



AUGUST, 1966

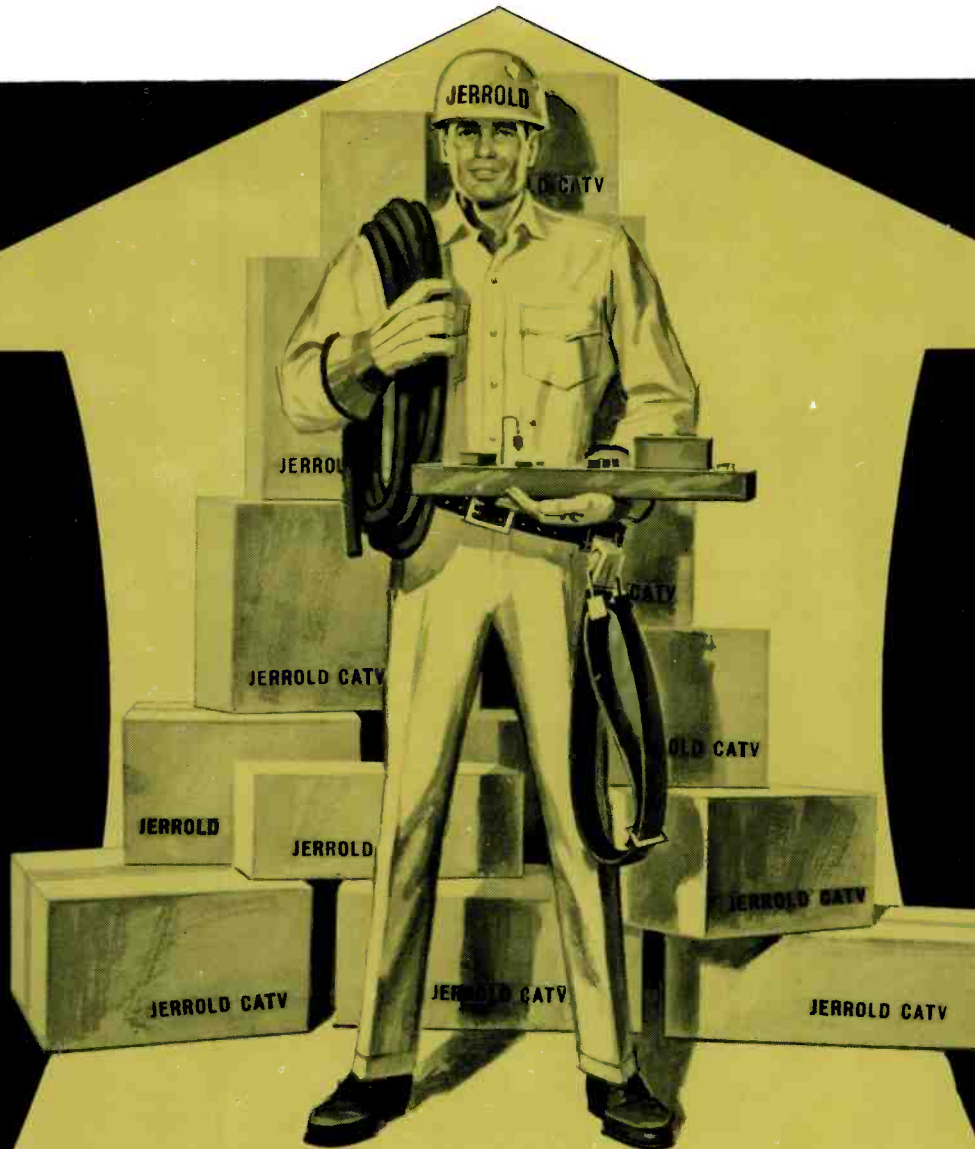
TV & Communications

The Professional Journal of the Cable Television Industry



NCTA Convention Highlights • Analysis of New Equipment • Exclusive—CATV in Japan

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And products are on the move at Viking. Last year our CATV business tripled. We introduced 151 new cable television products. "Vikal" solid sheath aluminum cable is being manufactured in half mile lengths. The great "Goldline" Solid State Modular Amplifiers are setting new performance standards for the CATV industry.

Systems Construction Company, a Viking subsidiary, is engineering and building turnkeys at a rapid pace.

Viking moved ahead of competition with the introduction of the compact, "Weatherama" time/weather device. We also joined forces with United

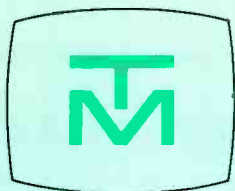
Press International to produce the "News-A-Rama" — the finest CATV news machine available.

Things are moving at Viking and they're keeping pace with the exciting CATV industry.

If you are thinking of a move in CATV — move with Viking!

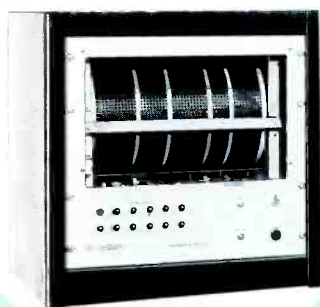
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VR-6275

This new low cost video recorder was developed by AMPEX and introduced to the CATV industry by TeleMation. Records and plays back both picture and sound on reuseable magnetic tape. Beautiful styling and beautiful pictures—a must for your local origination plans.

Portable — take it to City Hall or to your High School ball park.

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PORTABLE CAMERA SYSTEMS

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You got the word in Miami. Local origination is IN! Let TeleMation quote you a system custom designed to your requirements. Call us collect—Today!

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Public Service



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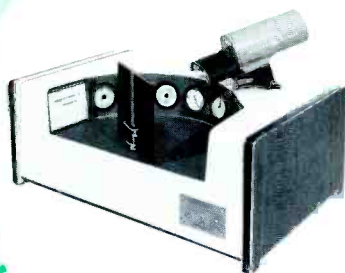
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IN THIS ISSUE

CONVENTION HIGHLIGHTS

A special section, as well as the cover, of this month's issue has been devoted to the recent NCTA national convention in Miami Beach, Florida. A review and analysis of new products shown in Miami, and photo coverage of the exhibit area are provided by Technical Associate I. Switzer and Managing Editor Robert Searle. Also included are condensed versions of major speeches given at the convention. Read the special section starting on page 34.

JAPANESE CATV



"CATV in Japan," says Philip D. Hamlin, "exists upon two desires: coverage by the stations and receiver sales by the dealers." Mr. Hamlin's brief, comprehensive narrative points out the major differences in U. S. and Japanese CATV, and relates some of the problems faced in constructing a system in Japan. Read about his visit to two Japanese systems on page 54.

FACTORS IN FIELD STRENGTH

The elements that influence field strength do not easily lend themselves to "hard and fast" rules and formulas. According to author S. F. Kaufman, a number of variables may contribute to the range and quality of TV reception in a particular area, including: frequency, radiated power, antenna height, terrain and weather. Read Mr. Kaufman's discussion of field strength and how it is influenced on page 62.

OUR COVER

Pictured on this month's cover are NCTA National Vice-Chairman Jack R. Crosby, Mrs. Crosby, NCTA National Chairman Alfred R. Stern, Miss Anita Bryant, NCTA President Frederick W. Ford, and Mrs. Ford.

Stanley M. Searle, Patrick T. Pogue PUBLISHERS

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AUGUST, 1966
Volume 3, Number 8

TV & COMMUNICATIONS

THE PROFESSIONAL JOURNAL OF THE CABLE TELEVISION INDUSTRY

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EDITORIAL

By Stanley M. Searle

Socialized CATV

An editorial appearing recently in a Charlotte, N. C. newspaper proposed "*the exploration of the legality and advisability of eventual ownership of the (CATV) system, or outright ownership and operation from the beginning.*" The newspaper interprets the "*hot pursuit of a franchise by three CATV firms*" as an indication of the profit potential in cable television—and ample justification for the city's looking into prospects of public ownership of the proposed Charlotte system.

The newspaper editorial calls attention to the Asheville, N. C. franchise which was awarded on the basis of a 16 per cent franchise tax with system ownership reverting to the city after 20 years. (The suggestion by the *Charlotte Observer* with regard to city ownership of the cable system is convincing evidence of the harm already done by the ill-conceived proposal which won the Asheville franchise.)

The editorial in question states that "*the city of Charlotte should not be bashful about eyeing community antenna television with the purpose of getting the greatest possible financial benefit from it for hard-pressed taxpayers.*" While we're on the subject of financial benefits for the taxpayers, how about proposing city ownership of the local newspaper? There is plenty of money to be made in newspaper publishing. So why not let the city own the newspaper *with the purpose of getting the greatest possible financial benefits for the taxpayers!*

Certainly common ownership of a cable television system is *not* in keeping with the American system of free enterprise. Cable television is not a basic essential. Nor is there any reason for restricting free competition by private businesses for the opportunity to provide this service to the public.

Unless the *Charlotte Observer* is prepared to accept the idea of cities entering into the business of operating newspapers it should retract its advocacy of city-owned cable television.

The concept of "socialized CATV" will undoubtedly be brought up many times during the next few years as cable television is introduced in virtually every community of our land. Cable operators should make it their business to challenge this idea whenever and wherever it is presented. It is a concept alien to the American enterprise system.

Alert CATV operators can hopefully prevent another "Asheville", and thereby render a very important service to the cable television viewers and system operators across the country.

FCC Restricts ETV

On June 22, the FCC issued a cease and desist order to Mission Cable TV, operator of a system in Poway, Calif. near San Diego. The Commission had ruled that 7 Los Angeles stations put a Grade B signal over Poway, but that KCET, the educational station, did not. Thus, a little ETV is being kept out of an area in which there is *no ETV* because it offers only public service programming—not high power.

Lee Druckman of Mission Cable reports that he has received several calls from subscribers who want to know why they can no longer receive educational television. The cable firm filed for a waiver of the rule late in July. Poway is within the Grade A contour of KFMB-TV, San Diego, the nation's 54th ARB market.

Imagination Important

Cable television operators may face a tightening economic squeeze from legislation, regulation, taxation and possible copyright frees. (The probable result of efforts by state, federal and local government officials, broadcasters and others who wish either to retard growth of CATV or share in its profits.) However, the opportunities for increased profits are steadily improving. And after developing skills and technology for local public service programming, CATV operators will soon discover many opportunities to provide services for pay.

Besides entertainment services, many operators will want to explore leased or metered use of their cables for voice communications, teletypewriter, private closed circuit television including ETV, and dozens of other specialized services.

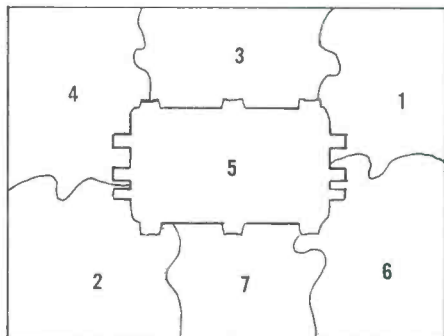
Obstacles to these profitable new cable services will be presented just as rapidly as the corporate imagination of the Bell System can devise them. But the matter will eventually be decided in favor of the cable operators by the anti-trust division of the Justice Department—if the weight of public interest, convenience and necessity doesn't decide the matter first.

Stan Searle



Where does Kaiser-Cox fit into your CATV plans?

Everywhere!



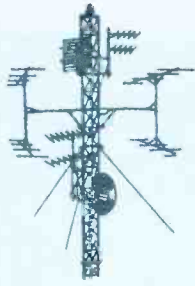
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CATV Industry PERSPECTIVE

The Commission will be forced into a new look at CATV as inequities and inadequacies of the FCC's Second Report and Order and the House Commerce Committee's CATV bill become increasingly obvious. Among the "first fruits" of the Commission's newly enacted rules were cease and desist orders specifically aimed at curtailing the extension of certain UHF and ETV signals. And construction of CATV systems in many small towns and suburbs within the "top 100" market areas has been halted--thus depriving millions of a full choice of television programming. Many of these home owners are in shadow areas or are affected by conditions which prevent good color reception.

Because the public interest is not being served by the Commission's present restrictive role in cable television, Congress cannot be expected to ratify the present FCC approach. However, in view of the trend toward greater government involvement in private industry--and the growing tendency toward government by regulation--it is safe to assume that Congress will give the FCC powerful control over CATV. But pressure from constituents will require congressmen to limit restrictions which the FCC can place upon system expansion and multiplicity of services.

Counterbalancing pressure from wealthy broadcast and copyright interests may prevail in making the CATV operator's lot much more complicated and expensive. In summary, because these interests will be unable to preserve a virtual television monopoly, at the exclusion of CATV, the broadcast lobby will attempt to restrict growth of CATV by imposing financial burdens on the cable operator. By drastically reducing the profit motive in cable system construction, NAB, AMST and others will hope to keep CATV out of several hundred communities where cable service would be highly feasible, based on present technological and economic factors.

NCTA convention revealed substantial updating and improvement in equipment lines for CATV (see special report in this issue). Strong emphasis on local public service origination by cable systems added to interest in the \$1,500 Ampex video tape recorder displayed by TeleMation. New CATV amplifiers were shown by American Electronics Labs, Anaconda-Astrodata, Cascade Electronics, Kaiser-Cox and SKL. More than \$12 million worth of equipment and construction orders were reportedly written at the convention, with Jerrold accounting for half of the business. The all-out Jerrold promotional efforts were undoubtedly costly as well as productive. Jerrold matched a large display and annual dinner party and entertainment with a gigantic personal sales effort. Nearly one out of every 20 persons attending the convention was a Jerrold employee! New head-end equipment introduced in Miami will inaugurate keener competition for the "Channel Commander market". Both CAS and Dynair have developed head-end control units.

CATV technology continues to improve and is approaching a high degree of sophistication in many areas. The wiring of very large and very small towns will be made feasible by low loss cables and solid-state amplifier equipment currently in production and on the drawing boards. Economically feasible cable service to very large and very small towns will be given a tremendous boost if the 18,000 MHz microwave service currently under experimentation by Hughes Aircraft and TelePrompTer is a success.

Now that you know all about aluminum sheathed cable, how about an aluminum sheathed, air dielectric type?



■ Attenuation is about 25% less than the equivalent size of foam cable, for one thing. For another, return loss is guaranteed not less than 26 db from 20 to 225 MC. And, average VSWR on all channels won't exceed 1.03:1. If you need further convincing, an air dielectric coax allows you to run from antenna to head-end equipment into town, over greater distances, with far fewer amplifiers. Imagine what this means to your original installation cost as well as service requirements. And, if the town you want to serve isn't particularly well located and it looks like microwave is the only way out, remember Helical Membrane can handle the job without a special FCC permit.

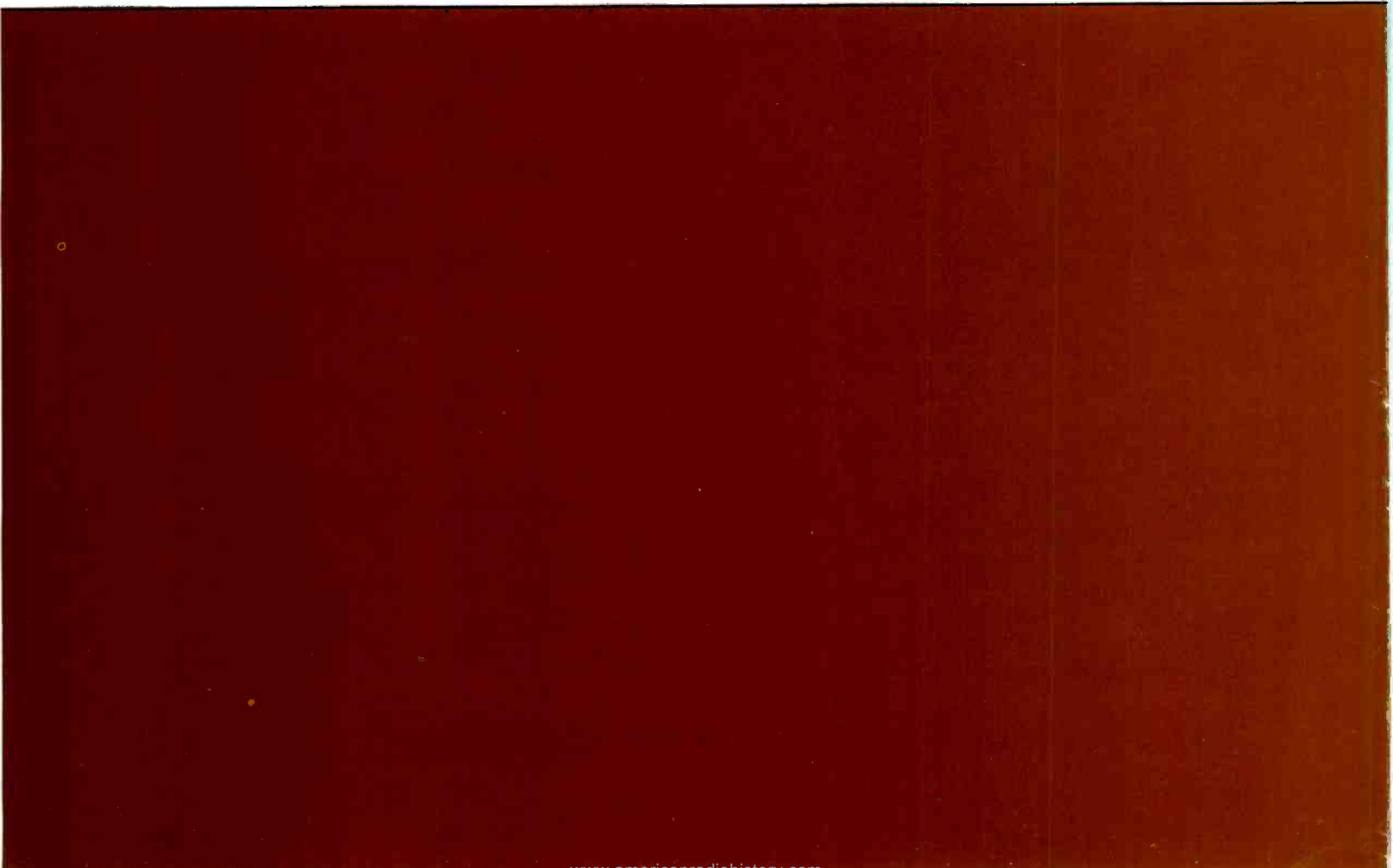
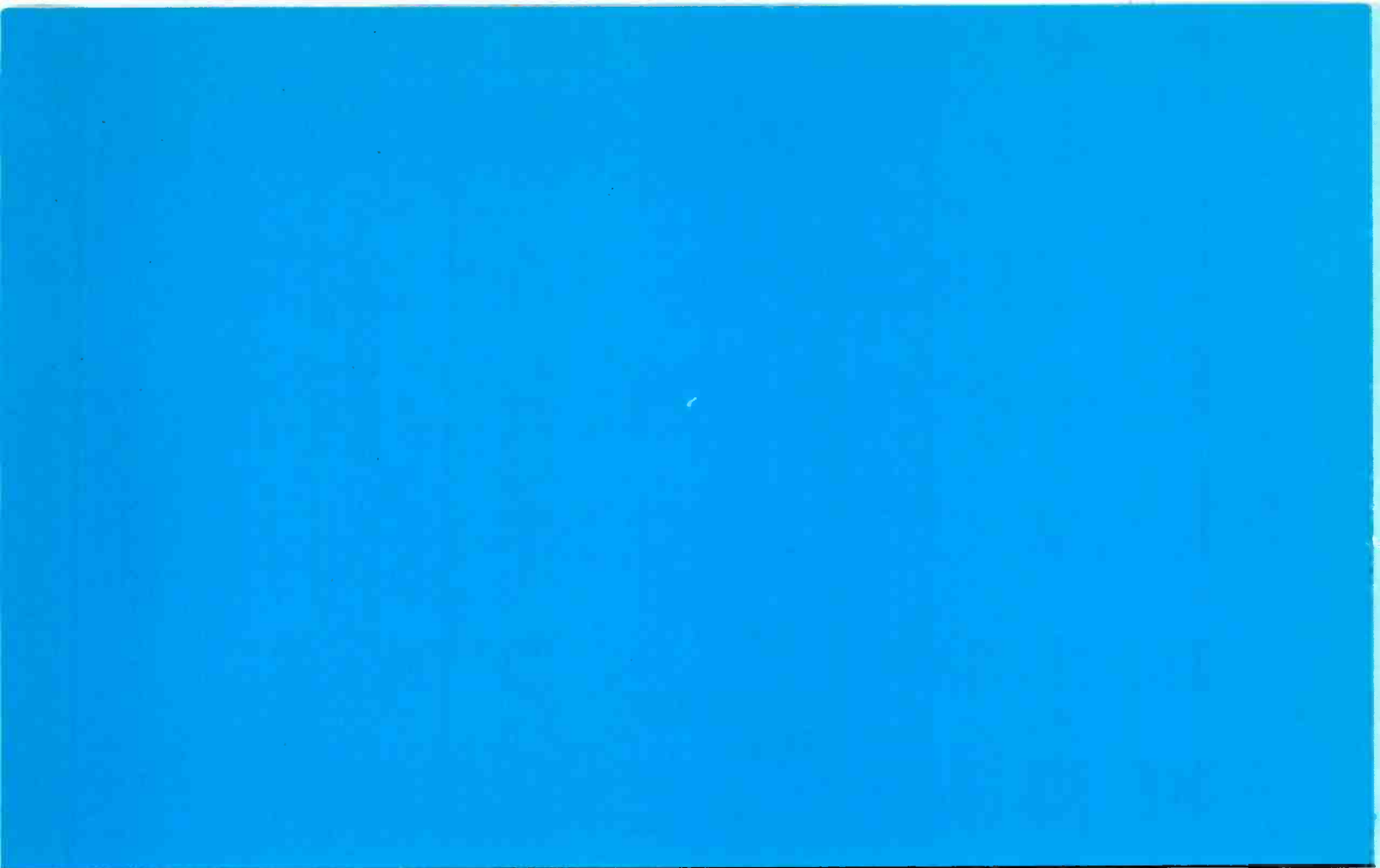
Helical Membrane coaxial cable is competitively priced with cables covering only the low band

frequencies. Quality is the keynote. Adverse atmospheric conditions, heavy snow, hail or rain have no effect. Construction consists of a copper inner conductor supported coaxially by a polyethylene helix. A continuous aluminum outer conductor provides a permanent moisture vapor barrier. You can buy Helical Membrane in $\frac{3}{4}$ " , $\frac{7}{8}$ " and 1" diameters, 75 ohm impedance, in 1000 foot reels. And, special Habirlene jacketing is available if you're interested in direct burial.

While on the subject, why not look into our Foamflex aluminum sheathed foam dielectric coaxial cable for bridging off Helical Membrane in town? Helical Membrane and Foamflex, a high-performance pair for your next installation.

For a complete listing of Sales-Service-Stocking Centers, plus up-to-the-minute technical data, write, wire, TWX or telephone: Phelps Dodge Copper Products Corporation, 300 Park Avenue, New York, N.Y. 10022. 212 751-3200, (TWX) 212 867-7455.

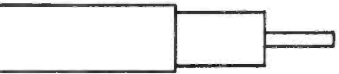
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MODEL 106C WITH SOLID STATE TELEVISION CAMERA

Cable television's latest technical development. This automatic device provides a continuous display of time, wind speed, wind direction, temperature, barometric pressure, and humidity. Housed in an attractive case mounted on a mahogany pedestal, the brightly illuminated display is easily read and understood. It is protected by a nonglaring screen that provides a neat flush front not marred by openings. No controls or adjustments are required as the unit operates automatically.

Space is provided below the displays for inserting a written message. These are easily changed, and provide a strong focal point for announcing special events, cable promotions, and for public service announcements.



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Humidity: Relative 0-100%
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Readout Lamp Life: Excess of 5000 hrs

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Video Output 1.4 v p-p

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115 vac, 60 Hz, approx. 500 watts

ENCLOSURE DIMENSIONS

24 in. wide x 16 in. long x 22 in. high

The readout numerals are a full one inch tall and appear with a high degree of legibility on the television screen. This system may be easily tied into existing cable television facilities, as the camera furnishes video and a 20 db RF signal on TV Channels 5 or 6.

Each unit is fully prealigned at the factory and requires no calibration in the field. All "Weather Data" systems are shipped ready for installation. Technical personnel are not required to install either the display or the sensors. After installation, operation is completely automatic.

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LETTERS

EDITORIAL ON TARGET

● For some time I have intended to compliment you on the informativeness of *TV&C*. I particularly enjoyed your candidly written editorial entitled "FCC Restricts UHF." The article was very enlightening, and your frankness made interesting reading.

Joe L. Berry, Manager
Iowa Video, Inc.
Ft. Madison, Iowa

LIFE STORY EXPANDED

● I much appreciated all the CATV material you sent me, and I had hoped that I would have been able to get my story in *Life* by this time. However, I rapidly discovered that CATV was a good deal more involved than I had thought, and what I thought was going to be a short 1500-word discussion has expanded into about 3000 words and still seems to be growing.

In researching the story, I found your *TV & Communications* magazine and especially your *Cable Television Review* very helpful, and I wonder if you could bring me up to date by sending me the issues . . . through the present, and keep on sending me the *Review* as it comes out until I close my story.

Chris Wells
Business Editor
Life Magazine

We are pleased to cooperate with Life in preparation of their proposed feature on CATV—and hope that this story will fully reflect the comprehensive research which that magazine's staff has done. Publication of the article was expected sometime in late July.

PROMOTION NEEDED

● Your "Industry Perspective", May issue, last paragraph, is like a breath of fresh air to those of us attempting to sell CATV system operators on better, more consistent subscriber advertising and promotion. In talking to dozens of system people in the past year, I am convinced this is one of the industry's most pressing needs — making more people (subscribers and non-subscribers, in present and future CATV communities) more fully aware of CATV's customer benefits.

Samuel J. Henry
Samuel J. Henry & Associates
Phoenix, Arizona

AN OPEN LETTER

• Please consider this an open letter to the NAB, FCC, TV receiver manufacturers and CATV industry.

The broadcast industry has evidently maneuvered the FCC into rulemaking procedures which will give this arm of the Federal Government control over the CATV industry and upset the viewing habits of millions of citizens by depriving them of their right and choice to view desired signals of superior quality which may no longer be available to them.

If we as CATV operators are going to be forced into protecting local two-bit two-by-four stations of inferior quality at our expense and our customers dissatisfaction, from any competition from outside TV signals (which is evidently what they want), then I think we should give the broadcasters and FCC a helping hand and introduce legislation immediately which would control the TV set manufacturers to this extent: If a TV set is to be sold in a particular market area, the manufacturer or local TV sales store should be required to delete from the TV receiver's tuner, all channels of stations whose grade "B" contour does not quite reach that particular market area.

