



APRIL 1967

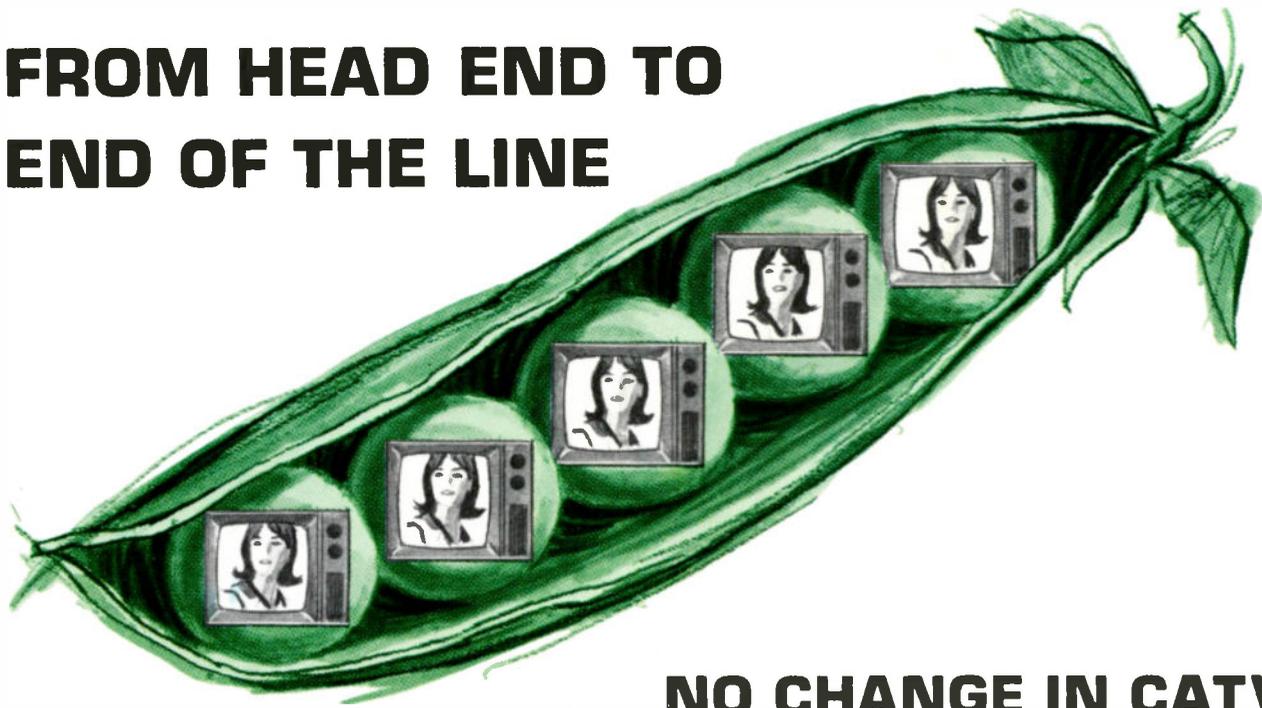
TV Communications

The Professional Journal of the Cable Television Industry

**SPECIAL
CONSTRUCTION
EDITION**

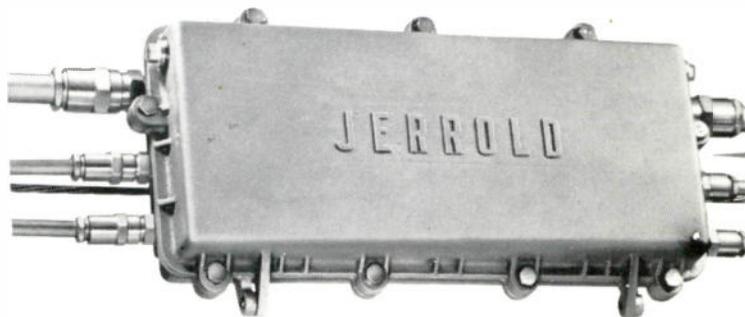


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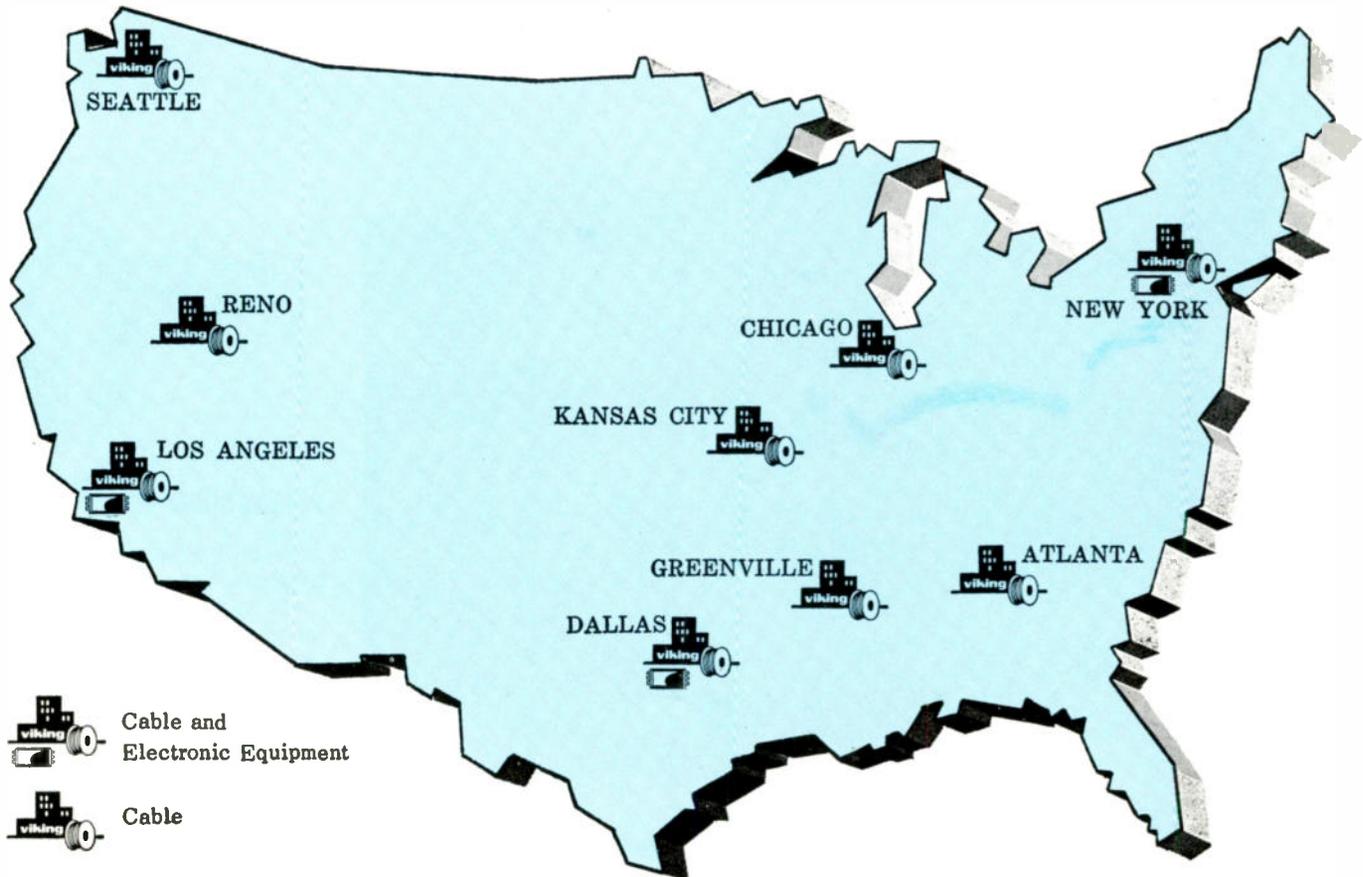
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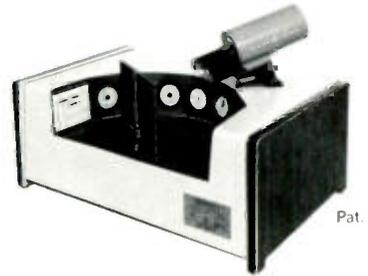


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IN THIS ISSUE

Emphasis On Construction

Structured toward the construction aspect of the cable industry, this month's issue offers a variety of articles geared toward technique and product. Contractor Pete Collins discusses the role of a contractor and the industry's need for adequate engineering, beginning on page 42. Manager Marvin Jones relates the story behind his Yuma, Arizona system's decision to "go buried," starting on page 50. Underground installation receives further attention in Vern Coolidge's discussion of the problems—and answers—to burying a system, starting on page 58. Standard Radio and TV Co.'s experience with heat-shrinkable splice covers is discussed in detail starting on page 77.

Time To Take Stock

The great potential of CATV, says author Charles Wigutow, lies in its ability to merely be "on the scene on demand." Although weather information and news services are now available to fill this need, a new innovation has just recently been made available to system operators: the Trans-Lux Stock Quotation Service. For a detailed description of how this service works and the possibilities it offers your system, see page 39.

A Material Difference

The technical and economic needs of the rapidly growing CATV market call for an equally changing product line. Among the new developments for CATV cables is the copper clad aluminum conductor, a light weight material which offers several possible advantages over the familiar solid copper conductor. For details on this promising technical advance, turn to page 66.

Our Cover: This month's photo features CATV construction on Canyon TV Cable's plant in Aspen, Colorado. Equipment is Viking; construction (and photo) by Pete Collins Company.

Stanley M. Searle, Patrick T. Pogue: Publishers

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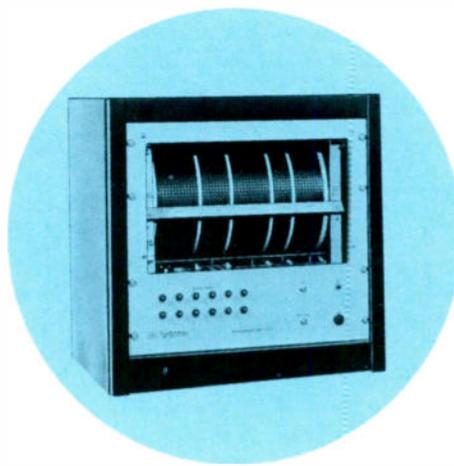
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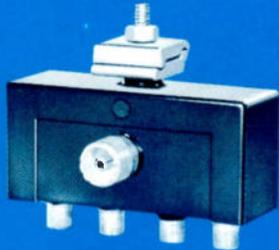
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TV COMMUNICATIONS

