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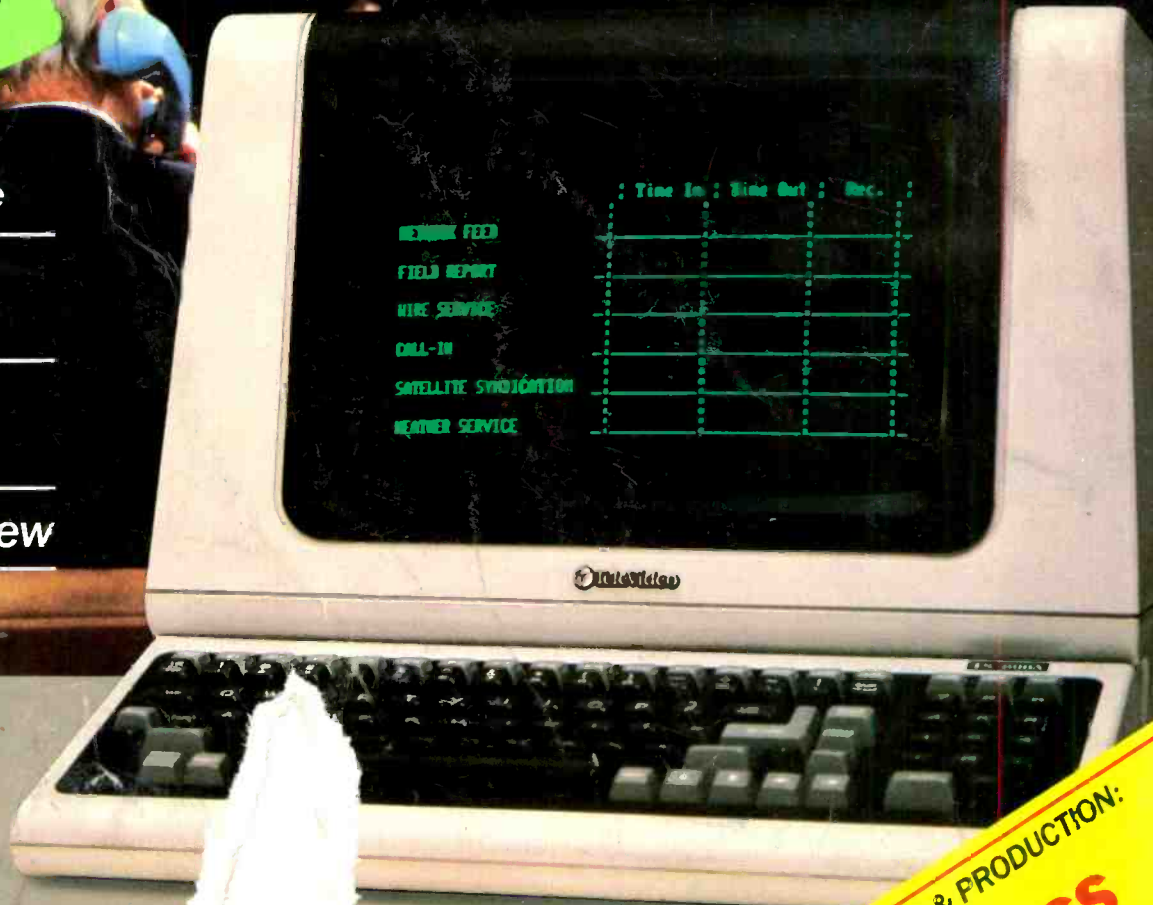
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Viewfinders
for ENG

Selecting an
AM antenna

RTNDA Preview

FM SCA



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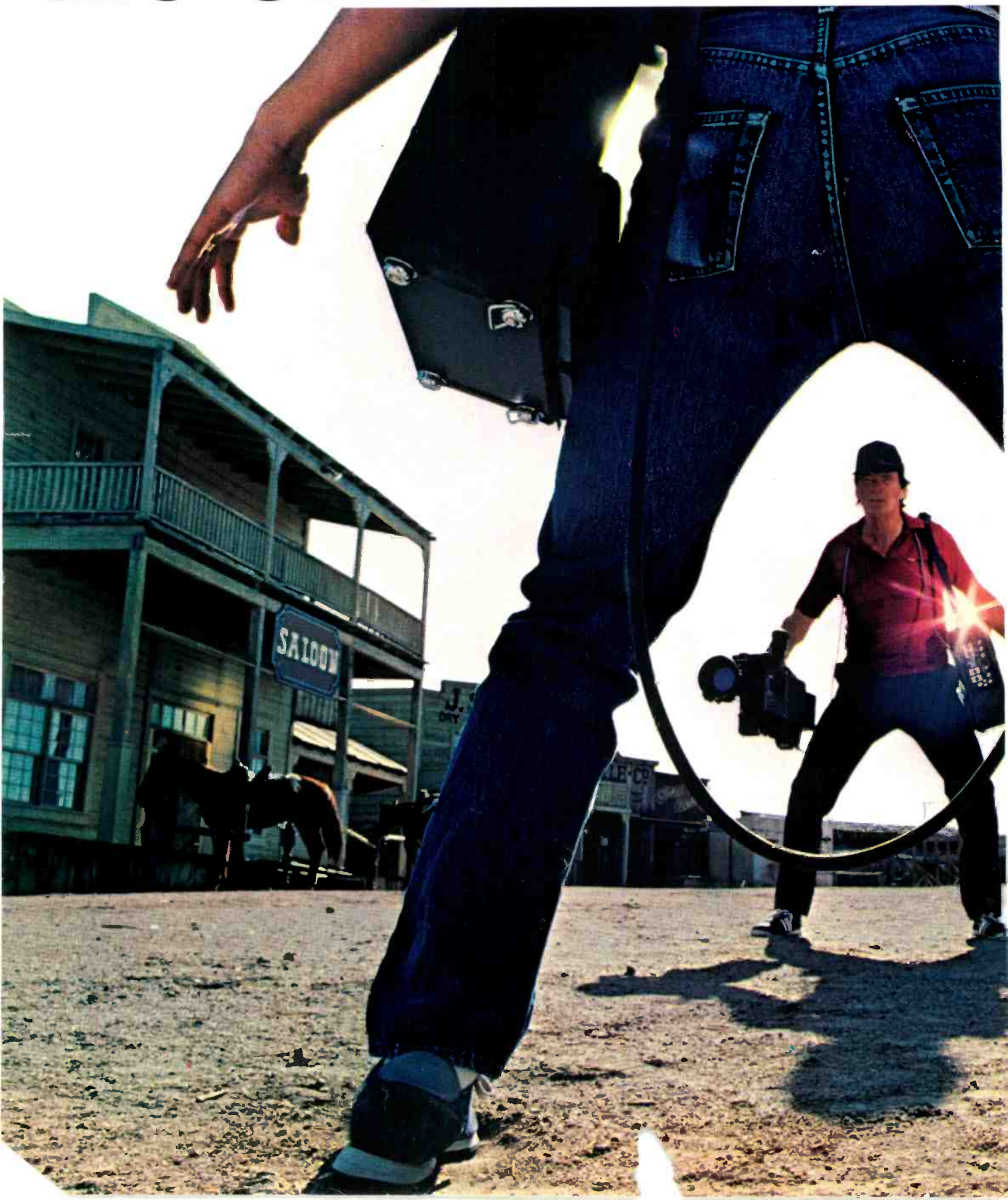
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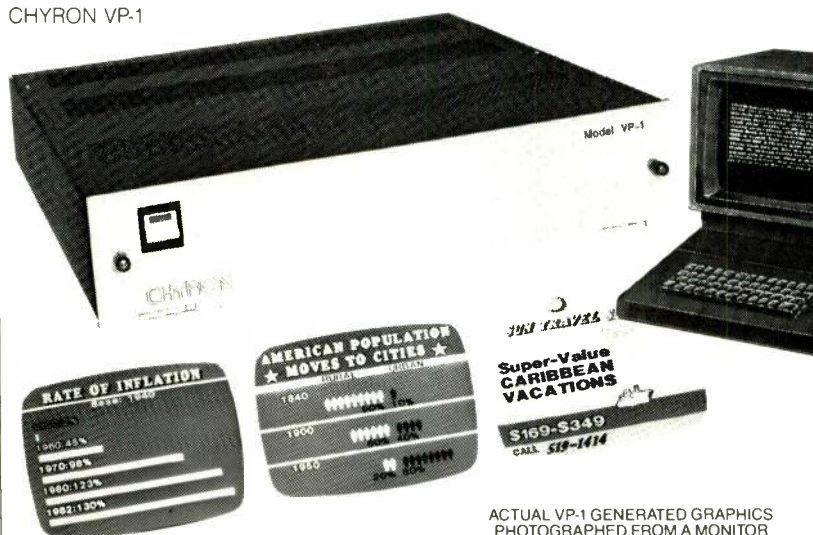


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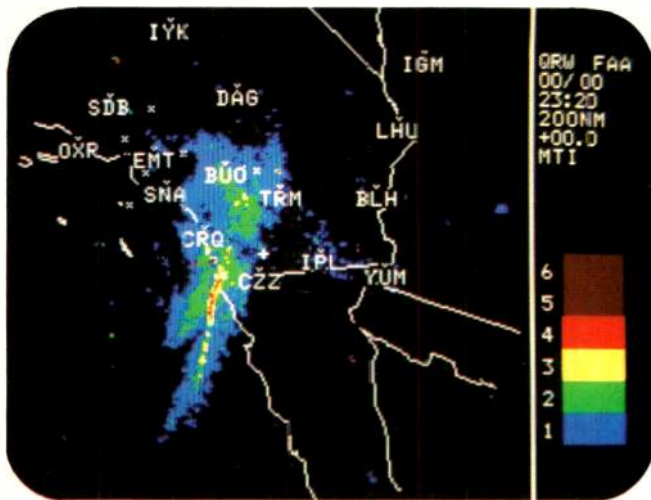
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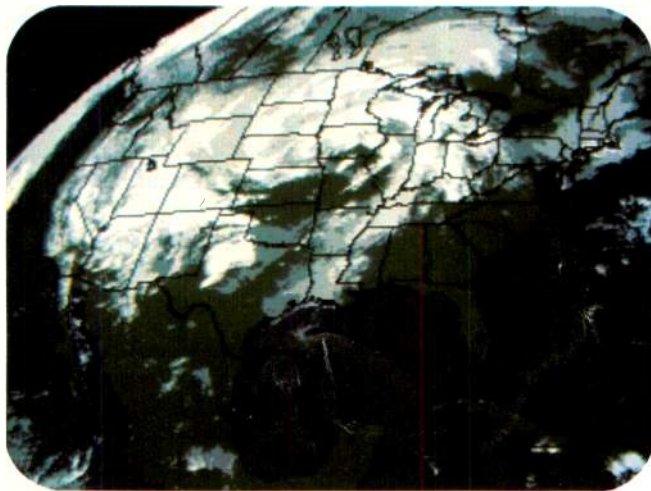


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SEPTEMBER 1983 VOLUME 19/NUMBER 9

FEATURES

SPECIAL REPORT: ENG



ENA: New Era in Electronic News Acquisition

47

How does a radio or TV station battle the ever-increasing number of news sources? Computerized Electronic News Acquisition is the answer.

VIEWFINDERS FOR ENG

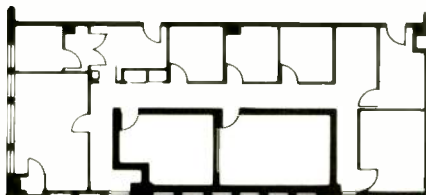
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With the wealth of information available in today's ENG camera viewfinders, the operator need never look away from the scene. But is there too much information?

RTNDA URGES NEWS DIRECTORS: "BRING YOUR ENGINEERS"

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More time for exhibit-visiting has been planned for this year's show in Las Vegas, so engineers are especially welcome.



FACILITIES DESIGN AND ENGINEERING, PART 10: Selecting and Installing an FM Antenna

75

AM stations planning a new or upgraded facility would be wise to pay careful attention to John Battison's analysis about how to select and install both antennas and towers.

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THE JUNGLE



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News and Profits

A GLOWING REPORT in the RTNDA *Communicator* (June 1983) prepared by Vernon Stone confirms what most have suspected: that news is making money for radio and TV stations in every market size. Among the TV stations surveyed, 83 percent said news was paying its own way (79 percent in ADIs 1-25, 88 percent in ADIs 26-50, and over 80 percent in every other market). Among radio stations, 66 percent said news was profitable (the highest percentages being in large, medium, and small markets, with major markets trailing somewhat behind).

Equally significant compared with this finding is that news ad revenues are up over the previous year's figures. Among TV stations, 78 percent were up (seven percent were down and 15 percent were unchanged); among radio stations, 49 percent were up (15 percent were down and 26 percent were unchanged).

Reports from other sources also help confirm that news is a money-maker. Some stations report that more than 50 percent of their income comes from news operations, and that the figure is growing steadily. This, of course, is to be expected. After all, it is news which gives a station the local market identity and sense of community involvement which most experts suggest is the best means for stations to survive the onslaught of satellite-delivered programming from national sources. Evidently the survival plan is working.

But the RTNDA study also reveals another, less pride-inspiring fact about news: in some cases, expenditures for news are down. This does not appear to be the case in television, where average news expenditures are up at 77 percent of stations (as high as 85 percent of stations in ADIs 26-50). But in the radio arena, even though news profits are up at almost two-thirds of the stations, expenditures for news are up at only 43 percent. The worst case is small market radio, where news revenues are up at 51 percent of the stations but news expenditures are up at only 35 percent.

It is, of course, only natural that there should be some profit-taking, especially among smaller operations. But it is equally clear that if news is to remain a source of profits, then management must keep investing money in it, both in terms of personnel and state-of-the-art hardware. Selling news short now will surely mean disaster in the future if the station skimps on promoting its local identity.

This is borne out by still another finding in the RTNDA study: there is a direct relationship between the staff size and how profitable the news operation is. In every case, there were more stations with news staffs of three or more making money off news than stations with one or two news staffers. For example, ad revenues were up at 76 percent of stations with three or more news staff, 66 percent at those with two staff members, and only 51 percent at those with one staff member.

In general, the RTNDA study makes it clear that there is much to be proud about when it comes to television and radio news. But it also suggests that management take a long, hard look at the return-for-effort profile of the news department and consider strongly a renewed investment in the future of the news operation.

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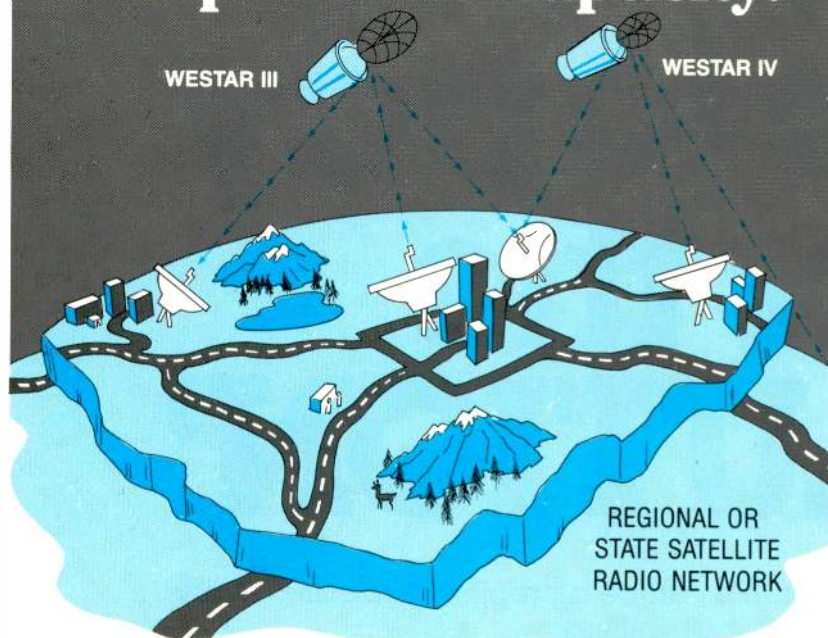
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LETTERS

FM SCA QUESTIONS

To the Editor:

I have just seen the article in your June issue on FM SCA use. ["Deregulation of SCAs," FCC Rules and Regulations.] May I point out a small but egregious error. After posing the question of whether or not the use of one or both of the SCAs will adversely affect the signal coverage on the main channel, the writer states: "There are, unfortunately, no answers to this question."

I would like to point out that there is, indeed, an answer to that question, and it has nothing to do with theoretical mathematics or nervous engineers. An SCA properly installed and maintained has no discernible effect on main channel operation. The usual 10 percent injection amounts to slightly less than 1 dB of modulation, which is below the threshold of hearing. The suggestion that 1 dB of modulation will "seriously affect" the station's coverage is ludicrous. The fact is, it would be next to impossible to even find a listener in a fringe area who would find a signal-to-noise ratio acceptable at, say, 24 dB but not at 23 dB. But even if you could find such a listener, signal strength fluctuations of seven to 10 dB are the rule rather than the exception in fringe areas, because of factors such as weather, day-to-night propagation characteristics, sun spots, terrain, and so on, all quite independent of whether or not the SCA is in use. In short, if listeners can receive a useable signal without the SCA, adding the SCA will make no discernible difference to them at all.

To put the whole question in proper perspective for the programmers, they run a greater risk of losing a listener by playing a bad record than by turning on and using the SCA.

Joe Meier
VP of Network and Operations
Radio Data Systems, Inc.
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For more discussion of the FM SCA issues, see "FM SCA" elsewhere in this issue.—ED.

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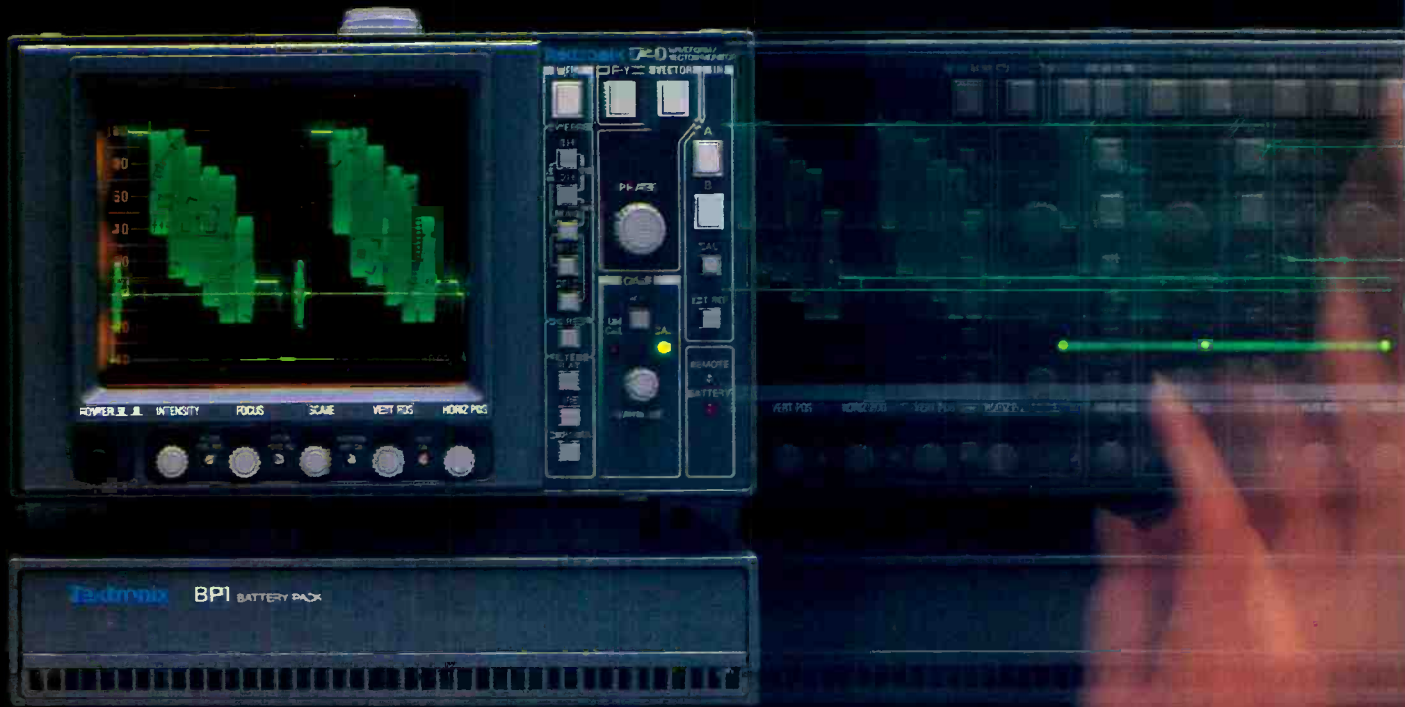
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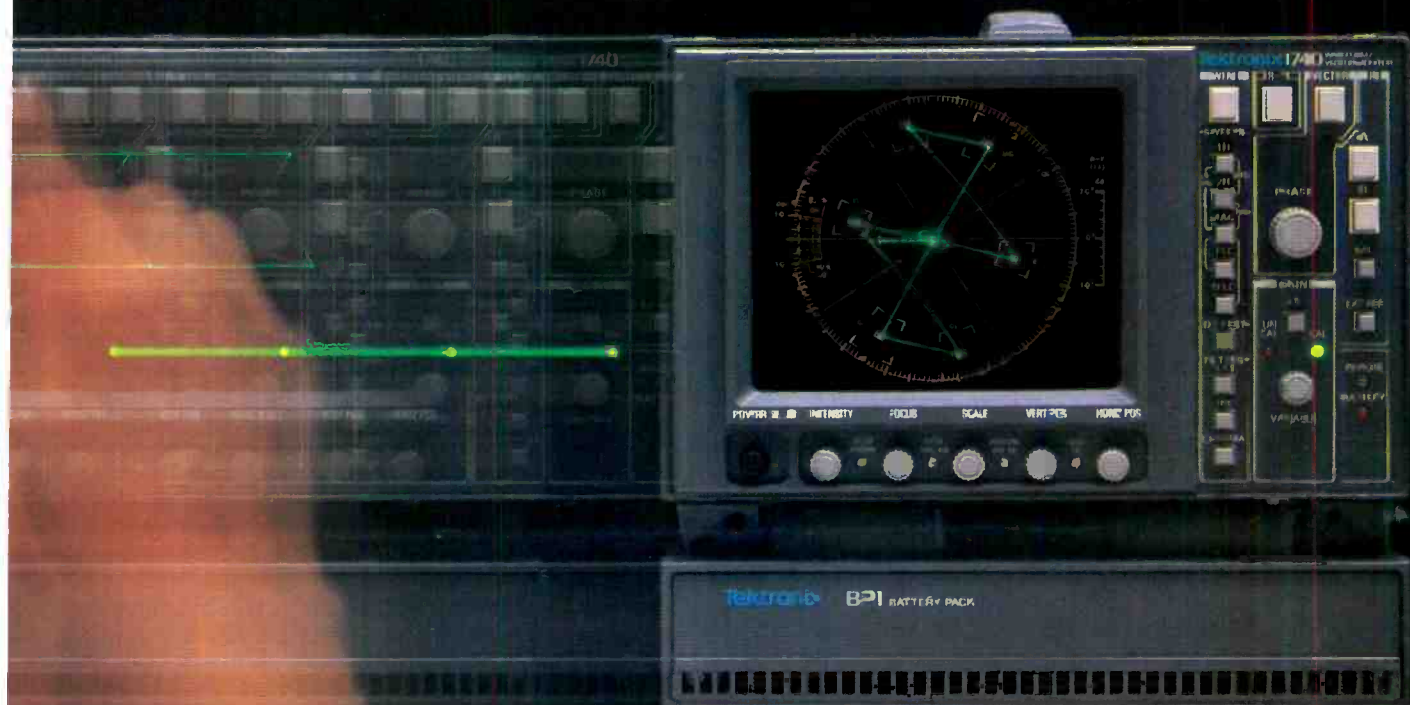
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McKinney Lands Top Spot at Mass Media Bureau

Career FCC staffer James C. McKinney has been appointed chief of the FCC's Mass Media Bureau, succeeding Larry Harris, who left late in July to accept the president's post at Metro-media Communications.

McKinney, who has been with the Commission 20 years, was chief of the Private Radio Bureau prior to his reassignment. He hopes to transfer his success in Private Radio—where he cleared serious backlog problems and application processing delays despite a 15 percent staff reduction—to Mass Media.

In a recent interview, McKinney said that his first priorities in the new post would be to familiarize himself with the policy issues that affect the Mass Media Bureau and to meet the staff. "Then I'll be getting actively involved in the low-power television process," McKinney continued. The huge backlog of LPTV applications poses an obstacle to the FCC's deregulatory policies, McKin-



ney feels. He is confident he will be able to speed up the LPTV process, but predicts the improvement will be less dramatic than in Private Radio because of the more complex legal and regulatory issues involved.

An engineer with a broadcasting background, McKinney takes a cau-

tious view of technical deregulation. "I think the Commission hasn't made any fatal errors yet," he said, "but I think the Commission has to be very careful." Such changes as the recent deletion of logging requirements "won't do any harm," according to McKinney, "but some of the other things—I won't enumerate which ones—do have some chance of severe interference, and the public doesn't like that. . . . I'm going to be worried about it, and when I'm worried, I'm going to tell the Commission."

U.S. Takes Reservation on Two DBS Agreements

In the aftermath of the recent Region 2 Administrative Radio Conference, which allocated orbital positions for direct-broadcast satellites, the United States delegation was mostly pleased with the outcome. But in at least two areas, U.S. dissatisfaction was serious enough to cause this country to take a reservation—a formal statement that it would not be bound by the international agreement.

The first and most important issue was power flux density, a measurement of the strength of the satellite's signal on the earth. The U.S. had pushed for a pfd of -105 dBw/m², 60 percent higher than the -107 dBw/m² standard the conference adopted. The higher power level would have permitted the use of smaller—and cheaper—receiving dishes, a big selling point here, where DBS will be primarily directed at individual households. For countries planning to serve communities rather than homes, however, the savings in building lower-powered satellites more than offset the cost of the larger dishes. In addition, some countries were concerned about signals crossing their borders, which the higher power level could have encouraged.

Even with the reservation, the U.S. will still have to negotiate with Canada and Mexico to avoid interference problems if it uses the higher power figure.

As for the orbital slots themselves, the allocations the U.S. received were amply sufficient to accommodate the current DBS licensees. The plan falls short of expectations, however, in that any satellite in the farthest east position, at 65° W, will lose power during as much as an hour 22 evenings of the year as the earth's shadow falls on its solar panels. The two most western positions— 166° W and 176° W—are capable of serving only the Pacific time

Sophisticated Edit Center Opens in Southwest

Video and film producers in the Dallas area have increased opportunities for state-of-the-art post-production with the opening of the new Dallas Post-Production Center, a recent addition to the \$25 million Dallas Communications Complex at Las Colinas. According to the center's owners, the 13,000-square-foot installation is the largest post-production facility in the southwest.

The new editing facility, designed to complement the production capabilities of the larger complex, cost \$2.5 million to construct. The equipment, which is valued at over \$2 million, includes the brand-new CMX 3400 X editor, introduced at the April 1983 NAB convention. Complementing the computer editor are a Grass Valley Group 300 switcher, a \$100,000 Dubner graphics system, Ampex two-channel ADO, and Ampex VPR-2B VTRs. The

facility offers videotape editing and dubbing in one-inch, two-inch, and $\frac{3}{4}$ -inch formats and expects to serve ad agencies, network and independent producers, and corporate clients.

Principals in the post-production center are Dallas-based video producers Lee Martin and Nick Riccelli, with investors Carl Summers and Wells Morse. Former ABC television engineer Dave Gass is director of engineering; Randy Seiler is assistant director of engineering. Dale Thorne is chief editor and Carey Elizabeth Morse is creative director.

Nick Riccelli (left) and Lee Martin lounge in an edit suite of the new Dallas Post-Production Center as chief editor Dale Thorne operates the console.



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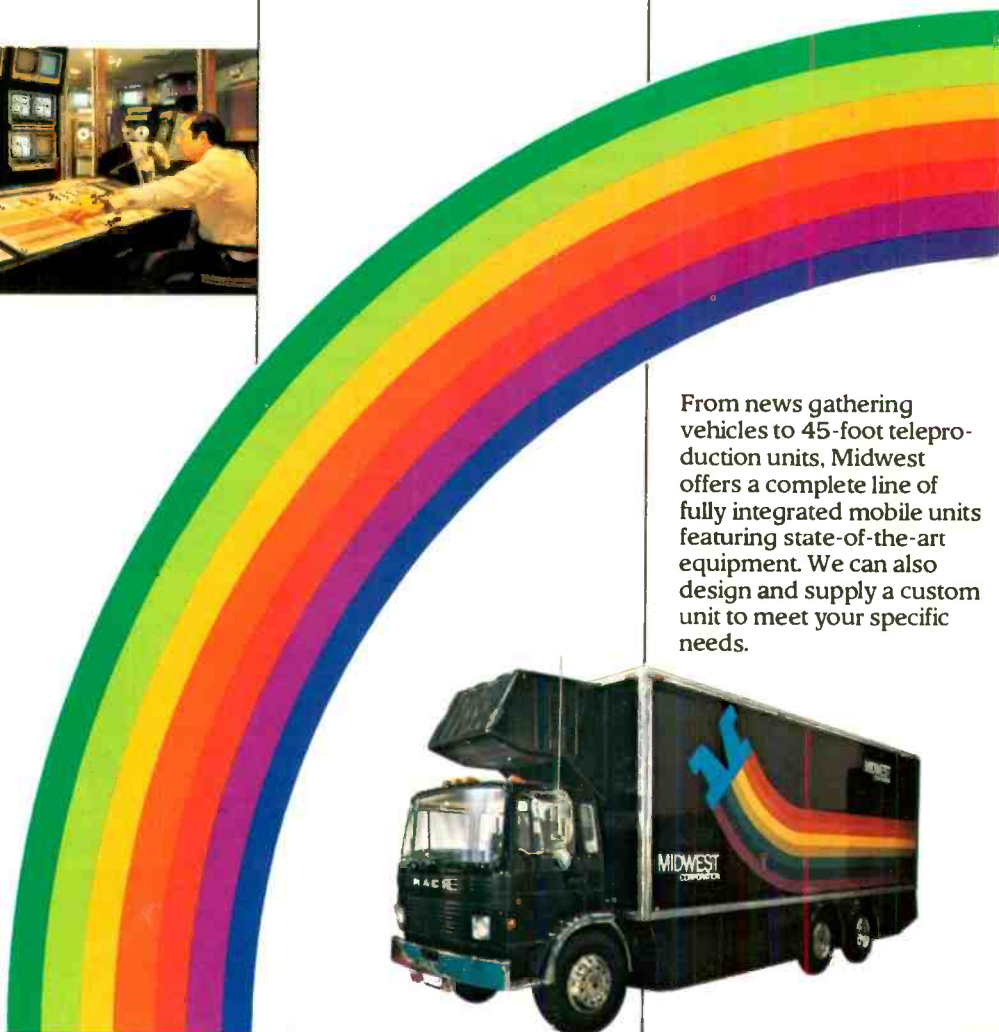
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zone; planners had originally wanted them to serve the Mountain zone as well.

