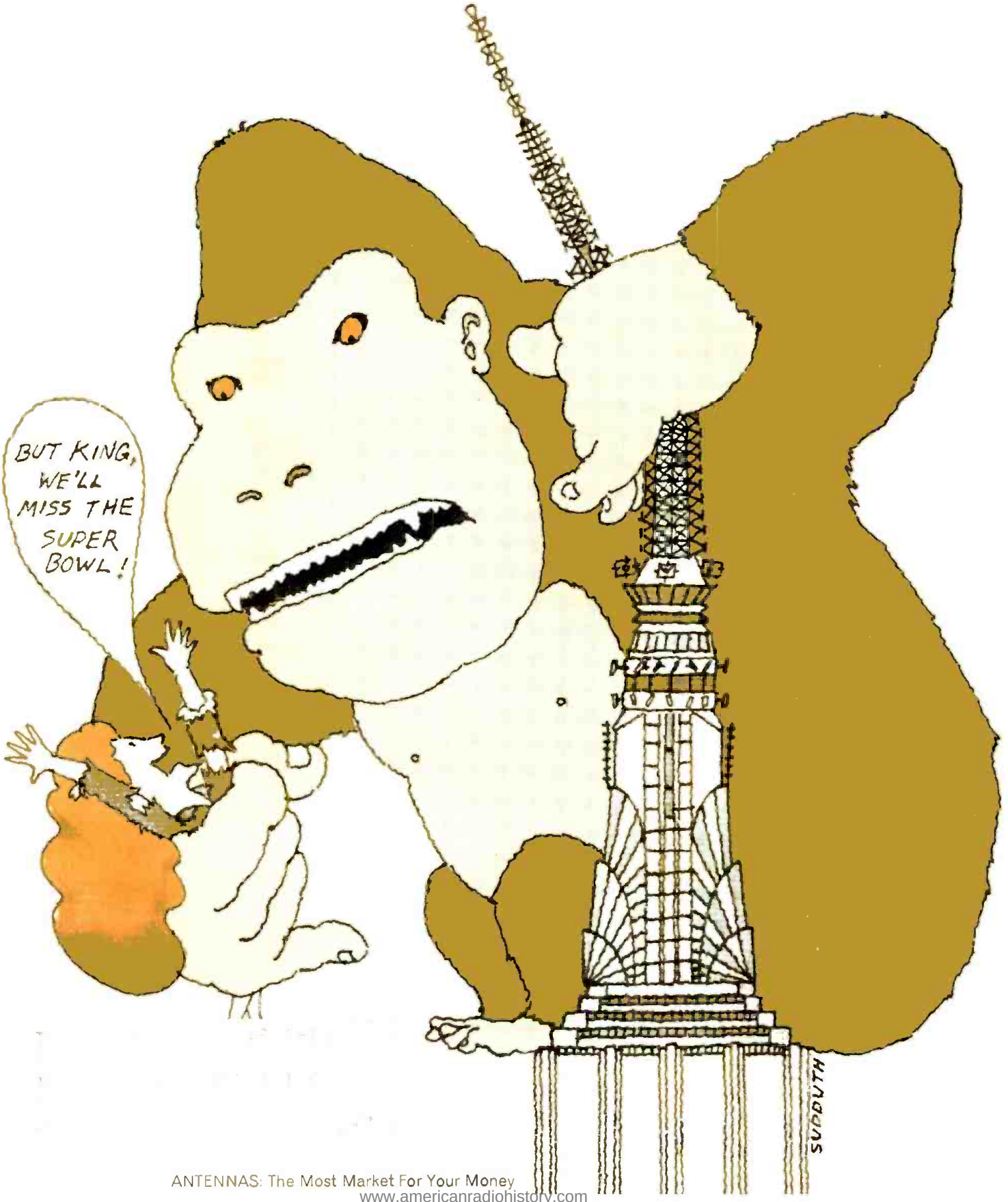
A MACTIER PUBLICATION / JANUARY 1969

BM/E

BROADCAST MANAGEMENT/ENGINEERING



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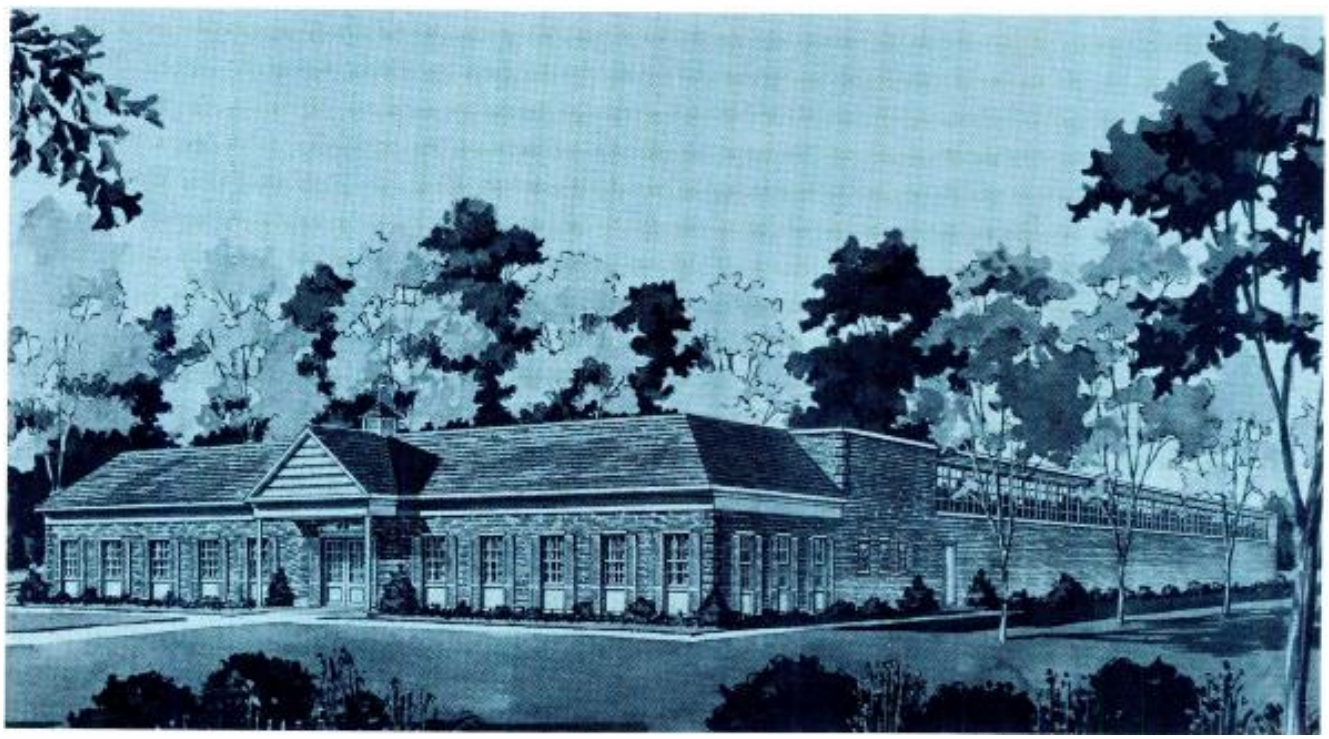

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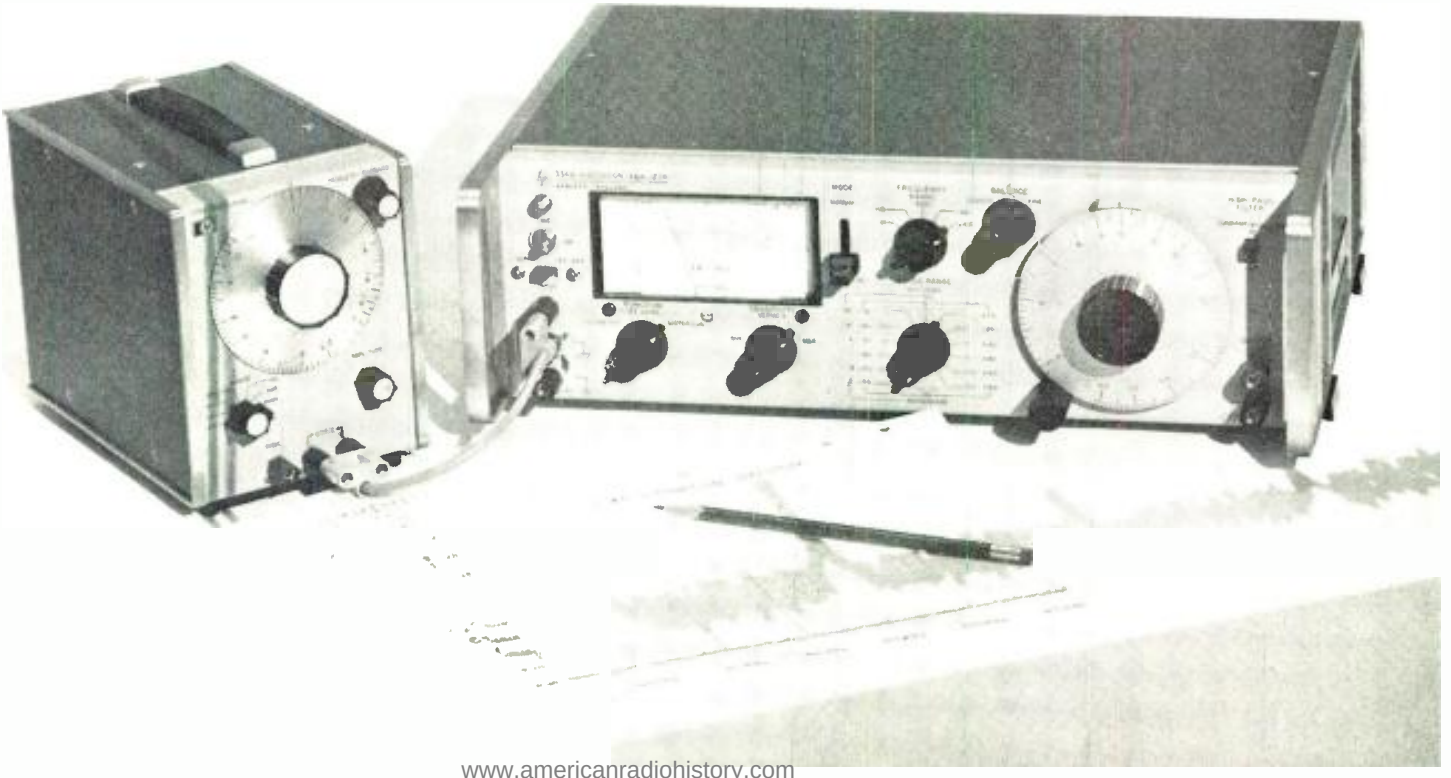

JANUARY 1969/VOLUME 5/NUMBER 1

BM/E

BROADCAST
MANAGEMENT/
ENGINEERING

This month's cover: Illustrator Art Sudduth's idea of an antenna problem is having King Kong shorten the mast atop New York's Empire State Building. You'll have to agree that's trouble. We don't promise you'll find a way out of this situation in our antenna section, but for some new ideas on antennas, turn to pages 44-55.

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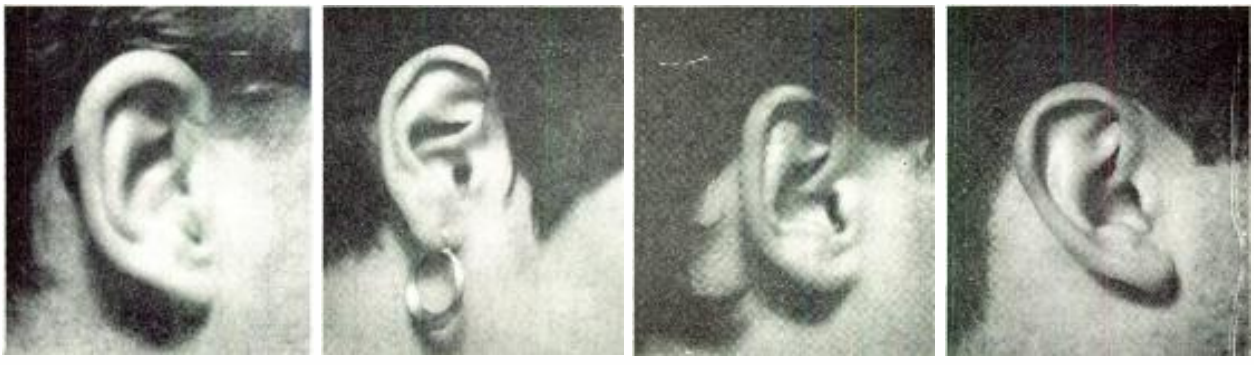

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BROADCAST INDUSTRY NEWS

Task Force suggests fewer curbs on CATV; urges creation of two powerful authorities

After a 15-month analysis of telecommunications in the U.S., the President's Task Force on Communications Policy submitted its 400-page report to President Johnson early in December. Implicit in the Force's conclusion that CATV is commission's hope for stimulating diversity in programming while retaining localism, and contrary to the FCC's Notice on CATV (see p. 12), is a call for eased restrictions on CATV.

More explicit and equally controversial are two of the committee's recommendations—that a single authority direct spectrum allocation within the U.S. and that one carrier manage international telecommunications.

The 17-man committee, headed by Eugene V. Rostow, undersecretary of state for political affairs, decided that CATV is presently the most promising means of achieving diversity after it considered six other possibilities: low-power uhf stations; government control of programming; pay TV; distribution of TV programs by satellite; video recording; development of a fourth commercial network.

Cable TV, according to the report, has developed because it assures access and a clear signal, in many localities, to more stations than does over-the-air broadcasting. Cable TV can offer 20 channels at relatively low cost per channel (and thus originate programming), is potentially well suited to selective distribution and can survive without government subsidy or protection.

Other broadcasting recommendations of the Task Force include:

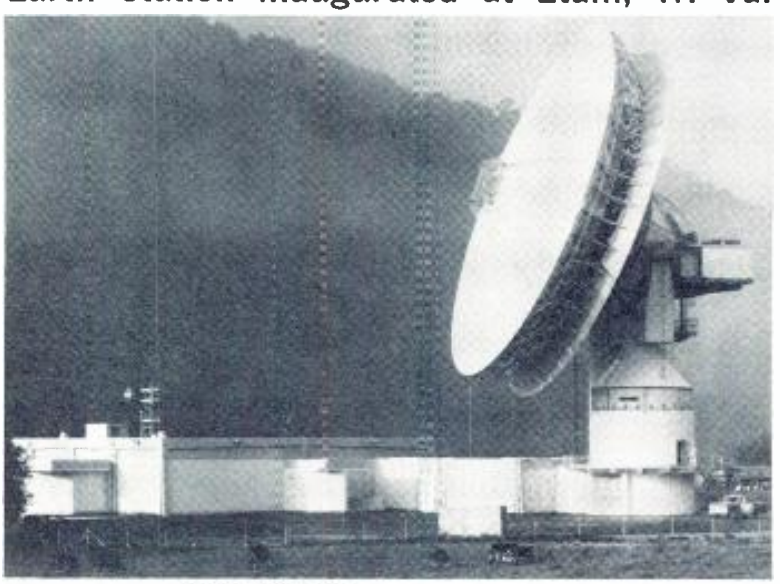
- Full copyright liability should be assigned to CATV for using distant TV signals and no liability for using purely local TV signals.
- The FCC should investigate cross-ownership of CATV and broadcasting in the same market and consolidated ownership of cable, broadcasting, newspapers, magazines and movie interests on a national scale.
- "Unusable" TV channels (due to interference) should be used by land mobile services.
- The federal government should use TV channels to expound on national goals—job training, literacy, health, etc.
- Federal agencies should participate in license renewals and rulemaking proceedings before the FCC as a way of getting their own programs aired.
- As for economics, a sliding scale of license fees might be instituted, dependent upon bandwidth, power and other elements.

On spectrum management, the committee decided that a single spectrum manager is needed to handle allocations between government and nongovernment use and to coordinate various activities of the government in using the spectrum. Presently, a formal mechanism for settling conflicts between nongovernment and government users doesn't exist. According to the Task Force report, "the spectrum manager and the FCC should encounter no major obstacles in working together, under the watchful eye of Congress; any needed changes in existing broadcast station allotment plan which would appropriately reflect the objectives of both agencies."

Aware of the irony in that the government—large user of telecommunications facilities and equipment—has no central office to oversee within the government, the committee suggested that an "entity" be established that would encompass the role of spectrum manager and go further into the field of telecommunications. Composed of lawyers, scientists, statisticians and economists, the executive branch "capability" would help other government agencies and coordinate the government's activities in telecommunications research and development.

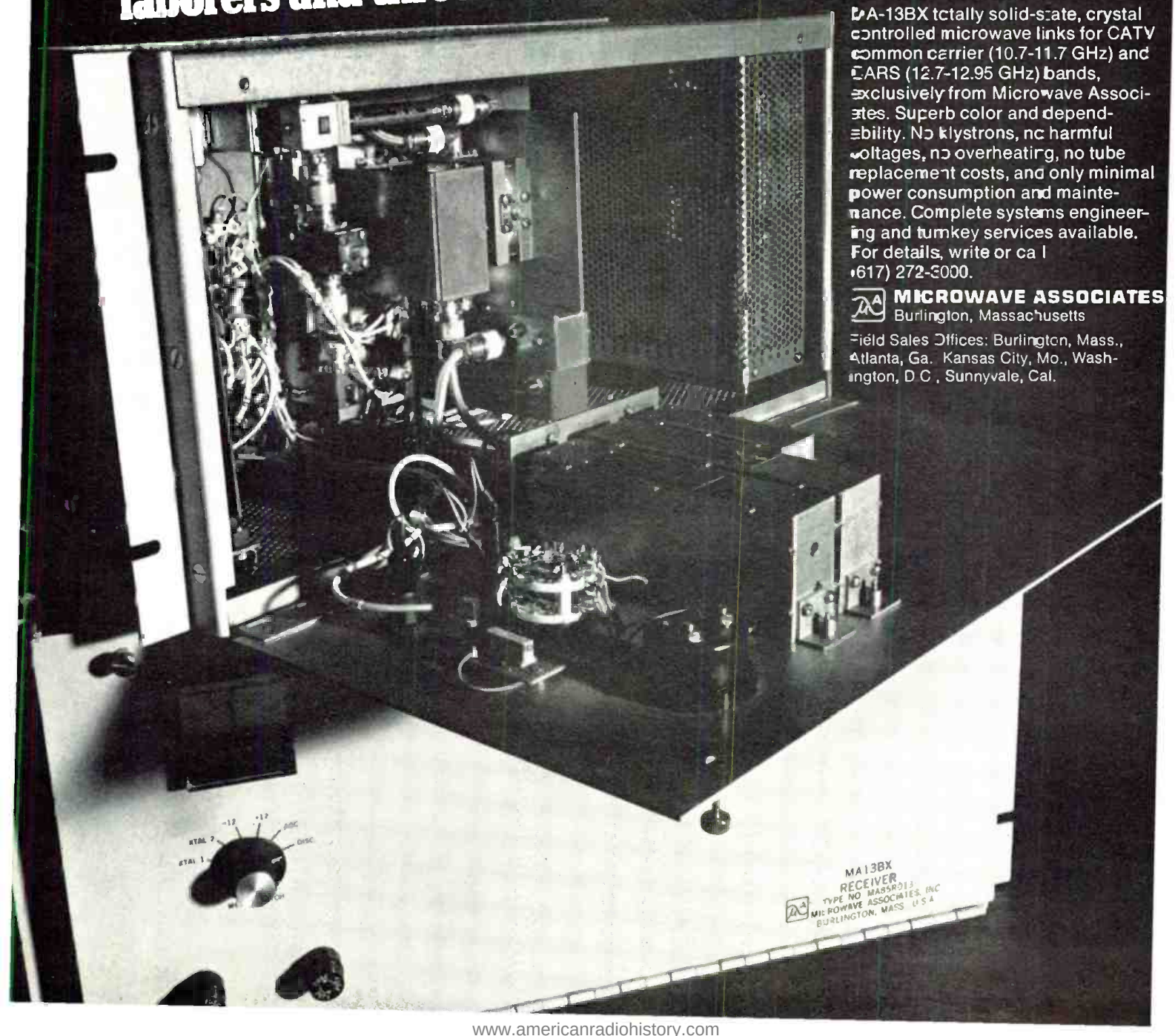
Included in these most far-reaching recommendations for re-

Earth Station Inaugurated at Etam, W. Va.



Silhouetted against dramatic background at Etam, West Virginia, is the antenna at Comsat-operated earth station—the first of three new Comsat-managed installations in operation since the fall. Basic communications equipment is Raytheon's solid state KTR-3A microwave communications equipment. Small antenna at left is part of the American Telephone and Telegraph Company's microwave, also Raytheon equipped.

This totally solid-state microwave link is thirty miles of CATV coaxial cable, sixty-two line amplifiers, twelve hundred telephone poles, one drilling rig, two property lawyers, nineteen rights of way, six shovels, eight laborers and three irate housewives.



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vamping the nation's communications structure since passage of the Communications Act of 1934, is the proposal to create a government-sponsored, privately owned monopoly to transmit all international communications, now performed by Comsat, and the voice and record (hard copy) carriers. Objections within the Task Force centered around the fear that the government would be fostering creation of a monopoly that would inhibit competition in international communications. But the majority argued that with the development of high-capacity undersea cables and communications satellites, the distinction between voice and record carriers has lost its technical significance.

The committee suggested that the merger would further U.S. foreign policy objectives by strengthening the country's hand in international telecommunications negotiations. The Task Force observed that foreign companies, most of which are nationally owned monopolies, would no longer be able to "play off" one American carrier against another to gain advantage in communications agreements.

The committee was vague on where the new company begins and where the present carriers end. At one point, the report suggested that the new company should be allowed to deal directly with large communications users. Thus, the new company would be competing directly with present carriers.

The Task Force recommended that a "pilot" project be undertaken with Comsat in a "trustee role," sending up satellites for an experimental domestic system.

ETV interconnections begin on trial basis

The American Telephone and Telegraph Co. began to provide facilities for network interconnections of 150 public television stations during prime time in mid-December.

Frank Pace, Jr., Corporation for Public Broadcasting board chairman, says that AT&T made the interconnection available during prime time hours from 8 to 10 on Sunday through Thursday evenings "at costs lower than commercial rates," representing a "substantial saving to public television." The start-up costs of about $500,000 for the trial network were funded jointly by the Corporation for Public Broadcasting and the Ford Foundation.

Pace says that the project is just the beginning of the Corporation's goal of public television—"free interconnection or substantially reduced rates for whatever amounts of time public television may require." The growth of interconnection service, Pace says, "offers an opportunity for new kinds of programming and a more effective distribution system."

Three experts preview broadcasting's future

The future of broadcasting was projected both technologically and conceptually in a lecture-demonstration produced by Triangle Stations at the Lincoln Center for the Performing Arts on Nov. 13. Previewing the next decade of broadcasting was William E. Roberts, president, Ampex Corp., Betty Furness, special assistant to the President for consumer affairs and Rosel H. Hyde, chairman, FCC.

Considering television as a medium of entertainment, education and cultural exposure, Roberts foresaw five advances in broadcasting technology:

- Automation and mechanization of broadcasting stations.
- TV receivers in the form of large, flat wall screens, accompanied by stereophonic audio.
- Higher color fidelity and stability.
- A 3-dimensional video.
- Increasing importance placed on satellite communication in the common carrier communication industry.

As a unilateral communication medium, television receivers to Roberts would become the communication centers. Roberts illustrated his vision of TV as more than an entertainment center by citing the ability of the student of the future to dial access to his desired audio-video material.

Miss Furness challenged the present broadcasting programming and offered a solution. According to her the problem is that the medium has created its own message —"everything for everybody." Miss Furness suggested that TV be used to warn, help and teach.

"Television doesn't preface its commercials by saying here it is if you don't have dentist's bills, aged relatives to support, or even if you can simply afford it. They sell the idea that not only is this the way life is meant to be, but this is the way it is."

Miss Furness continued to say that something is overlooked—"the power of television itself as a medium used by people to alleviate the humdrum existence of four walls in slums, in rural areas, in ghettos . . . I think TV has a responsibility toward these people, the responsibility of making things clear, of really telling them how it is . . . A newly recognized fact of life is that the poor do indeed pay more. It has been proven that the very TV set we've been talking about that costs you and me $129.95 can cost the poor $249.94. It costs a lot of money to be poor today . . ."

One of Miss Furness' solutions was to incorporate into the daily soap operas consumer education. "I think TV is a wonderful thing for the disadvantaged to have. I agree with the caseworker who called it 'a window on the world.' but I think TV has a tremendous responsibility in the view it shows through that window."

Agreeing with Miss Furness in that history will judge us not by the tools we create, but by how we use them, Hyde also asked that we use broadcasting in the spirit of good will and wisdom. Hyde stressed that the future will demand broadcasters to focus more and more on critical issues facing society. Hyde asked for a re-examination of the service concept: "We should make the best use of not scarcity of channels, but channels in abundance produced by technological achievements."

Committee to advise on EIA telecommunications

An Electronic Industries Association Committee on Telecommunications Policy has been appointed by EIA President Mark Shephard, Jr. Headed by Frank Barnes, the Committee will serve as an advisory group to the association's board of directors and its executive officers in the field of telecommunications.

Proposed functions of the 17-man Committee include:

- Defining the technological scope of telecommunications in terms acceptable to government and industry.
- Preparing programs and recommendations for information and guidance of government agencies and officials responsible for planning, procurement and/or regulation of telecommunications facilities.
- Investigating with government assistance, the opportunities for applying telecommunications services and technology in government-sponsored programs designed to

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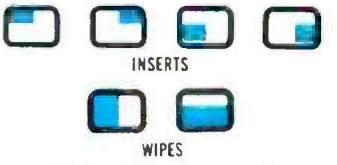

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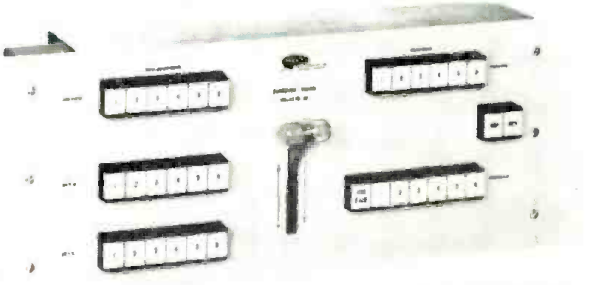

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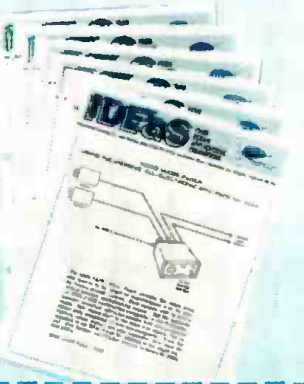

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NAB study shows public wants more editorials

According to a recent survey by the National Association of Broadcasters, most of the 70 percent of the adult population which has heard editorials over the air would like to hear more of them.

The survey on "public attitudes toward broadcast editorializing" is the second of two studies NAB has completed on this subject in the last two years. Major findings show:

- Some 70 percent of the public think broadcasters should editorialize—a proportion close to the 75 percent who think newspapers should.
- People who have seen and heard broadcast editorials give them high marks—in many cases higher than newspaper editorials—on specific characteristics such as helping people understand and think about issues.
- Broadcasters have wide latitude in the subject matter people feel is suitable for editorial discussion.
- There is greater public esteem for stations that editorialize than for those that don't.
- The public, by a four-to-one margin, favors regulation of broadcast editorials by stations themselves, rather than by the government.

TV breakthrough: laser display system

Development of a laser display system that produces large, bright, full-color television pictures has been announced by General Telephone & Electronics Laboratories. Presently a laboratory model, the system is considered to be a technological breakthrough toward achieving large-screen, color television pictures so bright that they could be shown in fully lighted rooms for educational, entertainment and commercial uses.

The system takes "off-the-air" signals from a standard home television set, impresses them on three laser beams and passes them through optical display devices to create quality color pictures.

Radiation control becomes 1968 law

The Radiation Control for Health and Safety Act has become law, directing the Secretary of Health, Education and Welfare to establish and administer performance standards for the control of radiation from electronic products.

Committees of the House and Senate cite numerous incidents which demonstrate the need for electronic products radiation control: studies showing "excessive" radiation from color television receivers to be "industrywide"; discovery that 24 out of 30 microwave ovens at a U.S. medical center "leaked potentially hazardous radiation"; a 1967 survey showing about two-thirds of about 112,000 medical X-ray machines did not meet current State recommendations or regulations.

WGBH fosters radio drama renaissance

WGBH-FM is not to be outdone by WGBH-TV's creativity (Nov. *BM/E*, p. 33-36). On Dec. 1, WGBH-FM launched its Radio Drama Development Project—a nationwide campaign to revive and update radio drama. More than 150 non-

commercial radio stations broadcasted selections from WGBH-FM's "Ten New Plays in Stereo," a record album distributed by the Project's backers without charge. The hope of the Project is to stimulate rebirth of local radio drama which flourished in the U.S. in the '40's and died in the '50's with the advent of television.

Funded by $114,000 last year from the National Endowment for the Arts, Old Dominion Foundation and WGBH Educational Foundation, the Project founded a repertory company and conducted a $10,000-prize national script contest. Judges Burgess Meredith, Douglas Cleverdon and William Alfred awarded top prize of $5000 to Philip Lee Devin for his "Ballad for a Wanton Boy." Devin is currently teaching playwriting, dramatic literature and acting at Vassar College.

Receipt of over 400 manuscripts encouraged Project workers in their belief that radio is a visual medium that works closer to the mind than any other and that this generation would respond to the existential quality of shifts in time, space and point of view permitted by stereo recording. Project enthusiasts are hardly alone—Samuel Beckett, Archibald MacLeish, Harold Pinter, Eugene Ionesco and Ingmar Bergman are with them all the way. Copies of WGBH's record album is available free to all interested educational stations.