THE PROFESSIONAL JOURNAL OF THE CABLE TELEVISION INDUSTRY

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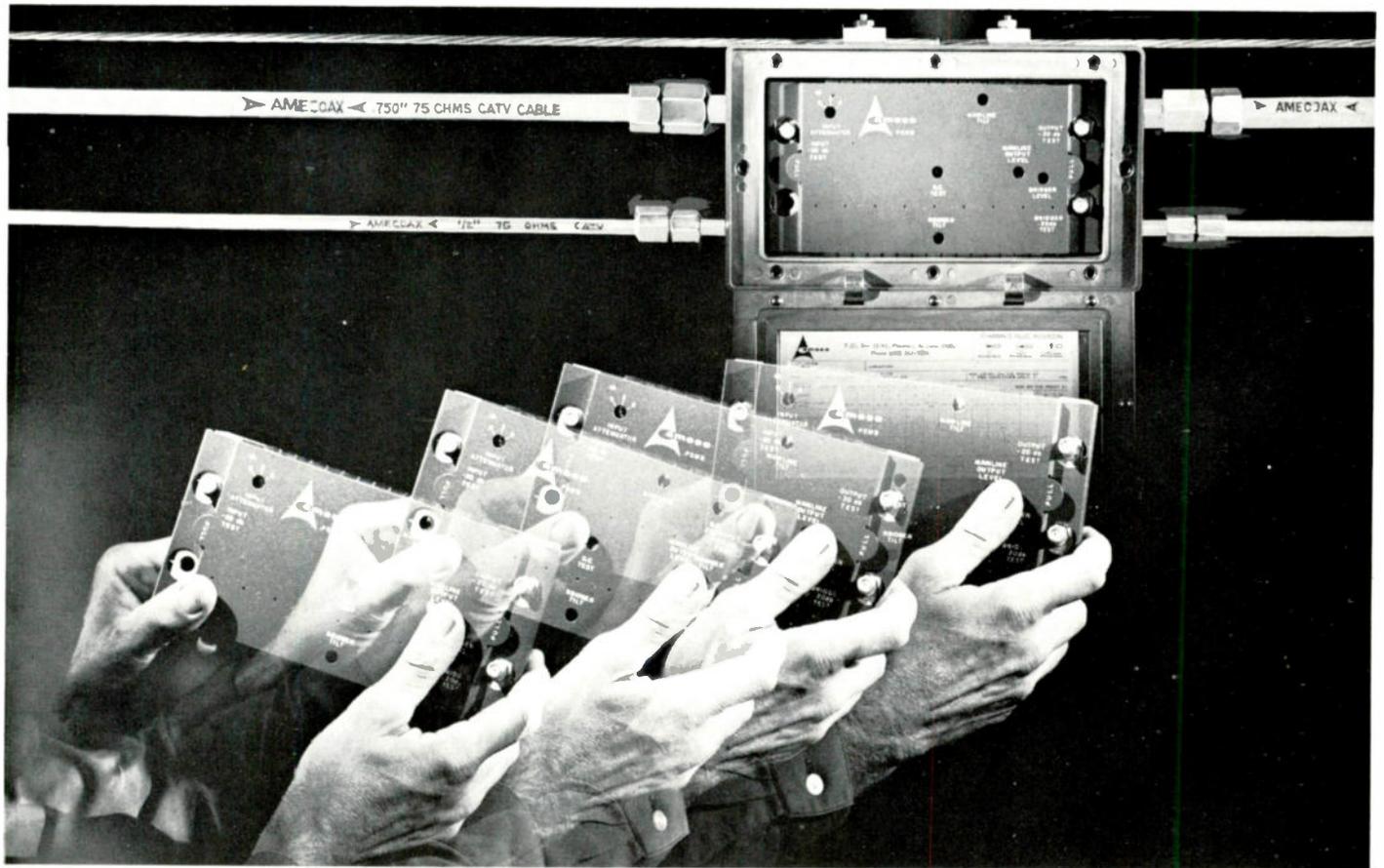
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EDITORIAL

By Stanley M. Searle

The Future of CATV

The shape of the CATV system of the future will be fashioned by public demand, just as it has been in the past. The first CATV systems were the result of a public demand for television—any kind of television. Today's consumer of television programming has greatly heightened his demands and sophisticated his appetites; his awareness of the advances in technology and programming capabilities substantiate his opinion that his television set owes him more than a good black and white picture from two or three regional stations.

As broadcast television has matured, it has grown away from the concept of *local public service*. This fact is inherent in the financial success of these broadcast operations and reflects the strength, rather than a weakness, of the broadcasters. However, the evolution of tall towers, increased power, and improved antenna efficiency has greatly extended the reception range of VHF television stations so that each serves at least a dozen individual communities. At the same time, the technical and economical limitations of UHF broadcasting leave the FCC's goal of "at least one television station in each community" totally unfulfilled.

The desire of the Commission to see as many communities as possible have local television service remains valid. The fact that UHF broadcasting has not lived up to FCC hopes only suggests that a different approach should be employed. And, through the natural forces of public demand, hundreds of additional communities *will have* "local television."

The blossoming technology and energetic imagination of the cable television industry will bring hundreds of communities a means of local self expression via television. By the very nature of cable service, this programming will be truly "local."

The programming, per se, may consist simply of local news and information announcements using the weather channel camera. Or it may range to dozens of hours per week of movies and public service films.

The only serious obstacle to this kind of farsighted, audience-oriented television lies in the fact that certain economic entities much larger than cable television operating companies are already keenly aware of the vacuum in programming and special communications services that can only be filled by coaxial cables into homes.

But the people who have made cable television what it is have substantial advantages over those who

would usurp the established position of hundreds of CATV companies now in operation. The same imagination, courage and confidence that have characterized the cable television industry can keep CATV a free enterprise. Free to grow and prosper in proportion to the public demand for services created and offered by the cable television operators.

Grasping At Straws?

A trace of panic is apparent in efforts of General Telephone to head off the impending FCC hearings on Section 214(a) of the Communications Act. At issue is the possibility that television distribution will be deemed non-telephone service, thereby requiring common carriers to obtain FCC certificates of "convenience and necessity" before constructing CATV facilities. Claiming that CATV Task Force members are not "decision-making Commission personnel," GT&E complained that the hearing is "adjudicatory," and that the Task Force, therefore, made "ex parte" contacts with Commissioners. Reports in *CABLE TELEVISION REVIEW* were cited as documentation.

A letter to FCC Executive Director Max Paglin, signed by six General operating divisions, noted the consistent accuracy of *CABLE TELEVISION REVIEW* in predicting Commission actions relative to the telco hearings. "CABLE TELEVISION REVIEW has been fairly successful in predicting Commission actions in these proceedings," the letter declared. And, according to the complaint, a recent article about the CATV Task Force in *TV COMMUNICATIONS*, and the accurate anticipation of FCC moves by *CABLE TELEVISION REVIEW* indirectly substantiate General Telephone's allegation that Task Force influence on the decision to expedite the 214 hearing (as reported by the *REVIEW*) constituted ex parte communications by the Task Force.

Meanwhile, the FCC has clarified the Task Force role as "decision-making personnel" in connection with the 214 hearing. And, on behalf of the *CABLE TELEVISION REVIEW* staff, I wish to thank General Telephone for their unsolicited endorsement of our reporting ability.

Perhaps the telco's have good reason to grasp at such straws. There is, in fact, a real possibility that the FCC will place precise controls upon the cable television involvements of telephone companies.

Stan Searle

April, 1967

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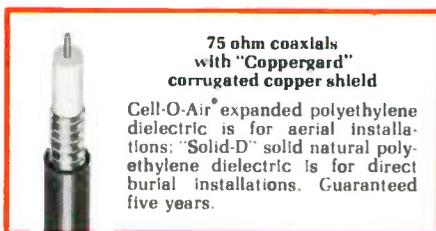


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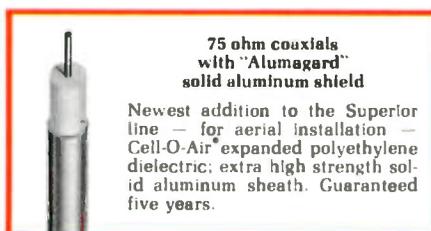
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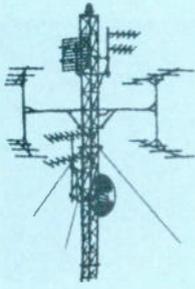
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CATV Industry PERSPECTIVE

Telephone companies involved in CATV ownership and construction of leaseback systems face probable restriction by the FCC. The Commission is expediting a hearing on Section 214(a) of the Communications Act, to determine whether cable television is, in fact, a "non-telephone service". It is probable that this will be the finding--and that telephone companies will be required to obtain an FCC certificate of "public convenience and necessity" before constructing any CATV facility. The Commission has cautioned telcos that if they continue to build cable TV plant during the 214 hearing, they do so at their own risk. The very facilities they are now constructing may be forfeited, the FCC warned.

The possibilities of transferring television from the airwaves to cable are increasing. Technically, this is possible at present--but the prospects of freeing VHF spectrum in this fashion are economically--and probably technically--impractical at this time. Pressure on FCC to provide frequencies for additional mobile radio use will result in continued investigation and discussion. Without question, the enormous amount of spectrum currently being consumed by entertainment media constitutes the principal target of frequency-hungry mobile radio users. These include police and fire departments and other governmental agencies whose great dependence on mobile radio lends substantial weight to their demands. The FCC will attempt to transfer as many communications services as possible to wire within the next few years. However, entertainment television will continue to be broadcast over the air for at least a number of years, utilizing the present technology.

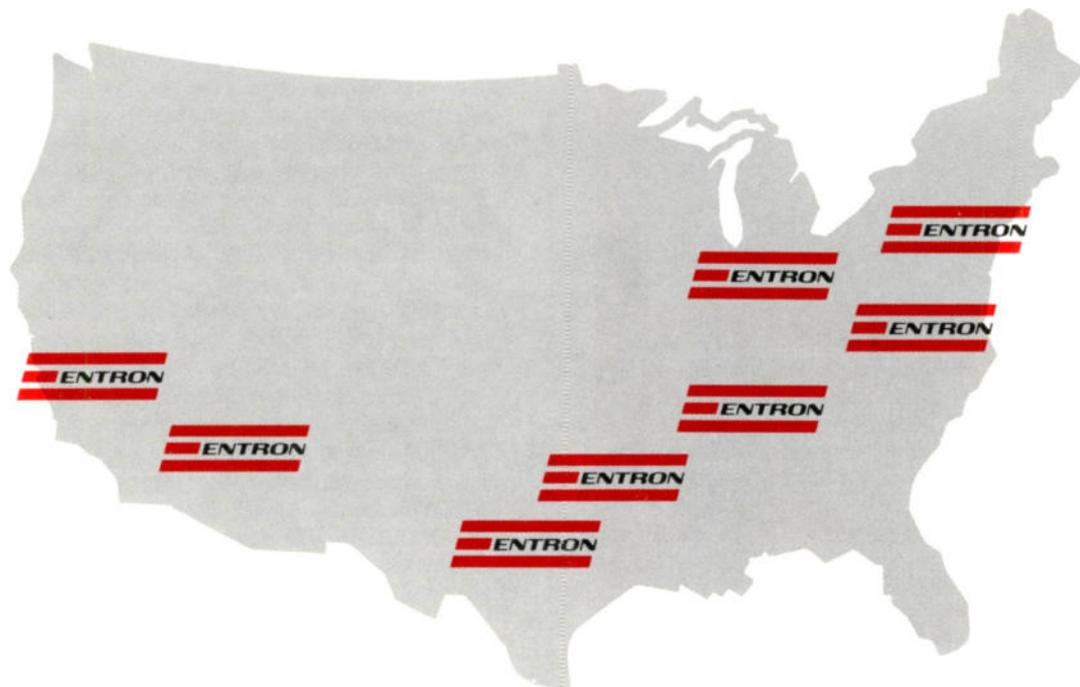
Touchy Copyright Revision Bill is sure to precipitate a fierce struggle on the floor of the House of Representatives. The bill is presently being held up in the House Rules Committee but will probably be passed out for action by Congress in essentially original form. Crucial provisions include restriction of CATV program origination and requirement of jukebox operators to pay copyright fees for the first time. Two principal angles of attack on CATV origination restrictions will be based on argument that the restriction has to do with regulation of CATV, per se, but not copyright considerations and, secondly, that restricting program origination violates right of free speech.

Commission evidently is giving way to original view of many staff members that the Second Report and Order is unenforceable and laden with inconsistencies. Top 100 market waivers will be granted in increasing numbers during the balance of the year--under pressure of public demand, weighted by embalances and inequities inherent in the arbitrary boundaries of ARB rankings.

The National Association of Broadcasters will continue to battle CATV on all fronts, especially local origination and "signal importation". ATR plans to microwave Los Angeles television signals to Texas and Oregon cable systems, for example, will be diligently attacked by the broadcast industry guardians. CATV opponents will be successful to at least a limited degree, in that their real objective is simply to delay the expansion of CATV. The handwriting is clearly on the wall and broadcasters are well aware that cable television will soon be serving all but a few of the very largest and the very smallest communities in the country.

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Good Business Manners

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No doubt there are moments, especially when the pressure is hot and heavy, when the answer must be no. Somehow, the importance of social niceties pales before the realization that your chief technician is out sick or that the problems on the trunk line must be straightened out by tomorrow. But most of the time, good business manners are, as one writer put it, "a necessary lubricant to business." They make it easier to get cooperation from the people you work with.