DBS Standards Plan Announced

The FCC has suggested to the General Services Administration (GSA) the establishment of an Industry Advisory Committee on Technical Standards for the Direct Broadcast Satellite service. The committee, according to the Commission proposal, would advise the FCC on the pros and cons of standardizing technical requirements for DBS transmission and reception, and would develop proposed standards if such standards were deemed desirable.

When the Commission initially authorized DBS service last year, it did so on an interim basis and refrained from setting technical standards, pleading a lack of information. In its proposal, however, it noted that "it would not be inconsistent with this position" to invite members of the industry to advise it on the issue of technical standards, and said the advisory committee could provide a forum for participants to express their views for or against any proposed standards.

In another satellite move, the FCC acted to lengthen the maximum license term for common carrier and fixed satellite licenses from five to 10 years. The change had been proposed in a rulemaking last April and was authorized by amendments to the Communications Act last year. It became effective on publication and included an extension of all current full-term licenses in the affected services to 10 years.

Networks Can't Deliver Audience, Turner Claims

A recent examination of viewer demographics by the Turner Broadcasting System, at a self-sponsored cable advertising seminar, produced claims by Turner and his executives that broadcast television was guilty of over-delivery or under-delivery of audiences, but could not deliver an audience that was appropriate for an advertiser.

The cable advertising seminar, held in July in New York, purported to examine results of demographic studies done by TBS and NTI. The product of the studies, the NAD (National Audience Demographic), was used as the

basis for claims made by cable television of a favorable advertising impact. If the claims made by Turner's panel are correct, interested representatives of the advertising industry who were gathered at the meeting witnessed an increase in cable penetration into viewers' homes, signalling a better delivery for advertisers' dollars.

The hosts introduced all of the TBS shows scheduled for next season, outlined program content for the coming season, and explained exactly what they meant by the Turner network. TBS offers 10 percent sports, 25 percent original production, and 50 percent films each week over the Turner network, which consists of CNN, CNN Headline News, CNN broadcast TV, CNN Radio, WTBS, and TNT (Turner Network Television). Even Japan will be getting a taste of Turner later this year when CNN is broadcast on that country's English-language channel.

All of this information was geared toward shedding a good light on cable TV in general, with TBS as the flagship of the medium. According to Robert Wussler, executive VP of TBS, all of Turner's efforts (including this seminar) combined with the rest of the cable industry's work illustrated a concerted

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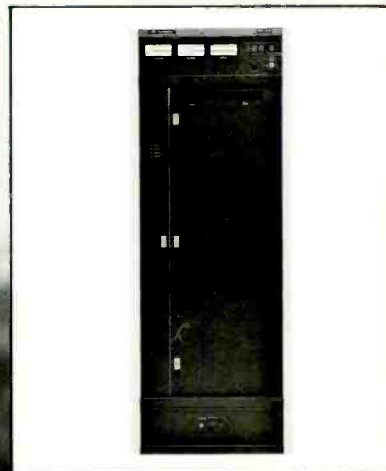
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NEWS

effort to draw more advertising. The success of such an effort was illustrated with two statistics: CNN's jump from 17 advertisers three years ago to 230 currently on the books and Turner's prediction that, at the end of the current decade, broadcast will only be providing to the advertiser 50 percent of viewer homes. Such figures and claims disputed the recent CBS 1990 television viewing projection, which predicted that the three major networks alone would garner 86 percent of the viewing homes.

FCC Dumps More Rules in Deregulatory Efforts

The FCC performed some additional regulatory housecleaning in its recent elimination of several longstanding policies and rules. Among the rules the commissioners deemed unnecessary were requirements that licensees maintain operating and maintenance logs of routine equipment observations.

In deleting these rules, the FCC reminded broadcasters that they remain responsible for operating their stations to standard, and warned that it would consider reinstating log-keeping if it found its technical rules abused. AM

stations with directional antennas but without FCC-approved antenna sampling systems will be required to continue both periodic observations and logging of antenna system operation. All broadcasters will have to continue logging results of tests of the Emergency Broadcast System; logging requirements for experimental stations also remain in force.

Antenna tower lighting log requirements were eliminated, although observation and inspection requirements stand. The FCC also reserved the option of requiring licensees to maintain logs in the event of interference or deficient operations.

In two other actions the same day, the Commission eliminated its type-approval requirement for aural modulation monitors and deleted its policies on licensee misuse of ratings data and use of inaccurate or exaggerated coverage maps. It based the latter action on its finding that nonregulatory methods exist for dealing with ratings and coverage map abuses, and that those transgressions are primarily of a commercial nature. It said that complaints about ratings abuses should be filed with the FTC. Licensees filing misleading coverage maps with the Commission could

be subject to criminal penalties for U.S. Code violations, the FCC said, and could place their licenses at risk.

SMPTE Group Agrees on Analog Component Video

Looking ahead toward the digital television studio, SMPTE's Working Group on Component Analog Video Standards has come up with a recommendation that may help ease the transition. The group recently reached consensus on a standardized signal for studio interconnection of television equipment in analog component form.

The new SMPTE standard calls for time multiplexing of the luminance and color difference signals, with the luminance signal time-compressed in a 2:1 ratio and the R-Y and B-Y signals time-compressed in a 4:1 ratio. In addition, the luminance and chrominance components will be normalized to equal amplitude ranges.

The standard allows baseband bandwidths of 5.5 MHz for luminance and 2.75 MHz each for R-Y and B-Y, significantly higher than the 4.2 MHz luminance bandwidth and 1 MHz chrominance bandwidth of NTSC. According to SMPTE's Barry C. Detwil-

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er, the additional bandwidth leaves room for improvements in television standards. "It's also good engineering practice to allow television facilities to have greater detail ability in all stages of production," Detwiler added. "That way, the only limitation occurs at the transmitter."

Detwiler also noted that the SMPTE groups working on digital standards will use the same system for maximum compatibility between analog and digital equipment in the transition studio.

NPR Loan Plan Approved Despite Last-Minute Hitch

A massive loan designed to save the life of National Public Radio was approved late in July after difficult negotiations that pitted the network against its benefactor, the Corporation for Public Broadcasting. One of the main sticking points was CPB's insistence that the network turn over the title to its transmitting equipment to a group of selected public radio stations. NPR rejected this proposal, but the parties finally agreed to a compromise whereby the equipment would be placed under the oversight of three independent trustees. The agreement broke the

deadlock, which almost forced NPR to miss its payroll.

At press time, the trustees were reported to be former U.S. Attorney General Elliott L. Richardson; Henry Geller of Duke University, a former Carter Administration telecommunications adviser; and Virginia Duncan of the Bechtel Group, formerly of the CPB board of trustees.

In addition to oversight of the transmitting equipment, the loan agreement calls for the CPB to maintain strict tabs on NPR's finances until the loan has been cleared. CPB will supervise NPR's financial officers and have full access to its financial records; it has the right to approve any budget changes. The loan will be granted as an \$8.5 million line of credit; CPB is also forgiving a previous \$600,000 loan to NPR, thus covering the entire \$9.1 million deficit.

The loan is being guaranteed by 170 NPR member stations, who have agreed to contribute money from their federal grants if NPR cannot meet its payments. The loan is scheduled to be repaid over the next three years through budget cutbacks and fundraising; next year's budget has been set at \$17.65 million, down \$8.35 million from the previous year. The new budget is

designed to allow NPR to continue its acclaimed public affairs programs, *Morning Edition* and *All Things Considered*.

Those two programs became fundraising vehicles last month when they hosted "NPR's Drive to Survive," special live editions of the show that urged listeners to contribute to NPR's barren coffers.

CBS Programs Go East in Ad-Supported Deal

Chinese television viewers will watch American programs and be pitched by American advertisers as the result of a unique agreement between CBS and China Central Television (CCTV).

Under the terms of the recent agreement, CBS will supply 64 hours of programs to CCTV, which was to select the shows this summer. CCTV is expected to lean heavily toward sports, documentaries, and cultural shows, with some of the last category perhaps coming from the archives of CBS Cable, the ill-fated arts service. The programs will be dubbed into Mandarin Chinese and will air Friday evenings after the CCTV newscast and alternate Sundays after the Chinese network's

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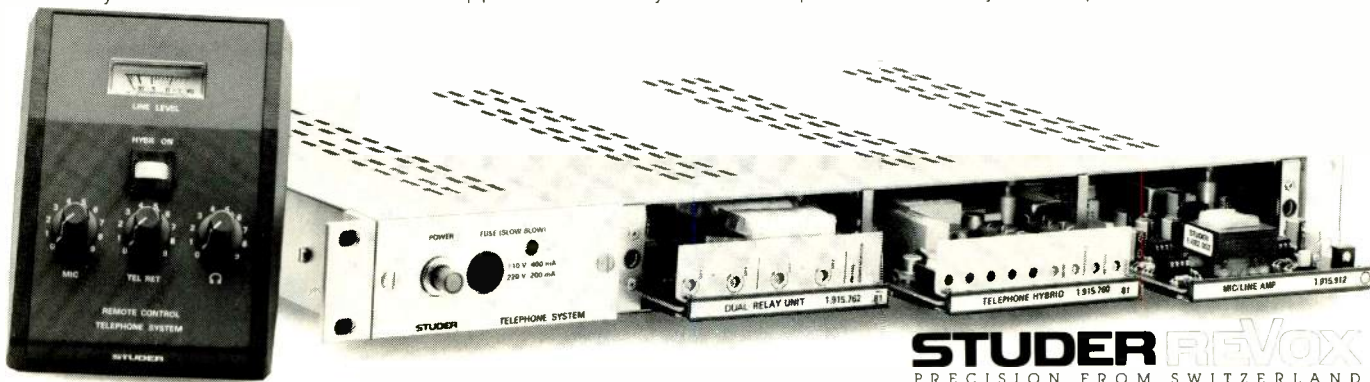
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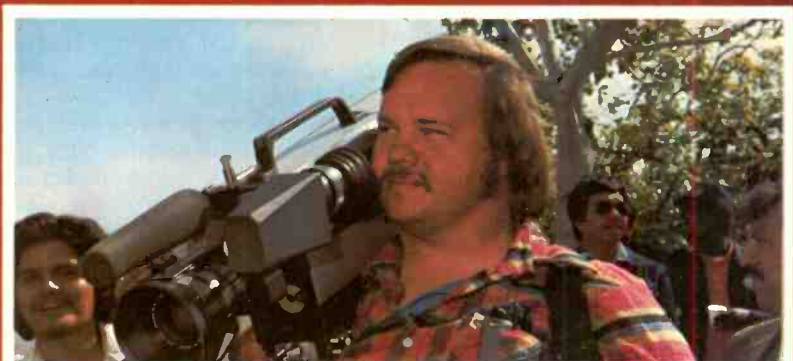


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telecast English lessons.

CBS will sell five minutes of advertising per hour to advertisers trying to establish themselves with the Chinese public. Revenues from the advertising will be shared with CCTV. CBS reportedly plans to limit the number of advertisers to fewer than a dozen, each promoting a distinct product type.

The accord between CBS and CCTV will not stop with programming—the organizations plan to cooperate in “current and new broadcast technologies,” according to spokespersons, and may engage in some joint productions.

Broadcast Systems Attract Crowds at Siggraph '83

Siggraph '83, the annual exhibit and conference of the Association for Computing Machinery (ACM) Special Interest Group on Computer Graphics, drew over 200,000 to Detroit in late July. Though many were in attendance to learn more about computer graphics applications in such areas as atomic research, jet fighter simulation, architecture, computer-aided automobile design, and so forth, interest in broadcast-related products and themes

has never been stronger.

On the exhibit floor, for instance, the biggest crowds were not at the booths of CAD/CAM manufacturers or even IBM, but rather at demonstrations of the MCI/Quantel Paint Box, the Via Video System One, the Dubner CBG, the Computer Graphics Labs IMAGES art system, and a computer-aided cartooning program in which the artist sketches frame-by-frame interpolated in-betweens. All, of course, were originally derived from computer graphics programs written for other industries; but it is television that is now using the hardware to create the dazzling array of effects and graphics that computer-aided designers in other areas can only dream about.

Another group of broadcast equipment manufacturers also eyeing the computer graphics market are display device suppliers—companies with high-resolution monitors, such as Ikegami, Tektronix, and Barco. Dynair showed its RGB switching equipment.

Still more evidence of interest in broadcast-related systems was demonstrated at two evening film/tape shows, where computer-graphics-generated products were shown to a large audience at Detroit's Cobo Hall. Again, the

images produced for entertainment media were the ones drawing the most attention—demonstration reels from TV commercial production companies such as Digital Effects in New York City and Robert Abel & Associates in Hollywood. A standing ovation greeted the screening of an extended segment of *The Works*, a computer-graphics-generated feature-length film being created by Lance Williams and others at the New York Institute of Technology. Wild applause also greeted a public service announcement produced at KRON, San Francisco, on its Aurora art/paint system showing a schoolhouse under attack as if in a video war game.

About the only area in which other applications of computer graphics still lead the broadcast industry is three-dimensional modeling, even though both MCI/Quantel (Mirage) and Bosch (FGS-4000) have 3D systems that produce many of the CAD/CAM-like effects. The problem with television systems, of course, is that they must work in real time, whereas other computer graphics applications have no such restraint. But several products on view at Siggraph indicate that real-time 3D modeling and manipulation may be just around the corner.

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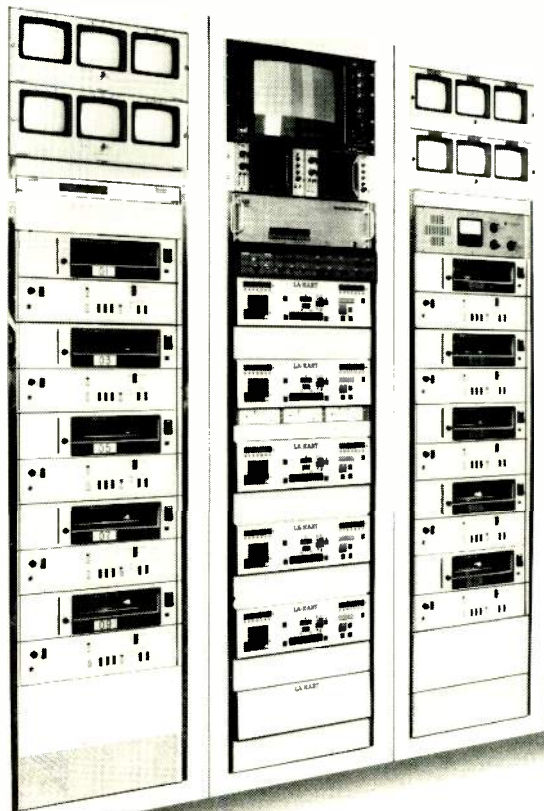
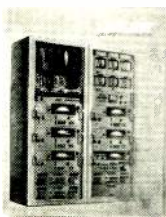
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NEWS BRIEFS

Cincinnati television viewers can receive teletext in their homes with Taft Broadcasting's introduction of its "Electra" service. Zenith Radio Corp. has cooperated by making teletext decoders available to consumers; Taft and Zenith are proponents of the British-developed World System Teletext standard. . . . Torbet Radio's second-quarter national spot profile shows 25-54 continuing its lead as the most requested age cell. Second was 18-49, with 25-49 third. . . . Film ranks second only to two-inch tape for TV station PSAs, according to a recent National Dairy Council survey of more than 1100 broadcast TV stations. For commercials, however, film is third, trailing 3/4-inch tape.

The FCC has proposed deleting provisions that limit certain full-time AM stations to the same daytime power as proposed for nighttime operations. . . . In the aftermath of a Broadcast Bureau decision that the CBS TV network had not violated the fairness doctrine in a 1981 Mike Wallace Profile on Jean Seberg, the Commission has announced a new policy requiring "follow-up" fairness complaints to be filed within a reasonable time (usually 30 days) after FCC denial of the original

complaint. Shortly after announcing the policy, the Commission affirmed the Broadcast Bureau action, which threw out a complaint by conservative group Accuracy in Media. . . . Outlet Co. has completed its acquisition of WHFS-FM, Bethesda, MD, which will switch to a news-talk format. Outlet's board of directors recently unanimously approved the company's merger agreement with Rockefeller Center, Inc. . . . Signal Media Corp. of Dallas has agreed to purchase KAAZ-AM and KLPO-FM, Little Rock, from Multimedia Radio for \$4.25 million.

Terminating its FM quadraphonic sound proceeding, the FCC stated that its deregulation of SCAs allows FM broadcasters to go ahead with quad sound if they wish. NAB president Edward O. Fritts responded by expressing his hope that broadcasters would use subcarriers for quad, although he noted that NAB would have preferred the FCC to set a single standard. . . . NAB's annual financial survey of TV stations found the typical station earned pretax profits of \$1,253,100 in 1982. The 17.7 percent increase in profits was matched by a 9.7 percent jump in gross time sales and climbs of 12.6 percent and 8.8 percent,

respectively, for national/regional spots and local advertising.

A bill designed to ease minority purchase of telecommunications properties has received NAB endorsement. Sponsored by Rep. Mickey Leland (D-TX), the legislation would authorize the FCC to allow tax certificates for sale of nonbroadcast properties to minority buyers. . . . NAB has asked the FCC to reconsider three points of its teletext decision. The association wants the FCC to require cable operators to carry broadcast teletext signals, to ease the burden of common carrier regulation for teletext services, and to expand its "unnecessarily restrictive definition" of the service.

Mutual Broadcasting System president and CEO Martin Rubenstein has called for a "concerted industry-wide effort" to convince Congress to repeal the fairness doctrine. . . . RTNDA had declared itself "flatly opposed" to the quantification inquiry now under way in the House of Representatives. Group president Dean Mell continued, "The amount of news and public affairs programming on radio and television should be determined by the demand for such programming, not by government edict."

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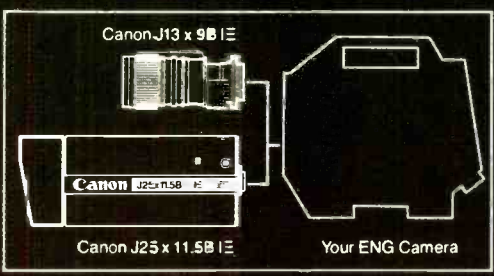
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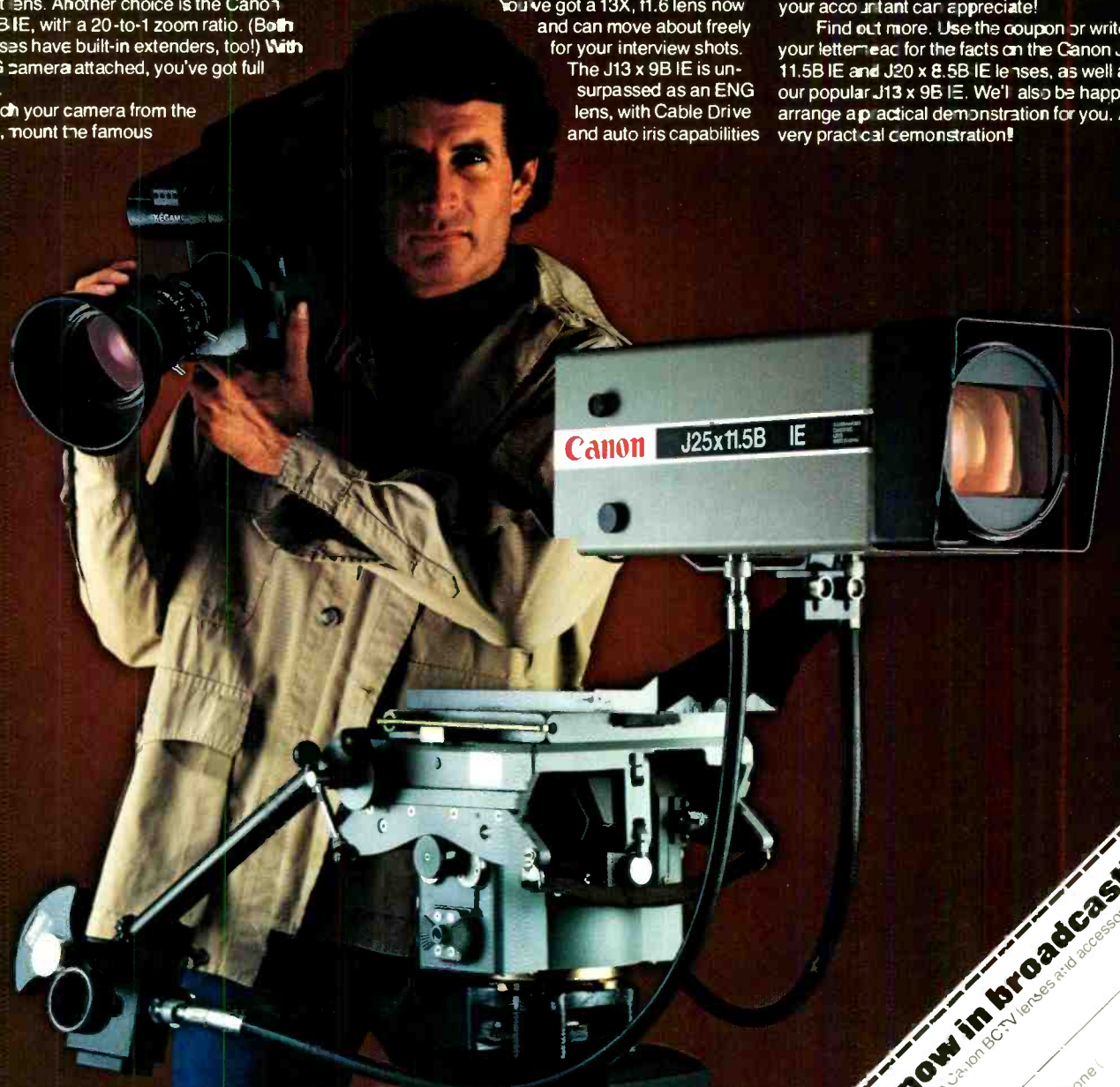


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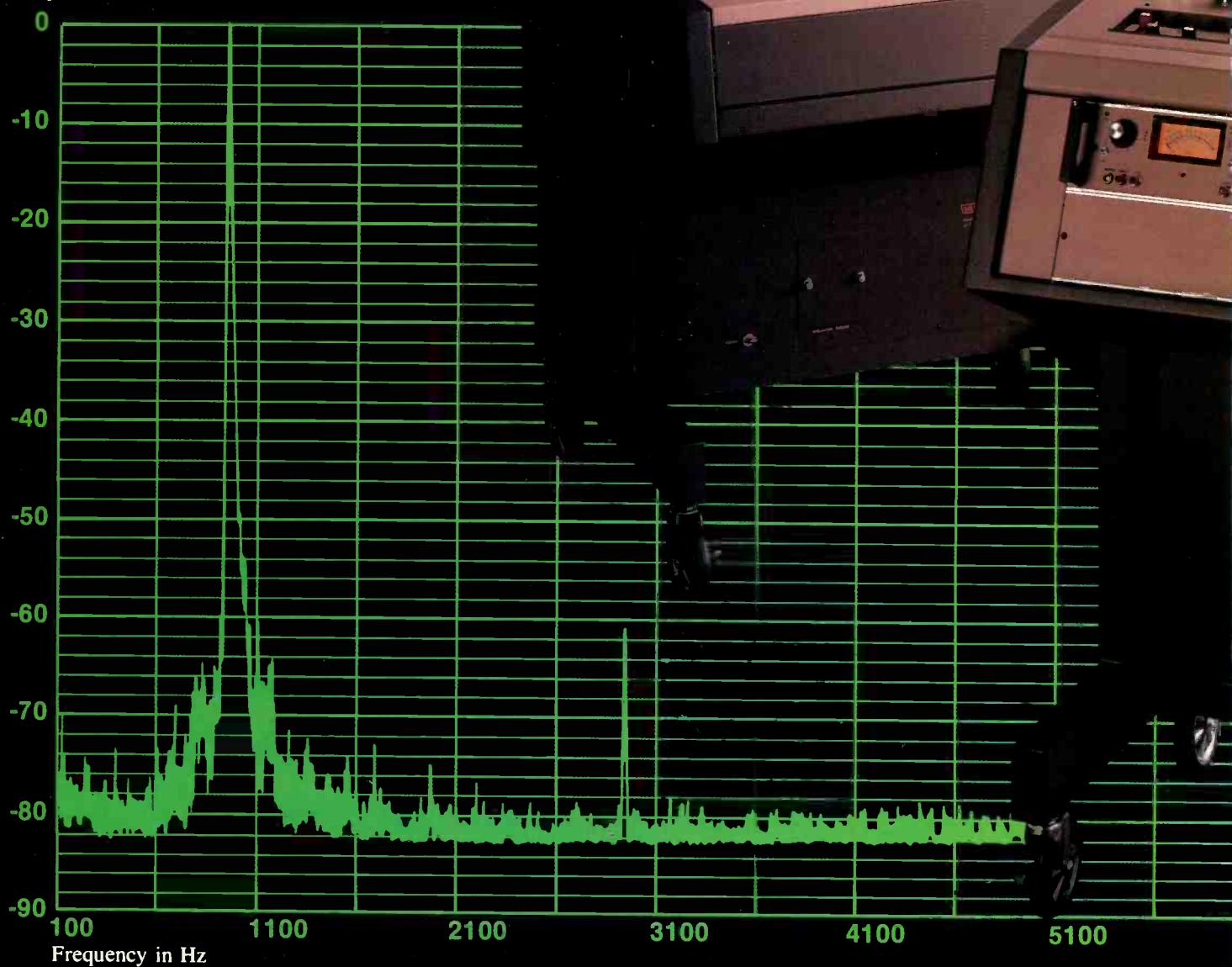
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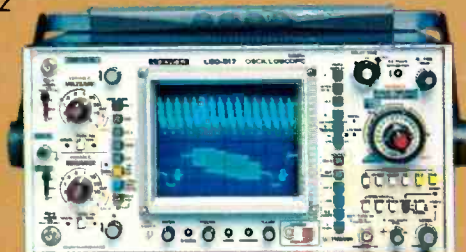


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RADIO programming & production

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TECHNOLOGICAL PROGRESS is often curtailed by financial constraints. But fortunately, there are always some who are willing to take the risks and possibly to turn a profit in promoting the technological cause. WNCN, a GAF-owned classical FM station in New York City, has been using the new DAD compact audio disc as a new programming tool for several months now and has proved that being a standard-bearer can pay dividends.

"We have always striven to be at the forefront of the new technologies," says WNCN chief engineer Richard Koziol. "We have been well known for our signal quality, innovations in live production, and the use of new equipment."

In keeping on the cutting edge of that tradition, Koziol and program director Mario Mazza feel the use of the digital audio disc helps distinguish the station from its competition on the air, helps with audience recognition, and also enhances the relationship with advertisers.

On-air improvement

The reason for using any new tool is to improve the final product, the on-air programming. The people at WNCN adhere strictly to that philosophy. Koziol carefully evaluates all of the new equipment, decides on its engineering merits or lack thereof, and discusses with Mazza the impact such new technology will have on the programming side.

So it was, back in February 1983, that WNCN made the move to programming with the digital disc players. Station management committed itself to the long-term digital programming project with the only restriction being the availability of software.

The first step came when Koziol received a demonstrator unit from Denon, along with five discs encoded with classical music. At the time, all the discs were from Japan with Japanese orchestras. (Since then, many new titles by European and American com-



WNCN chief engineer Richard Koziol demonstrates the compatibility of the CD player with the on-air studio.

posers and performers have been produced.)

The digital broadcasts were kicked off with a one-hour call-in show featuring Larry Klein, a music reviewer for *Stereo Review* magazine. The station was overwhelmed by callers, both during the one-hour show and for a week afterward, many offering to loan their personal compact discs to the station. In one case, a listener offered, and the station accepted, temporary use of a listener's player obtained overseas. The overall response was unanimous: The audience was excited by the new quality of sound it was hearing.

Hardware developments

Although the story ends with software—the sound of the music over the

airwaves—it begins with hardware. Notwithstanding the great variety of hardware that is beginning to flood the market, what almost all of the players have in common are those advantages offered by digital technology: pre-programmability of cuts in any order desired, infinite repeatability, frame-accurate access to musical passages, and digitally accurate cueing. What they also almost all have in common is that they are consumer machines.

After returning the borrowed unit to the generous listener, WNCN acquired a Philips consumer machine under the Magnavox label (Magnavox markets all the company's consumer players in the U.S.).

Sony, too, is playing an active role in promoting its digital player to the radio

RADIO PROGRAMMING

industry, and donated its units to radio stations in exchange for on-air mention of the digital disc player. Sony now has over 20 radio stations (nationwide) programming on its machines. Magnavox has about 15 to 20 stations, and Denon has even more.

WNCN, however, has been programming steadily with Magnavox and Denon players. In response to the station's needs, and with feedback from Koziol and engineers at RKO, Denon has been developing a professional ver-

sion of the digital system for marketing in North America. The DN-3000F has heavier construction, exact cueing, remote control, programmability of following cuts while current cut is being played, reduced access time, and other features.

Sony's machine also has remote control and the company is in the process of marketing a sturdier, more sophisticated machine for the broadcast industry. Philips, meanwhile, recently unveiled at a show in Europe its new



Denon has developed its new professional CD player for broadcast use.

professional CD player system. The system contains two disc players hooked to a remote control console. The new system offers numerous features, the most important of which may be fast and accurate access to program information such as: track number, absolute time code (indication of the elapsed time since the pause prior to the first piece of music on the disc), relative time code (exact amount of time from the beginning of the track being played), absolute time to go (amount of program time left on the disc), and relative time to go (amount of program time left on the track being played). There is also a dial for fast/slow frame search. Philips has indicated the machine may be available in the U.S. some time late in 1983.

Other companies are scrambling to come up with professional systems, hoping to offer the broadcaster the combination of quality, durability, and reasonable cost. Both Denon and Sony have had professional disc players in operation in Japan for some time, and Technics announced the release of its consumer machine at the summer CES. For now, many of the consumer systems are doing quite well, but that is only half the battle.

Software is key

Equally important to these hardware developments, however, are the software developments that allow a station to acquire music in digital form. At

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RADIO PROGRAMMING

WNCN, the biggest problem with the early forays into digital programming was the lack of available software. Even though the station borrowed from its loyal listeners in addition to receiving releases from Denon, there was a lack of enough quality programming.

The station also received software from Philips/Magnavox, but not in sufficient quantity. Part of the problem was that WNCN was unable to satisfy a widely diverse programming philosophy with what was available. WNCN

has now built its CD library to over 40 titles and is aggressively looking for more. Increasing numbers of titles are now coming onto the market from previously mentioned manufacturers as well as some others.

In fact, many of the companies are offering the permanent loan of the players to stations as a means of promoting their software selection, both current and soon-to-be-released titles.

A related development reflecting the

scramble for software is the formation of the new Compact Disc Group, an association of digital hardware and software manufacturers. The group's purpose is to promote awareness of the discs and the players, to inform the public about upcoming developments, and to catalog the number of titles available (which by August will be over 250).

In spite of such industry-wide efforts, there is presently a shortage of software. This impacts most severely on the classical stations, but is also felt at stations programming other formats as well. Because of a lack of digital masters, or even analog-to-digital conversions in rock music, AOR stations are programming very little CD music. WNEW-FM in New York, for example, has access to only three titles: Billy Joel and Santana (both digital masters), and a Bruce Springsteen which was an analog-to-digital transfer. Another problem inherent in AOR is that the extent of limiting practiced by stations using that format tends to have a negative influence on the quality of the digital signal.