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FCC clarifies rule for remote pickup stations

The logging requirements for remote broadcast pickup stations have been clarified through adoption of an amendment to Section 74.481 of the rules and the denied petition of Pacific FM, Inc., licensee of station KPEN-FM, San Francisco. The amendment became effective Nov. 19, 1968.

Pacific FM contended that those sections requiring log entries covering specific hours of operation, programs transmitted, point of origination, pertinent remarks about transmission, checks of antenna lighting and frequency checks are anachronistic, impractical and unnecessary.

The Commission replied that because it cannot monitor all stations at all times, the stations must keep logs to have a record if interference complaints arise. The FCC called the logging requirements for remote broadcast pickup stations "modest," but said that the simplicity of the language in the rule may have led to misunderstanding.

Mini-studio debuts in telephone booth

Radio station WIOD has opened what may be the world's miniest mini-broadcasting studio at the Broward County Courthouse in neighboring Fort Lauderdale—it's in a telephone booth.

Inside the doorway of the courthouse press room, the "studio" (air-conditioned and fully carpeted) provides a direct line for the transmission of news broadcasts from Fort Lauderdale via WIOD's Miami news headquarters.

It all started when the head of the station's Broward County News Bureau wanted a live microphone so that he could get good quality on his feeds to his office 25 miles away. After search for even a broom closet failed, the idea of a phone booth in the press room was thought up.

One problem: taxpayers, dimes in hand, are forever dashing into the booth looking for a place to deposit and call. What happens when the phone rings?

FOCUS ON
CATV

FCC takes sweeping new look at cable industry

Friday, December 13, well may go into the annals of CATV history as a hard luck day. It was on that day that the FCC chose to disclose its new look at the cable industry. It was a look that puts CATV down. To the discomfit of others, the Commission also authorized Pay TV to proceed on a nonexperimental basis, effective June 12, 1969.

The "FCC Proposed CATV Rules and Inquiry" would:

- require local program origination.
- require that cable operators obtain retransmission consent before carrying distant signals into major markets.
- limit the number of distant signals that can be carried within 35 miles of the station in smaller markets (three networks, one independent and one ETV).
- prohibit cross-ownership in a single area.

The new proposal requires a broadcaster to give this notice eight days before the broadcast date. The CATV operator, according to the Commission, must for his part, keep the licensee informed about his plans for carrying signals and the program schedules, if he knows them, of the stations providing the signals. If the CATV operator cannot obtain this information, the broadcaster must get it directly from the source of the signals.

In the interim the FCC would halt all major market proceedings that apply to systems within 35 miles of the center of the market except for a few exceptions to gain experience on the retransmission concept.

Although interim procedures are established to prevent disruption of service, any rules adopted will be applicable as they become effective to all systems beginning service after December 20, 1968.

Section III encourages CATV operators to lease "some channels on the system to others for the purpose of program origination or other communications services."

In the important and sensitive area of advertising, the Commissioners were unable to reach a definitive conclusion.

Equal time, sponsorship and fairness rulings proposed in the Notice closely parallel those already in by broadcasters.

The Commission has stirred up a hornet's nest of reaction. According to Frederick W. Ford, president of NCTA, "The FCC has fought tenaciously to gain regulatory powers over CATV, and having prevailed, seeks to use these powers to eviscerate the industry."

The Ford statement goes on to say that "without benefit of hearings, the Commission has instituted proceedings to bring to halt further expansion of CATV, disrupt the patterns of ownership, curtail any improvement of operating systems, and probably destroy the present manufacturing capacity of the industry."

Ford views the Commission's new rules as being "in defiance of the studied recommendations of the Task Force" (See p. 6).

In fitting CATV into the media mix, the Commissioners propose to prohibit cross-ownership of CATV and television stations in the same area. The Commission also proposes a rule to limit on a nationwide basis the total number of systems to be commonly owned, based on the number of subscribers, the size of the communities, and the regional concentration and the other broadcast interests of the CATV operator.

The Commission stresses "that no grandfathering is contemplated" with respect to the application of the cross-ownership rules, "although consideration will be given to the question of affording an appropriate period within which compliance is to be achieved."

With respect to importation of signals into major markets, there is to be a substitution of a fixed mileage standard. This 35-mile standard will take the place of the evidentuary hearing and will be adhered to in *every* case. (See p. 12, Dec./68 *BM/E*.)

According to the Commission, the mileage standard has the advantage of administrative ease and provides certainty to the affected industries. It is to be measured in air miles from the main post office in the designated market community.

While the proceeding is pending, the Commission will process microwave applications only if they are consistent with proposed rules. Requests for processing some "leap-frogging" by CATV systems outside of any 35-mile zone would be considered where waivers of proposed rules is contemplated. CATV systems in other than top-100 markets would be permitted to carry distant signals provided they do not leap-frog.

Irving Kahn, chairman and president of TelePrompTer Corporation, reacting to the new regulations, states that the "proposed new rules are harshly and unfairly restrictive upon the CATV industry, but they are not unexpected in the light of the Commission's traditional policy of protecting the economic status quo of the broadcast industry at the expense of the new services CATV could provide the public."

Technical standards are contemplated but have not yet been formulated. The Commission invites "concrete and detailed" suggestions on this and other provisions. Comments may be filed on or before June 16, 1969, with reply comments due August 16, 1969. Comments on the rulemaking proposals are due on or before March 3, 1969, with reply comments due April 3, 1969.

Despite the alarm with which industry spokesmen greeted the new rules, Chairman Hyde stated at the Friday the 13th press conference that the Commission "was simply seeking to stimulate and explore CATV's full potentiality. He went on to say that the Commissioners "feel it is unfair for CATV distributors to compete with TV broadcasters who must get their programs into the market without also having to originate some programs."

McClellan receives copyright recommendations

Although it's well nigh impossible to predict what legislation the Senate Subcommittee on Patents, Trademarks and Copyrights, under the chairmanship of Sen. John L. McClellan (D-Ark.) will devise, a certain degree of insight can be gleaned from a look at a cross-section of the 20-odd filings forwarded thus far to the Subcommittee.

NCTA's Frederick W. Ford holds that the "only workable compromise" is an "across-the-board approach." He maintains that copyright legislation must incorporate four basic provisions:

1) A compulsory license to distribute unaltered broadcast signals.

2) Recompense to the copyright owners in the form of a single, inclusive payment for all broadcast signals distributed by a cable system. The fee would be defined by

Continued on page 72

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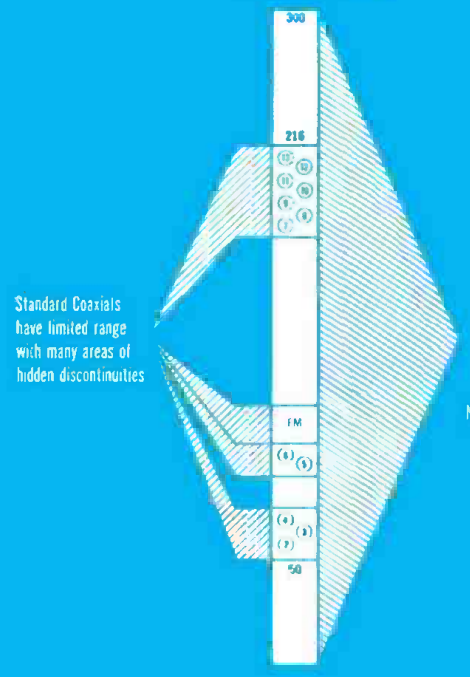
Close the gaps. Now.



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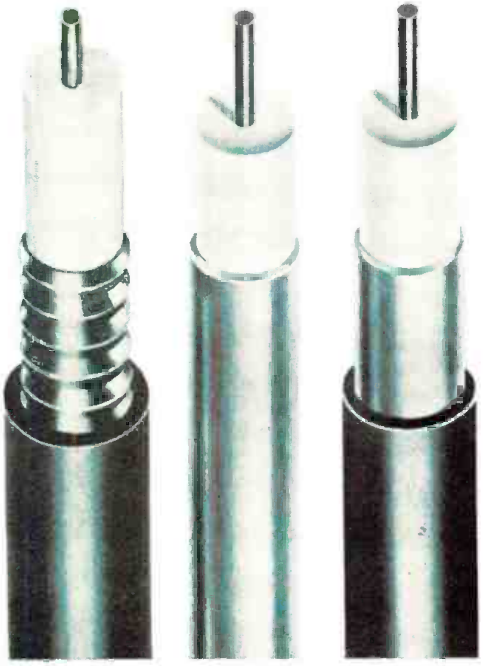

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MANAGEMENT Q&A

SI WILLING

Have questions on station management and sales? Ask Si. He'll draw on his many years of experience managing successful radio stations in a variety of markets. Si Willing is president of KMAR (Winnsboro, Louisiana) and of KNNN Broadcasting Corp. (Friona, Texas). He's also chief exec of brand-new KCRF-FM (Winnsboro, La.) due to go on the air in May. Send your questions to: **Si Willing, BM/E, 820 Second Ave., New York, N.Y. 10017.**

Q. We have a new radio station in a small agricultural market. We're the only station in this area. The merchants here have been print-oriented for over a century. They use the local weekly newspaper and handbills for their weekend specials. Since we're new and have no success stories to present to these merchants, how do we get them to advertise?

Ed Marshall, Columbia, La.

A. Tradition is a difficult thing to contend with but it can be done. There are small-town radio stations that do very well. Check your yearbook for small market stations located near you. Visit them and respectfully ask them to give you some of their success stories. The next step is to salvage carefully all of the discarded circulars from the post office trash cans. Tie them in red ribbon. Present them to the advertisers with the explanation

Continued on page 71

Attention TV Stations:

We've got news for you!

FILMLINE'S professional color film processors now available for TV NEWS

The FILMLINE Models FE-30 and FE-50 are exciting new color film processors designed specifically for use in television station news departments. The design is backed by Filmline's reputation as the world's leading manufacturer of professional film processors for the commercial motion picture laboratory industry.

Now for the first time the television industry can enjoy the benefits of professional caliber equipment incorporating exclusive FILMLINE features that have paced the state-of-the-art in commercial laboratories, at a cost lower than processors offering less.

After you check these exclusive Filmline features you'll want to install a Filmline processor in your news department NOW!

MODEL FE-50: 16 mm Color Processor for Ektachrome Film. Speed 50 FPM. **$22,500**

MODEL FE-30: 16mm Color Processor for Ektachrome film. Speed 30 FPM. **$16,400**

- **"FILMLINE OVERDRIVE FILM TRANSPORT SYSTEM"** This marvel of engineering completely eliminates film breakage, pulled perforations, scratches and operator error. The film can be deliberately stalled in the machine without film breakage or significant change of film footage in solutions. The heart of any film processor is the drive system. No other film drive system such as sprocket drive, bottom drive or simple clutch drives with floating lower assemblies can give you the performance capability of the unique Filmline Overdrive Film Transport System.
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- **"MATERIALS, CONSTRUCTION AND DESIGN"** All Filmline machines are constructed entirely of metal and tanks are type 316 stainless steel, heliarc welded to government specifications. The finest components available are used and rigid quality control standards are maintained.

Compare Filmline features to other processors costing more money. Feature-by-feature, a careful evaluation will convince you that Filmline offers you more for your investment.

Additional Features included in price of machine (Not as extras).

Magazine load, daylight operation ■ Feed-in time delay elevator (completely accessible) ■ Take-up time delay elevator (completely accessible) ■ Red brass bleach tank, shafts, etc. Prehardener solution filter ■ Precision Filmline Venturi air squeegee prior to drybox entry ■ Air vent on prehardener ■ Solid state variable speed D.C. drive main motor ■ Bottom drains and valves on all tanks ■ Extended development time up to two additional camera stops at 50 FPM ■ Pump recirculation of all eight solutions thru spray bars ■ Temperature is sensed in the recirculation line ■ All solutions temperature controlled, no chilled water required ■ Built-in air compressor ■ Captive bottom assemblies assure you constant footage in each solution ■ Change over from standard developing to extended developing can be accomplished in a matter of seconds ■ Impingement dryer allows shorter put through time.

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INTERPRETING THE FCC RULES & REGULATIONS

Protection of television stations by CATV systems–Section 74.1103

SECTION 74.1103 OF THE COMMISSION'S RULES (the so-called "nonduplication" or "program exclusivity" rules) provides that CATV systems shall maintain the program exclusivity of Principal City, Grade A, Grade B, and 100-watt translator signals, against signals of lower priority but not against signals of equal priority.

The rules further provide that the TV station must request protection from the CATV system; upon receipt of same, the CATV may request that the TV station provide eight days' prior notice as to the date and time of every program to be protected and of every program to be deleted.

The basic problem: notice

Not unexpectedly, CATV systems have taken the position frequently that the TV station(s) has failed to provide the notice required; in particular, CATVs have claimed that they have not received the date and time of program to be deleted. The basic problem, intentionally and unintentionally, is usually one of "communications"; the more frequent disagreements arise from lack of understanding between the parties. Therefore, what are the parties' obligations under Section 74.1103? Who has the burden of notice? How great is that burden, or what is adequate notice? A review of the Commission's purposes and the pertinent provisions of Section 74.1103 is warranted in order to answer these questions.

The purpose of the program exclusivity rules

In the *First Report and Order* in Docket No. 14895 and 15233 where the Commission was dealing with a 15-day nonduplication requirement, it stated (38 FCC at p. 734):

> . . . the searching out of duplicating programs in the schedules of competing stations can impose some burden on the CATV operator—especially with regard to syndicated and feature film programs, which may be scheduled in different markets on widely varying dates with little regular pattern, and particularly where it is required to protect more than one station. We think this task should properly be undertaken by the broadcaster requestion protection, i.e., that he should specify both the programs to be protected and the program against which he desires protection. For the most part this burden will be minimal—particularly in relation to regularly scheduled network programs. Where it is more than minimal, we think the broadcaster should bear it unless the CATV operator would prefer to do so himself . . . (Emphases supplied.)

In the *Second Report and Order*, the Commission further stated (2 FCC 2d at pp. 751-752):

> . . . we think that the broadcaster should afford the CATV sufficient advance notice of nonduplication requests to permit the CATV system to make its program schedule available to subscribers and to set an automatic switching device only once for the entire week. Accordingly, we shall amend Section 21.712(h), 74.1033(f), and 91.559(f) to require that the station, upon request of the CATV operator, shall give notice under these sections at least 8 days prior to the broadcast to be deleted. Since same-day nonduplication affects principally network programs, which are ordinarily presented at the same time each week during the network season, this amendment should pose no difficulty for the station. Indeed, in most instances it would appear that such notice could be given at the start of the network season and continued in effect until further notice occasioned by changes in the schedule of the network or the local station. (Emphases supplied.)

Thus, in both the *First Report* and the *Second Report*, the Commission has placed the primary burdens of notice upon the broadcaster. The provisions of Section 74.1103 are no less clear. A synopsis thereof follows.

Section 74.1103(e) (nonduplication in general) provides that the CATV system shall maintain the program exclusivity of all 100-W translators and Grade B or higher priority signals carried on the systems against signals of lower priority. CATVs cannot duplicate the programs of such stations on the same day as broadcast by the protected station.

The all-important Section 74.1103(f) (dealing with the notice required for nonduplication) provides, in pertinent part, as follows:

> (1) The television station must request nonduplication protection from the CATV system.
> (2) The CATV, in turn, may request that the TV station seeking protection provide:
> (a) Eight days prior notice of the date and time of every program to be protected; and
> (b) Eight days prior notice of the date and time of every program to be deleted.

In order to force the TV station to give eight days prior notice, the CATV—after the TV's initial request for protection—must provide a list of all TV stations it carries and indicate channel substitutions, if any. This places the burden of deter-

This section, providing broad interpretation of FCC rules and policies, does not substitute for competent legal counsel. Legal advice on any given problem is predicated on the particular facts of each case. Therefore, when specific problems arise, you would be well advised to consult your own legal counsel.

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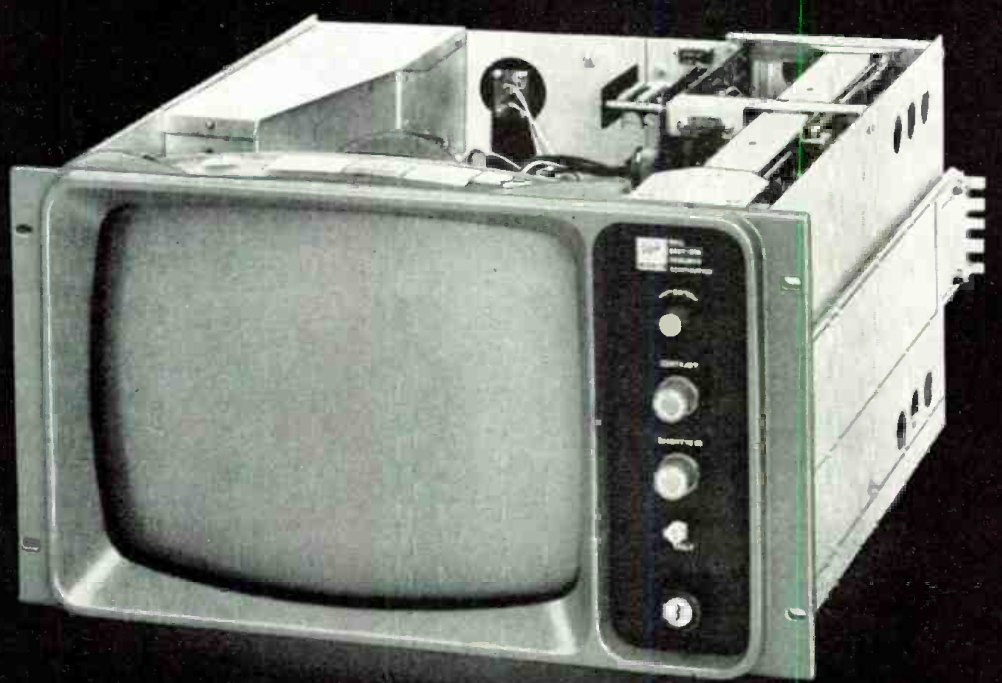

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the CATV operators what programs should be (1) protected and (2) deleted.

Several CATV operators viewed the foregoing case as a convenient vehicle to forestall and delay complying with nonduplication requests. If the TV station's notices did not contain very specific information dealing with every program to be protected and deleted, it took no action. Later in *Willmar*, the Commission decided that it would not abide such tactics.

Willmar Video case—Is a TV program schedule adequate notice?

(1) On March 7, 1968, the Commission, by its Decision (FCC 68-219) in Docket 17604, in *Willmar Video, Inc.*, ordered the latter to cease and desist its violations of 74.1103 and to provide protection to KCMT-TV, Alexandria, Minnesota. This was a hearing case; the facts follow.

(2) In October 1967, the Hearing Examiner issued his Initial Decision (FCC 670-53) finding that KCMT had given adequate notice and ordered Willmar to cease further violations. The Examiner noted KCMT had sent its program schedule with underscoring of the programs to be protected. The notice did not mark the programs to be deleted.

(3) Willmar appealed the Examiner's ruling and argued (for the first time) that KCMT's notice was deficient, because it failed to list the programs to be deleted. The Commission observed that KCMT's program schedule (underscoring programs to be protected) is sufficient notice of those to be deleted because the latter were all network shows and Willmar knew well the date and time of the shows to be deleted. The real reason for the Commission's harsh ruling here is that Willmar did not respond to KCMT's letters, did not ask for clarification of KCMT's notice, or otherwise show good faith. If Willmar had not been so totally uncooperative, the Commission might well have required KCMT to list the programs to be deleted by date and time and to list them separately from the programs to be protected. Why? The Courts might well reverse the FCC for failure to enforce its rule as written. The Commission's language sheds further light.

> In determining compliance with the notice requirements [of 74.1103], the dispositive issue is whether sufficient information has been furnished [by the TV to the CATV] to enable the CATV system to ascertain the program to be deleted without searching through the entire day's schedule of each station carried on the cable. (See Decision, para. 7.)
>
> At no time did Willmar Video request clarification of the notice or give the slightest indication that additional information was necessary or desired.
>
> The CATV system may not be permitted to excuse noncompliance on the ground of a claimed deficiency in the information unless it comes forward with some evidence that a deficiency did, in fact, exist, or that the information was erroneous. (See Decision, para. 8; see also Channel 9 Syracuse, Inc., U.S. App. D.C., case no. 20,843.)

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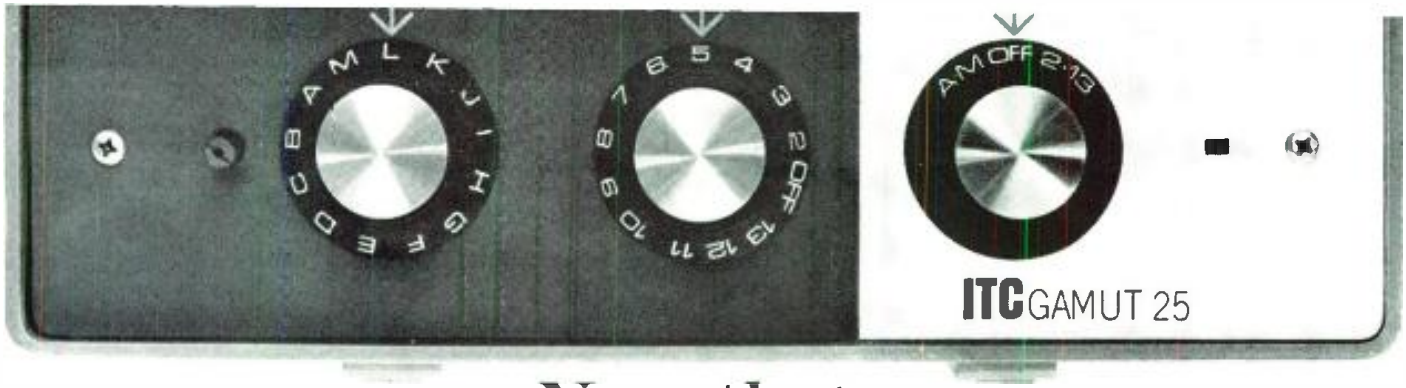
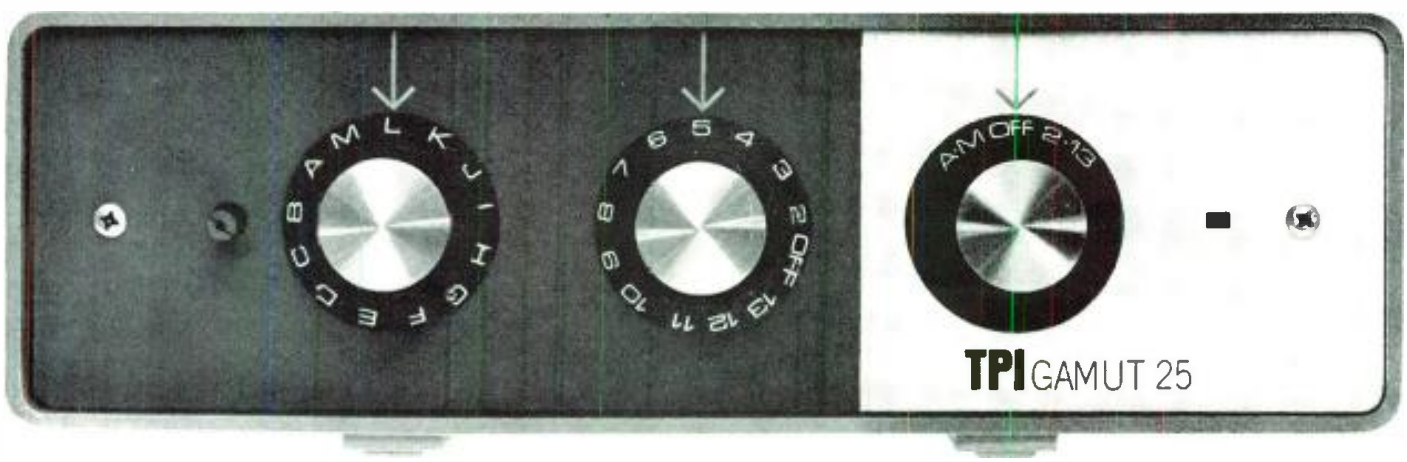


Now that we've made a name for ourselves,

we've gone and changed it.



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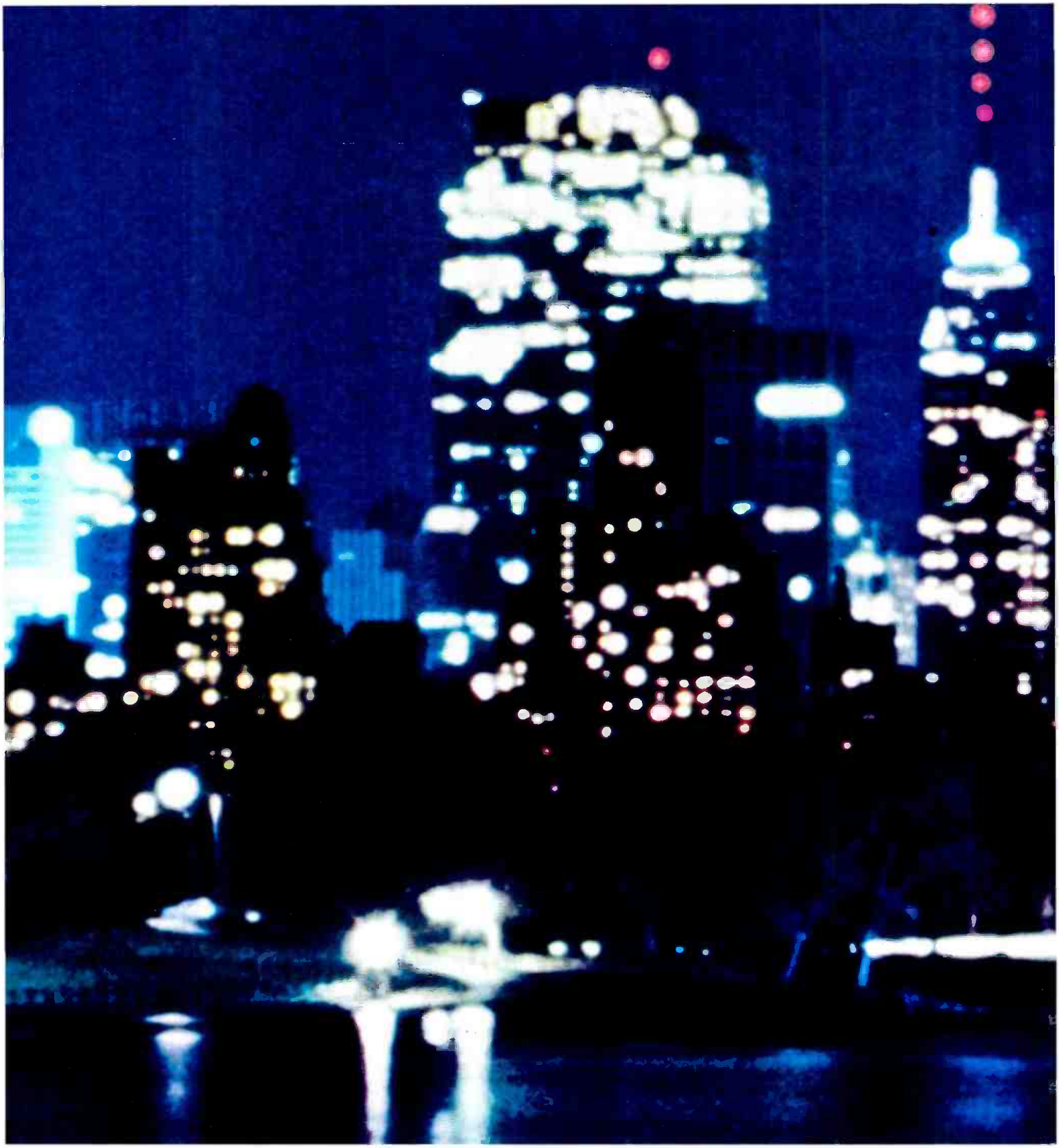

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mining and listing programs to be protected and deleted upon the TV station seeking protection. Technically, all CATV systems should be prepared by now to provide this protection upon request; that is, they should have the "switching" equipment installed and operable. It should be emphasized that, contrary to the rules proposed in April 1965, only "same day" protection need be afforded; that is, the CATV may provide programming, duplicative of the local stations, any day prior or subsequent to the day of its telecast by the latter.

Section 74.1103 (g) (exceptions to nonduplication rule) provides that the CATV system need not delete a program *if*:

> (1) In so doing, it would leave available to subscribers less than two network programs;
> (2) It is offered by the network in prime time (6:00 P.M. to 11:00 P.M., Eastern time) and is broadcast by the station requesting deletion, in whole or in part, outside of what is locally considered prime time;
> (3) The time of presentation is of special significance (e.g., a speech), only simultaneous nonduplication protection need be afforded;
> (4) It is offered in color but will be broadcast in black and white by the station seeking protection.

The provisions of the Rules, the *First Report* and *Second Report* seem clear. First, the TV station must request protection; second, the CATV must cooperate and give a list of the TV signals it carries; and, third, the TV station has the burden of giving the CATV a list of the programs (1) to be protected and (2) to be deleted. The problem: Many CATVs claim that they have never been given a proper list (under 74.1103(f)) of the programs to be deleted; thus, some CATVs have refused to comply and complaints have been filed with the FCC. The question: What form of notice, as to programs to be deleted, is required of the TV station?