But what are good business manners? You can always memorize which fork to use, but there are no such hard and fast rules for on-the-job manners, the manager must depend on his common sense and his normal feelings of consideration for his subordinates, and business associates.

Above all, he must be flexible. What would be appropriate in one situation might be just stuffy formality in another. What would be good natured kidding to one subordinate might be considered rudeness by another.

Of 150 businesses queried in a *Fortune* survey on business manners, 125 reported that they operated on a first name basis. Obviously, business in formality is on the upswing. Some managers frown on this, however, even if they call their subordinates by first names. Once more it depends on the situation, the atmosphere, the people. If you feel that such familiarity will undermine your authority, don't extend the invitation. If you prefer the informality of first names, make that clear. Consider your subordinates' preferences, too. Some employees, such as youngsters just starting out, may actually feel more at ease calling you mister; let them.

Now let's look at the matter of visitors in relation to good business manners. Theoretically, a business visit goes like this: The visitor has an appointment, he arrives promptly, comes to the point fast and in five minutes is on his way. Maybe. But you've also got to be ready for something like this:

The visitor is fifteen minutes late, or perhaps has no appointment at all. You're tied up with your accountant in a cheerless discussion of the system's problems and you have a discussion on costs scheduled with your people in twenty minutes.

It's situations like these that can put a manager's business manners to the acid test. Handling visitors courteously yet firmly takes considerable finesse and self-restraint.

When someone has a definite appointment, he should be shown to your desk promptly at the agreed upon time. However, if your schedule has been messed up and you can't see him immediately, either go yourself or send someone else to explain the problem to him. Let him know, without being falsely optimistic, about how long it will be before you're free. If he decides to wait, make sure that he's comfortable.

Even if you're tied up with someone else, you should be notified when an expected visitor has arrived. You can then try to wind things up so your visitor isn't kept waiting.

A visitor without an appointment doesn't need such kid-glove handling, but if you can't see him you might go out to

(Continued on page 68)



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CATV *Legal* VIEW

BY JOHN P. COLE, Jr.

Due Process and Hogan's Goat

With a flurry of CATV regulatory activity, the FCC, with uncharacteristic expedition, has recently acted to dispose of a number of significant matters affecting CATV. Numerous petitions for waiver of section 74.1107 of the Commission's Rules (the prohibition against implementation of new CATV services within the Top-100 TV markets) and petitions requesting waiver of section 74.1103 of the Commission's Rules (the rule provision requiring non-duplication protection of "local" TV stations) have recently been acted upon by the agency.

With commendable effort and able leadership, the productivity of the newly created CATV Task Force has whittled away in impressive fashion at a foreboding backlog of undone work. The demonstrated productivity of the CATV Task Force could well serve as an inspirational example to other sections of the agency.

In spite of this unusual display of regulatory energy, all is not good.

But as a necessary preface to any critical analysis of FCC activity, fairness requires some explanation in the Commission's defense. Such is particularly appropriate in the case of the newly created CATV Task Force. Undermanned in terms of personnel quantity, and thrown directly into the breach of virtually insolvable problems, the Task Force has performed admirably. It seems clear to us initially that whatever blame may fairly be attributable to the present inadequacies in FCC practices rests not upon the persons charged with administering the burdensome task but rather upon the system created by fundamental agency policy.

Since the late Fall of 1966, CATV actions at the Commission have been divided into two principal

categories. The agency was compelled to set up some machinery to dispose of the mountain of paper accumulated from disputes arising between broadcasters and CATV systems involving "carriage" and "non-duplication" protections to local television stations. At the same time the Commission was obligated to find some limited method of authorizing new CATV operation within the Top-100 television markets.

Confronted with these two massive problems and having no entirely acceptable method of resolution, the Commission, and especially its CATV Task Force, were faced with the necessity to improvise. In this light, two basic philosophical decisions were made.

First, the non-duplication and carriage rules would simply be enforced and petitions for waivers by CATV systems would be denied. Implementing this basic policy decision, the Commission began the task of writing decisions in each individual circumstance denying the waiver petitions which it had previously invited. Several basic decisions were written and, thereafter, depending upon the particular nature of each waiver request, the pending CATV petitions were denied in wholesale lots utilizing the most appropriate decision format. As a literal matter, only the names were changed "to protect the innocent"; and decisions began flowing from the Commission disposing of complicated factual



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

situations like a broken record — denied, denied, denied.

Implementation of the waiver procedure authorizing commencement of new CATV services within the Top-100 TV markets in the United States similarly required adoption of a basic policy approach. In its rule prohibiting CATV operation within the Top-100 TV markets, the Commission ordered that no new CATV service carrying "distant city" signals should commence within the predicted Grade A service area of any television station in the United States operating from one of the Top-100 markets. It is of course not unusual for the Grade A Contour of a highpowered VHF television station to extend to a radius of 40-50 miles from the transmitter location. Therefore, in order to avoid the dilemma created by an unworkable rule and to escape the burden of having to hold hearings in so many situations as to break down entirely its internal processes, the Commission evolved a new policy — rather than enacting a new, reasonable, workable rule.

Thus, we now have the "heart-fringe" doctrine. If the proposed new CATV system is situated in the "heart" or the urbanized, metropolitan area of the TV market in question, hearings will probably be held to determine whether such CATV services should be authorized. On the other hand, if the locale of the proposed new CATV service is separated from the urbanized, metropolitan area and instead located on the "fringe" of the market, such services will in all probability meet the public-interest standard — whatever that may be — required for authorization.

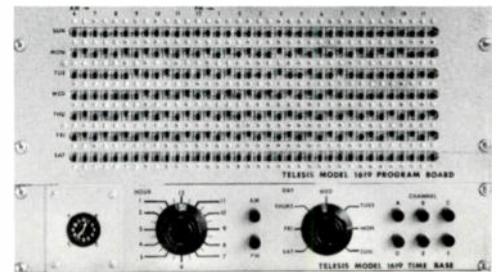
In other words, rather than rewrite an unworkable rule to present a new, rational and clearly recited Commission policy, the complications and added processing burden of requiring petitions for waiver will be continued.

Thus, as a typical example of this new regulatory policy, adjudication of petitions for waiver of the "Top-100" rule pending for two towns within the Albuquerque, New Mexico TV market, Albuquerque

(Continued on page 73)

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Copyright Bill Comes Before House

The House Judiciary Committee, by a vote of 23-3, has approved the mammoth copyright bill which, if enacted, could substantially influence the CATV industry. The bill is essentially the same as the one approved last year, shortly before the end of the Congressional session.

House Copyright Subcommittee Acting Chairman Robert Kastenmeier (D-Wis.) had indicated earlier that he was confident that the subcommittee would pass the bill out within a few weeks, but he anticipated some trouble in getting the bill past the full Judiciary Com-

mittee. However, the committee approved the bill only a few days after the subcommittee passed it out.

The proposed legislation is enormously complex, with the controversial CATV section being only one of several highly-disputed areas of copyright law. The law, as proposed in the bill approved by the House Judiciary Committee, would partially include CATV systems. One section in particular specifies that CATV systems which originate programs of other than a routine nature would be completely liable for copyright payments.

CATV Ownership Questioned

The question of CATV ownership by telephone companies came into rigid perspective when Congressman John Dingell (D-Mich.) requested complete information on CATV cross-ownership from FCC Chairman Rosel H. Hyde. Dingell, a fervent antitrust and Chairman of a House Small Business Subcommittee, stated that the subcommittee has been studying the activities of several firms "with respect to their acquisition of or application for local franchises for CATV." A subcommittee source later indicated that growing interest is being expressed in several telephone companies which some regard as likely to make strong moves in the CATV field.

In relation to franchises being held by broadcasters, the Dingell letter stated that "It is my impression that there is a present and growing danger of economic concentration detrimental to the public interest in the field of CATV. I am particularly concerned since it is quite clear that technology in being may well result in CATV subscribers having available to them an entire spectrum of serv-

ices in the near future." He said there should be a Commission rule limiting the number of franchises to be held by one owner and raised the question of whether broadcasting-CATV cross-ownership should be allowed. He asked the Commission for complete information on what its CATV ownership policies are and what moves it plans to make.

Cooke Announces New CATV Plans

CATV magnate Jack Kent Cooke, owner of the American Cablevision, Inc. systems, announced last month that he has decided to divest himself of the majority of his CATV holdings. Cooke's statement substantiated the rumors which had been circulating in some CATV circles, that various broadcast interests were trying to buy the American Cablevision holdings. Cooke, however, indicated that the systems are for sale on an individual basis.

Revealing his intention to pursue the extension of CATV investments in metropolitan markets, Cooke's formal statement noted that "In

the past two years, while building American Cablevision into one of the largest CATV systems in the world, I have concurrently been creating the rather important sports complex in which I have invested more than \$30 million. I have decided to sell the American Cablevision systems so that we can concentrate our company's CATV efforts towards metropolitan of America, such as Tucson, Arizona, where American Cablevision has recently been granted a CATV license. In specializing in this manner, I will be able to devote more of my time to our sports division."

Cooke began his phenomenal CATV venture only a little over 2½ years ago with the purchase of CATV Inc., with a subscribership of around 14,800. Total subscribers to his systems now range over the 85,000 mark.

Pa. Antitrust Suit Simmers

A Federal antitrust suit involving two franchised firms in Hanover, Pennsylvania has developed out of an alleged attempt to monopolize CATV in that city. The two firms involved are Radio Hanover, Inc. and Penn-Mar CATV Inc., a corporation formed by United Utilities, United Telephone of Pennsylvania, United Transmission, Inc., Susquehanna Broadcasting Co., Brush-Moore Newspapers of Canton, Ohio and Penn-Mar Publishing, owners of the Hanover Evening Sun. Both CATV companies are operating under franchises issued by the city of Hanover.

Radio Hanover's suit requested that a preliminary injunction be issued against United Telephone and its alleged co-conspirators. Apparently accepting Radio Hanover's contention that construction could begin before the defendants could be notified, Federal District Judge William J. Nealon, sitting in Harrisburg, Pa., ordered an immediate hearing on the injunction. The case, as well as the recent case of *Warrensburg (Mo.) Cable Inc. vs. United Transmission and United Telephone Company of Missouri*, could ultimately become major anti-trust cases in CATV history.

Utility Action Stews

CATV-Utility action is still simmering in several state legislatures across the country. Among them is the Vermont House, which passed out a regulatory bill which would place under Public Service Board control all systems except those run by companies presently under PSB control (i.e., telco-owned systems would not fall under PSB jurisdiction: only the telephone company itself would be regulated.) The bill was approved by a 74-72 vote, with five House members absent. However, system operators are optimistic that, due to the closeness of the House vote, the bill may not be passed by the Senate. Last year the bill came out of the House by a 2-1 majority with a vote of 105-45, but was killed in the Senate.

Four CATV bills have been introduced in the Massachusetts State Legislature. Two, which are in the House, would empower municipally-owned power and light companies to own and operate CATV systems. The third would order an investigation by the Consumer Council on the nature of CATV. The Senate bill in essence is the same as the first two house bills: it would enable municipally-owned power and light companies to own and operate CATV systems. The Power and Light Committee has heard readings on all three bills, but has not yet reported on them.

NCTA Drive Underway

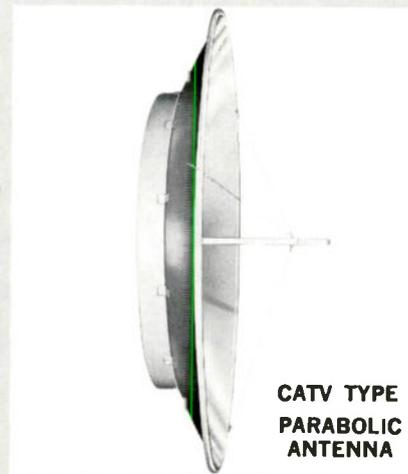
The National Community Television Association has announced plans to turn more than 150 salesmen loose in a newly-launched drive to attain 100 per cent membership in the Association. In cooperation with the drive, sales representatives of NCTA's associate member companies will participate in a contest to enroll the greatest number of CATV systems as new members. John Campbell, president of CAS Manufacturing Company of Irvine, Texas and associate member representative on the NCTA Board of Directors, is coordinating the manufacturer and supplier effort.