That leaves the greatest impetus in broadcasting's digital uprising to classical stations such as WNCN. Programming at that station is done months in advance so that the station's monthly program guide, *Keynote*, will have accurate listings. Currently, the structure is to play CDs on a Wednesday evening set and to fill in throughout the week whenever the opportunity presents itself.

As for expanding the amount of digital programming time, Mazza says that "the more discs we get that will fit into our overall programming themes and philosophies, the more CD programming time we will have."

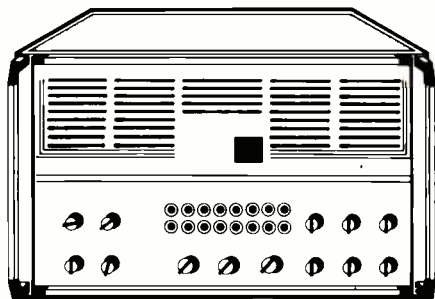
One obstacle which may prevent WNCN from going totally digital is the large number of program hours devoted to live broadcasting. Currently, according to Koziol, the station has decided not to go with digital in the live segments because it would require a substantial investment in recording equipment and training costs, would require additional personnel, and would necessitate the purchase of brand-new editing equipment. For this type of production, then, analog programming is more economically feasible.

Despite this, the number of hours the CDs are on the air steadily increases as the program director looks to substitute similar digital material for existing analog records. And in spite of an anemic software supply and the supposed extra expense of digital technology, stations such as WNCN have stepped forward in an effort to prove the viability of regular digital programming. **BM/E**

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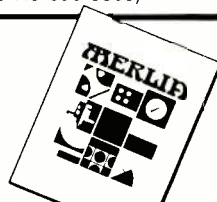
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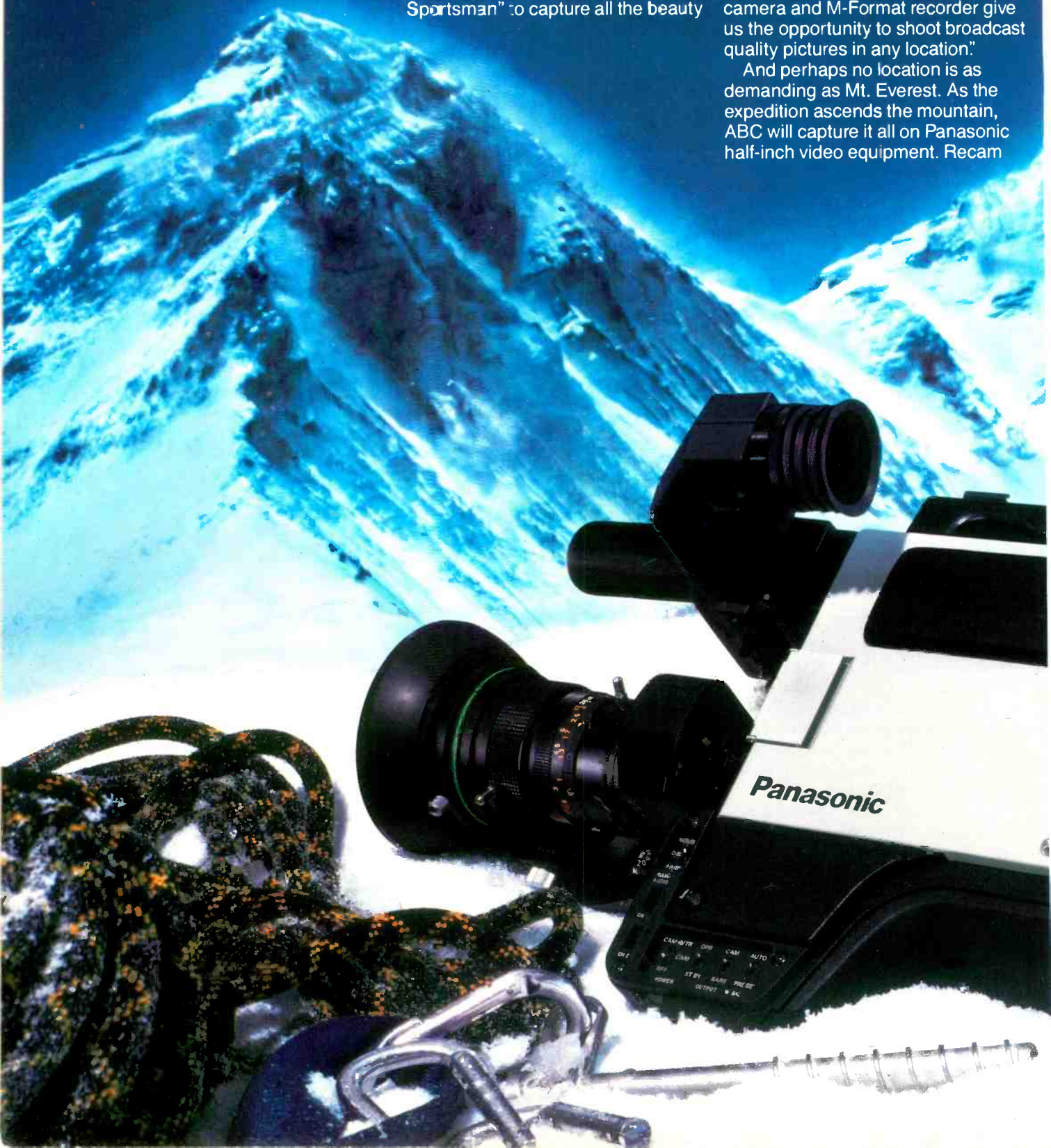
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TELEVISION

programming & production

Careful Camera Placement Gets Angle on Rain-Delayed Diana Ross Concert

OF ALL THE FACTORS that go into making a successful live concert production, one of the most critical is the selection and placement of cameras and lenses. One person who's given great thought to the problem is Keith Winikoff, director of video operations at Greene, Crowe and Co., the Burbank mobile teleproduction facility.

"Just watching the stage for two hours can be boring," Winikoff complains. It is unlikely that viewers of the recent Diana Ross concert, which Paramount produced live for Showtime from New York City's Central Park, had much to beef about in that respect. (The weather, on the other hand, was a legitimate cause for complaint. Rain forced the show to be cancelled midway through the original July 21 gig and rescheduled for the following evening.) According to Winikoff, the production was carefully preplanned to make the most of the dynamic relationship between the star and her audience.

Winikoff worked closely with director Steve Binder to develop the camera positions for the production, which was broadcast live over Showtime and recorded for later worldwide distribution by Paramount.

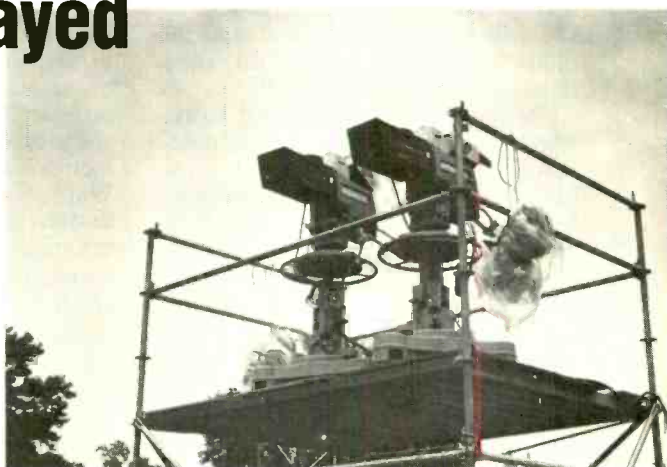
Getting the big picture

"Steve's concern was to keep the large scope of the concert part of the event," explains Winikoff. The Great Lawn in Central Park measures roughly 1000 feet by 400 feet, and the crowd was expected to number approximately 500,000. To give viewers the full scope, Binder originally hoped to put a camera in a helicopter or blimp, but city regulations and scheduling problems grounded that idea. The next best thing, then, was to get on top of one of the skyscrapers that look north toward the park. A particular advantage of this angle is that the stage was to be set up at the southern end of the lawn, facing

north; with the right lens, therefore, the camera could look over the singer's left shoulder into the crowd.

Similar concerns informed the placement of all the cameras for the concert. The four hard cameras, all RCA TK-47s, were to be set up on pedestals for the stage shots. Cameras 1 and 2, both on a center platform located about 40 feet from the stage, were designed to give head-on views of the performer. Camera 1, the "head-to-toe" shot, had a Fujinon 14:1 lens for the primary coverage of the entertainer; Camera 2, with a 30:1 Fujinon lens, was slated for tight face shots. Winikoff praises the 30:1 lens for its excellent ramping characteristics, although in this case the concert

At the lawn's northern end, an HL-79 on a Chapman Titan crane gave crowd views.



Camera 1 (left), with 14:1 Fujinon lens, shares platform in front of stage with Camera 2, with 30:1 lens. Both are RCA TK-47s.

took place during daylight (6:00 to 8:00 p.m. Eastern time), making aperture less critical.

Camera 3 was positioned at stage right, just in front of the stage, on a Vinten pedestal for eye-level shots. The last hard camera, Camera 4, was on the opposite end of the stage on a small Chapman Electra crane designed to move across the front of the stage and

Last-minute changes put both Camera 3 (shown here) and Camera 4 on Chapman Electra cranes.



TELEVISION PROGRAMMING

give crowd shots. Both Cameras 3 and 4 had 14:1 Fujinon lenses.

Hand-held flexibility

The first of the hand-held cameras, Camera 5, was an Ikegami HL-79 with Fujinon's 17:1 lens. The camera operator had the option of using a tripod or going hand-held, to follow Ross if she moved down toward the audience. Winikoff and Binder chose the 17:1 lens for this camera because of its 9 to 153 mm focal range, allowing close shots of the crowd as well as fairly wide shots.

For less conventional crowd shots, Winikoff and Binder planned to position Camera 6, another HL-79, on a Louma crane (made in France and handled in the U.S. by Panavision), a remote-control crane with a 26-foot arm. With the remote pan and tilt, Winikoff says, "we could drop the camera into the crowd for many interesting moods—such as 360-degree pans directly over people." To increase the versatility of this camera, the crane was installed on a 300-foot track, allowing many different audience shots.

"We used Fujinon's new 7x7 lens for the Louma crane," Winikoff adds, "because its 7 to 50 mm range gave an

extreme wide angle, almost fisheye, but it goes tight enough to focus in on something. The minimum focusing distance is just a few inches and infinity is past 12 feet, so focusing isn't critical."

For Camera 7, Winikoff and Binder opted for "the largest crane we could find"—in this case, a converted hook-and-ladder truck operated by Camera Towers of New Jersey. The truck, with its elevation of nearly 100 feet, was to be situated approximately 800 feet from the stage on the right side.

"We chose a Fujinon 17:1 lens for this camera, rather than a larger one, because such a high camera platform sways a little, and you can't hold an effective closeup with a huge lens," Winikoff explains. "Also, we wanted to show the scope of the event, not just the stage."

Also mounted on a crane was Camera 8, on a Chapman Titan with a 36-foot extension arm. Winikoff used this camera, with its 17:1 lens, for a fast arc shot about 10 feet above the crowd—a shot he had used before and considers very effective.

Some disagreement arose as to the deployment of Camera 9. "The director wanted a roaming RF camera in the crowd," Winikoff explains, "but the

New York police department said 'You're nuts!'" The police department's objections apparently stemmed from its fears—not without foundation—of restricted mobility and unpredictable audience members. Finally okayed, the plan called for the RF camera to use M/A-COM's MA 13 portable 13 GHz transmitter, with a receiver positioned behind the stage and RF communication to the camera operator.

The final camera position, described earlier, provided a bird's-eye view from the top of the Gulf & Western building. This camera had a 30:1 Fujinon lens and also transmitted over an RF link. The signals from both Cameras 9 and 10 were routed through Digital Video Systems frame synchronizers rented for the occasion.

Selection of the cameras themselves was a major consideration. Four new Ikegami HK-322s, on order at the time of the concert, had not yet arrived, so the Greene, Crowe truck's four RCA TK-47s were slated for Central Park. The remaining six cameras were Ikegami HL-79As.

Small tube advantages

In making the switch from the TK-47 to the HK-322, Winikoff is also switch-

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TELEVISION PROGRAMMING

ing pickup tube sizes—from 30 mm to 25 mm. The change, he says, was deliberate.

“We’ve found in the past that the larger format has had problems with microphonics”—distortions in the video caused by sound waves hitting the pickup tubes—“in very loud sound environments,” Winikoff explains. As a concert and show engineer, Winikoff is especially sensitive to such difficulties. The distortion caused by microphonics gives a “waterfall” effect on the screen.

Another problem with the larger tubes, especially with the lead-oxide Plumbicons, is lens flare, discoloration in the low-light areas or the light level changes. The larger optical surface of 30 mm tubes exaggerates both these problems, according to Winikoff. Another drawback of the 30 mm format is highlight decay lag, the stiction problem with afterimages of bright light sources.

“We felt our next camera would be a 25 mm variety,” Winikoff relates. The advantages of 30 mm tubes in ease of registration have been largely matched by recent advances in 25 mm camera technology, with features such as spatial error correction that allow very

Enormous Camera Towers crane raised an HL-79 with a Fujinon 17:1 lens high above the audience.



tight registration even with the smaller tubes. In addition, the 32x32 zone pattern offered by Ikegami and other camera manufacturers lets the operator register the camera to a finite point for great accuracy. This accuracy and the better performance in terms of micro-

phonics and lens flare make the 25 mm tubes very attractive.

If smaller tubes have so many advantages, why not use all 2/3-inch cameras? “The small cameras don’t have enough mass to work well on a large pedestal,” Winikoff explains. The extra weight of

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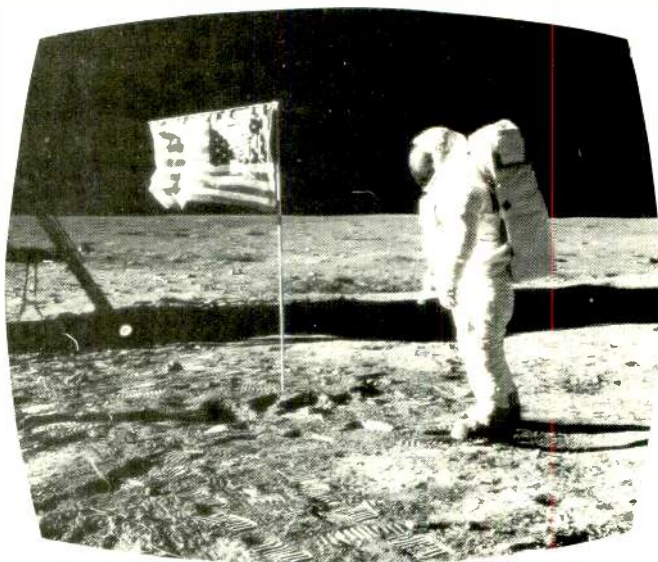
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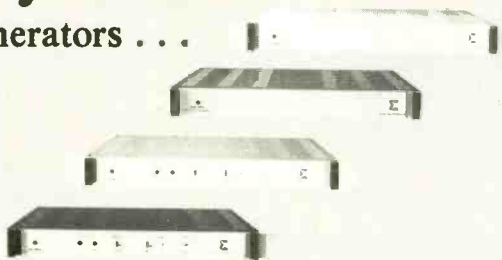
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a larger camera gives more stability and control for smoother dollying. Also, many of the lenses available for $\frac{2}{3}$ -inch cameras, while of excellent optical quality, are basically designed for ENG-type work and may have somewhat less smooth and less sophisticated servos than the larger-format lenses, designed for the studio.

Roomy control room

The Greene, Crowe truck, designed for show and concert work, was built by the company's principal partners—Winikoff, Gene Crowe, and Ed Greene—in a 45-foot Gerstenslager box with a 26-foot expandable side that increases its width by another four feet. "One of the main advantages of the truck," Winikoff says, "is the control room, which is over twelve and a half feet wide because of the expanding side. Most trucks put the production switcher crosswise in the control room, which is eight feet wide at the most and very cramped for four people."

In the Greene, Crowe truck, on the other hand, the Grass Valley 1600-7K switcher runs lengthwise in the truck, giving plenty of room for the director, technical director, assistant director and production assistant. Along with the switcher is a customized Telemation 30x20 routing system, with a software interface to a programmable 40-button control panel.

Another feature of the truck that came in handy for the Diana Ross concert was the on-board MCI/Quantel DPE-5000SP, which Winikoff used for transitional effects and to integrate montage footage, shot before the show, into the telecast.

As one would expect for a concert production involving a 20-piece orchestra, extensive audio work was to be part of the show. The idea was to have the orchestra in a pit in front of the stage, where one of the cranes could drop down for closeups of the performers or even their sheet music. For audio, Winikoff used two Otari MTR-24 24-track recorders and Greene, Crowe's custom Audiotronics board, which has 48 inputs and 24 outputs. Winikoff notes that the truck itself is capable of handling up to 160 inputs. One of the 24-tracks is permanently mounted, although the truck is wired for two; the usual audio complement is the 24-track plus two Otari four-track ATRs.

With Keith Winikoff and Greene, Crowe, there's nothing accidental about selection and placement of cameras and lenses. If careful preplanning is any indication of final success, the July 21 show covered Diana Ross—and the star's audience—from all the right angles.

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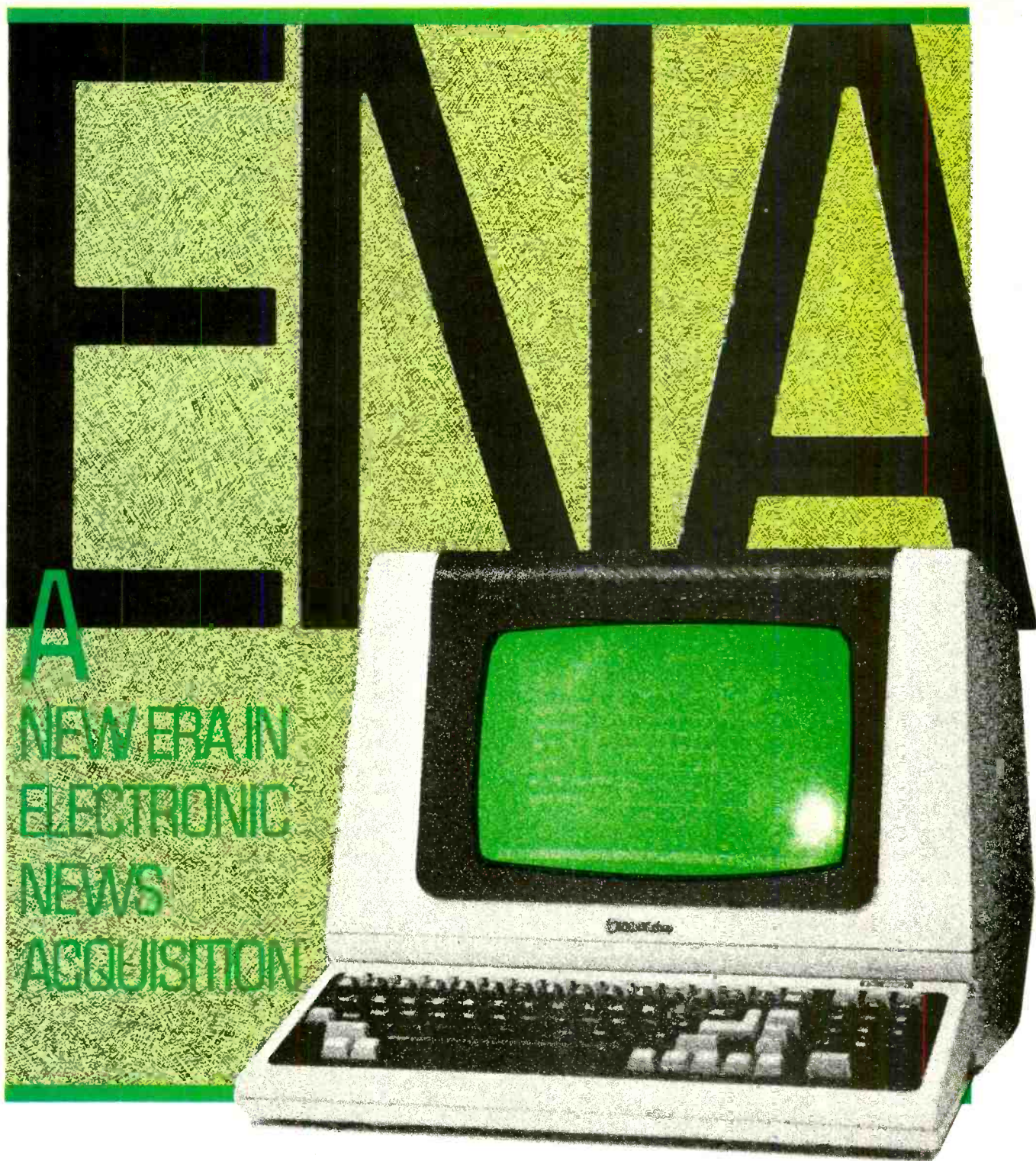
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A NEW ERA IN ELECTRONIC NEWS ACQUISITION

T By Tim Wetmore, Associate Editor
echnology has changed the way news is gathered. Today's radio and TV stations have entered a new era in which news is electronically acquired from a huge variety of sources, then electronically blended into the newscast.

FACED WITH AN ALMOST BEWILDERING number of sources of news in today's competitive newsroom environment—feeds from the network, syndicated news services, the station's own reporters, viewer/listener call-ins, wire services, etc., etc.—and the need to record, route, and process them all, news directors and engineers are increasingly turning to newsroom computers as the only way to manage. And with the computerized newsroom has come a brand-new era in broadcast journalism—ENA, or electronic news acquisition. ENG concepts, as sophisticated as they have become, simply cannot keep pace with all the news sources.

Computers are changing the way news is being assembled, written, and broadcast, permitting news staffs to



handle information in ways never before possible. This is not a bold prediction of things to come; this is a simple fact of the electronic information age, at the forefront of which is the broadcast industry. The important questions in this issue are no longer whether computer-controlled news will take over or how it will happen. The relevant queries are now: When will computer-controlled news take over broadcasting? How and why has it already happened?

The prudent analysis wisely sidesteps the prediction required to answer the first question of when. But as to how and why computer systems are moving into newsrooms across the country, there is much hard evidence to examine.

Exhibit A: The well-known and much-documented case of KCBS in San Francisco. In 1977, Larry Cooper, the news director at KCBS, was inundated with the volume of news and the speed with which it was coming in. "We decided that something had to be done," says Cooper, "something that would help acquire and process the information faster than we could do it by conventional methods." The first move was to become a UPI bureau, because UPI had an open port in its computer at the New York headquarters. In addition, KCBS was linked by satellite and phone lines. KCBS paid for the six terminals and the circuit, and rented the ports from UPI.

When the next step—expansion beyond simple computerized wire service monitoring—was contemplated, the station ran into an obstacle. At the time, there were no broadcast-oriented computerized news systems available, at least none with a track record. The people at KCBS decided to put an advertisement in a computer magazine, but all the responses were from companies who had designed and installed computers for various newspaper bureaus. Cooper found that the newspaper systems didn't have the speed required, nor did they have the ability to coordinate, rapidly, an entire news broadcast. Still, the decision was made to go with a newspaper system designed by Integrated Technology. After modification of both hardware and software, with a great deal of input from station personnel, the system was up and running by December 1980.

At first there was a problem with the station's new ENA system, something the news staff could not get used to even after several training periods: quiet. The newly installed system was too quiet, and it unnerved a veteran staff used to the noise and chaos of bells and wire printers. KCBS finally discovered a solution at Radio Shack—a little \$2.50 noisemaker that would go "beep" every time the computer received information over the wire!

Parallel development verifies trend

Exhibit B: The less well-known but no less important case of CNN. At the same time KCBS was experimenting with UPI computers and looking for news systems to modify for broadcasting, Basys was busy adapting its successful print news computers for applications in the broadcast industry. The adaptations resulted in the Mini Fury and the larger and more complex News Fury. By June 1980, the company's first ENA system was installed at CNN.

At CNN, like most other news productions, when an urgent news item came over one of the wires, an assistant

heard the bell, went over to the machine, and took the copy to an editor who would confirm whether or not it was urgent. Only then, if it didn't need to be rewritten, was it taken to one of the news personalities to be read on the air. With the Basys system installed, urgent messages flash on a monitor which can be placed anywhere in the newsroom for easy availability, and can be immediately read or rewritten, saving much time and effort.

Further, with the phenomenal volume of information flowing through CNN's 24-hour-a-day newscast, its people now have a system that allows them to store and retrieve information more efficiently than they had in the precomputer past.

Small-market applications

CNN and KCBS were the pioneering cases in the fledgling electronic news acquisition industry. Since then, Colorgraphics/IT, Basys, Quanta, BEI (which is making a bid to acquire the Newscan/Weathergraphics system from McInnis-Skinner), and Telesource, among others, have installed systems at a number of radio and television stations. The electronic handling of information is becoming a necessity to keep up with the constant flow of news material and turn it around fast enough to get it on the air—even outside the four or five top markets.

WKYT, Channel 27 in Lexington, KY, for example, recently installed in its newsroom a complete Newstar computer news package from Colorgraphics. (Earlier this year, Colorgraphics bought Integrated Technology, which had developed Newstar, perhaps foreseeing the arrival of the all-electronic newsroom in which not only wire feeds and word processing, but also weather, sports, and on-air graphics, may one day be integrated.) WKYT bought the system as Lexington went from 132 to 78 in market size and the station's small news staff grew to 35.

This move to computers conforms to the general consensus among ENA experts that, if your news staff has grown to more than 25, you may need a computerized newsgathering system. Smaller than this, the investment may not realize a return. It must be recognized, though, that this hasn't been a deterrent to many small market stations. In fact, one of the principal advantages of ENA is that it can be implemented in stages, starting small and growing larger when the situation demands it.

This was the case with WTLV, an ABC affiliate in Jacksonville, FL. News director Tom Sanders purchased the QuantaNews system from Quanta as a way of growing into an ever-expanding system. The QuantaNews is a versatile system, meeting a station's needs for anything from a simple start-up, user-defined archive system, to a full-blown multiterminal computer handling wire services, data sources, remote bureaus, and electronic mail.

"We changed to computers because we saw newspapers operating more efficiently with them, and felt that we should make the move now so as not to fall behind in a very demanding and competitive business," asserts Sanders. The station started out with two terminals because they required only a small investment and still gave the station a base on which to grow. With the two terminals, both at the assignment desk where the most paperwork is done, WTLV could train its personnel at the proper pace and still have the advantages the computer offered.



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Later, Sanders expanded to six terminals, providing the staff with the capabilities of archiving, future file storage, and a place to schedule lineups and rundowns in addition to text editing. This involved training producers to do lineups on the computer—according to the majority of broadcasters the most efficient way to handle the rapid-fire demands on news programming. As the rundowns are being entered, the computer can time-out the stories, telling the producer how long they will take on the air, one of the most important considerations for news directors, writers, and producers.

Archive facilities are another approach to starter systems for ENA. KRIS, the NBC affiliate in Corpus Christi, TX, started its archiving with a Jefferson Data NewsInventory software system based on the IBM PC/XT with Winchester hard disk. News director Doug Caldwell says the purchase was a way of beginning the station's effort toward acquiring an all-electronic newsroom, and that the next step will involve text editing, wire service monitoring, and program handling. In Caldwell's words, "Electronic newsrooms are the wave of the future—orderly, clean, and efficient. They are also more accurate and make people look smarter. Even better, they will pay for themselves over the long term."

Financial considerations

Whether the decision is made to start with a small archive unit or to go to the sophisticated newsroom system that handles all information processing, an important consideration for those pondering the relative merits of an ENA system is its economic value. When a station pays for equipment, its return on the investment is realized by money savings and more efficient use of staff time. As it happens, those radio and television stations which have converted their news operation completely to computers have found the greatest return in money and efficiency.

A case in point is WOR Radio, a large operation in New York City which converted its conventional newsroom to an ENA system in March 1983. The \$160,000 Basys system now installed consists of seven terminals in the newsroom and two in the on-air studio used by anchor John Gambling, a top-rated news personality, and by the show's producer. There are two CPUs, each with 20 Mbytes of memory.

The station feels that the way the computer has helped with its morning news, and the way in which it fits into future plans for all programming needs, has made it well worth the money. Gambling keeps one terminal with him in the studio and the producer has the second. The script can appear on the screen right in front of Gambling, obviating the need for paper. Any weather messages, updates, traffic, or high-priority material is flashed on the screen as it comes in, allowing the anchor to have it on the air the very second the information is available. If it's not of immediate importance, the producer can decide and route messages to other writers or reporters via the electronic mail system, telling them to rewrite the story, do further research, or to file in the archives or subject file.

Having a story first is very important in news, but may not, in the end, save or make the station money. WOR's plan, though, was to put the continuity involving all live commercials on the screen, and later to expand the conti-



The electronic newsroom from Basys coordinates all news efforts at KRON-TV, San Francisco.

nunity and traffic systems, thereby coordinating the whole operation. This, in management's estimate, could save the station money and could only be accomplished with the ENA system. The station management has found that the system has cut down tremendously on make-goods and has caused fewer mistakes by having less old or superfluous copy sitting around. When stations like WOR do a lot of live copy, the ability to edit wires from any terminal as the information comes in, and to be able to cut down on paper costs, is a savings worth the investment.

Another Basys system was installed at KRON-TV, the NBC affiliate in San Francisco. The station originally went on-line in May 1982, expanded in December of the same year, and continued the expansion to the present system in June of this year—62 terminals operating off 660 Mybytes of memory and 38 Mybytes of disk storage. The return has been a tremendous amount of savings in staff time and paper cost.

Under its current incarnation, the ENA system at KRON also saves money on rentals for wire printers, and makes the whole information processing task quicker and more accurate, with absolutely nothing on the air coming from paper or originating on a typewriter. With its huge staff of about 180 people, KRON uses the computer for rapid and clear communication between terminals and even its bureaus in Sacramento, San Jose, and Oakland. The station's entire library is computerized, presently using an IBM machine, but soon to be converted to the Basys system, allowing anyone at any terminal immediate access to relevant information.

As Dick Van Wie, news director at KRON states, "It's more cost-effective because in the long run it's no more expensive than the equipment for the standard newsroom—while being more efficient. In our old system, it was almost impossible to keep all the various information from all the sources straight, and to organize and retain it for immediate reference. That's the kind of thing a computer does best."

Total electronic news

One of the biggest forces in the present tendency toward the all-electronic television, radio and combined TV/radio station is Colorgraphics/Integrated Technology. The company sold 15 systems on the floor at NAB and currently has double TV/radio systems installed at KIRO-Seattle, WGN-Chicago, and is installing the Newstar sys-



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tem at CBS Radio Network headquarters in New York, with the TV side taking a very serious look. These news organizations shared the vision with Colorgraphics that the broadcast news industry was heading for the total electronic newsroom eventually, and all indications urged them to begin the process now.