There is not one iota of difference in forcing someone who can easily pick up an outside signal on a normal rooftop antenna in lieu of watching the local station who puts a grade "A" or "B" signal in the area and in forcing the subscribers of CATV to watch the local station in lieu of the outside signal.

When you think about this for a while, you can easily see that both the TV set manufacturers and the antenna manufacturers are discriminating against the local broadcasters. I think you could find that this condition exists in most areas where CATV serves the public.

I strongly urge all CATV operators to purchase a complimentary subscription to *TV & Communications* and have this mailed on a regular basis to all their Congressmen, Senators, Local Editor, and anyone else who needs to hear our side of the story. Believe me, they all need to hear it.

Milton F. Underwood
Southern Regional Manager
H & B Communications Corp.
Florence, Alabama

Letters may be addressed to:
Editor, TV & Communications,
P.O. Box 63992, Oklahoma City,
Oklahoma 73106

EMERG-ALERT SYSTEM™

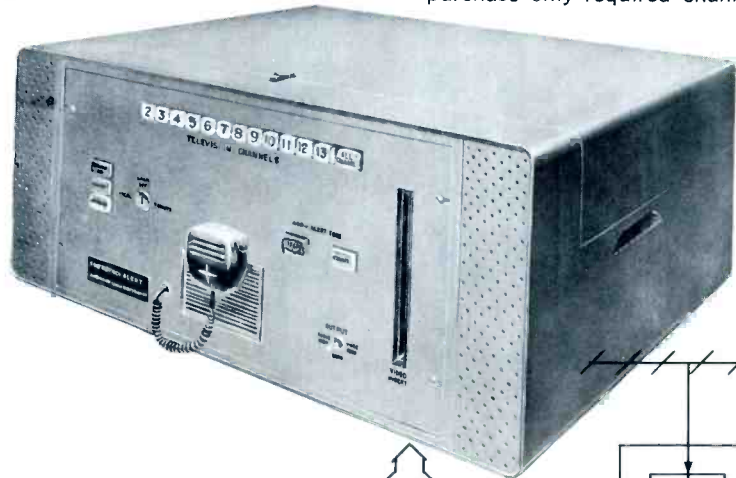
The Model 600 Emerg-Alert System is an emergency alert warning system for the cable television industry. This equipment, which is the first of its type, inserts both video and audio messages into CATV systems. It is designed to permit operation from remote locations such as police or fire stations, governmental offices, civil defense headquarters, or other posts of authority during emergency situations.

The Model 600 has a self-contained video-origination system with a high-quality vidicon camera that is constantly ready to display an alert message on any or all television channels. The alert message is copy that is placed on a card and inserted in a front panel slot—a method that permits messages to be quickly and easily changed. Audio messages can originate locally, or from a remote point through a telephone wire line.

This unit may also be used to notify subscribers if cable facilities on a particular channel are inoperative.

- CRYSTAL CONTROLLED
- MODULAR PLUG-IN CONSTRUCTION
- SELF-CONTAINED

The Model 600 Emerg-Alert System is compatible with CATV equipment, and is easily installed. Plug-in crystal-controlled video modulator units are easily exchanged, requiring the operator to purchase only required channels.



SPECIFICATIONS

CRYSTAL-CONTROLLED VIDEO MODULATOR

Video Bandwidth 10 MHz
RF Carrier Frequency Channels 2-13
Output Impedance 75 Ohms
Output Voltage RF over 30 db

CAMERA

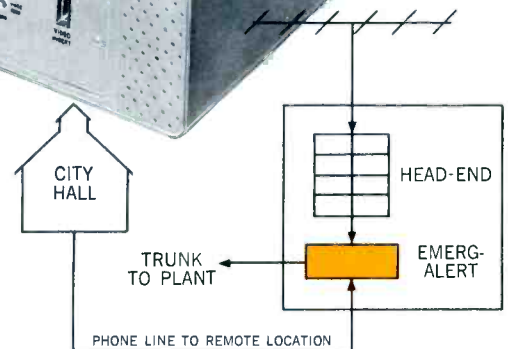
Video Bandwidth 5 MHz
Video Output 1.4 v p-p

POWER REQUIREMENT

115 vac. 60 Hz, approx. 500 watts

ENCLOSURE DIMENSIONS

11½ in. high x 15 in. deep x 24 in. wide



The Emerg-Alert unit may be energized from either local or remote position. Whenever the unit is keyed, it will automatically disconnect the trunk that has been inserted through the unit and connect the trunk to its own modulators. Upon keying the unit, an automatic 10 second audio tone will be produced. Audio and video messages will then be inserted on all desired channels.

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CATV Legal VIEW

BY JOHN P. COLE, Jr.

THE COMMERCE COMMITTEE AND THE CONSTITUTION

On June 9, 1966, after hearings, a Bill to amend the Communications Act was reported out by the House Committee on Interstate and Foreign Commerce recommending that comprehensive regulatory jurisdiction over the operation of all community antenna systems be conferred on the Federal Communications Commission. While a strongly worded dissent to the reported bill was filed by a minority of the Committee, a substantial majority of the members of the Commerce Committee felt that *carte blanche* authority to control the establishment and operation of CATV systems should be vested in the FCC.

Certainly, one of the most interesting, and *unique*, provisions contained in the Bill as reported out by the Committee reads as follows:

"No community antenna system shall transmit over its system any program or other material other than that which it has received directly or indirectly over the air from a broadcast station, except that the Commission may, upon an express finding that it would serve the public interest, authorize by general rule limited exceptions to permit such transmissions without any additional charge to subscribers."

By this simple, one-sentence provision, the Committee urges to the full House that CATV systems be singled out and hereafter excepted from the protection of those freedoms guaranteed to *all* by the First Amendment to the U. S. Constitution. In its zeal, however, the Committee seems to have overlooked the fact that back in 1791, the Constitution was amended by a Bill of Rights to provide, among other things, that: "Congress shall make no law . . . abridging the freedom of speech, or of the press". The courts, with commendable consistency, have acted to give this mandate the broadest possible application and scope.

John P. Cole, Jr. is a member of the Federal Communications Bar Association and a member of the Bar of the District of Columbia and the States of Maryland and Georgia.

If enacted into law, the recommendation of the Committee would establish by governmental fiat an unprecedented "prior restraint" on the CATV entrepreneur's right to originate, distribute, circulate or otherwise make available for public reception any programming over the closed-circuit cable facility other than that which has been broadcasted by an authorized radio or TV station. The recommended statutory provision would, of course, grant to the agency the power to make "limited exceptions" to this otherwise absolute restraint on communication; but this small "concession" in no way remedies the basic constitutional infirmity.

This legislative proposal is so dramatically inconsistent with prevailing principles of constitutional law as to tarnish virtually beyond repair the entire work product of the Commerce Committee in this sensitive area of its responsibility. For in this enlightened age, it is inconceivable that the government of the United States can by edict prevent the origination, distribution or reception of constitutionally protected communications where, in fact, the means and wherewithal for such activity is in existence and available; and it is neigh unbelievable that the Committee seriously urges the adoption of such a patently unlawful prohibition upon the free exercise of a constitutional right.

On occasions too numerous to require citation, the U. S. Supreme Court has observed that any system of prior restraint on the free flow of communications by governmental prohibition "comes before it bearing a heavy presumption against its constitutional validity". "The very purpose of a bill of rights was to withdraw certain subjects from the vicissitudes of political controversy, to place them beyond the reach of majorities and officials and to establish them as legal principles to be applied by the courts."¹

"The right of freedom of speech and press includes not only the right to utter or to print, but the right to distribute, (and) the right to receive . . ."²

Communication by any lawful means — motion picture, radio, television, newspaper, closed-circuit, hand bill, the mails, etc., falls squarely within the constitutional protection provided by the First Amendment. "The press in its historical connotation comprehends every sort of publication which affords a vehicle of information and opinion."³ The freedoms of speech and press rest on "the assumption that the widest possible dissemination of information . . . is essential to the welfare of the public, (and) that a free press is a condition of a free society"⁴.

Encompassed within these basic constitutional protections are amusement and entertainment as well as, of course, the exposition of ideas. "The line between the informing and the entertaining is too illusive for the protection of that basic right. Everyone is familiar with instances of propaganda through fiction. What is one man's amusement, teaches another's doctrine."⁵

Yet, in the face of these fundamental constitutional guarantees to *all* of the people, an important Committee of the Congress of the United States, without discernible reference to manifest principles of constitutional law, urges the application by statutory mandate of a prior restraint on the CATV operator's right to originate or otherwise distribute certain types of communications over closed-circuit communication's facilities. There can be no doubt that the provision discussed here purports to suppress totally the use of the CATV closed-circuit cable as a medium or vehicle for communication of ideas or entertainment unless those ideas or entertainment originate at the transmitter of a broadcast station. It amounts, insofar as the CATV operator's origination of programs is concerned, to total censorship, in advance — an activity irreconcilable with the proper function of government under the Constitution.

There is no need here to belabor the question of constitutionality. The proposed provision impairs the freedoms of speech and press and thus is unalterably in conflict with the First Amendment; and any court, we are confident, would promptly so hold. If the recommendation of the Commerce Committee is constitutionally sound, the Congress could just as validly pass a law prohibiting newspapers from carrying news, features, or advertisements except that which is obtained from the
(Continued on Page 58)

¹ Board of Education v. Barnette, 319 U.S. 624, 638 (1943).

² Griswold v. Connecticut, 381 U.S. 479, 482 (1965).

³ Lovell v. Griffin, 303 U.S. 444, 452 (1938).

⁴ Associated Press v. U.S., 326 U.S. 1, 20 (1945).

⁵ Winters v. New York, 333 U.S. 507, 510 (1948).



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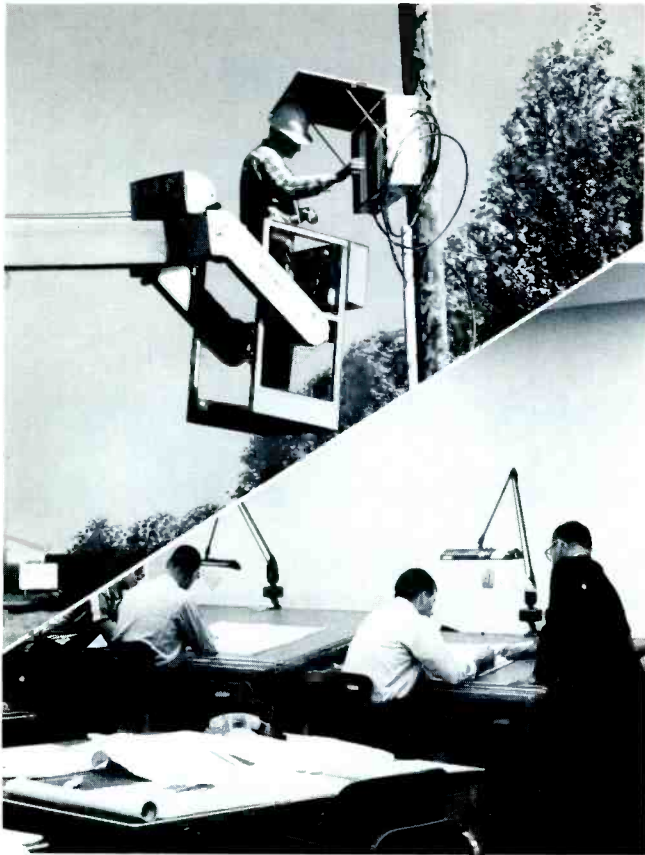
This Two Phase Purchase Plan is made practical by the Cascade Electronics Ltd. concept of modular circuit design. The housing is universal, whether for a trunk amplifier, bridging amplifier, or for a trunk/distribution combination amplifier. Amplifier housings can be programmed for function without technical skill. You program the housing as the system layout and customer service requires.

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THE GOOD SUPERVISOR

What makes a good supervisor? In the eyes of his men, the ideal supervisor has many of the virtues, such as fairness, that one would expect; he is, moreover, a highly competent worker himself. He prefers to avoid extensive mixing with employees; he does not overdo in trying to help workers with their personality problems; and he is not "all sweetness and light" — he can get tough when the situation demands it.

These traits are the highlights of a composite portrait that came out of interviews with 110 hourly paid workers in different companies. The interviews were conducted off the job; the men knew that what they said individually would be kept in strict confidence.

Although men vary in their individual desires and needs, there seem to be universal traits every employee expects of a foreman. Some of these have become almost a commonplace, but they are fundamentals. The first factor is personal consideration. In other words, employees want to be treated with courtesy and kindness, and with respect for their individuality, dignity, and feelings.

The other fundamental expectation is that a foreman should be impartial and play no favorites. Partiality and favoritism were vigorously resented by all the employees interviewed. Unless the supervisor is fair, the employees say they do not feel they can count upon fair treatment necessary to their security and peace of mind.

With a few exceptions, employees strongly emphasized the belief that a good supervisor must be technically competent. One reason for this respect for job proficiency seems to be that many people respect skill, ability, and competence as such.

The workers interviewed decisively indicated that they wanted their foreman to have thorough knowledge of how well each member of the group performed his job.

Associated with the desire for the supervisor to have complete knowledge of his men's job performance is the feeling that he ought to have reasonable control over his work group. In other words, he must translate his knowledge into appropriate action. There was a general feeling among workers that to be worth respecting as a man, a foreman should have the backbone to correct men who need correcting, and to see that his operation is run properly.

The workers in many cases felt a supervisor should avoid over-familiarity. The main reason for this feeling seemed to be that employees tend to feel insecure when supervisor and worker mix socially to any great extent. Such mixing appears to breed suspicion and jealousy because men feel they must compete socially for the boss's favor to protect job interests.

It is only human for employees constantly to attempt to gratify their psychological and economic needs. It is natural to expect that, in the worker's eyes, the supervisor's main justification for existence is his ability and willingness to help the worker attain his goals and satisfy his needs. Thus employees said a supervisor should be well informed about the way his men performed their jobs, because only then will a man receive credit for good work. Similarly employees said a foreman should be technically proficient, because this proficiency enabled him to show his men better and easier ways of doing their jobs, and helped them to develop their own technical proficiency. □

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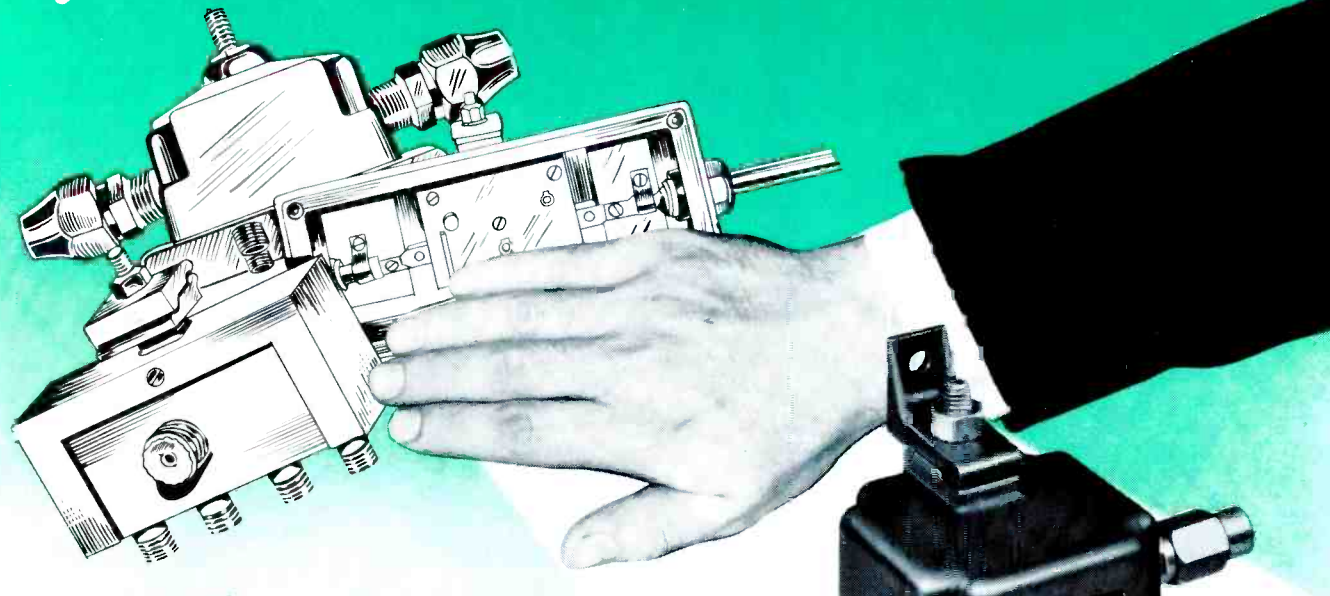
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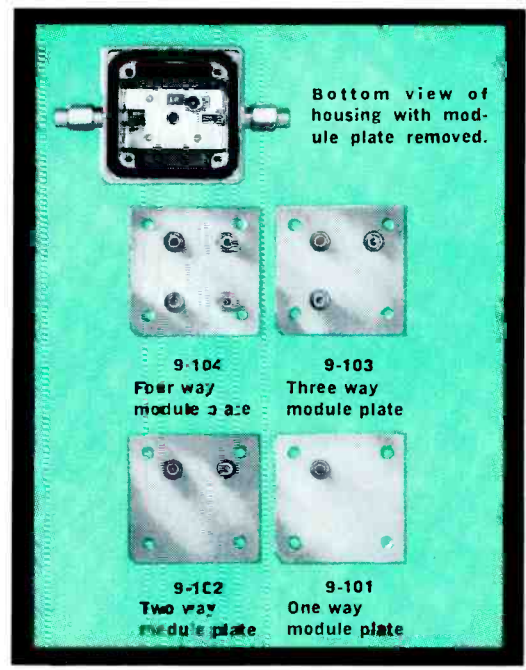


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News SPECTRUM

CONGRESSIONAL CATV ACTION

The House Commerce Committee, by a vote of 20 to 11, has approved a bill which, in effect, authorizes FCC jurisdiction over CATV systems. The committee, headed by Rep. Harley Staggers (D-W. Va.) reported out legislation that would change the Commission's original legislative language only by the addition of three amendments, one of which could have a severe adverse impact on some systems. The bill was reported out after nine days of closed executive meetings.

NCTA Protests

The National Community Television Association was, of course, outraged by the bill. NCTA President Frederick W. Ford, contacted soon after the bill came out of committee, said his reaction was "... negative . . . I don't know how they arrived at this particular bill." He said he was studying the legislation, and later issued a statement criticizing the bill as giving the FCC "power to control the free speech" of the CATV industry and to "freeze the growth of CATV."

Congressional Opinions Vary

Congressional reaction varied in direct proportion to the votes cast in the committee. Perhaps the most enlightening comments were those of Committee Chairman Staggers, who sponsored the FCC bill, but was unhappy that everyone could not be satisfied. Asked if he was satisfied with the bill, Staggers said: "No, I was not. It was a compromise that no one's satisfied with. The industries involved should have worked it out, but they couldn't, so we got brought in."

Adverse comments on the bill were also plentiful, coming from those who had fought to protect CATV interests. Rep. Walter Rogers (D-Tex.), chairman of the Communications Subcommittee and leader of the CATV fight, would only generally comment: "It's basically unconstitutional." He said he had not yet formulated plans for a floor fight. Rep. Fred Rooney (D-Pa.), from a powerful CATV district and a staunch supporter of CATV, issued a statement that the bill if adopted "will stymie the community antenna television industry for many years to come."

Industry Expresses Concern

Initial reactions to the bill by industry leaders around the country indicated that they are preparing for an active fight in the months ahead — not a silent wake for the industry. When informed of the content (and omissions) of the bill, operators expressed concern and anger. Several were amazed that the Pickle amendment, which limited the "local station" concept to 35 miles, was conspicuously absent.

Al Stern, newly-elected NCTA chairman and president of the group owner Television Communications Corp., New York City, noted that the bill "didn't come as a shock to many of us," but he did feel that this is the action which will rally the industry forces: "Unfortunately, this is not a bill that serves the public, in that it would prevent them from seeing the programming they want. But this is certainly not the end of the ball game. You just can't by legislation stop people from seeing what they want to see. These problems are simply growing pains . . . It is only natural that certain major economic forces resist the growth of something which they consider competitive."

Ameco president Bruce Merrill's initial statement was succinct: "This bill is still a long way from having the president's signature!" This thought was also echoed by James R. Palmer, president of Centre Video Corp., who felt that, "this is only the first step, it still has to go a long way before it becomes law . . . I think the terrific inconsistencies between the copyright decision and this bill reported out of the Commerce Committee are such that it just cannot come into being. There are too many things left to reconcile as the bill now stands." A Jerrold spokesman stated: "We haven't had time to study the bill, but it doesn't take much reading to see that it's a dreadful bill." Former NCTA chairman, Fred Stephenson, Rogers, Ark., didn't think "the industry can accept such a bill."

On the West coast, Harold R. Sugarman, president of H&B American, expressed displeasure with the bill, but felt that it would be modified on the House floor.

Bill Daniels, upon hearing of the bill's passage, issued this rallying call to the industry: "My initial reaction is: First, I'm not surprised. Secondly, we will fight it on the floor of the House of Representatives. Thirdly, we then will have the opportunity as a free American to fight it on the floor of the Senate. And fourthly, this is only going to retard the growth of CATV, it's not going to stop it. We know we're right, and it's just a question of whether we grow in the next 12 months or in the next 5 years. Eventually we've got to win this battle."

TOP 100 TANGLE GROWS

The proverbial "red flag" that the Federal Communications Commission is waving in the form of their top 100 market ruling on the importation of signals is apparently having the well-known undesirable effect on systems which fall under it.

TeleSystem's Springfield Township, Pa., system, which ignored the FCC rules and went ahead with construction, has, like its rebellious brothers, received an order from the Commission to show cause why it should not be ordered to cease and desist operation of its system, which is importing distant signals into a top 100 market without FCC approval.

Buckeye Cablevision Inc., Toledo, Ohio, has indignantly challenged the FCC's rules all the way to the U. S. Court of Appeals in Washington, D.C. Instead of appealing the Commission's cease and desist order on the basis that the Commission adopted its new rules hurriedly and without proper notification, Buckeye has determinedly tried to re-open all the issues.

First Illinois Cable TV, Inc., attacked the top 100 concept by filing a petition for waiver of the rules which was supported by a resolution passed unanimously by the Springfield city council. The petition points out the tenuous, unrealistic nature of the "markets" concept, especially when applied to the Springfield-Decatur, Champaign-Danville market, which is ARB market number 73. This market, the petition maintains, "has no relationship to the actual market or what is considered to be a market trading area."

The Second Report and Order itself will be tested in the 8th Circuit Court of Appeals in St. Louis, Missouri, in a suit filed by Midwest Video and Black Hills Video. The two companies have received permission to enlarge the scope of the pleading, and, along with Association, will argue the bearing of the National Community Television the Second Report and Order upon the First Report and Order.

BEISSWENGER CHIEF EXEC.; SHAPP LEAVES INDUSTRY

Milt Shapp, CATV pioneer, who earlier this year stepped down from active participation in the day-to-day operation of The Jerrold Corporation to run successfully for the Democratic nomination for Governor of Pennsylvania, has now sold all his shares in the firm. A syndicate headed by Howard Butcher III, W. W. Keen Butcher and Robert H. Beisswenger, has purchased the block of stock which represents 25% of The Jerrold Corporation stock.

Mr. Beisswenger, who has been president and chief operating officer of the firm since early this year, has been elected chief executive officer, and three new directors have also been named. Those on the board of directors are: Howard Butcher III and W. W. Keen Butcher partners in the

Butcher & Sherred investment banking firm; Philip Zinman, chairman of the board of Associated Mortgage Company; Simon Pomerantz, Jerrold treasurer; Dalck Feith, president of Dalco Manufacturing Company; and Wentworth P. Johnson, director of the Fidelity-Philadelphia Trust Company.

FCC LEASEBACK CONTROL REAFFIRMED

The Federal Communications Commission has reaffirmed its order that American Telephone and Telegraph, and General Telephone and Electric Service Corp. must file CATV leaseback tariffs with the Commission. The FCC reaffirmed the order after both telephone companies objected on the grounds that systems are provided only with local distribution facilities, and that leaseback tariffs should therefore be filed with the states. The Commission's argument is that CATV systems

are in interstate commerce, and therefore any common carrier serving them should be considered as engaged in interstate commerce. The National Community Television Association has filed a brief before the FCC opposing the AT&T petition, and backing the Commission's stand.

WHITNEY ELECTED ENTRON PRESIDENT



Mr. Whitney

Edward P. Whitney, a pioneer in the CATV industry, was elected president of Entron, Inc., on July 12, 1966, by the board of directors.

He replaces Robert J. McGeehan who resigned to devote more time to his personal affairs and to other business interests including a family-owned CATV system in Fredricksberg, Virginia. Mr. McGeehan will continue with the firm in the capacity of consultant.

Mr. Whitney, formerly vice president and sales manager of Entron, also was elected to the board of directors and to the executive committee of the board.

EIA TO HAVE CATV SECTION

The board of the Electronic Industries Association, at the close of the EIA's 42nd annual meeting in Chicago, recommended the setting up of a CATV section under the industrial division. Bob Vendeland of Dynair Electronics Inc. will be responsible for the initial organization. Reportedly, an official from a CATV manufacturing firm will head up the group.

HOUSE COPYRIGHT DEADLINE

The House Copyright Subcommittee, headed by Rep. Robert W. Kastenmeier has been forced to delay once again in finishing work on the sweeping copyright revision legislation on which it has been toiling for so long. The CATV section has already been announced, however, and Kastenmeier said that no changes would be made in it before the bill is reported to the full Judiciary Committee. The bill has to go through the entire legislative process before it can affect the CATV industry however, and that can't happen until the subcommittee acts.

MARYLAND CATV BILL

A CATV utility bill was introduced in mid-July in the Maryland legislative council by Solomon Fiss, Chairman of the State's Public Service Commission.

NEW NCTA LEADERS CHOSEN

NCTA figures show a record 1,850 registrants at the national convention this year, with 65 industry suppliers represented on the exhibit floor. The atmosphere was even more businesslike than in previous years, with unseasonable weather limiting excursions outside the convention area.



NCTA officers, front row, Benjamin Conroy, Alfred Stern and Jack Crosby; back row, Harry Butcher and Bud Weir.

New officers and directors were installed during the three-day meet, including Alfred R. Stern, National Chairman; Jack R. Crosby, Vice Chairman; Ralph L. Weir, Secretary; and Harry C. Butcher, Treasurer. Directors added were William Adler, Yolando Barco, Marcus Bartlett, Robert Beisswenger, Byron Jarvis, Robert Jernigan and Bob Magness, all for three year terms; Richard Moore, and John Morrissey, both for two years; and Monroe Rifkin for one year. Associate members elected John Campbell of CAS Manufacturing as their representative on the NCTA board.