Sam Street, director of membership services for NCTA, noted his appreciation for the response of the associate members.

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Sec. 214 Hearings Designated

Early in March, the commission ordered expedited consideration of one of the key provisions designated for scrutiny during the consolidated hearings: Section 214 of the Communications Act, which requires that carriers apply for and receive certificates of service to the public interest before they may offer cable service. The section, which has become a noticeable bone of contention between CATV and telco interests, allows exceptions if the lines involved are less than ten miles. Exceptions are also granted if the service is not interstate in nature.

In taking its action, the Commission denied a petition by the California Community Television Association that requested the FCC to reject or suspend sections of a new CATV tariff filed by Pacific Telephone and Telegraph Company. All the issues involved, the Commission noted, would be considered in the consolidated hearing, and the new tariff is preferable to the old "in that the former offers CATV channel service to all qualified customers alike in each service area on equal terms and conditions rather than to specifically named customers." In doing so, however, the Commission stated: "Although we are denying the petition herein, we are concerned about the need to determine as expeditiously as

possible the Section 214 issue involved in the Bell System tariff offerings to CATV operators. Therefore, concurrently without action herein, we are ordering an expedited procedure whereby this issue may be resolved prior to a determination of the other issues in the consolidated case." Although the initial order applied only to the Bell Systems, the Commission later included California Water and Telephone Company, General Telephone System and United Utilities in the giant hearing.

CATV/telco Battle Gains Depth

It could be a long siege for the nation's CATV/telco interests. What started out to be a simple—although significant—decision in regard to CATV problems has, in one short month, compounded into a virtual maze of complications.

The Commission, in an attempt to get to the core of CATV/telco problems, early this year ordered, on its own motion, the consolidation of all CATV questions regarding the practices of telephone companies. At the same time, the FCC announced that it would investigate the CATV practices of several General Telephone & Electronics companies, eight affiliates of United Utilities, Inc. and eighteen affiliates of American Telephone and Telegraph Co.'s Bell System.

TelePrompter Filings Get More Opposition

The complicated state of TelePrompter Corp.'s CATV/FCC involvements is growing steadily more complicated. To date, the New York firm is entangled in at least two major battles, both of which will be decided by the Commission.

TelePrompter's proposal (filed jointly with Hughes Aircraft Co.) to utilize a currently unused part of the broadcast spectrum to serve CATV systems has received strong opposition from American Telephone and Telegraph Co. Based on experiments with its CATV system in Manhattan, New York City, the TelePrompter filing had asked the Commission to approve a nationwide service for converting broadcast signals into the 18,000 MHz band for relay to cable distribution points. AT&T's filing exerted opposition to "any action that may foreclose this important spectrum space in the 18,000 MHz range from use by common carriers in providing more comprehensive and widely-needed communication services to the public than are encompassed by the TelePrompter proposal."

The Commission also received other filings concerning the proposal. New York-Penn Microwave Corp. asked the FCC for an extension of the filing deadline, as the

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proposal is "a complex document," and needs longer study before a reply could be filed. TeleSystems Corp., a CATV multiple owner, supported the TelePrompTer-Hughes petition as a "logical and economically feasible solution to the problem of expanding the availability of CATV service to virtually all of the homes which are located within a reasonable distance of a CATV system."

Task Force Grows In Stature

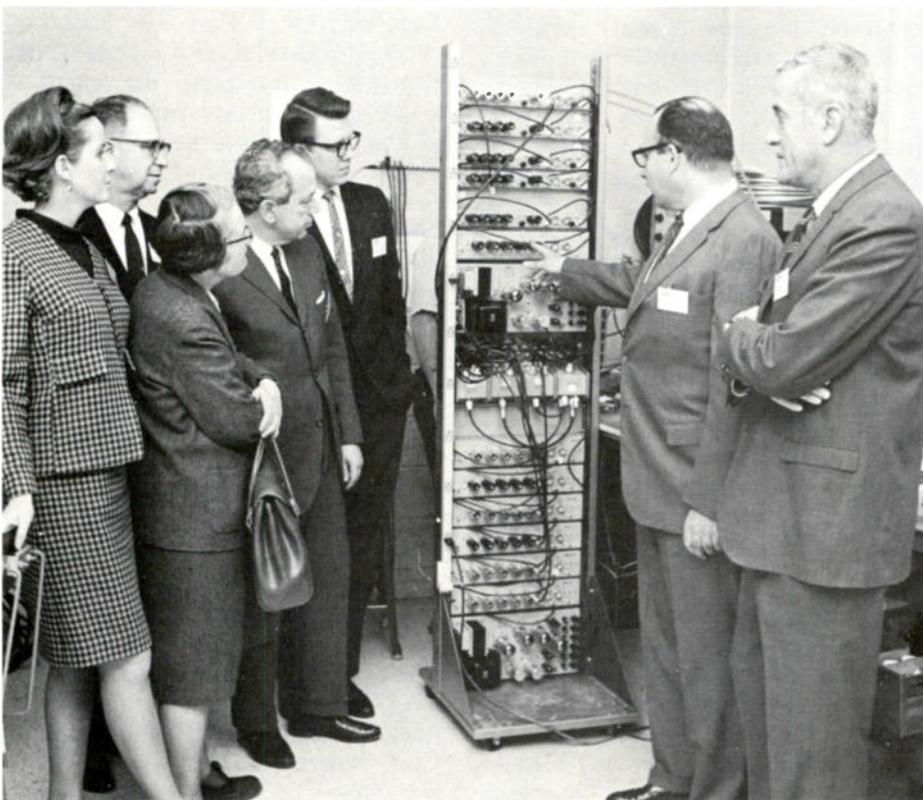
The FCC has changed its formal rules to show the growing stature of the Commission's CATV Task Force. The changes were made, the Commission said, "to reflect the status of the CATV Task Force as decision-making Commission personnel in restricted rulemaking proceedings involving service by common carriers to Community Antenna Television Systems. The status of the Task Force in such proceedings is the same as that of the Common Carrier Bureau." Earlier last month, the Commission announced the delegation of "additional authority to the Chief

of the CATV Task Force...(Sol Schildhouse)...to act on a number of housekeeping matters."

General Tel vs Task Force

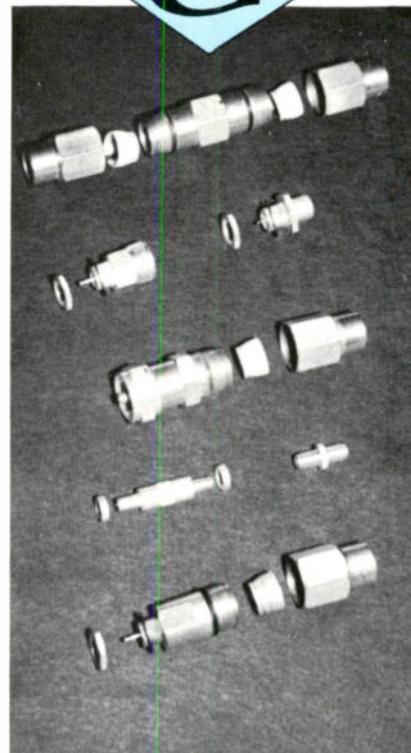
Shortly after the 214 hearings were ordered, several General Telephone subsidiaries filed a complaint with the Executive Director of the FCC, alleging *ex parte* presentation on the issue by the CATV Task Force. The three-page complaint was furnished to the designated Hearing Examiner and all counsel of record in the Section 214 hearing. Significantly, the specific filing which resulted in the Commission's decision to spin off the 214 issue for special consideration was not a docketed case, as charged by the General Tel complaint. Rather, the issue involved the petition by the California Community Television Association which asked the Commission to reject or suspend the PT&T tariff.

The Commission, apparently, dismissed the charge as a reflection of General Tel's annoyance at being included in the 214 hearings.



Entron, Inc. President Edward P. Whitney (r.) looks on as Vice President Heinz Blum explains the function of test equipment for measuring cross-modulation to FCC Task Force Members Patricia Murphy (l.), Robert Koteen, Francis Peck, Leonard Lieberman and Gary Christensen. The group visited Entron recently for the purpose of observing the company's production of CATV equipment and to discuss Entron's role as an operator/owner of CATV systems.

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More CATV Grants, Denials

Though the Herculean task of processing CATV waiver applications promises no relief, the FCC is maintaining steadily its yield of Rules decisions. Last month's decisions included a grant of authority to Back Mountain Telecable, Inc. to continue operation of its system at Dallas Township, Dallas Borough and Kingston Township, Pa., while its case is pending before the Commission. Tele-Ception of Winchester (Ky.), Inc. was granted an extension of time to comply with an earlier FCC order, and Jonesboro (Ark.) Cable TV Inc. received the green light to commence operation of its system. The Commission denied a petition filed by George T. Heinrich, licensee of KAIT-TV, Jonesboro, which said that the CATV would harm the public interest. The FCC also dismissed a request for rules waiver which was filed Ohio Valley Cable Corp., operator of a system in Crooksville, Ohio, because the request failed to comply with procedural requirements.

The Commission denied a request by Chippewa Cable Co. of Chippewa Falls, Wisc. for waiver of the rules to permit program duplication, but Panther Valley Television Co. was granted a temporary waiver of the carriage and nonduplication conditions of the rules. (However, the Commission denied the Panther Valley request for permanent waiver with respect to the signal of WDAU-TV in Scranton, Pa.) The Panther Valley systems serve Lansford, Coaldale, Nesquehoning and Summit Hill, Pa.

Program Exclusivity Action

The FCC denied four requests for waivers of the program exclusivity requirements filed by Garrett Coaxle Television Tower Inc., which operates a CATV system in Siloam Springs, Arkansas; Irvine Community Television Inc., operator of a CATV system in Irvine, Kentucky; Plainview Cable TV Company, which owns and operates a CATV system in Plainview, Texas; and Ellensburg Television Cable Corporation, which operates a CATV system in Ellensburg, Washington. The Commission also

denied a request for a waiver of both the carriage and program exclusivity requirements filed by Berks TV Cable Company, which owns and operates a CATV system in Reading, Pennsylvania. The Commission denied a request for a waiver of the program exclusivity provisions of FCC rules filed by TV Cable Service Company, which operates systems in Norton, Appalachia and Big Stone Gap, Virginia. The Commission also denied a petition for waiver of the program exclusivity requirement filed by Trans-Video of Arkansas, which operates a CATV system in Fayetteville, Arkansas.

Additional denials went to La Crosse TV Signal Company, which operates a CATV system in La Crosse, Wisconsin; Wausau Cablevision, owner and operator of a CATV system in Wausau, Wisconsin; New England Video, operator of a CATV system in Keene, New Hampshire; Titusville Cable TV Inc., which operates CATV systems in Hydetown, Oil Creek Township and Titusville, Pennsylvania; and Tower Antennas Inc., owner and operator of CATV systems in Waverly and Caldwell, Ohio. The Commission partially granted a request for waivers of the carriage and program exclusivity requirements of its rules filed by Television Distribution System, operator of a CATV system in Huntsville, Alabama.

Distant Signal Action

The FCC allowed Vista Cablevision Inc. to begin operation of its CATV system in Vista, California, carrying San Diego stations KFMB-TV, KOGO-TV, Kaar Television, KGOG-TV, and Tijuana, Mexico television station XETV. The CATV system's request for permission to carry some Los Angeles TV signals, however, was put into the consolidated hearing now progressing on the importation of Los Angeles signals into the San Diego market by CATV systems. The consolidated hearing already involves several California systems, including Mission Cable TV Inc. (see separate story on Cox Purchase), Southwestern Cable Co., Pacific Video Co. and

Trans-Video Corp., whose case involves a request by Midwest Television Inc. (licensee of KFMB-TV, San Diego) for relief from the systems' carriage of Los Angeles signals.