One of the conditions that pushed KIRO into the purchase of an ENA system was a paper crisis. As Vic Bremer, news and program manager at KIRO, relates, the newsroom environment had become stressful. There was the sound of ripping paper from the wires, reams of paper abounded in the noisy room, and dust and equipment breakdowns contributing to a generally tense atmosphere. "This was antithetical to the immediacy and the accuracy on which we placed such great importance in our broadcasts," Bremer maintains.

In June 1982, the station's 13-terminal system was installed and worked so well that immediate plans were made to get remote terminals for outlying bureaus. (There are two permanent bureaus in downtown Seattle and two less formal setups in the outer counties that the station serves.) With this connection for stories to be filed instantaneously from the perimeter of the metro area, a more complete and accurate newscast is possible. News from the downtown courthouse bureau and the distant county bureaus comes in faster, allowing "hot" stories to go immediately on the air, or giving the staff longer rewrite time between newscasts. This capability also permits remote terminals access to computerized archives, libraries, and



News editor Lynn Olson of KIRO, Seattle edits wire story picked up by Integrated Technology ENA system.

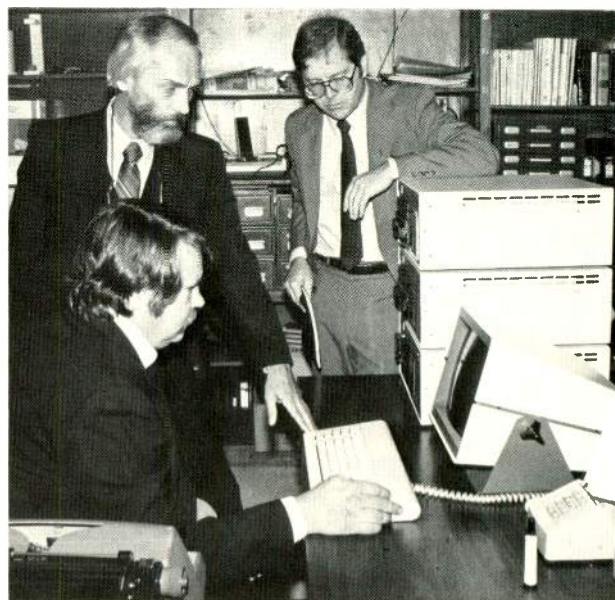
other research tools for more thorough reporting. Another benefit is that it gives the studio news staff more time to turn the regular stories around if they need rewriting, in order to fit them into any overriding theme that has developed during the day. To this end, Colorgraphics/IT will be offering a couple of portable models, allowing field reporters phone-in capability and access to computer files.

The interface with the radio side of the operation is important as the station progresses towards its electronic goal. Eventually, after the system is complete, television and radio operations will be able to trade information back and forth between the computers. This information can be modified or restricted by categories such as subject of news story, by title, date, on-air time, or many other important newscast parameters.

In the case of KIRO, the TV assignment desk computer

will have access to the radio computer's work file (the planned schedule of topics to air on the next broadcast). This capability permits a producer to run a parallel story, to sidestep a story rather than repeat it, or to scan any story in the file and decide whether it has merit for his particular medium. Any number of other possibilities are available, depending on the nature of the two broadcast media and the personnel involved. Such an interface between television and radio can increase a reporter's potential for the amount of news gathered and the outlets for such news. An interchange of this kind opens an important new facet of the business to staff members on both sides.

A station which plans to take advantage of these techniques is WGN, the Chicago superstation. Management will, according to news director Paul Davis, exchange information between radio and television. The station will



KAIT-TV news director Cal Wasson, at keyboard, works with QuantaNews; adjacent to CRT are dual redundant hard disk drives.

go one step further and exchange reporting through computer. WGN also purchased the Colorgraphics/IT Newstar system. Davis, in fact, purchased two separate but identical systems for radio and television. He felt the architecture of IT's internal system was well suited for interfacing the nine printers and the 39 terminals in each system. The station also possesses two remote terminals. "The overall exchange both in the studio and with the remotes offers an improvement in wordsmithing, and thus in the quality of our scripts," claims Davis. He also recognizes improvements in coordination of all writers' and reporters' efforts, and a newly found ease of scheduling. Davis hasn't forgotten the financial considerations either. "We were drowning in a sea of paper. This rescued us. We expect it to save us \$80,000 a year in paper alone."

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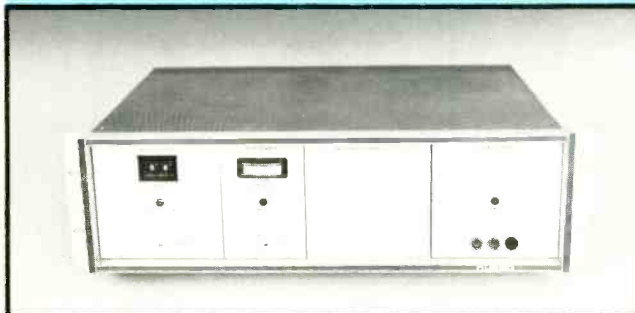


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from a terminal to the teleprompter. In radio, where a station may not want to invest in a completely separate terminal for the on-air news anchor, but still wants to increase its efficiency and eliminate its paper problems, an electronic teleprompter can come in handy. The type size and speed of operation can be varied according to the station's style of production and the anchor's preferences.

A company which started its foray into computerized news handling with an electronic teleprompter is Beston Electronics. The BEI unit was called DataPrompter, and the first one was sold to KDUB, an ABC affiliate in Dubuque, IA two years ago. Using a Texas Instruments 9900 as its hardware base, the DataPrompter can prompt the on-air news, restack shows for scheduling, and is capable of word processing for news writers. Its limitations came with its inability to sort wire stories, and it did not have archiving or electronic mail. Still, for a small market station, that at the time had no teleprompter at all, and wanted to begin its investment in an ENA system, it was a good start. The news staff consisted of eight people when the system was purchased in 1981.

Chuck Cyberski, the news director at KDUB, has found that the word processing feature has increased the quality of the broadcast product and that the electronic teleprompter is easier for the on-air personalities, and he is poised to go ahead into a more complete system that will include scheduling and wire service monitoring. An added feature is that there is a feed for closed captioning of the news broadcast made possible with the addition of a

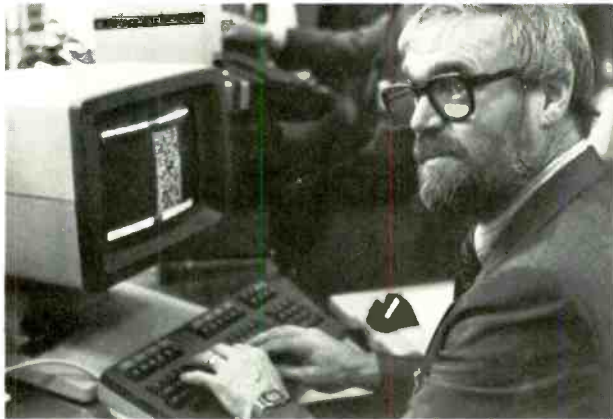


Wendall Anschutz of KCTV prepares script using split-screen capability of BEI DataNews system.

small box for encoding and decoding. Cyberski is convinced that the station will go to the total ENA system, that it is just a matter of timing.

After DataPrompter's success with several stations, Beston introduced at this year's NAB the DataNews system. This computer is an enhanced version of the DataPrompter, using a Motorola 68000 microprocessor and five-inch floppy disks for storage. There is much more memory with the new system, allowing a greater degree of uses through customized software. Meanwhile the company is in the process of acquiring McInnis-Skinner, manufacturers of the popular Newscan and Weathergraphics systems.

A different twist on the computerized newsroom system, one that includes capability for an electronic teleprompter, has been developed by Telesource. Using its own hardware, based on a Motorola 68000 processor, it is a networking system with each intelligent terminal dedicated to a specific processing purpose. The news staff will have terminals that pertain to their task, all linked through a central file server which also controls the teleprompting. If a person needs a function other than the ones normally performed, they move about to a different terminal. Capabilities of the system include word processing, wire monitoring, directory and indexing, with



Tam Fry, BBC journalist, using his ENS software at *Breakfast TV* newsroom.

news, sports, weather graphics, and still store facilities resulting from the system networking. The company's newly developed system is expandable beyond 200 terminals, with prices and configurations all depending on custom installation. Telesource plans to show the system at this year's RTNDA.

Another established company known for its teleprompting equipment is Autocue. The company's Model 2000 is a new digital prompting and script display system that has a hard copy printer, variable prompting format, and a remote-control unit that can control character size, roll speed, closed captioning, and story reset. The unit can be purchased as a standalone unit, but is also being marketed in the U.S. along with an electronic newsroom system developed by the BBC in Britain.

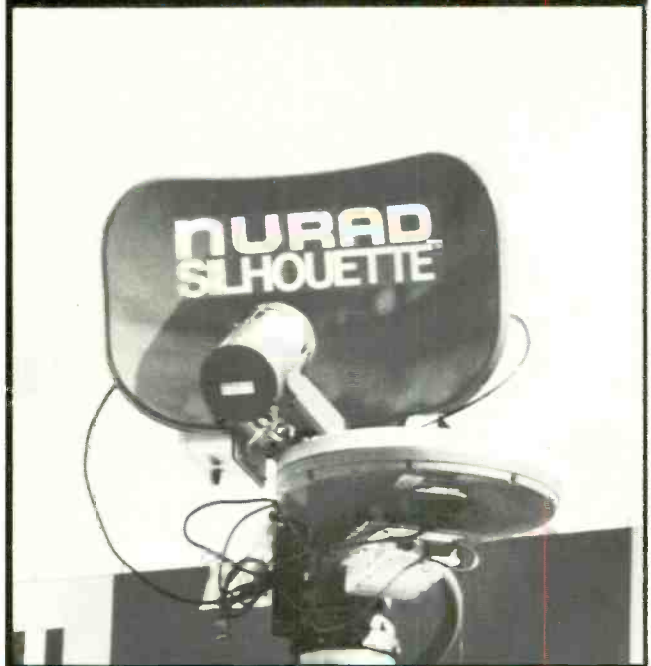
When the BBC went on the air in January 1983, with its news television program *Breakfast Time*, it was with the ENS system in full operation. Designed by Tam Fry, a journalist for the BBC show, programmed by System Solve, a software company, and operating on Hewlett Packard hardware, the system processes a 100-sequence program and holds 500 pages of script if necessary.

Along with the standard word processing and wire monitoring, the system has a diary that holds up to 365 days of entries with cross references. Storyboarding and technical sequences can also be stored in the computer, permitting a director to overview which cameras, VTRs, and other production equipment will be operating and the sequence in which they will operate. There is also a videotape log facility. The standard prompt unit is the Autocue 2000. With the system in operation since the beginning of the year and having experienced no down time under a 24-hour broadcast schedule, the designers felt they should display the system elsewhere. It was shown at the Montreux TV Symposium in Europe. The consortium of designers and programmers has also demonstrated it in the U.S., and the NBC TV network is actively interested.

Bringing the news delivery chain full circle, from the electronic teleprompter through text editing and archiving, back to computerized acquisition of information, the reality of electronic newsgathering is brought to bear on the broadcasting industry. The capabilities of computers are clearly impacting heavily on the way news is acquired, distributed and, finally, broadcast to the public. **BM/E**

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VIEW-FINDERS FOR ENG

ENG camera viewfinders give operators an eyeful of vital information. But is it too much?

By Eva J. Blinder
Senior Associate Editor

AT AN ENG SHOOT, the news event doesn't stop for the camera operator to check just one more parameter. Therefore, some form of instantaneous assurance that the camera is indeed working properly is almost as important to the ENG crew as rapid setup. And for the camera operator, the most important link with the camera is through the viewfinder. It has reached the point, in fact, when the operator's eye need never leave the viewfinder from the moment the news team arrives at the scene until the last bit of tape has been shot.

Viewfinder indicators—from simple tally lights and LEDs to full character generator displays—offer a wide variety of different information to camera operators. The need for such information was recognized by ENG camera manufacturers very early, and such breakthrough cameras as the RCA TK-76 and the Ikegami HL-35, in including such indicators, were following an already established tradition. Thomson-CSF, in a 1976 description of its Microcam 1, listed LED viewfinder indicators for low battery voltage, tally, incorrect color filter wheel setting, and VTR servo lock. The increasing sophistication of ENG cameras, spurred by the availability of microprocessors, has led to a corresponding growth in the number and kinds of viewfinder indicators offered by


camera makers. In addition, the arrival of the single-piece recorder/camera combination has caused some rethinking of viewfinder functions.

The particular parameters a camera manufacturer will choose to highlight in the viewfinder, and the way they will be indicated, reflect a combination of current technology and design philosophy. The questions a camera designer must ask include: What information is most important to the camera operator? How much information can fit into the housing of a 1.5-inch viewfinder? What is the best way to display it?

Viewfinder indicator choices

A *BM/E* survey of manufacturers indicates that almost all include some warning of low battery voltage in their ENG camera viewfinders; record tally lights are almost as common. Beyond that, manufacturers diverge widely on what indicators they present. The more common include completion of white balance, high gain mode, and video level. More esoteric warnings include indication of excessive humidity in the VTR head cylinder, included in the Panasonic ReCam.

One of the most unusual viewfinder displays is provided by Harris for its TC-90. The Smart Package option, introduced last April at NAB, consists of two cards that plug into the camera to provide a variety of functions, including SMPTE and VITC timecode generation and au-



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automatic registration on scene content, without the need for diascope or test charts. The new functions appear as a character-generator display that reads out time code and alphanumeric status messages as well as warnings in the viewfinder CRT raster itself. For example, if the camera operator chooses to use the automatic registration func-



A character generator in the viewfinder of Harris's TC-90 ENG camera displays time code and auto setup status superimposed on the picture.

tion, the character generator will flash the words AUTO OK for 30 seconds. If, however, the scene contains insufficient detail for automatic registration to proceed, the viewfinder will alternately flash the words WARNING and DETAIL, and the camera will revert to the previous registration setting.

The Smart Package's automatic white balance and black balance functions are also indicated in the viewfinder by a white cursor line that appears on the screen when either white or black balance has been selected; the line disappears when the camera is ready. The character generator even warns when the mercury battery that powers the time code generator is about to run down.

Fred Haines, manager of training and technical publications for Harris, says that laying the time code down during shooting saves the time it would take to do it either before or after the shoot. Then, when the ENG crew returns to the edit suite, they can edit instantly without delay, using the camera viewfinder as a time code display device if they wish. He notes that setting the time code generator for time of day gives the operator a record of the exact time events occur, which may come in handy for important news.

The option package took Harris about three years to develop, according to Haines. It was made possible by the introduction of CMOS chips, which draw very little power—allowing the mercury battery for the time code clock to run for six months of continuous operation. The time code feature, while unique among current ENG cameras, did not originate with Harris; the CEI-310 ENG camera, no longer on the market, also displayed time code in its viewfinder as an option.

"The reception has been quite enthusiastic, both here and in Europe," Haines says, although he admits that the idea was a "brainstorm" and not developed in response to user requests. "It's hard to say if this kind of thing will be-

come a trend," he muses, "but I think it's very possible."

Other manufacturers have mixed feelings about character generator displays in viewfinders, although many agree they may be the wave of the future. Lawrence See, Sony product manager for cameras and monitors, points out that several manufacturers, including Sony, have used graphic or character displays (the company's DXCM-3 indicated completion of white balance, for example, with a large WB OK across the middle of the screen).

See predicts that character or graphic displays will become "quite common" in the near future, but he worries about camera operators being overwhelmed with too much information. "I'd like to see it in its own area above the picture," he suggests, noting that a scene with large bright areas can easily wash out character displays, making them illegible.

"A camera operator doesn't have time to read too many displays, and he needs the information quickly," See continues. Too many indicators, whether in the screen or around the periphery, are distracting and take too long to read. "For example," See explains, "the camera operator doesn't need to know what the gamma is—but he could use a warning if someone turned the gamma off."

Representatives of several other manufacturers echoed See's concerns. For example, Jim Bonan, ENG/EFP camera product management at RCA, says, "Time code is a good example of something the camera operator doesn't want to know about. It gets in his way." In other areas, like battery warnings, Bonan concedes that character generator displays could be "a great idea. They could eliminate some of the cryptic flashing lights."

Philips product manager Nick La Bate agrees that character generator displays will be the new trend and says Philips is thinking along those lines. Their primary usefulness, however, will be "for people just getting into camera operation," La Bate feels. "The experienced operator is used to other techniques." Even experienced operators will get used to the new displays in time, La Bate predicts.

"A viewfinder in a camera is sort of like the dashboard of a car," says Dave Walton, product manager at JVC. "You can put a lot of information in there. Some people like all of it, but you can have so much that while you're looking at it, you run into a tree. We found that many people would rather not have it." JVC's KY-2000 Series cameras, Walton recalls, had a waveform monitor in the viewfinder that showed the illuminance level of each line of video. "It was very useful," Walton comments, "but most camera operators complained that it was in the way and they didn't need it." The zebra-type video level indication JVC (and other companies) uses in its newer cameras is "less useful but less obtrusive," according to Walton.

As for the time code idea, Walton dismisses it as unnecessary. "The most useful information would be playback off the tape, if you could get a high-resolution color CRT small enough to be a viewfinder," Walton suggests. He doesn't see this happening in the near future, however.

"I've always been a firm believer in keeping things simple," says Frank Coleman of Hitachi. "On larger, computerized cameras we'll probably see character-generator-based readouts of zoom and iris, but in a 1.5-inch viewfinder the characters are too small."



Coleman suggests as a possibility marrying in a small LCD character display below the raster for alphanumeric displays—something he feels Hitachi may do in the future—but he says there's really little need for change. "Time is money," he admonishes. "A camera operator can't waste time looking at indicators and controls." As for Walton's dream of a color viewfinder, Coleman predicts that the extra weight of a color viewfinder would make the idea impractical. In addition, the inherent chroma crawl problem of NTSC could create difficulty on such a small CRT, he feels.

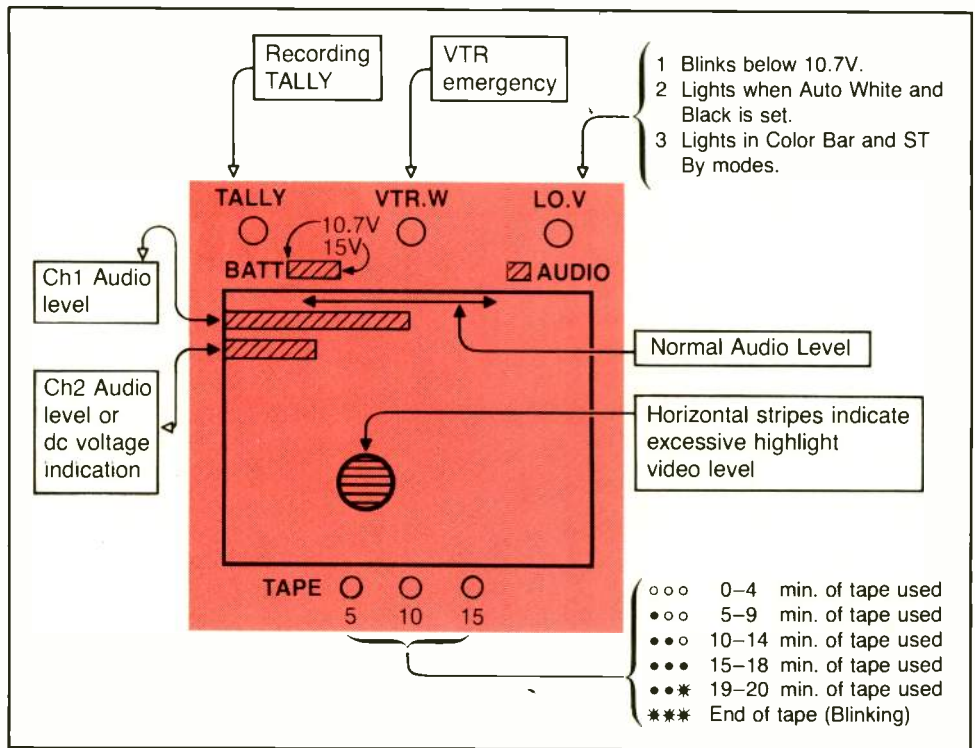
The ultimate answer, of course, may be the solution arrived at by the aircraft industry—a system of voice-synthesized warnings that would speak to the camera operator through a separate earpiece or interrupt the program audio monitor with phrases such as "low light level . . . switch in 6 dB gain" or the like. This type of oral presentation has been found to be the most effective way of alerting pilots to potential problems, and it keeps the viewfinder image free of visual clutter.

Recorder/cameras: A closer link

The close marriage of camera and recorder in the new one-piece units has opened the possibility of supplying additional information to the camera viewfinder. RCA's Bonan explains that the M-format VTR interface is a 62-pin connector that allows plenty of information to pass between the camera and recorder sections of the Hawk-eye. He adds, "With a one-piece, you know a lot more about the tape recorder than you knew before. You can share more information with a direct connection than with a cable."

Perhaps the most important piece of additional information—one found in the viewfinders of all the one-piece cameras *BM/E* surveyed—is minutes of tape remaining (in some cases, tape time elapsed).

In the Sony Betacam, for example, on-board computers in the recorder section calculate the amount of tape time remaining and feed the information to the viewfinder, which has indicators just above the top left corner of the CRT that read "10M" and "5M." Both light up when there is more than 15 minutes of tape remaining; the 10M sign lights when between 15 and 10 minutes remain; and the 5M sign lights when less than 10 minutes remain and starts blinking when less than five minutes of tape are left. The indication is the same in the Thomson-CSF Betacam



This schematic of the Ampex FPC-10 viewfinder illustrates the variety indicators offered. Note that some have dual meanings.

cameras, MC-611 and MC-613; in both cases, the tape time remaining indicators function only when the camera and recorder sections are linked with the 50-pin connector.

M-format recorder/cameras such as the RCA Hawk-eye, Panasonic ReCam, and Ampex ARC system use a slightly different arrangement that indicates how many minutes of tape have been used. A good example is the FPC-10, introduced by Ampex at the last NAB show as the camera section of ARC. Three LEDs are arranged horizontally under the viewfinder CRT. Once five minutes have elapsed, the left LED lights; the center LED lights when 10 minutes have passed; and all three are lit after 15 minutes. At 19 minutes the right-hand LED starts to blink, and all three blink when the tape reaches its end.

The Bosch Quartercam quarter-inch recorder/camera has yet another kind of tape length indicator, this one a graphic display. A white bar at the top of the viewfinder raster slowly diminishes in length as the tape is used, giving the camera operator a pictorial representation of the amount of tape remaining. (The bar doubles as an iris alignment aid.) The system also has an LED tape length indicator, as well as another LED that doubles as a VTR warning and EOT marker.

Several manufacturers of conventional ENG/EFP cameras also include some sort of VTR warning signals, although few are as specific as the time-elapsed lights of the one-piece units. JVC, for example, has a tape-end warning and tape servo alarm in the viewfinder for its KY-950U and KY-900U broadcast cameras; VTR warnings and/or EOT alarms are also offered by Harris (TC-90) and Panasonic (WV-888 and WV-777), among others.

An important indicator offered by many manufacturers is video level, frequently shown by a striped "zebra" pat-

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Incidentally, although George didn't receive the White House News Photographers' award for 1980, Pete Hakel (WJLA, Washington) did. He won with Fujinon, too. It's not a coincidence. According to Pete, "90% of the ENG work in D.C. is Fujinon."

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tern covering the area of the picture that has reached full level. An alternative method is the peak level indicator, which turns black any picture area that exceeds the set video level. The latter approach is taken chiefly by RCA and Panasonic. RCA's TK-710 has what Bonan calls an inversion indicator, in which areas of the picture that are over level turn black. An additional feature of the TK-710 (shared by the Hawkeye) is the ability of the viewfinder to lock at luminance output or to switch red, green, blue, or minus green into the viewfinder for a registration check.

According to Tony Fujii, product engineer at Panasonic, the company's WV-888 camera originally had a "wink effect," in which the signal area over 100 IRE blinked. The production models of the camera, however, incorporate an inversion level indicator similar to the RCA TK-710.

Zebra-pattern indicators seem more common and are found, with individual variations, in such cameras as Ikegami's HL-83, HL-79E, and ITC-730; Sony's BVP-3 Betacam; JVC's KY-950U, KY-900U, and KY-310; Ampex's FPC-10 (which uses horizontal stripes rather than diagonal stripes or a herringbone pattern); and Sharp's XC-800 and XC-900D. The Bosch KCF 1 camera has a dual level warning, showing a coarse zebra pattern over areas above 100 percent level and a fine pattern in the areas below 70 percent level.

In addition to video level, several cameras have some indication of audio level. For example, the viewfinder of the Ampex FPC-10 has two horizontal stripes at the upper left of the raster to indicate audio level for each of two channels. (The lower stripe doubles as a dc voltage indication.) RCA's Hawkeye has twin LEDs that light when the two audio channels have come up to full level; Panasonic's ReCam and Bosch's Quartercam also have audio level indicators in the viewfinder.

Completion of the white balance (and sometimes black balance) function is indicated in several manufacturers' viewfinders, usually by means of a simple tally light. An exception is the RCA Hawkeye, which displays a square white cursor over the sample area while auto white or black balance is being performed. When the function is successfully completed, the cursor disappears. A similar indicator in the Philips LDK 44 viewfinder has a black cursor. Black balance in the LDK 44 is indicated by a straight line across the picture, and an addition indicator, consisting of vertical and horizontal lines that bisect each other, shows completion of auto registration and auto white balance functions. Bosch's KCF 1 shows a "window" over the sample area for white balance.

Another viewfinder feature that differs considerably among manufacturers is the ability to view the output of the recorder's confidence heads (contingent, of course, on using an appropriately equipped VTR). JVC's new CR-4700U 3/4-inch portable recorder, for example, is thus equipped, and Walton says the confidence circuit on the viewfinder is "probably the most useful feature. It tells you whether or not you've got a picture." According to Walton, Panasonic has used the camera's return video circuit, usually used for program or VCR output, to view video confidence.

With RCA's Hawkeye and TK-710, VTR playback can

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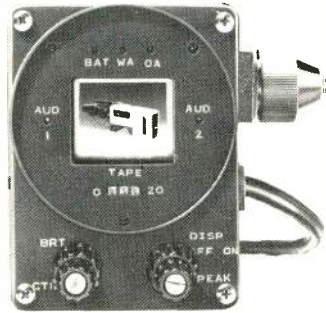


PHILIPS



be seen in the viewfinder, as long as the camera is connected to a recorder that plays back. This is not, however, a video confidence feature, which many manufacturers see as unnecessary. "Video confidence is only useful with a color monitor," according to Hitachi's Coleman.

The LDK 44 offers some unusual test aids through its viewfinder. When the camera is in the standby mode, a sawtooth pattern can be generated for camera troubleshooting. The camera also generates color bars.



LEDs surrounding the viewfinder CRT of the RCA Hawkeye give information on battery status, white balance, audio level, and tape time remaining.

Striking a balance

It is apparent, therefore, that camera manufacturers are limited only by their imaginations in the kinds of information they can feed into a viewfinder. Even so, most choose to keep their offerings fairly simple and straightforward, reasoning that the camera operator is most concerned with the picture. An interesting distinction is made by Panasonic's Fujii: "The kind of information you need on a camera viewfinder depends on the kind of camera operator. An amateur needs a lot, but professionals know how the camera works, and sometimes they don't like so much

information. They want the actual picture instead."

"A cameraman's basic function is to frame and focus the picture," states Bonan. "He only needs to know if something will not allow him to keep recording."

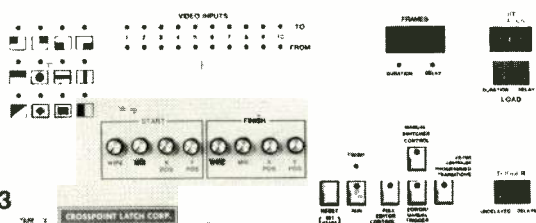
Still, many manufacturers see the number of viewfinder indicators increasing in the future as microcircuits make additional data available and competition for the flashiest viewfinder increases. Bonan likens the trend to what has happened to 35 mm still cameras in the past few years, with exposures, f-stops, shutter speeds and other information suddenly appearing in viewfinders. But while they recognize the trend, not all are convinced.

"Again, I would question what a camera operator needs to see other than correct levels, proper color balance, and some warning that he or she is about to run out of juice," says Walton. "As long as camera operators have two hands, switch positions will provide the final check. After all, you don't have an indicator to tell you that the indicator's not working."

On the other hand, it is possible that some manufacturer may one day incorporate the electronics necessary to present, at the operator's discretion, a waveform monitor/vectorscope display of the camera or VTR output right in the viewfinder. For the operator who is also an engineer, such convenience would mean the virtual elimination of supplementary scopes. Not all operators would welcome such an addition, and not all would be able to use it. But it comes down to a matter of taste—the reason why some buy automobiles with fancy dials and displays while others are content with speed and fuel indicators. **BM/E**

A POWERFUL COMBINATION FOR YOUR POST-PRODUCTION FACILITY

EDITOR SWITCHER INTERFACE CONTROLLED



6403

The 6403 allows the editor to talk to, and control your CROSSPOINT LATCH 6112, 6124, 6139 switchers.

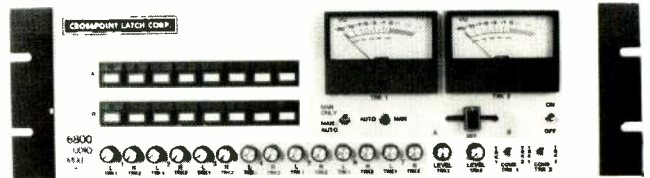
With any editor, it can accept the 'cut-in' command pulse from the editor, and perform frame accurate mixes and wipes, and keys. It can even perform wipes which start or stop part way on the screen. It also performs delayed transitions.

With sophisticated editors, it permits the switcher to be controlled entirely from the editor keyboard, accepting and executing commands such as, duration times, pattern types etc.

6403
\$2750

Editor Module \$995
(specify editor)

EDITOR AUDIO MIXER CONTROLLED



The 6800 is an audio mixer which can be controlled directly from an editor, to perform dissolves or cuts. It has a built in tone generator. Input 7 can be internally jumpered to perform a voice over function. The 6800 accepts commands such as duration times, and input selection from the editor keyboard. It also has a front panel manual override. The 6803 is an audio-follow mixer for the 6139, 6112 and 6124 switchers.

On both mixers the inputs are dual channel (stereo) and can be reversed or combined at the outputs.

6800 \$3500

6803 \$2500 (audio-follow only)

6112 \$7950

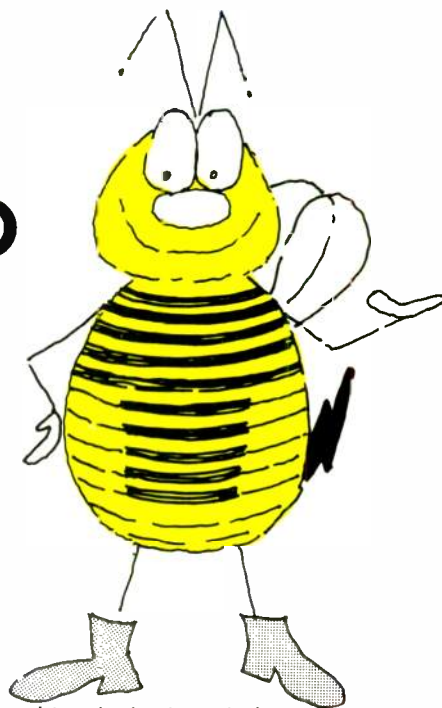
6124 \$13,700

6139 \$14,500

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Sometimes we didn't understand each other. Sometimes we had to shake hands in order to proceed. Sometimes we worked 16 and 20 hours a day. Sometimes we gave up our weekends. Even Friday nights.