Executive Committee for the coming year will consist of the five NCTA officers and two board members named by Chairman Stern—Albin Malin and Marcus Bartlett. Immediate past National Chairman Conroy is considered an officer of the Association.

Also named by Chairman Stern were members of the NCTA Legislative Committee. The group is headed by Glenn Flinn, and includes Joel Smith, Walter Jenkins, Frank Cooper, Arlo Woolery, Bob McGeehan and Jim Palmer.

The two bylaws amendments put before the NCTA membership were approved—one dealing with membership of systems owned by associate member firms; the other with equalizing voting power among members based on average dues rather than on number of systems owned. A 10 cent per subscriber assessment was also approved if necessary to cope with recent Association expenses.



New NCTA directors, front row, Robert Beisswenger, Richard Moore, and John Morrissey; back row, William Adler, Marcus Bartlett, Byron Jarvis and Robert Jernigan.

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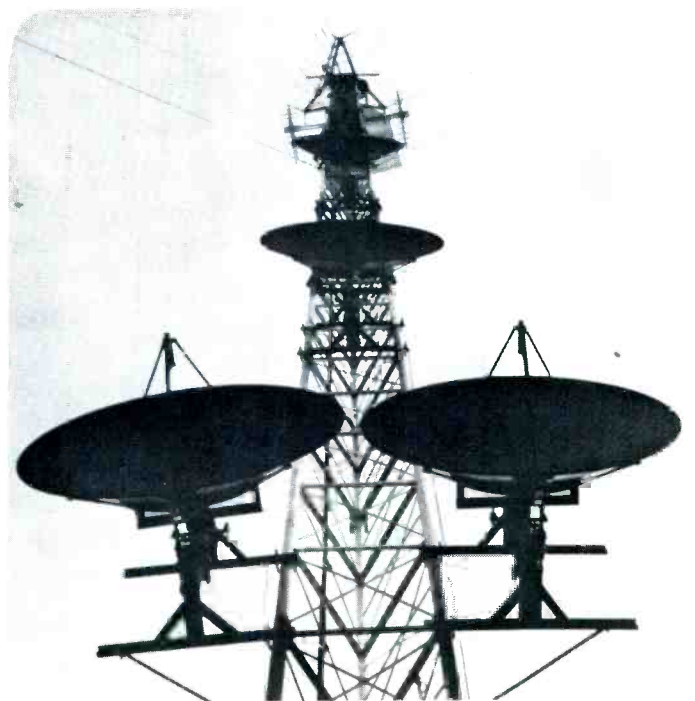
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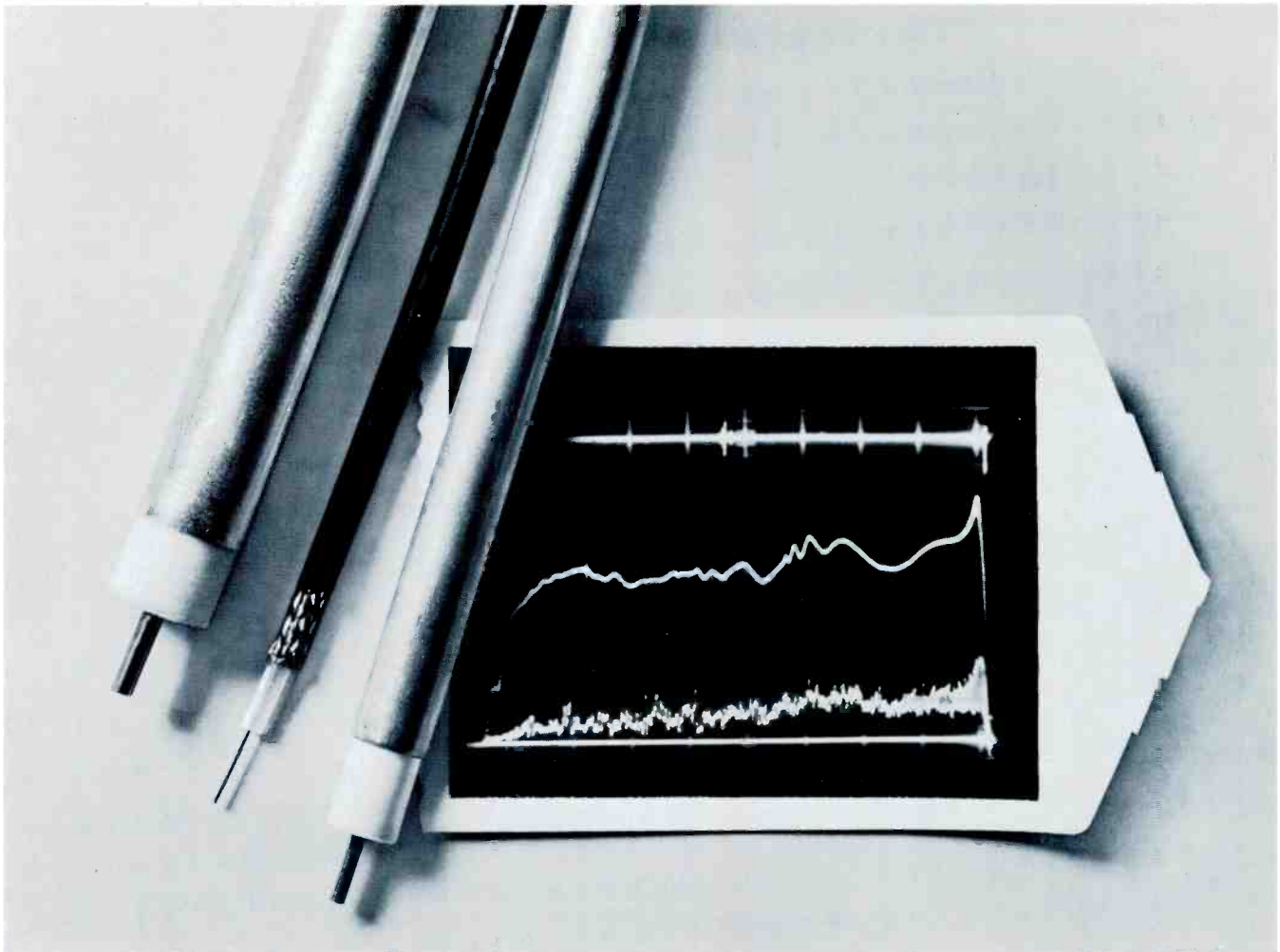
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The bill calls for state regulation of charges and areas of CATV operation and anticipates continued CATV regulation along present lines by the FCC. Fiss said that the FCC rules are broad and general and should be supplemented by state laws. Herbert Cahlan of WJZ-TV in Baltimore told the legislators that the broadcasting industry doesn't object to CATV service in areas of Maryland with inadequate television reception, but does oppose CATV in better-served areas such as Baltimore.



NEW KAISER-COX FACILITY

Kaiser-Cox Corp. recently moved into the new 40,000 sq. ft. facility pictured above. The new building blends Aztec motif of screen blocks with the desert landscaping typical of Phoenix, home of the CATV-manufacturing firm.

TELEPROMPTER-HUGHES AGREEMENT ANNOUNCED

TelePrompTer Corp. and Hughes Aircraft Co. have announced the formation of a jointly-owned subsidiary, Theta Communications Corp., for development and commercial distribution of electronic communications products and systems. The announcement of the joint venture was made by Irving B. Kahn, chairman and president of TelePrompTer, and Roy E. Wendahl, executive vice president of Hughes.

According to Kahn, Theta Communications will function primarily as a marketing and sales organization through which technical concepts developed by Hughes in space communications may be applied to television and electronic communication. "We think many of these concepts have specific applications in such areas as CATV and microwave transmission . . ." Wendahl said.

In a separate transaction, Hughes acquired a "substantial but minority" interest in TelePrompTer's New York City CATV system. According to the announcement, Hughes may acquire up to 49 per cent of the system during a period of five years. TelePrompTer initiated service in the Inwood section of Upper Manhattan in June, and is presently wiring other sections of the city.

INDUSTRY PIONEERS HONORED

Twenty-one leaders of the CATV industry received recognition as charter members of the "CATV Pioneers' Club" at the annual NCTA Banquet held during the industry's convention in Miami. Prerequisites for selection as a CATV Pioneer included at least a decade of active involvement in the cable television industry; selection was made by a special committee of NCTA members.

Honored for their contributions to CATV were: George J. Barco; Martin F. Malarkey; Bruce Merrill; Milton J. Shapp; Bill Daniels; Robert J. Tarlton; Fred J. Stevenson; Albin J. Malin; Glenn H. Flinn; Sandford F. Randolph; Benjamin J. Conroy, Jr.; Fred Lieberman; Stratford Smith; Frank P. Thompson; M. William Adler; Charles E. Clements; Jack R. Crosby; Albert J. Ricci; Gene Schneider; Archer S. Taylor; and Edward P. Whitney.

Presentation of the engraved plaques was made by Stan Searle, publisher of *TV & Communications* magazine and *Cable Television Review*, sponsors of the new award. The Pioneer Award recognition, one of the highlights of the banquet award ceremonies, will be an annual event.

VIKING INITIATES CONSTRUCTION

More than 30 state and local officials took part in groundbreaking ceremonies at the 25-acre site of Viking Industry's new coaxial cable facility in Freehold, New Jersey. The new plant, which is expected to be in operation



by fall, will be under the management of Hal Roveda, who is currently managing Viking's cable production facility in Hoboken, New Jersey. The Viking plant in Freehold will reportedly have a production area of over 130,000 sq. ft. Ted Baum, Viking executive vice-president, is shown breaking ground for the plant.

NEVADA HEARING SCHEDULED

United States District Judge Bruce Thompson of Reno has named a three-judge panel, to be convened September 30, to determine whether the Nevada Public Service Commission can exercise jurisdiction over CATV systems

in that state. Besides Thompson, the other judges will be Judge Charles M. Merrill of the Ninth Circuit U.S. Court of Appeals and District Judge Roger D. Foley of Las Vegas.

In the case, Thompson has continued a temporary restraining order preventing the Commission from regulating CATV systems until the matter is heard. TV Pix, Inc., which has systems in Elko, Carson City and South Lake Tahoe, filed for the injunction last May 10.

SECOND BOGGS AWARD GOES TO BEN CONROY

Benjamin J. Conroy, Jr., is the recipient of this year's coveted NCTA "Larry Boggs Award." The award, which was established two years ago by friends of CATV pioneer Larry Boggs, is presented annually to the



Bill Daniels (left) presents the NCTA's Larry Boggs Award to Ben Conroy at NCTA banquet.

person who has made the greatest contribution to the CATV industry during the preceding year. Conroy received the honor at the banquet of the NCTA's Annual Convention held last month in Miami.

Presentation of the award was made by Bill Daniels, president of the Denver-based CATV brokerage firm of Daniels & Associates, Inc. Daniels was the recipient of the first Larry Boggs Award, presented last year at the association's convention in Denver, Colorado.

Conroy is president of the Uvalde (Texas) TV Cable Corp., and a vice president of GenCoE, Inc. He first entered the CATV industry in 1954, and has actively participated in its advancement through local, state and national endeavors. He has served as president of his state association for two years, as a member and secretary of the NCTA board of directors, and as chairman of the association's pole line committee. He served for the past year as NCTA national chairman.

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TELEMATION WINNERS TAKE IN NASSAU

William David Savoy, CATV Consultant, was the lucky winner of Telemation, Inc.'s cruise to Nassau following the NCTA Convention in Miami. Mr. Savoy, a bachelor from Madison,



Maine, invited industry friend, Fred McElroy of Vumore, to share the all-expense paid cruise for two. The S.S. Bahama Star sailed from Miami on July 1 and returned July 4. Pictured with Mr. Savoy (center) are Ray M. Unrath, marketing manager of Telemation, and Mrs. Unrath.

CAROLINA TEL GOES ALL-OUT

Carolina Telephone & Telegraph Co. of Tarboro, North Carolina has acquired one CATV firm, Cablevision, Inc. and merged CATV interests with Jefferson Standard Broadcasting Co. of Charlotte. The new operating firm will be called Jefferson-Carolina Corporation; it will easily be the largest group owner in North Carolina.

The first step in the independent telco's expansion was the acquisition of the Gastonia-based Cablevision Inc., which has systems either in operation or under construction in Gastonia, Dunn, Erwin, and Lumberton. The firm also holds franchises in nine other North Carolina cities.

PRESIDENT FILLS COMMISSION POSTS

The Federal Communications Commission returned to full strength last month with Rosel Hyde officially setting the pace as Chairman, and new Commissioner Nicholas Johnson adding his own controversial personage.

President Johnson made the appointments to fill the breach in the Commission caused by E. William Henry's retirement May 1. The Senate wasted no time in approving the nominations, and both men were sworn into office within two weeks after the President's appointment.

Hyde, who has been acting Chairman since Henry's retirement, has served over twenty years as a member of the FCC.

Johnson, a Democrat, will fill the seventh slot on the Commission. At 32 he is the youngest man ever named to the FCC, and has already earned a reputation for himself as a straightforward, energetic individual.

OTTAWA FRANCHISES CLOSE

The Ottawa board of control has recommended that the city be split into two halves for cable service from Ottawa Cablevision Ltd. and Skyline Cablevision Ltd. The recommendation has been forwarded to the city council for final approval. Both firms agreed to pay the city 3% of the gross receipts and to charge subscribers \$5 per month. Two other firms were in the running for board of control approval, but were turned down.

L.A. APPROVES FOUR CATV ZONES

The Los Angeles city council by a 13-0 vote has called for the granting of four franchises within the city. The vote followed a report by Robert W. Russell, general manager of the city's Public Utilities and Transportation Department, which stated that 30,000 to 40,000 homes in the city have poor reception due to natural barriers and other interference. The four areas are: Santa Monica Mountains, Pacific Palisades, Santa Monica and Eagle Rock.

TEMPE CASE REACHES COURT

Mountain States Telephone and Telegraph Co. has asked the Superior Court in Tempe, Arizona to issue a declaratory judgement, ruling whether American Cable Television, Phoenix, or Central Arizona Broadcasting, Mesa, should be granted pole attachment rights. Both firms received franchises in Tempe at the same time, but Mountain States, following the pattern of AT&T affiliates, will allow only one franchised firm on its poles.

TELCO'S DON'T NEED FRANCHISES IN WASHINGTON?

"Telephone Companies which operate under state-wide franchise need no city or county franchise to operate a community antenna television service in most cases," Washington Attorney General John J. O'Connell stated in reply to a request for opinion by State Senator W. A. Gissberg. The Attorney General said, however, that if the telephone company builds special circuits for the community television system which don't qualify under the legal definition of telephone lines, then this specialized service is subject to city and county franchises.

REA LOAN PLAN BEFORE HOUSE

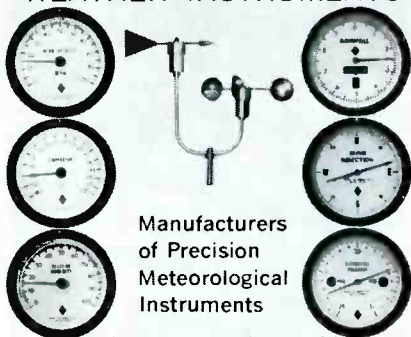
The section of a pending administration bill which would permit telephone co-ops to use funds from a proposed new telephone bank to build CATV facilities has received the endorsement of David C. Fullarton, executive manager of the National Telephone Co-operative Association.

The controversial new plan calls for the establishment of government-backed rural electric and telephone banks to supplement lending by the Rural Electrification Administration (REA) in order to meet the capital needs of rural electric systems.

The National Association of Broadcasters and the National Grange have lined up against the REA loan plan which is now pending before the House Agricultural Committee. The July 18 issue of Cable Television Review reported an interview with Harry Graham of the Grange in which he stated that the bill would allow CATV system owners "to have their cake and eat it too." By treating CATV systems as common carriers in making them available for federal funds, the bill, in Graham's opinion, would go against the contentions of the CATV industry and the FCC—as well as the pending CATV bill—that systems are not common carriers. By figuring different ways in different cases, Graham said, CATV operators would be getting "special privileges."

Earlier in the Month, NAB president Vincent Wasilewski, in a letter to House Agriculture Committee Chairman Rep. Harold Cooley (D-N.C.), argued that the proposal would amount to discrimination against radio and television stations, and translators which would not be allowed to borrow from the banks. Wasilewski, like Harry Graham of the Grange, also attacked the bill's section which treats CATV as a common carrier. □

WEATHER INSTRUMENTS

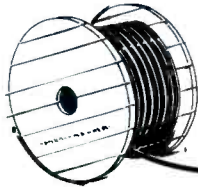


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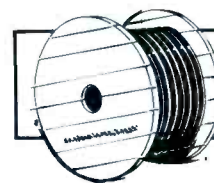


Maximum Attenuation db/100 ft. at 68°F			
Channel 6		Channel 13	
Nominal	0.52	Nominal	0.85
Maximum*	0.55	Maximum*	0.89

*These are limits as indicated by production to date. Until a permanent specification sheet is issued, these maximum values should be reconfirmed by our engineering department at the time of system design.

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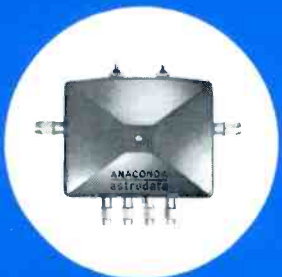
Trunk Line Amplifiers



Trunk Line Bridging Amplifiers



Trunk Line AGC Amplifiers



Intermediate Bridging Amplifiers



Trunk Line
AGC Bridging Amplifiers

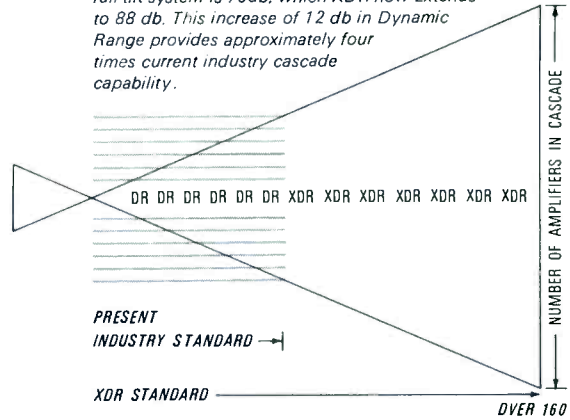


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FINANCIAL REPORTS

H&B American president, Harold R. Sugeran, reported that the net profit for the company's first nine months of fiscal 1966 was \$410,506 up from the loss of \$135,990 for the same period last year. Net profit per share for the period ended April 30 was 16 cents on 2,587,799 shares outstanding as against a restated loss of 5 cents per share on the 2,581,541 shares outstanding at the same time last year.

The Jerrold Corporation president, Robert H. Beisswenger, reported that first quarter consolidated sales and pre-tax earnings of the company reached the highest levels for any quarter in the company's history. Pre-tax earnings for the quarter ended May 31, 1966, were \$2,270,143 compared with \$748,649 for the corresponding period of last year. After-tax profits were \$1,149,143 or 53 cents per share, compared with \$691,823 and 32 cents per share. Consolidated sales were \$11,745,622, against \$8,269,144 for the preceding year. Jerrold's recent audited statement showed that total assets of the company increased nearly 40 percent last year, from \$20,429,851 to \$28,516,177.

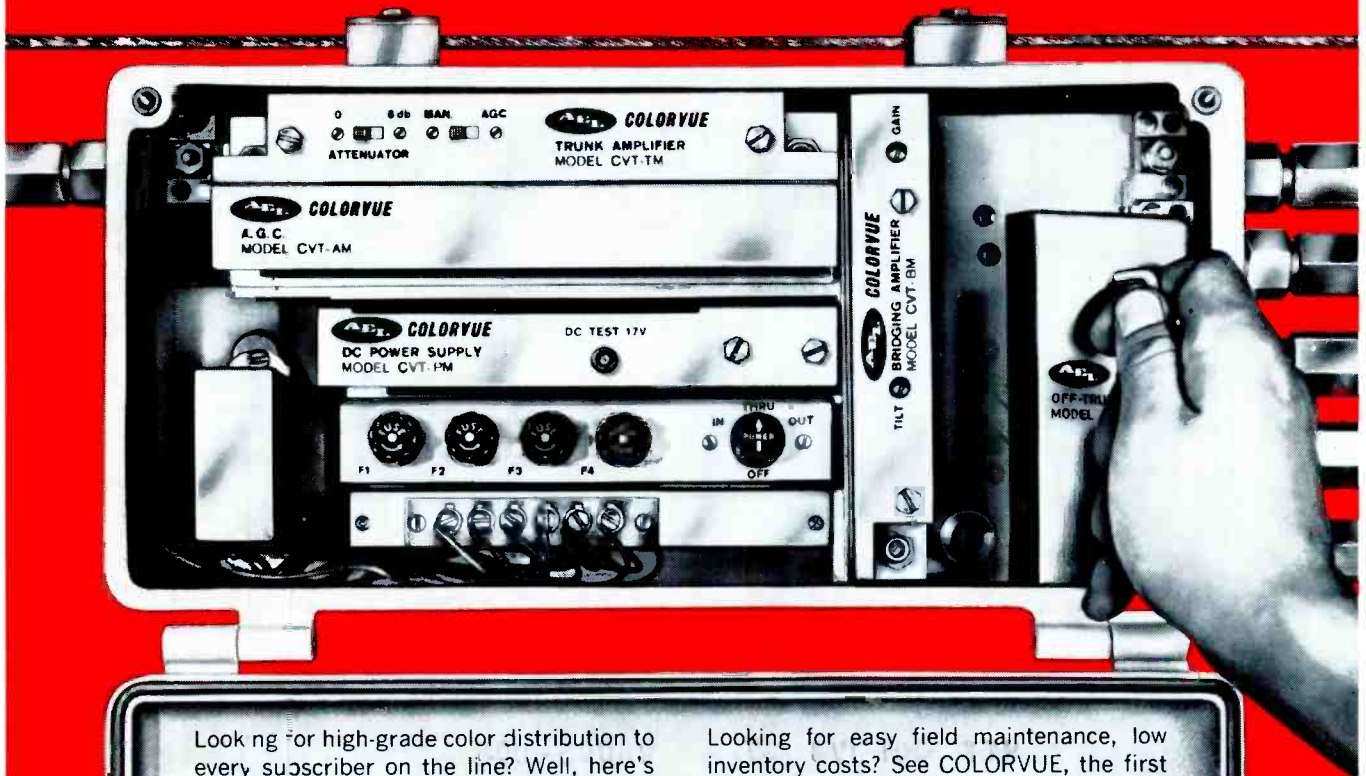
TelePrompTer Corp. filed with the Securities and Exchange Commission for sale to the public of 75,512 outstanding shares of common stock. According to the SEC, TelePrompTer has outstanding 824,324 shares, of which 23 per cent is owned by management officials.

Cox Broadcasting Corp. directors have declared a regular quarterly cash dividend of 10 cents per share on common stock, payable to stockholders of record of June 24.

Viking Industries, Inc., announced that May 9 has been declared the record date for its 3 for 2 common stock split voted by stockholders at the annual meeting in April. Fractional amounts will be paid in cash or stockholders will have the option of buying fractional amounts up to one share. The new par value will be 6 $\frac{2}{3}$ cents from the original 10 cents a share.

TelePhompTer Corp. reported that it had record first-quarter earnings of \$73,439. Before-tax earnings of \$105,520 were 48.8 per cent above the first quarter profit of \$70,917 in 1965. The company's gross revenues were \$1,639,331, an increase of 40.4 per cent over last year's \$1,167,215 in the corresponding period. □

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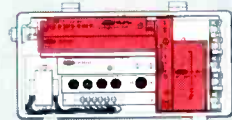
Basic housing with Trunk Amplifier/ DC Power Supply modules.



Basic housing with Trunk Amplifier/ AGC/ DC Power Supply modules.



Basic housing with Trunk Amplifier/ Bridging Amplifier/ Off-Trunk Splitter/ DC Power Supply modules.



Basic housing with Trunk Amplifier/ AGC/ Bridging Amplifier/ Off-Trunk Splitter/ DC Power Supply modules.



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FOCUS

... On Progress

Systems

Terry H. Lee, Storer Broadcasting Co. vice president for business planning and development, has been named vice president, television division. Lee will supervise the overall operations of Storer's five television stations in addition to his supervision of operations for Storer's nine CATV systems.

John L. Buchanan has resigned his position as vice president of American Cable Television, Inc., in order to pursue private business interests. Buchanan began his career with Ameco, Inc. in 1963, as marketing manager. He was involved in the formulation of a nationwide marketing plan and utilization of the Ameco "salesmobile". His resignation was effective June 21, 1966.

Ned W. Cogswell has been named vice president, engineering for General Television Inc., Salisbury, Maryland. He will be responsible for system construction, technical work and microwave for all of General Television's systems.

Wenton F. Stewart has been elected vice president and general manager of GT&E Communications Inc. Stewart has served as general manager of GT&E Communications since its formation in May, 1965.

Richard Carlton has been appointed vice president of the newly-formed entertainment division of Trans-Lux Corp. Carlton will handle the expansion of the firm into the ownership of television stations and CATV systems.

Gary Dail has been appointed manager of the General Electric Cablevision Corp. system in Merced, California.

Milford G. Richey has been appointed vice president-engineering of American Cable Television, Inc. Richey moves to ACT I from Ameco, where he pioneered the development of solid state devices.

Donald W. Curtis has been named system manager of the G-E Cablevision Wartertown (N.Y.) system. Curtis formerly was associated with C&H TV Service, Inc.

James W. Van Dyke is now serving as administrative assistant in the production department at Ameco, Inc. Van Dyke was plant manager for the F. C. Thornton Co. before joining Ameco.

Suppliers

William G. Laird has been appointed vice president, engineering of Tele-Mation, Inc. Laird has been with Tele-Mation and its affiliates since 1962.

Matthew J. Lysek has been appointed sales engineer for Craftsman Electronic Products, Inc. Lysek was previously product planner for the Lamson Corp., Syracuse, N.Y.

R. E. O'Brien has been appointed sales manager for Gilbert Engineering Co., Inc. O'Brien has been manager of the firm's electronic connector division. Paul Rhodes has been named electronics engineer for the company.

Robert J. Sheahan has been appointed director of contract sales at Ameco, Inc. Joe D. Marlowe has joined the firm as a CATV sales engineer.

Jack Aylward has been appointed marketing manager for the cable division at Amphenol Corp. Aylward, a 10-year veteran of the company, was formerly district sales manager for the southeastern states.

James J. Taglia has been appointed midwest area manager for Kaiser-Cox Corp. Taglia comes to the firm from Jerrold Electronics Corp. Before joining Jerrold he was assistant to the president of the NCTA.