Analysis of Cases Concerning Notice Buckeye Case

There have been numerous cases interpreting Section 74.1103 of the Rules; most of the cases concerning interpretation of the "notice" provisions (74.1103 (f)) have dealt with other provisions of Section 74.1103 as well. For example, *Buckeye Cablevision, Inc.*, 11 RR 2d 668 (1967), concerned a general request for waiver of the nonduplication (Section 74.1103) provisions of the Rules. While ruling against the request, the Commission found also that the advance schedule, submitted by the TV station to Buckeye, was sufficient of the programs to be protected but in some instances was inadequate notice of the programs to be deleted. The Commission noted that any deficiencies on the part of the TV station's notice would alleviate the CATV's responsibility to protect. In other words, the Commission placed the TV industry on notice; it would require the 74.1103 "notices" to be specific enough to show

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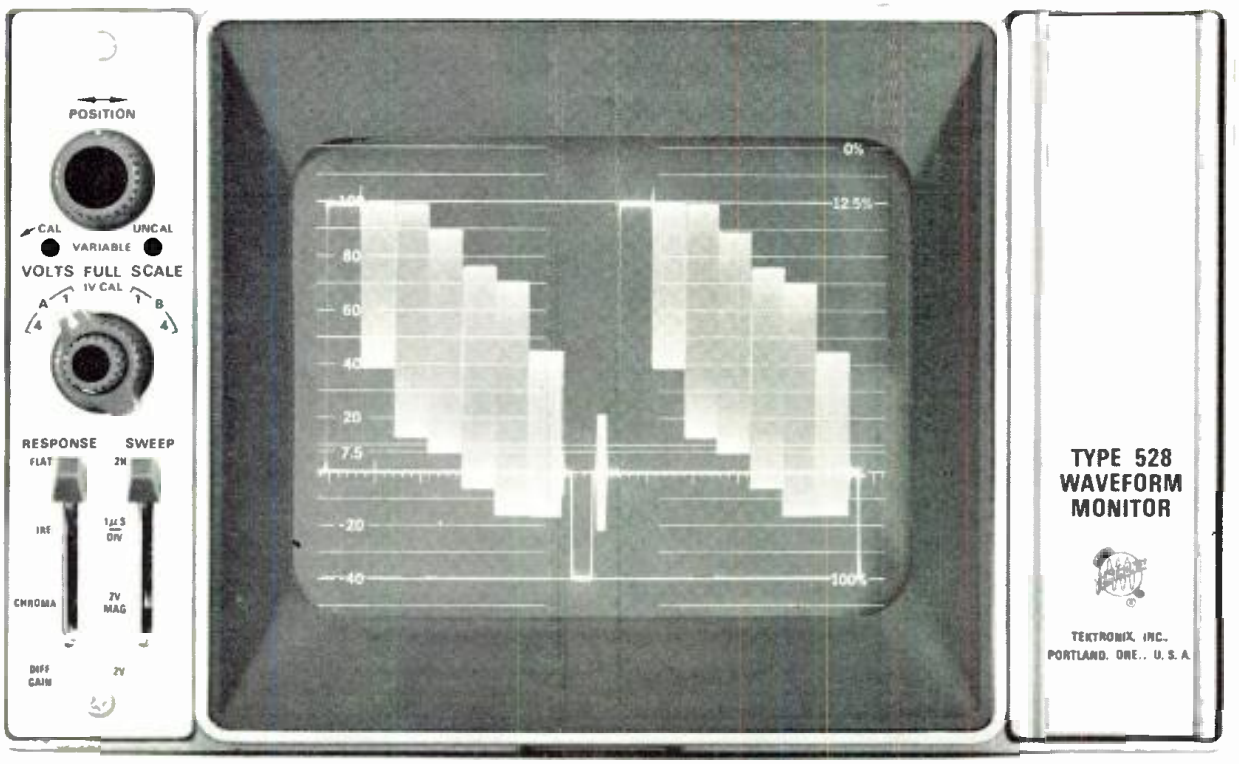

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Neither in hearing nor pleadings did Willmar offer any of the above; moreover, Willmar was chronically silent.

(4) On November 8, 1968, the Commission issued a further Order (FCC 68-1090) in this case. It seems that, between its March Decision and November 1968, Willmar failed to comply. In the November 1968 Order, the Commission buttressed its March Decision as follows: (a) the Commission conceded that "KCMT did not at all times fully discharge its responsibility" since KCMT frequently failed to state "the time" of the programs to be deleted—thus, the Commission indirectly conceded that the mere provision of its program schedule without clearly marking the time of shows to be deleted may be inadequate notice; (b) the Commission noted that, on September 20, 1968, long after the March Decision, KCMT gave a new notice listing, in two columns, the date and time of programs to be protected and to be deleted.

Thus, after two years of pleadings and hearings, The Commission has redefined its original position in this case and issued an Order which could withstand appeal to Court. In sum, the Commission has said:

> Whatever the form of the notice, it must give the date and time of the programs to be protected and to be deleted; and.
>
> CATVs must evidence some good faith, not ignore requests for protection, ask for clarification where needed, and the like.

It seems clear, under the rules as written, a CATV system can still demand real specificity of notice. It appears that:

(1) provision of the TV station's program schedule, properly marked, is adequate notice of the programs to be protected, but

(2) somewhere on the said schedule or attached thereto, the TV station must give a list of the times of the programs to be deleted. (Naturally, the CATV should give the TV a list of the stations it carries.) Conduct (or silence) like Willmar's is not recommended. If the notice seems inadequate, the CATV should communicate such fact to the TV and ask for clarification. The CATV can make the TV be specific. If the TV fails to do so, the CATV can stand on its rights for a list "of the date and time" of the programs to be protected and deleted. Either the Commission or the Court will vindicate the CATV. If the CATV has evidenced good faith, it need not fear. Willmar did not. Thus, even though KCMT's notice originally was inadequate, the Commission held against the CATV; Willmar did not go to Court; KCMT subsequently gave a proper notice, and the Commission issued a legally buttressed opinion a month thereafter.

In brief, the CATV should require the TV to give specific notice and keep asking (in writing) for some until it is given. If in doubt, consult competent legal counsel. **BM/E**

R. C. Etheridge ..WMEL, Pensacola, Florida

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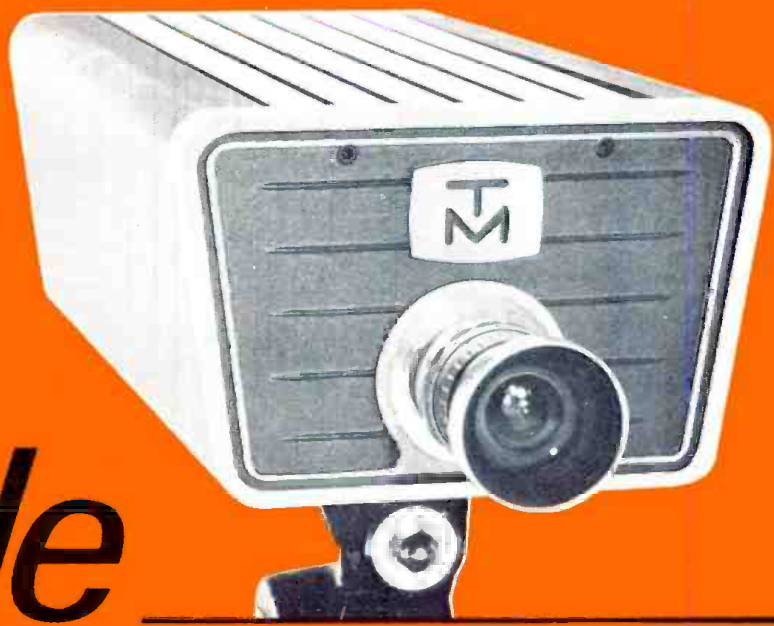

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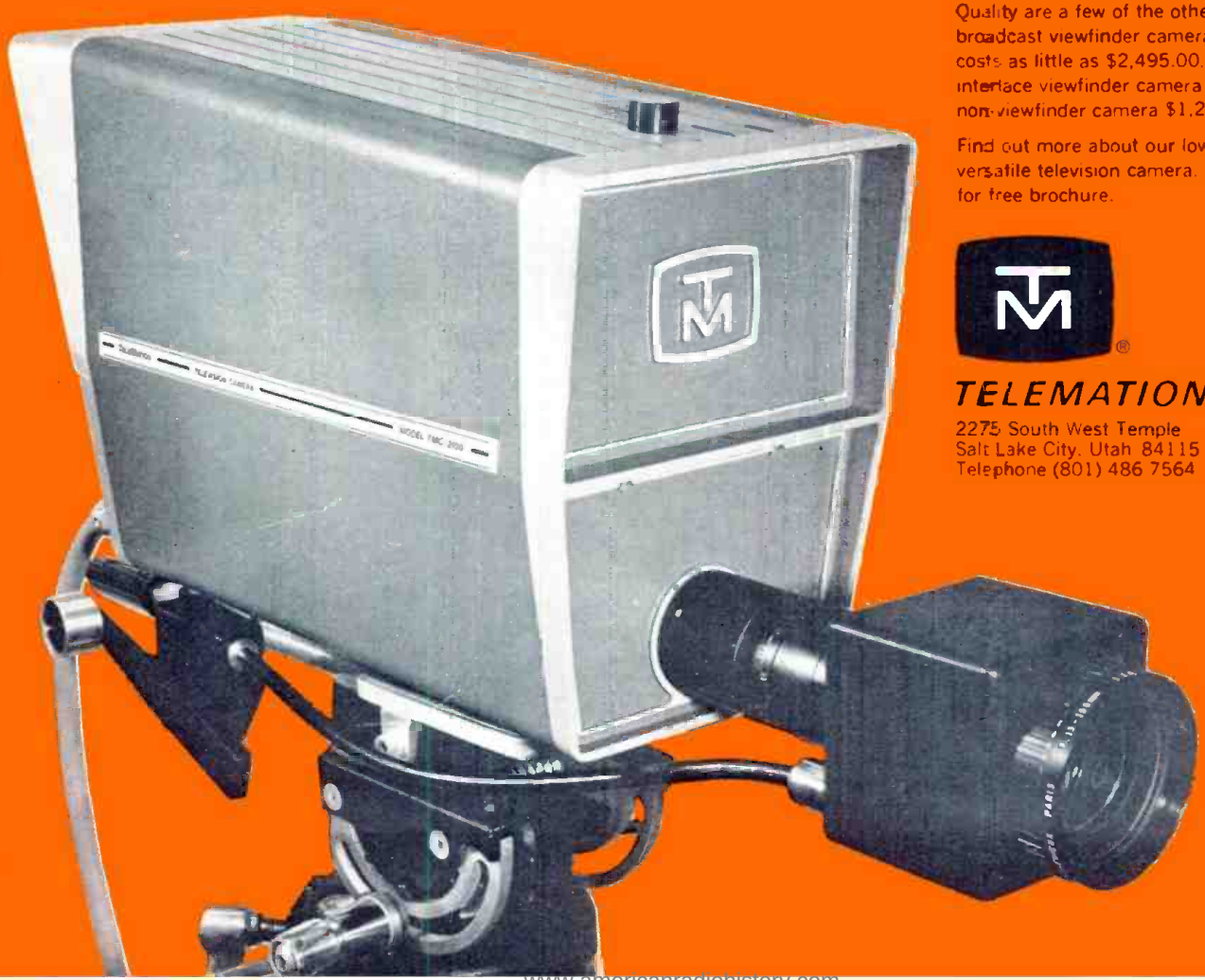

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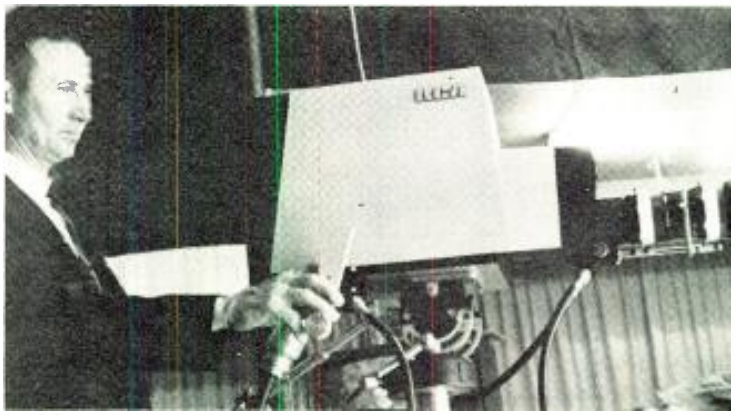
NAEB—Showcase And Forum for Educators



BM/E Photo

Single-vidicon color camera by RCA has 250-line resolution.

HOW TO GET MONEY and how to spend it took up most of the time of NAEB Convention goers. To be sure, ubiquitous placards announcing the fifth freedom managed to keep the theme, freedom from ignorance, supraliminal but finance was the consuming topic.

Money matters started with the 9:30 A.M. keynote address by McGeorge Bundy, president, Ford Foundation, and were stressed again at lunch by Nicholas Johnson, FCC Commissioner. The following day the U.S. Office of Education explained at separate radio and TV sessions the ground rules for allocating its $4-million to new and old applicants (seventy-three old applicants are already on file with requests for $33-million). Ford's TV program coordinator, Davis David, reflected on the foundation's ETV support program and the Corporation for Public Broadcasting revealed its general thinking about spending its initial seed money of $5-million.

Later, a panel of station experts devoted an afternoon to fund-raising techniques which included support from viewers, support from foundations and corporations and special fund raising events. The Council for State Educational Telecommunications Authorities (CSETA) were told by Donald Taverner, WQED, Pittsburgh, Pa., how to get state, and local government support. Robbing a bank was the only avenue not explored.

Other than Money

Not everything was money. Many sessions labeled "Utilization of . . ." dealt with evaluation of programming and equipment. Techniques for serving ghetto schools and communities were explored in depth. A resolution calling on NAEB members "to initiate action leading to additional programming that will significantly meet the needs of Black Americans" was passed at the annual business meeting.

There was no shortage of ways to spend money at the convention. The exhibit floor showed thousands of hardware exhibits (see exhibits).

Hard reappraisal of instructional technology on the closing day revealed that most use of TV in schools falls far short of its potential in improving quality or reducing cost of instruction.

Other highlights included:

- A speech by HEW Secretary Wilbur Cohen in which he called much of current commercial TV and radio "pure unadulterated trash" and cited social inequality and discrimination as the most crucial domestic problem. Cohen asked the communicators to respond to inequality and six other vital national issues: poverty, the future of education, inadequate health care, the poor quality of our environment, and the communications gap between races, the young and the old, and the poor and the well-to-do.
- Emphasis on hiring more personnel from minority groups.
- Need for some good public relations drives to improve the image of educational television.
- Need for public broadcasting to

BM/E Photo

Norelco color stage featured pretty teachers, Little Shaver camera and other gear.

← Circle 18 on Reader Service Card

play a valuable role in the political process at all levels of government (Bundy). Public broadcasting "was absent without leave" during the recent presidential campaign said Bob Squire, past director of television for the Democratic National Committee. (Among the exceptions was KCTS-TV Seattle which ran a telecourse on local issues.)

- Awards by Visual Electronics ($1000 to an outstanding student, Zbigniew Koryzma) and *Reader's Digest* (six $1000 awards for outstanding programming) to KVIS, Sacramento; WITF, Hershey; KQED, San Francisco; KETC, St. Louis; WENH, Durham, N.H., KUON, Lincoln, Nebr.
- Election of Dr. George Bair, education director of the South Carolina Educational Television Commission to chairman of the Executive Board of Directors, NAEB.

Dividing Small Funds Adds Problems

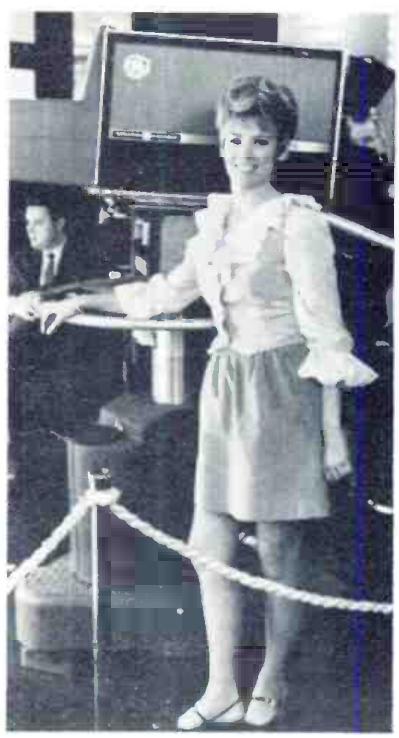
The hiatus in funds between the end of one federal program and the commencement of its successor has complicated the grant making process. No longer can applications be processed as received since the backlog exceeds the new supply of money. Congress authorized $12.5-million for the current year but appropriated only $84.375-million (of which $375,000 will be used for administration). To help establish priorities in making grants the U.S. Office of Education has appointed 13 consultants. Further, since the new statutory limit per state is 8.5 percent of the annual appropriation (or $340,000 per state), the Office of Education will consult with State educational television and radio agencies. Thus many opinions will influence how grants are made.

New application forms for grants under the current authorization should have been in the hands of those seeking funds by December 30th of last year, according to Ray Stanley of HEW.

Although the recent emphasis of Ford and CPB has been on establishing a national network for public broadcasting (at reduced

BM/E Photos

(Left, top to bottom) Sylvania stage showed off mono cameras and consoles, color receivers. Visual unveiled new color camera, to be demonstrated at NAB. Portable mono camera and shoulder-harness VTR were new Shibaden entries. Spinning color filter with pickup tube of exceptional sensitivity were features of new CBS Labs camera.



(Above, top to bottom) Streamlined mono camera from Raytheon is operated by streamlined model. Standard TV color cameras focused on gals in G.E. color studio. New mono camera is from Norelco.

AT&T rates which will begin this month), both Ford and CPB will make grants to individual stations. Ford currently is supporting programming work at some 17 stations and networks, and announced last October a second phase program of $5-million for 1969. The largest amount available to a single station in a major city or to a regional net is $750,000. State networks are eligible for $250,000 grants. Only series programs are eligible (six, one-hour or ten half-hour efforts). The awards will be made March 12, according to Davis.

CPB will entertain proposals from individual stations for general program grants of up to $10,000 per station. Similar grants are available to each of the six regional educational networks.

With three Santas to address, all in roughly the same time slot, it has indeed been a season for proposalmanship. Although there were no formal sessions on this at the NAEB, plenty of private advice was exchanged.

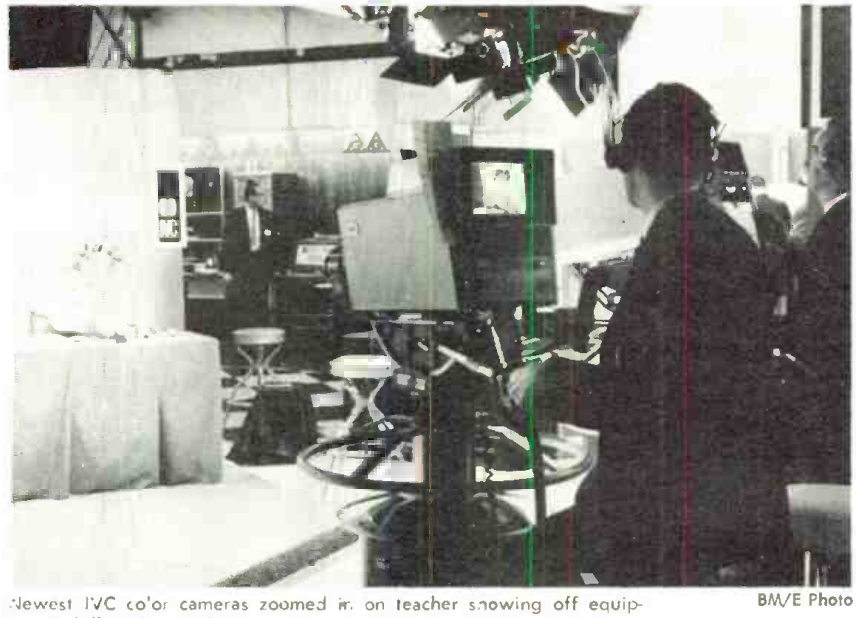
Advice offered

Bundy in his keynote address stressed the need for two national public networks (electronic turnpikes), more regional and statewide networks and more quality production centers (rather than the one NET center).

Interconnection possibilities for national and regional program will change the programming schedules of local ETV outlets. Local stations, while supporting the interconnection idea, are mindful and a little apprehensive that funds for interconnection will not be available for local programming. This caused no small amount of small talk in the hallways and across luncheon tables.

Nicholas Johnson stressed that a philosophy will have to be developed to balance allocation of CPB monies between local and national production efforts. Johnson favored user fees as a source of CPB revenue rather than general tax funds or special taxes.

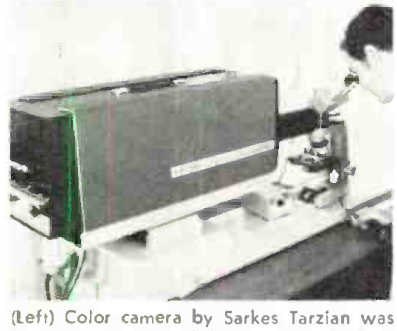
Ideas for raising local funds raised in the panel session included from private sources the studio pass, subscription to program guides, voting privileges and a travel program. Underwriting specific programs by banks, savings companies, insurance companies and utilities is a distant possibility. Good station-sponsor relations can result if stations offer sponsors



Newest IVC color cameras zoomed in on teacher showing off equipment's full studio capabilities. BM/E Photo

Lightweight Ampex BC-210 cameras fleshed out large and variegated exhibit area covering many aspects of color production. BM/E Photo

BM/E Photos



(Left) Color camera by Sarkes Tarzian was in constant use. (Above, top) Bell & Howell teacher shows how to use color gear for education. (Above) Another Bell & Howell camera focuses on microscope image.

BM/E Photos

(Top to bottom) Microscope field is subject for this GPL closed-circuit camera. Panorama of mono cameras and receivers was engaging exhibit by Packard-Bell. New mono camera capabilities were shown off by Panasonic. New control console by TeleMation handled cameras zoomed in on model electric train layout.

Microscope TV camera adapter by GBC shows off their CCTV camera's capabilities.

MTI's rugged camera/microscope features jitter-free performance.

help in their internal instructional or training programs. Among special fund raising events, the auction in which local merchants contribute products for sale over-the-air is popular.

Stimulating Dull TV

Videotapes and films of many exciting individual programs were played for the stimulation and approbation of convention goers (ghetto programming, black programming, game simulation). One session tried to evaluate use of total instructional technology. Somber conclusion was that instructional technology has largely failed to measure up. Dr. William Paisley, director of ERIC, Institute for Communications Research, Stanford University, in recapping some four-hundred evaluation reports, reminded the convention that while in general, ITV instruction has been as good as a classroom teacher, it has been no better. Two-way feedback between teacher and pupil is a vital weakness despite pretesting of programs.

No real measure of actual classroom use of ITV is being made, and Dr. William Lybrand of American University suspects it is lower than generally considered because of poor program quality. Team teaching (classroom teacher plus TV teacher) is a farce if the classroom teacher has to be primarily a disciplinarian to keep the students from cutting up in front of the "talking face on the boob tube."

Cottage-type productions have to go, Lybrand predicted. Availability of superior programs forces new roles on the superintendent, principals and teachers. Since central distribution within a district is a necessity, superintendents rather than principals will have to be in charge of scheduling. Improvement of quality requires new understanding between the studio teacher and the classroom teacher; the producer and the educator. Most strategies of involvement to get needed cooperation have failed so far, said Lybrand. If the school board insists on a verifiable return on investment, problems are further magnified.

One obvious national need is for more individual prescribed instruction said Dr. Andrew Molnar of HEW, which some teachers resist. They would rather provide information in a classroom situation than direct students to materials available from resource centers. A necessary step for progress toward wider acceptance of instructional systems is to imbue teachers with a new set of values, i.e., tradeoff security provided by autonomy in classrooms for less drudgery in detail which is possible with systems.

Dr. George Hall of NAEB at an earlier session described the problem as "freeing teachers for adaptive and reinforcement pursuits." Can teachers be encouraged to accept the goal of directing self-study in exchange for a reduced responsibility in determining content? Hall said the book as a mediating help threatened the lecturer in the 13th Century. The book is now accepted, why not TV mediation, he asked.

Technical Sessions Respond to Needs

Stanford University is doing pioneering work in the field of ITFS talkback. With the technology developed and an application pending with FCC, SU has a radio talkback system ready to go any time the commission gives the word.

Presenting a paper entitled "The Stanford University Proposal for ITFS Talkback Channels" at NAEB, A1 Morris, chief engineer of Genesys Systems, stated the case for radio talkback. He said

Continued on page 33

ONE MAN; ONE CAMERA, THE IVC-100 ☐ Internet Television Productions, Inc. of Laguna Beach, California in association with San Clemente Cable TV Co. and Leisure World (a Rossmoor development) desired to produce live pick-up of the San Clemente Surf Club Competition, the Hollywood Hackers Golf Tournament, plus an award banquet for later cablecast to 15,000 Southern California homes. ☐ Problem? You bet. ☐ This meant surf, turf and filet mignon—lighting conditions from one extreme to the other—fixed and remote camera positioning—indoor, outdoor and studio locations. ☐ The IVC-100 color camera and IVC-800 video tape recorder was the only system that could do the job and deliver top-notch color fidelity and registration at realistic costs. ☐ In three days of bouncing from truck-to-turf, not a single operating adjustment had to be made by the lone operator. Now, this same performance is in pocketbook range of every cablecaster, large and small. See the reverse side for details on the IVC-100 color camera and IVC-800 video tape recorder.

IVC
International Video Corporation

SURF...TURF...AND FILET MIGNON

IVC's INNOVATIONAL DESIGN BRINGS THE VIDICON TO LIFE IN THE IVC-100 COLOR CAMERA.

New design ideas in optics and electronic design have maximized performance. Reduced "lag", high stability, and better registration are the result. The IVC-100 with built-in sync generator and encoder is transportable (one man); easy to maintain and set up. It can be used for remote taping, multiple camera pick-up and film chain functions with proper options. Price—$14,000.

IVC's DESIGN ECONOMY MAKES IVC-800 SERIES RECORDERS THE ONLY SELF-CONTAINED, PORTABLE VTR's THAT EDIT IN COLOR.

Frugal design engineering by IVC not only cuts cost but delivers more equipment capability for the investment. The IVC-800's built-in electronic editing feature, for instance, contributes to operating efficiency without affecting compactness, mobility and versatility. The IVC 1" format allows an hour of recording time on a small 8" NAB reel tape—30% less tape is used at an average savings of $15 an hour. The IVC-800 reproduces high-resolution NTSC-type color pictures, or, wideband monochrome pictures with bandwidth exceeding 5MHz. Stop motion is standard. Slow motion is optional. Price—$4,200 to $6,200 depending on options.

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2200 East Devon Avenue,
Des Plaines,
Illinois 60018
Phone (312) 297-5160

New switcher from Grass Valley handles and previews variety of program sources.

that although it couldn't be proven that students in grade and high schools learn better with talkback systems, it was absolutely vital on college level. [*Editors Note:* Experts at other sessions viewed talkback as desirable.]

Morris informed those attending that although 70 talkback systems are now in use, the Stanford system is the first ITFS radio talkback system. Stanford rejected the use of telephone lines mainly on the basis of cost, and additionally, radio circuits provide double the frequency response—10 kHz. Cost analysis shows that the radio system will save $18,700 over a period of ten years as compared with the cost of telephone circuits. Video talkback has been shown to be educationally of little or no value, and has technical kinks because of a lack of channels.

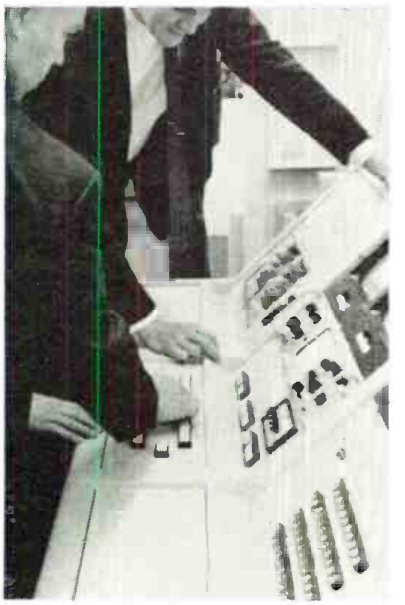
The Stanford proposal incorporates the use of 3 of the 4 MHz spectrum space presently unused at the top of the ITFS band. The proposal would provide talkback channels for each of the 32 video channels and a 1-MHz separation between video and talkback channels. Stanford's test system has shown that an omnidirectional transmitting antenna radiates a signal with a 22-dB signal-to-noise ratio at a distance of 16 miles; 10-ft dish antennas show the same noise ratio at 40 miles. The FCC has indicated that type approval will be required for all equipment intended for ITFS talkback.

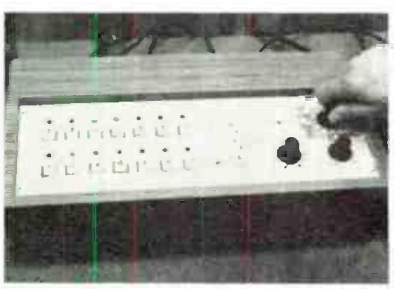
ITFS channel crowding in the Los Angeles area has introduced the use of a computer to sort out transmitter location and interference for ITFS co-channel operation. A study of the problem by Hammett & Edison, consultants, of San Francisco also investigated methods of antenna placement for minimum co-channel interference.

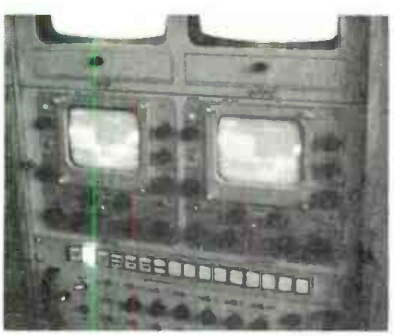
One-hundred-fifty school districts conducting 200 courses in the Los Angeles area are now us-

Central Dynamics' effects generators and proc amplifiers were able to produce psychedelic effects to order.