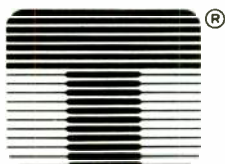
But, you know what we got? Miracles. We got the **BUZ SERIES 2000**.

It's great. We're using local area networking (LAN) so our system is quick. Its' data-transmission speeds zoom up to one million bits per second. The system can be easily and economically expanded so it's priced and sized for all markets.

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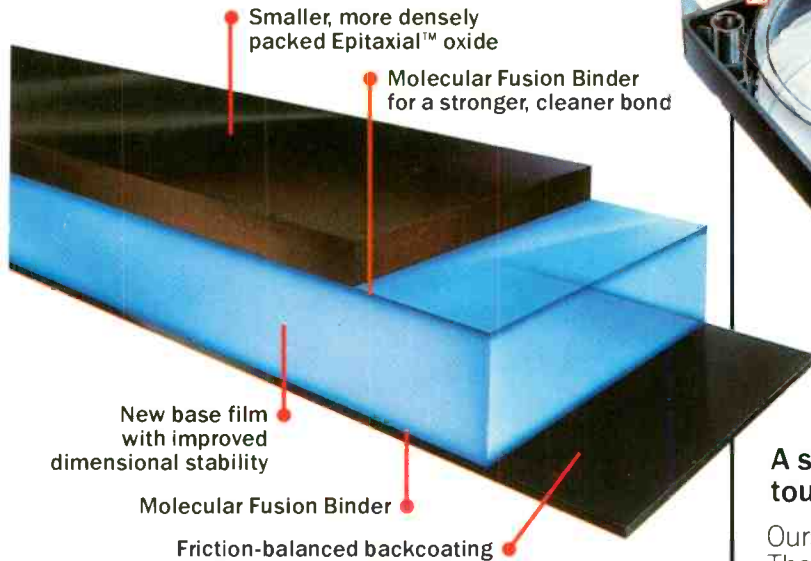
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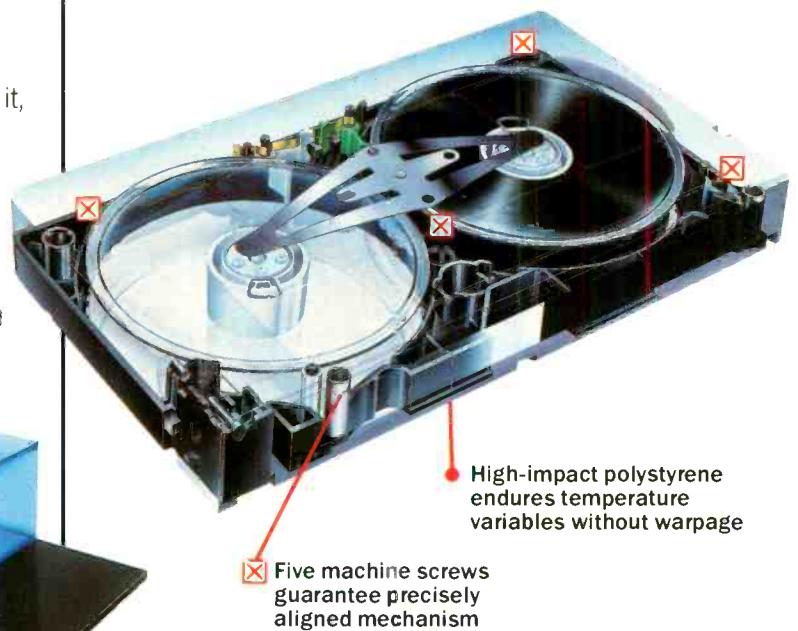
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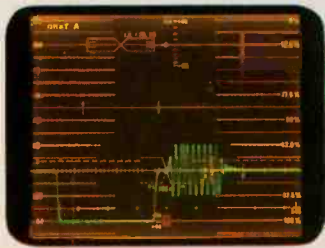
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Professional Video Division

Circle 148 on Reader Service Card



RTNDA URGES NEWS DIRECTORS: “BRING YOUR ENGINEERS”

News directors set to monitor increasing importance of news at annual meeting in Las Vegas.



When the thirty-eighth annual RTNDA conference convenes in Las Vegas later this month (September 22-24), more than 80 exhibitors will be on

hand to show the news community how the technology for gathering and presenting the news has become an inseparable part of news itself. And, with more time deliberately set aside for conventioners to tour the exhibits, RTNDA president-elect and program chairman Ed Godfrey of WAVE-TV, Louisville, is urging RTNDA members “to bring their chief engineers along this year.”

Highlights of the exhibit (a complete listing of exhibitors and booth numbers follows) include a fully operational radio studio designed by Pacific Recorders & Engineering, from which broadcasts will originate during the convention. (The studio will be installed as

part of the new broadcast center at KSL, Salt Lake City, after the convention.)

Convention panel discussions will concentrate on topics of major concern to news directors: the TV assignment desk; campaign and election coverage; business and economic reporting; and the GM/ND relationship (see *BM/E*, November 1982; p.77, “Make the News Director a GM?”, based on RTNDA research). Another panel will focus on the popular subject of newsroom computers.

RTNDA attendees can also look forward to an impressive lineup of guest speakers. Bill Moyers (CBS), Paul Harvey, and Diane Sawyer (CBS) will deliver luncheon addresses. Sig Mickelson will receive a distinguished service award. David Brinkley (ABC) will deliver the keynote speech. And John Chancellor (NBC) will close the proceedings by his acceptance speech at the Paul White Award banquet.

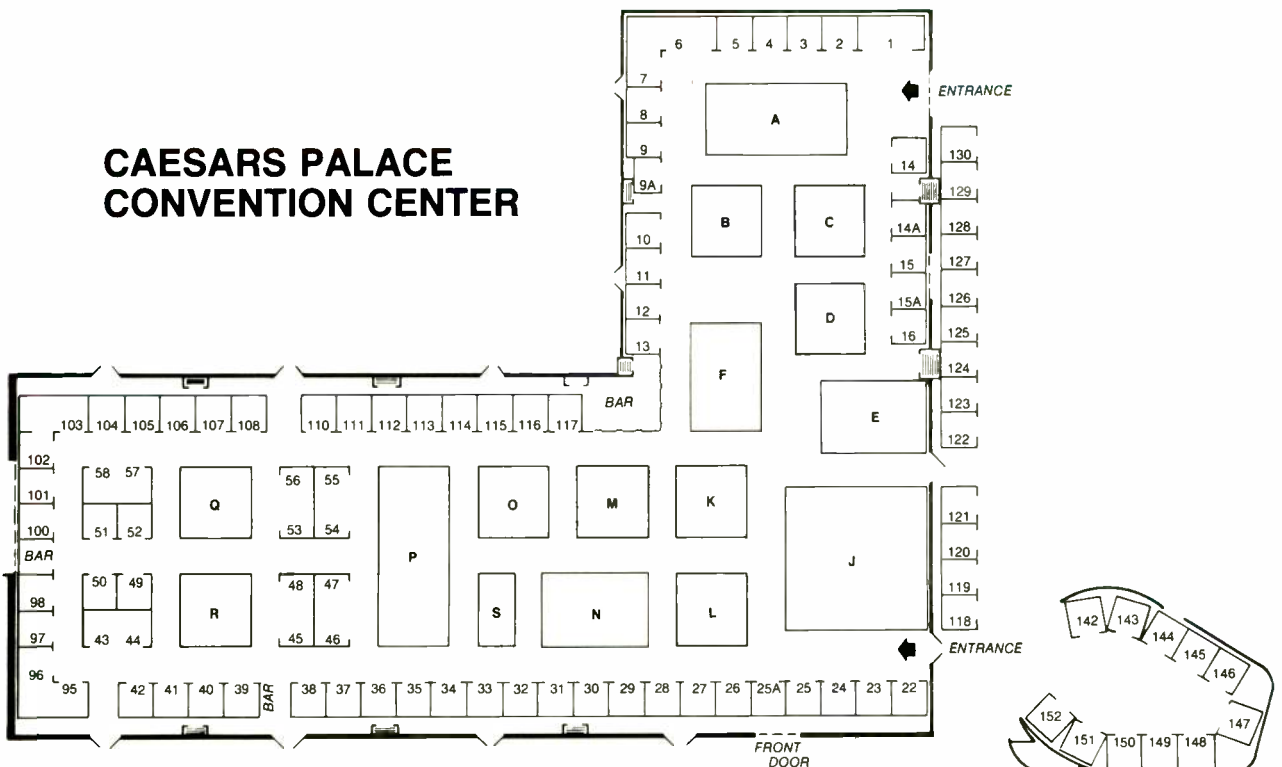
A full report on the convention will appear in the November issue.



CONFERENCE EXHIBITORS

EXHIBITOR	BOOTH NO.	PRODUCT OR SERVICE	EXHIBITOR	BOOTH NO.	PRODUCT OR SERVICE	EXHIBITOR	BOOTH NO.	PRODUCT OR SERVICE
Accu-Weather	50	Weather systems	Fujinon	114	Lenses	Graphic Express	14	Sets, graphics
ADDA	B	Still stores	G&G Design	6, 7	Sets, graphics	Ivanhoe	51	Programming
Alcare	24	Features	Communications			Jacobs & Gerber	49	Programming
Alden	45, 48	Weather recorders	JVC	C	Production equip.	Jefferson Data	Q	Newsroom computers
Angenieux	25	Lenses	Kavouras	95, 96	Weather systems	King Features	32	Features
Asaca	30	Newsgathering systems	King World	K	Programming	Lang Video	100	ENG switchers
Associated Press	22, 23	Programming	Marti	117	Transmission, RPU	McInnis-Skinner/BEI	P	Newsroom computers
Basys	107, 108	Newsroom computers	Mead Data	110-112	Newsroom computers	Media Computing	98	Newsroom computers
BEI/McInnis-Skinner	P	Newsroom computers	Midwest Corp.	53, 56	Mobile vans	Mighty Minute Program	4	Programming
Bill Black	46, 47	Mobile vans	NY Comm.	57, 58	Satellite services	N*I*W*S	A	Programming
Bonneville	122, 123	Satellite services	Pacific Recorders	Radio Newsroom	Production equip.	PEP	26, 27	Power supplies
Bosch	54, 55	Production equip.	Quanta Corp.	1-3	Newsroom computers	Q-TV	116	Teleprompters
Bdcst. Microwave (BMS)	118-121	Microwave	RCA	N	Production equip.	Reunion Tower	142, 143	Transmission
Bdcst. News Service	9A,10	Programming	Rip 'N Read	127	Programming	Rohr's TV	29	Production services
CBN/Newscom	40	Programming						
Colorgraphics	M	Weather systems						
Comrex	28	Audio production						
CQI/Sportsticker	16	Programming						
Crosspoint Latch	124, 125	Production switchers						
Creative Works	52	Production services						
Docuvid	41	Production services						
E-N-G Corp.	E	Mobile vans						
Environmental Satellite	113	Transmission						
Fortel	43, 44	Image processing						

CAESARS PALACE CONVENTION CENTER





Scribe Recorders	128, 129	Newsgathering equip.	Thomson-CSF	8, 9	Cameras
Sony	J	Production equip.	Turner Bdcst.	F	Programming
Station Program Resources	36	Programming	Sports Network	106	Programming
Telescript	25A	Teleprompters	UPI	L	Programming
Telesource	R	Newsroom computers	Ultimatte	101	Special effects
TV Engineering Corp.	151, 152	Mobile vans	Westinghouse-Group W	D	Programming
Terminal Systems	12	Production equip.	Winsted	126	Racks, cabinets
			Wold	102, 103	Satellite services
			WSI	34, 35	Weather systems
			(partial list as of 7/15/83)		

PROGRAM HIGHLIGHTS

Wednesday, September 21

8:00 a.m. Golf & tennis tournaments

6:30 p.m. Welcoming reception

Thursday, September 22

8:00 a.m. Business breakfast

8:45 a.m. Business meeting: reports, resolutions, nominations

9:30 a.m. RTNDA DSA acceptance: Sig Mickelson

Keynote Address: David Brinkley, ABC News

10:00 a.m. Visit exhibits

11:30 a.m. Reception

Noon Luncheon: RTNDA Canada Report; Foundation Report; address by Bill Moyers, CBS

2:00 p.m. Visit exhibits

3:30 p.m. Radio Workshop: The PR Experts
Lou Adler, WOR radio, New York City

Herb Schmertz, Mobile Oil
Michael Klepper, Michael Klepper Assoc.

George Glazer, Hill & Knowlton

TV Workshop: TV Assignment Desk
Zeke Segal, CBS News, Atlanta
Chris Schmidt, WREG-TV, Memphis

Jon Mangum, WKRG-TV, Mobile
Jim Rutledge, CNN, Washington, DC

6:30 p.m. Basic Computers for Newsroom Administration
Skip Haley, WSFA-TV, Montgomery, AL

Friday, September 23

9:00 a.m. Joint Workshops: Radio/TV Writing
Rob Sunde, ABC Info. Network
Charles Osgood, CBS News
Av Westin, ABC News

Joint Workshops: Trouble in the Newsroom—Booze and Pills
Tom Becherer, WLKY-TV, Louisville

Jim Wollert, Memphis State U.
Lou Sanman, ABC TV
Ellen Baker, VA Center

11:00 a.m. Visit exhibits

Noon Luncheon: RTNDA Intl. Radio

2:00 p.m. Awards; address by Paul Harvey

Business Meeting: elections, resolutions

3:30 p.m. Radio Workshop: Business and Economic Reporting

Mel Kampmann, Foundation for American Comm.

TV Workshop: Campaign and Election Coverage

Mike Michaelson, C-SPAN

Mike Miller, Republican Natl. Committee

Bob Neuman, Democratic Natl. Committee

Robert Snow, U.S. Secret Service
Bruce Hough, Bonneville Satellite Corp.

Saturday, September 24

8:00 a.m. Radio member meeting

9:00 a.m. Radio Workshop: The GM/ND Relationship

Gregg Peterson, WBBM, Chicago
John Price, WWVA, Wheeling, WV
Robert Biernacki, GM, WOR-AM, New York

Dale Miller, GM, WAJR, Morgantown, WV

TV Workshop: The GM/ND Relationship

Ron Miller, WWBT-TV, Richmond, VA

Jeff Davidson, President/CEO, Gannett Bdcst.

Richard Manship, GM, WBRZ, Baton Rouge, LA

A. Rabun Matthews, WSB-TV, Atlanta

Bob Sherwood, KFTY, Santa Rosa, CA

11:00 a.m. Visit exhibits

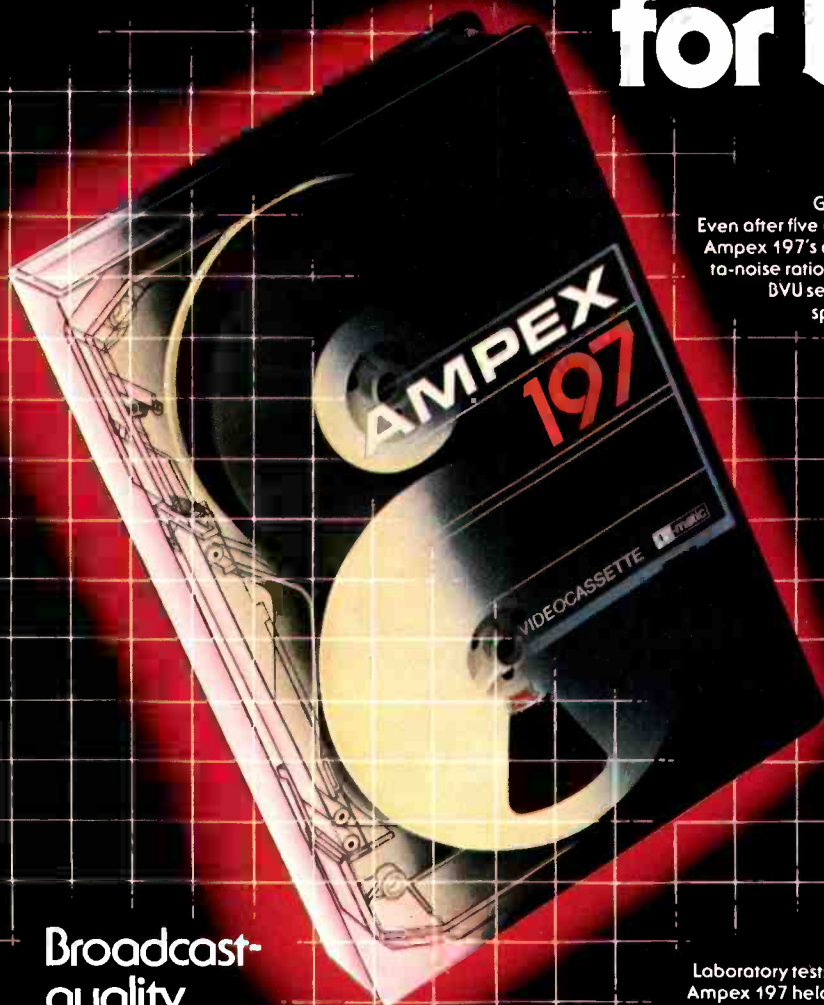
Noon Luncheon: RTNDA Intl. TV Awards; address by Diane Sawyer, CBS News

2:00 p.m. Joint Workshop: Management Motivation

Leo McManus, LF McManus Co.

6:30 p.m. Paul White Award Reception and Banquet; address by John Chancellor, NBC News

Ampex 197: designed especially for broadcast.

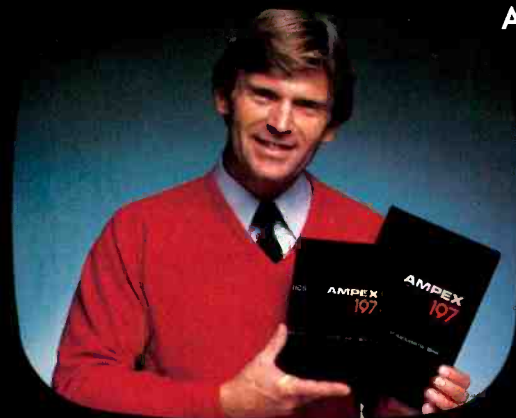


Broadcast-quality color and sharpness.

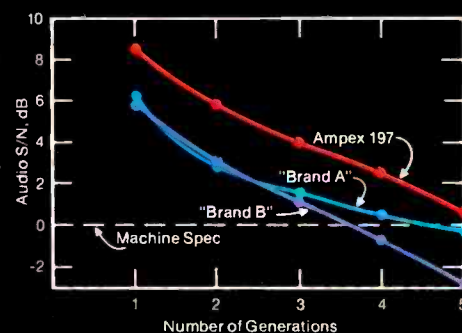
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With superb chrominance and luminance performance it is ideal for ENG, EFP and on-line editing.

Ampex 197 has been especially formulated to optimize the performance of Sony BVU recorders.



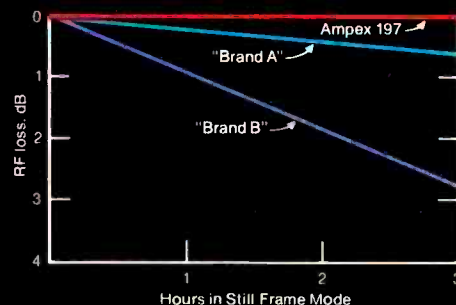
AUDIO MULTIPLE GENERATIONS
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Ampex 197 offers superior signal-to-noise and low distortion characteristics. This means crisper, cleaner audio performance under heavy editing conditions and multiple generation dubbing. Plus excellent stereo fidelity when used for music recording.

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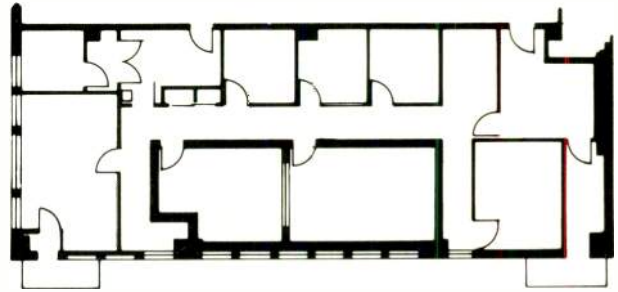
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Quality worth broadcasting.

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PART 10



SELECTING AND INSTALLING AN AM ANTENNA

BY JOHN H. BATTISON

THE ANTENNA, THE LAST LINK in the chain between the studio and the electromagnetic carrier in space, is the link most often grossly neglected. Antennas for FM and TV, ordinarily out of reach on tall towers, are comparatively easy for the engineer to ignore as long as they work even moderately well. But even easier to forget, AM antennas, usually standing right on the ground, too often are poorly designed and operated. The engineer's quick reaction to his AM antenna is likely to be, "that rusty old tower in the field."

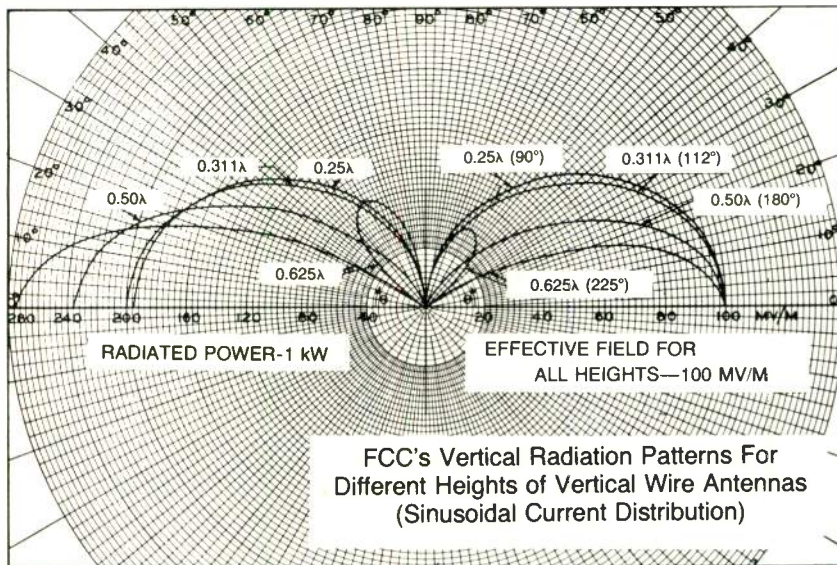
Instead, he should be thinking carefully and intelligently not only about the "rusty old tower" but also about the ground system at its base, the transmission line, and the tuning and coupling devices. It is essential to design and

out of service many years ago. The vertical radiator has a lot of advantages for AM broadcasting:

- It is nondirectional in the horizontal plane.
- Construction is simple and the cost is low.
- Efficiency can be high.
- It has ready control of base operating impedance.
- Vertical polarization gives excellent results since most receiving antennas, including auto antennas, are vertical.

The radiation efficiency of a vertical antenna depends mainly on the following factors:

- Electrical "height" as related to RF wavelength.
- Base operating impedance.
- The Q.
- Transmission line losses.
- Ground-plane conductivity.
- Environment (trees, towers, hills).



maintain every part of the antenna system properly to avoid having a signal poor in quality and a stumbling block to the station's efforts to cover the market.

BASIC DESIGN

All AM broadcast antennas today are vertical radiators—the last flat-top, at WOR in New Jersey, went

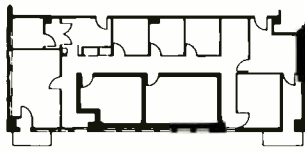
John H. Battison, PE, is director of engineering for WOSU-AM-FM-TV, Columbus, OH.

The effects of electrical height on efficiency are shown for several antennas in Figure 1, which is drawn from the Federal Communications Commission's Rules, and shows horizontal fields, radiated power, and vertical patterns. It is interesting to note that the 112-degree radiator (0.311 wavelength) is extremely rare in an actual antenna. At the time the rules were drawn up, the 112-degree radiator was simply the average height of all the AM antennas in use in broadcasting in the U.S.

Up to a point, the taller the antenna, the higher the efficiency, as the chart indicates. But efficiency falls off again at heights above about 225 degrees. The full-wave antenna, 360 degrees, is most inefficient. However, if it is economically desirable to use a very tall television or FM antenna as an AM radiator, the low efficiency can be overcome by breaking the antenna in two with insulators at the center, and feeding the two halves separately.

THE QUARTER-WAVE ANTENNA

The most popular AM antenna for medium-wave broadcasting is the quarter-wave. One reason is that the



FACILITIES DESIGN AND ENGINEERING

antenna lends itself readily to the necessary calculations for the antenna system. And it is efficient and not too costly over most of the AM band.

The quarter-wave can be driven in two different ways. One is the commonly used series feed, with the RF power fed in at the base of the antenna. The antenna must be insulated from ground at the base, as must the guy wires. The base operating impedance of this antenna is about 36 ohms, but the actual figure varies somewhat with cross-sectional dimensions as well as electrical length. Thus it is virtually unheard of to find two quarter-wave antennas with *exactly* the same base operating resistance.

The second way to drive a quarter-wave antenna is with shunt feed. Power is fed to the antenna through a line connected to a point where the antenna impedance approximately matches the transmission line impedance. The shunt feed is convenient when the original installation was for an FM or TV antenna, with a grounded tower. The tower can take up AM duty with a simple shunt feed, and no substantial alterations.

THE FOLDED UNIPOLE

When physical height cannot reach the full dimension for a quarter-wave radiator, the folded unipole, developed by consulting engineer John Mullaney in the 1960s, is often a good solution. This shunt-fed design will give a short antenna additional electrical "length" where a full-length

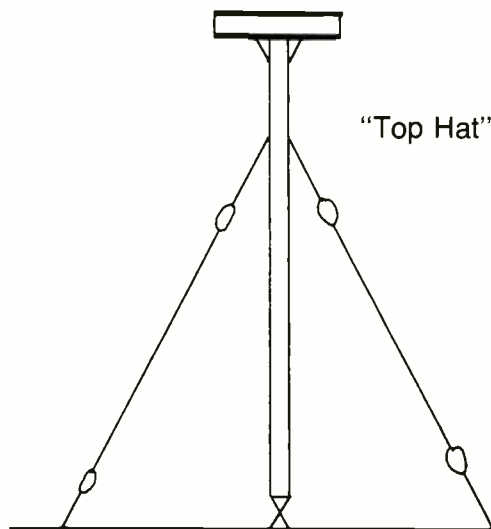


Figure 2. Top loaded tower using "Top Hat" to increase base operating resistance.

structure cannot be used such as near an airport where the FAA restricts the height of vertical structures. A 65-degree folded unipole can come close to the efficiency of a full 90-degree quarter-wave radiator and has a greater bandwidth.

One form of the folded unipole uses six wires suspended from arms at the top of the tower and insulated from it. These extend to just above ground at the base of the tower.

The addition of a "top hat" of conducting material is often used for increasing the electrical length of a vertical radiator (see Figure 2). The top hat, attached near the top

of the tower, can take several forms—such as a circular frame of conducting material on top of the tower which raises the operating resistance about 10 percent.

Even more effective is the use of the antenna tower guy wires for the top loading (see Figure 3). Twenty feet or more of each of the top three guy wires are electrically connected to the top of the tower (insulators are removed). The connections must be made carefully for very low resistance, to avoid arcing and I^2R losses. A skirt cable joins the lower ends of the three guy wires where they fasten to insulators in the lower portions.

FACTORS IN CONSTRUCTION

A well-made antenna tower should last for years. But long life depends on expert design and construction. To obtain proper construction, the broadcaster should go to an established antenna maker with a record of success.

Basic in proper construction is the use of steel heavy enough to do the job. The taller the tower, the heavier the steel must be (a gauge that is right for a 100-foot tower is likely to be dangerously weak at 200 or 300 feet).

The greatest enemy of antenna health is rust, and the entire tower must be galvanized to prevent its formation. The best galvanizing is that done after a tower section is completely assembled so that the coating of zinc can cover all joints and cracks, as well as the steel members. If the tower section parts are galvanized before they are assembled, it is possible that the zinc may be stripped off in the assembly process, leaving openings for moisture and rust. The FCC requirement that the tower be painted in aviation red and white means that the galvanized surface must be roughened with a weak acid solution so that the paint will stick.

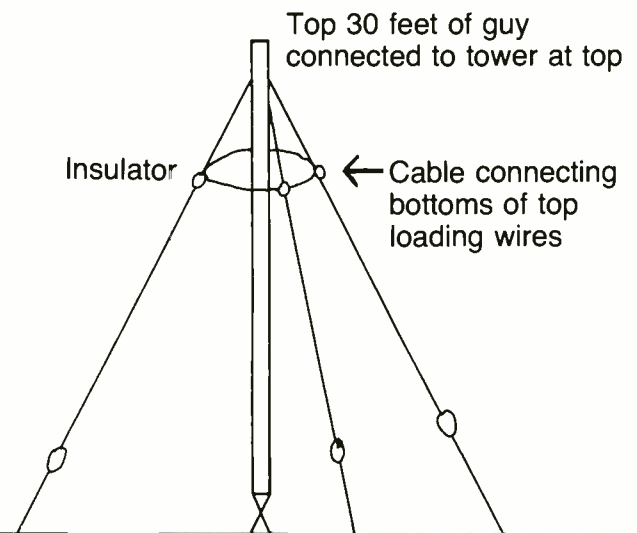


Figure 3. Top loading by means of top 30 feet of guys.

When you put up your tower, it is not enough to bolt the sections together. Across each joint you must weld or clamp a jumper cable to make sure of a low-resistance path from section to section. Many cases of poor radiation efficiency have been caused by power losses at high resistance tower joints. All bolted joints must be inspected for tightness after the tower is erected.

SELF-SUPPORTING OR GUYED?

The choice between a self-supporting antenna and one held up by guy wires is usually determined by economics



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a
message
on
Yamaha's new
RM1608
recording
mixer.

FUNCTION

- MULTI
- 2TRK
- MXD



RM1608

SPECIFICATIONS

TOTAL HARMONIC DISTORTION (T.H.D.)

Less than 0.1% at +4dB *output, 20Hz to 20kHz (all Faders and controls at nominal)

HUM & NOISE (20Hz to 20kHz) $R_s = 150$ ohms (INPUT GAIN "-60")

- 128dB Equivalent Input Noise (E.I.N.)
- 95dB residual output noise: all Faders down.
- 80dB (84dB S/N) PGM Master volume control at maximum and all CH PGM assign switches off.
- 64dB (68dB S/N) PGM Master volume control at maximum and one CH Fader at nominal level.
- 73dB (77dB S/N) STEREO Master Fader at maximum and all CH STEREO level controls at minimum level.
- 64dB (68dB S/N) STEREO Master Fader at maximum and one CH STEREO level control at nominal level.
- 80dB (70dB S/N) ECHO SEND volume at maximum and all CH ECHO volumes at minimum level.
- 75dB (65dB S/N) ECHO SEND volume at maximum and one CH ECHO volume at nominal level.

