit remains unchanged. A quick visual inspection of A3 on PWA A17 reveals that pin 6 goes via an easily cut trace on the top of the board, under the chip to pin 14. This trace passes pins 5, 4, and 3. I wanted to cut the time by a factor of four, from four minutes to one, so I selected pin 4 as the new output, cut the trace, and tacked a tiny jumper between pin 4 and the trace. Presto-chango — at 42 seconds the stop light flashes, and at 50 seconds the machine defaults to E-E and tension is relaxed. Now we can rehearse edits, trim, and make decisions to our hearts' delight with one-quarter as many passes on the poor old edit stock.

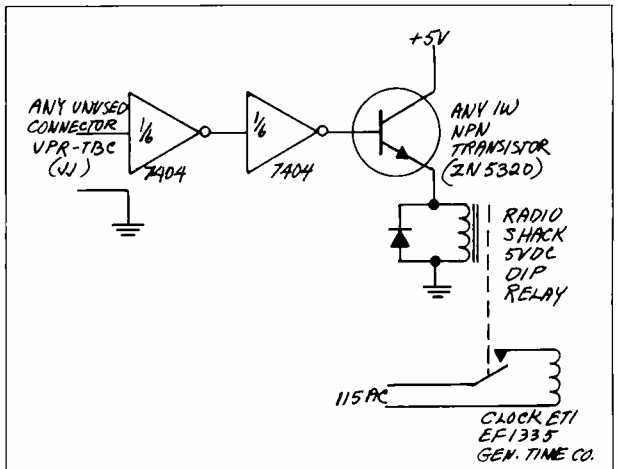
23. VPR-1 Elapsed Time Indicator

P.M. Dunton, Engineer
KOLD-TV, Tucson, Ariz.

Problem: The warranty on Ampex VPR-1 heads is on an hourly prorated basis, but the machine has no time elapsed clock.

Solution: Use the STANDBY signal in the VPR-1 to run an outboard clock. The STANDBY signal gates the drum on in any mode that requires the drum to turn and is available on the VPR-1 motherboard; pick it up at 29/30 XA8. The signal is brought out through an unused pin of the TBC connector. A ground is also brought out through the same connector.

The circuit can be constructed with one 7404 chip, a 5 V dc relay, a transistor, and a General Time EF1335 elapsed time indicator, which only draws 2.5 W. If several VPR-1s are reasonably close together, all the clocks can be installed in a box with a single LM309 for a 5 V power supply.



Duntan's VPR-1 elapsed time indicator

Rules for BM/E's Great Idea Contest

Mail to:
Editors, BM/E
295 Madison Avenue
New York, New York 10017

1980 Entry Form

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

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

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

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

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

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

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

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

5. Winners: Top rated entries in the year-long tally will become winners in each of the three major categories (AM, FM, TV). Final winners will be picked in February, 1981, and announced in the March, 1981, issue of *BM/E*.

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

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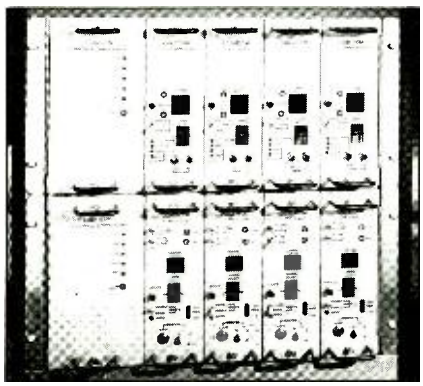
BROADCAST EQUIPMENT

SPSC FM Terminal 250

Model 412 is a frequency-agile, SPSC FM terminal for satellite transmission and reception of high-quality audio, voice, or data. Its modulator accepts wideband audio signals (50 Hz to 15 kHz), compresses their dynamic range, and uses the resultant signals to frequency modulate an internally generated RF carrier in the 52 to 88 MHz range. This carrier can function as the



input to commonly used satellite up-converters and high-power amplifiers for microwave transmission. The demodulator accepts RF signals from an earth station's down-converter and selects the appropriate carrier; it demodulates the signals and then expands them for high-quality reproduction. It features a patented phase-locked loop detector for threshold extension and exceptional performance in high-noise environments. The basic version has 16 predetermined RF carrier frequencies with a PROM for preselection. Model 412-360 has a frequency synthesizer that provides selection of 360 channels (in 100 kHz increments) throughout the 52 to 88 MHz spectrum, giving virtually continuous receiver coverage of that range. COASTCOM.