Booth American Company returned to the Commission to ask reconsideration for a February 17 decision that denied the company's petition for waiver of distant signal rules to authorize its CATV system in Muskegon, Michigan. Booth American has requested permission to carry five of the distant signals, including ETV outlet.

Waivers were also granted to Beloit Community Television Services Inc. and Whitewater Cable Corporation in Whitewater, Wisconsin, Jefferson Cable Corporation in Jefferson, Wisconsin, and Total TV Inc. in Janesville, Wisconsin, to import signals from Milwaukee.

Top 100 Action

The Commission took a major action affecting the Syracuse, New York market and, in addition, awarded favorable decisions to several petitioning CATV systems. Approval went to a petition by Central New York Cable TV Inc., which had asked for a waiver of the hearing requirement for systems wanting to initiate service in one of the Top 100 markets. The grant allows Central New York Cable to serve New Hartford, Whitesboro, Whitestown, Yorkville, New York Mills, Schuyler, Paris, Clayville, Clinton, Kirkland and Marcy, all New York State.

The Commission also granted the petition of Newchannels Corporation to import distant signals to its CATV system in Fulton, New York, and granted the petition of Onondaga Video Inc. for a hearing on its proposed CATV service to Onondaga Township. The Commission, however, denied petitions for waivers of hearing filed by Newchannels Corporation and Upstate Community Antenna Inc. for the CATV systems to serve Manlius, Minoa, Liverpool, Fayetteville, Clay Township, and Cicero Township, New York. The latter applications were set for a consolidated hearing with an already complex batch of CATV applications in the Syracuse market. These involve CATV applications by Newchan-

nels, General Electric Cablevision Corp. and Eastern Microwave Inc., all of which will have their say in the consolidated hearing.

Taking another look at a complicated multi-market logjam of CATV applications, the FCC set the whole bundle for hearing. This time the markets were Rockford, Illinois, ranked number 99; Madison, Wisconsin, ranked number 80; and Milwaukee, Wisconsin, ranked number 24. In designating the consolidated hearing, the Commission granted waivers of the hearing requirements to permit Rockford Community Television Inc. in Loves Park, Illinois, to import Chicago ETV signals and TV Cable Company of Stephenson County in Freeport, Illinois, to import educational signals from Madison, Wisconsin, and Chicago.

Task Force Action

The FCC CATV Task Force exercised its recently-granted powers to grant uncontested community antenna relay station applications. The Task Force awarded a construction permit to Midnight Sun Broadcasters Inc. for Seward, Alaska, and Television Cable Co. in Dequeen, Arkansas. Other Task Force grants went to Jack Kent Cooke, Inc., which had petitioned for approval of CATV relay stations in Winona, Minnesota and La Crosse, Wisconsin.

Maine Court Test Underway

The first round of Maine's CATV/telco legal test was conducted in Portland (Maine) last month, under the scrutiny of Superior Court Judge Harold Rubin. The hearing resulted in only factual evidence, since both parties have agreed that no substantial question of fact exists: i.e., the issue is one of law.

Party plaintiffs in the case are the City of Waterville, Maine and CATV franchise holder Robert Drapeau, who have charged that the defendants—New England Telephone & Telegraph Co. and Bartell-Media—have initiated the construction—and eventual operation—of a leaseback cable system without benefit of a franchise from the city. The city and Drapeau contend that the Maine statutes

support the right of the municipality to franchise CATV activities.

New England Tel and Bartell Media have argued that a franchise is not required by an operator leasing CATV distribution facilities from the AT&T affiliate, a point that is highly significant, due to the complicated utility status of New England Telephone in the state of Maine under laws which were passed in the 1880's.

As a result of the confusing legal situation, the Maine Municipal Association has sponsored a bill which would amend and clarify the statutes relating to municipal regulation of CATV systems. The bill stipulates that "municipal officers may contract on such terms and conditions as are in the best interests of the municipality for the granting of a CATV franchise, and points particularly to "transmission of television signals by wire . . . such as are placed or maintained by any public utility." It adds that "the municipal officers of towns shall have exclusive power to enact all ordinances authorized" by the bill.

Cox Adds To CATV Holdings

Officials of Cox Broadcasting Corp. have announced that agreement has been reached on the pending acquisition of CATV systems in San Diego and Bakersfield, California. Under the principal terms of the agreement Cox will become the sole owner of the two West Coast properties, which are currently operated by Trans-Video Corp. Cox already owns a 16% interest in Trans-Video Corp. and a 50% interest in Bakersfield Cable TV, Inc. Upon formal approval of the plan, Cox will exchange 155,000 newly-issued shares of its common stock for the interests presently held by an investment group and the management of the California cable television enterprises.

Cox is already recognized as one of the largest operators in the country, with approximately 75,000 subscribers in wholly or partly-owned operating companies. The system in San Diego, which had approximately 28,325 subscribers at the beginning of the year, is one of the largest in the nation

Arizona/Southwest Meet

FCC Task Force Chief Sol Schildhouse was headline speaker at last month's meeting of the Arizona Community Television Association and the Southwest CATV Association. Speaking at the Hotel Valley Ho in Scottsdale, Arizona, Schildhouse told the operators that "CATV - once a mere curiosity - has developed into an important but embattled growth industry

Hitting on the various problems with which the industry is now



Featured speaker at the Arizona/Southwest Association Banquet was Sol Schildhouse, Director of the FCC's CATV Task Force.

faced, Schildhouse, noted that "What we are witnessing in all of these conflicts is a demonstration of democracy in action—and at its imperfect best. We stir, move ahead a step, go sideways for a while, back and fill, reexamine—all the while groping for a permanent policy. This is a bruising game. And it's probably because you pose a challenge to the accustomed and comfortable order of things. But the result seems foreordained. Everybody is just going to have to move over a little bit to make room for a robust and dynamic cable industry."

Other speakers for the two-day meet included C. D. Owens, Jr.; John E. Lewis; Bruno Zucconi; G. C. Kleykamp; Ken Lawson; Sid Mills; and Arizona Governor Jack Williams. A business meeting of the Arizona Association resulted in the election of Robert E. Cowley of Flagstaff as president; Howard Teal of Holdbrook as vice-president; and Douglas Shank of Phoenix as secretary-treasurer.

Texas System Honored By Air Force

McAllen (Tex.) Cable Television Corp. has been cited by the U.S. Air Force for "outstanding television public service" as the result of a series of recruiting programs cablecast by the CATV system. According to Air Force sources, the locally-originated programs raised that community's level of enlistments to the highest in the nation



Air Force Captain Gary Scarborough (l.) presents McAllen manager Edwin Sharp with a special commendation for the system's outstanding public service programming. The specially designed plaque featured an Air Force seal superimposed upon a TV camera.

during the month of January. The system is a subsidiary of The Jerrold Corp.

The series was developed in cooperation with local Air Force recruiting officers, and was cablecast on the system's Channel 12, which is utilized for public service origination. According to Edwin Sharp, manager of the McAllen system, "Our purpose was to bring important information about the armed service directly into the homes of McAllen's youth.

FCC Reveals Pay TV Plans

Federal Communications Commission Chairman Rosel H. Hyde, speaking at the Commission's annual review hearing before the House Commerce Committee, revealed that the FCC is considering plans to set up some kind of legal Pay TV system. Hyde noted that the Commission has been considering such a rulemaking for more than a year, and that a report is expected soon from a panel of three

Commissioners who are studying the issue. Committee Chairman Harley Staggers (D-W. Va.), apparently unaware of the immediacy on the Pay TV developments, announced that hearings on the plans would be held immediately. Hyde's formal statement made only brief mention of CATV, but he significantly spoke of it as one of six major categories—one of which was broadcast. In contrast, CATV last year got little mention at the meeting.

La. Operators Meet

The Louisiana Association of Cable TV Operators held its spring convention last month at the Ramada Inn. in Houma, La. Scheduled speeches included talks by Heinz Blum of Entron Inc.; John Campbell of CAS Manufacturing Co.; and Tom Smith of Scientific-Atlanta.

Weary Buckeye Files Again

Harried by repeated rebuffs from the FCC and the U.S. Court of Appeals for the District of Columbia, Buckeye Cablevision Inc. has now filed in the Sixth Circuit Court of Appeals for the Toledo, Ohio area (in which the system operates). Buckeye filed in Cincinnati, Ohio to challenge the FCC's Second Report and Order involving the broad issues of CATV regulation.

Superior Cable Announces New Division

Superior Cable Corp. has announced the establishment of Comm/Scope Division, formed to handle turnkey construction of



Superior Cable Corp. vice-president, marketing J. H. Bowman (l.) and Vern L. Coolidge, Comm/Scope Division manager, examine an armored submarine coaxial cable at the company's Hickory, N.C. plant.

CATV and other communications systems. The name Comm/Scope represents Communications systems construction, planning and engineering. According to Vern L. Coolidge, manager, the new division is currently engaged in preliminary studies for system installations in several southeastern states.

ABC-ITT Case Reopened

Prompted by the resolute pleas of the Justice Department, the FCC has ordered the proposed ABC-ITT merger case reopened. The Commission, by a narrow vote, approved the merger last December, but the Justice Department later asked for a new hearing on the basis that the merger could bring up questions of antitrust violations. (ITT's relation to the CATV industry is one of the fields that the Department thinks should be examined.) Noting the long delays and disappointments that have already thwarted the case, the Commission's order said that the probe would be conducted as speedily as possible.

ATR Filings Continue

American Television Relay Inc., which has before the FCC an application to bring the signals of four Los Angeles independent television stations via microwave to Texas communities, was the center of considerable attention at the Commission last month. KLTV Television in Tyler, Texas asked the Commission to deny the American Television Relay request to the Midland-Odessa area. The station argued that it would be a step toward a wired network. The National Association of Broadcasters, saying the proposal "represents a direct potential threat to all stations through whose service areas the microwave proposal might pass," asked the Commission to give the NAB more time to file its comments. The NAB wants to participate, it said, because the proposals "raise basic policy questions of general concern to the entire broadcasting industry."

In a related case, Vumore Company asked the Commission to enlarge the issues in the Albuquerque market case. In that case, American Relay has petitioned for permission to bring the Los Angeles

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independents into Albuquerque, and the Commission, while allowing the service to nearby Santa Fe, set the application for hearing. American Relay wants to service the Vumore CATV system in the Albuquerque area. Vumore requested that the issues expanded to include submissions by the Albuquerque television stations of their revenues, incomes, expenses and other business details. Vumore argued that all the business ramifications of CATV service there must be explored.

Dal-Worth's Troubles Compound

Dal-Worth Microwave, Inc. last month filed a slashing opposition to Southwestern Bell Telephone Co.'s petition to the FCC for denial of Dal-Worth's microwave carrier application. Bell's request, filed January 20, was not the first filed in opposition to the Dal-Worth plan, which would involve the construction of microwave stations for distribution of nonbroadcast programming to CATV systems in Texas. Several Texas television stations, as well as the National Association of Broadcasters, have previously filed objections to the proposal. (Dal-Worth wants, initially, to serve three Texas CATV systems — Brownwood Television Cable Service in Brownwood, KBC Corp. in Killeen, and Television Cable Service Co. in Tyler, Texas.

The firm also plans to originate three channels of programming: one for news and sports, one for motion pictures and one for educational programs.)

Viking Initiates Freehold Shipments

Shipments have started from Viking Industries' new Freehold, New Jersey cable facility, according to reports from Robert Baum, vice president of marketing. Baum indicates that the new 130,000



Targeted primarily for the production of CATV equipment, Viking's new Freehold, N.J. plant is designed to double the company's production capacity.

square-foot plant doubles Viking's capacity for producing cable. He adds that while the firm makes cables for a number of uses, including sound systems and master TV systems, the new facility will be devoted primarily to serving the needs of the burgeoning CATV industry. Harold Roveda will serve as plant manager.