CROSSTALK

- 70db at 1kHz: adjacent Input.
- 70db at 1kHz: Input to Output.

MAXIMUM VOLTAGE GAIN (INPUT GAIN "-60")

PGM	74dB: MIC IN to PGM OUT.	ECHO	70dB: MIC IN to ECHO SEND.	
	24dB: TAPE IN to PGM OUT.		C/R	74dB: MIC IN to C/R OUT.
	34dB: ECHO RETURN to PGM OUT.			24dB: 2 TRK IN to C/R OUT.
STEREO	14dB: PGM SUB IN to PGM OUT.	STUDIO	74dB: MIC IN to STUDIO OUT.	
	74dB: MIC IN to STEREO OUT.			24dB: 2 TRK IN to STUDIO OUT.
	24dB: TAPE IN to STEREO OUT.			
	34dB: ECHO RETURN to STEREO OUT.			

CHANNEL EQUALIZATION

± 15 dB maximum

HIGH: from 2k to 20kHz PEAKING. MID: from 0.35k to 5kHz PEAKING. LOW: from 50 to 700 Hz PEAKING.

HIGH PASS FILTER - 12dB/octave cut off below 80Hz.

OSCILLATOR Switchable sine wave 100Hz, 1kHz, 10Hz

PHANTOM POWER 48V DC is applied to XLR type connector's 2 pin and 3 pin for powering condenser microphone.

DIMENSION (W x H x D) 37-1/2" x 11" x 30-1/4" (953 mm x 279.6 mm x 769 mm)

Hum and Noise are measured with a -6dB/octave filter at 12.47kHz; equivalent to a 20 kHz filter with infinite dB/octave attenuation.

*0dB is referenced to 0.775V RMS.

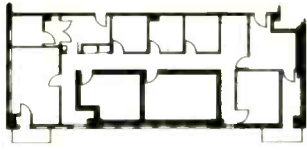
• Sensitivity is the lowest level that will produce an output of -10dB (245mV), or the nominal output level when the unit is set to maximum gain.

• All specifications subject to change without notice.

The specs speak for themselves. But they can't tell you how natural, logical and easy the RM1608 is to work. All the controls and switches are logically arranged to help you get the job done quickly and accurately.

And in the tradition of Yamaha's sound reinforcement mixers, the RM1608 sets new standards of reliability as well as ease of operation. For complete information, write: Yamaha International Corporation, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarborough, Ont. M1S 3R1.





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and the space available for the tower. Self-supporting, as might be expected, is more expensive, but necessary if the space is not large enough for a guy wire system.

The self-supporting tower, usually with four legs tapered outward, supplies a space under the tower for the tuning unit. The RF drive can be connected to the tower with four lengths of copper tubing, one to each leg.

The base insulators used to support series-fed towers are very important in the tower operation. Of course the insulator must be strong enough to carry the antenna weight, plus that of the guy wires and anything else hung on the tower. This is usually the responsibility of the tow-

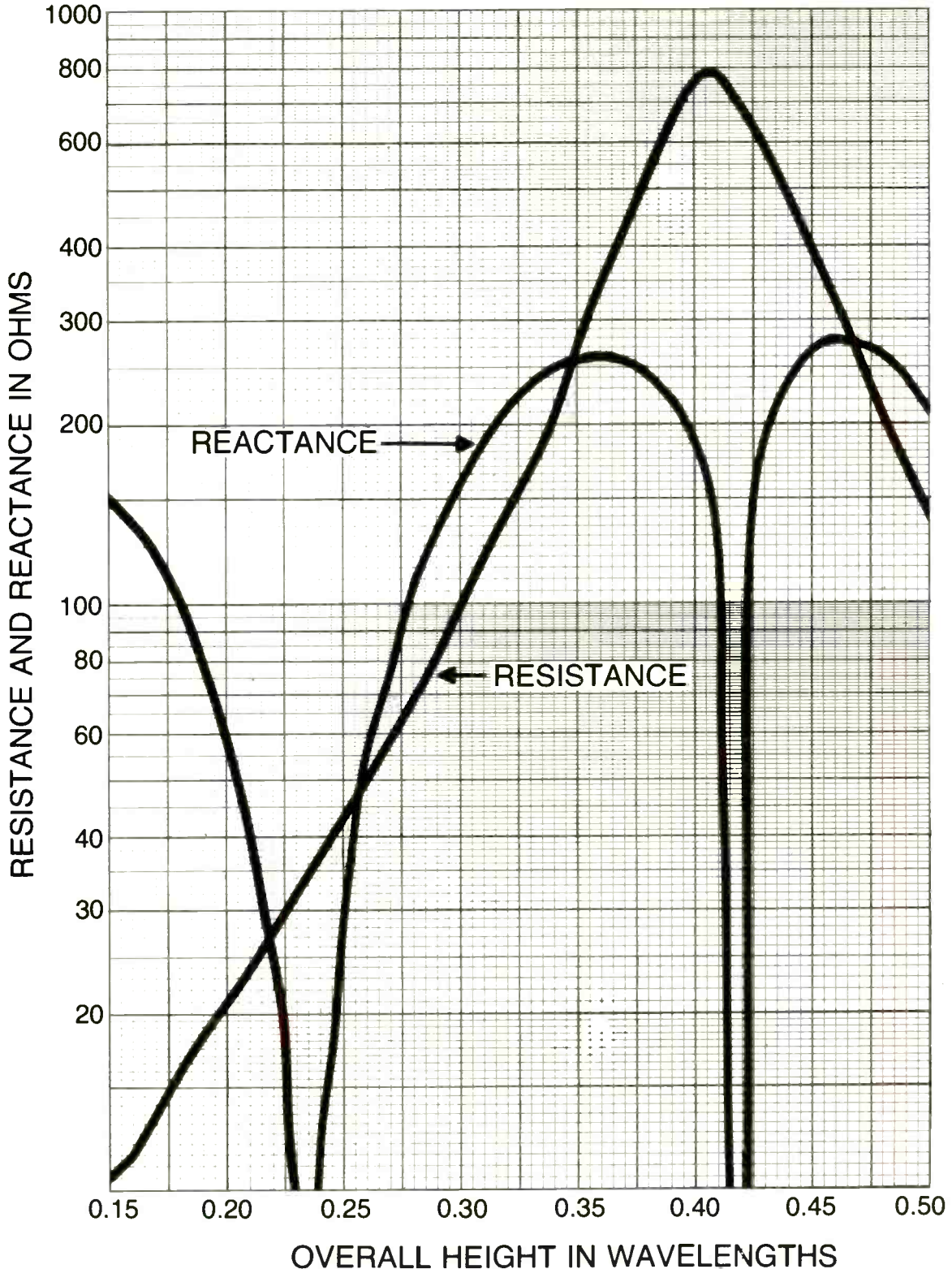
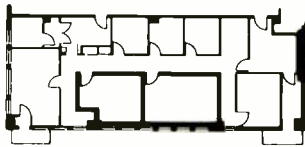


Figure 4. Graph of resistance and reactance of antennas of various lengths. This is adequate for most cases. If a more precise value is required, it can be calculated using the characteristic impedance.



er supplier—another reason for using a supplier with solid experience!

However, it is a good idea to interest yourself in the physical characteristics of a proposed base insulator. Be sure it has a weep hole, or holes, so that moisture can drain out promptly. An accumulation of moisture in insulator cavities is likely to crack the insulator in freezing weather, or the moisture may produce a short circuit to ground in wet weather, causing variability in the radiation characteristics of the antenna.

It is possible to jack up the antenna and put in a new insulator if the tower is installed with the necessary hardware for this purpose. (See Figure 4.)

FEEDER SYSTEMS

Getting the RF power from transmitter to antenna with a nonradiating line is, of course, an integral part of the antenna system. The open-wire line, the favorite in the early days of radio, has high efficiency. The characteristic impedance is:

$$Z_c = 276 \log \frac{2s}{d}$$

Where: s = spacing between conductors
 d = diameter of conductors.

However, the disadvantages of the open-wire line are obvious: it is vulnerable to the weather (ice is a particular danger), and vandalism. It also has a tendency to excessive radiation. And so a natural development of the open-wire line was a form of coaxial cable, with six to twelve wires evenly spaced around a center conductor. This kind

of transmission line is still used in some parts of the world for very high-power medium-wave transmitters.

It is single coaxial cable, however, which solved the problems of the open-wire line and is now virtually universal in AM antenna systems: no vandalism if the line is buried and no damage by the weather. There are several types. Rigid coax, or "plumbing," popular in the '40s, is efficient, has a very long life when properly installed, and is relatively trouble-free. The great drawback is that the 20-foot length makes it difficult to install. The insulating spacers are fragile and easily damaged. The "bullets" that connect the inner conductors from one section to the next sometimes develop poor contacts, which may cause arcing, burning and damage to the line, in addition to power loss. Expansion and contraction because of thermal changes also make special suspension devices necessary on most tower installations.

Flexible, continuous coax is free of these installation problems, since it comes in any length. Coax can be supported on trestles above the ground, but if there is exposure to vandalism, it is safer buried below the frost line. A buried coax must have a plastic outer jacket to eliminate moisture problems.

Although it is satisfactory, in most cases, to use flexible coax without pressurization, the careful engineer will put air or gas, under pressure, in his lines by means of a dry-air pump that takes air, dehydrates it, and pressurizes the line with three to five pounds.

Nitrogen under the same pressure can be used, supplied by high-pressure cylinders with reduction valves. Nitrogen is preferred over air for high-power transmitters. In rigid coax, dry air or nitrogen pressurization should always be used.

TOWER LIGHTS

Most broadcast towers require lighting and two kinds are used. Night-only lights are the familiar red side-

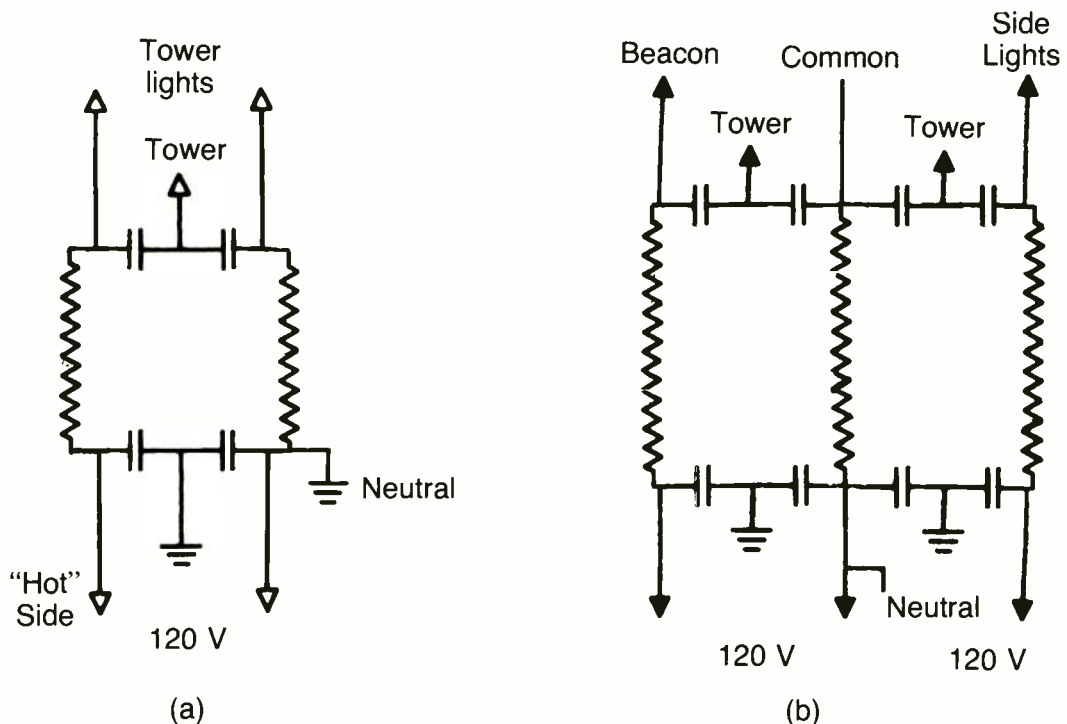


Figure 5. (a) Single supply, two RF chokes.
 (b) Dual supply, three RF chokes.

(Note: ac power wires are usually pulled through the copper tube used to connect ATU to tower.)

Introducing the New Electro-Voice RE30 omni and RE34 cardioid ENG/EFP microphones

“Sophisticated microphones that simplify field production.”

Action doesn't wait. The constant deadlines faced by news gathering and field production crews demand equipment compatibility, fast set-ups, simple operation and absolute reliability.

Electro-Voice knows.

We've designed and built the broadcast microphones that have set performance and reliability standards, and we stand behind EV Professional Microphones with a warranty and service policy that's second to none.

And EV listens.

Properly designed broadcast products are the result of pooled efforts. That's why EV devoted years to research, by working with network and local broadcasters to engineer all of the desired features into a pair of rather revolutionary new microphones for ENG and EFP.

EV confirmed that field microphones should incorporate low handling noise, resistance to humidity and moisture problems, extreme durability, and the same reliability and level of performance that the industry has become accustomed to expect from EV microphones like the phenomenal 635A and RE20.

Introducing the RE30 and RE34.

Because remotes present a variety of acoustic environments, EV engineered the RE30 with an omnidirectional pickup pattern, and the RE34 with a cardioid pattern. Except for their polar patterns, each model has the same features.

Both the RE30 and RE34 have switchable outputs—either line level or microphone level. No longer will field crews



be stuck without the right signal level. A flick of the recessed switch adjusts the output level, producing instant compatibility without the need for extra equipment or cables. The low distortion line-level amplifier allows direct interface with line-level inputs such as those common on microwave and fiber optic transmitters.

Additionally, the RE30 and RE34 will drive and hold telephone lines*.

*F.C.C. approved interconnect may be required.

Each microphone includes a low-distortion limiter which functions at either output level.

The RE30 and RE34 can be powered by either phantom power or a standard, available anywhere, 9-volt “transistor radio” battery. With both power sources present, the battery becomes a redundancy powering system that instantly and silently takes over if ever required.

An LED, mounted so as to be easily visible to the talent only, serves several important functions...it shows the presence of phantom power, monitors battery condition, and offers the world's first hand-held “tally light” to signal on-air personalities from off-camera.

Get the whole story.

No advertisement can hope to explain all of the features of these incredible new microphones. Complete engineering data sheets describing the many features and benefits of the RE30 and RE34 are available free upon request.

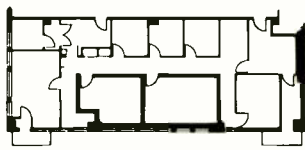
Many Electro-Voice Professional Microphone Dealers can arrange a hands-on trial at no cost to you. For more information please write to: Greg Silsby, Market Development Manager/Professional Markets, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.



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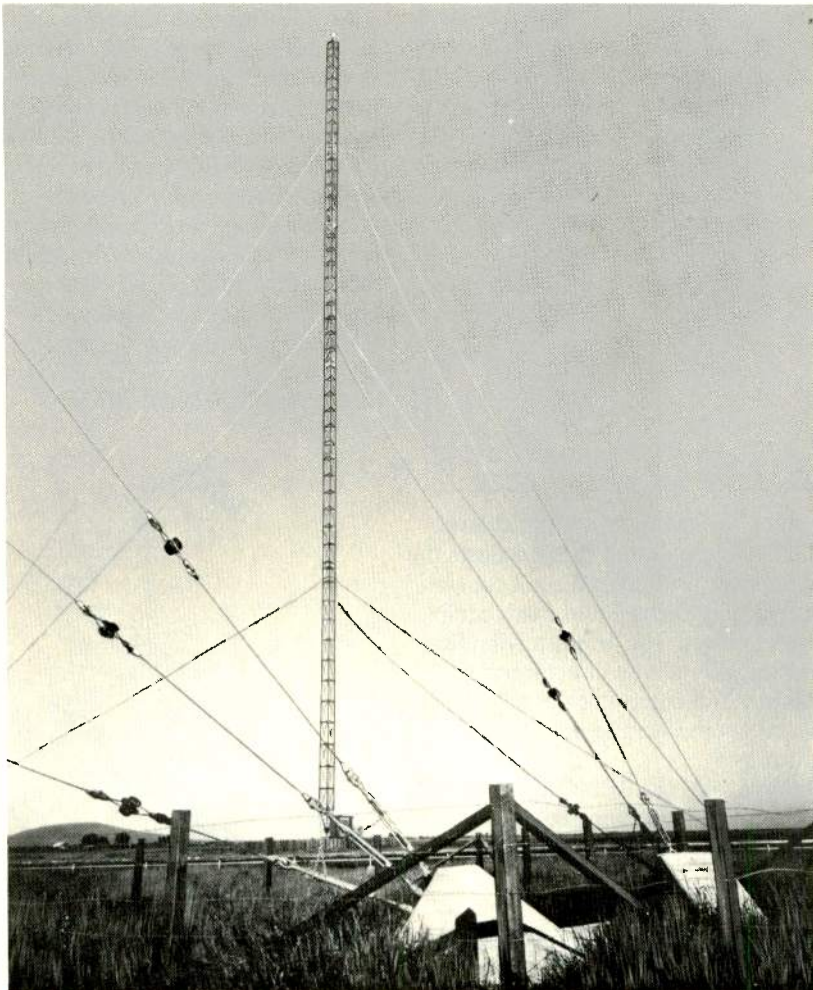
FACILITIES DESIGN AND ENGINEERING

markers on the tower and flashing red beacon on top. Strobe lighting, on the other hand, is required by the FAA and FCC on tall towers and at locations near airports. Strobe lights are available that automatically shift from highest intensity in daylight to lower intensity at dusk, and to lowest at night. This helps reduce complaints from homeowners in the surrounding area.

On a grounded tower, there is no problem in supplying ac power to operate the lights. On a tower insulated from ground, however, some method must be found to get the power across the base insulator without shorting it to ground.

The best device for this is the Austin transformer, formed of two coils, rather like doughnuts, intersecting, but not touching, each other. The primary is attached to the tower footing and the secondary to the tower itself.

Another way to power is with lighting chokes. Figure 5 shows lighting choke circuits properly for one or two ac feeds to the tower. Lighting chokes work well as long as they are properly maintained. But if they are damaged and the inductance is reduced, antenna efficiency and radiation can be impaired. It is also important to use high-quality bypass capacitors to keep residual RF from getting into the power lines.



An AM antenna tower from RCA.

If you use lighting chokes, it is a good idea to measure the base operating impedance with, and without, the chokes connected. Any effects they have on the antenna characteristics will show up clearly. This information is also useful for reference if you have any problems with antenna performance.

GROUND SYSTEMS

The power fed to the antenna system is dissipated in two major loads. One is the radiation resistance of the antenna itself, which determines the power actually radiated, the other is the resistance of the ground system. Clearly the ratio of antenna resistance to ground-system resistance determines the efficiency. With a total system resistance of 25 ohms, of which 20 is radiation resistance and 5 ohms is ground resistance, the efficiency will be poor—about 80 percent.

The ground system resistance is important because the currents induced in the earth by a vertical radiator return to the antenna along converging paths through the ground. Since the earth is an imperfect conductor, there will be I^2R losses in the ground, and these losses will be substantial unless steps are taken to reduce them.

A system of copper wire radials will drastically reduce the ground losses. Common practice is to make the radials about as long as the tower is high. In fact, there is very little to gain from making them longer—the area close to the antenna base is the most important. In general, the shorter the antenna, the higher the ground losses.

The usual radial system consists of 120 buried radials, spaced three degrees apart, equal in length to the height of the tower.

The ground system resistance can often be made even lower with shorter, 50-foot radials between the main radials. This interleaved system is often used where the ground conductivity is especially poor and the return current is expected to be high.

Another way to get low resistance in the ground path close to the tower is by burying a mat of expanded copper at the tower base. The mat can be from 24 to 48 feet square. A mat is especially useful if there is not room for the full length of the radials. If the radials on one side must be a little shorter than those on the other, a very small decrease in radiation on the short side might be detected by measurement. But it is most unlikely that listeners in that direction would be aware of any loss of signal strength.

The ATU must be installed close to the base of the tower and grounded with a four-inch copper strap brazed directly to the ground system. The trenches carrying the transmission line, ac power, intercom lines, and any sampling lines should be dug and all installed *before* the ground system is put in place. It is better to use conduit pipe for these cables; then if a cable has to be replaced, you are not required to dig up the whole system.

BM/E

The telecine without tubes.

Digital CCD technology means better pictures.

Advanced technology in the new Bosch FDL 60 "U.S. Series" with PanScan and black stretch gives you tremendous advantages over conventional film scanners.

And the most important of these is superb picture quality with high resolution, excellent signal-to-noise ratio, and brilliant color rendition with negative or positive film.

CCDs make the difference

The use of solid-state CCDs—charge-coupled devices—completely

eliminates electro-optical problems inherent to pickup or scanning tubes.

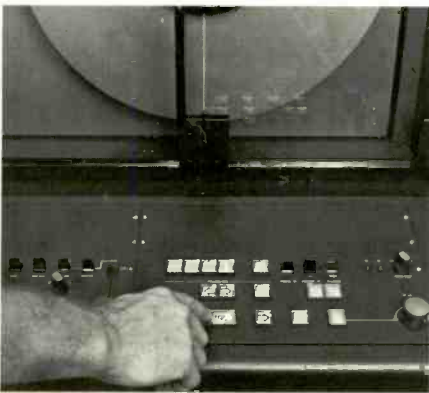
You don't have to worry about burn-in, afterglow, or field lag because there's no photoconductive or phosphor layer to cause these effects.

You can forget about shrinkage, flicker, vertical deflection, horizontal misregistration, and positioning errors of all kinds.

And never again will you be subjected to the expensive ordeal of tube changes.

New operational modes

Thanks to the FDL 60's capstan drive and digital signal processing, you can operate slow motion, fast motion, forward, reverse, and freeze frame—all in full broadcast quality. You can start and stop instantly, and with frame accuracy. You can search for scenes or frames either with variable programmable search or frame jogging, both with full format color pictures.



Convenient film deck controls include speed, mode, direction, format, framing, and focus. Adjacent decks control audio, video, and color correction.

Low operating costs

The solid-state devices used in the FDL 60, including the CCD sensors, need no maintenance. They have all the reliability and long operating life typical of semiconductors. So besides giving you a better picture, the FDL 60 saves you money on maintenance.

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The FDL 60 gives you operational flexibility you'd expect only in a modern videotape recorder. You control it like a VTR, too. The servo deck with continuous capstan drive and microcomputer control ensures gentle film handling. And it's totally insensitive to perforation damage.

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You can even integrate the FDL 60 into your VTR editing and film-to-tape transfer systems.

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Is SCA paging a possibility?

SCA paging is not only a possibility, it is a reality. Radio station KFRX in Lincoln, Nebraska began SCA paging in July, 1983.

The success of this first commercial effort has proven both the feasibility of SCA paging and the reliability of Reach SCA pagers and related equipment.

This success is further reflected in the fact that over 60 other radio stations are currently working with Reach to introduce SCA paging in markets across the country.

As with any new technology, there will naturally be questions. We encourage you to contact a Reach representative for answers.



Reach Inc.
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Lincoln, NE 68510
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FM SCA: An Engineering Perspective

By Robin Lanier, Senior Editor

THE USE OF SUBCARRIERS IN FM under an SCA, spurned by many broadcasters in the past as likely to be harmful to a station's main signal, is getting new acceptance as an operation that can greatly expand profit power for FM broadcasters.

This transformation has come from recent engineering studies showing that not only one, but several subcarriers can be used without difficulties. Impetus was also gained from a deregulation ruling by the Federal Communications Commission, issued in April, incorporating some of the engineering findings and removing nearly all restrictions on the kinds of business operation allowed under an SCA.

In effect, the FCC's changes in the applications rules amount to a wide-open use entitlement for the broadcaster. (For more information see this month's FCC Rules and Regulations.) The new business landscape for an SCA would be much less attractive, however, without the technical changes. Under the earlier rules, the subcarriers were limited to the stereo second channel and one more, at 67 kHz. Sideband frequencies could not be above 75 kHz, and the total modulation of the FM carrier could not exceed 100 percent. This last restriction meant that if one subcarrier was injected at 10 percent, the main channel modulation was limited to 90 percent; or, if two subcarriers were at 10 percent each, the main channel had to be backed off to 80 percent.

The latter requirement, of course, severely encumbered the broadcaster's economics, since he was reluctant to reduce his main channel coverage, even moderately.

National Public Radio, looking for ways to improve the profit-making potential of member stations, started investigations several years ago to determine if expansion of FM subcarrier use would be possible. The FCC had previously ruled that commercial use of additional subcarriers by public stations would be allowed if public service use of already existing SCA subcarriers

would not be affected.

An NPR engineering team under John Kean carried out tests at station WETA-FM in Washington, DC, in 1981, with a temporary authorization from the FCC. A subcarrier, in addition to the standard one at 67 kHz, was tried at various frequencies up to 95 kHz, with sideband frequencies to 99 kHz allowed. In addition, the team assessed the effects of modulation totals above 100 percent as the subcarriers were added.

The main findings were that a subcarrier at 92 kHz produces lower interference levels in the main channel than the one at 67 kHz. Further findings showed that adding the 92 kHz subcarrier without additional "back-off" in main-channel modulation, so that the total modulation reached 110 percent from time to time, produced no increase in the sideband spectrum at normal signal levels, and no combined sideband energy that exceeded the limits set up in the FCC rules.

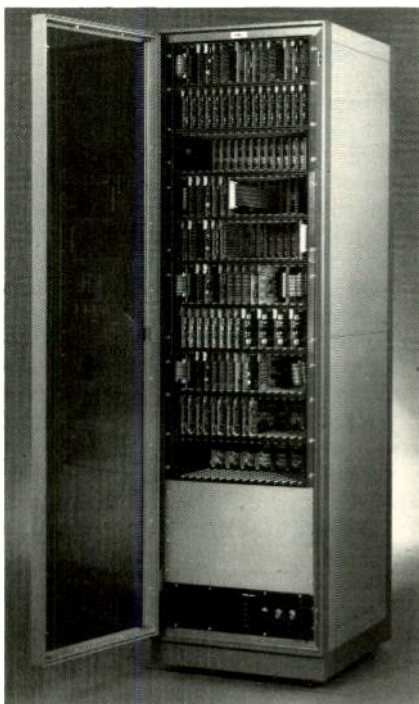
A study by Westinghouse Broadcasting and Cable, under the direction of Harrison Klein, director of radio engineering, confirmed the finding on total modulation. The report notes that the "back-off" requirement is the single most important factor preventing wide use of SCA subcarriers. As a result of extensive laboratory tests, the Westinghouse report concludes that: When the first subcarrier of 10 percent injection is added, the back-off should be one-half the total injection, or 5 percent for a 10 percent injection. When additional subcarriers are added, *no additional main channel back-off is needed*. Thus, with two SCA subcarriers, each of 10 percent, the total modulation should be allowed to reach 115 percent.

The tests, made at the plant of Broadcast Electronics in November 1982, showed that when a 92 kHz subcarrier is added to a composite already including a main, stereo, and 67 kHz modulation, there is almost no change in spectrum shape. The report notes that this apparent "something-for-nothing" result rests on the fact that the increase in modulation energy with the 92 kHz subcarrier is very small and makes up an insignificant part of the total. John Kean, discussing the quite similar results in the NPR tests, judged that another important factor is the very high probability that peaks of the different subcarrier signals will not all occur at the same time.

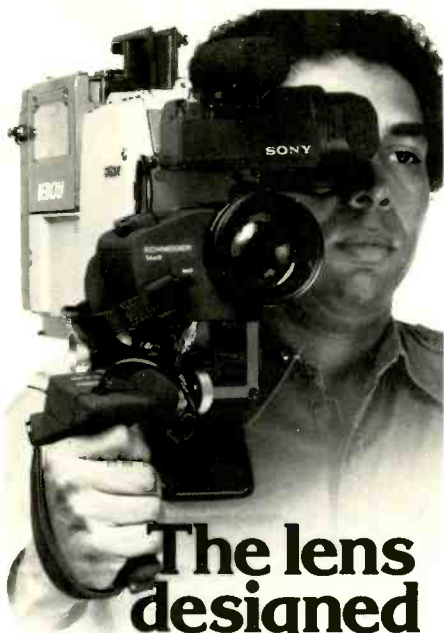
Meanwhile, the FCC issued in August 1982 a Notice of Proposed Rule-Making with technical changes fairly close to the NPR findings. Among the propositions was the opening of the FM baseband to additional subcarriers up to 95 kHz, allowance of sideband energy to 99 kHz, and allowance of total modulation to 110 percent. The April ruling approved all except the 110 percent modulation allowance.

RF protection

The main question that remains at issue here is the RF protection ratio, which establishes the effective integrity of the



The BBL System III radio paging terminal.



The lens designed with the cameraman in mind.

The Schneider 14X ENG/EFP lens is economical, lightweight, and has all the features it should have. It brings out the best in the best cameras available today.

This lens is packed with conveniences that help the cameraman get the most out of every situation. It has a pistol-grip with built-in iris control that has all controls available within a thumb's touch. It has a generously sized rocker control that makes it easier to control the zoom. And because the iris and zoom electronics are in a weather-resistant housing, there are no shorts from moisture in the field.

The lens can power zoom from 9mm to 126mm. Or with the 2X built-in extender from 18 to 252mm. With the low distortion 6.3mm, to 9mm aspheric lens attachment, it can power zoom on the super wide angle shots. Schneider broadcast lenses are available throughout the United States and Canada from:

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Schneider

14X ENG/EFP

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signal from one station in the face of interference from another. John Kean says that he is currently seeking support from industry groups for a series of RF protection ratio tests which should bring the results the FCC is looking for. NPR has all the needed equipment in place and ready to go.

If these tests are made with wide industry backing, and the results are conclusive for the increase in modulation limits, the general opinion is that the FCC will approve the change. With a June 7 date for final comment, the approval could come in early fall.

On the business side, the FCC's decision represented a total acceptance of the "new" SCA. In the notice of proposed rule-making, the FCC had emphasized the serious under-utilization of the spectrum arising from the small proportion of FM broadcasters using subcarriers. The proposal showed estimates of use and nonuse indicating that the industry was losing more than 100,000 hours of subcarrier use a day.

With the April 7 decision, the kinds of information that the broadcaster can handle under an SCA are almost without restriction. The FCC expressed the hope that there would be a substantial industry swing to the service. There is only one general restriction that the broadcaster should be aware of: The broadcaster must avoid performing like a "common carrier," unless the broadcaster wants to be a common carrier.

This would bring the broadcaster under a whole new set of FCC rules, more restrictive than the ones he now must follow, and would also put him under the regulation of the utility commission in his state.

Among the new SCA businesses, paging seems the one most likely to involve the broadcaster in common carrier activity. There are many radio common carriers in operation in the paging business. The FCC is preparing detailed regulations to clarify the rules on common carrier status, with regulations scheduled to be ready some time in May. A spokesman at the FCC gave *BM/E* a preliminary resume: If a broadcaster leases an SCA channel to a common carrier supplying paging, that does not make the broadcaster a common carrier. However, if the broadcaster operates the paging business himself, and has electronic connection to the telephone system for the use of customers, he is likely to be ruled a common carrier.