Lighting Control System 251

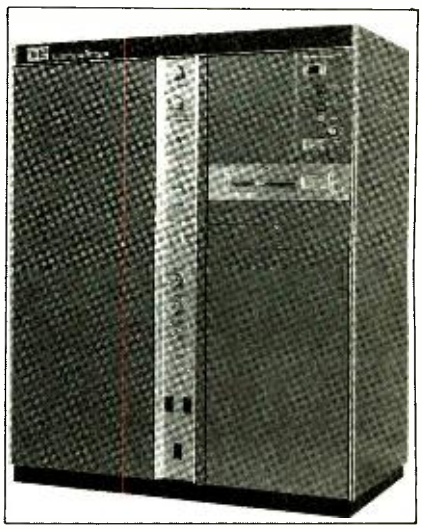
miniPalette™ is a smaller, lower-cost version of the maker's Light Palette lighting control system. Compact and self-contained, it will interface with existing dimmers and features multiplexed control output. The unit will record individual stage "pictures" and the designated transitions between them with assured repeatability, and can execute timed or manual multi-part cues precisely as designated. Standard features include 12-inch display screen, 10 playback submasters, three faders (one split), GO/STOP button, light level wheel, display and command keyboard, and floppy disc for storage. Designer's remote control, hand-held remote control module, manual console, printout, and special effects software are optional. STRAND CENTURY.

Mic/Headphone Combo 252

The Beyer DT 108 dynamic moving coil microphone/headphone is designed for live, remote broadcasting, studio film television, and DJ applications. It withstands sound pressure levels beyond 120 dB without damage and has a frequency range of 40 Hz to 12 kHz. The noise-cancelling mic rotates 180 degrees; the headphone has an extended frequency response and is virtually impossible to overload, according to the manufacturer. The unit is unaffected by temperature or humidity changes. Construction is modular and the unit is fully field-serviceable. $89.95 BURNS AUDIOTRONICS.

FM Transmitter 253

FM-30 is a single-tube 30 kW FM transmitter with a unique folded half-wave cavity power amplifier design, digitally programmed FX-30 ultralinear exciter, and microprocessor-



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In recording studios, concert halls and theatres worldwide, Beyer is the premier name in microphones. Loved by performers and respected by engineers.

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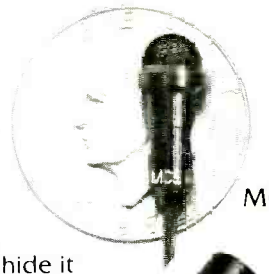
The Beyer MCE 5 is the world's smallest electret condenser and provides true broadcast-quality audio from a 7 x 23 mm. cylinder weighing just 6.5 grams. It has wide frequency response, but is immune to most body noises. And you can hide it almost anywhere and connect it to a cable or a wireless transmitter.

If you can't get the mic near the sound source, try our Beyer MC 717 shotgun. It has a directional gain of at least 20 dB and a 40-20K frequency response.