Richard C. Mitinger will represent the wire and cable division of Copperweld Steel Co. in Pennsylvania, western Maryland, and parts of West Virginia, Virginia, and Washington, D.C. He replaces Clyde C. Sowards, who has retired.

David J. Ryan has joined American Television Relay, Inc. as a field technician.

Professional

Thomas G. Shack, Jr., has joined the Washington, D. C. legal firm of Smith & Pepper, as a partner.

B. Hillman Bailey, Jr., KNOC-TV Cable Co., Natchitoches, is the new 1966-67 president of the Louisiana Association of Cable TV Operators. Norman "Chick" Williams is secretary-treasurer.

Milton Underwood, Muscle Shoals TV Cable Co., Florence, will head Alabama CATV Association for the coming year. William McDonald will serve as vice president; and Otto Miller as secretary-treasurer.

William Betts of Maysville, Kentucky, has been elected president of the Kentucky CATV Association. Tom Gullett, Winchester, is first vice president; William Breeding, Monticello, is second vice president; and Joe Simmons, Glasgow, is secretary-treasurer.

Jack Milligan is providing CATV technical consultation services through Noram Cable Construction, Ltd., Rexdale, Ontario. Milligan was formerly technical director for Metronics Corp., Guelph, Ontario.

Robert A. Searle has been promoted to executive editor of Cable Television Review, the weekly news service of TV & Communications magazine. John Paul Johnson has been named managing editor of the publication, and R. Wayne Wilson has been appointed as its director of advertising.



Terry Lee



John Buchanan



Milford Richey



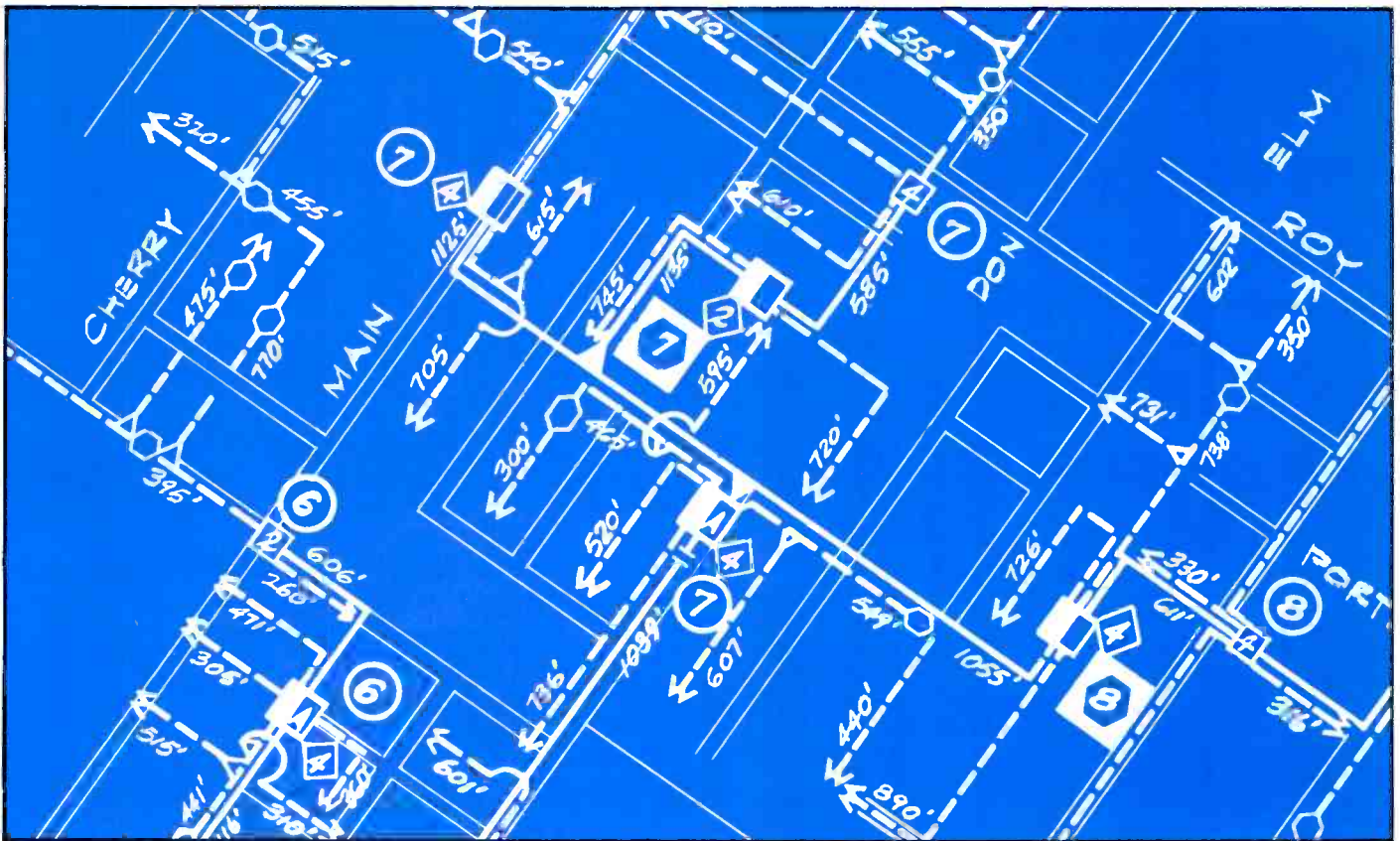
Donald Curtis



William Laird



Matthew Lysek



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NEW CATV EQUIPMENT

By Technical Associate I. Switzer and Managing Editor Robert A. Searle

A major function of the annual NCTA convention is providing the opportunity for cable television operators to examine and discuss the products and services designed for their industry. This year's show saw several new lines of equipment introduced, and numerous new accessories and services offered.

Emphasis was on local origination and non-duplication equipment, and on distribution equipment designed to make the cable operator's maintenance job easier. Most exhibitors agreed that, although the show was one day shorter than in previous years, the interest and activity at the exhibits was gratifyingly high. Good convention planning and unseasonable rain showers undoubtedly added to the success of the trade show.

The following analysis of equipment shown in Miami was prepared by TV&C Technical Associate I. Switzer. Mr. Switzer is a CATV consultant with 13 years experience in this field, and is presently serving in that capacity for Famous Players Canadian Corporation—the largest group operator in Canada. His candid reports on the NAB and IEEE trade shows were featured in these pages earlier this year.

Although she appeared but briefly on the registration list, Mother Bell's influence loomed very large over the CATV equipment show at the NCTA's 15th annual convention. Since Ma Bell is shaping up as a possible large purchaser of CATV equipment, equipment manufacturers hoping for a share of this market have shaped their equipment, particularly the packaging, to Bell requirements. The heavy cast housing, with multiple bolt fastening and weatherproof gaskets has become the standard offering of nearly all manufacturers. Details vary from company to company but the basic aspects of the housings remain the same — cast aluminum housings with doors that are held on by multiple fasteners,

gaskets to provide weather seal, amplifiers on plug-in modules, captive center conductor fastening for cables. Some variation is noticed — Anaconda Astrodata's covers are held down by a single slot head screw; captive center is optional on Ameco equipment using a clever washer and crimped sleeve arrangement; some lines offer radiation gaskets as well as weather gaskets; otherwise pretty much of a sameness in packaging in all the lines shown.

Electrical specifications also seemed pretty much alike — everyone recommending + 35 dbmv output operation on main trunks, somewhat higher on distribution. Other aspects of electrical performance were also pretty much alike from one make to another. One

notable general improvement from last year is that virtually all companies are using full wave power systems, at least on trunk equipment. Viking has gone a step further and is offering switching mode regulators in their "Futura" amplifier line. These provide efficient power supply operations over a wide range of cable voltages. Other manufacturers (AEL and Ameco) use tapped transformers to improve powering efficiency.

Other notable changes and innovations include an "A" model Starline series from Jerrold. The power supply now comes out with the amplifier module. Jerrold now has a more complete and useful line of line extender amplifiers to go with their Starline



Above, Gay Rogeness (left) talks with operators at the Ameco exhibit. Henkel & McCoy booth is shown below.



TeleMation exhibit, above, featured line of local origination equipment. Bob McGeehan is pictured below at Entron display.



Jerrold display, above is shown ready for the first day's business. Shown below at the Plastoid booth are Messrs. Grant, Haggerty, Hemminger and Johnson.



series. Kaiser-Cox has completely re-designed their housing and now offers a "Bell type" housing with a novel system for clamping cable center conductors. Ameco has re-designed their 70 series into the new "Pacesetter" line with new housings and full wave power. There are two major newcomers to the amplifier field and one change so radical that it deserves special mention.

SKL is hardly recognizable in its new image, fancy new brochures, new sales approach, new equipment. Not an N connector in sight! Bell-type equipment housings, and amplifier modules which look similar in shape to Jerrold Starline. I am assured that circuitry is different. SKL of course still features directional coupler taps, having pioneered them in the industry, and is no doubt drawing pleasure in seeing them come to be accepted by the whole industry. SKL has introduced the "distributed circuit" approach to solid-state amplifiers in a high gain, high level amplifier for distribution use. This amplifier was hinted at last year and is now offered for immediate application.

American Electronic Labs has entered the CATV field after building a successful business in military and premium industrial electronics. AEL's units are a little more modularized than some others — amplifier, bridge, AGC and power supply being all completely separate modules. In common with other manufacturers, components tend to be commercial grade rather than the telephone of MIL grade.

Anaconda Astrodata introduced their amplifier line with the concept of "automatic CATV." Amplifiers are sent out from the factory with all ad-

justments preset and sealed with instructions for installation in the cable at certain spacings. The equipment is quite literally sealed. Tilt and level controls are under a sealing tape which carries the guarantee — breaking the seal voids the guarantee. Controls are further sealed inside with Glyptal to indicate whether they have been moved.

The Anaconda Astrodata specs for single amplifiers are most impressive but are modified somewhat in the translation to practical recommendations for operating systems. The maximum single amplifier output capability of + 60 dbmv for full tilt, 12-channel operation gets derated to + 34 dbmv for main line in medium size systems and +40 for distribution. I suspect that the heavy derating factor is applied to provide a sizeable safety margin in meeting the manufacturer's system guarantees. It is possible that the equipment could achieve some worthwhile improvements in system performance parameters in the hands of intelligent field engineers and technicians.

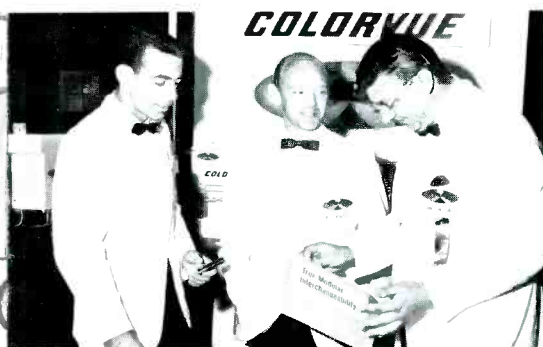
A potentially significant development was hidden away in Blonder-Tongue's display and received very little attention. This is a UHF distribution system for MATV application. This includes high level strip amplifiers for single UHF channels and a line of UHF distribution accessories. This may be a portent of future CATV distribution systems.

I was surprised that more manufacturers have not adopted the test-spigot system that Jerrold introduced last year in their Starline series. The test points on the amplifier bridge the input and output lines directly. Isolation

of test equipment is provided by a small test fixture (attenuating resistance). These test fixtures can be accurately calibrated and provide more accurate test points than the usual test points whose isolating resistors are built right into the amplifiers. Direct test points will also facilitate future use of high impedance electronic probes which will probably come into use in the next few years. Large sophisticated systems require accurate alignment right on the pole and inaccuracies in test points become a source of concern when technicians are faced with really tough accuracy specifications in set-up and maintenance.

Two manufacturers of amplifiers were conspicuously absent. Jim Palmer's C-Cor did not display their equipment even though their viewpoint was expressed in a technical paper at the convention. This writer saw one of the C-Cor amplifiers at the IEEE show in New York in March along with the C-Cor instrumentation amplifier line. It is regrettable that the equipment was not on display because shows of this kind are the only time that many operators get to look at a wide range of equipment lines. The C-Cor company, formerly Community Engineering Company, was a pioneer in CATV amplifiers, and their return to the field after some years in instrumentation amplifiers should represent a worthwhile blend of long CATV experience and know how with state-of-the-art technology acquired in the instrumentation field.

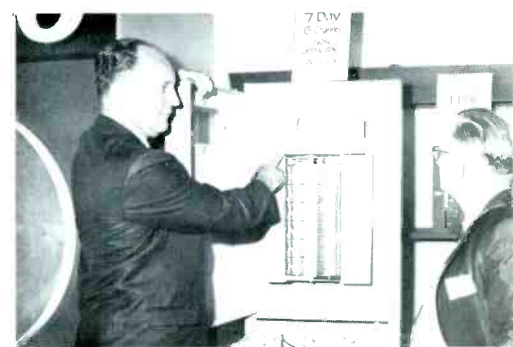
JFD Electronics, former prime movers in the TAME organization, have moved into the system ownership and equipment manufacturing fields. They are developing an amplifier line, under



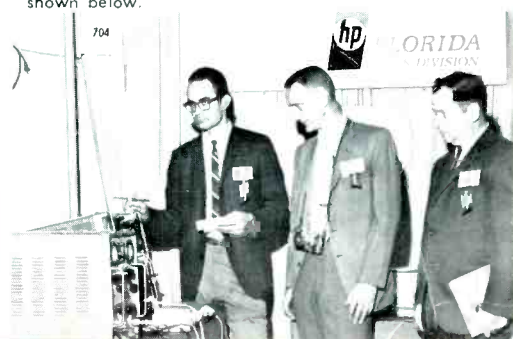
The American Electronic Labs booth, above, is manned by Messrs. McGowan, Black and Wydro. At Times Wire booth below are Messrs. Sommer, Jeffers, McNair, Kushner and Ceracche.

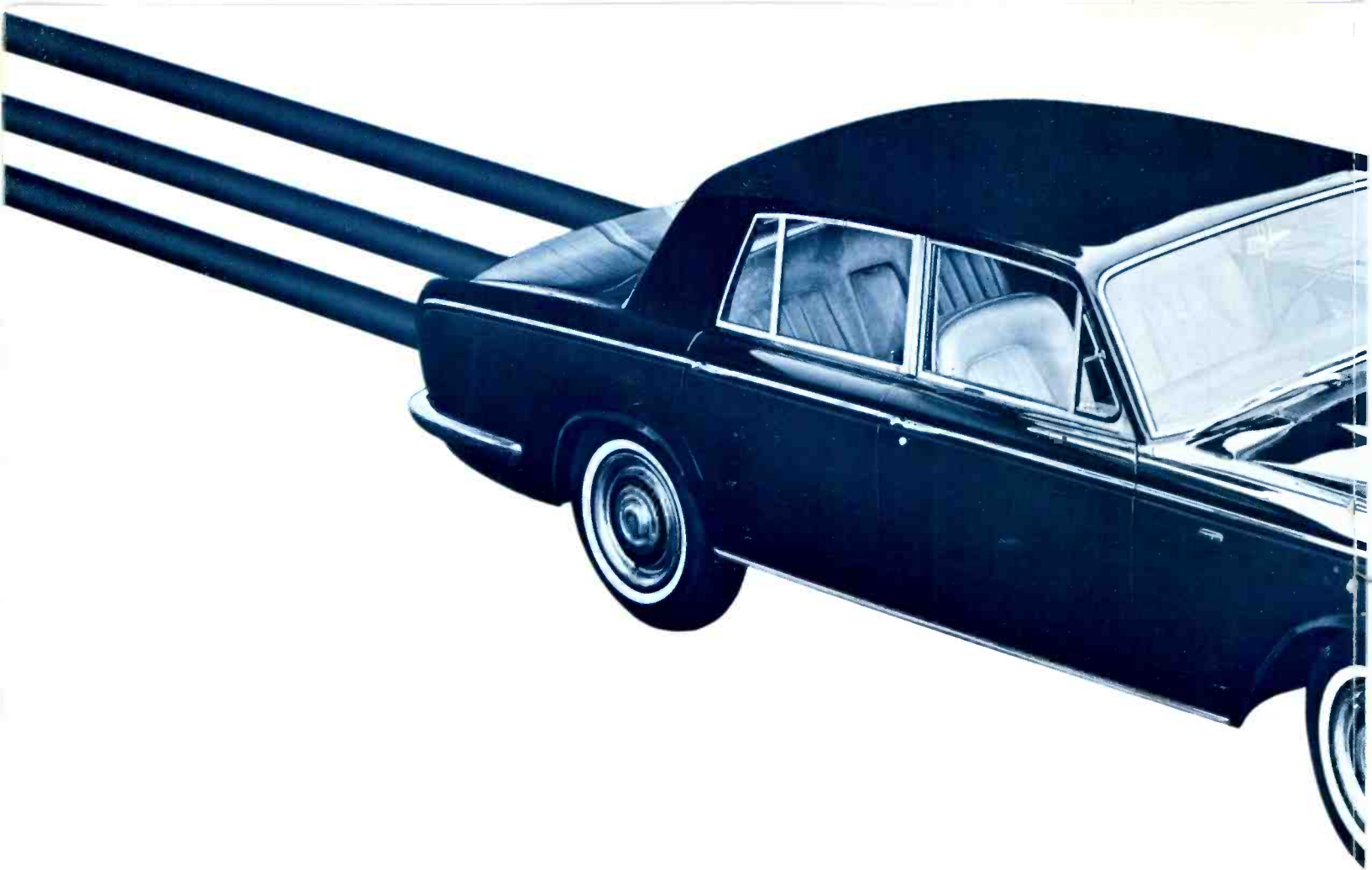


Channell Splicing Machine Co. featured accessory line at booth shown above. Mrs. Ken Easton and Messrs. Gray and Evans are shown below at Benco booth.

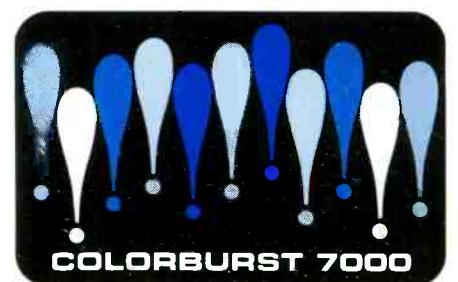


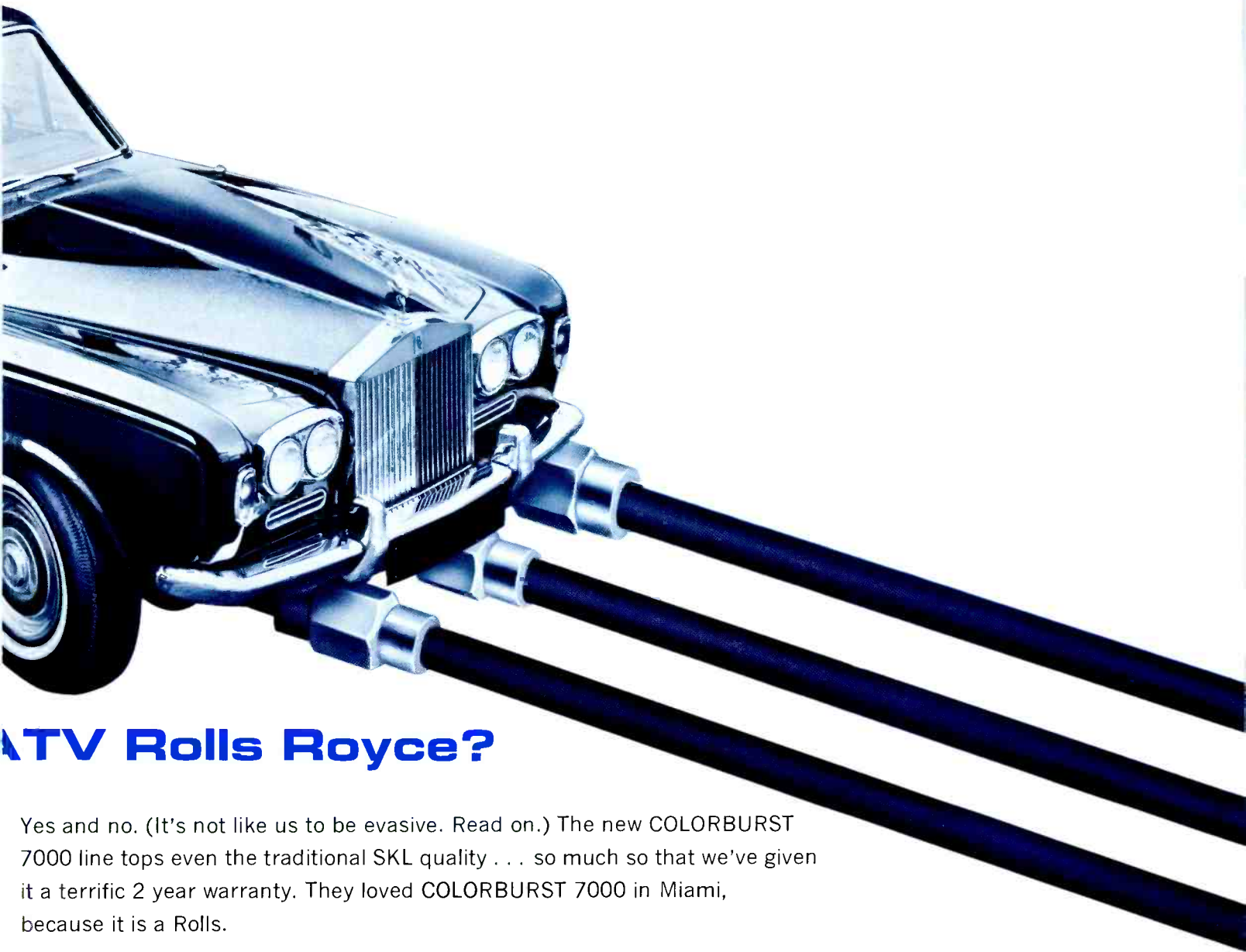
Messrs. Hubbell and Hannigan examine switcher at Viking exhibit, above. Hewlett Packard test equipment was featured at that firm's booth, shown below.





Is **SKL** stuck with another CA





CATV Rolls Royce?

Yes and no. (It's not like us to be evasive. Read on.) The new COLORBURST 7000 line tops even the traditional SKL quality . . . so much so that we've given it a terrific 2 year warranty. They loved COLORBURST 7000 in Miami, because it is a Rolls.

But we're hardly stuck with it. Not this time. For 15 years we've been making Rolls Royces while CATV operators snapped up the Chevys. We've had enough of that. We figured that almost everybody would buy a Rolls if it were Chevy priced. So that's our plan. Sell Rolls Royces at Chevy prices!

It's working. Since Miami, more systems have gone SKL than ever before. How about you? Call the Telephone Service Bureau in Boston (617/254-5400) or Phoenix (602/264-2775) and the nearby pro from SKL will be by with COLORBURST 7000 and his Chevy dealer's pencil.

SKL

SPENCER-KENNEDY LABORATORIES, INC.

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the direction of Ira Kamen, based on application of field effect transistors. I understand that the line was not quite ready for the NCTA convention and that it will be introduced this fall. The FET should have worthwhile application in CATV, at least in input stages of amplifiers and antenna preamps.

Cascade Electronics Ltd., was started last fall in Vancouver, Canada to get around the duties and taxes levied on imported equipment by the Canadian government, and to supply the equipment needs of a group of CATV systems controlled by Canadian Wirevision. A new equipment line was developed by a group of engineers imported from the U.S., and the equipment is now being marketed to the industry at large. The equipment features quick change plug-in circuit cards. Thermal type AGC control is recommended but electronic AGC is optionally available. I could have wished for captive center conductor cable fittings.

Not too much new in cable this year. Last year was the "aluminum explosion." This year aluminum is consolidating its position. Superior finally gave in, adding conventional aluminum/foam cables to its established corrugated copper cable line. Superior also introduced, rather gingerly, a balloon dielectric cable. This cable uses a polytube formed into balloon sections to support the center conductor inside an aluminum sheath. The cable was originally developed in France as a CCIR spec toll cable. It has had some difficulty meeting performance specifications for toll cables, particularly in larger sizes. Superior and Simplex hold U.S. rights to the design, and Superior claims to have overcome the quality control problems which have plagued

this cable design. Their preliminary brochure describes a .412 size cable with losses about the same as conventional .500 aluminum/foam, and priced about half way between .412 and .500. No return loss specs were mentioned in the brochure. This cable could be a significant step in cable development for CATV and could lead us to pressurized systems.

Times showed a 1 1/4" aluminum/foam cable. The center conductor is copperclad aluminum. This appears to be the largest cable available in this construction and is intended for long trunk runs with minimum number of amplifiers. Times also showed a low-loss drop cable intended for long drop runs or for drops requiring higher than normal levels.

Connectors were shown by several firms, Gilbert Engineering and American Pamcor featuring them in their particular displays. I expect that buyers specifications on splices will tighten up as more impedance checking equipment in the form of bridges and time domain reflectometers come into more common system use. Some improvements in the commonly used F connectors were shown, offering improved weather protection.

Head-end equipment is in for some significant changes. CAS Manufacturing featured a prototype of their solid state head-end system and promised early delivery on these units. The CAS unit features an array of plug in modules accessible from the front in the manner of solid-state broadcast video distribution amplifiers. Dynair has improved their solid-state modulator and showed prototype of a solid-state demodulator, something they have been promising for almost two years. It still

seems to be somewhat in the air, as the company was soliciting suggestions for various features of the unit. Ameco is promising a solid-state double heterodyne system. Jerrold is still going with their well established tube type Channel Commander but has owned up to one of the C-Com's weaknesses by introducing a crystal controlled fixed tuned tuner module for the C-Com. I would still like to see a full solid-state version. Alignment is critical in head-end equipment, particularly in color broadcasts, and there is some concern about alignment every time a tube is changed. A really stable solid-state head-end unit would be very welcome.

Entron has a new double heterodyne head-end system for handling FM stations. All solid-state, and very neatly built into a narrow rack panel space.

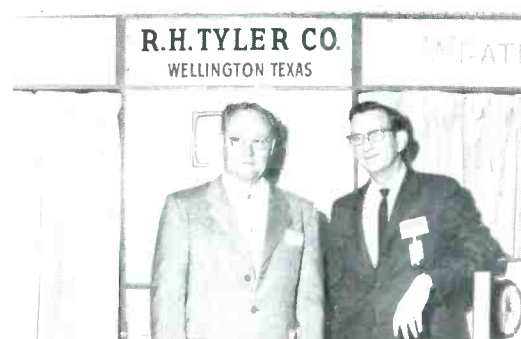
Scientific Atlanta seems to have been very successful with the cantilevered broad-band log periodic antennas introduced last year, and this year offers large arrays of these antennas for long distance CATV reception. The arrays, 16 antennas for low-band, and 36 antennas for high-band, are intended for mounting on twin towers at 250 to 300 feet and to be competitive with the large ground level parabolic antennas which have become popular in the last two years. Jerrold's Taco division has now introduced cantilevered quad arrays of log periodics to compete with Scientific Atlanta's line. Fort Worth Tower has accumulated some experience with parabolics and was talking about the space diversity system they built for a client in Texas. Gabriel Electronics and RF Systems showed specialty antennas for microwave applications and for special VHF/UHF applications.