(Above, top to bottom) Alma Engineering had a new effects board in operation. Effects in a suitcase composed a new idea shown by Diamond Power. Ball Brothers displayed a new helical converter in a rack mount.

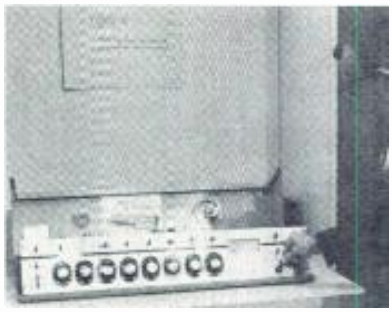


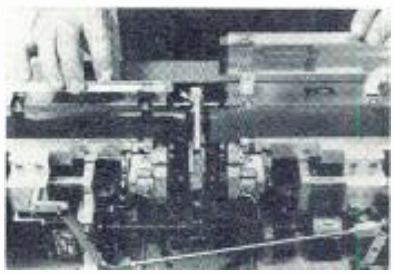


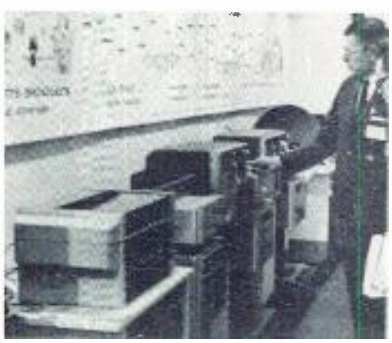


BM/E Photos

(Above, top to bottom) Dynair entered the large-scale effects field with this streamlined board. Telemet's new audio distribution amplifier bowed at the convention. Ward Video displayed a compact, simplified effects generator and switcher. Video processor from Vital Industries sharpens up sloppy NTSC signals from helical VTR as shown in unprocessed signal at left, and processed one in right scope.







BM/E Photos

(Top to bottom) New audio console, the Yard II from Gates Radio, has 12 inputs and 8 mixing channels. Shibaden's automatic tape splicing machine does everything for quad tapes except lick the postage stamps. Solid-State heterodyne system model MA-2H was shown by Microwave Associates. Another heterodyne repeater system, the SRH-2, was shown by Jerrold, is especially suitable for 2.5 GHz ITFS systems Mark IV 16mm color film processor was shown by Jamieson Film Co.

ing 30 channels assigned by the FCC. The study, conducted by L. Templeton, revealed that there is a need for a minimum of 4 channels per district, or 600 channels. Thus, the 30 channels currently available are serving only 5 percent of the need.

Templeton presented methods of minimizing the shortage of spectrum space by experimenting with antenna orientation and by writing a computer program for tracking down all possible interference from ITFS or other 2500-MHz sources.

The study revealed that a 50:1 separation ratio was needed to give the required 55-dB signal-to-noise ratio for effective operation with omnidirectional transmitting antennas. After experimenting with the positioning of transmitting antennas in the centers of the school districts and in a back-to-back configurations, Templeton found that side-to-side orientation provided by far the best signal-to-noise ratio. This was achieved by positioning the antennas the widest possible distance apart and catty-cornered along the common border of neighboring school districts. The side-to-side configuration provides signal-to-noise ratios of 20 dB for the transmitted signal, 30 dB for the received signal and an additional 10 dB through cross-polarization, for a total of 60 dB—5 dB in excess of the 55-dB requirement.

The computer program was put into action to sort all possible signal sources with respect to each receiver. When the computer detected possible interference a printout was produced containing interference strength and vector for each receiver. The computer required cards to be prepared containing location, service, signal-to-noise ratio, azimuth-gain pair, etc. of all transmitters in the Los Angeles area that could possibly interfere with ITFS transmission in the area.

Templeton's conclusion is that there is presently no order in ITFS channel assignment procedures. He feels that the FCC should require each applicant to find out what the interference situation is in his own area before granting the use of an ITFS channel. He thinks that the current crowding on ITFS bands both on the east and west coasts points up the need for increased efficiency in their use and that additional rulemaking requiring ITFS applicants to inform the FCC of the extent of channel saturation before considering applications. Templeton also thinks that the use of translators may ease ITFS channel congestion.

"In what ways can a sound-only medium communicate better than a sight and sound medium?" That's the question Karl Schmidt posed at NAEB's session on "New Developments In Instructional Radio."

Schmidt maintains that radio is better on at least two counts:

- **Cost.** Radio costs 0.5 to 0.1 what TV costs. As associate director for radio at the University Wisconsin, Schmidt reports that their cost of equipping 9 stations with SCA was $54,000. The UW setup includes telephone talkback, with 118 telephone drops. The cost for the talkback circuits has been $60,000 over a period of 9 months.
- **Mobility.** Schmidt maintains that radio seems to be better where creative response is required in the listener. People can work and listen while using their imaginations.

He is enthusiastic about the results of the University of Wisconsin program and advocates the use of SCA channels coupled with talkback provisions. He cites transient crosstalk from the main fm channel and the need for "supercritical" placement and tuning of receivers and antennas as major problems.

Illustrating the ability of production to reduce costs, Schmidt stated that two years ago the cost of an SCA receiver ranged from $125 to about $300. He now obtains his receivers from Janzak of Stamford, Conn. for $20 to $25.

Satellite interconnection is here and it's economically feasible. That's the informed opinion of Edmund Pease, director of systems Research, Foundation for Advanced Communication for Education. Pease states that one hour of satellite should soon be available for $10.

Citing studies and recommendations by Philco-Ford, GE and Hughes-Ford, Pease revealed some interesting facts about the myriad of variables involved with satellite systems. The Philco-Ford study concerned itself with determining the best methods of getting satellite transmissions to individual school buildings. Three methods emerged: 1) direct broadcast from satellite to building, 2) a limited broadcast system and 3) rebroadcast from central distribution center. The study revealed that the best bargain for the public is the rebroadcast method. Direct broad-

cast to the individual school building is possible but it's the most expensive way of getting satellite signal to school building. The limited broadcast method represents a compromise in cost between the extremes of rebroadcast and direct reception.

The GE study consisted of a computer program for sorting out variables of beamwidth comparisons. Large directional satellite antennas mean limited ground service areas, small ground antennas and small power requirements in the satellite. Making the satellite antenna smaller and omnidirectional increases the satellite power requirements, enlarges the ground service area and increases the size of the ground antenna.

Hughes-Ford makes specific recommendations as to size of antenna and probable cost. The Hughes-Ford study also revealed that there are only certain frequency windows open for satellite operation because of atmospheric absorption. Estimates of cost range from $1000 for a 10-ft ETV antenna to a high of $150,000 30-ft dish. Hughes recommends the use of a 30-ft antenna and draws the line at 10 ft for the absolute minimum size ETV antenna since small receiving antennas on the ground increase intersatellite interference or the effect of orbital crowding.

Pease stated that a few thousand hours of satellite interconnection a year now are economically possible for ETV stations. He pegs the total satellite reception system cost at $25,000 to $30,000. (See *BM/E*, March, 1968, page 35 for more information on satellite transmission.)

Pease implores ETVers to make the FCC aware of their satellite needs now because channel assignments soon will become critical.

NAEB Products In the Spotlight

IT WAS A HAPPY convention, as educators from the U.S. and abroad gathered to let their hair down and talk earthy nuts-and-bolts about the latest in educational technology. And there was plenty to see on the exhibit floor as manufacturers pulled out the stops to show off their latest and best, and very often, their experimental gear.

There were some 80 exhibitors on the Sheraton-Park's show floor, and their wares were ogled by more than 5000 visitors—most from out-of-town. The Sheraton was bulging at the seams with conventioneers, as were most other Washington hotels within the radius of a 10-minute taxi ride.

Cameras Prominent

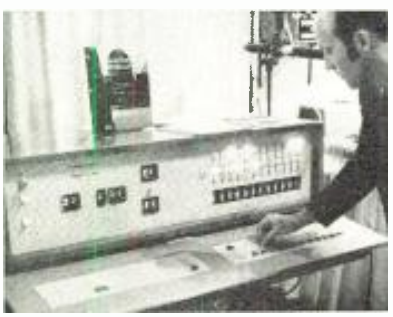
Once on the show floor, the visitor was treated to a variety of color equipment rivaled only by the NAB Show. There were full-scale broadcast cameras in all price ranges. Norelco and GE showed their standard lines. IVC unveiled a couple of new versions of its camera, and RCA showed its own 3-vidicon film chain plus a one-vidicon camera that took the convention by surprise.

Using a system of striped color filters similar to that described in the June, 1968 *BM/E* (p. 42), the single-vidicon RCA PK-701 is tagged at $6500, while its larger studio version, the PK-730, is slated to sell for $9850. Because of the system of filter stripes used in the red and blue channels, these new cameras have resolution of 250 lines—not broadcast quality, but more than ample for many CCTV and ITV applications. RCA expects to start deliveries toward the end of the year.

Also new in economy color cameras is the IVC-200, a scaled-up version of IVC's well-known three-vidicon studio camera. Tagged at $18,500, this broadcast quality camera has a number of extra features including a much larger electronic viewfinder than its predecessors. Standard equipment is a Rank Taylor Hobson Varotal 10:1 lens with local or remote servo-driven iris.

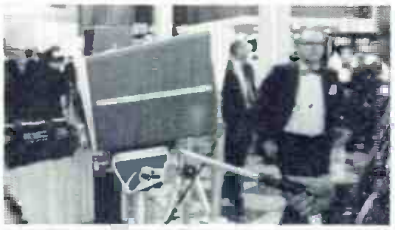
Field-Sequential Bows Again

A potentially low-cost color camera aimed primarily at the medical TV market is a field-sequential system from CBS Laboratories. The prototype camera, complete with spinning color wheel, weighs in at a miniscule 10 pounds and has incredible color sensitivity



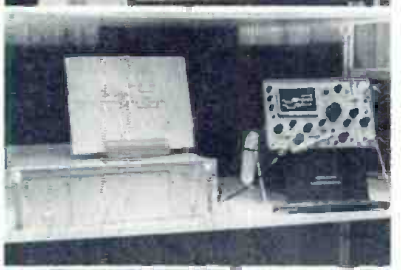
BM/E Photos

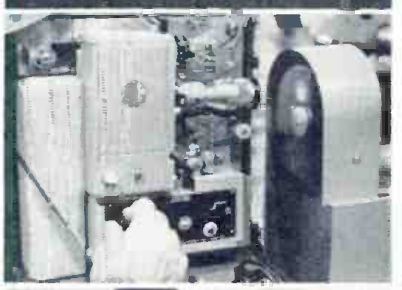
(Top to bottom) "Anti-gravity" device from ColorTran adds telescoping height flexibility to any studio lighting unit. Bardwell-Macalister showed line of quality lighting systems. Memo-Q lighting control board from Century Lighting provides automation in the studio. Kliegl showed lighting kit in a suitcase.



BM/E Photos

(Above, top to bottom) New Samson "camlink" pan head from Quick-Set is springless camera head mount. Davis & Sanford tripod and head feature full-size camera support at budget price. Slot antenna for ITFS and translators was displayed by EMCEE. Movie/TV sync control was exhibited by Kalart. Line of TV cable connectors was shown by Boston Insulated Wire.





(Above, top to bottom) Frequency standard master by Tracor can sync studio and remote TV gear. Tele-Cine's "Tele-Tec videotape editing programmer has single-frame accuracy. On display in Grass Valley booth, Andersen Labs device compensates for delay caused by studio in loop. Movie-to-TV camera sync unit was shown by Eastman Kodak. Super-size film reels are feature of projector exhibited by Technical Materiel Corp.

at extremely low light levels. The camera has been tentatively dubbed the "Starlight" TV, and the monitor must be a modified monochrome set with a rotating color wheel in front of the screen. CBS is talking seriously about using this camera along with a bioscope for fiber-optic views of the interior of the patient's body. While NTSC conversion circuitry hasn't been announced for this equipment, presumably CBS is working along those lines for the future. Camera price information hasn't been announced.

Also on prominent display was Visual's new color camera entry—a broadcast-quality camera using three Plumbicons. It was displayed but not demonstrated; there are a few minor engineering changes still to be made, and the camera will be demonstrated at NAB.

A variety of videotape equipment was in constant use—representing virtually all price scales—from about $1000 up. Helical formats were predominant, since this is the major format used in ITV. The helical machine is so prevalent among ETV users, in fact, that an entire technical session was devoted to user results. While this meeting divulged no great surprises, a large number of users polled used higher priced helical recorders in preference to the low-cost budget machines.

Among some of the other brand-new products shown for the first time were these:

- a monochrome version of GE's light valve large screen TV projection system
- lead-oxide vidicons from GE
- a zero studio delay system by Anderson Laboratories
- hetrodyne repeaters from Jerrold for relaying 2500 mHz
- a carrel system from Jerrold capable of receiving 30 rf channels via a single coaxial cable
- a mechanical tape editor and thumbwheel dial access system from Shibaden (plus numerous VTRs shown for the first time)
- a video hard copy printer from Visual
- a new adjustable lighting fixture from Colortran

There was something on the exhibit floor for everyone—low-cost equipment, high-priced gear, total systems, turnkey operations, consultants, engineering services. In front of the Sheraton-Park, mobile vans by Sylvania and Ampex added a note of versatility to ETV system capabilities. Some of the convention's standout features are highlighted on these pages. **BM/E**

The BC-210 is a streamlined, compact package.

Compact Studio Camera Simplifies Colorization

Even a wispy secretary can haul the ultra-thin cable for this two-tube camera—the studio version of the portable BC-100 which has already had a rigorous baptism of fire. The camera head is small and light enough for easy mobility, and it's tagged about 1/3 lower than conventional color cameras. Is this the harbinger of the future?

BROADCAST COLOR CAMERAS must produce an adequate luminance image for good monochrome compatibility along with accurate color information reproduction in the image for color viewers. Conventional cameras do this by using four image tubes, one of them providing the luminance channel.

A new approach to this problem is to take advantage of modern field-storage devices to minimize the complexity of the chrominance signals needed to form the composite color signal. The two-tube BC-210 uses one Plumbicon tube as a full-bandwith luminance channel and a second Plumbicon as the alternate red/blue field channel. The sequencing of the fields is done mechanically through a rotating filter synchronized to the vertical rate. The alternate red/blue fields are channeled through a field delay device. The combination of the delayed path and the direct path produce the full red/blue information for each field. The green signal is obtained through subtractive matrixing between the red/blue signals and the luminance channel.

Portable Color

The problem of making broadcast pictures with just two tubes was solved in the BC-100 design. Taking advantage of the compact optic and yoke assembly layout in the two-tube arrangement, the resulting BC-210 is a giant step toward streamlined camera design. With no microwave operation to consider, the BC-210 is greatly simplified compared to a hand-held camera. Addition of two coaxial cables and a few control wires for iris, cue, talkback and sync lock removed the need for multiplexing.

The use of only two imaging tubes makes registration at the camera an easy task. Every tube that is eliminated in a color camera results in 10 fewer setup controls. The use of a small slave sync generator at the camera head eliminates all

clamp timing and cable length problems associated with pulse timing, and also provides a correctly blanked viewfinder picture.

The Two-Tube Concept

The studio BC-210 was designed using the building blocks proven in the original development of a portable two-tube color camera. Compared with three- and four-tube cameras, the two-tube system is relatively simple. A two-way beam splitter separates light from the zoom lens into two "bundles." One bundle is presented to the luminance Plumbicon tube; the other passes through a simple revolving red and blue filter which presents the chrominance Plumbicon tube with red and blue sequential fields at a rate of 30 red and 30 blue fields per second—locked to the vertical sync.

Since 60 fields per second are needed to avoid color flicker and meet NTSC specifications, each field is used twice, once as the original signal and once as a delayed signal displaced in vertical position by one line. This is done by field switching processed through a compact new solid-state 262-line delay.

The three signals (red, blue and luminance) are then fed into an electronic matrix in which green is obtained by subtracting appropriate portions of blue and red from the luminance signal. Thus, with only two tubes, and at a significant saving in weight, size and cost, all the necessary information is provided for a broadcast color picture.

Colorimetry

The old CBS field-sequential system worked, but suffered from a noncompatible field rate and color breakup problems. The separate luminance channel in the Ampex system solves these earlier difficulties, and by eliminating the need for green in the filter wheel, makes possible a 60-H2 color field rate. Compared with the red, green, blue field-sequential system, color fringing is considerably reduced.

To televise color satisfactorily, the fast motion of a white object on a black background is probably the hardest problem to handle. In the R-G-B field-sequential system, successive fields have the maximum possible chrominance variation. Further, in a field-sequential system, there is a severe luminance variation from field to field.

In this new system, color fringing is no serious problem.

Optical System

The optical system is designed to obtain high resolution. Pictures of excellent colorimetry are obtained at light levels as low as 100 foot candles. The luminance channel characteristic is similar to that in a four-tube camera except that the sensitivity is improved by reducing the beam splitter's reflectance in the green region. This also permits separation of green in the base station matrix with the required signal-to-noise ratio. The response of the chrominance channel is precisely shaped by the optical red and blue dichroic pass filters in the filter wheel and by the Plumbicon response.

The filter wheel itself revolves at 7.5 rps (450 rpm) driven by a standard high-reliability motor locked to vertical sync by a digital feedback servo which requires no aligment or adjustment.

Angenieux designed a 6:1, 22mm to 132mm *f2.6* zoom lens for this camera. It is corrected for the total amount of glass in the optical path, and the back local distance is computed for the configuration used.

In addition to the optical system and lens, the camera head has two Plumbicon deflection yokes,

Why Two Tubes?

With manufacturers vying to reduce camera costs ($75,000 and more for conventional studio models) and camera size (150-200 pounds, plus mounting equipment and heavy cable) the approach taken by Ampex is a major challenge to the three- and four-tube design of traditional cameras.

The design goal was to develop a high-quality color camera that is smaller and lighter, easier to set up, operate and maintain, and less costly than previous cameras. These standards, it was felt, would encourage multi-camera networks, stations and production houses to incorporate the new camera into existing color facilities.

The resulting BC-210 broadcast studio color camera is: small (about 50 pounds without zoom lens); simple to set up, operate and maintain; low-cost ($50,000 compared to $75,000 for big studio cameras) and reliable (proven in on-the-air success of the back-pack BC-100 two-tube camera).

Promising work on a two-tube simultaneous luminance and sequential color camera had been done by Dr. Willium Hughes of Oklahoma State University. Dr. Hughes proved the validity of the concept in 1961. His camera used image orthicon and vidicon tubes, however neither had all the characteristics desirable for the system. It also depended on vacuum tube amplifiers and on magnetostrictive field delay lines which were below broadcast standards. But by 1966, when Ampex began serious work towards entering the color camera market, some of these limitations were not as prevalent, and others had been overcome.

The impetus to begin work was provided by the American Broadcasting Company, which approached Ampex with a request to design and develop a portable broadcast quality color camera that could be used by a single operator. Subsequent research, development and engineering resulted in the BC-100, dubbed "The Scrambler" by ABC. This led to the development of the new Ampex BC-210 studio color camera. The on-air success of its portable camera convinced engineers that a studio version could be designed to meet these stringent criteria.

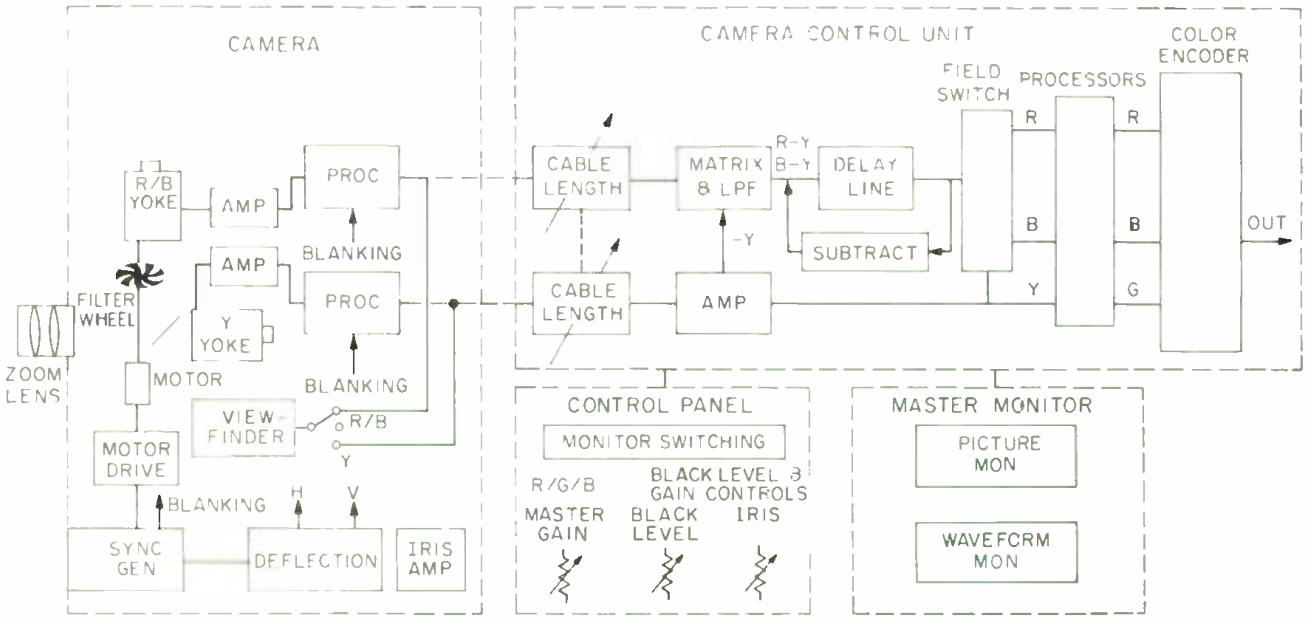
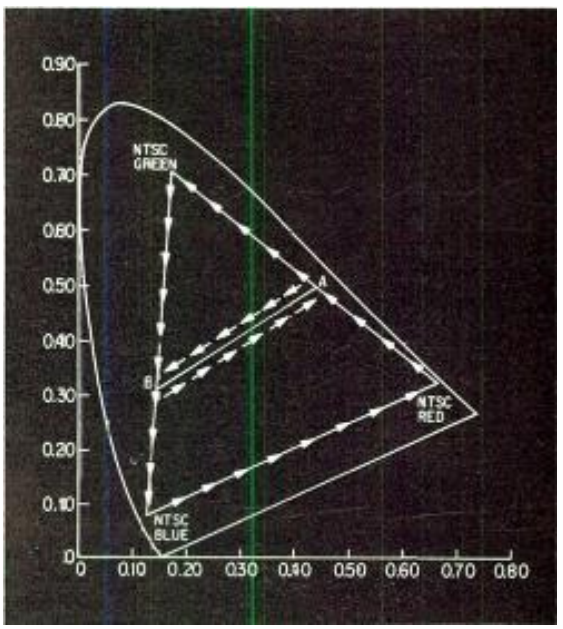
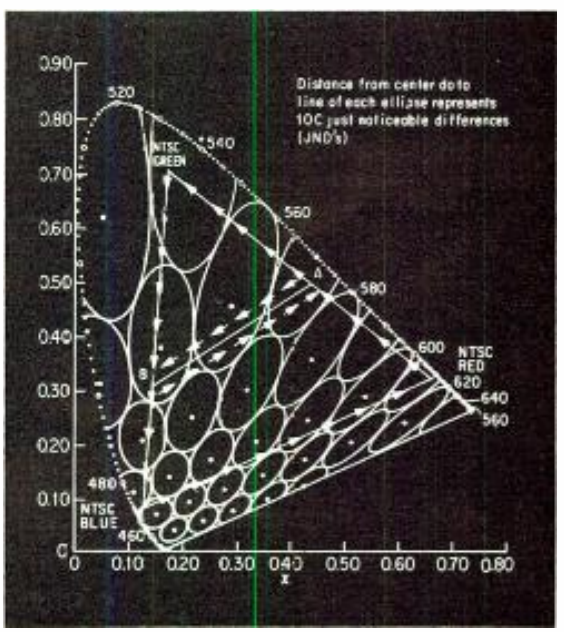


Fig. 1. Simplified block diagram of BC-210 camera head and control systems, showing color matrixing nets.

(Right) Fig 2. C.I.E. color chart. (Right, below) Fig. 3. Judd's ellipses of noticeable difference with C.I.E. color chart superimposed.





video processor units, micrologic sync generator, trimming controls, dc-dc converter, automatic sync lock system, four-position filter turret, preamplifiers, power supply, sweep failure protection and electronic viewfinder. The entire camera head including viewfinder weighs less than 50 pounds and measures 8½-inches by 13½-inches by 20½-inches.

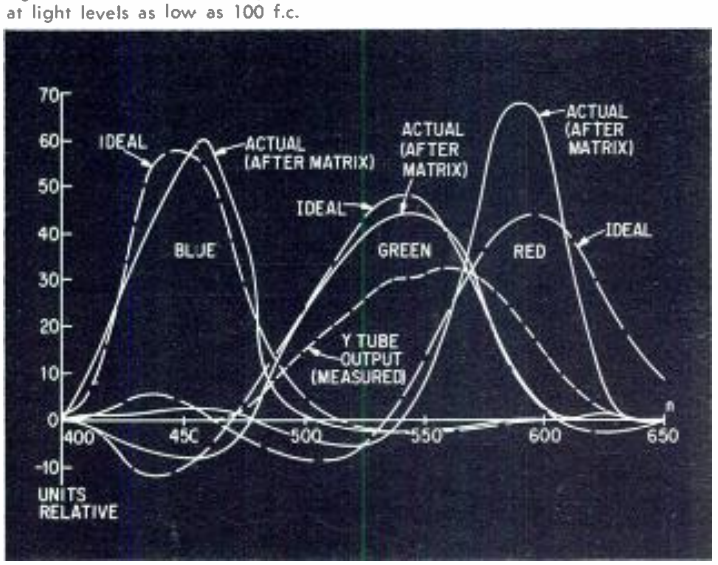
The sync generator in the camera is part of a new sync timing correction system which automatically keeps the camera locked to the camera control unit color sync generator. When the cable length is changed, correct sync timing is maintained automatically; more than 3000 feet of cable may be used. In addition to sync, power level is adjusted automatically to compensate for changes in cable length.

Other features of the camera head include talkback facilities between camera and control unit, with two headset positions at the camera; iris fully servoed from the remote panel; camera operating controls conveniently located at the rear of the camera; separate tally lights for operator and talent.

The solid-state removable electronic viewfinder uses a high-resolution, high-brightness 7-inch rectangular CRT. A monitoring switch lets the operator check the luminance signal, chrominance signal and registration by "subtracting" the R and B signals from the luminance signal.

The cable is the smallest ever used on a studio broadcast color camera. It measures 0.485-inches in diameter and 2000 feet of it weighs only 300 pounds. The same length of conventional color

Fig. 4. Relative colorimetry of the BC-210 camera at light levels as low as 100 f.c.



Camera control panel is simple and easy to set up at the cameraman's position.

camera cable weighs 2000 pounds and is four times as bulky.

The reduced size is possible because the cable contains only two coaxial cables, two twisted pairs and 10 other small-gauge wires. Design factors contributing to this small cable size are the elimination of one Plumbicon tube in the camera head, location of the camera controls at the camera head and a sync generator in the camera slaved to the master studio generator, producing automatically timed-corrected drive pulses.

Rack Equipment

The camera control rack contains processing electronics, color sync generator (if required), sync lock comparator, vertical aperture corrector, NTSC encoder and solid-state delay line. It accepts video from the miniature cable and processes it to give conventional, R.G.B outputs. The unit also contains a phone distribution system for communicating within the studio.

The field delay is a wire line with magnetostrictive transducers. The modulation system used through the delay line permits the narrow bandwith color difference signals to be delayed without loss of picture quality.

The control panel, in ½-rack mounting, is connected with the control unit by a 41-conductor cable. It provides conventional R.G.B painting control and difference signal setup controls with complete remote monitoring facilities. The panel also provides remote control of the color encoder, master pedestal control, remote iris control, remote control test signal switch and cameraman talkback.

Two Tubes on the Air

The two-tube broadcast color camera has already had an excellent baptism of fire. The BC-100 was the first portable color camera used successfully on the air during the 1967 UCLA-USC college football game. It let ABC's camera crew obtain dramatic pictures along the rocky cliffs during the Bing Crosby Golf Tournament at Pebble Beach, California, last January. And if operated successfully in the cold and snow at Grenoble, during the Winter Olympic Games in February. During the political convention coverage in August, it was used for the first time as a microwave unit to televise on-the-floor events without the restraint of a cable.

The BC-210 is a major breakthrough in studio color camera design. It fills broadcast industry's need for a lower cost, compact high quality studio color camera. The combination of big camera quality at a moderate price makes the BC-210 especially welcome in the color camera marketplace. Operational simplicity, plus quick and inexpensive maintenance, add to its attractiveness to broadcasters. Because of its small size and miniature cable, it can add flexibility to multicamera productions and remote pickups. Because of its quality and price, it can be a first camera for broadcasters initially going to color. **BM/E**

BM/E Photo

Dr. Goldmark, developer of the EVR system, demonstrates ease of cartridge loading. Tiny size of individual EVR frames is apparent in closeup (far right).

EVR—Newest Visual Medium

Electronic Video Recording, the CBS entry in the audio/visual area, uses photographically recorded images in a special cartridge that plays back through the antenna terminals of any TV receiver.

ANNOUNCING ITS LATEST STEP in bringing Electronic Video Recording to the industrial, educational and home entertainment market, the EVR division of the CBS hosted a massive press conference at the New York Hilton on Dec. 10.