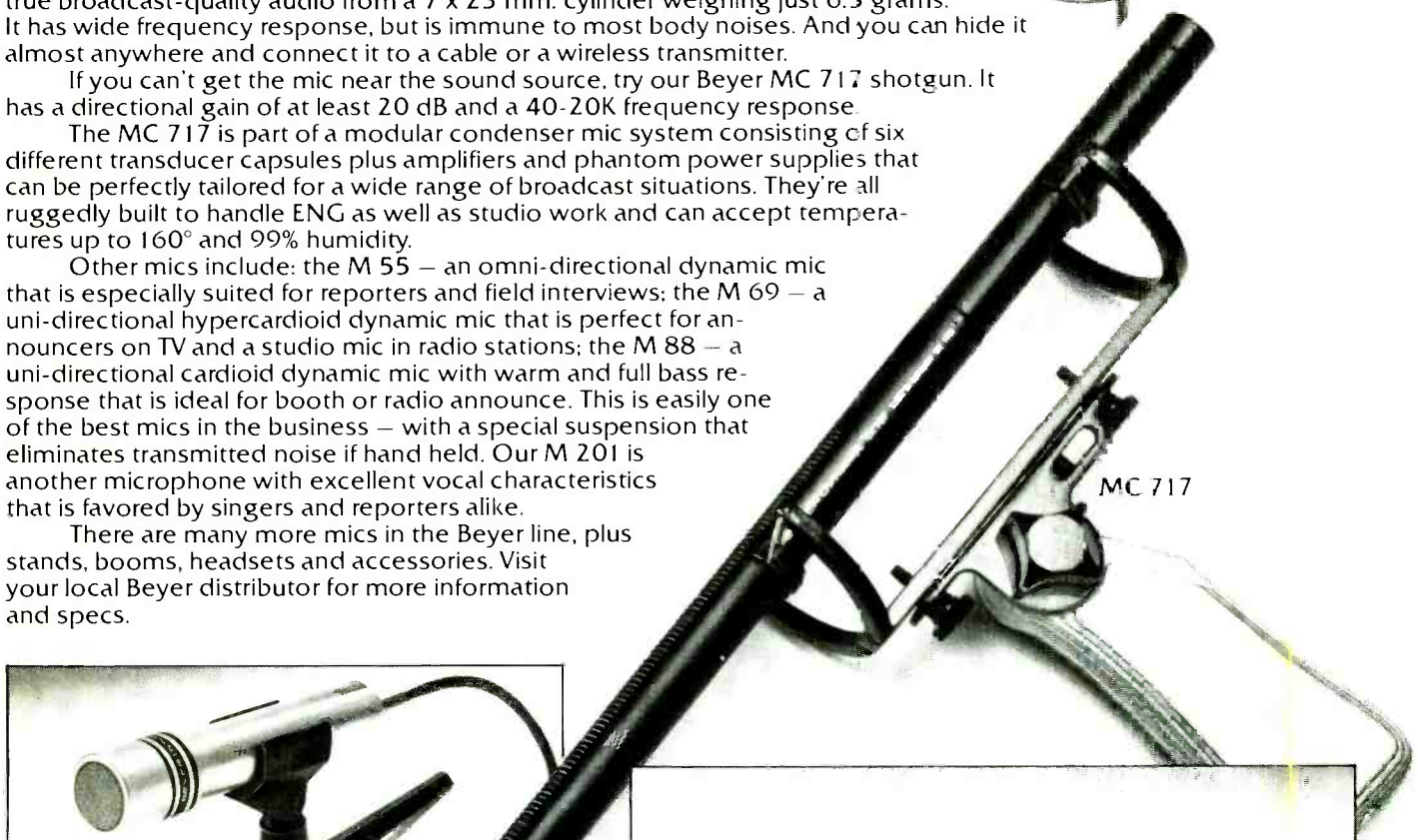
The MC 717 is part of a modular condenser mic system consisting of six different transducer capsules plus amplifiers and phantom power supplies that can be perfectly tailored for a wide range of broadcast situations. They're all ruggedly built to handle ENG as well as studio work and can accept temperatures up to 160° and 99% humidity.

Other mics include: the M 55 – an omni-directional dynamic mic that is especially suited for reporters and field interviews; the M 69 – a uni-directional hypercardioid dynamic mic that is perfect for announcers on TV and a studio mic in radio stations; the M 88 – a uni-directional cardioid dynamic mic with warm and full bass response that is ideal for booth or radio announce. This is easily one of the best mics in the business – with a special suspension that eliminates transmitted noise if hand held. Our M 201 is another microphone with excellent vocal characteristics that is favored by singers and reporters alike.