A reported feature of the new

facility is a massive aluminum extruder, costing more than \$1 million. The machine, code-named Alex, is the only one of its kind in the U.S. Developed in Europe, Alex was designed especially for Viking.

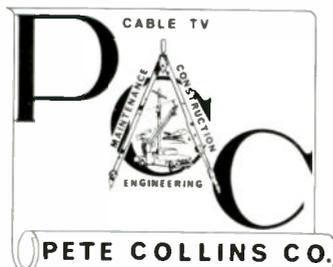
Jerrold Urges CATV For Public TV

Jerrold Corp. President Robert H. Beisswenger, in a letter to President Johnson last month, "strongly urged" the addition of CATV industry representatives to the proposed 15-member corporation which will oversee a nationwide Public Television Network. Beisswenger's message noted agreement that, "Noncommercial television is....reaching only a fraction of its potential audience—and achieving only a fraction of its potential worth."

The letter stated that Jerrold, as a "leading manufacturer and systems operator for the (CATV) industry....strongly believe(s) that community antenna television—the direct video pipeline to the home—should be considered as an important means of bringing Public Television to the American viewer."

Brand-Rex Ark. Plant Begins Production

The Brand-Rex Division of American Enka Corporation reports that its new 90,000 square foot Siloam Springs, Arkansas plant is now in full operation. The new Siloam Springs plant is located on a 47-acre site in a major market center of the independent telephone industry. Initial employment stands at approximately 100 people. Brand-Rex plans to produce only telephone and communications cable at the new Siloam Springs plant.



This symbol is the sign of unexcelled craftsmanship in CATV system engineering, construction and maintenance. It represents years of nationwide experience and state-of-the-art techniques. It is known and respected throughout the industry. The company behind it stands ready to help you with your specific system construction needs, any time. Contact us for courteous, professional counsel.

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ARTICLE CORRECTION

An error was made in the January TV Communications article entitled "A Cooke's Recipe For CATV" concerning the manufacture of digital weather service equipment and "Emerg-Alert" warning system equipment. This CATV equipment is manufactured by Asteroid Corporation of San Diego, California, which has no connection with Jack Kent Cooke's firm.



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- 3 Engineering Assistance** — If you're already in business, or do not need the complete Turnkey service, we can offer a competent staff of construction supervisors and systems engineers to assist you on a per-job basis. Quotes will be supplied on request.
- 4 Research & Development** — A continuing program of product design, testing and field study assures you of the finest, most economical products available, end-to-end.

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- 5 Quality Control** — Kaiser-Cox not only conducts exhaustive QC tests on its amplifiers and the separate modules that go into our products — but we also check-out each individual component as it's delivered to us — before it is installed in the equipment! Our standards exceed military specifications because your profits are geared to reliability of service.

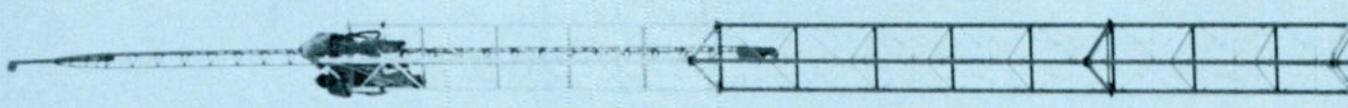
Space-Age Product Technology — The Kaiser-Cox Phoenician transistorized series of CATV amplifiers is the most advanced, most efficient, most copied equipment in the industry today!



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—Tommy Moore, President



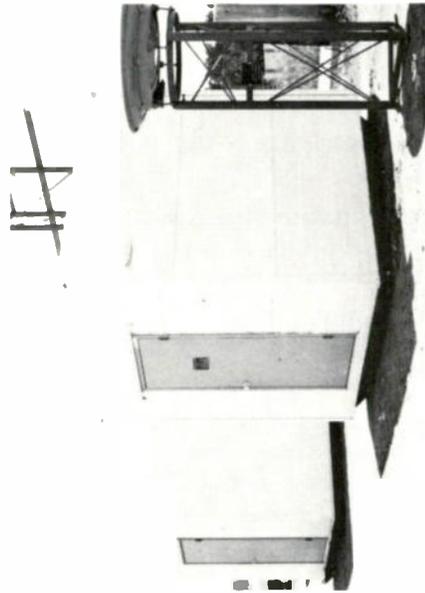
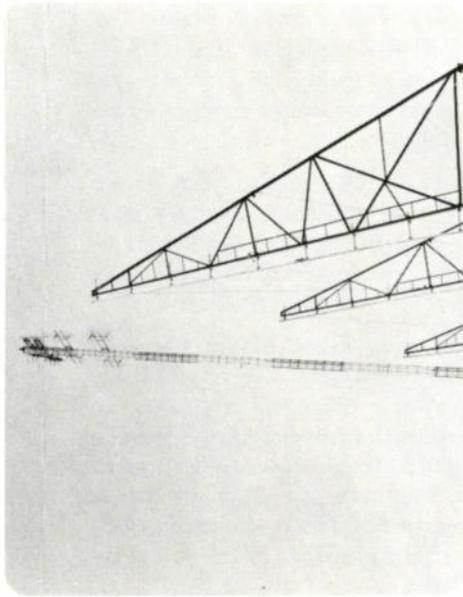
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FOCUS

... On People

Systems

Courtney M. Kirkeeng has been named operations manager by Western Communications Inc., for the CATV installation under construction in Concord and Contra Costa County, California.

Donald D. Sullivan has been named general manager of Universal Cable Vision, Inc., which operates systems in several Florida communities. Sullivan previously was vice president and general manager of KTVV, Sioux City, Iowa.

Reid L. Shaw has been named vice president and general manager of the General Electric Cablevision Corp. He replaces Robert B. Hanna, who has retired after 38 years with the company. Shaw will continue as vice president and general manager of the General Electric Broadcasting Company.

Dr. G. Burton Bloch has been named president of the Vumore TV Corp., which will operate under the trade name of Total TV of Grant County (Wisc.).

Jim Keller is the new head of CATV operations for CBS. Keller was formerly operations manager at United Transmission.

Clark Swalley has been named to the newly-created position of operations manager of Multi-Channel TV Cable of Mansfield, Ohio.

Albert Huff has been named manager of the Video Communications, Inc. system in Desert Hot Springs, California.

Henry M. Walther, vice president and general manager of Community TV Corp. and Northco Microwave, has announced

his resignation. Walther had been with the companies for the past 10 years.

James L. Reinsch, Jr. has been named general manager of Columbus (Ind.) Communications Corp. Reinsch will also supervise initial phases of construction for the system, which is scheduled for completion July 1.

Roland Scott has taken over the Fredonia Cable Television maintenance responsibilities. Scott replaces Mike Kirk, who had been with the system for nearly a year.

Don Winn has joined the staff of Maryville (Tex.) Cable TV Inc. as technician. Winn was former with the Waco, Texas system.

Marguerite Minor has been appointed apprentice manager of Campbellsville (Ky.) Cable TV, Inc.

Anne Rankin has been appointed apprentice manager of Richmond (Ky.) Cable TV, Inc.

Wanda Ress has been appointed apprentice manager of Indiana Cablevision, Inc., which operates in Tell City, Indiana.

Mrs. Ruth Jean Sharp has been appointed apprentice manager of Glasgow (Ky.) Cablevision, Inc. Mrs. Sharp has been with the system since September, 1965.

Suppliers

Helmut Dieter and Ray M. Wood have been named vice presidents at Ameco, Inc. Wood, vice president-manufacturing, has been director of Ameco's production facility since last September. He joined the firm in November, 1965.

Dieter, vice president-contracting, has over 15 years of experience in the CATV field. Before accepting the Ameco assignment, he was president of American Television Relay, Inc.

Robert C. Bacon has been named executive vice president and assistant manager of TeleMation, Inc. and Electronic Sales Corp. Bacon joined Electronic Sales in 1963 as an electronics engineer.

William L. Grey has been named president of Anaconda Wire and Cable Company. He had been executive vice president of the company since November of 1966. Grey succeeds Robert B. Fulton, who has accepted the position of vice president of The Anaconda Co. Fulton had been president of the subsidiary since 1965.

S. W. Pai, director of engineering at Craftsman Electronic Products, Inc. has been appointed vice president-engineering. Pai has appointed Robert B. Johnson as project engineer. Johnson was previously with General Electric Company. Malcolm Hare has been appointed quality control engineer for Craftsman. Prior to joining the company, Hare was associated with Taber Instrument Corp.

Richard E. Hall has been promoted to group executive/marketing at Amphenol Corp. Prior to the appointment, Hall was president of Amphenol's sales division. Herbert F. Motz, who was eastern region vice president of the sales division, succeeds Hall as president of the division.

J. W. Black has been named assistant product sales manager, CATV division, for American Electronic Laboratories, Inc. Black joined AEL in 1966 as a sales engineer for the division.

Ray D. Thrower has been appointed field services manager of Microflect Co., Inc.

Leon J. Knize has been appointed director of marketing for Blonder-Tongue Laboratories, Inc. Knize formerly held key positions with Fisher Radio Corp., Ravenswood Corp. and Stromberg-Carl-



Courtney Kirkeeng



Donald Sullivan



Helmut Dieter



Ray Wood



Robert Bacon



Gary Christensen

son. Richard B. Helhoski has been named general manager of Blonder-Tongue's newly-formed special accounts division.

Dr. James H. McNamara has been named director of research for the Rome Cable Division of Aluminum Company of America. He succeeds George L. McCutchan, who retired March 31 after more than 30 years of service.

Henry E. Bartels has been elected vice president-engineering of The International Silver Company. Bartels will assume broad corporate responsibilities in International's engineering and manufacturing areas, including the Times Wire and Cable Division.

R. P. (Pat) Brown has been named general sales manager for Cascade Electronics Ltd. Brown assumes the post formerly held by C. L. Dietderich, who has left the firm. Richard F. Yearick has been appointed eastern U.S. regional sales manager for the company. Phil Colone and J. Mason Hamilton have been appointed as sales representatives for the New York-New England and South-eastern U.S. regions, respectively.

James W. Hart has been appointed director of engineering projects and administration for Andrew Corp. Hart was previously associated with Mark Products and with Motorola Inc.

Warner Associates of Bethesda, Maryland has been named sales representative for Maryland, Virginia and the District of Columbia for R.F. Systems, Inc. of Cohasset, Mass.

J. Robert Clary has been assigned to the Tulsa, Oklahoma sales office of the Brand-Rex division of American Enka Corp. Clary comes to Brand-Rex after eight years with General Cable Corp.

A. E. Ford has been named director of operations and John B. Dennis production manager for Ameco, Inc.'s Remcor subsidiary.

William D. Winder has been named purchasing agent for Andrews Towers, Inc. Winder has some 10 years experience in the field.

Professional

Gary L. Christensen has been appointed Assistant General Counsel of the National Community Television Association. Christensen formerly worked with the FCC's CATV Task Force and earlier was with the legislative division of the Office of the General Counsel of the FCC.

TV Communications

Joseph Gans, president of Berwick Cable TV Company, has been named chairman for the Pennsylvania Community Antenna Television Association's spring convention in Hazelton, Pennsylvania. Gans is vice-president of the association. Cecil Woodland of Semit (Pa.) Cable TV has been named to the association's public relations committee.

Peter Severeid has joined the law firm of Fisher, Wayland, Duvall & Southmayd. The firm practices law before the various administrative agencies, including the FCC.

Obituaries

Bob Socia, manager of Leesville (La.) Cable Television, and formerly with Cablevision, Lafayette, California, was killed in an automobile accident February 8, 1967.

Robert D. Merrill, retired vice president of American Cable & Radio Corp and son of the late John Leonard Merrill, a pioneer in the development of inter-American communications, died February 15 of a heart attack in his home in Kennebunkport, Maine. He was 62.