More than 250 members of the consumer, financial, electronic, educational and broadcast trade press witnessed the first public demonstration of EVR. (A similar display took place the following day in London.) Robert E. Brockway, president, CBS EVR division, presented a panel of five speakers, each of whom explained his part in the goal of selling the EVR player and program cartridges on a worldwide scale.

The first speaker, Dr. Frank Stanton, president of CBS, provided background material on the origin and development of EVR (See p. 8, Oct. /67 *BM/E*) and outlined CBS' hopes for its future. Felix A. Kalinsky, president, CBS Comtec Group, announced that agreements have been made with Motorola Inc. and *The New York Times*. Elmer H. Wavering, president of Motorola, described his Company's plans for production of EVR players. Motorola's production schedule should provide sufficient monochrome players for distribution and marketing in the first half of 1970; color players should be available in the latter half of 1971. Wavering disclosed that his company is tooling up for initial production runs of 25,000 to 100,000 units.

Marketing will be aimed first at educational, hotel/motel and industrial applications. Estimates are that EVR players won't find their way into homes before three to five years have elapsed. Wavering indicated that initial ruggedized industrial-educational models of the players would be priced close to $800. Later, nonruggedized consumer models should be lower in price especially as production increases, according to Wavering.

Arthur Ochs "Punch" Sulzberger, president and publisher of *The New York Times,* revealed his organization's decision to become the first producer of educational films exclusively for the EVR format. Sulzberger expects cartridge production to hit the 3-million mark by the last quarter of this year. *The Times* has identified 40 or 50 subjects for use in EVR cartridge production. CBS intends to make its film conversion production facilities available to all producers of program material. Although costs of conversion and production are difficult to estimate and vary greatly with the size of a run, the cost of the raw stock is less than one half that of Super 8.

Highlight of the gathering at the Hilton was Dr. Peter Goldmark's demonstration of EVR. Keeping his audience of stitches with quips, Dr. Goldmark inserted a cartridge into one of two EVR players and explained the machine's operation. Track A of the two-track cartridge was played first. Monitors lining both sides of the Sutton Room flouresced after only momentary sync instability with a crystal clear presentation of *Mission Impossible*. Dr. Goldmark demonstrated the machine's stop motion, reverse, fast forward and frame-by-frame capabilities. Switching to track B, Dr. Goldmark held the audience spell-bound with a British educational film he whimsically introduced as concerning the sex life of a grasshopper. The film kept eyeballs glued to the screens.

The EVR cartridge measures 7 in. in diameter by ¾ in. wide. It has a maximum capacity of 750 feet of film, 8.75mm (under ⅜ in.) wide. This is equivalent to 180,000 picture frames or 52 minutes of programming. Cartridges now available play 26 minutes per track; CBS is now experimenting with thinner films to increase playing time. Color playing time will be half that of monochrome cartridges.

THE NEW AMPEX BC-210 is the first two-Plumbicon* tube color camera that gives you an easy answer to your need for full studio performance plus fast-action field portability—at a price that makes it easy to buy.

The BC-210 color camera can do both studio and remote colorcasting easily. It weighs less than 50 lbs. without lens. The cable, which severely limits other cameras, is less than ½ inch in diameter and weighs only 12½ lbs. per 100 feet. A technician can easily

Give your crew a break

STATION MANAGER EXULTS:
The easiest thing about the new BC-210 is owning it. For the price of two big heavy cameras we can get three of these and have some cash left over. We should be able to get more work done in a lot less time and with fewer people, thanks to that new light-weight cable.

SALES MANAGER SAYS:
We can't work any harder, we've got to work smarter. That's why we invested in the BC-210. It puts out color pictures advertisers can admire for themselves. Plus it has easy portability for location work which opens up all kinds of new business.

FLOORMAN SAYS:
I'm sure looking forward to working with that new light cable the BC-210 uses. It's hard to believe that 3000 feet weigh only 375 pounds—compared to 3000 pounds for conventional cable. And for remotes, the camera lifts right off the tripod with its own handle and sits on a clear, smooth underside. It's plenty rugged because it's all solid state.

shoulder 300 or 400 feet of cable for fast-reaction coverage of local news or sports. And maintenance is easy too—kept easy by the simple design. If you want to lift your station to the top of your market, do it the easy way: the BC-210 color camera.

For complete information, call your Ampex man or write the Video Products Sales Manager at our world headquarters: Ampex Corporation, 401 Broadway, Redwood City, California 94063.

with our new BC-210...the easy color camera

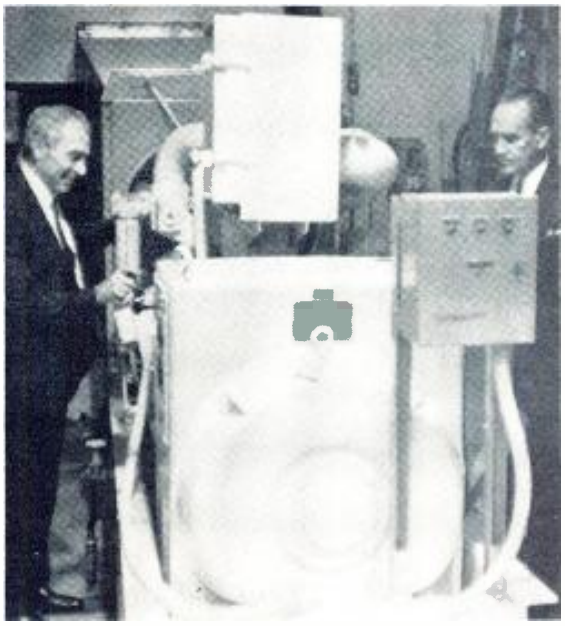
CAMERAMAN SAYS:
Think of it—a color camera with only three little knobs under the big bright viewfinder (which is removable!) At last I'll be able to concentrate on being creative with my camera instead of being its slave.

VIDEO ENGINEER SAYS:
Talk about easy! Set-up time on the new BC-210 should let me get home without a wilted collar once in a while. All major controls are at the CCU. Give it a five minute warm-up, register one channel, and you're ready to go.

CHIEF ENGINEER SAYS:
It will be a great change to see my crew go home once without looking like they've gone five rounds—with less griping about heavy this and complicated that.

AMPEX

*TM, NV Philips



BM E Photo

(Left, above) Technician laying ground radia's—150 for each of the three towers. (Left) Extending the radials required use of a Ditch Witch. (Above) Allis-Chalmers 200-kW Diesel power generator gets a test startup. Generator will start and cut over automatically in power failures.

and idle. It is a two-tower ¼-wave with a center wire, fed in phase with about a 70-percent efficiency. That old antenna is now up for hire. The new towers are half-wave structures with an effective height of 692 feet and have an efficiency of about 86 percent. The result has been a net increase in the upper lobe of the figure-8 transmitted field pattern. The lower lobe—toward Philadelphia—is about the same as it was before. "We've also rotated the upper lobe about 15 degrees clockwise," says Garufy, "to get better coverage in New York City, Long Island, Connecticut and Westchester."

Results: "Tremendous response from our listeners," says Sather. "People who've never been able to hear us before or weren't regular listeners because they heard us so poorly, are now getting excellent reception."

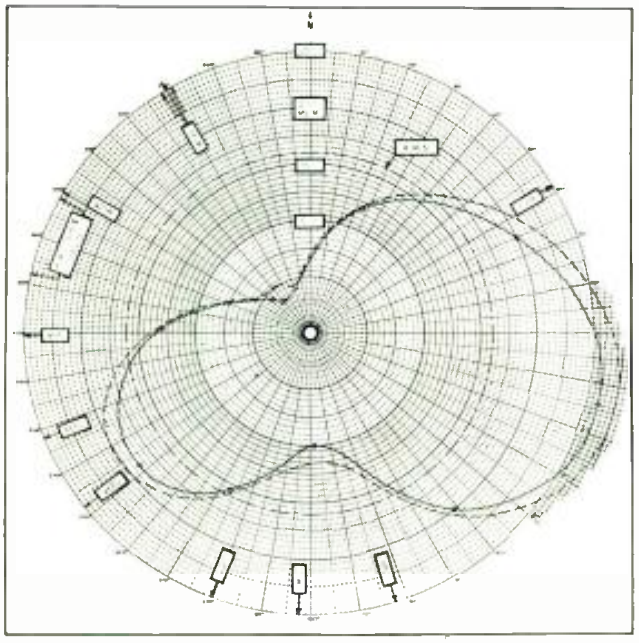
Remote Control Operation

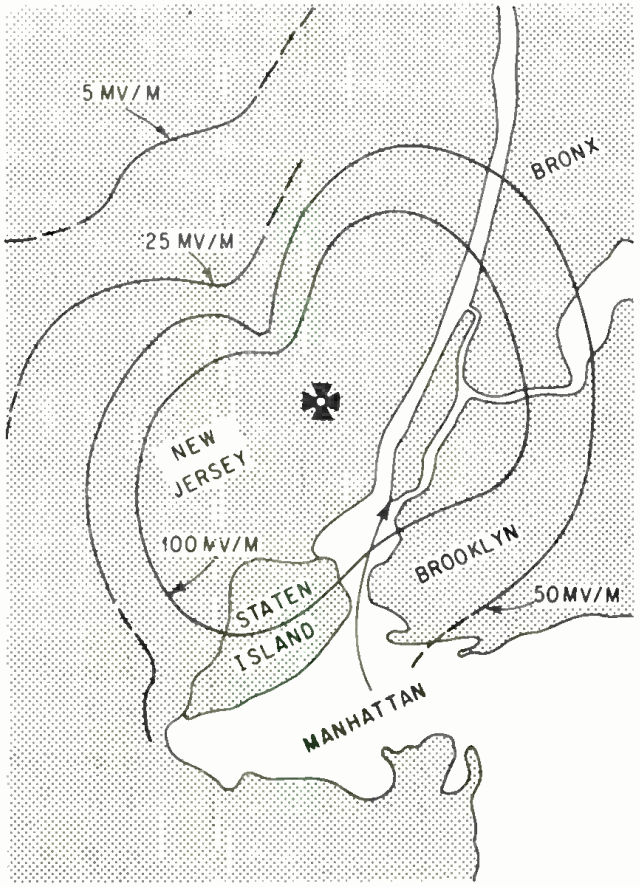
The new plant itself is designed for remote-control operation, and once the system has been proven, WOR expects to apply for remote-control approval. In addition to the airtight nature of the building and its super-efficient air pumping and filtration system, the "kitchen" area has been designed as a fallout shelter for transmitter engineer survival. It has an independent air filter and pump which can be run by a motor or a handcrank. There is a fully stocked larder, and a folding canvas cot leans against one wall in readiness for atomic or other, more mundane emergency uses.

An unusual feature of the antenna towers is their "skirts"—outrigger wires running partway up the structures for detuning other stations. Inside the blockhouse, a Continental phasor keeps the antennas properly matched and phased. Extensive trap circuits reduce interference from other nearby transmitters.

Another special emergency setup is an automatic transfer system which permits either transmitter to operate into just a single antenna tower at 10 kilowatts. The switching permits changeover to any one of the three towers in such emergencies. Radiation in such a case is nondirectional, but the location is so good, that the received signal in New York is actually better in this emergency mode than it was with the 50-kW directional at the old Carteret location. Tower efficiency is so great in fact, that the FCC restricts such operation, and the transmitter power actually has to be cut to below 10-kW when operating this way.

This emergency mode might be necessary if a transmission line were to fail, or if one of the towers were to receive a severe lightning hit knocking out some of the coupling equipment in the





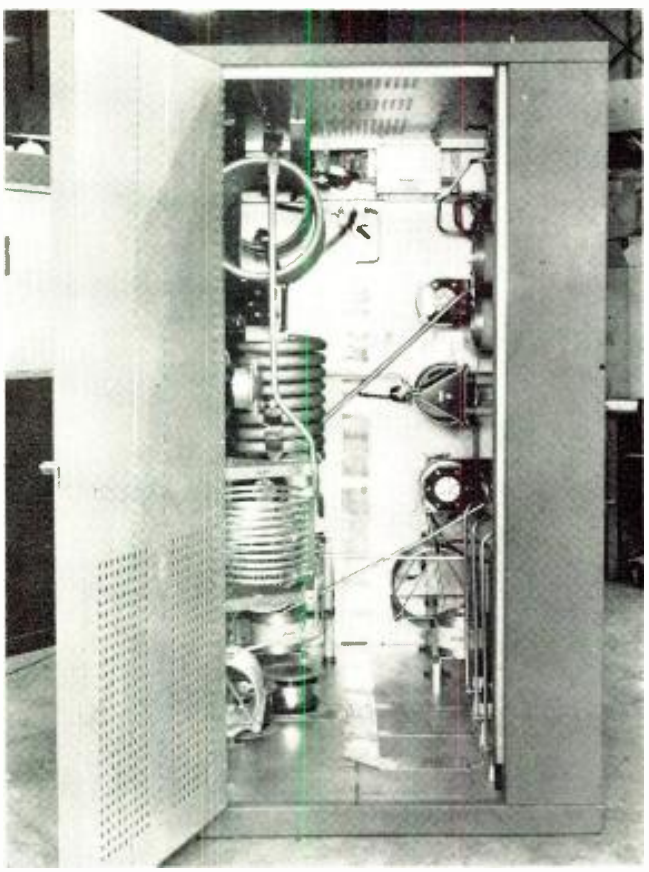
(Above) Horizontal radiation pattern is elongated figure-8 pattern, with bulk of signal concentrated in New York City's densely populated area. (Right) Measured contours from transmitter (at cross) show 100 millivolts of signal in all of Manhattan, and reaching deep into the Bronx, Queens, part of Brooklyn and Staten Island. The 50-millivolt contour covers virtually all of the remaining areas of the city.

coupling house at the tower base. The towers are well protected against lightning, but there's always the possibility, and the tower engineers have planned well to cover most contingencies.

Reducing the Fire Hazard

The road through Paradise Valley is somewhat changed in character these days. Once inside the WOR property, earth dikes rear up on both sides of the road, as though to save the visitor from the view. Actually, these dikes form a gigantic settling basin for wet landfill provided under contract by builders working on a nearby expansion of the New Jersey Turnpike. The fill's ultimate purpose is to make the garbage fireproof and to provide a more attractive vista around the towers.

Under this new fill is the antenna ground structure—a system of 120 buried cables radiating from each tower base. These cables were buried with a conventional Ditch Witch in the not-so-conventional garbage. Ultimately, the area will be seeded and landscaped to provide a parklike appearance—an oasis in the midst of the swamp and the rumbling garbage trucks. Eventually, it may be the hub of a radio park in the midst of downtown "Meadowland City"—the proposed highly planned new city envisioned for the area. By that time, local real estate values may well belie the humble origins of Paradise Valley. **BM/E**



A peek under the hood of the Continental phasor reveals its giant-size tuned circuits. This unit's job is to keep the antennas properly matched and phased for most efficient operation.

You know that supply problem that seems so tough?

We solved it last year.

You think many of your supply problems are unique? Chances are we've met and solved most of them already. Somebody, somewhere at Pruzan—on the phone order desk, in sales or purchasing, or even in the warehouse—has been up against your kind of problem before. And solved it.

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Call us collect right now. The phone number is (206) 624-6505. When the man answers say "Ala-Pruzan." He'll help you make your supply problems disappear—almost like magic.

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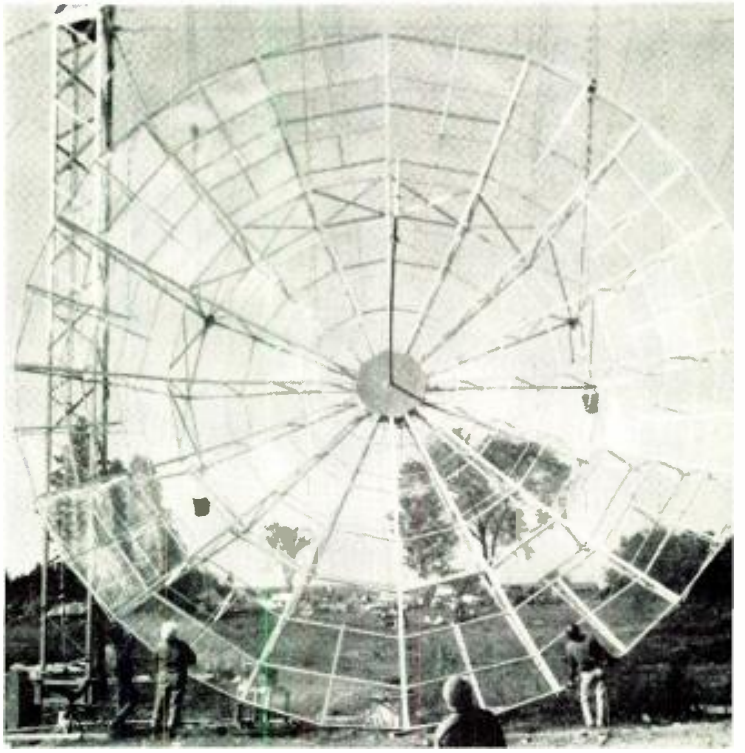
Circle 21 on Reader Service Card

The New Look in CATV Antennas



Parabolic reflector type CATV antenna by Hosken is designed for extremely difficult reception areas.

No longer a poor, neglected stepchild, the CATV industry has its own particular breed of head-end antennas designed for picking up everything from fringe-distant stations to feeble radiation from communications satellites.

HEAD-END ANTENNAS CAN POSE a problem—especially for the new and uninitiated cable operator. There's a feast of antenna types available, many of them specifically designed for CATV use.

A head-end installation represents a sizable investment. As such, it's poor economics to skimp on the antenna. These antennas, after all, are your interface with the commercial station signals that you want to pipe to your subscribers. It's your job to provide these channels as crisply and clearly as today's technology will allow.

Height Is Important

Any head-end antenna has to be up high—preferably on a hilltop—to pull in as much over-the-horizon signal as possible. Even if the site itself is high, some kind of tower structure is needed to support the complex and diverse antenna arrays.

Major supporting structures are available from such companies as Fort Worth and Trylon. Fort Worth Tower Co. features towers in a variety of heights and types. Guyed towers are available in heights from 100 feet up, with many special designs available on special order. Booms are furnished in a special configuration to allow conformity to all varying system specifications. These booms are highly versatile and permit attachments to the main tower at any level and in any position. These CATV booms are made from the same structural steel as the main towers, and are available painted or galvanized.

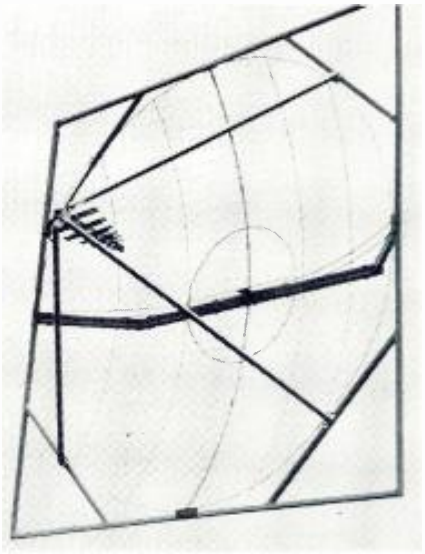
Low-Cost Tower

Trylon, Inc., offers a line of towers starting with a low-cost 60-foot maximum guyed tower for light-duty and budget installations. This particular mast goes up in a single day. Other heavier towers, such as Trylon's "Heavyweight" series, can be used singly, or in pairs or groupings. These structures can reach heights of 1500 feet and provide maximum reach for CATV head-end antennas. Such heavy-duty towers can hold not only vhf and uhf high-gain receiving antennas, but can also support microwave dishes for imported distant signals.

When paired, these masts can be capped by a bridge between them to support heavy or large-size antenna arrays, microwave dishes or a variety of mixed antennas. Wind-loading capacity of these towers is extremely high, and they stand up well in adverse weather.

High-Gain Antennas

In any head-end application, it's certainly in the cable operator's best interests to use the highest-gain antennas possible for snow-free reception and distribution. Avoidable interference or static has no business going out on the cable.



(Left) Paraf'ector PR-450 by Scala is available for any frequency from 350-1000 MHz. Model PB-81-BB Parabeam uhf antenna (right) by Jerrold, has broadband feed. RF Systems' zig-zag unit (far right) is characterized by single feed point and can be flush-mounted with the tower.

There are numerous specialized antennas that will fill this need, including variations on the classic Yagi and log-periodic designs, plus a couple of more esoteric configurations.

Setting its sights squarely on the CATV market, Hosken Cable TV Antennas Ltd., a Canadian firm, is marketing a line of antennas that can solve a variety of difficult head-end signal problems. Top of the line is an aluminum parabolic unit with an expanded aluminum mesh screen. This parabolic dish, looking ever so much like a drafty radar bowl, has a 40-ft diameter and is intended for weak signal areas where local interference is a problem. On-site assembly time is two days. Other versions of this dish are available with diversity switching. This antenna has so much gain that it's been successfully used to track satellites. Gain is typically 25.6 dB with 55 percent efficiency at 200 MHz, and front-to-back ratio is 35 to 50 dB.

An even larger Hosken antenna, looking like a gigantic half-circle, is the circular arch tropo parabolic. This giant, economy-size unit is 100 ft wide and 65 ft high. It's so large, it must be ground-mounted, a la conventional tropo, and its height can be increased to 89 ft in extremely poor signal areas. The receiving elements are ranged in the antenna's focal point, at some distance from the main dish, depending on dish curvature.

High-Gain Yagis

Another firm specializing in high-quality, high-gain antennas for CATV is Scala Radio Corp. The catalog includes a line of receiving Yagis that feature single piece full-length elements and a balance feed system for high electrical stability and low noise. These elements are held in place by machined castings for good weather durability. These Yagis are available in five- or 10-element designs with a variety of connectors.

Another Scala special is the "Paraflector"—a junior-size parabolic antenna for uhf reception. Essentially a parabolic section in one plane, the driver is positioned to approach a point source. Measured over the 350- to 1000-MHz range, this antenna is equal to a parabolic dish of the same aperature and has the advantages of simpler and lighter weight design. Gain on channel 14 is 16 dB higher than for a half-wave dipole. At the higher channels, gain increases to 17.5 dB at channel 83.

Another Scala array, models CL 26 and CL 713, are color log pickups—bascially frequency-independent modified logarithmic antennas. The model CL 26 covers low vhf channels, while CL 713 is designed for the high vhf channels. The CL 26 has a gain of 10.5 dB over isotropic source, and the CL 173 has an 11 dB gain. The two arrays give an indicated coverage equal to twelve 5-element single-channel Yagis.

Stacks of Antennas

Old-hand CATV manufacturer Jerrold has a few tricks in its antenna bag, including stacked parabolic dishes called the "Parabeam" series. These antennas are available as single dishes, dual arrays and quad arrays for high gain with minimal wind load. They're are optimized for narrow sections of the uhf band, with fourteen basic models for channels 14-18, 19-22, 23-26, 27-30, 31-35, 36-41, 42-46, 47-52, 53-58, 59-63, 64-69, 70-74, 75-78 and 79-83. This type of frequency specialization, while offering high gain at specific frequencies, is bound to load up a tower with many antennas for the various available uhf channels. Still, this method may be preferable for many CATV operators.

Another Jerrold series, the "Color Captain" arrays, are assembled as diamond 4 arrays, single antennas and special designs. These antennas, with their log-periodic response, provide low sidelobes, reduced wide-angle radiation and good front-to-back ratios for high co-channel rejection. Gain is 15 dB minimum above isotropic source for low-band vhf, and 18 dB for high-band. The antennas are one-piece welded, and require no field assembly. Low-band antennas are fold-out units that take about five minutes for one man to assemble. Wind resistance is up to 100 mph with no ice, and up to 70 mph with one inch of radial ice. **BM/E**

Picking the Right TV Antenna

By Dr. Jose Perini

Picking the right TV transmitting antenna can be a hairy business, involving detailed engineering studies, computer time and often imprecise results. Frequently, the true efficiency and radiation contours aren't fully established until after the antenna is hoisted and on the air long enough for some field-strength measurements. Using a special computer program, Dr. Perini has developed a set of curves that takes a lot of the guesswork out of TV antenna design.

PLANNING A TV transmitting plant demands a comprehensive study of all the different combinations of existing equipment and possible sites. The target is best possible performance within a specified budget. The actual coverage, that very elusive quantity, has to be maximized.

In some cases, we'd like to know what would happen to existing TV station coverage when

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Soaring 1473 feet above the ground on a Dresser-Crane tower, three different antennas for as many Houston, Texas stations take advantage of altitude. At left is helical antenna for KHTV (channel 39); in the center is a zig-zag unit for KHOU-TV (channel 11); at right is batwing belonging to KPRC-TV (channel 2).

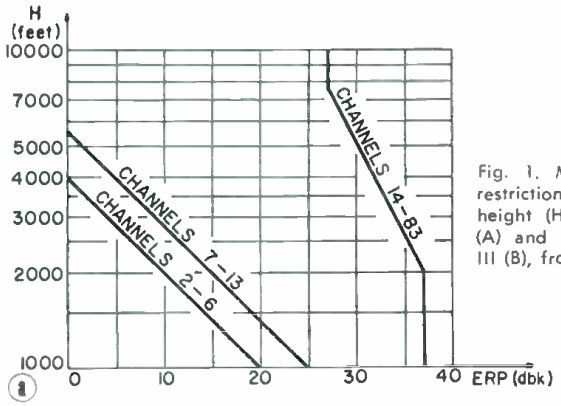
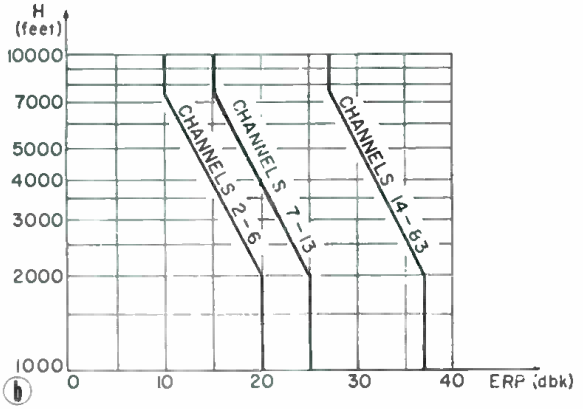


Fig. 1. Maximum erp restrictions vs. antenna height (H) for zone I (A) and zones II and III (B), from FCC Rules.



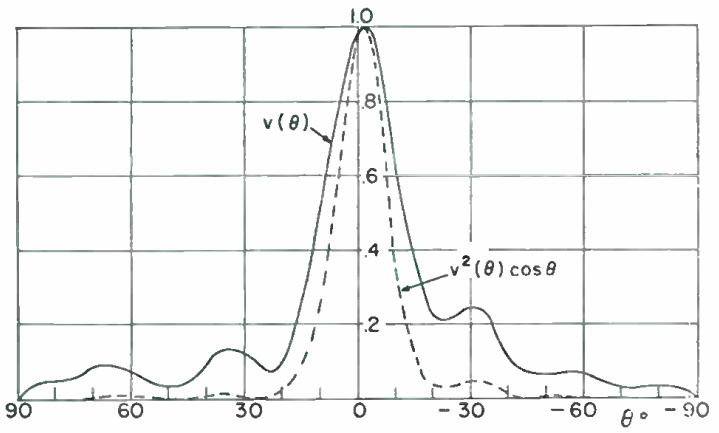


Fig. 2. Vertical pattern plotted for gain computation.

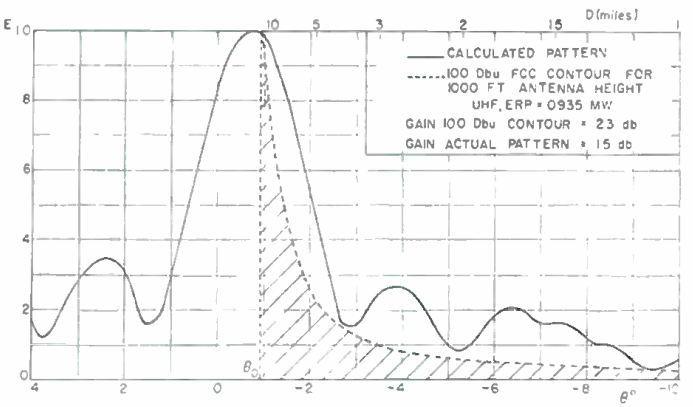


Fig. 3. 100 dBu FCC contour and actual calculated pattern.

some parameters are changed. These could include antenna height, antenna gain or transmitter power. What is the combination that will buy the most coverage for the least amount of change and/or money?

Transmission Factors

There are five major factors that affect TV transmission:

- Effective radiated power.
- Transmitter power.
- Transmission line efficiency.
- Antenna gain and pattern.
- Site location.

Usually, the maximum radiated power is limited by legal restrictions in the vhf band and by equipment performance in uhf, although legal restrictions may also occur there. The FCC specifies the maximum radiated power according to the graphs in Figure 1.

Transmitter power should be kept to a minimum to keep down operating cost. This will be influenced by the antenna gain and transmission line efficiency, which in turn, are directly related to the antenna tower height. All these parameters are related in this equation:

$$ERP = T_p \times \eta \times G$$

where

ERP — effective radiated power
T_p — transmitter power
η — transmission line efficiency
G — maximum or rms antenna gain depending on whether the antenna horizontal pattern is directional or omnidirectional. Usually this gain is over the dipole.

A superficial look at this equation would make it seem that we could reduce T_p arbitrarily by increasing G proportionally. This method is wrong for two reasons: First, to obtain an arbitrarily large gain, it would require a very large antenna, resulting in excessive antenna and supporting structure costs. Also, if a predetermined *minimum* signal level is to be achieved out to a

specified distance, then the antenna cannot exceed a *maximum gain*.