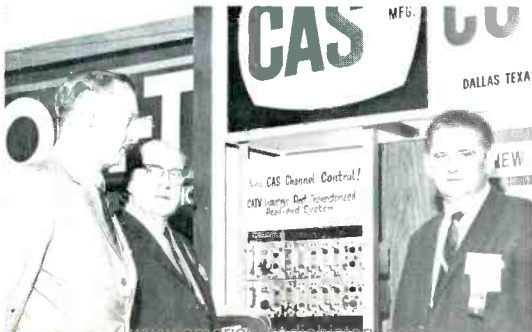
Superior Cable's exhibit is shown above, awaiting first rush of CATV'ers. Shown at the Craftsman booth below are Mssrs. Florescu, Crosby and Greiner.



Kaiser-Cox exhibit, above, stands ready for cable operators. Shown below at the CAS Manufacturing display are Mssrs. Jackson, Carrick and Spradlin.



Mssrs. Callahan and Tyler are shown at the Weather-Scan booth above. Below are Mssrs. Teslik and Cordon at the Lenkurt booth.



Heterodyne repeating is now firmly established in the microwave field, usually with TWT amplifiers in repeaters. Everything except high level RF stages is now solid-state, and in modular packages. Baseband repeaters are still available for short hauls, but heterodyne repeating seems universal now for longer hauls. The microwave field seems telephone oriented in quality and systems concepts and CATV users of such equipment receive the benefits, and the bills. Nevertheless one could wish for more CATV equipment to be built to the same standards.

The directional coupler tap has finally received full acceptance in the industry. It is now available from virtually all manufacturers. There is considerable variation in packaging, every manufacturer having his own ideas on the ideal form. I was particularly impressed by Jerrold's model for use in buried system pedestals. Craftsman seems to have a very successful version with excellent electrical characteristics and separate splitter plug in modules. Entron has a version that uses standard pressure tap stingers in conjunction with a directional coupler, permitting variable drop losses. Electroline showed an English-made version that uses a printed strip line section as the directional coupler and splitter element. The price was definitely right and in a sturdier housing could be a worthwhile item. You can find any kind of construction and housing that you wish, now that everyone is making them.

Multiple outlet pressure taps were shown by Benco and CAS, back-matched, of course. CAS call their two outlet version "Nanny-goat" and the four spigot version is, of course, the "Milk-Cow." Not much new in matching

transformers, except perhaps, marked reductions in price.

There were fewer weather information systems than were shown last year. The Telesis digital display system, shown last year by Ameco, was not back this year — possibly too high in price for the CATV market. Viking showed their news teletype system offered in conjunction with United Press International. TeleMation Inc. offered the system introduced last year in conjunction with American Press. Mechanical scan weather displays were shown as well as a system using optical multiplex for sequential dial display. R. H. Tyler showed that firm's new compact, pedestal-mounted Weather-Scan unit. Texas Electronics, supplier of weather instruments to many of the firms making complete weather information channels, showed their instrument lines for people wishing to assemble their own systems. Jack Kent Cooke, Inc. showed a digital display system in what appears to be a practical price class. Digital display seems to me an ideal weather display and the Cooke people look forward to a substantial market for their system. I felt that it should have a facility for a 35mm slide projector.

Aberdeen Company and Preformed Line Products showed their hardware lines with particular emphasis on drop cable clamps.

In the author's view, test equipment did not receive the prominence that it deserves, but maybe I am prejudiced along these lines. Hewlett-Packard exhibited at NCTA for the first time. This maker of cadillac-class test equipment showed their time domain reflectometer system and their new television waveform monitor. The TDR system is becoming more popular as its useful-

ness becomes known to CATV operators. It has been a big item among cable and connector manufacturers since its introduction two years ago. Telemet Company showed an excellent line of broadcast video processing and test items.

Anaconda Astrodata showed prototype of a cute little field strength meter with some unique features. The meter has a channel selector like than on a TV set and automatic frequency control to lock to the desired picture channel. Synchronous detection is used. The meter is battery powered and has a taut band meter movement which should give much better service in rough field conditions than the conventional jewelled meter movements.

Hewlett-Packard showed their spectrum analyzer briefly during the show. This is a marvelous instrument but its price tag of about \$9,500 will keep it out of CATV application except for some of the equipment manufacturers' development labs. Although it was not shown at the exhibition, Nelson-Ross Electronics presented a technical paper on a spectrum analyzer that has been developed for CATV applications as a swept, high resolution field strength meter in a price class designed for practical CATV application.

A number of solid-state field strength meters were shown. Such meters have been available from Benco, Delta, and Blonder-Tongue for at least a year or so. Jerrold has taken over marketing of the Sadelco meter, and their own "Deluxe" FSM introduced last year is still some months away from full scale delivery. Delta has a very useful field strength meter calibrator at a reasonable price. This is a sort of "poor man's signal generator," but every system



Spencer-Kennedy Laboratories exhibit looks busy, as shown above. Discussion of CATV towers is in process at Rohn booth, below.



E. G. Perkins and Bill Lastinger are shown above at the American Cable Electronics booth. Shown below is the Cascade Electronics exhibit.



Mssrs. Leverette, Massey, Platt and House are shown above at Cable Promotional Services booth. At Gilbert Engineering display below are Mssrs. Rhodes and Dery.



should have one, or something like it.

Anaconda Astrodata has been working with Texscan Corporation on CATV test equipment. They introduced their model 990 test system which incorporates solid-state sweep generator, detector, scope display, high speed RF switches, RF test amplifier, turret attenuators, impedance bridge (have I left anything out?) in a single compact package, light enough for field or bench use. Changes from one basic test set up to another are made by simple switch functions and the whole unit makes a very useful test package, particularly for systems having a high volume of bench work to do.

Jerrold has finally released their very fine 3-position RF switcher in a 75 ohm version. Their RF bridges are excellent but a little too complex and expensive for the widespread application which the bridge technique deserves. The Anaconda Astrodata-Texscan project represents a growing trend of co-operation between established instrument firms and CATV equipment suppliers.

Blonder-Tongue has a comprehensive solid-state test equipment line in a moderate price range and deserves serious consideration.

SKL introduced a filter-amplifier for adjustment of co-channel antenna arrays. The instrument filters the 10 or 20 Kc co-channel components from the video signal and facilitates adjustment of arrays for cancellation of co-channel interference.

Amplifiers are now being specified to plus or minus 0.25 db flatness and there is not much equipment around yet to test equipment or systems to that degree of accuracy. A growing demand

by system operators will no doubt bring greater variety from present suppliers or interest new suppliers in the CATV test equipment field.

Dynair has a handy sideband analyzer. Sideband analyzers are a combined video sweeper and spectrum analyzer and are the standard instruments for frequency alignment of transmitters and their CATV equivalent — modulators. Operators with a number of modulators, possibly in conjunction with microwave systems, will find this analyzer a handy instrument.

Non-duplication protection looks like it is here to stay and several equipment manufacturers have responded with switching equipment to make this function nearly automatic. Jerrold introduced a unit using pin programming of switching functions. TeleMation Inc. offers a unit based on long experience with non-duplication switching problems. International Good Music, Inc., has applied extensive broadcast automation experience to the non-dup problem. Viking also offers a moderately priced switching unit. It's a shame that broadcasters can not be trusted to perform the switching function for us with suitable cue tones, as this would no doubt simplify the technical problems. However all the units shown appeared to be reasonable solutions to the non-dup switching problems and are offered at reasonable prices.

Sigma Industries and Channell Splicing Machine were back showing their lines of splice covers, and equipment housings for underground and pedestal installation. The Channell housings seem more versatile for housing equipment, while Sigma's line of heat shrink products appears to have worthwhile

application in the splice cover and fitting protection field.

Cummins-Allison was a new exhibitor, showing items which many systems are probably already using — subscriber coupon billing books. Of considerable interest was the coupon equipment which makes coupons directly machine convertible into punched cards or punched paper tape for computer processing. A few of the larger CATV systems are already using computer accounting techniques and probably many more systems, when they reach the sizes they aspire to, will be using computer accounting for subscriber revenue.

A number of consulting and contract construction services had display booths and many more had hospitality suites and distributed handbills at the convention. I don't know where these operators are getting all the personnel to perform all the services being offered.

There was a clear trend at the show away from selling hardware on an item by item basis toward a selling of turn-key systems. Most companies were selling their complete "image" with fancy qualifications brochures. Firms like Ameco actually displayed very little equipment but concentrated on the whole system approach.

This year's equipment show represented mostly a consolidation of last year's technical gains, with no spectacular innovations. I think the next big step will be in test equipment, possibly at next year's show. Further spectacular amplifier progress awaits the transistor manufacturer's progress in high power, low cost, ultralinear devices. □



Anaconda Astrodata exhibit area is shown above. Below are Mssrs. Jacobs, Stock and Keller at the Dynair display.



Herb Pruzan waits for exhibits to open at the Pruzan Co. booth shown above. Tom Johnson greets Bill Heady and Dick Surprenant at Daniels and Associates booth, below.



At the Delta exhibit above are Mrs. Ken Easton, and Mssrs. Sawyer and Keefe. Collins Radio representatives Beckerich, Spear and Glade are shown below.



KEY CONVENTION SPEECHES

This year's NCTA convention featured simultaneous management and technical sessions, with a number of top speakers featured in both programs. Attendance at the technical meetings apparently suffered somewhat due to the concurrent management talks, but overall interest in the dual programs was high. Local origination of public service programming was the hottest topic, along with the current state of regulation and legislation confronting the industry.

Featured speakers on the agenda were NCTA Chairman Conroy and President Ford, FCC Commissioner Wadsworth, and Canadian broadcasting official W. R. Wilson. The latter is Technical Advisor to the Board of Broadcast Governors, and a knowledgeable friend of Canadian cable service.

The speeches of Mr. Conroy, Mr. Ford, and Mr. Wadsworth are considered of paramount importance to everyone involved in CATV, and for that reason are presented below in excerpted form. Full texts of these and other speeches are available from NCTA national headquarters.

NCTA PRESIDENT FORD:



The growth of the Association since July 1, 1965 to June 1, 1966 has been significant. In the eleven month period since July 1, 1965, our membership has increased from 642 systems in operation and under construction to 937 systems. During the same period our customers have increased from 962,862 to 1,203,991.

This growth has occurred in the face of the increased opposition by organized broadcasters to the expansion of CATV; the restrictive regulations which the Federal Communications Commission has sought to impose; the crippling legislation reported out of the House Interstate and Foreign Com-

merce Committee; and the adverse decision by Judge Herlands in the copyright case of *United Artists v. Fortnightly Corp.* in the United States District Court for the Southern District of New York.

The most unfair of all the Commission rules with respect to CATV is its failure to adequately "grandfather" existing systems. The most oppressive rule is its top 100 market rule. This rule, in effect, freezes the construction of new CATV systems in the Grade A contour of any station in the top 100 ARB markets until long and costly hearings are held.

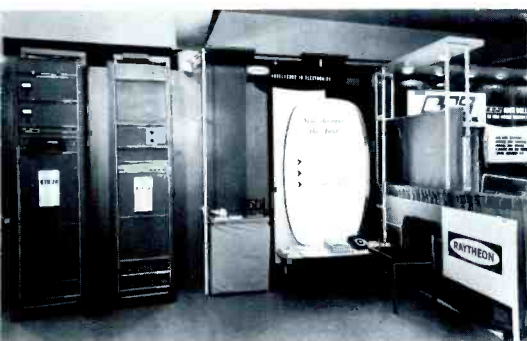
But, the most astounding action of the Commission is its recommendation, seconded by the House Committee, that it be given the power to prevent you from originating programs.

... The Commission in this bill has asked for the power to control by gen-

eral regulation the free speech of CATV operators. It also would give the Commission power to prevent, if it so desires, the public from receiving any television programs, except as they are fed to them by broadcasters. This power of complete prior restraint on free speech is, we believe, an unconstitutional invasion of the rights of the public to see and hear an electronic voice, other than that of broadcasters. To me, this is a repudiation of the basic principles of the Communications Act.

... Broadcast stations in a community are obligated to provide a program fare which is of interest to all the people in that community, and that obligation will ordinarily require reliance on something more than programs, all, or nearly all, of which originate outside the community.

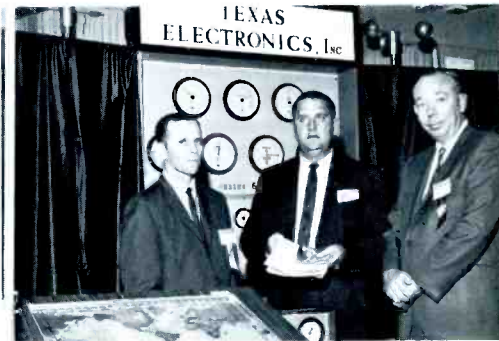
How many of the local stations that



Raytheon microwave equipment was featured in that firm's booth, above. Preformed Line Products exhibit is shown below.



American Pamcor exhibit, above, featured that firm's line of solderless connectors. John P. Minster is pictured below at the Cummins-Chicago booth.



Mssrs. Young, Leeds and Tozer are shown above at the Texas Electronics booth. Shown at the Burnup & Sims booth below are Mssrs. Suttles and Pledger.



you carry make more than a token effort to present local live public service programs? How many of them really do anything of this kind for any community other than the city in which they are located? I will venture to guess that, in most cases, your answer will be "None."

The television broadcaster, and particularly the network affiliate, has not discharged this important responsibility for local live public service programming, and for a very good reason. He can't! There are literally hundreds of communities, in fact, 4,699 communities with a population of more than 2,500 throughout the United States. There are only some 612 television stations to serve their local needs and interests. How can such a limited number of television stations serve the purely local interests of more than 4,600 communities without trespassing on the time of uninterested viewers?

Again, this is pointed out not to chastise the broadcaster, but to call attention to the fact that the area in which he is assigned a specific responsibility to serve the public interest is in many instances too vast for a single broadcast organization to cover.

The CATV industry, as it is being rebuilt into 12-channel systems, has the capacity, the channel availability, the integrated area coverage, and the desire to perform this great public service that the broadcaster cannot perform. Almost 150 systems presently originate programs of some type. We are not and will not be competing with the broadcaster for this programming.

Nevertheless, your opponents do not want you to serve that very interest which they do not and cannot serve. They do not want you to cablecast the proceedings of the local city council.

They do not want you to cablecast the discussion of public issues. They do not want you to cablecast the local public service programs. Why? Because they do not want even a small portion of the public to be drawn away from their commercial programs. They call it fractionalization of audience. I call it freedom of the public to choose without let or hindrance from the government.

I urge each of you, if it is at all technically and economically feasible, to immediately institute on one channel of your systems programs designed to serve the needs, desires and interests of the community of which you are a part . . .

Let us unite to fight the encroachment of H. R. 13286 on the constitutional rights of the American people to see and hear a diversity of programs. Let us fight in the communities, in the states, in the Congress, before the Commission, in the courts. Let us fight to fully serve this area of public interest so long under-served. The interests that would prohibit you from communicating with the public, that would build a fence around themselves so that they alone can reach the public, must be opposed with all of the vigor that this industry possesses. And I am sure that if we bring to bear the full forces of our efforts, we will be successful in defeating the imposition of this crippling legislation and of these restrictive rules on our industry.

Let us continue our service to the public as master antennas for the improvement of the reception of television signals by the public. Let us also assume our public service responsibility to the communities in which we operate to the end that the hopes and dreams of the framers of our broad-

cast system as an instrument for public service, will be realized through our cable systems in a way which has not and cannot be achieved by a television frequency system alone.

PAST-CHAIRMAN CONROY:



This is a year that saw brought to a head two of our major concerns — copyright and regulation — and saw a refocusing in a federal arena of a third area of concern to us — telephone industry involvement in CATV.

The FCC dropped a couple of shoes on AT&T this year; the second one in deciding that lease tariffs are a federal matter, not state, and in assuming jurisdiction over them. NCTA is vitally interested in this matter, and if you have not yet done so, I highly recommend that you read NCTA comments filed before the FCC in opposition to AT&T's Petition for Reconsideration.

A parallel subject is that of control of CATV systems by State Public Utility Commissions. The National Association of Railroad and Utilities Commissioners at a meeting in New York last September adopted a resolution directing its General Solicitor to prepare a draft of a model act providing for state regulation of CATV systems.

The model act has been prepared and will be making the rounds of the state legislatures. In each State, the industry must gird its loins and be ready to meet the problem head on,



Shown at Sigma Industries booth are Messrs. Reardon, Barnes and Monroe. Messrs. Chesen and Tokarczyk are pictured at the Advance Industries exhibit below.



Messrs. Barnes, Crisman, Astrowsky and Levisay are shown at Gabriel booth, above. At Blonder-Tongue display below are Messrs. Farey, Schulz, Glaab, Wilson and Helhoski.

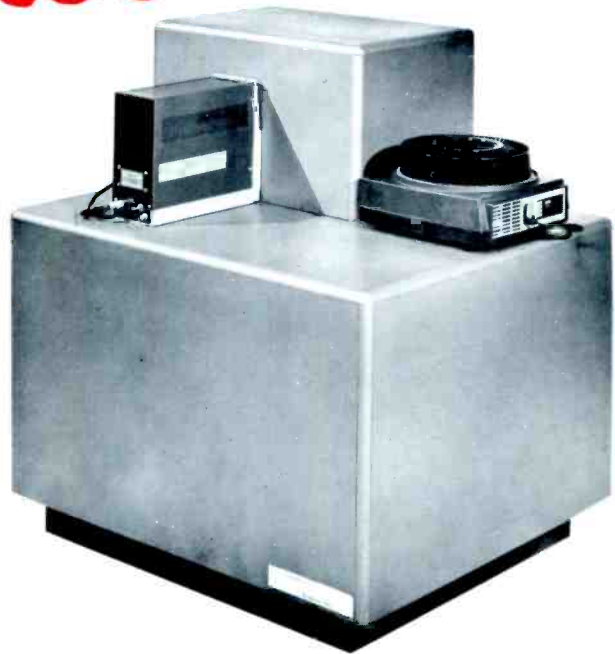


Switching equipment was featured at International Good Music booth, above. Aberdeen booth, below, awaits opening of exhibits.



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Accutron time piece provides continuous accuracy; no resetting even after power outage



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as it has been met in state after state since 1952.

One of the more upsetting decisions this year was that of the U.S. District Court in New York in *United Artists vs. Fortnightly Corporation*. It came as a shocker to every cable operator that, in effect, each time TV signal passes through an amplifier tube or transistor constitutes a performance within the meaning of the Copyright Act.

There is no question that this decision will have an impact upon CATV. Certainly, if upheld, it will put us into a different ball game, with different rules, some of which could operate to our advantage. The FCC itself recognizes this in the Second Report and Order.

We have in the past sought to avoid the programming function, in a broad sense. Now, it may be thrust upon us, and who knows what doors, formerly closed or untried — now that the copyright latch may be loosed — may now open to reveal a vista of new worlds and new concepts fully available. And the public will be the winner.

The Second Report and Order ordains that there shall be two classes of citizens, a fortunate 10% and an unlucky 90% to whom the benefits of clear reception and diversity of television programming via CATV are temporarily denied. All this under the guise of protecting the public and UHF. In view of the effort to deny to 90% of the public even the right to examine the benefits of new technology, punishing the public seems a more accurate description of their aim. The rash of court cases, waiver requests, cease and desist orders, show cause proceedings, and so on, which are the spawn of

this precipitous and ill-conceived regulatory adventure are now upon us. And there will be many more.

H.R. 13286 is bad legislation. Without due process, by complying with it, we could place ourselves in jeopardy under copyright laws. It is a bad bill. It must not be allowed to pass.

Under the legislation reported out of the House Commerce Committee, we face the unenviable possibility of getting the worst of two regulatory worlds. There could be two distinct types of regulation for community antennas, that is, non-utility at the federal level and utility at the state level. Practically, however, our services and facilities are identical, as between inter and intra-state, and there is no logical line of demarcation between the two forms of regulation. Results could be chaotic for our industry.

Let me suggest to you now for the weeks ahead: keep your bags packed and a couple of clean shirts ready. You'll be needing them.

No longer can we afford the wasteful luxury of letting the problems and the law suits come to us — happen to us. We must, as individuals or groups, state, regional or national, initiate actions to meet the problems head on. In the long run it is inevitable that the public will be served as it demands to be served.

I'd like to conclude with a little editorializing. This is not usually a part of the Chairman's report but I think it is well to depart from established ruts occasionally.

For the health of our industry we need to be an association of cable operators 100% committed to the CATV industry and its concepts. Our policies should be those that are proper for

us — not for broadcasters or some other industry. The same should be said for those we elect to shape our policies.

It is always a source of amazement and deep regret to see certain members of NCTA take violent issue with some of the reasonable suggestions we have made to the Commission and to the Congress.

We have in the past, and still do, welcome members of other industries to our ranks as a blessing. But with the split loyalties and selfish actions we've seen recently, this blessing is certainly a mixed one.

I feel that the next few years will see a continuation of the growth of CATV despite the profusion of problems we have today and the hostile interests opposing us. The public we serve has shown it is interested in, and willing to pay for the service we are rendering them now and will continue to render in that public's interest.

COMMISSIONER WADSWORTH:



My prime illustration of inadequate planning is usually the FCC's handling of CATV matters over the years leading up to our Second Report and Order in March of this year. . . .

By the time I was sworn in to the FCC in May, 1965, to take the place of Commissioner Ford, who departed for greener pastures, the FCC had (1) both affirmed and denied regulatory authority over CATV; (2) successfully defended in the courts both conflicting views; (3) denied and



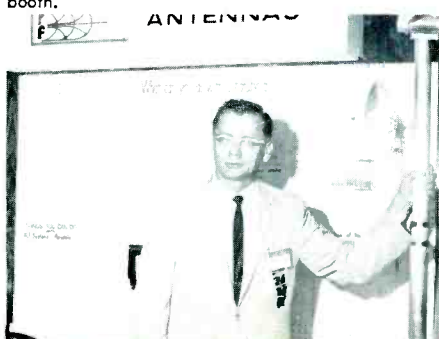
Joe Potts and Wm. Robinson are shown at the Cal-Tel Construction booth, above. Al Fowler, president of RF Systems is shown below at his firm's booth.



Tom Aye prepares literature for opening of Tape-Athon display, shown above. Charles Golsen and John DeWaal are shown below at Telemet booth.



John Frye is pictured above at the TCA tower display. Below, Charles Camill and Jack Aylward are shown at the Amphenol exhibit.



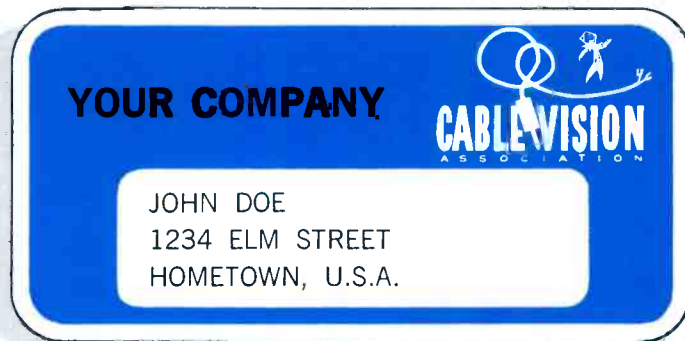
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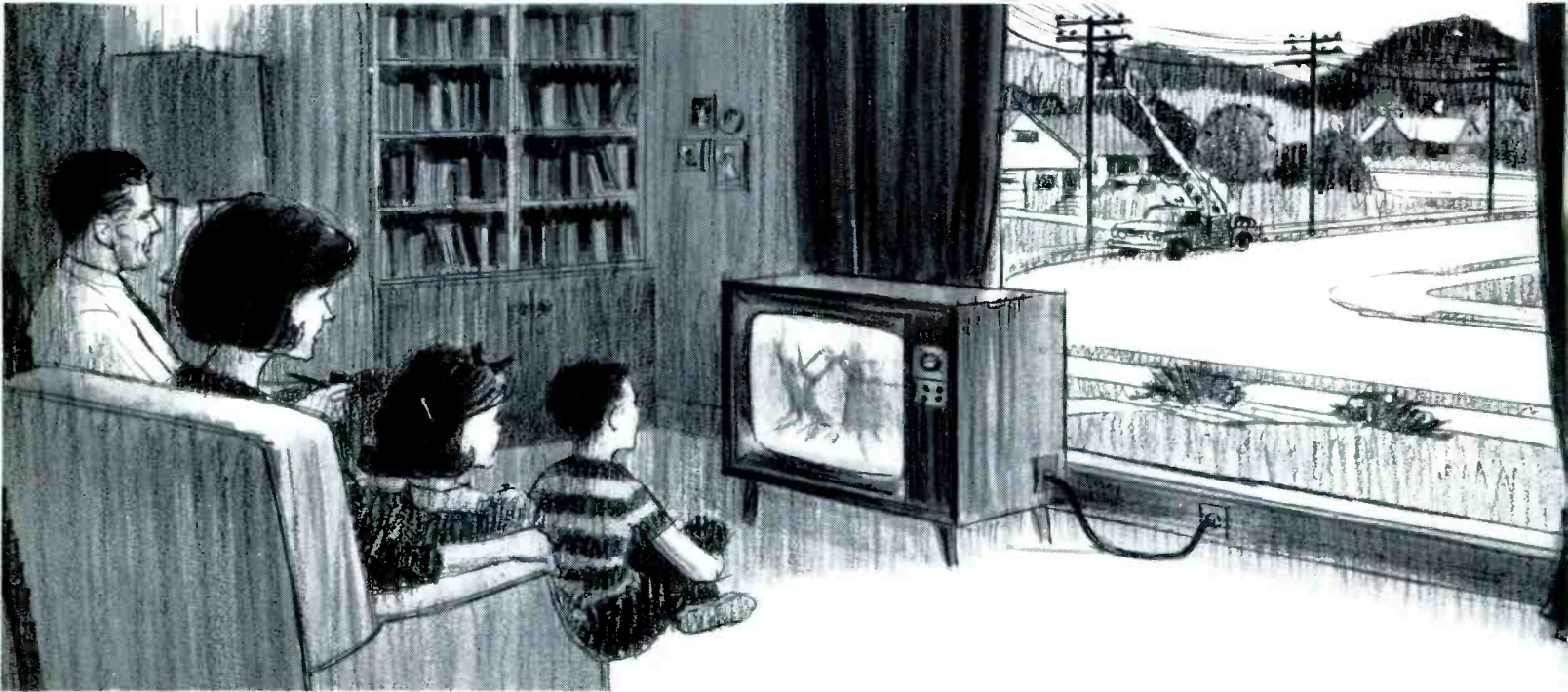


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that CATV has an obvious and inherent adverse impact on TV; and (4) adopted and rejected the case-by-case approach. These hesitant, half-hearted compromise measures satisfied and served no one — not the TV industry, the CATV industry, or the public. Generally speaking, everybody — including most of the Commissioners — were unhappy with the FCC's record in this growingly important field.