There are many more mics in the Beyer line, plus stands, booms, headsets and accessories. Visit your local Beyer distributor for more information and specs.



MCE 5

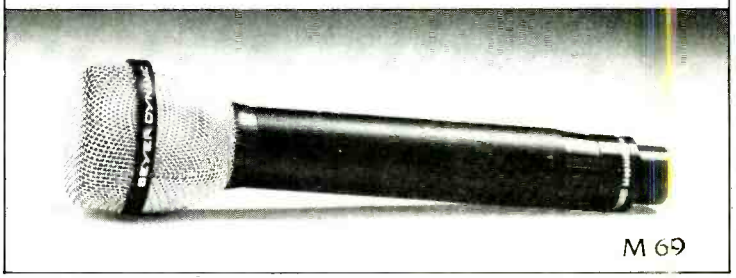


MC 717

M 55

M 20

M 88



M 69

Beyer Dynamic

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In Canada, H. Roy Gray, Ltd.

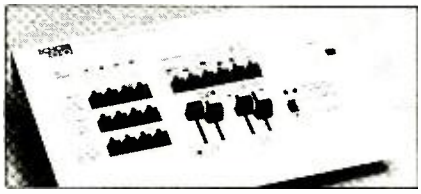
Circle 179 on Reader Service Card

Broadcast Equipment

based control system. The single high-gain Eimac tetrode provides full power output on any frequency between 87.5 and 108 MHz. Plate efficiency of the final amp approaches 80 percent. The new cavity design eliminates the plate blocking capacitor and all sliding contacts, resulting in higher reliability and efficiency and lower maintenance costs, according to the manufacturer. Five identical amp modules make up the solid state IPA; failure of any one will result in a 15 percent power reduction and failure of two will cause a 35 percent power reduction. All transmitter control and status functions are performed by the built-in microprocessor controller; 127 different status indications are provided. BROADCAST ELECTRONICS, INC.

Special Effects Generator 254

Model SE/4 is a compact special effects generator capable of controlling two color cameras and two monochrome cameras. The unit operates with two JVC G-71 USJ cameras, which need



not be modified in any way. Two additional monochrome cameras and a keying camera can also be controlled. It provides six special effects, including four corner inserts, a non-positionable circle wipe, and keying. Also included are soft-touch VI switches and an internal RS-170 sync generator with genlock capability. $1895. ECHOLAB.

UHF Klystrons 255

These new external cavity klystrons for UHF TV transmitters use 10 percent less power than previous models, according to the maker, resulting in substantial savings in energy expenses. They are directly interchangeable with existing tube models standard in UHF transmitters in current use, including those by other manufacturers. No modifications to existing hardware are required for installation. The tubes have been designed so that a minimum gain of 35 dB produces 35 to 58 kW peak-of-sync power output with less than 10 W of RF drive power. Peak-of-sync efficiency is stated as 40 to 42 percent. Models 4KM100LA-H and 4KM100LF-H are intended for operation in the 470 to 596 MHz band, while models 4KM150LA-H and 4KM150LF-H cover the 596 to 710 MHz band. All models permit multiplexing of video and audio signals with improved linearity over existing models. VARIAN.

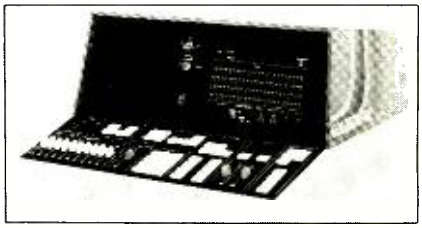
For more information circle bold face numbers on reader service card.

Stereo Digital Delay 256

The DMX 15-80S microprocessor-controlled digital delay unit offers two independent channels of delay up to a maximum of two seconds per channel at 18 kHz bandwidth with typical distortion of 0.025 percent and dynamic range of 90 dB. Delay selections are entered via a keypad; nine memories for delay setting on each channel allow instant recall of effects. The totally modular unit accepts special effects options such as real time pitch change of ±1 octave and programmable reverb. It may also be interfaced for external computer control. Input/output level and mixing, VCO speed and depth, phase relationship, and delay lock-in are controlled from the front panel. Model DMX 15-80SB is identical but lacks the keyboard entry facility. From $5200. ADVANCED MUSIC SYSTEMS.