If we say that an antenna has a gain of 50, it means that we have to feed this antenna fifty times *less* power than we do an isotropic source (or dipole—whichever is chosen for reference) to achieve the same field in the direction the gain is defined. If we know the radiation pattern of an antenna, we can compute its gain by applying this definition. The equation for this which gives the gain of an omnidirectional antenna, is:

$$G = \frac{2}{1.64 \int_{-\pi/2}^{\pi/2} v^2(\theta)\cos\theta\, d\theta}$$

In the denominator, v θ is the vertical pattern of the antenna. The equation tells us that we have to compute the area under the square of the vertical pattern multiplied by cos θ. This is illustrated in Figure 2. The equation also tells us that to obtain a large value of G, the integral in the denominator has to have a small value, which implies that the area under the curve should be small. If we now specify that the field of an antenna can never be below a certain value, say 100 dBu, this is the same as saying that the antenna's vertical pattern should never be below the 100 dBu contour as shown in Figure 3. This in turn implies that the integral in the denominator cannot be made arbitrarily small. In fact its minimum value corresponds to the 100-dBu theoretical pattern.

Site Selection

The selection of a site will affect the antenna pattern requirements. As a general rule, if a large area has to be covered, greater antenna height will be needed. A hilltop site will reduce antenna tower costs as well as transmission line losses.

The site will also determine what kind of horizontal and vertical patterns the antenna must have. Omnidirectional horizontal patterns will be needed when the antenna is in the middle of a populated area; directional when it's between population centers. The vertical pattern can be contoured so the radiated field is never below a predetermined value, close into the antenna tower or out to the maximum distance to be covered. The pattern in Figure 3 represents a field which will never be below 100 dBu from close-in to 13 miles out.

To take maximum advantage of the available radiated power, the antenna's main beam should be tilted so it points below the horizon. The vertical pattern should have as little energy as possible above this angle since this radiation will only reduce the gain. A vertical pattern designed with all these factors is shown in Figure 3. Note that the maximum radiation occurs in the direction of maximum 100 dBu coverage ($\theta_0 \cong 0.8°$ below the horizon) and that the pattern never falls below the 100 dBu contour. The pattern above the horizon is kept to a minimum.

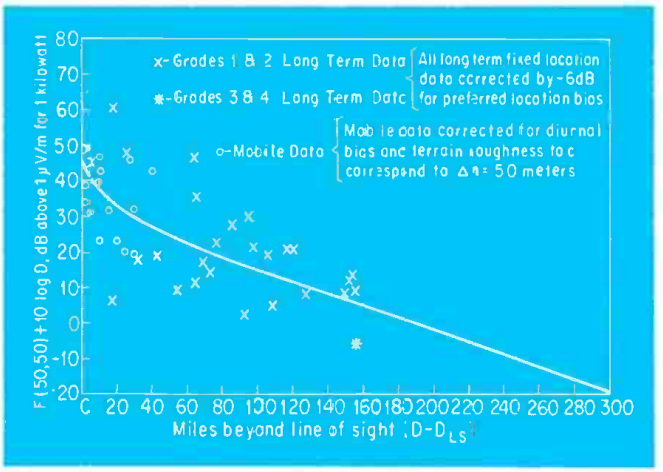
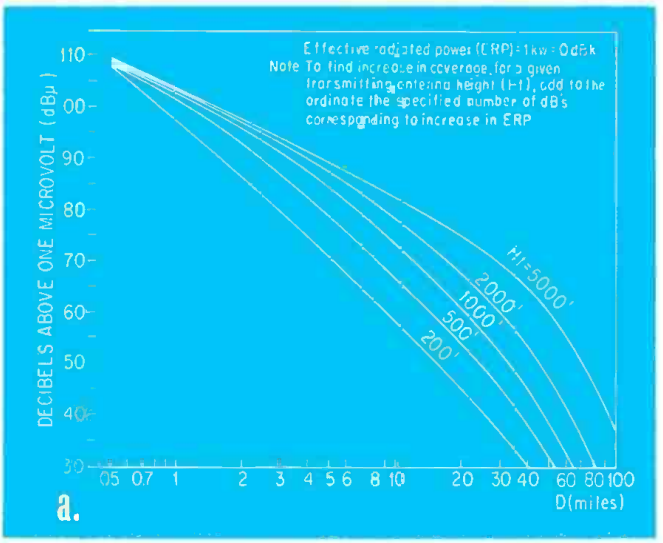


Fig. 4. Proposed new FCC (50, 50) curves for uhf, from FCC report no. R-6602. Note that curve does not fit any of the measured data.



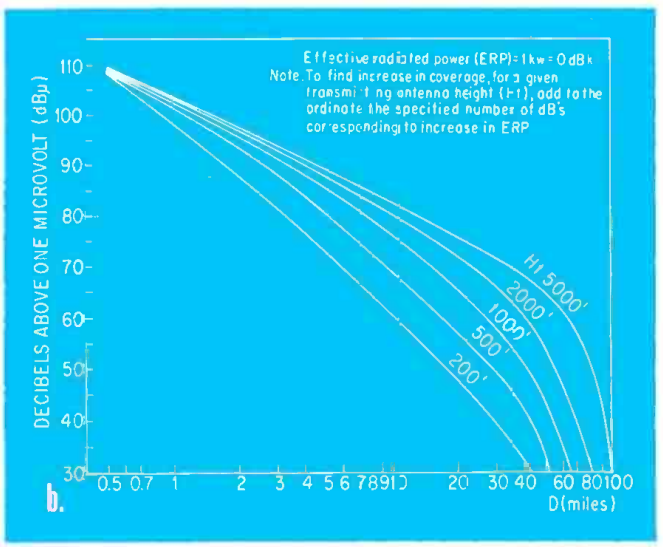


Fig. 5. Coverage data from FCC (50, 50) curves in sixth report for channels 3-6 and 14-83 (A) and channels 7-13 (B).

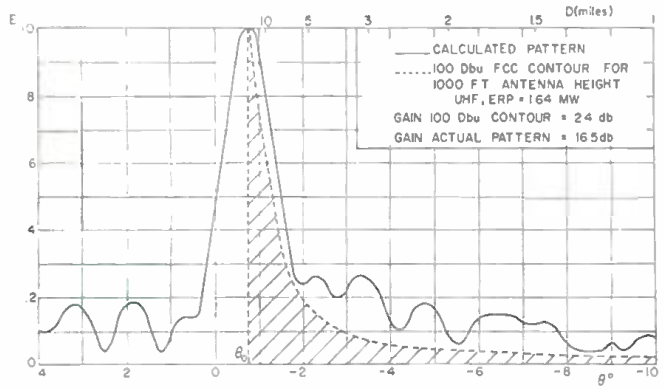


Fig. 6. 100 dBu FCC contour and actual calculated pattern.

Station coverage is an elusive and controversial figure. There's no way it can be estimated reasonably accurately. One reason is because it's not really defined in a convenient way. One may say that the principal city coverage for uhf stations is the contour around the transmitter for which the signal is 80 dBu or higher. But how do you establish where this contour lies? What is the field intensity at a distance from the transmitter when a change of a few feet in the receiving antenna may change the received signal by more than 5 dB? A redefinition of the received signal might make it more compatible with the practical measurements.

It's easy to say, "Well, we just go by the book." We compute the coverage to an accuracy of tenths of miles by using the FCC (50,50) curves. It looks nice on paper, but not in the field when the station doesn't perform as predicted.

In the same way that the average man doesn't exist, the FCC (50,50) curves don't apply to any specific part of the country. This is clearly illustrated in FCC report no. R-6602, in which new FCC (50,50) curves are described. Figure 4 shows how a "smooth curve" was fitted through the maze of points that deviate as much as ±30 dB from the curve. In any one of these particular location where the data were gathered, the FCC (50,-50) predict field would be as much as 30 dB off the measured value. That curve was scientifically fitted to the points by the use of mean square error analysis, but if you pushed it up or down 10 dB, it wouldn't make much difference to the inexperienced eye. If more data were gathered, that alone could shift the curve up or down 5 dB very easily, depending on the part of the country supplying the new data.

This seems to be a hopeless situation, but it's the only tool that we have. Until a better method is developed, we'll have to use this, but should be well aware of its weaknesses. Anyone can compute what the FCC (50,50) coverage is and with a lot of reservations, guess what the actual coverage will be. The curves are also useful in studying the relative influence of the different parameters in a given installation.

Plotting the Curves

The FCC (50,50) curves in use today are shown in Figure 5. They're a plot of the signal above one microvolt as a function of different antenna heights. The (50,50) means that the signal level is expected to be above the specified value 50 percent of the time in 50 percent of the locations at distance D. Figure 5a applies to the low vhf channels (2 through 6) and to all uhf channels (14 through 83). Figure 5b applies to the high vhf channels (7 through 13).

In Figure 5a, for example, if the ERP is 1 kW, an 80-dBu signal should be expected only out to a distance of 6.7 miles if an antenna height of 1000 ft. above average terrain is used, and out to 9 miles if the antenna height is increased to 2000 ft. If instead of 1 kW ERP we used 100 kW ERP (20 dBk) then we should add 20 dB to the ordinates of Figure 5a. The actual 80 dBu line corresponds now to the 60 dBu line in the graph, and we see that with H = 1000 ft, we would have 80 dBu signal out to 21 miles, while with H = 2000 ft, the maximum coverage would be 30 miles.

The constant dBu contours referred to in the previous sections can be obtained from these curves. In Figure 5a, for an ERP of 100 kW (20 dBk) when H = 1000 ft, we see that the maximum coverage is 21 miles. From H = 1000 ft and D = 21 miles, we compute the angle below horizon that the electromagnetic ray will see 21 miles from a height of 1000 ft. This is the beam tilt θ that should be used in the vertical pattern of the antenna. At a distance of 10 miles, the signal will be 73-60 = 13 dB above 80 dBu. We can therefore reduce the radiated field from the antenna, at that corresponding angle below the horizon, by 13 dB and still have 80 dBu 10 miles away.

If a similar procedure is used for other values of D, then a contour similar to that of Fig. 3 (which is for H = 1000 ft, ERP = 1.64 mW, E = 100 dBu) can be obtained. D can also be translated into the angle θ below the horizontal plane, passing through the antenna, at which an electromagnetic ray sees the distance D. This is done by assuming a spherical earth with a radius 4/3 of its actual one due to bending of the rays by atmospheric refraction. In Figure 3, both D and θ scales are shown. If we now compute the area under the square of this contour multiplied by cos θ we can evaluate the maximum gain possible while still maintaining uniform coverage at a preselected signal level. This antenna would have a theoretical vertical pattern shown by the shaded area of Figure 3.

Deriving Maximum Gain Curves

It turns out that the maximum possible gain is important in selecting a TV transmitting antenna. Computing maximum gain involves figuring the constant dBu contours and integration of the area under the square of the contour multiplied by cos θ. This calculation has to be done by computer.

If we look at Figure 3, we see that the area

under the 100 dBu contour (shaded area) is much smaller than that under the actual pattern. The gain of the 100-dBu contour is 24 dB, and that of the actual pattern is approximately 16.5 dB. If the side lobes were better controlled, this last gain could probably be as high as 18 dB. Thus a *practical* figure for the maximum gain is about 6 dB less than theoretically computed from the constant-dBu contours. This is the value used in the curves in Figures 6 and 7. In the case of low-gain antennas, probably 8 dB reduction would be more appropriate, since we'd have a smaller number of variables to control the pattern synthesis.

The possible deviations from the constant dBu contour are illustrated in Figure 6, where the theoretical gain is 23 dB and that of the actual pattern is 15 dB. With this in mind we can now look at the computer developed curves. They are illustrated in Figure 7. Figure 7a is a plot of the maximum practical antenna vertical gain to obtain a constant 74 dBu signal, out to a distance D, as a function of the antenna height (H) and effective radiated power (ERP). The curves also show the required beam tilt (θ). To use this curve for a field strength other than 74 dBu, add to the ERP (dBk) scale the number of dBu increase contemplated. For example, if 94 dBu signal level is desired then the actual 20 dBk curve corresponds to the 0 dBk of Figure 7a.

Figures 7b and 7c were derived for 77 and 80 dBu respectively. If a different signal level is desired, then the ERP (dBk) scales should be increased by the number of dB above 77 and 80 dBu in the respective graphs. The reason why 74, 77 and 80 dBu were chosen is because they are the principal city signal strengths specified by the FCC for low vhf, high vhf and uhf.

Nearby Field Patterns

In some applications, the field very near the antenna isn't important and the vertical field pattern can be allowed to be smaller than the constant dBu contour used to shape the main beam and first sidelobes. If in Figure 3, there is no populated area within two miles of the transmitter, we could allow the vertical pattern to be below the 100-dBu contour for angles greater than 5.3°. In doing so we're allowing the gain of the antenna to go up, since we're reducing the area under $v(\theta)$. However this reduction is usually not substantial, since the main contribution for the area under $v(\theta)$ comes from the main beam and first sidelobes. In situations like this, the maximum gain of Figure 7 could be violated, but not by very much. These curves are still correct, however, for the values of ERP, H,D and θ since they were derived from the FCC (50,50) curves of Figure 5. The maximum gain G_m should be used here just as a guide. If the actual antenna gain is several dB greater than G_m, there is reason to suspect that too high a gain is being demanded from the antenna. This will probably be confirmed when the synthesis of the antenna pattern is attempted. **BM/E**

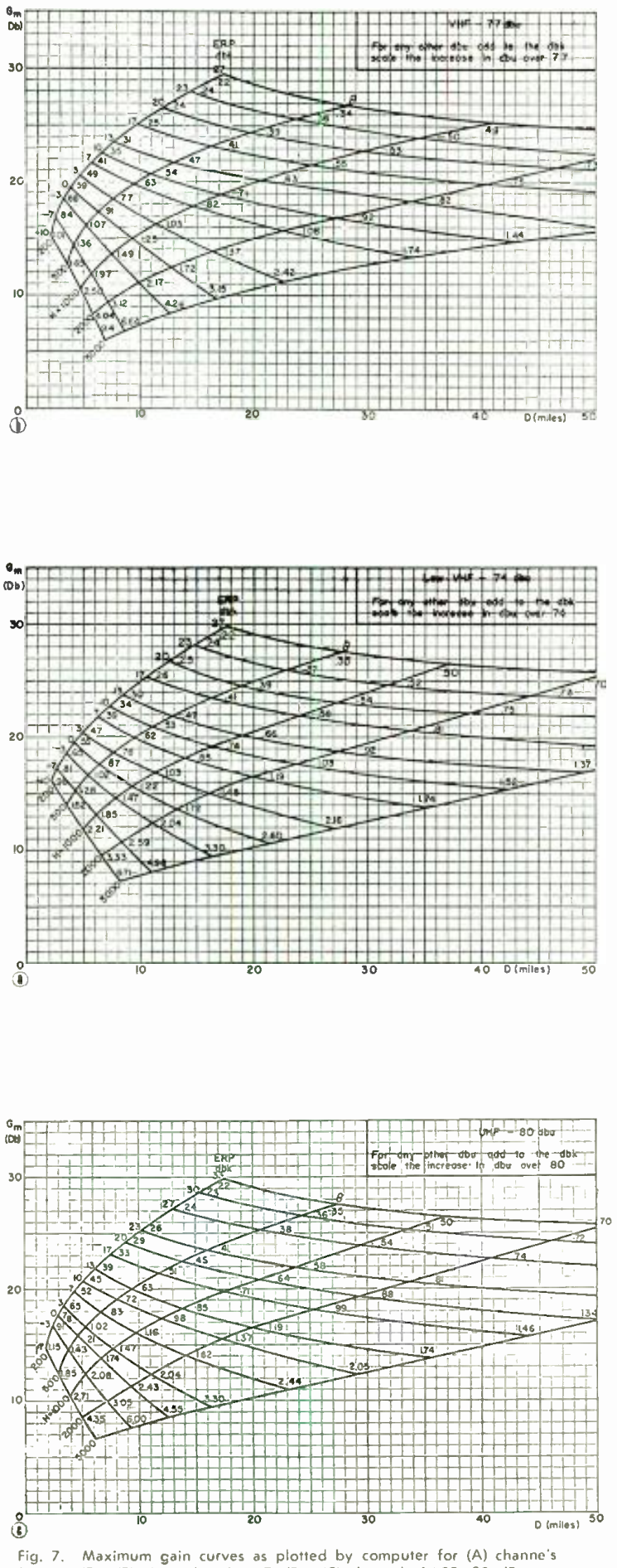
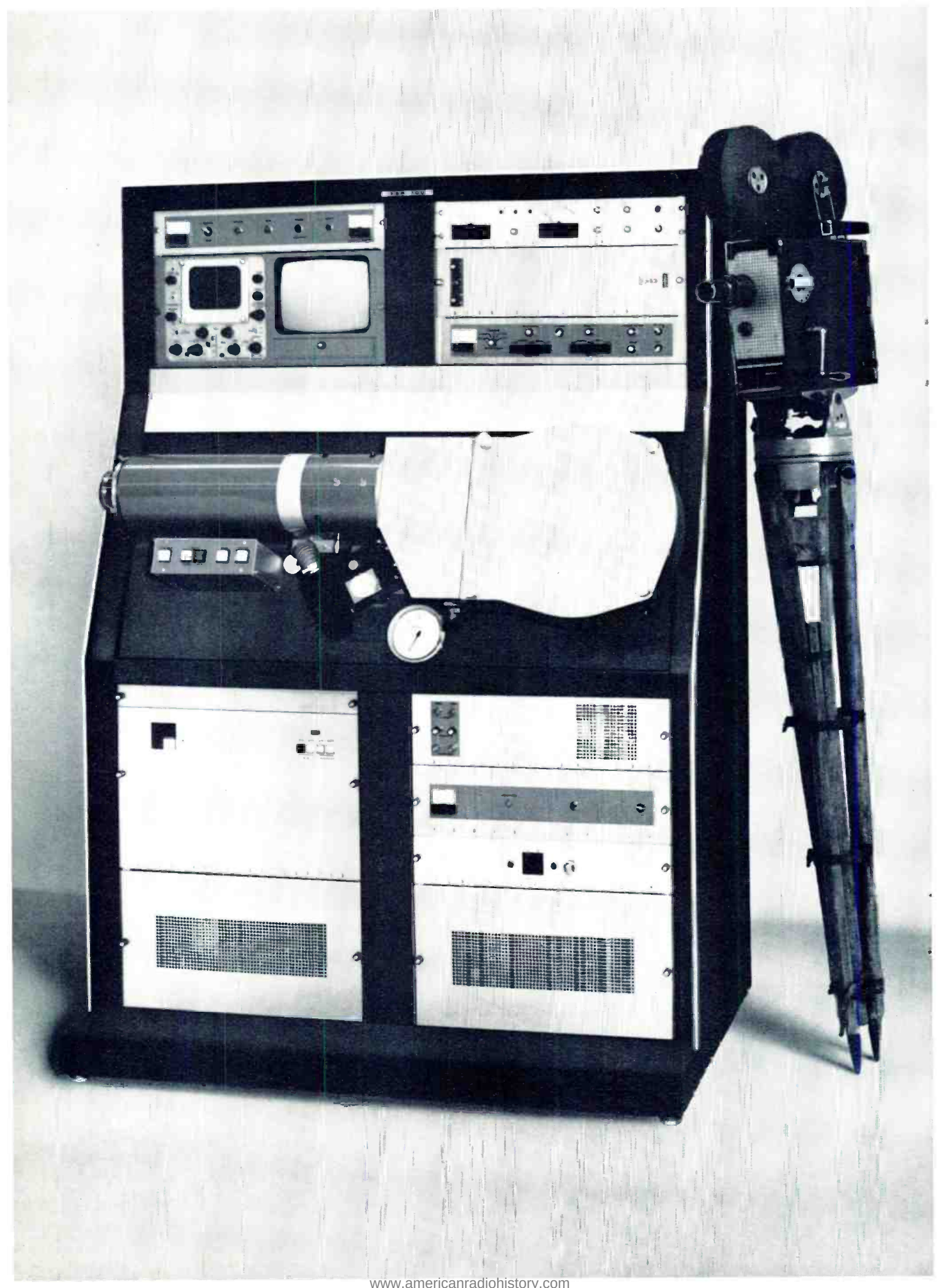


Fig. 7. Maximum gain curves as plotted by computer for (A) channe's 2-6, 74 dBu; (B) channels 7-13, 77 dBu; (C) channels 14-83, 80 dBu.



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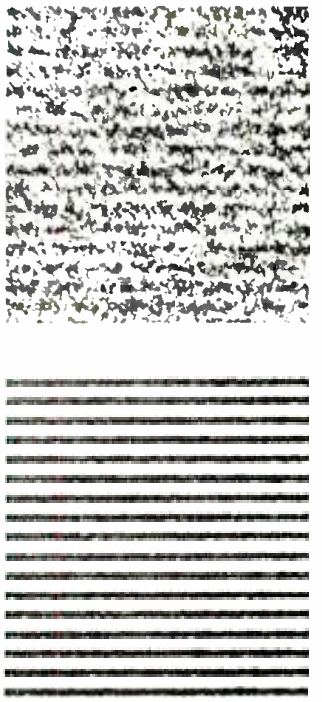

Television raster lines (right) enlarged from 16mm film frames. Lower: EBR-100 recording on 3M fine-grain (less than 0.1 micron) electron recording film. Top: kinescope recording on television recording film. Line-to-line spacing in both pictures is approximately 0.00058 inches or 14.7 microns.

TRANSFER LIVE OR TAPE TV TO 16 MM FILM ELECTRONICALLY AND GET PRINTS WITH 1000-LINE RESOLUTION.

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The 3M Brand EBR-100 far surpasses the conventional kinescope in reproduction quality and in the ability to produce consistently good films. It opens new horizons for TV taping and mass film distribution for educational and training purposes.

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Direct beam monitoring provides simple, positive adjustment of exposure and gamma. Secondary electrons imaging the film target verify that focus, size, and linearity are correct. You can choose between a direct positive or a film negative with the flick of a switch. The system also is switchable from US standard 525-line to European 625-line requirements.

The EBR-100 records on low-cost fine grain film. Overall resolution exceeds 1000 lines. The film uses conventional processing and is shown on standard 16mm projectors.

The unit is 68 inches tall, 46 inches wide, 34 inches deep, weighs approximately 1000 lb. and costs about $55,000. Optical or magnetic sound is available at extra cost.

For details, call our EBR-100 information phone. The number is (805) 482-1911, ext. 216. Or write to EBR-100 Dept. at the address below.

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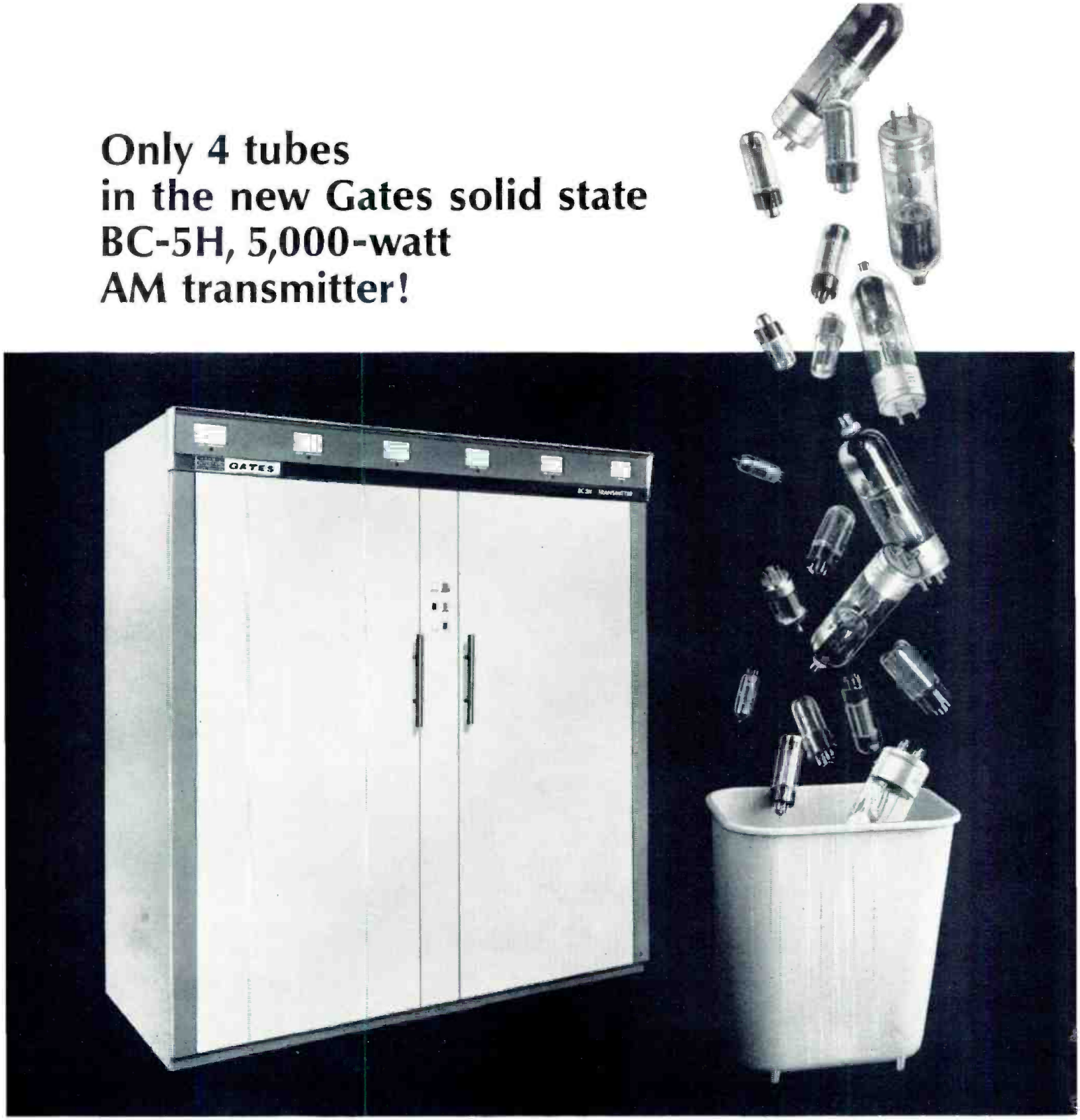

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Like the use of transistors in all circuits except the RF driver,
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And silicon diodes in all power supplies.
And with capability for easy conversion to 10 KW.
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But enough. Write for the whole story. It's packed with power.

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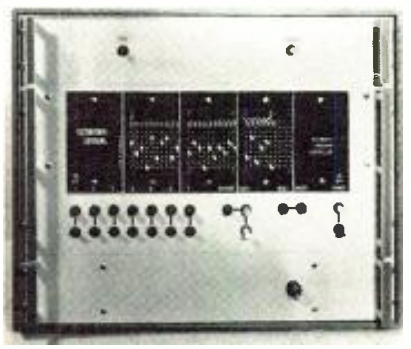
BROADCAST EQUIPMENT

Automatic program controller

Automatic Program Controller selects any of 7 channels, in a sequence of up to 25 events, using a pin-controlled matrix board. A 3-form C

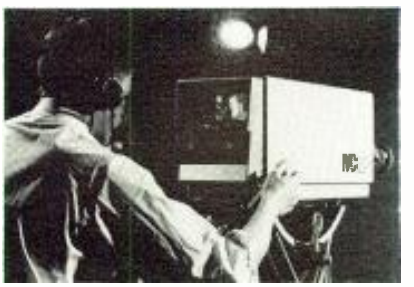


contact closure is provided by the selected channel at each step of the program. Format can be continuous, stepped, or under clock control. Events can be overlapped, if required. Manual control of all circuits is possible. Applications include neon signs, radio/TV programming, CATV and background music. Price is $1495. Ultimation Systems.

Circle 102 on Reader Service Card

International color

First low-cost broadcast and closed circuit color TV cameras designed to operate on both PAL and SECAM systems now are available. Cameras are fifty-Hz versions of the IVC-100 NTSC color cameras. The IVC-101 has three vidicon tubes, integral viewfinder, sync generator and 6:1 zoom lens. The IVC-121 is similar to the IVC-101, and uses broadcast sync generator and encoder for both PAL and SECAM systems and meets broadcast requirements in all countries of the world using PAL and SECAM systems. PAL and SECAM cameras weigh 67 lb. They have a resolution of 400 lines at the center and at the corners. Each of the cameras has a maximum of



28 internal setup adjustments. International Video Corp.

Circle 103 on Reader Service Card

Stereo echo mixer/ channel equalizer

EM-7 stereo echo mixer and accessory EQ-7 channel equalizer, when used together, completely process

audio input signals. Echo and low frequency equalization can be introduced to create special effects. Units are suitable for broadcast and recording studio applications. EM-7 mixer handles up to 8 inputs, 4 line and 4 mike, switch selectable from the front panel, feeding them to 4 mixing channels. Any mixing or echo mixing channel can be switch assigned to either output channel or both output channels simultaneously. EM-7 mixers are stackable to permit increasing the number of

T-structure tower; ITFS antenna series

A T-structure tower has been developed that is 220 ft high and is designed to two 12-ft parabolic antennas at the same elevation. Normally this requirement is met by building two towers and putting a bridge between them. The problem of supporting four antennas on one tower was solved through the use of T-structure. The tower is square and is fabricated from A-31 galvanized steel, with 3-ft cross sections. Cross section on the tower is 20 ft long, 12 ft high and three ft thick. Cross section provides opportunity to stack Ts or bridges at right angles or parallel to each other. Antenna in photo has the capability of accommodating up to 10 antennas at a single elevation. Andrews Tower, Inc.

Circle 100 on Reader Service Card

Series 4760 ITFS antennas for ITFS applications in the 2500-MHz range provide omnidirectional power gains ranging from 7 to 16 dB over an isotropic source. The 2 to 16 (depending on the antenna gain) vertically stacked slotted cylinders are enclosed in a weatherproof fiberglass radome that may be heated for deicing. Type 4760 can be equipped with side- or top-mounted lightning rods where required. Directional version (Type 4585) is also available. Alford Manufacturing Co.