At that time, and speaking for myself, my mind on the subject was entirely clear. I came to the Commission with no previous background in electronic communications, no special interests or associations, no axes to grind, and no prejudices except one; I instinctively favor, as a matter of ingrained ideology, free enterprise.

At this point, I should perhaps remind you that each Commissioner has within his office his own legal and engineering advisors. These assistants are responsible to him only. Therefore, Commissioners have access to legal and technical advice that is entirely independent from the whole Commission's staff.

The first and foremost conclusion I drew out of this "wire mire" in which "Able Cable" was sinking, was an extremely basic one; namely, regardless of whether or not the FCC had regulatory authority over CATV's, directly or indirectly, over microwave or by wire, it was the *Congress rather than the FCC which should establish national policy on CATV.*

Unfortunately, this simple and democratic concept did not afford me sufficient guidance for action in this bemuddled field. It was an important signpost but scarcely enough to chart

a comprehensive and effective regulatory program. One of the most difficult problems was that Congress, itself, had consistently failed officially to act one way or another, and I did not feel I was entitled to withhold Commission action thereby. For this would have been tantamount to tacitly condoning the allegedly disruptive effect of CATV on the established allocation policy.

The Second Report, I would be first to admit, is not a perfect document. It is, you have noted, considerably longer than the Gettysburg Address and the Constitution — combined — although still somewhat shorter than "Gone with the Wind." I like to believe that if I had drafted it, it would be a shorter, neater, simpler and clearer document.

I did not outline my reasons for voting for the Second Report in order to apologize for either the vote or the Report. I think I did right and that the Commission acted correctly. My point is that these long and involved government documents are the result of careful study, agonizing soul-searching, long discussions, parliamentary maneuvers, inter-action of government departments, and a concatenation of complex forces that are brought forth in our form of government. I also want to assure you that while these may not have turned out the way the CATV industry wants them, none of the Commissioners has acted out of malice, prejudice, or without an earnest and sincere effort to serve the public interest the best way he knows how.

Accordingly, the Second Report and Order is what the Commission and the communications industry now have to

live and work with. While it admittedly may be modified, or perhaps even expunged, by Congressional statute or Court decision, I believe that reasonable men will adjust to its general directions and groundrules until such time as these may be changed, either legislatively or judicially.

Yet, as we commence our regulatory tasks let me solemnly assure you that the CATV industry, both collectively and individually, need have no fear of not getting a "fair shake" from the Commission. CATV is a recognized, responsible and valued contributor to our television service, and it will be so treated.

Our only vested interest is the public interest. If anyone shows us — either on requests for waiver, or on a full hearing record where necessary — that the public is better served by any new approach or particular proposal, then we will modify our established approach or waive the existing rules to accommodate that proposal.

The CATV bill . . . points to more intensive contact between the CATV industry, an emerging giant, and the FCC. We have already established excellent liaison with your organization, the NCTA, and with your Washington representatives. The future indicates the need for closer grass-roots contacts which, I hope, will be both pleasant as well as constructive. I believe that new legislation along the lines now pending, will finally give CATV its proper place in the sun and, instead of thwarting its growth, will help its healthy development along lines of legitimate aspiration so it can continue its vital role in our nation's growing communications system. □



Maurice and Bernard Olfman are shown above at the Electroline exhibit.



Tommy Moore shown supervising installation of the Ft. Worth Tower exhibit.



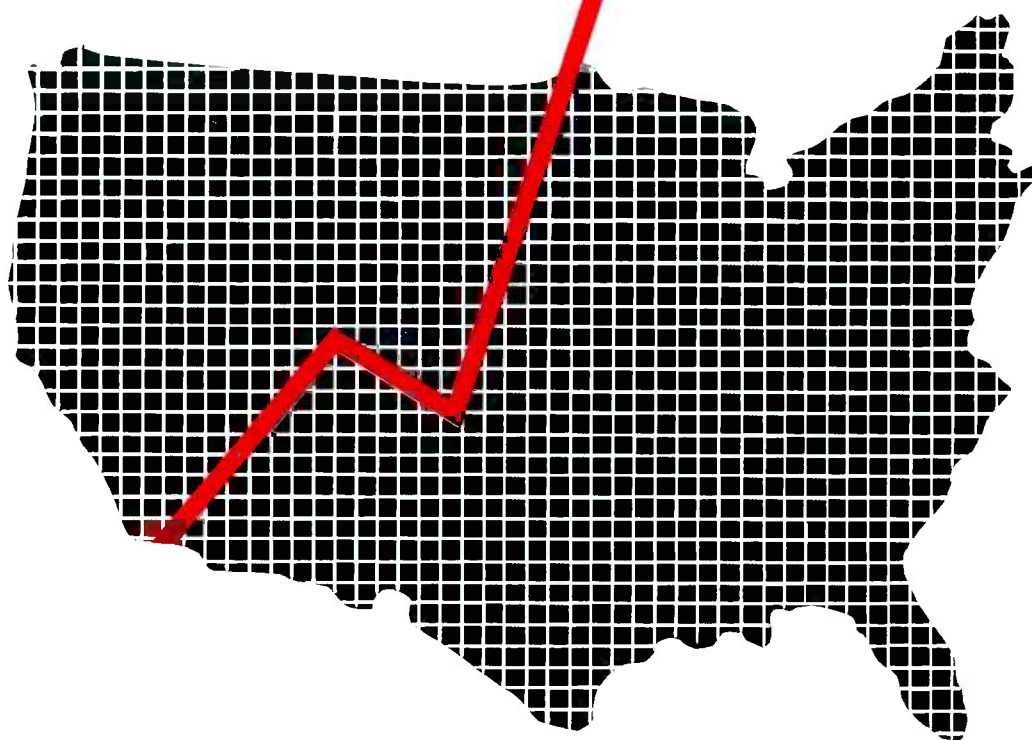
Bill Servies and Mrs. Rudy Riley are shown at the Systems Engineering booth.



C. F. Reed is shown above at the Phelps Dodge display.

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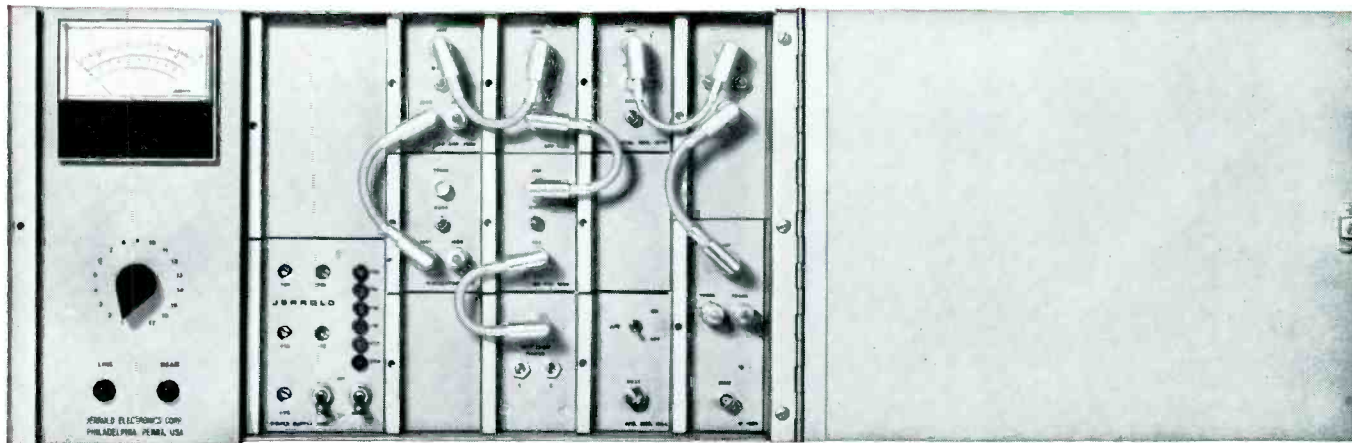
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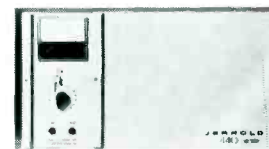
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CATV EQUIPMENT PRODUCTION

Past, Present and Predicted

By G. T. Simmons and R. E. Berndt

Motorola Semiconductor Products Division, in Phoenix, Arizona, is a major supplier of solid-state devices to the CATV industry. That firm's interest in the cable industry has moved Motorola management to commission a study of all phases of the CATV business. As adapted for publication here, the report consists mostly of statistical data and analysis of equipment requirements of the industry.

Authors Simmons and Berndt have relied on generally accepted methods of research in compiling the various charts and tables included, resulting in relatively conservative, as well as objective findings. Predictions and statistical projections were made with all current political and technical developments in mind. Since most readers within the CATV industry are well aware of the current legislative/regulative situation, sections of the report dealing with such background information were omitted here.

Mr. Simmons is a graduate of the University of Nebraska where he majored in Economics and Statistics. He was associated with Ford Motor Co. prior to joining Motorola. His present position is that of Consumer Market Analyst for Motorola Semiconductor Products Division in Phoenix. Responsibilities of the position include research, evaluation and analysis of consumer end-product markets offering potential for semiconductor devices.

Mr. Berndt holds two engineering degrees from Indiana Institute of Technology. After spending 5 years in the aerospace industry as systems engineer, sales engineer and marketing researcher, he recently turned to the commercial field. As industrial market analyst for Motorola's Semiconductor Division, he is responsible for research and analysis of major markets for solid-state devices.

INTEGRAL ELEMENTS OF A TYPICAL SYSTEM

The basic composition of a typical cable television system is shown in Figure 1. The information contained in Table 2 defines specific equipment quantities for this typical system based on use of the modulator-demodulator type design of head-end equipment.

There are three basic philosophies used in head-end equipment: (1) Mod-demod, in which each received signal is processed individually and sent to the cable via a repeater (actually the modulator); (2) Heterodyne, in which one

integral unit, similar to a TV receiver, has separate stages in the tuner per channel, AGC is added for signal stability, hybrid mixers cancel co-channel interference, and finally the signal is sent to the cable, or super trunkline; and (3) TRF (tuned radio frequency) in which simple strip RF stages are used, similar to the old reliable TRF receivers, on a per channel basis to merely amplify the received signal prior to sending it out on the cable.

For average-sized systems, tower equipment will normally use a separate antenna per TV channel received, and a separate pre-amp per channel where needed. We have assumed that only 70% of all channels received will require a pre-amp — thus the 4 pre-amps shown in Figure 2.

Three types of distribution amplifiers are used in a cable system: trunkline, distribution (bridging), and feeder line extenders. Distribution equipment varies, dependent upon the design philosophy of the manufacturer. Data in this section shows the average quantity of amplifiers, by type, on a system mile basis.

GENERAL INDUSTRY STATISTICS

CATV, in its first seven years of existence or by year end 1957, had grown to nearly 580 operating systems, with approximately 490,000 subscribers. (Data projected for the

TABLE 2: Equipment Content of a Typical Existing CATV System

General:	
Average of 53 miles of system plant	
Average of 24 subscribers per mile	
Average of 3 subscribers per feeder line	
Average of 6 TV channels received	
Tower Equipment:	
1 antenna per TV channel = 6 antennas	
1 pre-amp per antenna (when necessary due to TV broadcast site) = 4 pre-amps	
Head-End Equipment:	
1 wide-band amp per TV channel = 6 amps	
1 modulator per TV channel = 6 modulators	
Distribution Equipment:	
3 trunkline amps per mile = 159 trunkline amps	
2 distribution amps per mile = 106 distribution amps	
8 line extender amps per mile = 424 line extenders	

TABLE 3: Estimated Average Newly Installed CATV System Cost

Year	Total Average System Cost	Average Cost Per System Mile	Average Miles Per System
1958	\$150,000	\$3,500	43
1959	160,000	3,550	45
1960	170,000	3,600	47
1961	180,000	3,650	49
1962	190,000	3,700	51
1963	196,000	3,750	52
1964	200,000	3,800	53
1965	205,000	3,750	55
1966	208,000	3,700	56
1967	212,000	3,600	59
1968	215,000	3,500	62
1969	218,000	3,400	64
1970	221,000	3,350	66
1971	225,000	3,300	68

TABLE 1: Survey of CATV Systems Installed as of End of 1965

Item per System	Mean	Mode
Average miles of distribution plant	53	45
Quantity of existing subscribers per mile	23.6	15
Total quantity of existing subscribers	1250	675
Total quantity of potential subscribers	2660	1500
% of market penetration $\left(\frac{\text{existing subscribers}}{\text{potential subscribers}}\right)$	47%	45%
Installation fee	\$30.10	\$25.00
Average monthly cost to subscriber	\$ 4.95	\$ 5.00

Notes: Mean is defined as the arithmetic average, i.e., the sum total of the individual parts divided by the number of individual parts. Mode is defined as the most frequent value occurring in the data surveyed. Potential subscribers is defined as the number of subscribers expected to be added to existing systems within 5 years.

years 1966-71 is shown as reflecting expected normal annual progress for the industry). It should be realized that the industry's capacity is increasing very rapidly, and could accommodate a large rise in subscriber saturation at any time. Some industry sources are considerably more optimistic with regard to industry growth than are the writers.

Editor's Note: The authors' figures for total number of CATV subscribers during the years shown are, like most of other reports giving similar informations, considerably below the estimates of many informed individuals within the cable industry. Until such time as such information is filed with the FCC, no truly accurate figure can be given for total cable subscribers in the U.S.

TABLE 4: Estimated Total CATV Systems and Subscribers

Year End	New Systems	Net Operating Systems	% Annual Increase	Existing Subscribers (000 Omitted)	% Annual Increase	Total TV Homes (000 Omitted)	% CATV Homes of Total TV Homes
1958	99	679	17.1%	611	24.7%	43,950	1.39%
1959	95	774	14.0	735	20.3	45,750	1.61
1960	118	892	15.1	891	21.2	47,200	1.89
1961	119	1,011	13.4	1,062	19.2	48,885	2.17
1962	137	1,148	13.6	1,263	18.9	50,300	2.51
1963	146	1,294	11.8	1,477	16.9	51,600	2.86
1964	166	1,460	12.1	1,760	19.2	53,100	3.31
1965	215	1,675	16.3	2,100	19.3	54,690	3.84
1966	275	1,950	16.4	2,550	21.5	56,330	4.53
1967	350	2,300	17.9	3,150	23.6	58,020	5.43
1968	470	2,770	20.4	4,000	26.8	59,760	6.69
1969	530	3,300	19.1	5,030	25.7	61,560	8.17
1970	580	3,880	17.6	6,240	24.2	63,400	9.84
1971	620	4,500	15.7	8,100	29.7	65,300	12.40

TABLE 5: Estimated CATV Total Annual Investment (000 Omitted)

Year	Total Investment	= New System Investment	+ Replacement Investment	+ Expansion Investment
1958	\$ 20,628	\$ 14,820	\$ 3,168	\$ 2,640
1959	23,937	15,200	5,318	3,419
1960	30,771	20,140	6,733	3,898
1961	30,178	21,375	3,902	4,901
1962	36,880	26,125	5,111	5,644
1963	42,278	28,600	6,496	7,182
1964	50,067	33,250	7,940	8,877
1965	61,617	44,080	7,588	9,949
1966	79,230	57,190	9,684	12,356
1967	96,934	74,200	9,974	12,760
1968	125,314	101,050	11,599	12,665
1969	142,649	115,540	12,186	15,063
1970	160,213	128,180	13,975	18,058
1971	178,919	139,500	18,274	21,145

TABLE 6: Estimated CATV Electronic Equipment Total Annual Investment (000 Omitted)

Year	Total Investment	Electronic Equipment Investment	% E.E.I. of T.I.
1964	\$ 50,067	\$ 14,319	28.6%
1965	61,617	18,608	30.2
1966	79,230	25,195	31.8
1967	96,934	32,376	33.4
1968	125,314	43,860	35.0
1969	142,649	52,210	36.6
1970	160,213	61,362	38.3
1971	178,919	71,568	40.0

TABLE 7: Estimated CATV Total Annual Revenue (000 Omitted)

Year	Total Revenue	Monthly Charge Revenue	Installation Fee Revenue
1958	\$ 36,690	\$ 33,060	\$ 3,630
1959	44,100	40,380	3,720
1960	53,460	47,780	4,680
1961	63,750	58,620	5,130
1962	75,810	69,780	6,030
1963	88,620	82,200	6,420
1964	108,630	100,140	8,490
1965	126,000	115,800	10,200
1966	153,000	139,500	13,500
1967	189,000	171,000	18,000
1968	240,000	214,500	25,500
1969	301,800	270,900	30,900
1970	374,400	338,100	36,300
1971	486,000	430,200	55,800

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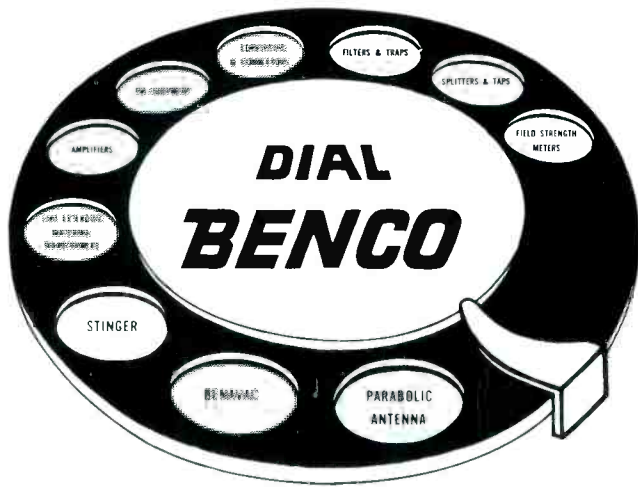
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CATV EQUIPMENT PRODUCTION

This section includes four tables which show annual equipment production by type of equipment. The first table (Table 8) is the total of the following three tables, which are equipment production allocated by market (i.e. new system, replacement, or system expansion).

Note: *New system equipment* is defined here to mean only equipment sold for use in complete systems being installed for the first time in a community. *Replacement equipment* includes all equipment sold to replace inoperative or obsolete components of existing systems. *System expansion equipment* is that which is sold for the purpose of adding subscribers to an existing system or for adding channels or services to existing systems.

TABLE 8: Total Equipment Production

Year End	Tower PA	Head-End		Distribution		
		WBA	MOD	TLA	DA	LE
1965	2,257	2,998	2,998	55,770	37,180	148,720
1966	2,933	3,900	3,900	72,063	48,042	192,168
1967	3,825	5,102	5,102	89,043	59,362	237,448
1968	5,083	6,836	6,836	117,951	78,634	314,536
1969	6,196	8,305	8,305	136,386	90,924	363,696
1970	7,274	9,820	9,820	155,814	103,876	415,504
1971	8,099	10,564	10,564	179,655	119,770	479,080

TABLE 9: New System Equipment Production

Year End	Tower PA	Head-End Equipment		Distribution Equipment		
		WBA	MOD	TLA	DA	LE
1965	1,204	1,720	1,720	35,475	23,650	94,600
1966	1,540	2,200	2,200	46,200	30,800	123,200
1967	2,205	3,150	3,150	61,950	41,300	165,200
1968	3,290	4,700	4,700	87,420	58,280	233,120
1969	4,081	5,830	5,830	101,760	67,840	271,360
1970	4,872	6,960	6,960	114,840	76,560	306,240
1971	5,208	7,440	7,440	126,480	84,320	337,280

TABLE 10: Replacement Equipment Production

Year End	Tower PA	Head-End Equipment		Distribution Equipment		
		WBA	MOD	TLA	DA	LE
1965	332	248	248	12,825	8,550	34,200
1966	413	300	300	16,638	11,092	44,368
1967	500	352	352	17,493	11,662	46,648
1968	575	396	396	20,961	13,974	55,896
1969	715	475	475	22,776	15,184	60,736
1970	813	590	590	26,394	17,596	70,384
1971	1,204	714	714	35,475	23,650	94,600

TABLE 11: Expansion Equipment Production

Year End	Tower PA	Head-End Equipment		Distribution Equipment		
		WBA	MOD	TLA	DA	LE
1965	721	1,030	1,030	7,470	4,980	19,920
1966	980	1,400	1,400	9,225	6,150	24,600
1967	1,120	1,600	1,600	9,600	6,400	25,600
1968	1,218	1,740	1,740	9,570	6,380	25,520
1969	1,400	2,000	2,000	11,850	7,900	31,600
1970	1,589	2,270	2,270	14,580	9,720	38,880
1971	1,687	2,410	2,410	17,700	11,800	47,200

CONCLUSION

The impending need for better reception on the part of many new color TV homes, plus the general consumer acceptance of CATV, will cause an outstanding growth for the industry over the next five years. Knowledgeable industry sources privately admit sincere optimism for the industry, in spite of apprehension about FCC regulations . . . It is our opinion that the climate for expansion of the CATV industry is excellent at least through 1971. □

A GOOD PUBLIC IMAGE

By Peter S. Carr, Chief Technician
St. Mary's (Pa.) TV Company

It is generally agreed that one of the most valuable assets of a CATV system is its good public image. Happy subscribers make for more profit, the aim of any business. All CATV systems start their operation with this good image born of initial impact in the viewer's pictures plus increased program selection. The trick of this trade is how to keep it once that impact wears off.

The maintenance of a good image doesn't really begin until the system has been "hot" about a year. During this period the average subscriber tends to overlook arising troubles as growing pains and will bear with the company. At the end of this time the company will probably have about twenty percent of expected saturation hooked up and will be pushing hard for the rest. It is easily forgotten that these present subscribers are also powerful salesmen for or *against* the cable. If these people are unhappy with their pictures, they don't keep it to themselves. The result is an uphill fight to realize the system's full customer potential.

If the product we sell to our customers isn't up to par, we can expect trouble calls. These are part of the business and will always be with us. They may be a built-in deficit but they can be minimized by recognizing the two major areas from which they come.


First we have system picture quality. This starts at the top of the tower and ends at the customer's TV set. Even in the big push to hook up new subscribers, system maintenance should take top priority. Remember that our first twenty percent subscribers are the best salesmen for helping to get the rest so *keep them happy*. This may mean pulling men off installations to sweep trunk line or set levels, but it's well worth the effort.

Secondly, there is the problem of handling those trouble calls that do come in. Try making excuses to the subscriber that broke his transformer and has been waiting three days for a technician to come and replace it. When people aren't happy with the cable they can't keep it to themselves. It's only natural that a potential customer listening to them will have second thoughts about hooking up. If the public once gets the idea that the cable isn't backed by prompt service, the operator will have a tough time convincing them to the contrary.

The best way to beat this problem is a set schedule of system maintenance. Daily checks of the head-end and antennas will assure that continued top quality pictures enter the system. This is the product you are selling. Be sure that its quality is of the highest.

In this young industry, it is difficult to find trained and experienced CATV technicians and most operators are faced with having to train their own. It is better to upgrade your technical staff with each new hire—and one qualification often overlooked is personality and manner of speech. Your technicians meet the customers and should give a good personal impression along with job competence. This is not an easy balance to obtain but will pay dividends in happier subscribers and fewer call-backs.

Your product is watched by the public all day, every day. If they like what they see, your problems will be few. If, on the other hand, they are unhappy with their pictures, your profits will quickly show it. Good business practice and attention to technical detail will assure that your good public image remains your most valuable asset.



read what others say about the 'SS' men . . .

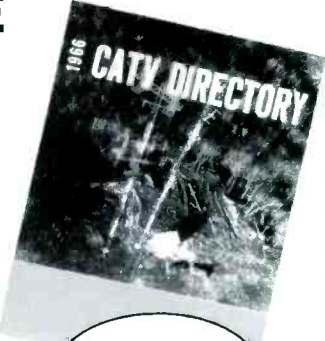
The contract job done here in Houma by you is by far one of the best I've seen in twelve years of CATV experience. Your construction foreman showed great attention to detail, excellent management, and a firm knowledge of the CATV construction and engineering business. I sincerely think that if all systems were built as well, our industry would surely be an example for the telephone company.

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A LOOK AT

JAPANESE CABLE TV SYSTEMS

By Philip D. Hamlin

The hardest adjustment for the foreigner in Japan is arithmetical. You leave the United States weighing 200 lbs. and arrive weighing 88 "kilos." You sit in amazing comfort on the world's fastest train and glance at the large speedometer thoughtfully provided by the railroad and learn you are traveling 200 kilometers per hour . . . and then try to find someone around you who remembers the conversion factor.

Japanese CATV is no exception. Cable lengths are in meters and so are mountain heights. Channel allocations are entirely different. But the hardest thing to assimilate is output levels. Although amplifiers commonly operate at 110 db output, they are not putting 300 volts into a 75 ohm line but just 3/10th of a volt. The difference is just 1000 times our 1000 microvolt reference against their 1 microvolt reference.

CATV in Japan exists upon two desires: coverage by the stations and receiver sales by the dealers. One exception that proves the rule is the first to be discussed here and which was installed, pretapped, before a single



Head-end components for the Hakone system are carried up mountain trail—vehicles would deface the scenery!

house had been constructed in the area.

Since all TV owners must pay a tax for the support of the national network, NHK, some of this money is contributed towards both CATV and translators.

Prior to this NHK policy, set manufacturers desiring sales in an area ad-



Poles for antenna mounts and trunk run down the mountain are transported and installed by hand.



Construction of distribution facilities also involves a great deal of manual labor.

vanced the money for a complete CATV system, then offered a preferential connection rate to those buying their brand, with all others paying about double. The second system to be discussed herein is of that type.



Technicians are shown completing the head-end installation for the Hakone system.

HAKONE PLAIN SYSTEM

Hakone is a famous "Spa," with baths fed by hot springs and said to be good for the alleviation of all physical and mental ailments. It is also the vacation locale for the wealthy Japanese and abounds in deluxe Japanese inns and summer homes.



Transport of cable for antenna run at Hakone looks like work.

Our trip to Hakone was arranged by Yuzo Amemiya, an executive of Yagi Antenna Company. Amemiya-San accompanied the author and his long-time Japanese business partner, Toshio Kawamoto, throughout the trip.