Lighting Control System 257

Colortrack is a compact microprocessor-based lighting control system designed for TV studio and theatrical applications. It controls 96 dimmer channels and incorporates a color-coded CRT display that is color-coordinated with the operator's control



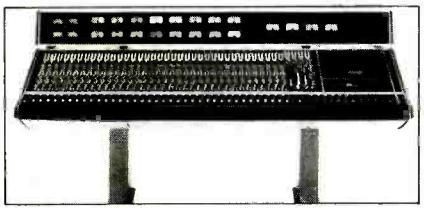
keyboard for ease of operation. Approximately 1000 cues of memory may be stored for each of the 96 channels; timed, auto, and manually operated faders are incorporated. Five different data displays are provided for stage memory, "Channel Track," limit, and submaster functions. Also featured are 10 dual-purpose submasters for both memory and manual backup control. Library storage is via mini floppy disc. The unit measures 19.5 by 21.5 by 11.5 inches and weighs 46 pounds. It operates on 120 V 60 Hz and 220/250 Hz. BERKEY COLORTRAN.

Video Squeezer 258

The Squeezer is a unique production tool that can reduce images to four discrete sizes (one-quarter, one-ninth, one-sixteenth, or one-twenty-fifth of original) with complete positioning capabilities. Both stills and live video can be squeezed, and the image can be bordered with full color, adjustable for width, saturation, and hue. The border can be used to crop from one of the four sizes to infinity, or may be omitted entirely. The unit can insert one image into itself or key it over another. It can be preset to four positions before air time. Signals for downstream keying are provided. $15,000. ARVIN/ECHO.

Mixing Console 259

Model 720 is the first in the maker's new Series 700 line of audio mixing consoles. The 36-in, 16-out unit has four effects outputs, two foldback outputs, stereo left and right outputs, two mono outputs, stereo control room and studio monitor outputs. It contains 24



VU meters that indicate all the console program outputs. The mainframe also contains a modular plug-in jack bay with 432 jacks. Other features include Trans Amp® transformerless mic preamps, three-band parametric-type equalization, VCA input subgrouping, and outboard control port on VCAs for use with automation systems, video editors, and other equipment. $41,000 to $63,000 depending on number and configuration of input channels. AUDITRONICS.

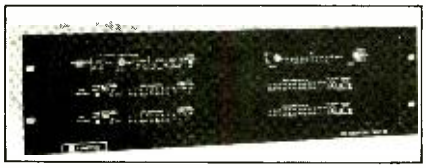
Stereo Consoles 260

The expanded 7000 Series of stereo broadcast consoles includes the 7008, which will accept up to 18 stereo inputs. It has six single-assignment pots and two pots with six pushbuttons each. The pushbuttons are designed as summing systems, so that any number of sources can be used simultaneously. The 7010 has all the features of the 7008 with the addition of 10 faders. Model 7012 is similar but includes 12 pots accommodating 22 stereo inputs. All may be equipped with the optional "A" meter panel, which adds Audition Line VU meters to the standard top panel. All models are dual-channel

stereo with an additional mono program output. They are transformerless, active-balanced in and out, and contain power MOS-FETs in high current demand sections. Specs include S/N better than 70 dB below nominal output; distortion 0.09 percent or lower on all outputs, and frequency response ±1 dB, 20 Hz to 100 kHz. HOWE AUDIO PRODUCTIONS.