Of those organizations already in the SCA industry, a survey showed eager acceptance of the new opportunities. Firms that lease the subcarriers from the broadcaster and then contract to deliver information will be most affected. Radio Data, a subsidiary of Bonneville that handles very large quantities of data through about 40 FM stations around the country, is getting ready to promote some of the new services to

continued on page 88

SCA: A Management Perspective

By Scott Goldman

One popular theory on how subcarrier channels will be put to use suggests radio paging services. Paging is a technology which has come a long way in recent years, and the potential market for pagers has increased almost exponentially since economies of scale brought the cost of paging down to the consumer level. In fact, at least two major radio common carriers (RCCs) have been responsible for marketing these services to the consumer as well as bringing the cost of these services down to a level affordable to the consumer. Metromedia, which owns a number of RCCs around the U.S., has recently begun marketing a pager in the New York market aimed exclusively at the consumer. Approaching the consumer market from a different angle, Communications Industries (CI) and its subsidiary, Gencom, have completed an agreement with the Tandy Corporation and its subsidiary, Radio Shack. Radio Shack outlets will sell pagers manufactured for them by Tandy and put them on Gencom's paging frequencies around the country. Mobile Communications Corporation of America (MCCA) has made a similar deal with National Public Radio.

Most of the capital-intensive equipment (transmitters, phone equipment, and

continued on page 88

Scott Goldman is sales and marketing manager of the Communications Marketing Research Groups of Compucon, Inc., a Dallas-based consulting firm specializing in communications systems design and market research.

The new Saticon II camera tube. Clearly superior to lead oxide.

Compare the unretouched photos below and see for yourself how the new RCA Saticon* II camera tube reduces specular high-light memory, without red trail.

You no longer have to choose between lead oxide's good handling of highlights and Saticon's well known superiority in other critical performance factors. Now it's a whole new ball game.

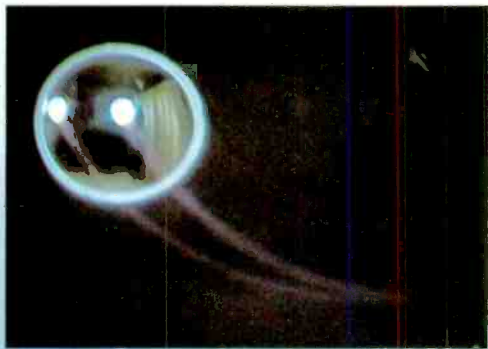
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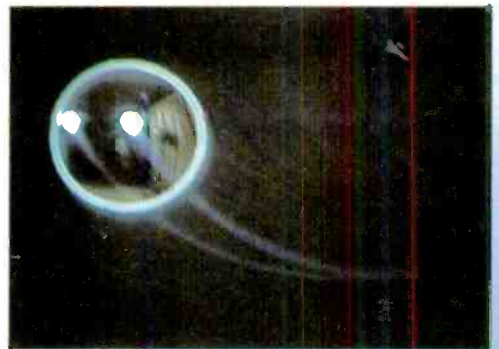
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Good. Plumbicon XQ1427.

Photograph of direct reflection of flood lamps, produced by camera with CTS circuitry. Note highlight memory with red trail.



Better. Saticon II BC4390.

Same subject and conditions as in photograph at left. Note reduced highlight memory without red trail.



RCA

continued from page 88

old and new customers. Joseph Meier, vice president of Radio Data, claims there has been a marked change in broadcaster attitudes toward operations of his kind. Earlier, it was difficult to convince most FMers that an SCA contract was a good deal. Today some stations are coming in, without prompting, to try to sell the channel.

Radio Data, in collaboration with the ABC engineering department in New York, has also been involved in technical tests similar to those already described. The Radio Data-ABC tests back up the general results of those by NPR and Westinghouse, and, according to Joe Meier, they suggest that even 120 percent modulation might be acceptable in some circumstances. Radio Data is also prepared for expansion through the use of satellite circuits for city-to-city hauls, with specially designed satellite antennas and receivers.

New horizons

As the horizons for new services open, the demand for more equipment will increase. This implies new kinds of hardware to accommodate the service, and both Johnson Electronics and McMartin have indicated that new equipment would be forthcoming to take advantage of the new rules.

McMartin showed prototype models at NAB of a new "Super S" SCA system capable of injecting three or four subcarriers at selected frequencies. The bandwidth is also selectable, and the user can have several narrowband channels or fewer broadband channels.

Another new piece of SCA hardware also shown at NAB is a combined generator and audio processor called "Sidekick" by its developer, Modulation Sciences of Brooklyn, NY. It has three elements needed in an SCA operation: a subcarrier generator, an audio processor, and a transmitter tuning aid—all designed to work together. The maker claims great reduction in crosstalk as compared with earlier systems, better signal quality, and simplified operation. The generator is crystal controlled for frequency stability of ± 0.01 percent from 0 to 50 degrees C. The audio processor is designed for 150 microsecond pre-emphasis, with 75 microsecond and 0 pre-emphasis available. The audio lowpass filter is overshoot corrected. The tuning aid includes a random noise generator and AM noise meter, so that the IPA and PA can be tweaked for minimum incidental AM noise, an important consideration for low crosstalk.

New techniques in delivery will also proliferate. For example, an outfit

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so on) needed to establish a paging service is already in place in a typical FM station. You would need to add little to the hardware typically on your premises in order to lease this subcarrier to a local RCC for their use as a paging channel. Should you decide to proceed with this plan to file for authority to use your subcarrier for paging services, however, the RCCs in your area are likely to file petitions opposing your application as an attempt to either preclude or delay the entry of an FM station into a field that they consider their proprietary territory. It is true that the FM broadcaster could conceivably offer this portion of the spectrum on a lease basis to the RCCs in the area, but it is also true that the FM broadcaster could offer paging service in competition with the local RCCs. The potentiality of competing directly with the RCC will vary depending on the market area, the level of congestion currently experienced by RCCs on their allocated paging channels, and the relationship you have established with these entrepreneurs in your area.

On the other hand, the amount of spectrum available to the RCC has recently gone from famine to feast with the opening of the 900 MHz band for additional paging services. Consequently, the RCC may think at first that your spectrum availability is not so appealing. Yet the equipment needed both to transmit and to receive paging signals in this 900 MHz band is not fully developed, so what may occur is a reluctant acceptance by the RCC of a lease arrangement for your subcarrier.

The marketing researcher's activities can be crucial in determining whether you should offer these paging services, or other services such as portable teletext or various digital data delivery services. Perhaps a combination of all three is the most prudent approach, yet there is truly no way to make this determination without an intensive investigation of the marketplace. A good marketing research analyst will be able to develop a profile of the potential users of these different services and then determine the potential relative demand by applying that user profile to the specific demographics of your market.

In determining the potential relative demand for the different types of services you might provide, you should also structure a survey to be conducted either via telephone or through the mail. The potential users of FM SCA channels will be a specific sector of the population, i.e., the business sector. The business sector that you lease your subcarrier to may then sell services to the consumer, but sales to the business sector should be what you as the broadcaster should concentrate on. Survey methods, therefore, have to be tuned to the business community and not to the consumer. Many researchers favor surveys of businesses conducted by telephone because they entail an inherent flexibility and the capability of reaching large numbers of respondents in a relatively brief period of time. This large number of respondents to your survey will offer statistical and practical advantages when attempting to determine the demand for your new services; they allow more accurate conclusions to be reached regarding potential demand, and they allow more comprehensive coverage of all the market segments to which you will be attempting to sell your services.

Another potential means of generating revenues from your unused subcarrier channel would be by providing control services access to public utilities. Essentially, this means that a small FM receiver could be installed on any utility-driven device (e.g., street lights, water heaters, outdoor advertising) so that power to nonessential utilities could be reduced on a discriminating basis in the event of a power shortage. During a power shortage, a coded signal could be broadcast to the entire coverage area activating only those devices with the appropriate decoder at the receiving end.

In dealing with the local utilities, however, the standard radio coverage contours required by the FCC will not be sufficient to determine the extent of the subcarrier's signal propagation characteristics. When providing services beyond standard broadcasting, real-world propagation characteristics become more critical. The best available method to accurately determine the actual coverage contour of your subcarrier signal is through a detailed propagation analysis. This analysis employs a database of elevation contours from the United States Geological Survey (USGS) 7.5 minute maps translated into a computer-readable format and sophisticated software to account for various antenna patterns, radiated power levels, differing height of antennas above ground, and so forth.

By having the computer simulate the effect of the actual terrain variations upon the signal being transmitted and by then inputting into this computer mod-

continued on page 90

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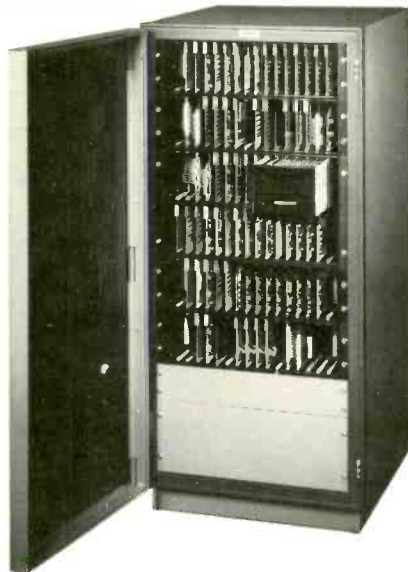
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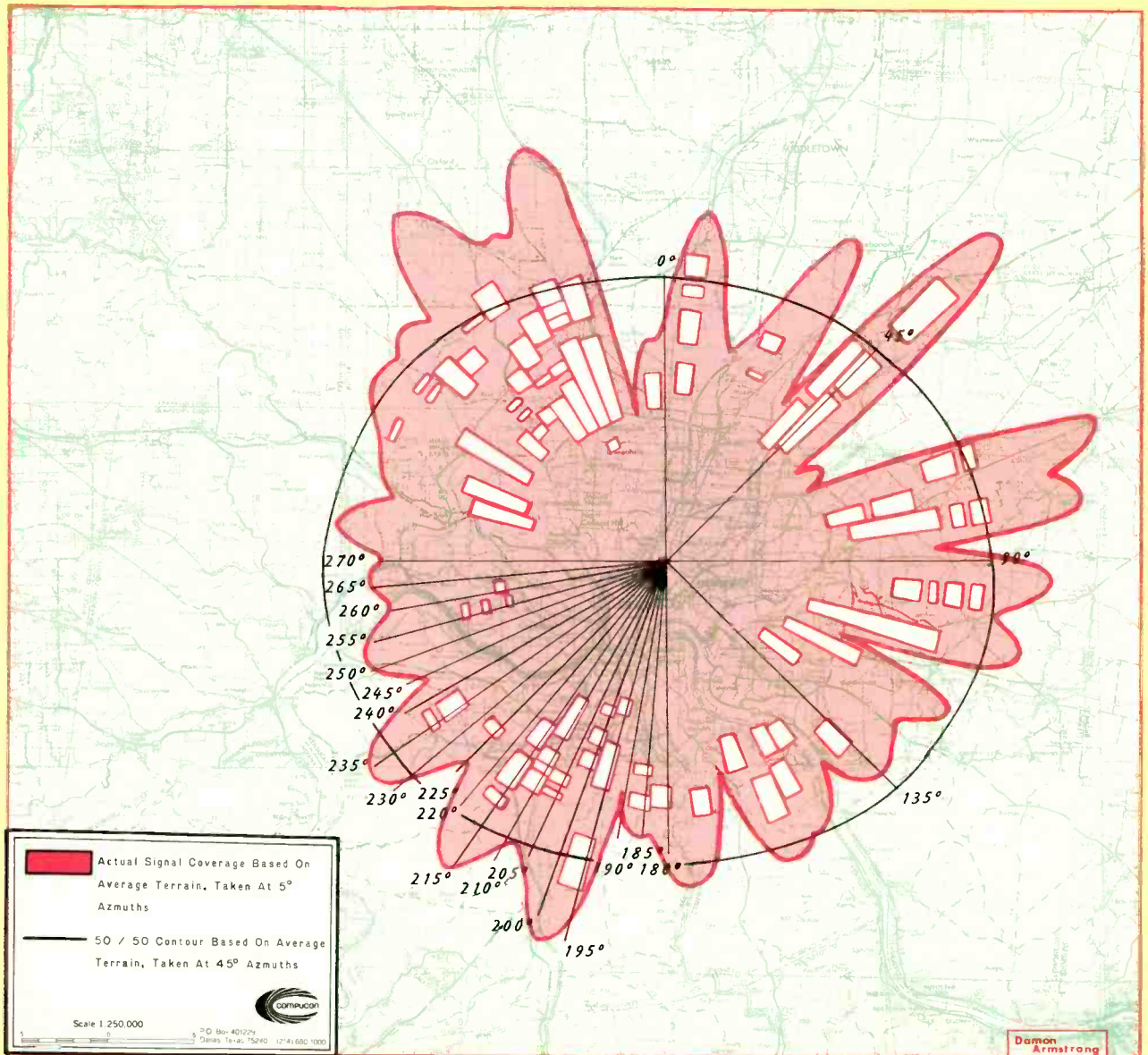
el the receive sensitivity of the device you are transmitting to, it is possible accurately to predict where the signal level of the subcarrier will be sufficient to activate the device to which you are signalling. The differences between the contour predicted by the standard method (known as an F(50,50) contour) and the actual predicted coverage of your signal can be dramatic. The F(50,50) contour averages the terrain variations of the topography of the broadcast area and produces a predicted signal coverage area based on these calculations of average terrain, taken at 45-degree azimuths. Conversely, detailed propagation analyses consider the actual terrain variations in predicting the coverage in each five-degree azimuth, representing a veritable quantum leap in prediction capabilities.

The software needed to make such radio coverage predic-

tions has gone through an evolutionary process. It is now possible to ascertain the dramatic difference between the real world and averaged terrain contours through the use of computers instead of the tedious and infinitely more costly methods of hand-profiling or actually measuring the signal level out in the field. For additional insight and impact, the contour of your predicted signal coverage limits can be merged with the demographics of the area to provide your prospective SCA users with the number of households, businesses, or other appropriate data that are encompassed by your actual coverage area. This data will greatly assist prospective users of your subcarrier in their determination as to whether or not your subcarrier signal reaches the geographic areas that they wish to cover. They will be able to physically see it for themselves instead of relying on an educated guess.

Computer-plotted contour uses digitized information about natural terrain such as mountains and valleys to predict coverage area of the SCA signal. The contour is formed by

calculating data along 72 separate radials (every five degrees) from the transmitter. Nulls are also predicted, shown as "holes" in the shaded area.



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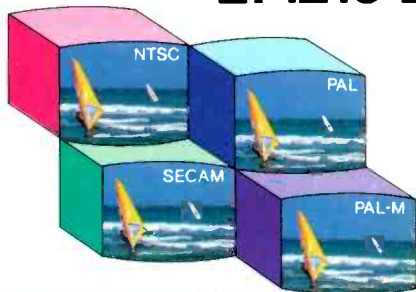


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called DataSpeed, based in San Francisco, is going to operate with pocket-held SCA receivers for customers who want instant stock market or commodity information. The receiver will incorporate enough computer memory to hold the latest quotations in the area of the customer's interest. The information is updated continuously via the SCA channel to which the receiver is tuned. The user simply keys in for the data he wants at any time, and gets a digital readout.

Telemet, based in Alexandria, VA, has announced a similar service. The Dow Jones Company is doing essentially the same thing, using desktop receivers for the customer.

National Public Radio has organized a new department called "Business Service," which will seek to exploit the combination of the NPR satellite net and the new SCA powers for the benefit of member public stations. The satellite-SCA combination should be watched—it is a particularly potent one for information distribution. It makes the service completely insensitive to distance; the satellite circuit transmits the information from city to city and the FM SCA channel reaches all points within the station's coverage.

Another service, in use in Europe for some time, is making a debut in this country, adding another way for SCAs to be used. It is automatic road information, or ARI, in which a special car receiver tuned to a local SCA channel can be keyed on for delivery of up-to-the-minute traffic and road information to the driver. The German firm Blaupunkt is making the receivers and beginning to promote the service in this country. It is already available in a number of American cities.

The emphasis on data transmission arises from the huge and growing market for this service and the ease of handling several channels of data on one SCA channel. But it is important to remember that a subcarrier at 92 kHz, say, can have the bandwidth for high-quality music or any other similar material. The main problems for the FM broadcaster using subcarriers in the future will be making choices among all the possibilities that have opened up, and setting up proper, long-term business relations with the organization selling the service to customers.

Finally, it is worth pointing out again that the new rules allow any method of modulation to be used on an SCA subcarrier. This means that the modulation can be FM, AM, FSK, slow-scan video, a part of quadraphonic, or any other system the broadcaster wants to use. It is part of the super-versatility of the new SCA. **BM/E**

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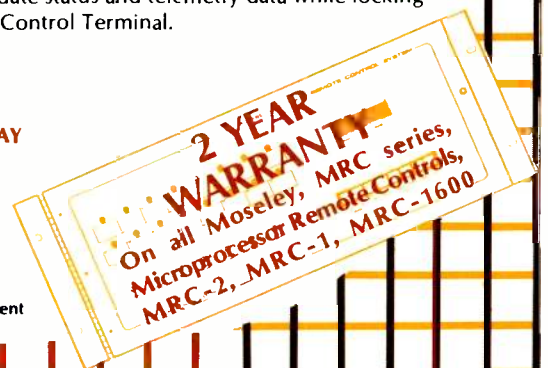
and 16 raise/lower relay-isolated command channels. In case of a temporary power-down of either terminal, all setup data is stored at both Control and Remote Terminals to avoid memory loss. Plug-in modules allow the MRC-1600 to be used with almost any interconnection network, including 2- or 4-wire telephone line, subaudible, FM subcarrier, or a combination of these.

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The MRC-1600 has full control fail-safe features and maintains special channels to monitor data link conditions and A/D ratios. A maintenance override mode continues to update status and telemetry data while locking out command signals from the Control Terminal.

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Montreux Symposium Reveals Europeans Hungry for Technology

By Robert Rivlin, Editor

"AMERICAN BROADCASTERS are a strange lot," mused an exhibitor at the recent International Television Symposium held in Montreux, Switzerland in early June. "On the one hand they want the very latest gadgets that technology has to offer—any bell or whistle that will give them a competitive edge. On the other hand they're woefully ignorant of the most basic advances that are being made in broadcasting technology—digital recording, HDTV, satellite delivery, and the rest. If it can't give them an immediate increase in bottom-line profits, they're just not interested."

This exhibitor's feelings were shared by many: technology in Europe is making enormous strides, and the Europeans seem ready to accept it; but their counterparts across the Atlantic must now meet the challenge and become involved. Not to do so will surely result in a situation such as what almost happened with the digital sampling standard when the EBU was on the verge of adopting its own component coding scheme before the Americans woke up and realized that they had better make their feelings known. The same could happen with virtually all the other technologies being advanced.

The Montreux symposium itself helped prove the international commitment to technological progress. The conference was organized into all-day sessions (the morning part dealt with more theoretical aspects, the afternoon part with actual hardware) on high-definition TV, direct broadcast satellites and program distribution, broadcast television production innovations, and digital studio and recording systems. Other sessions dealt with some of the major work that is going on in cable television and wideband signal distribution.

High-definition progress

One of the most significant demon-



Montreux, Switzerland, home of the bi-annual TV Symposium.

strations of the new technology at Montreux was the screening of six experimental HDTV tapes produced by six individual countries last year, including the Soviet Union. Sony HDTV equipment and a technical crew visited London, Paris, Salzburg, Montreux, Venice, and Leningrad, inviting each country to produce a segment of the tape, which included opera, ballet, light entertainment, and documentary programming. The tape was shown at the symposium on a range of HDTV monitors and projection TV systems from manufacturers such as Sony, Ikegami, and Panasonic.

As Joe Flaherty of CBS observed in his opening presentation of the 1125-line system demonstration, the new medium of HDTV has four characteristics:

- Vastly improved definition. In fact, the picture has approximately five times more information than a normal TV picture.
- Significantly better color fidelity without many of the color distortions visible in a standard picture.
- A wide-screen aspect ratio of 5x3.
- Multichannel stereophonic sound.

The Montreux demonstration marked the first time the NHK 1125-line system has been seen publicly in Europe, although both Sony and Ikegami demonstrated components of the system at the recent NAB show, the same system which CBS demonstrated to groups of broadcasters last year.

American broadcasters' interest in HDTV is perhaps best summed up in a report from International Resource Development Inc. of Norwalk, CT, which

NEWS FEATURE



Outside the exhibit hall, mobile vehicle and satellite receiver manufacturers showed their wares.



The Ampex/Nagra VPR-5 was one of the show's highlights.

Thomson-CSF's Vidifont Graphics V.



states: "For a somewhat marginal benefit to consumers—a better TV picture with less-evident lines across the screen—HDTV threatens to turn the consumer electronics industry upside down." The report goes on to assert that broadcast operations will be hurt by HDTV because of the large capital investment required to get started. For the Europeans and Japanese, however, capital investment is less of a problem, and the Japanese can be expected to begin HDTV satellite broadcasts to large-scale audiences in 1985. As a speaker at one of the technical sessions put it, "It is the *responsibility* of engineers in broadcasting to understand HDTV developments and learn to be proponents of the system."

The problem faced by HDTV at this juncture is one which confronts most new technologies: the urgent need to set a standard so that real development

work by manufacturers can proceed with the confidence that products will not be made immediately obsolete. In the case of HDTV, there are actually three standards: a production standard that would allow the actual users of the equipment (producers) to operate on a single worldwide system such as the 1125-line scheme proposed by NHK and developed by Sony/Ikegami/Matsushita; a standard that would operate at the studio level so that signal processing of material submitted to the studio by outside producers would all be handled in the same way; and, finally, a transmission standard, probably linked to satellite distribution, that would allow consumers to receive the HDTV signals either over the air or perhaps through cable TV. Of the three, the production standard is the closest to being actualized, although it is possible that a cable television operation that combined two existing medium bandwidth channels could transmit HDTV programming (movies, for example) in the near future; few homes, of course, would be able to afford the receiver necessary to see the wide-screen picture at this time.

The standards issue is being very hotly debated in countries around the world—particularly as it relates to existing television standards. On the one hand, the Japanese manufacturers seem to be convinced that changing over to an HDTV signal will benefit all, especially the broadcaster and certainly themselves as manufacturers of not only the production/studio/transmission equipment but also home TV receivers. On the other side of the coin, there are those who maintain that a system which cannot be received on existing home receivers of today is doomed to failure; why, they ask, should we not improve current PAL, NTSC and SECAM standards for enhanced TV reception, rather than ask the broadcaster and the consumer to radically change over to another system? "What we're doing at RCA," said a representative during a question-and-answer session, "is to look at what viewers want on their home sets, then we'll look at what transmission standards can do to give them what they want, then we'll see what production tools can be used to deliver an appropriate signal to the transmission system. But beginning with the production gear [as is being done with the 1125-line system] is going at it backwards."

Some of this worldwide debate will surely spill over into the deliberations of a brand-new committee which has been set up in the U.S. to study HDTV. Like the National Television Standards

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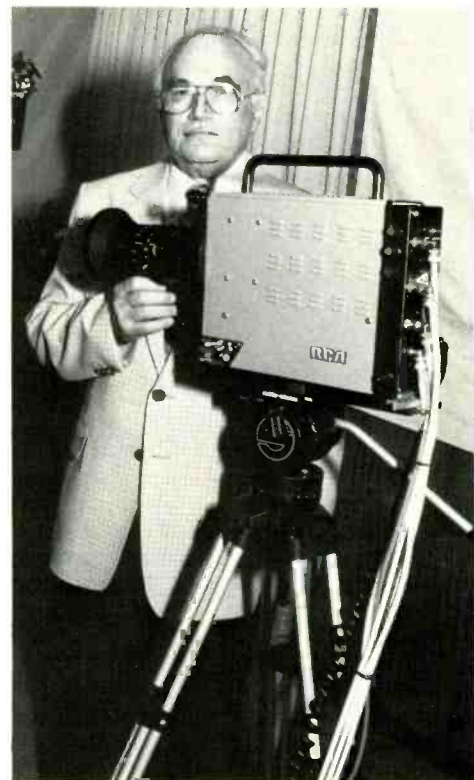


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NEWS FEATURE



Europeans have pulled ahead in areas such as CD technology.



RCA engineer Sid Bendell demonstrates the RCA CCD camera. The version shown at Montreux was housed in a Hawkeye body.

Committee (NTSC) which originally drafted the 525/60 standard for the U.S., the Advanced Television Standards Committee (ATSC) is an all-industry group that will be looking at the future of television with an eye to setting standards. Meeting under the auspices of the National Association of Broadcasters (NAB), the group will specifically examine three areas: improvements which can be made in the current 525-line NTSC system; enhanced 525-line systems which are being proposed by Philips and RCA, among others, in which a higher resolution signal would be transmitted but which would not *require* consumers to purchase new television sets unless they wanted the improved-quality service; and, finally, high-definition systems such as the NHK-proposed 1125-line standard.

Of major significance in this committee is its all-industry stature, which will involve active liaisons with groups such as the IEEE (expected to have an input on the design of future TV receivers) and SMPTE.

America, of course, is not alone when it comes to interest in establishing HDTV standards. As speaker after speaker at the roundtable discussion emphasized, broadcasters must begin thinking in the worldwide dimension when it comes to HDTV and must arrive at worldwide standards *now*, before individual countries' tastes and preferences become too set. Only then

will the ultimate advantage of HDTV—a truly international medium for the exchange of high-quality electronic programming, such as is not offered by film—be achieved.

At the BBC, it was revealed, interest in HDTV has been high not only among engineers "who are always interested in new technology," but also from the program development people, who find the 5x3 aspect ratio particularly appealing.

The official line from the EBU is that there are many problems but also many opportunities in HDTV. The group's main activity in this direction has been to closely follow the NHK developments, and to begin exploring how HDTV signals might be transmitted—either through the reallocation of the 20 GHz spectrum space or else by combining two 12 GHz channels.

The prevailing attitude was perhaps best summed up by a speaker representing the U.S.S.R. "We are hungry for HDTV," he observed, "but not starving. We must not be like the man who plants potatoes on the morning, then expects to harvest them that evening."

Digital recording

Besides HDTV, and other areas of technology such as DBS, which drew crowds at an all-day technical session, another area of major interest was the demonstration of digital video recording put on by Sony in a separate demon-

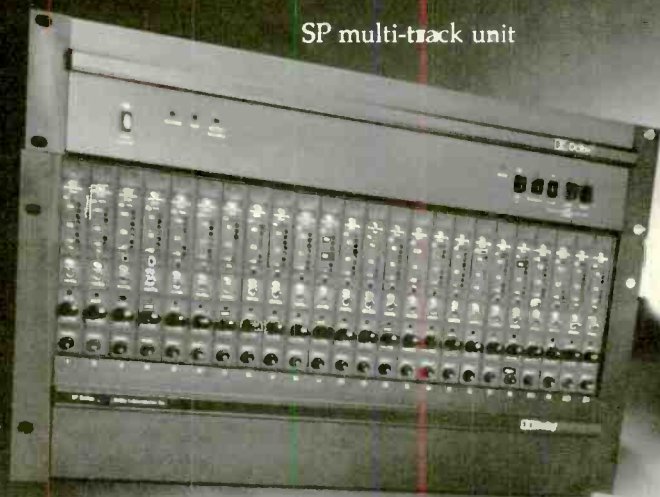
stration area. The demonstration used equipment developed by Sony Broadcast in its U.K. headquarters, coordinated by Sony in Japan.

The heart of the system is Sony's Type C one-inch recorder, although it has been substantially modified to accommodate digital recording, particularly in the configuration of the heads. Video heads are fixed in position, meaning that there is no dynamic tracking at this time. Significant advances in digital processing to allow shuttle mode operation have been achieved, however, allowing small packets of data to be sampled and interpolated into a visible picture at 10 times play speed in both forward and reverse. The same kind of processing enables operation at one-quarter play speed forward or reverse.

Another significant advance is that the machine will record *four channels* of digital audio, enabling simultaneous stereophonic soundtracks in two separate languages. Audio fidelity and quality is quite impressive, and is recorded at the 48 kHz/16-bit sampling standard which will probably become the international digital audio standard.

The version of the recorder demonstrated at Montreux conforms to the international digital video sampling standard of 13.5 MHz, with a 4:2:2 interrelationship among the luminance and two color difference signals. Its multistandard format, switching virtually instantly between NTSC and PAL,

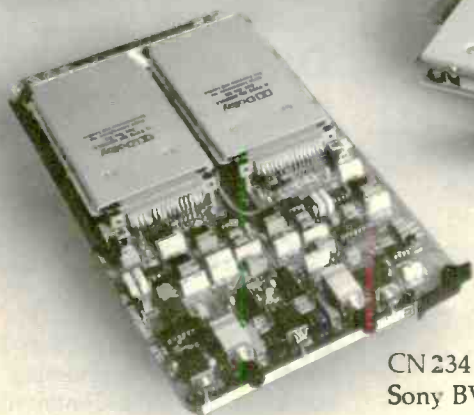
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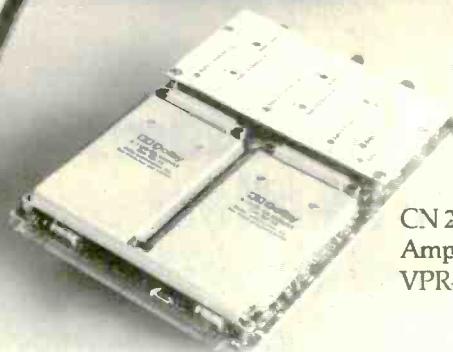
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NEWS FEATURE

is perhaps the first demonstration the world has seen of what an international sampling standard can offer in terms of standards compatibility.

Perhaps equally important to the recorder itself, however, was the amazing digital standards converter which Sony developed to go along with it—only an experiment at this point, but a system which had definite commercial possibilities. Operating on the 13.5 MHz/4:2:2 standard, the 625/50 to 525/60 converter incorporates no less than seven field stores, yet is housed in around two feet of rack space! (Sony also demonstrated an experimental digital standards converter in conjunction with the HDTV project, downconverting from the 1125/60 HDTV signal to 625/50.)

RCA's CCD camera

Still another significant advance in new technology at the show was RCA's first demonstration to the press of its CCD camera (shown to only a very few at the recent NAB show). This camera is radically different from other solid-state systems which have been shown to broadcasters over the past couple of years (including RCA's own previous

efforts), in that the camera uses a brand-new kind of CCD sensor—a frame transfer device in which the contents of the multiple solid-state data registers is read out during the video picture's vertical interval.

The advanced development model camera demonstrated at Montreux incorporates three 8 mm diagonal chips to replace the three half-inch tubes in a Hawkeye; otherwise the camera was virtually identical. But the performance is astonishing: signal-to-noise ratio is greater than 65 dB; static and dynamic resolution are equivalent to $\frac{2}{3}$ -inch tubes in the 0 dB gain mode, and dynamic resolution is much greater than $\frac{2}{3}$ -inch tubes when 18 dB gain is used; and sensitivity is 590 lux at f/1.4, 60 percent reflectance in the 0 dB gain mode, 73 lux at f/1.4 in the 18 dB mode. Best of all, perhaps, is that the CCD sensors mean absolutely no picture lag, even in extremely low lighting conditions, and the incredibly high dynamic range that allows the camera to see, for example, specular highlights from the sun's reflection off a car hood and the interior of the car at the same time with no blooming. Geometry and registration are also excellent, and nev-

er need to be aligned once preset at the factory.