Although only about 50 airline miles from Tokyo, "Hakone Myojindaira-Plain" is three hours by extremely fast express train, plus an hour and a half of automobile travel. The mountain roads are reminiscent of "Pike's Peak" while the scenery is even more beautiful than the State of Washington's.

The CATV system at Hakone is part of a railroad company's real estate development.

Japan's railroads are unique in that they make money and still present a genuine bargain to the traveling public. To generate more travel, many private companies develop mountain resort properties, especially in the "Spa"



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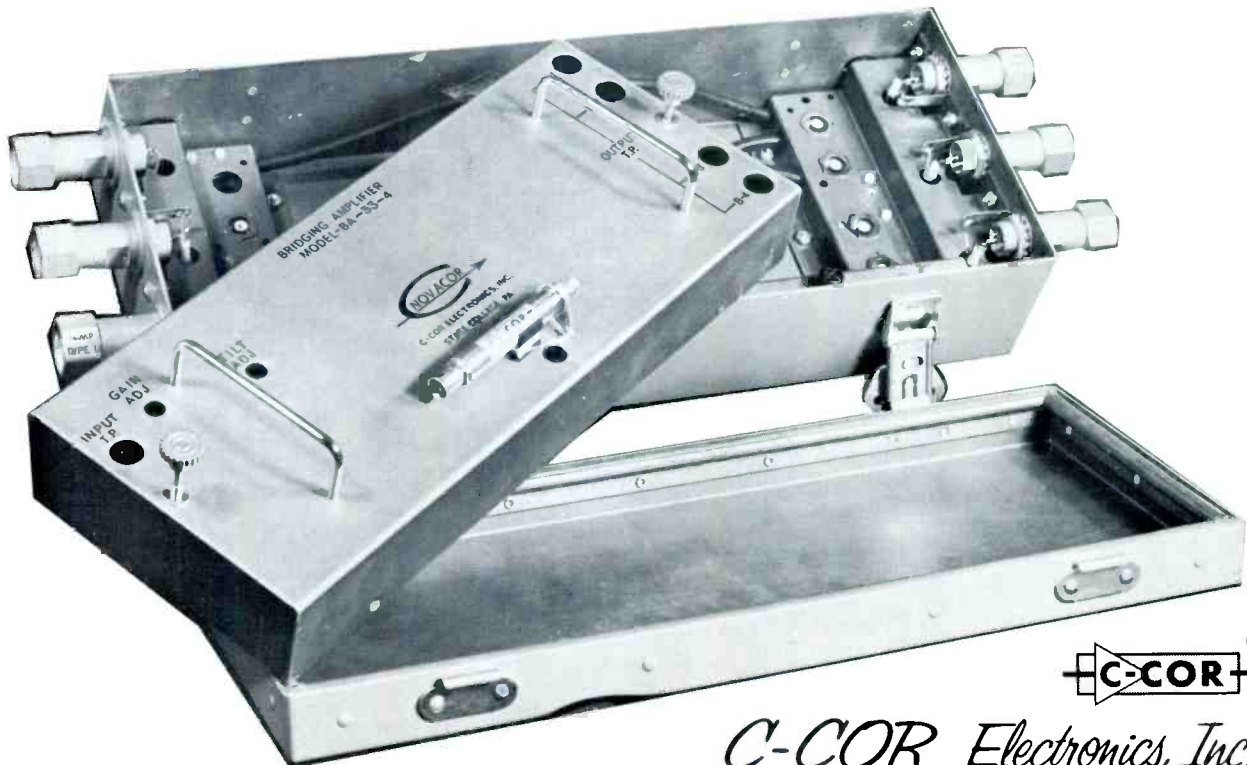
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direct input and directional coupler inputs with -12 db and -20 db coupling. The direct feed is designed to feed from a "bridger out" of a trunk amplifier, an external splitter, or directional coupler. The coupler feed is designed for insertion in the trunk without external coupler or splitters. Bridger cost per customer is 20% to 40% lower than competitive units since feeders are longer and more customers can be connected per bridging location. Priced at \$415.00 list, the systems-tested NOVACOR bridgers are in production with 30-day shipment.

* measured in accordance with the new NCTA standard for amplifier output (-57 db cross modulation, 12 channels, etc.)

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areas where the wealthy can afford to purchase property and build summer homes.

The system was constructed by Yagi Antenna Company as the prime contractor and Nitta Communication Industry Co., Ltd. as the pole line sub-contractor.

The difficulties in hauling construction materials up the mountain are fully apparent from the accompanying photos, furnished by Yagi.

Why were such "primitive" methods employed, instead of just bulldozing a road and hauling everything in by truck or Jeep? Because it would be

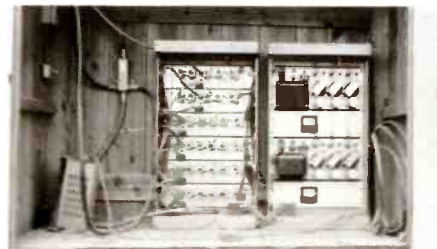
unthinkable to destroy and deface the beauty of the mountain!

Like all Japanese CATV, the Hakone system is "multi-channel." The following are the measured levels on the respective Tokyo channels at the antenna site:

Ch 1 (90-96 Mc)	.....	6,000 Microvolts
Ch 3 (102-108)	.....	9,000 Microvolts
Ch 4 (170-176)	.....	10,000 Microvolts
Ch 6 (182-188)	.....	10,000 Microvolts
Ch 8 (192-198)	.....	8,500 Microvolts
Ch 10 (204-210)	.....	3,000 Microvolts
Ch 12 (216-222)	.....	500 Microvolts

"Head-end" Amplifiers are 60 db gain with Ch 12 running at a conserva-

tive 50 db output (American) and the lower channels cranked back accordingly. All have AGC. Elaborate band pass filters are used to feed the multi-channel antenna outputs into the strip amplifier inputs.



60 db strip amplifiers in the Chichibu system—channel 10 runs at 1 volt output, with others cranked back according to cable loss. All have AGC.

Distance to the first "reamplifier" is approximately 1500 feet, and the third amplifier is at the base of the mountain, on the edge of the development.

All taps (directional couplers) were installed during construction. Each purchaser of a lot will thus automatically obtain a cable connection when he builds. Present saturation is 25%.

Construction techniques, hardware, and electronic engineering of this entire system is "Bell Telephone" quality. Poles were set by the construction company for about half the system, the rest being "joint use."



Directional coupler used in Chichibu system has 300 ohm output to subscriber. Drops are twin lead or ladder line.

Total "pre-connections" are 600. Total cable length after the antenna run is 14,400 feet. Antennae are 2740 feet above sea level and airline distance to Tokyo is slightly over 50 miles. No reception is possible without the system.

CHICHIBU CATV SYSTEM

"Chichibu" is at a compass heading of about 290° from Tokyo, whereas Hakone is approximately 205°. Hakone receives a "line of sight" signal, while Chichibu receives a "ricochet" signal refraction from a sharp peak, bounce from the valley below, and then a second "knife edge refraction" that



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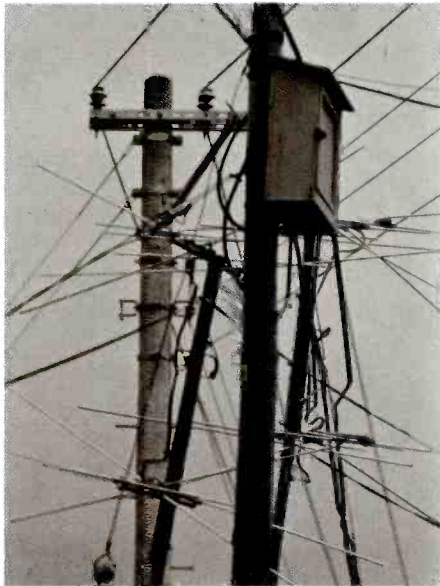
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puts a signal into Chichibu reminiscent of South Bend, Washington, right at ground level, and strong enough that the antennas face directly into heavy and very dense, deciduous trees. It is



Non-subscribers help themselves to liberal dose of radiation from Chichibu distribution facilities.

To encourage the sale of Victor sets, purchasers are allowed to connect to the system for \$40. Monthly charge is 40¢. Non-Victor purchasers may also connect at \$80, with the same monthly maintenance charge.

There are presently 1100 subscribers. About 550 purchased "Victors," a great disappointment to the company, and the balance purchased competitive makes.

From a casual inspection of the system, I would estimate about 200 are receiving free, "radiated" pictures from the wooden amplifier boxes and the twin lead drops.

Amplifiers were subcontracted by Victor to Miharū, a leading Japanese



Picture quality is indicated by snapshot taken in a farm home served by Chichibu system.

Chichibu was financed by an advance of \$50,000 from "Victor of Japan," a company that uses both the RCA "Master's Voice" dog trade-mark and the "Victor" name over here, but exports as "Nivico," a contraction of "Nippon Victor."

CATV company and a supplier of MATV components to Channel Master. All channels are "preamped" at the antenna site and then fed to six AGC'd, 60 db gain, tube type strip amplifiers. One volt output on the high channel at both antenna site and at each 40 db reamplifier is par for the course . . . a very considerate gesture to the "free loaders" who cram antennae around amplifier boxes like bees around a beehive.

All directional couplers are 75 ohm in, 75 out, and 300 ohms to subscriber. Twin lead, either solid dielectric or lower loss "ladder line type" is then used for drops. Since many drops are

200 yards or more, there is some justification.

This is in marked contrast to Hakone where directional couplers are used for main line tapping also, but all spigots are 75-75-75 and the drops are of RG-6 to RG-11 size coax.

So how are the pictures? Note TV set in farm house after 11 reamplifiers. Not a trace of intermodulation on any channel and pictures equal to the antenna site. Remarkably, this particular drop was about 250 yards long, contained haywire, unsoldered splices of solid twin lead to ladder line twin lead, and was actually tied in a loose knot where it entered the house! □

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(Continued from page 16)

national wire services. For if Congress possesses the power to establish the source or nature of communications eligible for distribution over closed-circuit media, it must similarly have the power to designate the source for all press media; there is no constitutional distinction between the two activities of government.

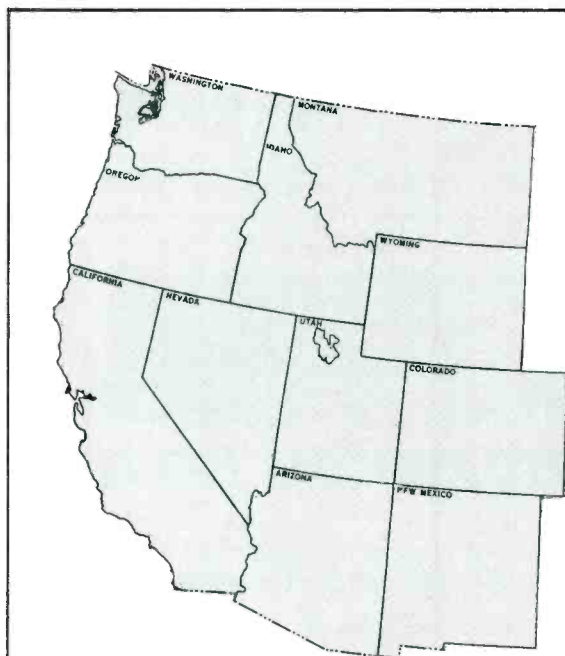
The real issue then is how can a respected, knowledgeable committee of the Congress be persuaded, or perhaps duped, into making such a legislative recommendation. And, in this regard, it is interesting to observe the sheer power and dedication of those entrenched few who construe almost any innovations in the electronic mass-media communications field as a threat to their established economic welfare and vast financial and political affluence. As well, and even more pertinent, it is somewhat disconcerting to observe the efficiency of this power establishment in persuading an important Committee of the Congress of the United States that the public welfare actually requires the permanent suspension of cherished constitutional freedoms of those who might seek to engage in a business endeavor which has even the earmarks of challenging the sanctity of the *status quo*.

The first possibility, or perhaps excuse for the majority of the Commerce Committee, is that the proponents of the provision against program origination are engaged only in normal parliamentary strategy knowing full well that they can (must) give on this particular point while holding firm on others in the bargaining process that almost always precedes the enactment of controversial legislation.

A further, and more likely, possibility, however, is that the powerful proponents of this restrictive, stifling legislation have been able, through legitimate lobbying means, literally to force their views in this highly complex area of Federal regulatory law on their respective elected representatives. For no politician, with the inclination or desire to retain the prefix, "incumbent", invites intentionally the wrath or ire of his friends in the television broadcasting industry. The broadcasting block, through its several principal trade associations, possesses today probably the most effective lobbying tools at the disposal of any segment of American industry, i.e. wealth combined with the ability and capacity to gain meaningful audience with virtually every major elected official in the land.

The lesson to be learned then is to know thy adversary, and, where ap-

propriate, emulate to the extent possible his proven formula for business prosperity. The potential impact of closed-circuit program origination offers a frightening concept only to those who know from experience the power of the press and fear dilution in their own predominance. CATV, of course, is but an infant when compared to the demonstrated influence and power of its major adversaries; but this is not reason to cease all efforts to impart some semblance of balance between the combatants. Look into community service program origination over your cable facility. Strive to fill a gap which many broadcasters, in their anxiety to serve the public interest and only incidentally to make money, have overlooked. Seize the opportunity when presented to go into UHF television; examine possibilities in radio. In other words, join your affluent adversary at his own game; it can be not only fun, but profitable and otherwise rewarding. The CATV operator is not likely to master his adversary; but any energy effectively expended in neutralizing the tremendous advantage now enjoyed by those who seek to maintain CATV as a permanently retarded stepchild in the mass-media communications family would seem, at least to this observer, to be energy well spent.



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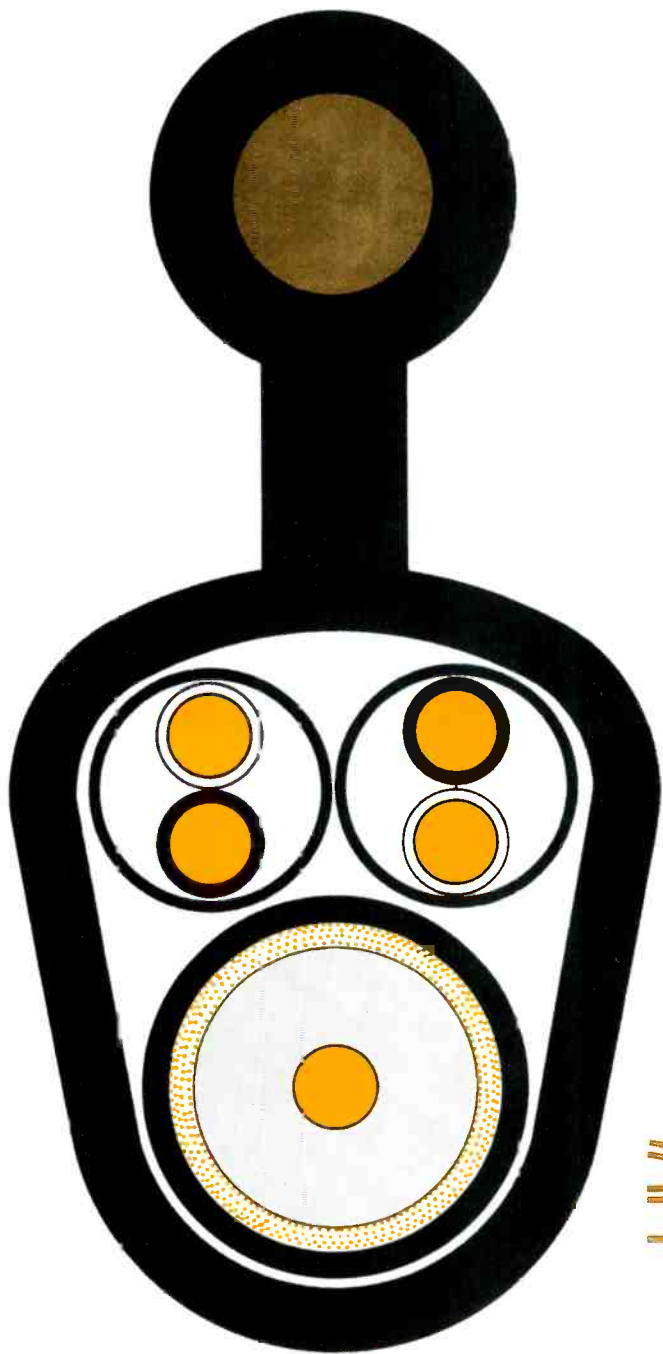
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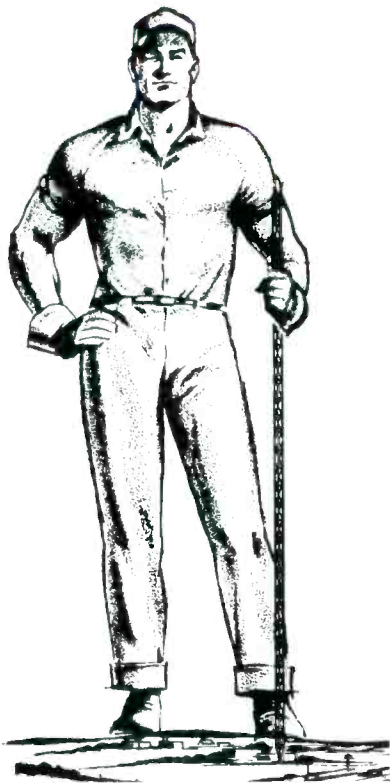
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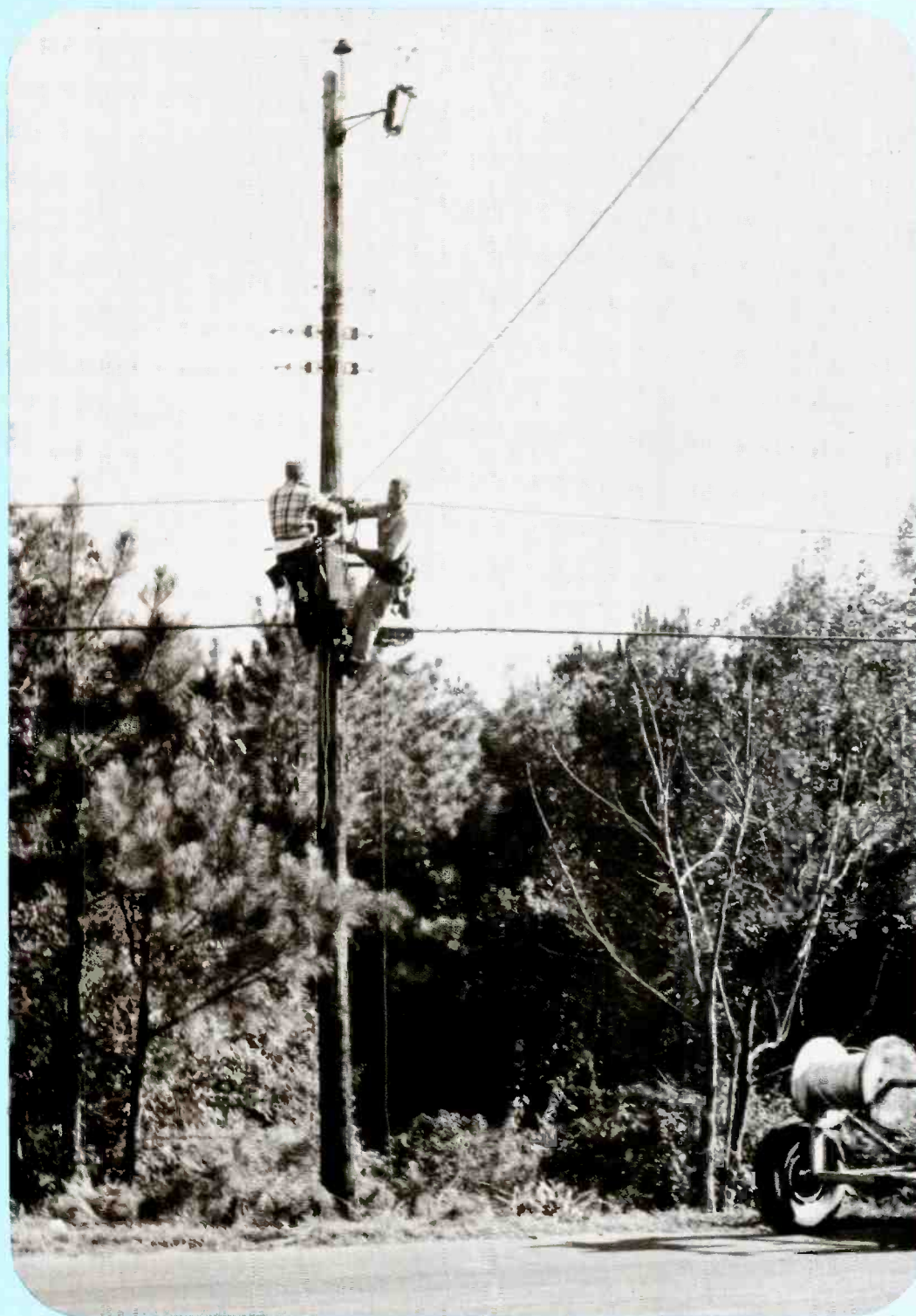


Photo Courtesy of Jerrold Electronics Corp.

- Factors Influencing Field Strength
- Cable System Safety
- Principles of TV—Part II
- Tower Topics

Factors Influencing Field Strength

By S. F. Kaufman Chief Engineer
Communications Systems Corporation

One of the earliest and most important questions a CATV system owner must ask is simply "What TV stations can I provide on the cable?" In order to correctly answer the question, information concerning the field strengths of both desired and undesired signals must be available. However, this information cannot be in the form of a single number for each station of interest, but rather as a range of values. There are a number of variables that contribute to the range and quality of TV reception in a particular area; e.g., frequency, radiated power, receiving and transmitting antenna height, distance and character of the intervening terrain, weather, and some additional factors that are still not too well understood.

WAVE PROPAGATION

The signal that is received at any particular location is made up of a number of component electro-magnetic waves. If one assumes line-of-sight visibility between transmitting and receiving antennae, the first signal to be encountered is the air or free space wave which in turn may be modified by a reflected signal. This latter signal may be the result of ground or obstacle reflection and arrives at the same point with a phase different from that of the direct signal. Depending upon the phase, the reflected signal may aid or detract from the direct wave. A third type of wave exists in the vicinity of the receiving antenna and it is generally due to reflections caused by direct waves in the immediate area. This "ground" wave is usually quite small and can be ignored for receiving antennas located more than a wavelength above the ground.

TROPOSPHERIC PROPAGATION

At the frequencies of interest, and for distances less than several hundred miles, the main signal transmission medium is the troposphere or lower atmosphere. In discussing propagation in this medium it should be noted that radio waves in these frequencies travel in a slightly curved path rather than in a straight or visual line. As a result the radio horizon is somewhat greater than the geometrical or visual horizon. This point is important because propagation mechanics seem to differ markedly in going from below to beyond radio horizon.

Tropospheric line-of-sight transmission in both the UHF and VHF spectrum is a generally well understood phenomenon that is subject to a certain amount of accurate speculation. Several theoretical and empirically modified equations exist to support the above contention as well as extensive test data. A nomogram exists (see Reference #1) that may be used to determine radio horizon when receiving and transmitting antenna heights are known. A good approximation in determining radio horizon is the formula:

$$d = \sqrt{2h}$$

Where d = distance to radio horizon in miles

h = height above sea level in feet

Beyond-the-horizon propagation is relatively poorly understood and rather unpredictable. In particular, it is possible to compute a median path loss between a pair of receiving and transmitting antennas and arrive at a figure that may prove to be correct within a factor of two. However, very large dynamic signal fades (lasting for several seconds) have been known to occur in a seemingly random and unpredictable fashion.

Some of the salient features of tropospheric propagation are outlined below:

BENDING RADIUS

A transmitted TV wave is received primarily due to the mechanism of diffraction*. This bending or "flow" of the tropospheric wave around obstacles in its path is characterized by transmission decreasing rapidly with increasing distance and a relatively slow transmission decrease with increasing frequency. The radius of bending is taken as 4/3's that of the true earth radius. However, this value of 1.33 is a nominal one and in this country may vary from a value of 1.25 to 2.0 as a function of locale, atmospheric conditions and the time of year. The larger the value of this bending radius, the further a TV signal may propagate. Generally, coastal regions have higher bending radii than do interior land areas.

* It should be noted in passing that a small portion of transmitted energy may reach a receiving antenna located beyond the radio horizon by means of scattering and reflections from inhomogeneities in the troposphere. This mechanism is not fully understood but accounts for received signal strengths that are larger than would be expected from earth-diffraction propagation.

SIGNAL FADES AND SEASONAL VARIATIONS

There are two common types of signal fades: fast fading and slow fading. Fast fading is caused by multipath transmission in the atmosphere and the incidence of this phenomenon increases with increasing frequency and distance. This phenomenon has also been observed on signals within radio line-of-sight but occurring at slower rates. These fast fades do not occur over wide geographic areas but appear to be confined to small local areas (possible only around your head-end). Space diversity reception techniques are proving to be quite successful in combatting this problem.

Slow fades are signal variations that occur over a period of several hours or longer. They may occur below or beyond the horizon and appear to be independent of frequency. In general they seem to arise as a result of refractive index changes in the atmosphere.

An extension of slow fade analysis may be made to describe signal variations due to the changes of the seasons. It is well known that signal strength during the summer and fall months is higher than levels recorded during the winter and early spring.

Evidence does exist of a relatively small systematic change in signal level as a function of the time of day. Average signal levels appear to be several db higher for the hours between midnight and noon than for the balance of the day. This phenomenon is also more pronounced in the summer than during the winter months.

TERRAIN AND FREQUENCY

The influence of local terrain conditions on received field strength is an important consideration when making a survey. In rough areas (foothills and rolling country) propagation factors are more favorable for VHF transmission than UHF. The converse is also true; that is, in flat, unvegetated areas, UHF propagation outperforms VHF. In such areas and within line-of-sight distances from the transmitter, UHF field strength is frequently found to be higher than VHF signals for equal effective radiated powers (erp) and transmitting antenna heights. It should be noted that these comparisons are only valid for limited distances and qualified by the nature of the terrain.

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Maximum Gain	24 db	Return Loss, Output	15 db Low Band
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Frequency Range	40-220 mc	Power	200 MA @ 20-30 VAC
Response Flatness	$\pm 1/2$ db	Recommended Input Levels @ Ch. 13	20 dbmv, Feeder 10 dbmv, Trunk
Gain Control Range @ Ch. 13	14-24 db continuous, 0-3-6 db switchable flat pad	Recommended Output Levels @ Ch. 13	40 dbmv, Feeder 32 dbmv, Trunk
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Other terrain-frequency tests have yielded a veritable grab bag of conclusions. These results vary from signal strengths being independent of frequency to signals increasing and decreasing as a function of frequency or varying proportionately or inversely as the square root of the frequency.