Circle 101 on Reader Service Card

input channels to 16, 24 or more if required. Output of the EM-7 is rated at 28 dBm and noise on mike channels is below −127 dBm referred to input. EM-7 mixer also contains separate stereo echo mixing circuits including echo send and receive amplifiers. EQ-7 accessory 4-channel equalizer plugs directly into the EM-7 mixer, allowing addition of up to 15 dB of boost or cut at 20 Hz on 4 separate channels independently and simultaneously. Amplifiers are included in the EG-7 to make up for equalization losses. Gately Electronics.

Circle 104 on Reader Service Card

Dropout recorder

3M Dropout Profile Recorder electronically evaluates videotape dropout defects may go unnoticed on the air due to the use of a dropout compensator. Dropout Profile Recorder defects these problems so the tape can be retired before it is reused to record new program material. Dropout profile of an hour-long tape is recorded on a 5 × 2½-in. strip chart. Pressure sensitive paper is used. Strip chart is

visible through a plastic window, which can be opened for writing identification data on the chart. Self-contained instrument is designed for mounting in standard RETMA rack. Only connections required are ac power and equalizer output of VTR reproduce electronics. Instrument uses an analog integrator to measure continuously the dropout rate during the previous few seconds of videotape playback. Averaging period used is roughly equivalent to the length of time that dropout annoyance is remembered by a typical viewer. Mincom Division, 3M Co.

Circle 105 on Reader Service Card

Monitor amplifier with 75-W input

Model 1100LU 75-W monitor amplifier is equipped with an output transformer, preamplifier and equalizer. The equalizer provides up to a 6-dB boost at 40 Hz (no steps for attenuation), up to 6-dB attenuation at 4 kHz (no steps for boost) and up to 6-dB boost at 12 kHz (no steps for attenuation). Equalizer has 2-dB/step switches for all three frequencies, and is intended for correction of frequency response of

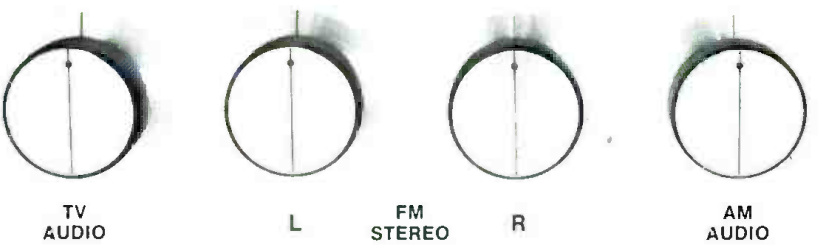
typical monitoring-type loudspeakers and control room accoustical conditions. Specifications include: 75-W output (+49 dBm), continuous sinewave; clips at slightly over 100 W in midband range, continuous sinewave input. Frequency response is ±1 dB 20 to 20,000 Hz (equalizer controls in flat position). Noise is at least 88 dB below full output, measured over a bandwidth of 20 kHz (with gain fully open, and all equalizer controls in FLAT position). Harmonic generation does not exceed 5 percent at rated output into rated load over the band 30 Hz to 15 kHz. Midrange distortion is less than 0.2 percent. United Recording Electronics Industries.

Circle 106 on Reader Service Card

Portable pager

Unipage is a pocket-size vhf-fm radio paging receiver for operation on any channel within the 150- to 174-MHz band. Receiver uses dual conversion superheterodyne circuit with 26 transistors, including one FET and six diodes. It is designed to operate on a rechargeable nickel cadmium battery. Audio output is rated at 120 mW at less than 5-percent distortion. Selectivity is 50 dB at ±15 kHz and sensitivity for 20 dB of quieting is better than 0.5 μV. Spurious response rejection is better than 60 dB and image response rejection is better than 50 dB. Rf bandwidth is ±10 kHz at 6 dB. Controls include volume con-

Circle 25 on Reader Service Card →



up to 4 subcarrier channels —including video— in STL's or intracity relays

One subcarrier channel for TV audio, two for FM stereo audio, and one for AM audio or SCA. With Collins microwave systems, that's what you get with color or black-and-white video in studio-transmitter links and intracity relay.

In the 6.8- to 7.1-GHz band, Collins offers this capability in the high performance 1-watt remodulating MW-408D for short systems, and the 5-watt IF heterodyne MW-409E for medium to long systems.

Both systems are completely solid state except for the 408D's transmitter klystron, and the 409E's traveling wavetube. Both meet NTSC color video transmission requirements. Both are available in non-standby or hot-standby space diversity configurations. And the quality of both is the same as Collins' broadcast quality.

Customer services are the same too: field survey, frequency planning, installation or installation assistance, financing, and training.

For details, contact your Collins sales engineer or Microwave Marketing Division, Collins Radio Company, Dallas, Texas 75207.

COLLINS

COMMUNICATION / COMPUTATION / CONTROL

trol with on-off switch, lamp or tone signal selector switch, reset switch, external speaker jack and battery charger terminals. Unimetrics, Inc.

Circle 108 on Reader Service Card

'Performance' CCTV vidicon cameras

The SC15A and SC16A vidicon cameras have a minimum resolution of 650 lines, and a binary divider chain for positive 2:1 interlace. The SC15A is designed for video/rf application. Rf modulation may be

tuned manually on channels 2 through 6 on a conventional TV receiver. SC15A is equipped with a three-lens manual turret for standard 16mm C mount lenses. The SC16A (shown in photo) has a 9-in. monitor/viewfinder, a 4:1 zoom lens and an intercom system. SC15A is priced at $1175; SC16A, $1800. Sylvania Electronics, Inc.

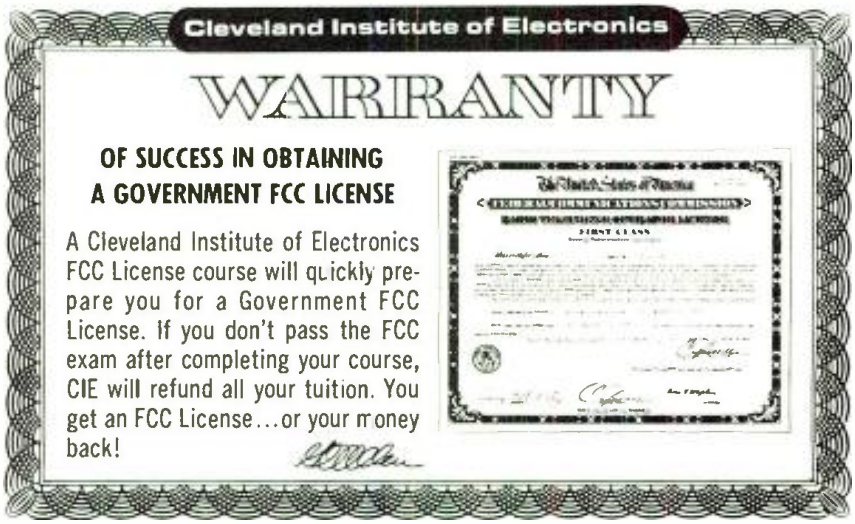
Circle 107 on Reader Service Card

CCTV camera with lots of options

The S/41 CCTV camera is designed for industrial and commercial use. An optional viewfinder attachment can easily be attached or removed. Other accessories include: rf output, dual video outputs, separate external sync input, built-in power supply for an automatic iris lens, locked interlace, special-purpose vidicons as well as a full line of mounting devices, enclosures and lenses. All camera options are designed for simple field installation or as stand-

You can earn more money if you get a Government FCC License

...and here's our famous CIE Warranty that you will get your License if you study with us at home



NOT SATISFIED with your present income? The most practical thing you can do about it is add to your Electronics know-how, pass the FCC exam and get your Government License.

The demand for licensed men is enormous. Today there are over a million licensed broadcast installations and mobile transmitters on the air, and the number is growing constantly. And according to Federal Law, no one is permitted to operate or service such equipment without a Government FCC License or without being under the direct supervision of a licensed operator.

This has resulted in a gold mine of new business for licensed service technicians. A typical mobile radio service contract pays an average of about $100 a month. It's possible for one trained technician to maintain eight to ten such mobile systems. Some men cover as many as fifteen systems, each with perhaps a dozen units.

Opportunities in Plants

And there are other exciting opportunities in the aerospace industry, electronics manufacturing, telephone companies, and plants operated by electronic automation. Inside industrial plants like these, it's the licensed technician who is always considered first for promotion and in-plant training programs. The reason is simple. Passing the Federal Government's FCC exam and getting your License is widely accepted proof that you know the fundamentals of Electronics.

So why doesn't everybody who "tinkers" with electronic components get an FCC License and start cleaning up?

The answer: it's not that simple. The Government's licensing exam is tough. In fact, an average of two out of every three men who take the FCC exam fail.

There is one way, however, of being pretty certain that you will pass the FCC exam. That's to take one of the FCC home study courses offered by the Cleveland Institute of Electronics.

CIE courses are so effective that better than 9 out of every 10 CIE graduates who take the exam pass it. That's why we can afford to back our courses with the iron-clad Warranty shown above: you get your FCC License or your money back.

Mail Coupon for Two Free Books

Want to know more? Send the coupon below for free copies of our school catalog, "How To Succeed In Electronics," describing opportunities in Electronics, together with our special booklet, "How To Get A Commercial FCC License." If coupon has been removed, just send your name and address to us.

ENROLL UNDER NEW G.I. BILL
All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, or are in service now, check box in coupon for G.I. Bill information.

Matt Stuczynski, Senior Transmitter Operator, Radio Station WBOE: "I give CIE credit for my First Class Commercial FCC License. Even though I had only six weeks of high school algebra, CIE's lessons made Electronics easy. I now have a good job in studio operation, transmitting, proof of performance, equipment servicing...and am on my way up."

Thomas E. Miller, Jr., Engineer, Indiana Bell Telephone Company: "I completed my CIE course and passed my FCC exam while in the Navy. On my discharge, I was swamped with job offers from all over the country. My only problem was to pick the best one, and I did—engineer with Indiana Bell Telephone. CIE made the difference between just a job and a management position."

CIE Cleveland Institute of Electronics
1776 East 17th Street, Cleveland, Ohio 44114

Cleveland Institute of Electronics
1776 E. 17th St., Cleveland, Ohio 44114

Please send me without cost or obligation:

1. Your 40-page book "How To Succeed In Electronics" describing the job opportunities in Electronics today and how your courses can prepare me for them.
2. Your book "How To Get A Commercial FCC License."

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(BM-17)

Circle 29 on Reader Service Card

ard factory additions. Motorola Communications and Electronics, Inc.
Circle 110 on Reader Service Card

Counter with dc to 125-MHz range

Model 1510A is an electronic counter with a dc to 125-MHz range. Range can be extended to 3 GHz with the addition of a single frequency converter plug in. Unit totalizes from 10^0 to 10^8. Frequency ratio is 10^{-16} to 10^{16}. Sensitivity is 100 mV. Crystal aging rate is 3

parts in 10^9 per day; 1 part in 10^9 per day or 5 parts in 10^{10} per day options are available. Internal output is scaled from 0.1 Hz in decade steps. There is provision for an externally supplied time base from 100 Hz to 10 MHz. BCD output is 1-2-4-8 code, negative true. A remotely programmable option is available. Basic price is $2495. Plug-in modules range in price from $50 to $285.00. Monsanto Electronic Instruments.
Circle 109 on Reader Service Card

Mobile fm radio with 30-W output

Latest addition to the Mocom 30 two-way radio line is an fm unit operating on 136- to 170-MHz band with an rf output of 30 W. Unit provides dash/trunk mount plug-in interchangeability of a basic drawer-type radio set for convenience in systems with both types of installations. It has a fully transis-

torized receiver and power supply. Receiver selectivity is maintained by a Perkay filter which is sealed in plastic. Reverse polarity protection protects circuitry if unit accidentally connected to the wrong battery polarity. Other features include adjustable squelch, and optional Private Line tone squelch for minimizing reception of messages from other systems on the same channel. Motorola Communications and Electronics, Inc.
Circle 112 on Reader Service Card

Every Hour of Every Day

Magnecord tape recorders run hour after hour, every day, under the toughest broadcast conditions. The die-cast mainplate assures permanent mechanical alignment. Timing accuracy is constant with the hysteresis synchronous capstan tape drive. Payout and take up reels have their own heavy duty split-capacitor motors. In short, solid state Magnecords are built to take it, day after day. You can depend on it.

The quality of a Magnecord does not vary from model to model. Features do:

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MODEL 1022. Studio or broadcast stereo unit. Inputs Per Channel: Auxiliary bridge and choice of Lo-Z microphone or balanced bridge or unbalanced bridge. Separate Playback and Record/Gain Controls for each channel. Master Playback and Record/Gain Controls. Balanced 150/600 ohm output. Choice of speeds and head configurations. Full remote option.

MODEL 1024. Commercial or personal stereo unit. Inputs Per Channel: Hi-Z microphone, mixing bridge, auxiliary bridge. Full mixing facilities. 1K ohm emitter follower output. Choice of speeds and head configurations.

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Circle 32 on Reader Service Card

CROSS-TALK

Dear *BM/E*

I read your *BM/E* magazine with great interest every month, especially the engineering articles, but I do have one severe criticism, what one might be called "printer's dropout."

In your October 1968 issue, in the article on "Network Loops," a section seems to be missing between pages 33 and 34.

Would you consider publishing the missing extracts not only for my benefit, but for all the many other readers who must be just as puzzled as I am!

T. G. Black
Chief Engineer
Gibralter Broadcasting Corp.

The printer's dropout between pages 33 and 34 actually consisted of just one line. The first sentence on page 34 should read: "Station technicians frequently get around these problems by periodically sampling the low-frequently level."

Dear *BM/E:*

I was most shocked to find my answer to your ITV query printed in the November 1968 issue of *Broadcast Management/Engineering* magazine. When I say "shocked," I mean practically bowled over for I find my words listed under a heading called "Minimal Maximization at Several Schools." If there is anyone in Southwestern Indiana, Southeastern Illinois, and Northwestern Kentucky more enthusiastic about instructional television, I have yet to meet him. I am afraid that whoever edited the comments on query goofed rather badly. What I said referred to other projects using enrichment programming once or twice a week to their classes.

Our organization has, for the past ten years (now in its eleventh) produced over 1100 programs a year, 5 days a week, 36 weeks per year, to the classroom, offering one-half of a daily lesson. That is about as ITV as you can get. The fact that we were on radio, doing television (which is hard to do) and are back this year, certainly offers proof that our programming is successful and our teachers are happy about it. The inference from this article is that ours is not successful and not going forward; an inference, I may suggest, most untrue. Our contact with our teachers is a daily contact. We have a field consultant visiting every classroom in our area throughout the year. Also, we have several workshops during the year bringing teachers together to discuss and formulate curriculum.

I am most sorry that this misinterpretation came about, for our people are most happy with the programming offered, and we are looking forward sometime early in 1969 to activating our own channel and increasing our program offering 100 percent.

I hope there is now a clear understanding that I am a believer in instructional television and Southwestern Indiana Educational Television practices it, we hope, to its extreme.

Quoting the last line from your publication, "Edelman appears to believe there is too little contact with teachers in the classroom." This statement, I believe, is true with regard to other projects I have observed through out the country and not in our own area of Indiana, Illinois and Kentucky.

Robert S. Edelman
Director, SWIETVC

Dear *BM/E:*

I have noted your interest in constructive critique, knowing how valuable this can be I would like to feel free to offer some ideas.

Primarily, I would like to see more feature stories on the operational end of radio and television stations. That is to say, more emphasis on type of sales, promotion, programming and basically, indepth studies concerning the alleviation of problems in the above areas.

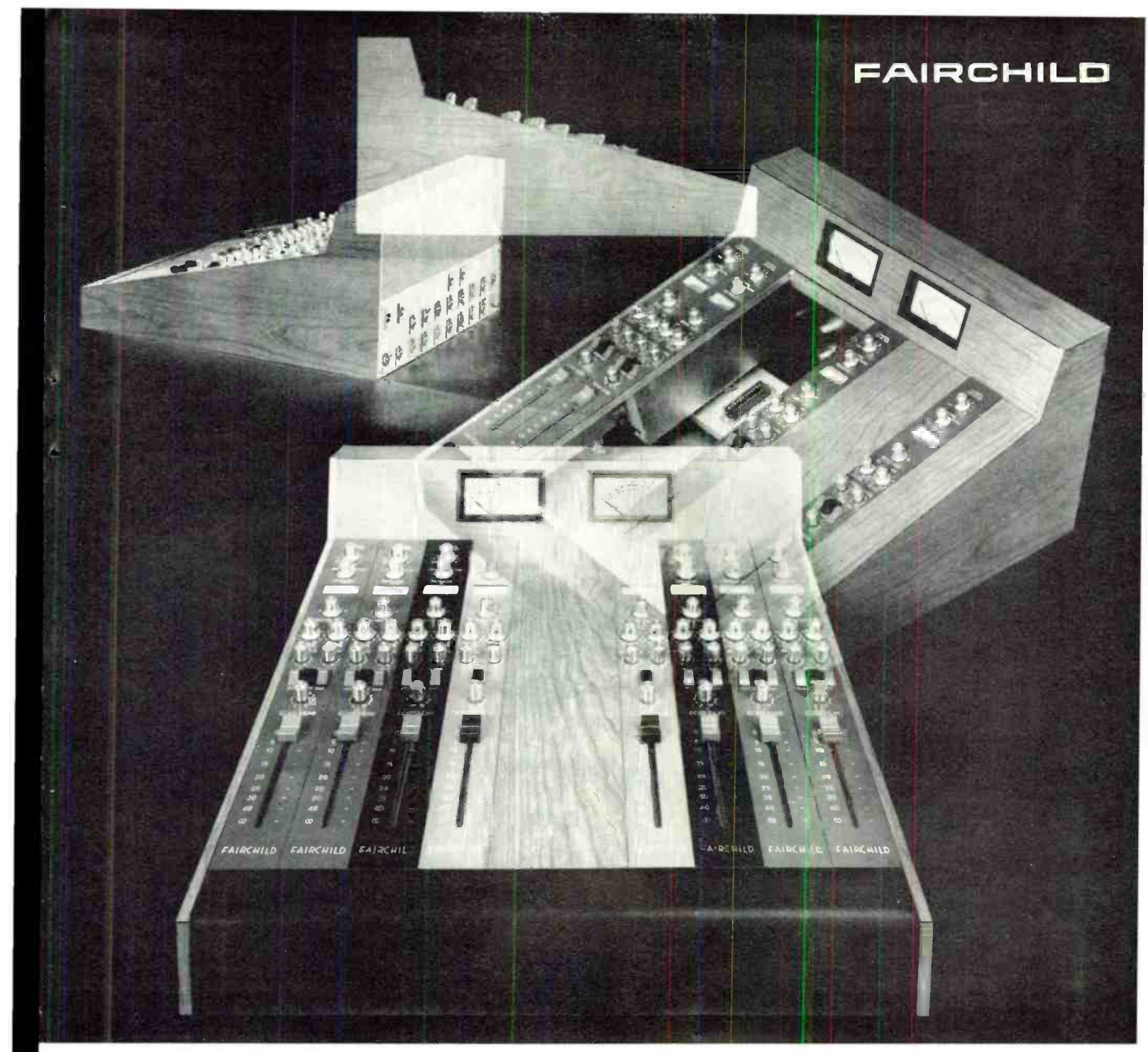
While I enjoy reading *BM/E* I feel there is more need for emphasis on areas of broadcasting that relate more directly to the managerial end of the operation. Let me say, too, that we are a unique station in so far as we are a new fm'er battling a long established a-m/fm branch studio in town, and I might add, we are winning the battle! Would be happy to supply you with facts if you are interested in how we are building our business.

Randy Jeffery
WFDT Radio
Columbia City, Indiana

Dear *BM/E*

Your special section in the November *BME*, "Tool or Toy?—ETV/ITV" was interesting to me as it was not too long ago that I was working in this field. However, the question you posed regarding the "tool" or "toy" label which should be given to the medium was not answered.

I hope, because your special issue did not mention any of the wastes that are associated with this medium (especially at the primary and secondary schools levels) that readers will not assume it is only a tool. The sad fact is that millions of dollars of



The Desktop Console above is comprised of

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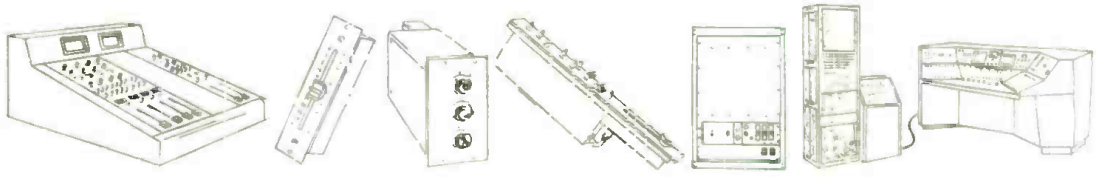
The Module includes these functions: Input Level Selector Switches and Pads, Input Preamplifier, Input Fader with or without cue, Echo Feed Control, Echo Feed Selector, Compressor, Full Spectrum Program Equalizer, Output Amplifier, Metering, Channel Selector Switch.

Each Fairchild Desktop Console is assembled to meet individual requirements; the one above accepts up to ten modules. Other Fairchild modules include the Integrated Control Output Module, which processes the signal from the mixing buss to the console output, and the Monitor Module, which provides complete flexibility in the selection of recording channels.

Contact your Fairchild Recording Distributor or write Fairchild for more data.

FAIRCHILD RECORDING EQUIPMENT CORPORATION, Dept. BME-1, 10-40 45th Avenue, Long Island City, New York 11101



DESKTOP MODULE CONSOLE / LUMITEN / REVERBERTRON 658B / INTEGRATED CONTROL MODULE / REVERBERTRON 658A / REMOTE AUDIO CONSOLE

taxpayers' money is being wasted in this area and, if this continues, it will give EV/ITV a bad name.

There are many serious and fixed limits of ETV/ITV, and unless educations are made to realize this, they will continue to squander money in areas where ETV/ITV does *not* belong. It is also about time that educators stop attempting to convince teachers that ETV/ITV will not replace some of them. Used as a real "tool," television can reduce the number of teachers required in our colleges and secondary schools by almost 1/3. This would have the effect of eliminating the many "marginal" educators that are presently being employed because of teacher shortages. The number of marginal and incompetent teachers is what is holding back public acceptance of higher salaries for educators and the reduction of their numbers by ETV/ITV would be a blessing.

Robert L. Rooney
General Manager/
Chief Engineer
WOSC, Oswego, N.Y.

Dear *BM/E*:
Many thanks for your mention of our project with ETV, Computer and Telephone, in the November issue of *BM/E*. I hope that your readers are challenged by the possibilities that our use of technology poses for the future of education. It is most important to us that the concepts of our work be exposed to the criticism and evaluation of the academic as well as the business community. With such exposure, we will be able to come to a better understanding of how our work can be best employed in the area of effective education. Again, many thanks for your inclusion of our work in your magazine.

Brother Austin David, FSC
Director of Education
Data Systems
Archdiocese of New York

Dear *BM/E*:
I am trying to find out whether the Otto K. Olsen Company of Hollywood, California, is still in business and if so, what their address is. This company manufactures studio lighting equipment. We'd like to contact them for replacement parts.

Many thinks for your help. We're still enjoying your magazine.

Fred Wright
Director
KGGM-TV
Albuquerque, N.M.

We've searched all standard electronic and broadcasting directories as well as our memories but we're unable to come up with anything. Can anybody help?

So far, there's only one applicant

It's Lenkurt's 76 TV microwave transmission system.

This is the system that's bringing top-quality color and black & white TV into areas where they used to think something was wrong with their picture if it didn't have snow most of the time.

For instance, take the 76 TV Studio Transmitter installation at station KOLO-TV in Reno, Nevada. Since the 76 is transistorized, the new system operates with practically no maintenance, quite a bonus to KOLO-TV because one of their microwave terminals is located on Freel Peak, where 20 foot snows and 100-200 mile winds are not uncommon.

Another outstanding feature of the 76 system is its versatility. At the University of Kansas Medical Center, a 76 ETV system makes it possible for students to participate in classes being presented at a sister campus, 45 miles away. This is one of the few two-way ETV systems in existence. This system is significant because of the high resolution it provides for remote observation of medical techniques.

And the Columbia Basin Microwave Company is using our microwave to transmit two off-the-air pickups through an extensive 76 network to serve several CATV companies and school districts.

So, whether you're planning a community TV setup, an Educational TV program, or want to join a network, *and* you want rugged, reliable equipment to help with top-quality color and black & white TV transmission, you'd be doing a smart thing to write us for the resume on our money-saving, solid-state 76 TV microwave system.

Lenkurt Electric Co., Inc., San Carlos, Calif. Other offices in Atlanta, Chicago, Dallas, and New York City.

LENKURT ELECTRIC

SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS GT&E

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NAMES
IN THE NEWS

Dr. W. E. Glenn

Paul Spengler

Dr. William E. Glenn, general manager of Applied Research for CBS Laboratories, has received a national citation for his pioneering efforts in development of an electron tube which makes possible quality color TV pictures as large as 6 × 8 feet.

Paul Spengler has been named assistant chief engineer at WBAL-TV, Baltimore, according to Otto R. Claus, chief engineer.

The board of directors of Anaconda Electronics has elected **Duane Crist** vice president.

The Society of Motion Picture and Television Engineers recently made three awards: Eastman Kodak Gold Medal Award to **Dr. Edgar Dale** for his contributions to promoting use of audio-visual equipment in education; Herbert T. Kalmus Gold Medal Award to **Walter A. Fallon** for his work on color film for motion pictures; and the E.I. du Pont Gold Medal Award to **Immanuel Samoylovitch Marshak,** of the USSR for his pioneering wrok on the electronic flash tube.

At the Audio Engineering Society's 20th anniversary conference in October, **Benjamin B. Bauer** was elected president of the Society.

Leonard E. Kronfeld has been named president and chairman of the board of Minnetech Laboratories.

NET Board Chairman Everett N. Case has announced the election of **John Hope Franklin,** chairman of the department of history at the University of Chicago, to the board of directors of National Educational Television.

The latest addition to WIOD (southern Florida) Radio's news staff is **Robert H. Thompson.**

The FCC has made known the appointment of **Raymond E. Spence, Jr.** as deputy chief engineer and **Robert L. Cutts** as assistant to the chief engineer for Plans and Spectrum Development.

Election of **Edward Schwartz** as vice president for operations of Multronics, Inc., has been announced by John H. Mullaney, president and chairman of the board.

David Bain

Hank E. Lockard

The Fairchild Recording Equipment Corp. has announced the appointment of **David Bain** as manager of application engineering, a newly created post.

Hank E. Lockard has been promoted to manager of Perfect TV, Inc., Harrisburg, largest of Jerrold Electronics' operating cable television systems.

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4	19	34	49	64	79	94	109	124	139	154	169	184	199	214	229	244	259	274	289	304	319
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215	230	245	260	275	290	305	320
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216	231	246	261	276	291	306	321
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217	232	247	262	277	292	307	322
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218	233	248	263	278	293	308	323
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219	234	249	264	279	294	309	324
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295	310	325
11	26	41	56	71	86	101	116	131	146	161	176	191	206	221	236	251	266	281	296	311	326
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222	237	252	267	282	297	312	327
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223	238	253	268	283	298	313	328
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   ☐ CATV Facility
   ☐ Telephone Company
   ☐ Government
   ☐ Other _____ (Specify)

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   ☐ Multiple Facility
   ☐ Single Facility

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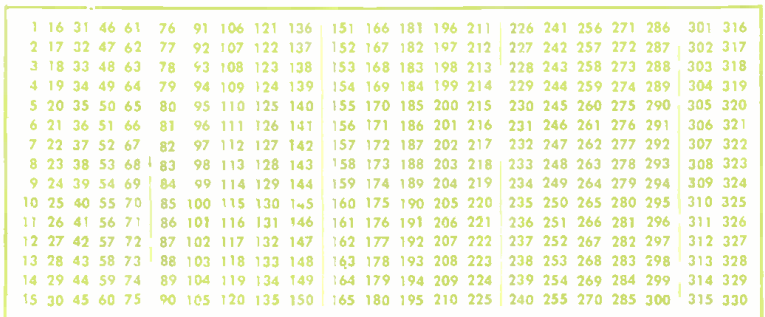

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Q & A

Continued from page 14

that you are performing a public service; that public service is that you are giving the merchant the names of the people who do not read or keep his circulars. *Don't be sarcastic but impress the merchant that you care enough about his business to save him mailing costs.* Then you can proceed by suggesting he use the money he saves by diverting it into a radio schedule.

This slow-but-sure process works very well, especially when you have success stories to show him from the other stations. Once you have an opportunity to advertise for a merchant, you must produce for him. Your every effort from this point on is to make his radio advertising pay off. Then you've got a foundation to build on. Getting the account is one thing, but keeping it is another! Success begets success and once you get started, it'll be a daily challenge to keep the ball rolling.

Now, in the matter of the weekly newspaper, you use this procedure: every newspaper ad has wasted space. Examine the ads closely. Re-arrange them to occupy *less* space. Determine how much the merchant could save by this new layout of his ad. Show this to the merchant. He'll appreciate the fact that you took enough time and trouble to show him how to save money on his newspaper ad. Now show him how to get more mileage out of his advertising by spending that money you saved him on your station. He'll be getting *both* media for the money that he used in newspapers alone. *Never,* I repeat, *never* knock the competition. Encourage advertisers to use your station because *of its value to them and not because your competition is bad for them!* Don't be greedy, shoot for a SHARE of the existing budget and that share will increase as you produce for the advertiser.