CATV

EQUIPMENT CLOSURES

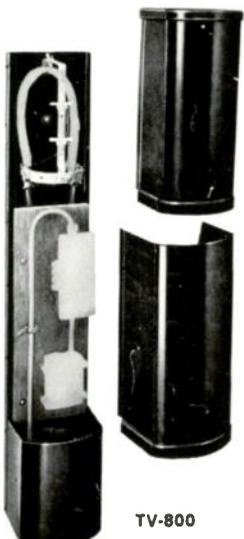
TV-600



280 Cubic inches
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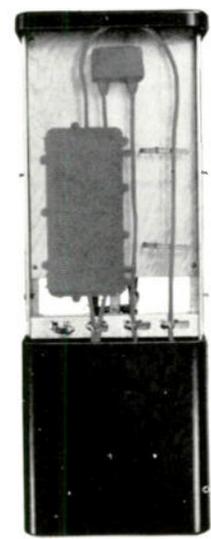
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FINANCIAL REPORTS

Viking Industries, Inc. announced that per share earnings for the year ending Dec. 31, 1966 were \$.86—up from the previous year's \$.48. Sales for the year were \$15,300,000 and net income was \$1,107,000. Sales and net income for the previous year were \$11,683,611 and \$602,080 respectively.

H&B American Corp. reported net income from operations for the six month period ended January 31, 1967 of \$278,839 as compared to \$278,054 for a like period of the preceding fiscal year. The net income figure for the current six month period is after providing \$90,000 for federal income tax, whereas no such provision was required in 1966 due to an available operation loss carryover. Gross revenues for the first six months ended January 31, 1967 were \$2,804,555 compared to \$2,479,319 for a like period in 1966 or

an increase of 13%. Six month pre-tax operating profits for 1967 of \$368,839 exceeded the 1966 pre-tax figure of \$278,054 by 33%. The company declared its fourth consecutive 12½ cents semi-annual dividend.

Entron Inc. reported consolidated sales for the 10-month period ended December 31, 1966 of \$2,843,990. Net income was \$61,874 before special credits of \$218,470—equal to 10 cents per share before special credits of 36 cents per share based upon average shares outstanding, for a total of 46 cents per share. The audited financial report included operations for 10 months only, reflecting a transition from a fiscal year to a calendar year basis of reporting.

Famous Players Canadian Ltd. reported sales for 1966 of \$35,925,398, as compared with \$28,347,758 for the pre-

vious year. Net income for 1966 was \$3,078,716 as compared with a net of \$2,432,040 for 1965. Earnings per share amounted to \$1.77, as compared with earnings of \$1.40 a share in 1965.

Storer Broadcasting Company disclosed that net earnings from operations increased to \$9,912,829 during 1966 or 23% over those of 1965, the company's previous record year. Net operating earnings in 1965 were \$8,059,062. Net earnings from all sources in 1966 surpassed the ten million dollar mark for the first time, reaching \$10,633,783. In 1965 net earnings were \$9,583,947. Gross operating revenues also achieved new highs during 1966, totally \$52,727,278, a 13.4% rise compared with the \$46,492,805 for 1965. Per share income earnings before non-recurring items increased to \$2.38 in 1966, a 20.8% increase over the \$1.97 earned in 1965.

Lin Broadcasting reported sales of \$3,931,000 for the year ending Dec. 31, 1966. Sales for the same period a year ago were \$1,977,000. Share earnings for the year were \$.73 as compared to \$.56 a year ago. Net income for the year 1966 was up to \$368,000 from the previous year's \$182,000. □

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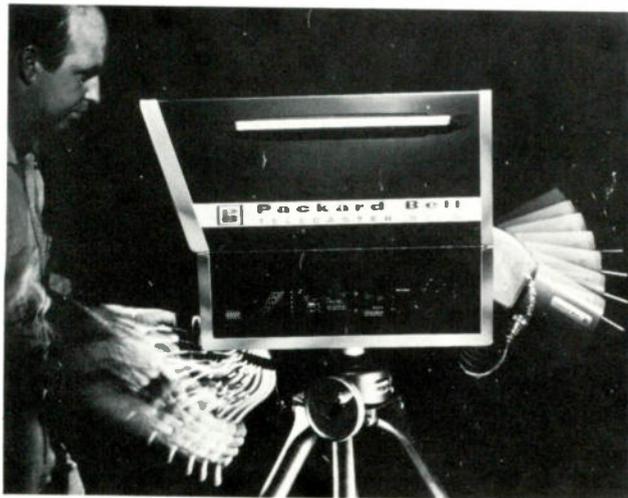
Another outstanding feature of the 76 system is its versatility. At the University of Kansas Medical Center, a 76 ETV system makes it possible for students to participate in classes being presented at a sister campus, 45 miles away. This is one of the few two-way ETV systems in existence. This system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

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MEETING CALENDAR

APRIL 16-18. The Southern CATV Association will hold its annual meeting at the Grove Park Inn, Asheville, North Carolina. For further details, contact Fred J. Stevenson, Rogers TV Cable Inc., Box 190, Rogers, Arkansas 72756.

APRIL 17-18. The Mid American CATV Association will hold its spring meeting at the Broadmoor Hotel, Colorado Springs, Colorado. For details contact Kenneth Schuelein, Box 770, Elk City, Oklahoma 73644.

APRIL 20-22. The Texas CATV Association, Inc. will hold its 7th annual convention at the Marriott Motor Hotel in Dallas, Texas. For details, contact Johnny Mankin, Box 989, Tyler, Texas 75701.

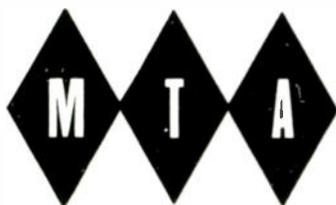
APRIL 27-29. The Kentucky CATV Association will hold its spring meeting at the Continental Inn, Lexington, Kentucky. For details, contact Joe Simmons, Glasgow Cablevision, Inc., 214 West Main St., Glasgow, Ky. 42141.

MAY. The Pennsylvania CATV Association will hold its spring meeting in the Hazleton, Pennsylvania area. Date is still to be set. For further information, contact James Palmer, 60 Decibel Road, State College, Pa. 16801.

MAY 8-9. The California Community Television Association will hold its annual spring meeting at the Senator Hotel, Sacramento, California. For details and reservations contact Walter Kaitz, Suite 1506, Lathan Square Building, Oakland, Calif. 94612.

MAY 15-19. The National Community Antenna Television Association of Canada will hold its 1967 Convention at the Chantecler Hotel, Ste. Adele, Quebec. For more information, contact Convention Chairman Jean Beauchemin, 1010 St. Catherine Street West, Suite 1004, Montreal 2, Canada.

JUNE 25-29. The National Community Television Association will hold its 16th Annual Convention at The Palmer House in Chicago, Illinois.



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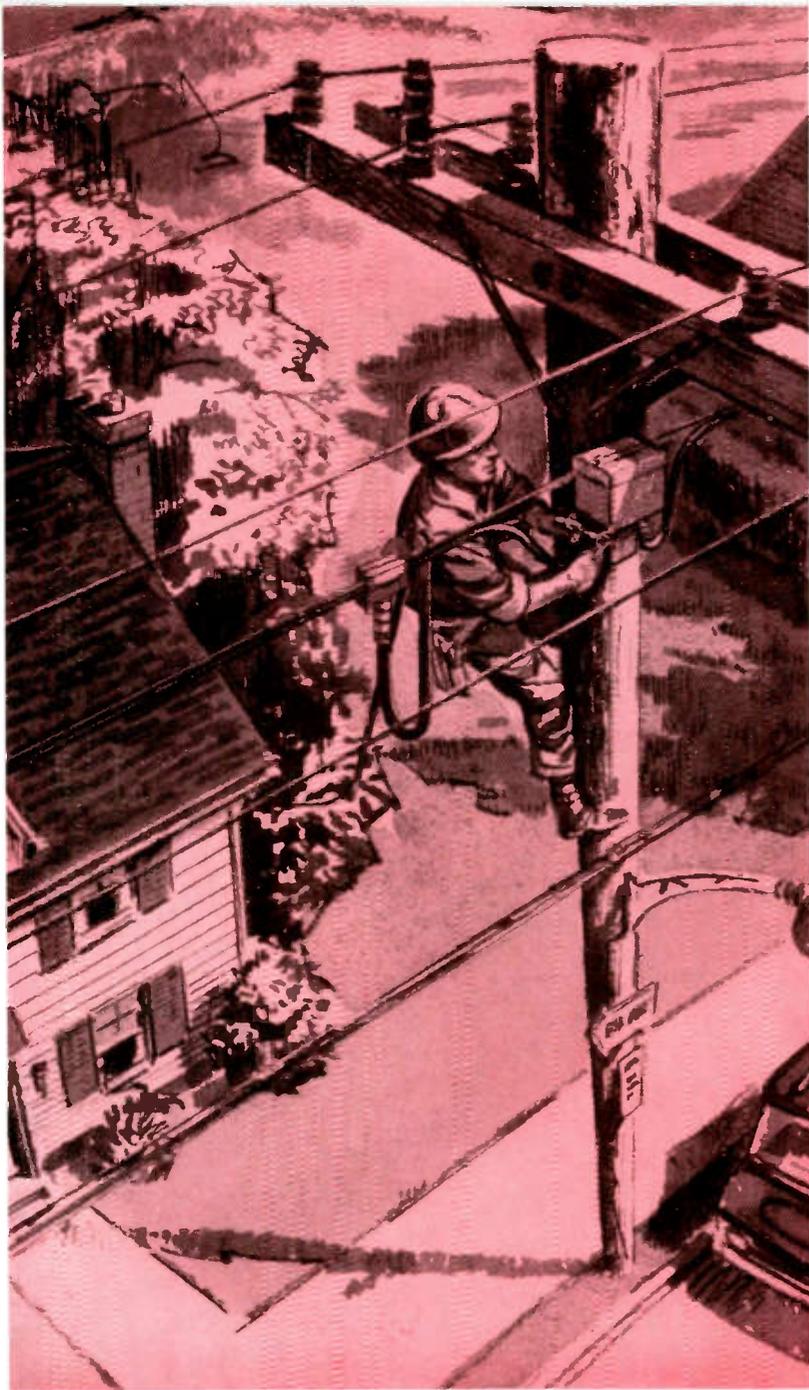
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TIMES
CATV CABLE & CONNECTORS



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Stock Quotation Channel

New CATV Service Introduced By Trans-Lux

By Charles Wigutow

Television sets are for entertainment. That is only one side of the story, however important. The other side, with even more important consequences is that it be a comprehensive source of information.

There is no doubt that the TV set has fulfilled its function as the family entertainment center. The latest headliner from the world of the stage is to be seen at prime time on the home screen. And in turn the television audience, in its vast numbers makes such a performer even more of a headliner.

The function of the television set as a dispenser of news and information has lagged somewhat in the quantity and details but not in the speed of reporting events. True, in the last few years documentaries as backgrounds to news have taken a more prominent place in the visual broadcasting spectrum with the television camera on the scene in troubled areas. On the spot reporters are seen nightly and in weekly showings of the noise and blood of war. These television journalists often combine the talents of the professor and legman reporter in bringing out the news and what goes on behind the news. It is fair to say that through television never has so wide a population been so well

informed as to what is taking place around the world.

If there is any shortcoming, it is one of convenience; one has to wait for the coming of a program at a scheduled hour. In the case of the newspaper reader, the delay is even longer. One must wait for the newspapers to roll off the press and be delivered to the home or news stand.

If the medium is to make any significant change, it can be done in the elimination of this wait. After all, television controls electrical impulses that travel at the rate of 186,000 miles a second and timing of this nature should allow for the possibility of pushing a button in the home and so becoming an observer of the scene while it is actually taking place.

Cable television has already taken steps toward making concrete the potential of always being on the scene on demand. It has done this with its weather information services. While the set of weather instruments are reporting varying conditions of temperature, wind, humidity, etc. as they are sensed by feelers in the atmosphere, the viewer at home, at any time at all can turn his dial to that channel and keep fully informed on conditions as of that moment; not something that happened an hour ago or the day before. Equally significant is the fact that he reads all the details, and not someone else's summary. He sees the details for himself while they are changing.