"We will manufacture a product out of these developments" said an RCA spokesman, stressing, however, that this version of the camera is only experimental.

The product will presumably be marketed principally to ENG operations, where its highlight handling and no-lag characteristics can be brought to bear on tough ENG assignments when there is little time to set up, and the camera has to be able to roll with the punches that actuality shooting brings. In this context, the lighter weight and lower power consumption characteristic of solid-state CCD technology may also be an asset to news crews, although the Hawkeye version demonstrated in Montreux does not yet incorporate any significant weight or power savings.

In short, American broadcasters will likely be forced to abandon some of their arrogance and come to realize that, even though the Europeans operate from within a generally well-protected cocoon of government subsidies and nonprofit organizations, theirs is a valuable contribution to the technology of broadcasting. **BM/E**

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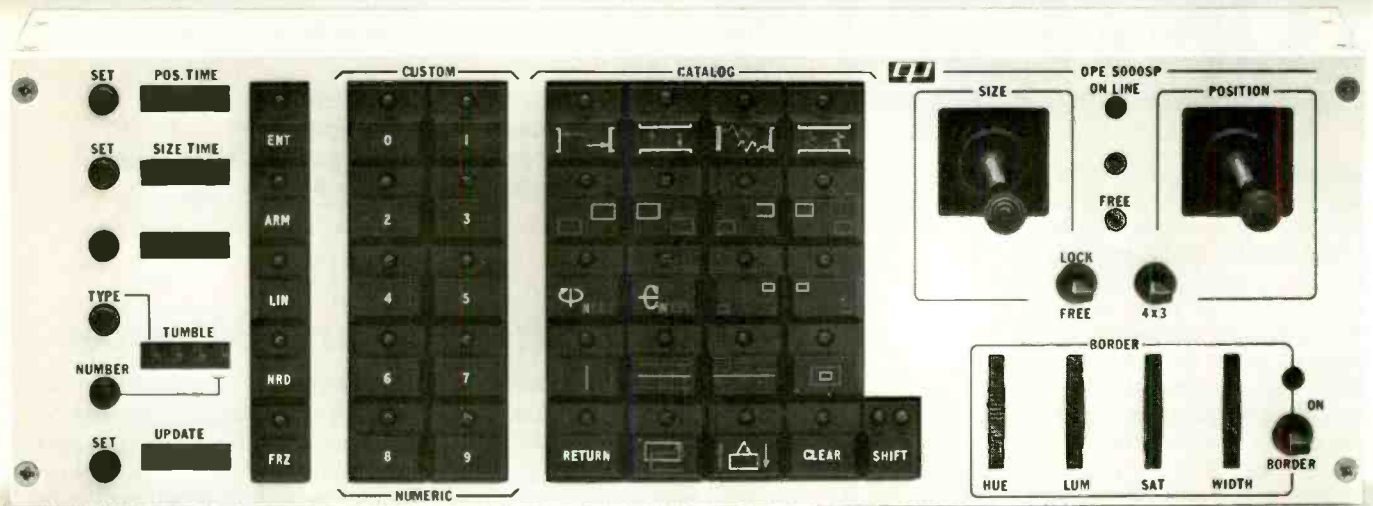
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GREAT IDEA CONTEST

Here's a chance to share your own personal solutions to some of broadcasting's most vexing engineering needs . . .

Each month, *BM/E* presents two engineering problems and invites you to submit solutions complete with diagrams. *BM/E's* editors will read the entries and select the best for publication—giving readers an opportunity to vote for the idea they consider best by using the ballot area on the Reader Service Card.

We will pay \$10 for each entry printed. In addition, the solution in each month's competition receiving the most votes on our Reader Service Card will win \$50.00. So put on your thinking cap and submit an answer to either of the problems outlined below . . . and be sure to watch this section for the solutions.

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Problem 22: Commercial Production Automation

When producing a tape for a commercial spot, it is often necessary to coordinate the different audio elements located on different tape decks. Design a system that will allow the insertion of audio sources from several different cart machines, in the proper order, onto an audio or video master tape.

**Solutions to Problem 22
must be received by
September 21, 1983 and will be
printed in the November 1983 issue**

Problem 23: Moisture Detector

Moisture is probably the worst enemy of electronics equipment, in both large devices such as transmitters and in smaller units such as cameras and recorders. Design either a macro or a micro moisture detector/alarm that can run on dc current in case of emergencies. Describe its applications and give its dimensions and mounting procedure if designed to be placed inside another device.

**Solutions to Problem 23
must be received by
October 24, 1983 and will be
printed in the December 1983 issue**

CONTEST RULES

- 1. How to Enter:** Submit your ideas on how to solve the problems, together with any schematic diagrams, photographs, or other supporting material. Entries should be roughly 500 words long. Mail the entries to *BM/E's* Great Ideas Contest, 295 Madison Avenue, New York, NY 10017. Use the official entry form or a separate piece of paper with your name, station or facility, address, and telephone number.
- 2. Voting and Prizes:** *BM/E's* editors will read all entries and select some for publication; the decision of the editors is final. Those selected for publication will receive a \$10 honorarium. Each month, readers will have an opportunity to vote for the solution they consider the best by using the Reader Service Card. *BM/E* will announce the solution receiving the most votes and will award the winner of each month's competition a \$50.00 check.
- 3. Eligibility:** All station and production facility personnel are eligible to enter solutions based on equipment already built or on ideas of how the problem should be solved. Consultants are welcome to submit ideas if they indicate at which facility the idea is in use. Manufacturers of equipment are not eligible to enter. Those submitting solutions are urged to think through their ideas carefully to be certain ideas conform to FCC specs and are in line with manufacturers' warranty guidelines.

Mail Official Entry Form to:

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295 Madison Avenue, New York, NY 10017

Solution to Problem # _____

Your Name: _____

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

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interpreting the FCC rules & regulations

Class Operation Restructuring Under Deregulation

By Harry Cole, FCC Counsel

AFTER ALMOST THREE and one-half years of deliberation, the Commission released its Report and Order in BC Docket No. 80-90 in mid-June, 1983. As a result of that decision, adopted by a 4 to 1 vote on May 26, 1983, the FM radio industry is likely to be in for some significant changes over the next few years, changes to be caused by an influx of new stations made possible by the FCC's action. However, in an impressive demonstration of creative control of paperflow, the Commission appears to have averted the deluge of channel allocation proposals and new station applications which, many thought, threatened to paralyze the Mass Media Bureau in much the same way as the onslaught of low-power television applications did in 1981-1982.

The changes adopted by the FCC closely tracked the proposals first advanced by the Commission in February 1980. The changes include the following:

- Class A stations will be permitted on channels previously reserved for Class

B or C operation.

- A new class of station—Class B-1—will be allowed to operate in Zones I and I-A, where only Class A or B stations were previously permitted. Class B-1 stations will have maximum facilities of 25 kW ERP and 328 feet (100 meters) HAAT, and will enjoy an expected service range of about 28 miles (45 kilometers).

- Two new classes of station—Class C-1 and C-2—will be allowed to operate in Zone II, which was previously reserved for Class A or C operation. Class C-2 stations have the same maximum facilities as Class B stations (i.e., 50 kW ERP and 492 feet (150 meters) HAAT) and thus represent, in effect, the potential of utilizing Class C channels for Class B stations. Class C-1 stations have maximum facilities (100 kW ERP and 984 feet (300 meters) HAAT) somewhat greater than Class C-2 stations, but somewhat lower than Class C stations. Class C-1 stations are expected to have a service range of about 45 miles (72 kilometers), and Class C-2 stations are expected to reach approximately 32 miles (52 kilometers).

- Existing Class B and C stations with less than maximum facilities will be required to meet certain minimum facility requirements within three years or face reclassification to a lower class of station. For Class C stations, the minimum requirements will include antenna height of 984 feet (300 meters).

- The Commission's FM rules have been amended to reflect conversion to the metric system (which explains the numerous parenthetical additions in the foregoing).

The likely effect of the first three changes noted above is fairly easy to predict—stations which, under the old standards, could not be squeezed in will now fit, and thus we can expect to see new stations springing up all over. Just how many new stations to expect is hard to say. Estimates run from a low of about 200 to a high of 1200 or more.

In reference to the fourth change, existing Class B and C station licenses are likely to be concerned about the mandatory upgrading. Under the old rules, when you got a Class B/C authorization with less than maximum power and antenna height, you had an unlimited

MINIMUM DISTANCE SEPARATION REQUIREMENTS in kilometers (and miles)

Relation	Co-channel	200 kHz	400/600 kHz	10.6/10.8 MHz
A to A	105 (65)	64 (40)	27 (17)	8 (5)
A to B1	138 (86)	89 (55)	48 (30)	8 (5)
A to B	163 (101)	105 (65)	69 (43)	16 (10)
A to C2	163 (101)	103 (64)	55 (34)	32 (20)
A to C1	196 (122)	129 (80)	74 (46)	32 (20)
A to C	222 (138)	169 (105)	105 (65)	32 (20)
B1 to B1	175 (109)	114 (71)	50 (31)	24 (15)
B1 to B	211 (131)	145 (90)	71 (44)	24 (15)
B1 to C2	200 (124)	134 (83)	56 (35)	40 (25)
B1 to C1	233 (145)	161 (100)	77 (48)	40 (25)
B1 to C	259 (161)	193 (120)	97 (60)	40 (25)
B to B	241 (150)	169 (105)	74 (46)	24 (15)
B to C2	237 (147)	164 (102)	74 (46)	40 (25)
B to C1	270 (168)	195 (121)	79 (49)	40 (25)
B to C	274 (170)	217 (135)	105 (65)	40 (25)
C2 to C2	190 (118)	130 (81)	58 (36)	48 (30)
C2 to C1	224 (139)	158 (98)	77 (49)	48 (30)
C2 to C	249 (155)	188 (117)	98 (61)	48 (30)
C1 to C1	245 (152)	177 (110)	82 (51)	48 (30)
C1 to C	270 (168)	209 (130)	101 (63)	48 (30)
C to C	290 (180)	241 (150)	105 (65)	48 (30)

FCC RULES & REGULATIONS

amount of time to improve your station to maximum facilities. Those days are now gone, and, in order to retain full Class C status, you will have to obtain, or at least apply for, 100 kW ERP and 984 feet (300 meters) HAAT. Class B status requires a minimum of 25 kW ERP, with no minimum antenna height applicable. The minimum for Class C-1 stations is 50 kW (with no limit on antenna height), and, for Class C-2 and B-1 stations, it's 3 kW (again, no antenna limit). The precise date by which all these upgrades will have to be accomplished, however, is not clear, for reasons which will be explained below.

Another important factor regarding the changes, as adopted by the FCC, is that they do not include any substantial reductions in minimum mileage separations between stations. The original proposal had included such a reduction for Class B separations, but that proposal was rejected. A table of the new minimum mileage separations is included in this article. Despite the Commission's decision not to alter its separation scheme substantially, it should be noted that the conversion to metric measurements did result in some minor reductions both in mileage separations and in maximum antenna heights.

The changes effected by BC Docket No. 80-90 are very likely to have major repercussions throughout the industry. The timing of those repercussions, however, has been carefully controlled by the Commission through an ingenious system by which the changes are to be phased in. The system will work as follows: The new rules, although adopted in May 1983, will not become effective until next fall, probably in October or November. Between May and the effective date (whenever that may be), the Commission's staff will put together its own list of proposed channel allocations based on the new rules. It is anticipated that this list will contain as many as 500 to 600 new channel allocations to communities across the country. When the new rules are formally made effective, the Commission will issue (as a Notice of Proposed Rule-making) its proposed list of allocations, and will invite reply comments from interested parties. Once all comments are in, the staff will review them and begin to issue a series of orders.

In view of the various procedural delays normally inherent in any rule-making proceeding, much less one of this enormity, it is unlikely that any new channel allocations under the re-

vised rules will be adopted before June 1984. This in turn means that applications for use of those channels will not be filed until mid-1984, at the absolute earliest, and new stations on those channels are thus not likely to be turned on until 1985, again, at the absolute earliest. This long-term phasing-in of the BC Docket No. 80-90 changes is a creative means by which the Commission can, to a degree, retain control of the workload to be generated by those changes. Had the FCC simply made the new rules effective upon their adoption, it would have been flooded by hundreds, and possibly thousands, of channel allocation proposals within weeks of the rules' effective date. All such proposals would have required evaluation not only on their own merits, but also as they related to one another, i.e., to determine if any proposal was mutually exclusive with any other(s). In turn, counterproposals would have to have been invited and considered. The resulting deluge of paper, and the extremely complex process of sorting everything out and processing it all, would almost certainly have slowed the FM allocations process to an absolute standstill. And this does not even include any applications that might

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FCC RULES & REGULATIONS

have been filed for proposed upgrading by existing licensees in a position to upgrade without having to change channels.

Instead, to avoid just such a breakdown in its processing lines, the Commission has forced proponents of new allocations to advance their proposals within the specific context of the FCC's own proposed allocations. In other words, rather than let itself be controlled by the haphazard order in which individual proponents might file their proposals, the FCC will be taking the lead in determining where the newly available channels should go, and interested parties whose proposals conflict with the FCC's will have the burden of convincing the FCC to change its omnibus proposal. Further, by establishing its own proposed allocation listing, the Commission has provided itself, and all commenting parties, with a definite framework to assist in the processing of the multitude of proposals which will doubtless be submitted.

All of this having been said, it remains to be determined what interested parties can or should do now in preparation for the release this fall of the Commission's proposed allocations list. The first thing to do, of course, is to no-

tify your consulting engineer and communications counsel of any interest you might have in particular allocations or in the possibility of adding new service, or expanding existing service, in any particular area. A discussion with such experts will assist you in understanding what facilities may be available as a result of the new rules. It will also assist your engineer and attorney in understanding the nature of your interests, and can further assist them in preparing the studies necessary to assure that any proposal you might wish to make is fully set forth to the Commission. No matter how much preparatory work is done, however, nothing can be filed with the Commission until it issues its listing of proposed allocations and makes the new rules effective. Once the FCC's list is released, you and your advisers should review the Commission's proposal to see whether your own interests would, or could, be satisfied under the Commission's plan. If you are interested in dropping in a new channel and the specific proposal you had in mind appears in the FCC's list, it might be a good idea to submit some appropriately supportive comments.

An additional consideration comes to bear if you are the licensee of a Class

B or C station currently operating with less than maximum facilities. In that case, you will be under an obligation to upgrade within three years of the effective date of the new rules or face reclassification as a lower class of station. Such reduction in class could, because of minimum mileage separation considerations, inhibit your ability to improve your station beyond certain levels. Thus, it is advisable to familiarize yourself with the minimum facilities requirements which must be met to avoid reclassification, and to review the possibility of upgrading within the three-year time limit.

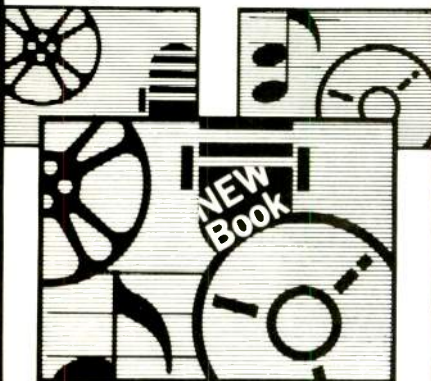
BC Docket No. 80-90 is the classic instance of a situation which potentially has major advantages and equally major disadvantages for all concerned. Fortunately, the FCC has provided everyone with a reasonable period of time in which calmly and objectively to assess their own needs and interests before the FCC's allocation list appears next fall. Broadcasters would do well to make use of that reasonable period. If you have any questions about BC Docket No. 80-90 or its particular effect upon you, you should contact your consulting engineer or communications counsel. **BM/E**

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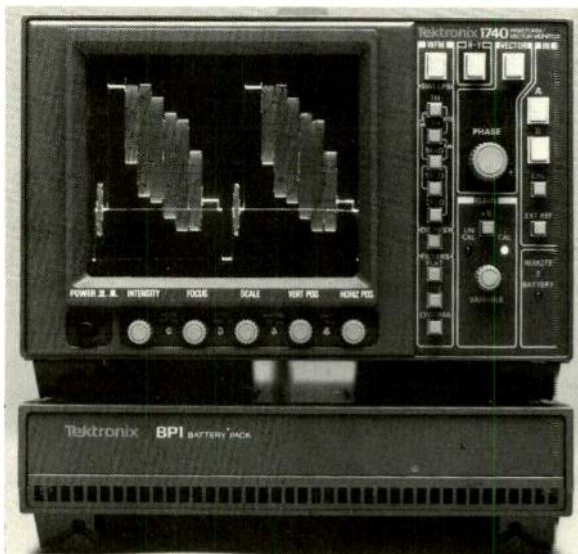
broadcast EQUIPMENT

Tektronix Develops Single-Unit Waveform Monitor/ Vectorscope

250

A portable, single-unit waveform monitor/vectorscope, Model 1740, was designed for use by television engineers and measurement engineers in all NTSC system countries. The new device provides similar performance to that previously available in the company's 528A waveform monitor and the 1420 vectorscope, but contained within a half rack size and at a lower price.

The new series, including the 1740, is suitable for video signal monitoring in camera control units, VTR bridges, production switcher consoles, mobile vans, and field production equipment. Features offered on the 1740 are dc operation, two-in-one measuring functions, and bright CRT display.



Options for the instruments provide a dc input for powering the monitor from a 12 V dc power source as well as offering the BPI battery pack power source that mounts to the bottom of the portable case.

Anton/Bauer Adaptor 251 Operates Light/Camera

The camera light power adaptor (CLPA) from Anton/Bauer was designed to provide portable lighting and camera power through a single Snap-On battery. The unit mounts directly between the bracket and battery on the rear of any camera and the integral cable plugs into the company's LG-U Black Beauty lighting head.

The LG-U uses a new high-efficiency 14 V bulb, the FLP, codeveloped with Anton/Bauer by Sylvania. At

70 W, the bulb offers light within a half-stop of a standard 100 W bulb while operating 70 percent longer.

Typical camera run time, with the light in use approximately one third of the time, will be over one hour. Also, the FLP bulb has an expected life of over 50 hours, which, according to the company, is eight times that of currently available video bulbs. The CLPA lists for \$125 and the FLP bulb for \$46.

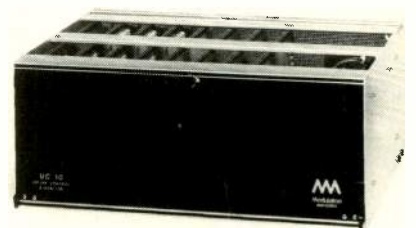
Cetec Vega Introduces 252 New Wireless Mic Receiver

The new Model R-42 Pro Plus wireless microphone receiver features what the company calls infinite gain technology. Low noise, true dual-receiver diversity, and switch-selectable Dynex II audio processing are primary developments of the new receiver. With Dynex II, the A-weighted dynamic range is typically 108 dB (maximum deviation

to noise floor). With Dynex II switched out, the unit has a 92 dB S/N.

Highest adjacent channel rejection is achieved with 16 poles of IF filtering. The preselector is a true four-pole, silverplated helical resonator filter. The design eliminates hum and powerline noise with Mu-Metal shielding for the power transformer and other critical circuitry. The companion nondiversity receiver is designated the Model R-41, and both work in conjunction with the 77 Dynex II bodypack transmitter or the Model 80, 81, or 82 hand-held transmitter.

Modulation Assoc. 253 Develops Uplink Controller



The new UC 10 is a control and monitor system for remote satellite uplinks. Designed to accommodate system expansion via plug-in modules, the system can dial automatically the systems engineer in case of alarm, reporting the fault condition.

Uplink voltage, current, and temperature monitor points may be checked with the unit, and backup systems can be switched in or out. The UC 10 also has the capacity to read the frequency of up to 16 MAI SM 710 modulators.

A standard CRT terminal and a 300 baud modem can control the system. The company offers the compatible terminal with integral modem and an optional printer. The package will automatically dial the uplink phone numbers from a list or dial a number entered from the keyboard. The system status can be displayed on the screen or can be dumped onto the printer.

Amtel Unveils 254 Evertz VITC Unit

The new Model ECM 4000 edit code master with VITC is designed as a combination generator and high-speed reader for both longitudinal and VITC with nearly all active components on plug-in modules. For simplified use, the company has included a format



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keypad which allows the unit to be quickly configured to specific operating requirements.

Features on the 4000 include presettable time and user bits, high-resolution character generator/keyer, and programmable remote control. Additional functions in the unit are the presence of an RS232 serial port interface to keyboard computerized editing systems, alphanumeric user bit data capability, and a wide speed range for longitudinal and VITC reader.

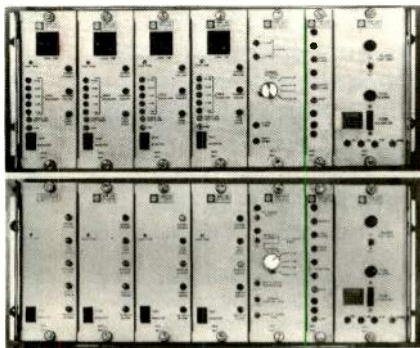
Also featured are programmable output level, jam sync modes, color frame correct code, and optional full-function remote-control unit with display. The list price for the ECM 4000 is \$5900.

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Karkar Offers **255** Digital Multiplexer

The digital stereo program channel multiplexer for multiplexing up to four program channels onto a DS-1 line is designated the KDM-415. The unit is



compatible with both D3 and Fe framing formats and is designed to meet or exceed both AT&T and CCITT recommendations.

The KDM-415 can be configured in either one- or two-way systems and is designed for remote-to-studio and STL uses via wires, telephone digital network, or microwave link. The unit is just as suitable for interfacing with satellite systems.

Also, the unit provides switchable preemphasis and deemphasis, built-in

cable equalizers, and switchable attenuators. Effects of random errors and error bursts are minimized through use of special algorithm. The KDM-415 has a built-in test unit at either end for single-ended level adjustments and trouble-shooting as well as comprehensive alarms and indicators at both the system and converter levels.

NEC Offers **256** Graphic Equalizer

The new DG-802X digital graphic equalizer permits independent control of phase and amplitude, octave by octave, with CRT display and provisions for memorizing equalization characteristics. Using a recently developed signal processing IC, the unit has a soft touch key pad which electronically controls phase and amplitude independently of each other at 10 center frequencies.

In conjunction with a personal computer, the two-channel system provides a graphic display for tracing active sound fields, with both measuring parameters displayed at each frequency. A wave form memory can store up to nine wave forms, and random access to the memory allows for instant recall by pushbutton.

The DG-802X has a dynamic range of more than 90 dB and separation between channels is better than 90 dB. Distortion is less than 0.01 percent.

Harris Introduces **257** LPTV Transmitters

A new line of low-power UHF and VHF television transmitters has been introduced and designated the TV Series. Included in the series is the TVH VHF high band, the TVL VHF

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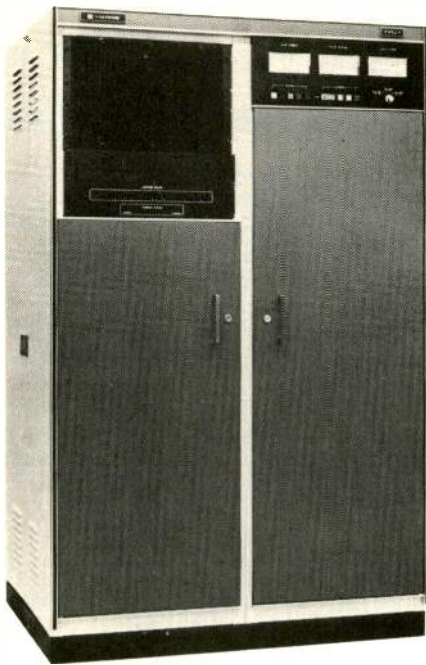
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EQUIPMENT



low band, and the TVU UHF models in 1, 2.5, 5, and 10 kW units.

The TV Series transmitters feature low-level IF modulation and diplexing, wideband modular design, long-term adjustment-free RF amplifiers, plug-in RF assemblies, and fully automatic op-

eration. Each style in the series is adaptable for remote-control operation.

Each transmitter is equipped with Harris's MCP-2 visual exciter with an improved video saw filter for vestigial sideband shaping. A quadrature corrector provides compensation for several types of tube nonlinearities, such as differential gain, incidental phase, and intermodulation distortion.

For-A Redesigns 258 Time Code Reader

The TCR-3500 is a new unit which provides SMPTE and EBU time code and user bit data reading functions plus character display and timer functions. The character display permits automatic superimposition of the time code readout onto the picture without the use of a title generator.

Two time code memories permit freezing any point in the videotape, identified by BCD time code, for push-button retrieval. The unit can also superimpose tape numbers from 00 to 99 onto the picture, providing an editing aid when several tapes are used in teleproduction. The TCR-3500 has two time generators. A count up/down fea-

ture with frame and tape number display has up to three start times which can be preset and put into memory. This includes a time freeze and reset function.

A built-in battery is standard for accurate real time measurement, even in the event of power failure. The TCR-3500 is priced at \$3000.

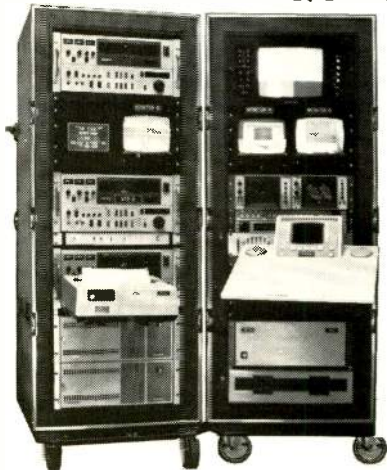
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Electro-Voice Adds 259 to Monitor Line

The release of the new Sentry 505 studio monitor speaker, featuring an angled enclosure for ceiling/wall mounting, adds another model to the Sentry line of monitors. The 505 is an acoustic match for the larger 500 as a result of calculated rolloff of the system's low frequencies at a rate that compensates for the bass boost which occurs when a speaker is mounted at a two-surface intersection.

The speaker's efficiency is measured

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at 96 dB (1 watt, 1 meter, anechoic), and offers frequency response from 40 Hz to 18 kHz (extendable to 28 Hz on the low end with a kit). Power handling capacity is claimed to be 100 W average long-term and 400 W short-term peak load.

A two-way speaker, the monitor contains a 12-inch, high-excursion woofer and a tweeter capable of handling 25 W. Crossover of the 505 is 1500 Hz. The speaker weighs 60 pounds, includes mounting brackets, and comes in a matte black vinyl-covered enclosure.

Lang Video Updates One-Shot ENG Unit

The One-Shot is a field mixing unit designed to function as a video switcher, source identifier, and audio mixer in a compact device. The system comes in a portable or rack-mount version and is suitable for installation into vans or helicopters.

Featuring modular plug-in components, it is a four-input video switcher, a digital NTSC color bar/eight symbol programmable character generator, a balanced four-input audio mixer with limiter, and a color black generator.



Options for the unit include a vertical interval switcher, a 12 to 30 Vdc power supply, a SMPTE color bar generator, a one-inch video monitor, and a modulator for channels 3, 4. The One-Shot, with all options, sells for under \$3700.

Automatic Level Control From Kennedy Space Center 261

A new automatic level control circuit has been developed to protect against signal overshoot. In the new circuit, two zener diodes, connected back-to-back in series with a capacitor, feed back signal that reduces the circuit gain.

The overshoot voltage spike causes the voltage across the zener diodes to exceed their breakdown voltages.

When this happens the diodes turn on, preventing the voltage spikes from appearing at the circuit output. When the spike voltage drops below the breakdown voltage of the diodes, they turn off. The initial output level is determined by the zener breakdown voltage and the capacitance of the series capacitor.

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BUSINESS BRIEFS



Montgomery Publications' LPTV station K6KZ in Junction City, KS recently completed equipment installation with video systems design by Lines Video Systems.

Kaman Broadcasting Systems plans to demonstrate its new software programs for automation at the twenty-third annual conference of Broadcast Financial Management. The new Kaman software shows advancements in its automation of traffic, accounting, and billing for television and radio.

RCA had higher second-quarter earnings on record sales. Earnings for the three months ended June 30 were \$66.2 million, compared with \$60.5 million in the second quarter of 1982.

Soundcraft Electronics has announced the formation of **Soundcraft Canada Ltd.**, a move to offer multinational distribution and new warranty programs.

Studer has expanded its west coast operations with the opening of a new northern California office and the appointment of a second sales engineer to the staff of the southern California office. . . . **Varitel Video** has opened its Los Angeles office and editing facilities and has incorporated into its San Francisco office new Betacam half-inch equipment.

Pierce-Phelps has formed a new arm to the company, the Audio Systems Division, which has been appointed as representative by **Sony/MCI**. The new division will distribute Telex, E-V, and TOA, as well as act as dealer for major lines such as Altec, JBL, Crown, Otari, and Yamaha. . . . **AFA Systems**, a division of A.F. Associates, has completed its installation and final testing of the **Empire Video** one-inch computerized editing facility that it designed in New York City.

Atlantic Research has completed

the sale of its subsidiary, **Datatronix**, to **Switchco, Inc.** in exchange for an \$800,000 demand note convertible into 64,000 shares of Switchco common stock.

Channel 18, a new LPTV station serving the cities of Sulphur Springs, Greenville, and Commerce, TX, has purchased the 22-foot mobile television production system featured by **Shook Electronic and Magnetic Media** at the recent NAB show. . . . **TFT, Inc.** has shipped the single largest order in the company's history. The shipment consisted of STLs and accessories bound for Taiwan.

NEC America held groundbreaking ceremonies in June to celebrate construction of its new corporate headquarters, to be opened in 1984, in Melville, NY. . . . **Altec Lansing** has relocated to another facility in Anaheim, CA after selling its previous facility there.

In the personnel department: **MCI/Quantel** has expanded its efforts by naming Kevin Prince as engineering manager, a new position reporting to George Hamilton, VP engineering services. . . . **Cetec Broadcast Group** has promoted Gary Persons to director of marketing, Ali Mahnad to antenna design engineer, and Edward Fitzgerald to FM sales product manager.

James Twerdahl has been elected president of **JBL, Inc.** after having served as executive VP and GM of JBL marketing. . . . **Lang Video Systems** announced that Ron Golick has joined the corporation as director of sales. . . . **Dynair** has appointed Richard M. West to the position of director of operations.

Three new personnel developments at **Channelmatic** have been announced: Tom Walsh is the new operations manager, overseeing design and manufacturing operations; Al Taylor has been named advertising director; and Dwain Keller has been appointed to oversee new product development and applications.

DigiVision has reorganized its top management, with John Cambon being named president of the company. . . . **Scientific-Atlanta** has elected John H. Levergood to the title of president and chief operating officer, in addition to naming him as a director of the company. . . . **Edward Bolger** has been named product manager at **CMX/Orox** and will be responsible for large-scale videotape editing systems. . . . **Artel Communications** announced two major personnel changes: Richard Cerny was recently elected chairman and CEO, and Tad Witkowitz was elected president and chief operating officer.

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