Local vegetation has also been shown to influence TV signals, especially in the upper frequency range. Below about 100 mcs. trees and shrubs do not appear to attenuate transmissions. However, at high VHF, vegetation has

been found to attenuate a fair amount of signal. This phenomenon becomes much more pronounced at the UHF frequencies. In fact, trees in full leaf have been shown to be opaque to high UHF transmissions. Signal surveys using antennas mounted relatively low to the ground and conducted near areas containing heavy foliage will thus yield lower signal levels from channel 7 on up.

No discussion of TV signal transmission over terrain would be complete without mentioning a phenomenon gen-

erally referred to as "Obstacle Gain." When an obstacle (a mountain) that does not pass RF is located between a transmitting and receiving antenna, radio energy reaches the receiving station as a result of diffraction above and around the edges of the obstacle. It has been experimentally proven that signals so received were much higher than when the propagation paths passed on either side of the obstacle. In addition, signal fading also appears to be significantly reduced over this obstacle type transmission path.

CABLE SYSTEM SAFETY

By Jack Pruzan
Pruzan Company

FIRST AID EQUIPMENT

First aid equipment and techniques sometimes are taken for granted by both executives and workers of a CATV system. But when these are needed, they become tremendously important. Prompt use of first aid has saved many lives, and failure to give needed help in an emergency has cost quite a few.

Every vehicle used by a CATV system should carry a good first aid kit. Most operators install this vital safety equipment on their trucks, but some forget the need to check kits at least monthly to be certain stocks in them are complete. A major first aid kit should be maintained at headquarters, and reserve stock should be on hand with which to make replacements as required. Someone should be assigned the definite responsibility to make regular checks and replacements.

Basic 10-unit first aid kits for line trucks include adhesive bandages, ammonia inhalants, antiseptic, compress bandages, burn ointment, tourniquets and triangular bandages. Heavy trucks usually carry 16-unit kits with larger assortments. Line trucks working on major construction projects should carry splints and a stretcher in addition to their basic first aid materials.

Crews working in areas where snakes are prevalent should include a snake bite kit with their supplies. The traditional snake bite remedy is not sufficient if this type of emergency occurs.

First aid kits should be checked

to be sure they include all materials required by individual state safety regulations. Containers should be of all-weather type and of waterproof construction.

Many CATV system operators who keep their trucks stocked as a matter of course forget that their automobiles also should include this safety precaution. Every vehicle used, without exception, should include at least a basic first aid kit.

Highly popular for automobile use is a combination first aid kit and emergency road marker. This compact package contains a full supply of the most-used first aid materials, and the kit doubles as a safety warning device. Such kits easily snap to an upright position and include reflective panels. When placed on a road near an accident they become effective signals to warn oncoming motorists to approach with caution.

First aid practices and techniques should not be overlooked. Many CATV systems require their line crews to attend Red Cross or other instruction courses. Others hold first aid classes of their own for all employees. When an emergency occurs, it is too late to read a book or to learn the basic steps which might save a fellow employee's life.

Manufacturers of first aid equipment publish helpful material of value to CATV system operators. Most manufacturers also maintain safety engineers who are glad to advise on specific problems. If you would like assistance of this type, address an inquiry in care of *TV & COMMUNICATIONS*. □

TRANSMITTING AND RECEIVING ANTENNA HEIGHT

Tests conducted using antenna height as a variable parameter yield results that should come as no surprise to CATV engineers. For all practical purposes, the data points to a linear relationship between transmitting antenna height and received signal strength. An example may serve to illustrate this point.

Assume a transmitting antenna at heights of 200 and 500 feet produces a measured signal strength of 100 and 700 u-volts respectively at some fixed distance. Then by linear interpolation, raising the antenna to a height of 750 feet should increase the signal reading to about 1200 uvolts. It should be noted that the above example assumes all other variables (erp, frequency, propagation factors, etc.) remain constant.

In a similar fashion, receiving antenna heights that clear the local terrain also exhibit the above linear signal gain with increasing height. However, statistical analysis of antennas operating in the 6-30 foot category support a square-root height gain variation. Above 30 feet, the height gain is linear.

In summary, the TASO study concludes that low frequency UHF field strength averages 7-8 db lower than low-band VHF signal strength and 4-5 db lower than high-band VHF signal strength on the basis of equal erp. In addition, UHF service falls off more rapidly beyond a Grade B contour than does VHF. Within the contours, UHF propagation is more variable. □

REFERENCES

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THE BASIC PRINCIPLES OF TELEVISION

PART 2

By Gay Kleykamp
Kaiser-Cox Corporation

Color television is standardized in the United States on the fundamental three-color system and is so transmitted as to be compatible with conventional monochrome or black and white receivers. The various colors are obtained by appropriate combinations of the three primary colors—red, green and blue. A luminance signal is transmitted using a sub-carrier frequency with characteristics such as to weigh each of the primary colors in proportion to its contribution to the brilliance of the scene. In this way the luminance signal is usable as the video signal of a conventional black and white or monochrome television receiver and to a colored television receiver this luminance signal provides the brightness information.

The amplitude, frequency and phase characteristics of the color sub-channel or sub-carrier frequency are so arrang-

ed as to provide the brightness information, the color difference information and the hue and intensity of color information. Those signals that indicate the color of the picture are called chrominance and they carry no information regarding the brightness of the picture. Only the luminance components of the color picture are therefore used in a conventional black and white receiver, while the chrominance information in the I and Q side bands are essentially cancelled by frequency interlacing so that they have little or no effect on the average brightness of the black and white picture.

To provide a reference for the phase and frequency characteristics of the color information transmitter, a synchronizing pulse known as a color burst is transmitted during the horizontal blanking interval. This color burst consists of about eight cycles of

3.6 megacycles synchronizing frequency which is that of the sub-carrier and is $455/2 \times$ the horizontal line frequency. Black and white pictures are received and produced on the picture tube of a color television receiver with little or no problem since the luminance signal is the only one transmitted and no chrominance signals are available. The red, blue and green guns of the color tube produce equal signals and the result is a combination of all or a picture in various shades of grey.

Certain mis-alignment or mis-adjustment of the color television receiver can result in unequal voltages being applied to the red, blue or green color guns of the tube and result in some color appearing to the eye with the reception of a black and white picture. It is therefore necessary that the color receiver be carefully adjusted for convergence of the three guns as well as for the proper operating voltages of the three cathode ray guns in the tube. Video distortion, such as noise or ghosts in a color picture, are more objectionable than they are in a black and white picture and some caution must be observed in preventing the loss of the color information carried on the 3.6 megacycle color sub-carrier.

Television signals are transmitted by means of radio waves. A radio wave is a combination of both electromagnetic and electrostatic fields. These fields are generated whenever an electrical conductor carrying a high frequency current exists in an open space. The television transmissions in the United States are carried on horizontally polarized waves traveling out from the transmitting antenna. This horizontal polarization means that the electric or electrostatic lines of force are parallel with the ground and the magnetic lines of force are perpendicular to it. The horizontal polarization of the transmitted radio wave or wave front was chosen to minimize the interference from other communications and noise sources which are usually vertically polarized; it was found that less man-made interference and noise of all kinds was encountered using a horizontally polarized wave transmission.

This wave front leaves the wire or antenna radiator and propagates in an ever-growing sphere with the source

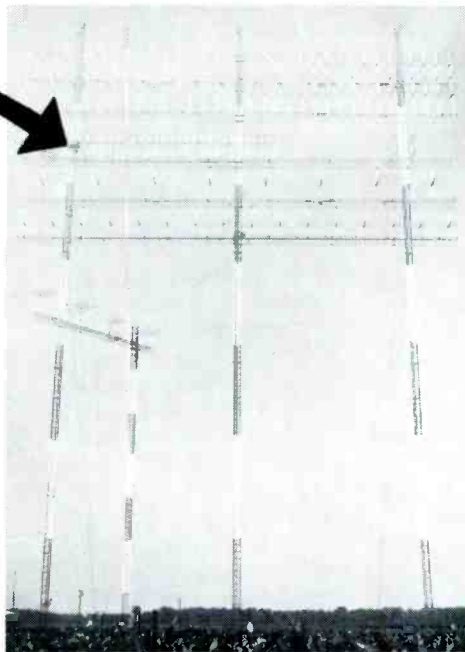
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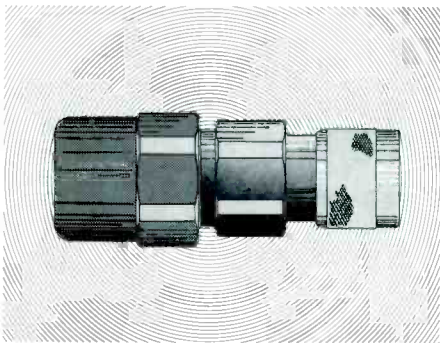
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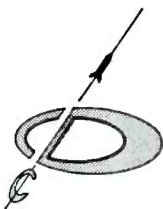


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as the center, or in the case of a basic two element or doublet antenna the configuration of the radiated wave is that of a doughnut. The speed at which the expanding radio wave front moves is approximately the speed of light or three hundred million meters per second (186,000 miles per second). As this wave front expands or propagates, it becomes weaker or dissipates so that the radiated field will have a strength that varies inversely with the square of the distance from the source. A number of factors enter into the attenuation of radiated energy, so that in actual practice the attenuation of the wave may be very much greater than the inverse distance law indicates.

Efficient receiving antennas are therefore required in CATV systems in order to provide the system with the very best signals available. An efficient or high gain antenna for television reception is especially desirable in CATV systems in order to reduce the noise content of the signal information. An antenna is an electric circuit of a special or passive type. It is usually constructed of rods or tubing.

Although it takes only about one-seventh of a second for a radio wave to travel around the world, and this time may be considered hardly worth worrying about, it becomes extremely important in the design of radio antennas. The wave length is defined as the velocity of the wave divided by the frequency.

The field intensity or strength of a wave is measured in terms of the voltage between two points lying on an electrostatic line of force in the plane of the wave front. The unit of length is universally accepted as the meter and since the voltage existing is usually quite low, the standard unit of measurement of this voltage is in microvolts per meter. The equipment required for measurement of actual field strength is quite elaborate and is seldom used by CATV personnel. It is relatively easy, however, to make relative field strength measurements and to determine whether an adjustment is required in the antenna system. These relative field strength measurements are generally made with a dipole antenna and approximate calculations can then be made to determine the approximate field intensity. As previously mentioned if the electric lines of force are horizontal, the wave is said to be horizontally polarized. All United States television transmission is horizontally polarized, and consequently, the receiving antennas designed for television reception are also horizontally polarized.

The ground waves; that is, those waves traveling in contact with the sur-

face of the earth at television channel frequencies are rapidly attenuated. These surface waves are primarily used in the standard broadcast band (not TV channels) and frequencies below a few megacycles.

When the transmitting antenna and receiving antenna are within "line of sight" of each other a direct transmission can be achieved. Some ground reflected rays strike the earth and are reflected to the receiving antenna; however, at television channel frequencies it is the direct ray or space wave that is most important and is the dominating factor. It is not entirely true that line of sight propagation is necessary for the use of space wave transmissions. Due to the structure of the atmosphere near the earth, the waves are bent into a curved path that keeps them nearer to the earth than true straight line travel. The line of sight distance may be computed as the square root of 2 times the height in feet. This gives the distance in miles to the effective horizon.

Atmospheric conditions at various heights from a few thousand feet to several miles are sometimes responsible for bending the waves downward. This tropospheric refraction is seldom stable for any considerable period of time but does occasionally provide relatively high field intensities from distant transmitters. The most common type of atmospheric condition causing this tropospheric refraction is temperature inversion. Normally, the temperature of the atmosphere decreases at a fairly constant rate of approximately three degrees fahrenheit for each one thousand feet. When for any reason this rate is decreased, a temperature inversion is said to exist and a tropospheric refraction of the wave front occurs.

The ability, therefore, to recognize and evaluate all of the unusual propagation effects will often help to explain seeming inconsistencies which may be incorrectly blamed on faulty antenna design. In addition to the tropospheric refraction due to temperature inversion, other effects may occur due to daily seasonal variations in the ionized layers that result in changes in the amount of ultraviolet light received from the sun, or more commonly termed sun spots. Another common source of variation in the received signal strength may be due to ionospheric storms or magnetic storms which may cause severe fading.

As the field strength of a received signal will be directly proportional to the current, it is, therefore, desirable to design the antenna for the maximum current flow. In other words, the circuit is made resonant at the operating

frequency. Unlike the previously discussed resonant circuits, where the capacitance, resistance and inductance are lumped constants, in an antenna, these elements are distributed along the wire.

If an antenna conductor or wire is just long enough to permit an electric charge to travel from one end to the other and then back again in the time required for one cycle, it will be resonant at that frequency. Since this so called "charge" travels the length of the wire twice, this length must be one-half wave length; therefore, the shortest resonant wire or antenna will be a half wave length long. Neglecting the propagation constant of the material of which the antenna is constructed, the length in feet of a half wave length at a given frequency is given by 492 divided by that frequency in megacycles.

In a half wave antenna the current is zero at the ends and maximum at the center and the voltage is zero at the center and maximum at each end with the voltage at one half of the antenna in opposite phase to that in the other half at any one instant. It is understood that these instantaneous values of current and voltage at any one point varies sinusoidally at the applied frequency. The current distribution along a half wave antenna is a curve approximately in the shape of a half sine wave with a maximum in the center, and is called a standing wave of current. The polarity of the current or voltage reverses every half wave length along the wire so that the voltage is maximum at every point where the current is minimum and so forth.

Inasmuch as the velocity of the electromagnetic wave propagation through a medium depends upon the dielectric constant of that medium, the electrical length of an antenna will be somewhat greater than the actual physical length. The average physical length of a resonant half wave antenna may be approximated by the formula: L (length in feet) equals $492 \times 0.95 / f$ (freq. in Mc).

It is necessary now to correct an over simplification previously stated. The current at the ends of the antenna does not quite reach zero because of "end effect," as there is some current flowing into the end capacitance. Also, it is more accurate to say that the voltage reaches a minimum rather than zero at the center of the half wave antenna. If this voltage at the center were zero and a maximum current existed it would imply that the circuit is entirely without resistance and this is obviously not true as the antenna consumes power.

The length-to-diameter ratios of various antennas corresponds to the behavior of ordinary resonant circuits having different Q's. A thick antenna will have a broad response curve whereas the thin antenna will have a high Q and will have a rather sharp frequency response.

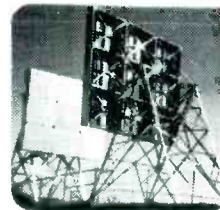
The half wave antenna is frequently called a half wave dipole and may be coupled together. This coupling may be effected by a short length of transmission line as well as by placing the two antennas in proximity to each other. The exact effect of this coupling depends upon the degree of coupling; that is, how close the antennas are to each other, and the resonance of each element. By intentionally combining antenna elements into an array, a significant increase in gain and directivity can be achieved.

The directivity of such an array may be expressed as a front-to-back ratio which means the ratio of the power received in the favored direction to the power received in the opposite direction; or may be expressed in terms of the angular distance between the directions at which the received power is one half the maximum power.

The term "gain" is the power gain over a half wave diode of the same orientation and height as the array referred to. These antenna arrays would consist of a driven or active element to which the transmission line would be connected together with parasitic elements that obtain power solely through coupling to another element in the array due to its proximity to such element. Those antenna systems having parasitic elements in front of the active or driven element are said to have "directors." Where the element is placed behind the active element, it is referred to as a "reflector." The parasitic elements are commonly spaced one quarter wave length or less so that the current in the parasitic element will be in the proper phase relationship to the active element. Also the reflector will be tuned or resonant to the low side of the frequency desired and the director parasitic element will be tuned or adjusted to the high frequency side of the desired resonant frequency.

At UHF television frequencies it is practical to construct antennas with parabolic reflectors and in other efficient configurations that would not be practical at lower frequencies. The actual construction and design of CATV receiving antennas is optimized for directivity or front-to-back ratio, gain and maximum resistance to the elements; such as, wind and ice. □

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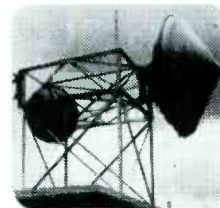
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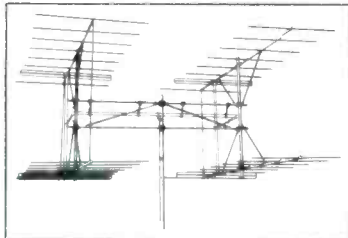
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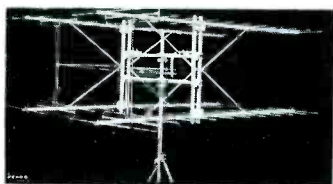
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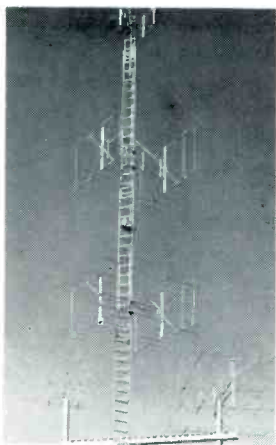
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TOWER OPICS

BY J. BENNETT

Tower sites are always different from one another in one respect or another. One may be flat and level, another may be mountainous and rocky and still another may be a parking lot in downtown Dallas. One kind of anchor will not serve all of these various conditions, therefore several different types are employed.

CONCRETE ANCHOR

The concrete anchor is used where the soil conditions are good and the site is fairly level. The hole is dug with a back hoe to the proper dimensions, then the anchor beam and reinforcing rods are put into place. The earth sides form the concrete, making for an efficient, economical anchor. (See Figure 1.)

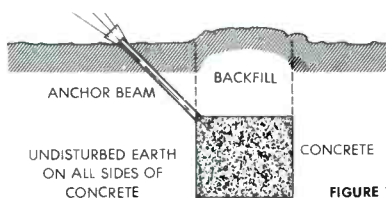


FIGURE 1

There are instances where a low soil bearing capacity necessitates employing piling to prevent the concrete block from sinking from its own weight. (See Figure 2.)

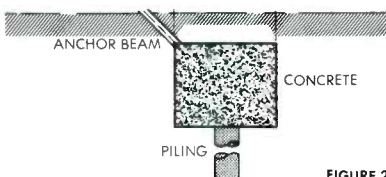


FIGURE 2

The steel anchor beam may be constructed of an I-Beam rods, channel, or angle depending upon the manufacturer. In some cases of large anchors in poor soil, the method shown in Figure 3 is sometimes used to keep the weight of the concrete low. Construction of this type is not very economical as forming is necessary.

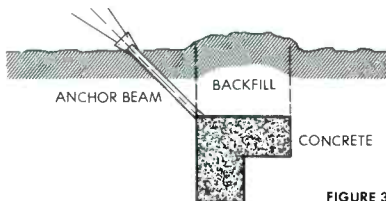


FIGURE 3

SCREW-IN ANCHOR

The screw-in anchor or sometimes called a "swamp anchor" affords an efficient anchorage at sites that have very poor soil and are somewhat inaccessible to heavy concrete trucks or pile-driving equipment. It is simply screwed into the ground at an angle (see Figure 4) to the required depth to achieve the required resistance to sustain the loads produced by the wires. Additional sections may be added to the stem if necessary to go deeper. It is common in swampy areas for this anchor to be installed forty or fifty feet deep. Tall

towers may have one "screw-in" anchor per wire, whereas small towers usually have several wires going to one anchor.

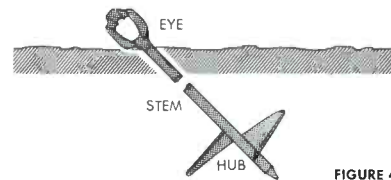


FIGURE 4

PILING ANCHOR

This anchor can be installed on land or in water. (See Figure 5.) The pile towards the tower is usually battered or angled slightly and a concrete cap poured as shown. The size and shape of the piling anchor varies considerably as more piles are required. Reinforcing bars serve to bond the piling, cap, and anchor beam together. Tower sites requiring the piling anchor must be accessible to heavy pile driving equipment.

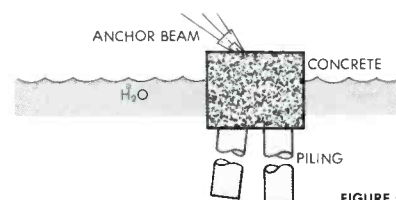


FIGURE 5

ROCK ANCHOR

The everlovin' ole rock anchor (see Figure 6) usually used on small towers, provides an ideal anchorage when the condition of the underlying rock is known. Holes are drilled, the depth of which depends on the type of rock and the loads imposed, and anchor bolts set. Steel expansion bolts may be installed, the bolts may be set into place with melted sulphur. The bolts have lock nuts and the threads are peened after installation.

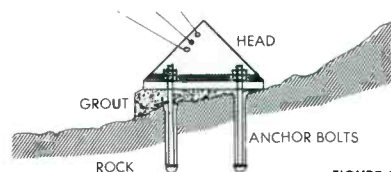


FIGURE 6

ELEVATED ANCHOR

At times an anchor must go beside a roadway or in a parking lot where cars and trucks may play havoc with a tower's guy wires. By using an elevated guy post (see Figure 7) the guys may be elevated to clear the passing vehicles. There are two types: One is the free-standing type; the other utilizes a back guy to resist the load at the top of the post. The free-standing guy post requires more concrete in the foundation to resist the overturning moment produced by the load of the wires on the top of the post. The free-standing guy post is mostly used in parking lots where traffic would be all around the anchor. One of my friendly co-workers, "Dutch" Giroux, reminds me that the elevated anchor is not a space saver as many people think, but is utilized merely to elevate the wires to clear passing vehicles.

One passing thought: To keep the ground from rising up and striking your tower rather violently, make darn sure it has the right anchors (just any old kind won't do). □

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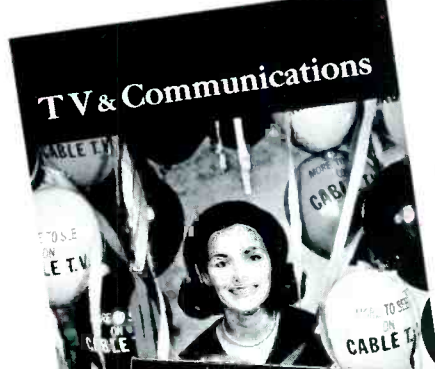
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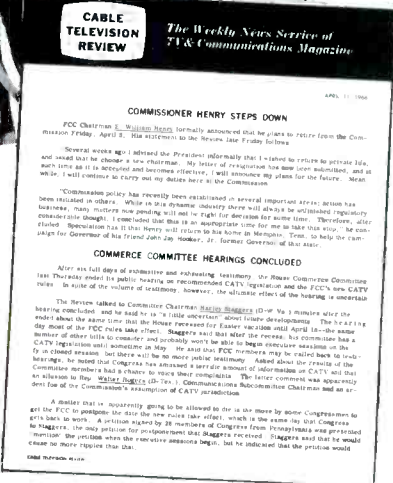
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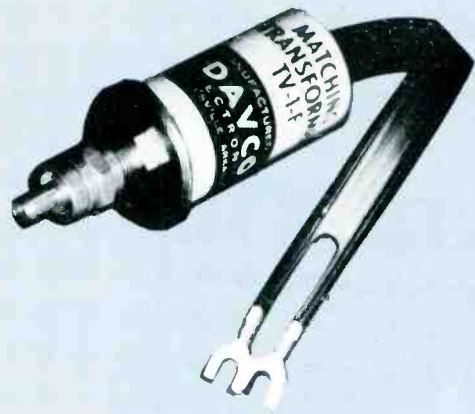
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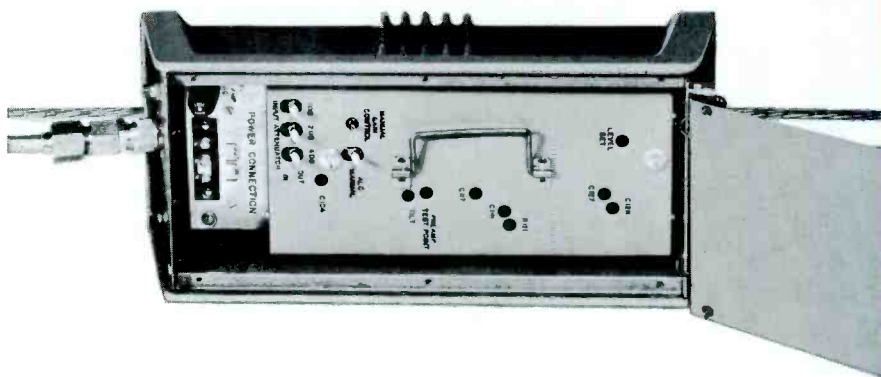
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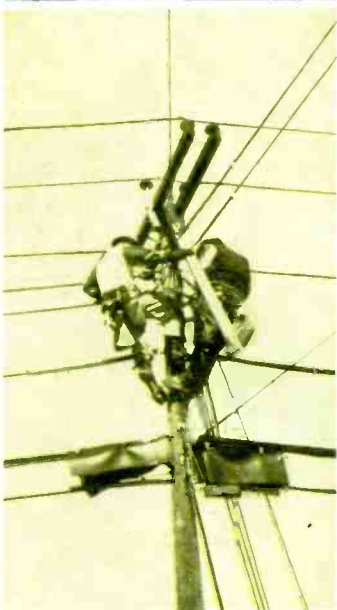
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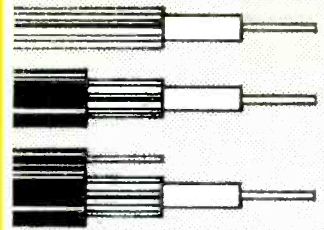
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viking
WE DO
MORE
THAN WE
HAVE
TO

WE
HAVE
TO!



Viking was always known as "that other company". The old Viking products weren't much to look at, but they worked. We continued engineering, testing and trying, and soon things began to happen.

Viking produced solid seamless, aluminum coaxial cable second to none! Every inch quality controlled with the lowest attenuation factor in the business. And, we make it in half mile lengths!

Last year we introduced the Solid State, Goldline Series of high level, modular, inline amplifiers. Now in full production, they are outperforming every other amplifier in the field.

Systems Construction Company, our turnkey division, is engineering new systems throughout the country.

Other Viking electronic equipment and accessory products are also better. New innovations, engineered

and designed for the technician are setting new standards in the industry.

Viking has come a long way and we appreciate the confidence so many CATV operators and technicians have in our products.

We've had to prove ourselves every step of the way — so when we say, "Viking gives you more", we mean it!

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... MOVING AHEAD WITH CATV