FM Composite Processor 261

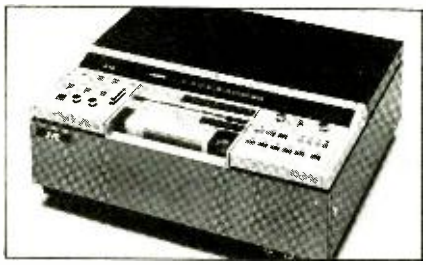
Model MSP-95 is an FM audio composite processing unit with an integrated design specifically intended for FM stations using an STL link. It drives com-



posite STLs or wideband input of any FM exciter. Features include Digitally Synthesized Modulation (DSM) and patented Dynamic Transient Response (DTR), which holds overshoot on any program material to two percent or less. A 2 to 6 dB increase in loudness from the stereo generator alone can be achieved while maintaining high stereo separation, low crosstalk, and low IM distortion, according to the manufacturer. Mono mode switching allows front-panel or remote selection of L+R, L, or R. The limiter section features "split band, dual function FM processing" and "soft synching," a recovery system that maintains stereo imagery while increasing loudness. Preemphasis is switch-selectable for 0, 25, 50, or 75 μs. HARRIS CORP.

Professional VCR 262

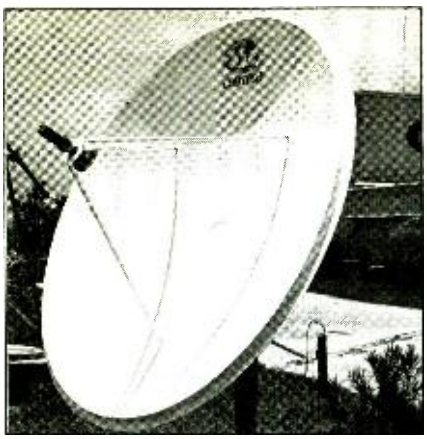
The CR-8200U professional editing VCR features a direct drive head drum and capstan, as well as direct-drive reel motors on the reel servo system. This results in stable tape movement at any speed, according to the manufacturer, who states luminance jitter at less than ±5 μs. Other features include a rotary erase head and blanking switcher for clean assemble and insert edits, an audio limiter circuit (manual or automatic) for each of the two channels, and dual audio recording level meters. The unit combines with the maker's RM-82U automatic editing control unit and CP-5500U videocassette player to form an under-$10,000 editing system. An external subcarrier input terminal allows TBC connection. When used with the RM-70U remote control unit or RM series edit controllers, the unit has continuously variable playback speeds from zero to five times normal in forward and reverse. Video S/N is more than 48 dB. $5300. JVC.



Three-Meter Antenna 263

This three-meter dish consists of a three-section fiberglass structure and is delivered with spars to mount the single polarization corrugated feed horn radiator, 4 GHz transformer, and a single mast mount. It has been designed for economical installation, according to the manufacturer. The basic reflector contains a unique splice plate design

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



that assures a surface tolerance, achieves high performance in C band, and permits 12/14 GHz update. The prime focus feed design has been optimized for efficiency to provide real gain figures in excess of 40 dB. Total system weight is 450 pounds; the heaviest section weighs 150 pounds. $2500. COMTECH ANTENNA CORP.

Video Delay Trimmers 264

VAR video delay trimmers permit extremely small delay adjustments and insure excellent amplitude and delay flatness, according to the manufacturer. They may be used alone or in conjunction with any of the maker's other delay

boxes from dc to 5.5 MHz. Model VAR011 has a delay range of 0 to 11 ns with trimmer continuously variable to 1 ns. Model VAR005 has a delay range of 3 to 7 ns with continuously variable trimmer. ALLEN AVIONICS.

Condenser Mic 265

Model ECM-989 is a lightweight back electret condenser microphone featuring a docking two-part design with separable capsule and power supply units allowing remote control capability. For stand-mounted or hand-held applications, the M-S stereo mic has three identical cardioid capsules — one mid capsule with front orientation and two opposed side-oriented capsules — unlike conventional M-S mics, which have a cardioid capsule and a bi-directional capsule. Gold evaporated 6u polyester film diaphragms contribute to excellent transient response characteristics, according to the manufacturer. Frequency response is 20 to 20,000 Hz; S/N is 66 dB. $435. SONY INDUSTRIES.