Q. I know I can make a sale if I can come up with the right answer to satisfy the sponsor. He is a local representative for a hearing aid company. This man sets up shop in each one of the five towns in my coverage area one day a week. He listened attentively to my presentation about the quality of my station. He agreed with the rates and offered no objections at all. This made me uneasy because I like to have at least *one* objection that I can overcome when I make a sale. He was saving that for the very last! He shot it out like a cannonball: "How can my customers respond to the ads when they're hard of hearing? That threw me for a loop and I got all tangled up when I tried to give him a reasonable answer. Please tell me what the answer to *that* one is.

Bill Vaughn, Charlotte, N.C.

A. In the first place, advertising certain products could be illegal in some states. For example, optometrists can use radio in some states and not in others. This matter is mostly one of state law, so check on this point first.

His message is intended for the *friends* and *relatives* of the people who are hard-of-hearing. The *last* person to *realize* that he has poor hearing is the person who is gradually losing his hearing. If I were you, I'd write a commercial something like this:

Someone you know will not

Continued on page 74

Continued from page 12

statute and based on a percentage of gross. A single place for the deposit of license fees also would be stipulated.

3) The cable industry would honor blackouts of professional sports contest broadcasts along the lines of existing law.

4) Copyright legislation must place no restrictions on program originations by cable systems or on the reception of programs which are not copyrighted.

Phillips, Nizer, Benjamin, Krim and Ballon, representing the crucial position of the film industry, would divide CATV into three categories paralleling the FCC's top-100 market division. Class one: top 75 markets or other markets with four or more commercial TV stations. Class two: remaining stations in the top-100 category or other markets with three commercial TV stations. Class three would consist of all other CATV systems. Class two systems would be recategorized as class one systems when they achieve 20-percent market penetration or three years after beginning operations or after January 1, 1974, whichever occurs sooner.

Making the fact clear that the film industry law firm does not speak for all motion picture companies, Warner Brothers-Seven Arts made a separate filing calling for "full copyright protection" against CATV relay of copyrighted programs, with but two exceptions:

"1) All CATV systems in the Grade A contour of commercial TV broadcast facilities may pick up local signals royalty-free (unless the system deletes or inserts commercials).

"2) All CATV systems in markets with fewer than three network affiliated television systems, if they so desire, may import, royalty-free (unless the system deletes or inserts commercials), from the nearest available stations on a nonduplicating program basis, sufficient distant signals to enable them to carry a total of three network affiliated stations. However, the right to import additional signals beyond three will be subject to full copyright protection and negotiation with copyright owners."

Both the film and broadcast industries appear to have aligned themselves behind the copyright law revision approved in 1967 by the House Judiciary Committee—Section 111. That legislation provided for a compulsory fee for local signals and complex individual contracts forbidding advertising and making originations difficult.

In the light of the Supreme Court's June/68 decision favoring CATV's copyright position with respect to signals received from the air, Section 111 or any other legislative attempting to group CATV under a general copyright statute now appears inappropriate and dated. As Frederick W. Ford of NCTA put it in a letter to Sen. McClellen, ". . . it would not be illogical for the CATV industry to fight any CATV inclusion in a copyright statute with every resource possible."

The estimated combined revenues of the various copyright owners exceeds $2-billion annually. This compares with annual revenues of perhaps $150-million for the entire cable industry.

Sen. McClellan has summoned his subcommittee to a private hearing two days after congress convenes on January 6. By the time the subcommittee meets, the 20-odd copyright interests involved will have seen drafts of the proposed legislation and expressed their comments.

Continued from page 71

hear this message because he's hard of hearing. Do him a favor. Put his name on the mailing list of (Hearing aid Company). These people will send him intelligent literature that will make him realize that he *could* be getting somewhat deaf. It's no disgrace to have a hearing loss, but it's an act of friendship to subtly call this to his attention. Don't put it off, but do it now! Make a list of your friends and relatives who need (Hearing Aid Company's) therapy and send it to (Hearing Aid Company and Address). If you find yourself increasing the volume of your radio to hear this message, well, we just gave you a good idea too. Write *now* to (Hearing Aid Company, address).

Mr. Vaughn. I hope this answers your question. One thing more, prepare your commercials, tape them and let your prospective sponsor read the copy as he listens to the tape. This will make him give undivided attention to the commercial and give you double the chance to make the sale. **BM/E**

LITERATURE of INTEREST

For additional data, circle number shown on Reader Service Card.

Rotary switches—half-inch subminiatures—are described in a bulletin by Oak Mfg. Co. Available in both 30- and 60-degree throw configurations, the switches described are gold-plated and have silver-alloy contacts. **150**

Emi/rfi shielding and moisture seal combination is featured in three data sheets from Technical Wire Products. Called "Consil," the seal is a fine network of silver particles with silicone rubber-filled openings. **151**

Rectifier modules are detailed in a 12-page application note, N136, from Unitrode. Included are illustrations of the variety of mounting configurations made possible by these self-stacking silicon "doorbell" modules. **152**

Cable plug for use with 0.141-in. diameter semirigid coaxial cable is presented by Sealectro in Conhex Product Bulletin CX-119A. The new connector is made of gold-plated stainless steel, and can be soldered directly to coaxial cable's solid copper jacket. **153**

High-temperature cable performance story appears in an illustrated brochure from Boston Insulated Wire & Cable. **154**

Instant slide presentation system requiring less than five minutes from taking a picture to projecting it on a screen, is detailed in Genarco's new bulletin. System combines Polaroid MP-3 Industrial View Land camera and Genarco's 3000-watt 3¼- × 4-in. slide projector. **155**

Digital instruments are discussed in Simpson Electric Co.'s twelve-page illustrated catalog. Featured are: a VOM, an electric counter, Model 2700 digital system, three matching precision strip chart recorders, a multirange milliohmmeter and multicorders. **156**

Solid state relays are discussed in Catalog 750 published by Ohmite Mfg. Co. Application data are included in graph form. **157**

TeleMation Vidicon Camera is presented in a four-page brochure from TeleMation, Inc. **158**

Power supplies are detailed in 40-page Catalog 154 created by Electronic Research Associates. Included are technical descriptions & specifications, unit lisitings, prices and availability as well as data on physical size and electrical connection. **159**

Control cables—their uses, ratings, insulation, jacketing and color coding—are described in a four-page reference sheet from Rome Cable. **160**

"Electronics for Everyone" is the title of Allied Radio's Catalog, 280. Includes 536 pages—from high fidelity components to electric guitars. **161**

Function, operation and objectives of International Correspondence Schools are explained in a 384-page manual. Courses of study include, "Radio and Television with Equipment Training," "Hi-Fi Stereo and Sound Systems Servicing," and "Telephony, Electronics and Radio Communications." **162**

"The High and Mighty" is the title of General Electric's 16-page, four-color brochure (GEA-8529). Described are GE's history, facilities and capabilities in designing, building and installing TV transmitting antennas. **163**

"Computer-Aided Drafting with CCTV" is the title of technical application bulletin (8-92) released by Cohu Electronics. Described is computer system built for use at Rohr Corp. **164**

Precision voltmeters are the subject of a 16-page booklet from John Fluke Mfg. Considered is the difference between digital and differential voltmeters, speed of measurement, relationship between accuracy and resolution and specmanship. **165**

"Miniature Chart Recorders" is the title and subject of Rustrak Instrument Division's 20-page catalog. **166**

"Hazard Warning Lights for Attended Towers," is the title of Hughey & Phillips, Inc.'s catalog. Included are data sheets describing specifications covering tower lighting and accessories, tower obstruction lighting kits and control units, replacement parts price list, special kits for tall tower obstruction lighting and tall tower specifications guide. Kits are designed to meet FCC and FAA requirements. **167**

BM/E CLASSIFIED MARKETPLACE

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DISPLAY CLASSIFIED ADVERTISING: $22.50 per inch 1x; $22.00 per inch 3x; $21.00 per inch 6x; $20.00 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 25¢ per word; minimum $3.00. BLIND BOX NUMBER: No extra charge. Replies sent to address below will be forwarded to you. PAYABLE IN ADVANCE; send check with order. CLOSING DATE: 5th of 2nd month preceding issue date.

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Radio Station Manager for Oklahoma daytimer. Excellent town, good market. Want all-around man, oriented on sales. Salary $750.00 a month plus car, and bonus. Ownership possibility to right man. Give full details including references. All replies confidential. Don't phone—write John Morris, The Free-Lance, Henryetta, Okla. 74437.

Engineer with good maintenance background. Some switching required. Full color operation. Good equipment well maintained. Full employee benefits plus good area to live in California. Good man will make over 10M first year. Contact Chief Engineer, KLYD-TV, Bakersfield, Calif.

CHIEF ENGINEER: Extensive transmitter and VTR experience who is willing to work hard in a small operation. Write to Joseph A. Sheridan, President and General Manager, WSWO-TV, P.O. Box 1366, Springfield, Ohio.

Announcer for 5KW full-time Pennsylvania adult music station with heavy accent on news and sports. No. 1 in medium market. Modern operation with top sound. No maintenance or selling. Good salary and fringe benefits. 215-696-3690.

Engineering position available to work with PC-70's, VR-2000's and TK-27's in outstanding metropolitan VHF operation. First Class license required. Write Box 169-11, c/o BM/E, Blue Ridge Summit, Pa. 17214.

First Class technician for east Pa. 5,000 watt full-time station. Well-established clean operation offers profit-sharing plan, other good benefits. Box 169-12, c/o BM/E, Blue Ridge Summit, Pa. 17214.

WNOG in Naples, Florida. NBC affiliate needs first phone night man—no maintenance. Send information and realistic salary immediately to John L. Norman, Program Director, P.O. Box 1128, Naples, Florida 33940.

#1 and #2 technicians wanted for 125-mile 20-channel CATV system. Construction beginning. Penna. Box 169-13, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Video design engineers and technicians needed in rapidly expanding Vital Industries, Inc., in Gainesville, Florida. Write or call Mr. N. Donoyan (3614 S. W. Archer Road. Tel. 904. 378-1581).

Sales minded station manager. Salary and bonus plus chance to earn part ownership. Small market in Carolinas. Box 169-1, c/o BM/E, Blue Ridge Summit, Pa. 17214.

POSITIONS WANTED

Professional salesman, manager, public relations, degree, proven record & references. Large corporation trained. 10 years experience. Married, 31. Desire permanent position having good growth opportunities. $12,500 minimum, available January. Box 169-2, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Trouble Shooting husband and wife managerial team. Familiar all phases AM radio. Prefer New England or Atlantic Coastal area. Available early 1969. Permanent. Box 169-3, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Happy Sound Morning Man—Experienced Combo—1st Phone. No Maintenance—Excellent Air Sell. Tight Production. Good References. Minnesota, Iowa, Wisconsin, Dakotas. Box 169-4, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Available immediately, recent broadcasting graduate, 3rd endorsed, creative, willing. Resume tape upon request. 233-2937 after 6:30. Peter Ledwith, 60 Woodmere Rd., West Hartford, Conn. 06119.

POSITIONS WANTED (cont'd.)

Female—40—December grad of Broadcast school. Desire work in copywriting, commercials or production commercials. Relocate. 3rd. Box 169-14, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Negro dj, N.Y. trained. Best jazz in town. Strong on news. Good board. 3rd endorsed. Box 169-15, c/o BM/E, Blue Ridge Summit, Pa. 17214.

DJ/announcer, newscaster, salesman. Negro, experienced, versatile, creative. 3rd endorsed. Tight board, authoritative news any format. Mature. Box 169-16, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Black personality disc-jockey . . . program variety show and jazz. Best radio ratings in the country. Dependable, married. Resume, tape upon request. Box 169-17, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Have FM CP? Let me put it on the air and in the money. First. Family, require 1 year contract. $175. Box 169-5, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Manager/Comm. manager, best references, small, medium markets. Full responsibility. 36 years old/civic leader. Experienced all phases. Box 169-6, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Experienced dj-announcer, third phone, tight board, good news, commercials. MOR. Interested in New York area. Box 169-7, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Disc jockey, newscaster, salesman, third-endorsed, tight board, experienced, dependable, versatile, creative, and Negro. Box 169-10, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Negro announcer—dependable—experienced. Reliable—can work any type station. Third endorsed. Box 169-18, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Young hip Negro announcer. Real swinger, will travel, broadcasting school graduate, third phone endorsement. 215/472-2741. Box 169-19, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Mature announcer with 20 years experience seeks position with large market station only. Good references. Write Box 169-20, c/o BM/E, Blue Ridge Summit, Pa. 17214.

EQUIPMENT FOR SALE

ANTENNA FOR SALE

1 RCA TFU-24BLS Antenna (Ch. 27) with ½ degree electrical beam tilt. Good condition (VSWR 1.1 to 1 or less). 28 sections RCA MI 19089 UHF Trans. line. 3⅛ inch—20 ft. sections.

Contact: R. J. Wickham, Dir. of Eng. WKOW-TV Madison, Wisconsin 53701

TRANSLATOR POWER now put your translator where antenna should be for best coverage not where power line happens to be . Use a TELAN thermoelectric generator. No moving parts, simple to operate, leave unattended 6-12 months. General Instrument Corp., Thermoelectric Division. Dept. BM, 65 Gouverneur St., Newark, N.J. 07104. 201-485-2100 ext. 481.

Best deals—Spotmaster, Scully, Magnecord, Crown, Amega film equipment, CBS Audimax/Volumax, Metron Modulation Monitor, Langevin, Pultec, Fairchild, Universal Audio, Rek-O-Kut, Gray, Russco, other top brands. Write for information. Finance, trade, lease. Audiovox, Box 7067-55, Miami, Florida, 33155.

Gates FM5B transmitter, excellent condition, operating recently and like new MO5534 Exciter on 100.7. Exciter easily retuned. Also over 500 feet of 3⅛" rigid transmission line for FM. Available immediately. Real good price. John R. Kreiger, KVET, 113 West 8th Street, Austin, Texas 78701. A.C. 512-GR 8-8521.

Gates 5KW FM transmitter FM5B, excellent condition, complete with stereo exciter, harmonic trap, tubes, manuals, connections to Gates RDC-10 remote control. Removed from operation for high power. Crated for shipment. Jack Link, KETO-FM, 1411 Fourth Avenue Building, Seattle, Washington 98101.

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Collins 737 amplifier converted to 4CX5000A tubes, $1750, f.o.b. Los Angeles. Good condition. Also Moseley SCG-4, 67kc. Generator like new. $450. Write or phone Adams, KUTE Radio, Occidental Center, Los Angeles 90015.

Collins 830E-1 5kw Solid state stereo generator; GE BF-3-A 10kw Amplifier with rectifier, amplifier converted to use 3CX2500 tubes. Call Mr. Leggett 213-681-6777.

Ampex 300 Mastering recorder. Mono Console. Excellent condition. $975.00. Barbara Allan Productions, Inc., Box 207, Kalamazoo, Michigan. Phone 327-6746.

100 ft. tower $200.00, 200 $800.00, 300 $1500.00, 400 $2400.00. Groundwire new 68¢ per lb. Bill Angle, 917/752-3040, Box 55, Greenville, N.C. 27834.

Broadcast and recording equipment, new and used, bought-sold-traded. New items listed daily. Maze Corporation, Box 6636, Birmingham, Ala. 35210.

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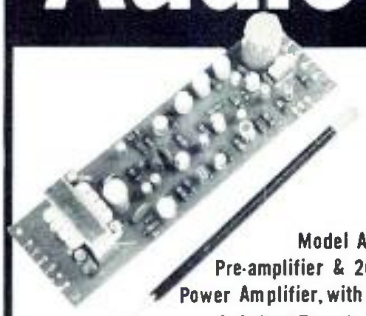

Model AA-300
Pre-amplifier & 200MW Power Amplifier, with Input & Output Transformers.

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	MODEL AA-300 PROFESSIONAL AMPLIFIER (200MW)	MODEL AA-500 PROFESSIONAL PRE-AMPLIFIER
Freq. Resp.	±1db, 20-20K cps, 200MW ±2db, 20-35K cps, 100MW	±½db, 20-20K cps Linear or RIAA Equalized or NAB Equalized
Harmonic Dist.	<1%, 20-20K cps, 100MW <2%, 20-20K cps, 200MW	<0.5% 20-20K cps
Input Z	50-150Ω, or 600< balanced (mu-metal shielded permalloy core transformer) 2K or 100KΩ unbalanced	48KΩ (May be used with input transformers)
Output Z	500Ω & 8Ω (grain oriented transformer) 200MW	5KΩ (May be used with output transformers)
Gain	80db	70db
Circuit	7 transistors 1 thermistor	4 transistors
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- ☐ Please send me, free of charge, your spec sheets on your complete line of amplifiers, oscillators, power supplies and RF Solid State Circuit Boards.

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Circle 45 on Reader Service Card

EQUIPMENT FOR SALE (cont'd.)

Schafer stereo automation system. Year old. Excellent condition. Make offer, KTBT, Garden Grove, Calif. (714) 530-5100.

RCA TTU-1B UHF Transmitter. Some parts missing. Exciters alone worth the price. Dick Lange, WHUT, Box 151, Anderson, Indiana 46015.

Complete kit audio proof forms $3.50 postpaid. Specify AM/FM. Box 2605, Corpus Christi, Texas 78403.

Protect your records. Send for our free LP supply lists. Record Supplies, Hillburn, N.Y. 10931.

One TBM-3500 black McMartin FM modulation monitor like new. Highest offer. Make yours. Box 169-8, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Auricon 400' optical. Magnetic. Zoom. Tripod compl. accessories. Magnasync 400' Mixer & accessories. Box 169-9, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Whatever your equipment needs . . . check first with Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee 37620.

6 element circular vertical and horizontal antenna. Price $2,400.00. Box 169-21, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Towers, broadcast, microwave, CATV, TV, new and used. Phone 224-9922, Tower Maintenance, Inc., 2408 Old St. Rd., Tallahassee, Fla.

BARGAINS: CCTV Cameras, monitors, send for free list. Box 169-22, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Japanese Electronics. New products monthly! $1.00. Money-back guarantee. DEE 10639 BM Riverside, North Hollywood, Calif. 91602.

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New lab prints free with each order

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"DEEJAY MANUAL" is a folio of Gags, Ideas, Breaks, Gimmix, Fun for the working deejay. Special $3.00 with this ad. Write for free "Broadcast Comedy" catalog. Show-Biz Comedy Service (Dept. E) 1735 E 26 St., Brooklyn, New York 11229.

35,000 professional comedy lines! Forty speakers' joke books plus current comedy, a topical humorous service period. Catalog free. Sample selection. $5. John Rain Associates, Inc., 232 Madison Avenue, New York City 10016.

PROGRAM SERVICES (cont'd)

DEEJAYS! 6000 classified gag lines for radio, $5.00! COMEDY CATALOG FREE! E. Orrin, Boyer Rd., Mariposa, Calif. 95338.

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R.E.I.'s famous (5) week course for the First Class Radio Telephone License is the shortest, most effective course in the nation. Over 98% of R.E.I. graduates pass F.C.C. exams for 1st class license. Total tuition $350.00. Job placement free. Write for brochure Radio Engineering Incorporated Schools. 1336 Main Street, Sarasota, Florida 33577—or 3123 Gillham Road, Kansas City, Missouri 64109—or 809 Caroline Street, Fredericksburg, Virginia 22401—or 625 E. Colorado Street, Glendale, California 91205.

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in a space of ..... inches..... words under the Classification of:

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BM/E ADVERTISERS' INDEX

*Also in Broadcast Equipment Buyers' Guide

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Central Tokyo, Japan
Yoshi Yamamoto

FROM THE EDITOR

A Farce, Unfortunately

A *BM/E* reader from overseas dropped into the office the other day to ask our advice.

He had just read the President's Task Force report on communications and was eager to offer the insatiable American public multiple programming. He whipped out a plan and asked how we thought the FCC would receive it. It was incredibly elegant and simple—too simple for the FCC.

Casting about for an approach to explain the facts of life, we asked if he was at all familiar with the FCC's requirements. He said yes, he'd read the Communications Act of 1934 and had kept up to date by listening to Radio Free Europe broadcasts.

"You have a most enlightened regulatory group," our guest enthused, "and my plan is aimed to fulfill the FCC's objectives. My plan is predicated on four values: 1) a TV outlet for local community expression; 2) an outlet for *every* community; 3) free TV and 4) maximum possible multiple programming. That's what the FCC wants, isn't it?"

We had to admit that it was, but covered ourselves by suggesting that there were other complications.

Rather than recount this conversation exactly as it occurred, we'd better give you Mr. G's plan. It was designed for two- and three-station communities within the top 100 markets such as a Decatur, a Cedar Rapids, or a Terre Haute. Mr. G's proposal called for: 1) construction of a uhf station limited to 10kW power; 2) a cable franchise (nonexclusive to include 20 channels:) 12 channels for TV signals; three channels for local neighborhood origination; and the remainder available for assorted public service transmissions. The uhf signal would be received free since it was over the air. Ten channels of TV would cost $5 a month; the full 20 channels, $8 a month.

Mr. G. had modest advertising rates worked out for the "U" and the cable and explained that studios at the "U" were available for cablecasting and that he'd have one or two mobile vans for on-the-scene telecasts, "U" or cable.

"Unique," we said, "but if somebody has already applied for a "U", or if the existing "V's" show how your cable saturation will hurt them through dilution of viewers, the FCC will turn you down."

"I've already thought of that," our bright foreigner responded. "If any "U's" complain, I'll buy them out for their current investment. And I have another trick up my sleeve prompted by Mr. Schildlause's talk on subsidizing 'U s." If the existing stations can show dilution, we'll raise the monthly cable fee an extra $5 and divide the proceeds among the local stations, that are hurt. With 10,000 subscribers, I have $50,000 a month to offer to local stations—maybe a little less after paying copyright or retransmission fees.

Surprised, we murmured, "You think the v'ewers will pay?"

"Yes, but I'll give them a choice not to. For five channels, there will be no extra fee. We'll let the public decide." Mr. G. then showed us a list of 30 cities in which he proposed to apply for a chance to bring more TV to the public.

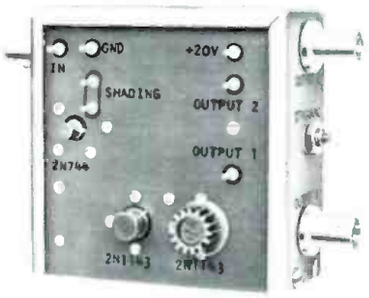
We had to hit him squarely this time. "You do know the FCC will not grant such multiple ownership?" we said. "But why?", he protested. "Didn't you notice that I am letting a local group of citizens decide what the local programming effort should be?"

"The FCC simply thinks that too much concentration of media corrupts; that's a tenant not in the Communications Act."

Our friend broke into a smile. "I have the answer," he declared. "I'll own only one system and franchise elsewhere!"

James A. Lippke, Editor

TCA3 TRANSISTORIZED CAMERA AMPLIFIER



The dependable TCA3 has almost become standard equipment in all image orthicon cameras. It replaces the vacuum tube pre-amplifier and is designed so it may be quickly mounted within available space in the camera without permanently disabling the vacuum tube amplifier. This cool little amplifier, about the size of a package of cigarettes, can add years to the life of cameras. The TCA3 sells for $295.00 F.O.B. Nashville, Tennessee.

For complete information, write to:

INTERNATIONAL NUCLEAR CORPORATION

608 Norris Ave • Nashville, Tenn. 37204 • Ph.: (615) 254-3365

Circle 50 on Reader Service Card

TC1 CLAMPING AMPLIFIER

The TC1 Clamping Amplifier employs tip clamping to remove low frequency signal deficiencies without disturbing burst and other chrominance information in or about back porch levels. The clamped stage utilizes a field effect transistor driven by a balanced bridge circuit. This advanced design technique produces highly effective and stable clamping. The TC1 Clamping Amplifier sells for $325.00 F.O.B. Nashville.

For complete information, write to:

INTERNATIONAL NUCLEAR CORPORATION

608 Norris Ave • Nashville, Tenn. 37204 • Ph.: (615) 254-3365

Circle 51 on Reader Service Card

INTERNATIONAL

NUCLEAR CORP.

TDA2D VIDEO/PULSE DISTRIBUTION AMPLIFIER

The now-famous TDA2 Distribution Amplifier, in use at most television stations and networks, has a recently added feature. The "D" stands for Differential Input, which we added to the TDA2. And not only did we add a differential input, we subtracted $30.00 from the price. Instead of $325.00, we're selling the new improved TDA2D for $295.00 F.O.B. Nashville, Tennessee. The compact TDA2D fits neatly into 1¾ inches of panel space and produces virtually no heat.

For complete information, write to:

INTERNATIONAL NUCLEAR CORPORATION

608 Norris Ave • Nashville, Tenn. 37204 • Ph.: (615) 254-3365

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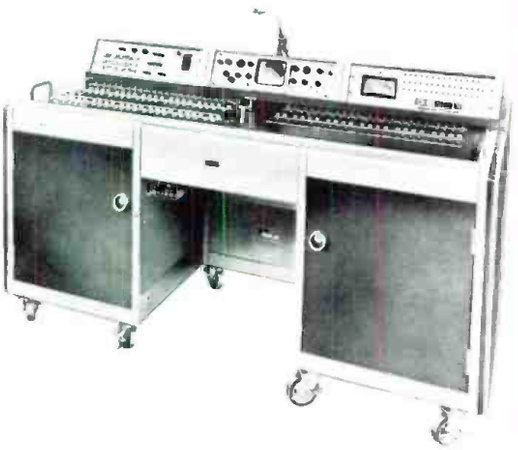
A COMPLETE REED STUDIO SWITCHING SYSTEM



We build them, in a few weeks, to your exact requirements. No limit on number of input and output buses. A single switching cross-bar can be operated from any number of studios, or master control, or VTR positions. Single re-entry, dual re-entry, keying buses, lap-dissolve buses, special effect buses, previews, spares, audio-follow-video, audio-not-follow-video, cut-bars, preset and transfer switching, and even computer-operated switching, are available for the asking.

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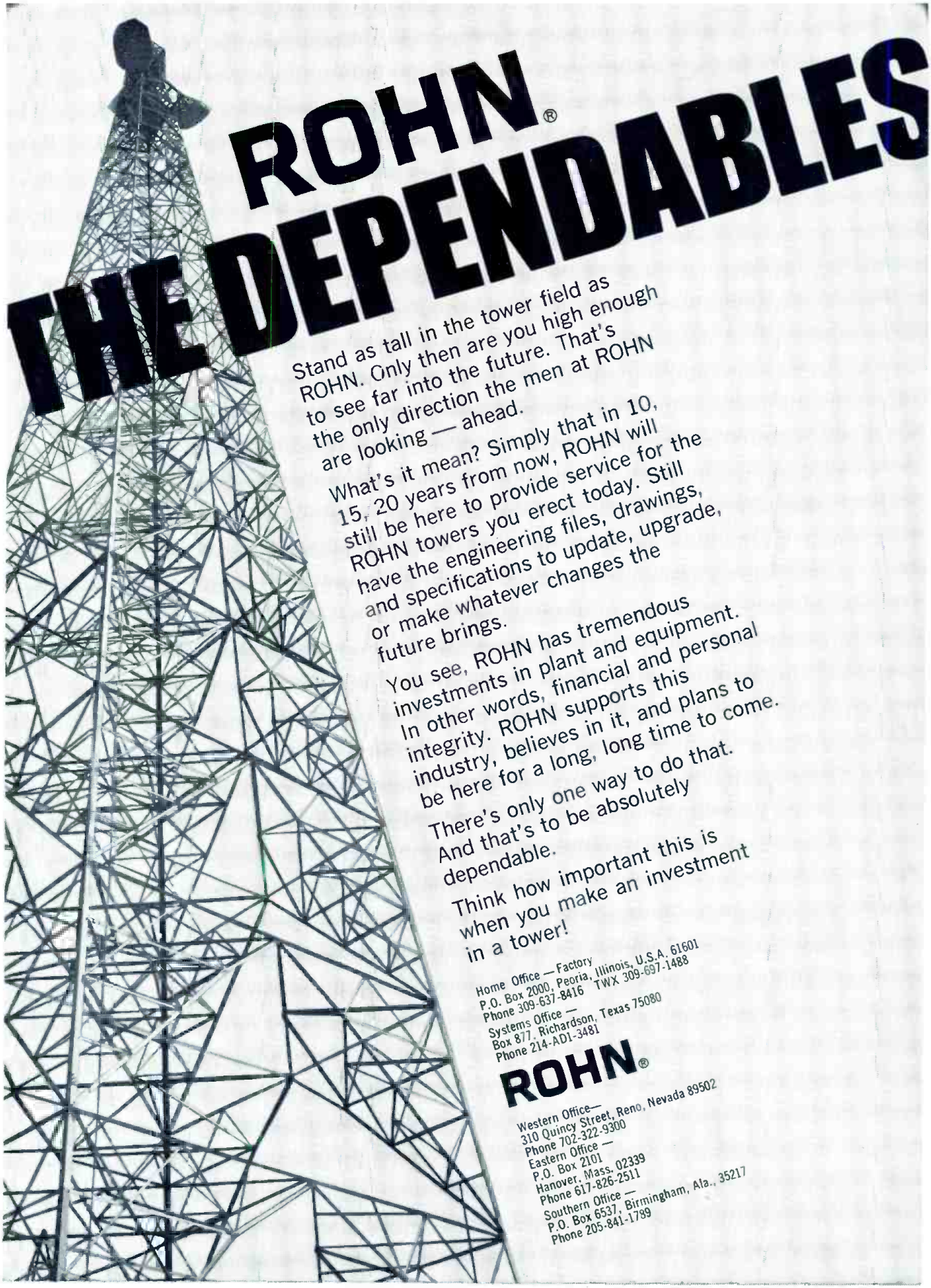

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