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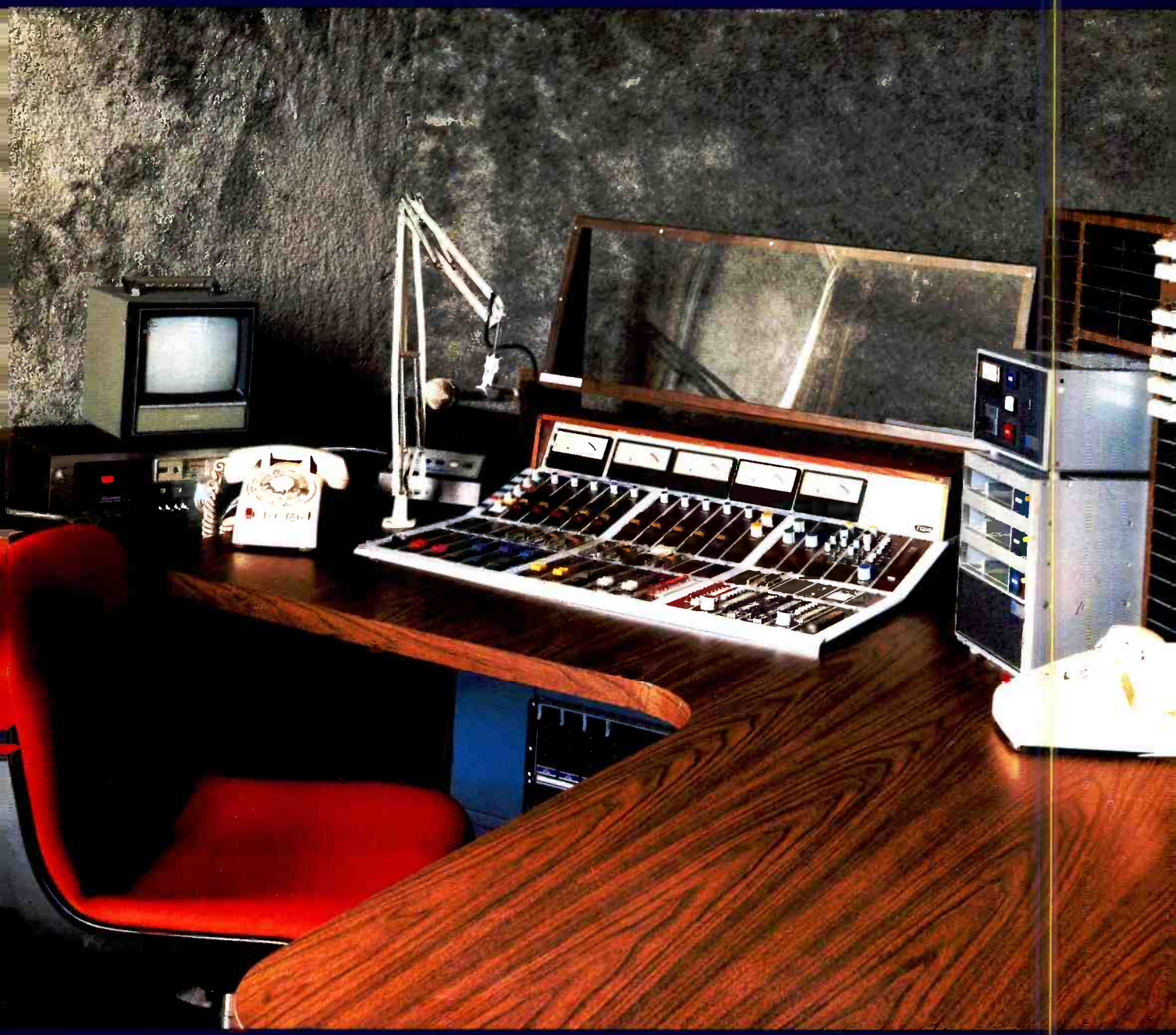
SS8550 STEREO CONSOLE



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