These are two innovations. One is being there; the other is seeing for yourself. Now cable TV has come through with another breakthrough; the Trans-Lux Stock Quotation Program Service. Viewers, in their own homes can see the continuous ticker tape itself as it reports price information directly from the New York Stock Exchange. This is instantaneous, except for a mandatory 15 minute delay required by the Exchange.

The interested spectator at home can watch all the exciting cross plays of bid and asked prices; he is there while prices surge or ebb. And he can participate by being able to call his broker at any moment he is prompted to do so.

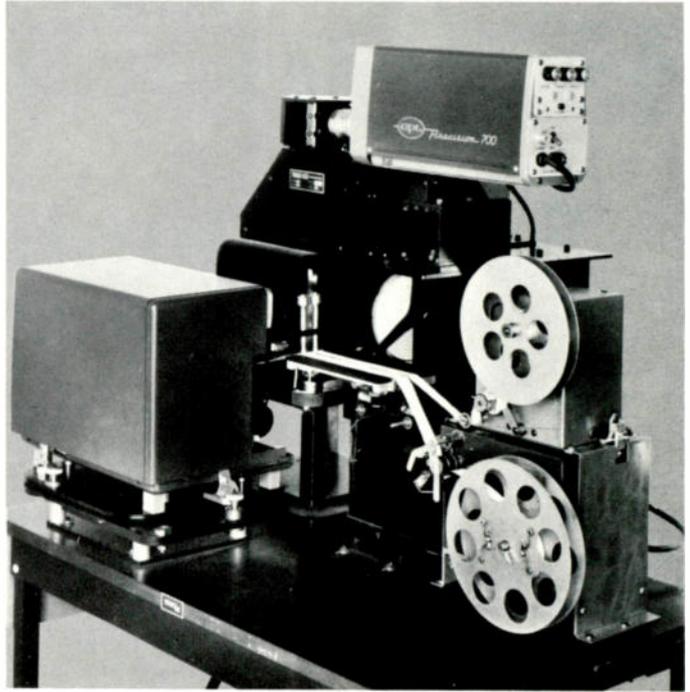
Here we have the immediacy of being present at the moment of action whenever the viewer chooses to be there. We have all the details that are taking place during the daily five and a half hours of stock market activity. And we have participation, making communication a two way process through the agency of cable television.



Most major hotels in New York City now offer patrons the Trans-Lux stock ticker service through Manhattan Cable TV's Channel 6. CATV operators may find many new subscribers in business sections of their communities with addition of this service to their system.

The entry of Trans-Lux into the CATV market is a natural step for a company that has been in the communications industry for more than forty years. Having had its beginnings in the development of stock quotation projection systems and in motion picture exhibition, it has gone into the booking of feature films and TV programs on American Airlines' Astrovision entertainment system and, as well, is in hot pursuit of transit systems other than airlines. Another division is an active international distributor of programs and features for television.

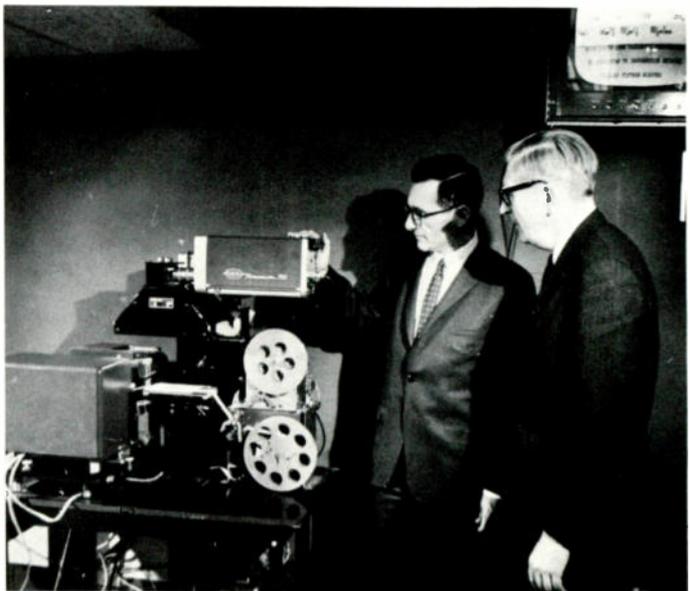
Trans-Lux Corporation of New York City is a pioneer in systems for the display of information to brokerage offices throughout the world. Its new Trans-Jet electronic stock quotation display was recently introduced and created a tremendously favorable reaction among Wall Streeters. It will join the famous Trans-Lux stock ticker projection system now in thousands of brokerage offices everywhere.



Heart of Trans-Lux Stock Quotation Program Service is this device which can provide two other sources of information (additional stock exchanges, local news or other announcements) along with the New York Stock Exchange tape.

president in charge of this new service, sees it as a boon to CATV operators, since it is certain to reach untapped areas; the offices of business men and professionals who represent major segments of the investing public. Retirement communities present another sizable subscriber potential for CATV systems by offering direct-from-the-source stock prices. Such locales, Weisberg notes, are usually well covered by stock brokerage offices, pointing to much investment activity among the retired.

Significantly, a 1965 census of shareholders reported in a publication by the New York Stock Exchange,



Sheldon W. Peterson (right) program director for Manhattan's Channel 6, examines stock ticker equipment with Robert Weisberg of Trans-Lux.



The stock ticker service made its debut on Manhattan Cable TV's Channel 6 in New York City. Watching the transmission on the systems monitors are Robert Weisberg, vice president of Trans-Lux, Ruddick C. Lawrence, vice president of the New York Stock Exchange, and Charles F. Dolan, president of Sterling Information Services, parent company of Manhattan Cable TV.

Brokers watching the Dow Jones news wire see it projected over a Trans-Lux system. And, the firm has installed nearly one hundred closed circuit TV systems involving some 700 monitors in brokerage offices throughout the world, these carrying quotations right to the desks. A similar 40-monitor system handling information on arrivals and departures was installed by Trans-Lux in the American Airlines' facility at N.Y.'s Kennedy Airport.

Out of this experience comes the natural adaptation of the stock service to the home by way of cable TV. And it is being accepted in such diverse places as Lakewood, Ohio (the Cleveland area), Manhattan Cable TV, the heart of New York City, Winter Haven, Florida, as well as Cape Coral, Florida.

It, without doubt, is a public service. The trends of the stock market make news of intense interest to everyone as being the harbinger of economic events. Robert Weisberg, Trans-Lux Distributing Corp. vice

shows that in the past five years the biggest increase in share ownership occurred in American cities and towns with populations between 2,500 and 25,000. Nearly one third of all share owners reside in small communities, the kind which have given CATV its greatest growth during the same period.

Not only does the interest exist, but cable systems can perform a patriotic duty by helping spread the doctrine of investing in a share of America through stock. While cable systems will be doing their bit for industry and people, they will also be benefiting the local brokerage houses at the same time.

The daily sale of shares on the New York Stock Exchange has increased from an average of 7.5 million one year ago to 9.7 million today. By placing these stock tickers in the home on the cable TV screen, a figure of 20 million shares is not unlikely.

In being both a public service and a boon to brokers it should be no problem to have the local brokerage concerns pick up the costs for installing this service on the cable system. It is already being done in Florida and California. No advertising is involved. At the most there is an announcement to the effect that this is a public service provided through the courtesy of the broker.

The Trans-Lux Stock Quotation Program Service has other features that adapt it to special CATV uses. In addition to carrying the New York Stock Exchange prices, it has the capability of showing on other tracks, simultaneously or independently, American Exchange prices, or local announcements and news of civic concern. These local reports can be printed on a contin-

uous tape formed into a loop, so as to be repeated on the screen over and over again. It becomes an automatic process once the tape is punched on a special typewriter.

If the head-end is miles away, there is no need to punch out a tape in the head-end building, or to build an extra trunk line between the office and the head-end.

A girl in the business office types out whatever you have to say to the community. This tape in the form of a loop is attached to a distributor in the same office. From here to the head-end all that is required is a simple telephone line that can be leased at a nominal cost. Telephone lines do the job because the tape delivers audio pulses, not video, to a printer at the head-end. The words, which have been printed, then are scanned by the camera, and so they go out to the subscribers on the system.

The attraction of continuous news has been proven to the New York audience by radio station WINS which has grown on round the clock repeated presentations of the news. Whenever you want the news, you don't wait for a scheduled time; you turn to the station and there it is.

Cable television can learn from WINS by giving the public what it wants in the way of stock quotations, announcements and civic news when it wants it. At the same time the CATV system is offering its subscribers all the other channels. That is the advantage cable television has. There is enough channel capacity to serve the public with all the variety that electronic wizardry can provide. The consumer is free to exercise his choice. □

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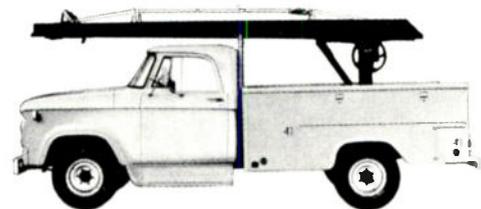
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A Contractor Looks at Cable TV Construction

By Pete Collins
President, Pete Collins Company

The Role Of The Contractor

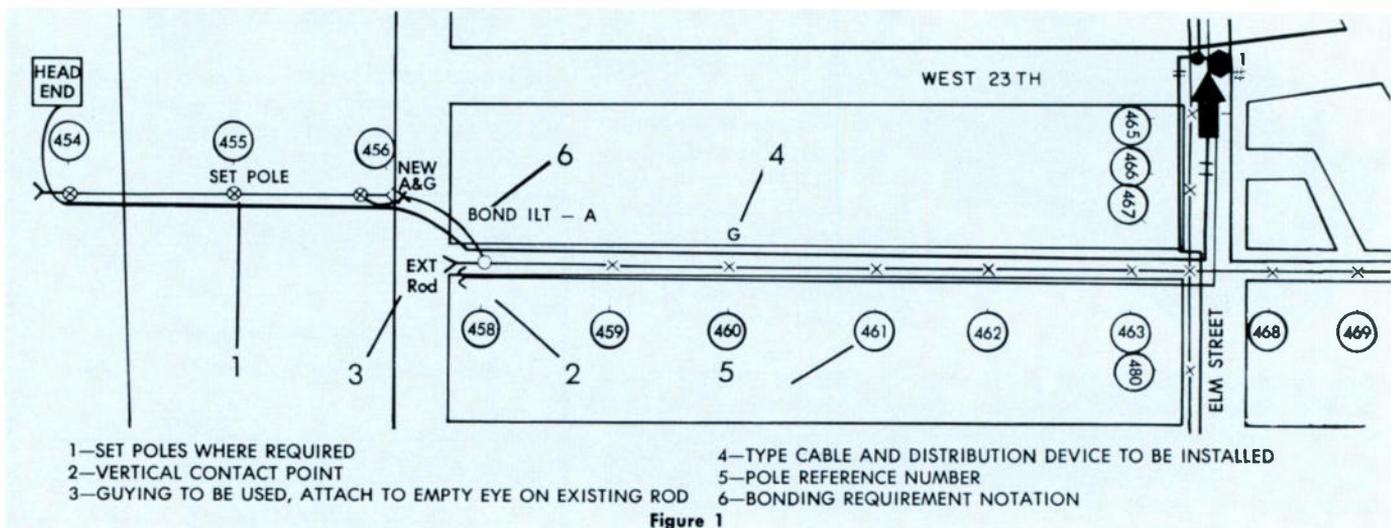
Should the contractor expect to begin a cable TV construction job and work through to completion without any delays for rearrangements, route changes, negotiations with local utilities or material suppliers? Provisions for this seemingly ideal situation actually exist in the contractual arrangements which spell out the responsibilities of the equipment manufacturer, the system owner, and the contractor. The manufacturer and the owner should supply the contractor with complete and accurate information on all routings, pole contacts, and electronic equipment installations. The contractor would then be in a position to construct a system of high quality and without the expense of idle men and equipment. In addition, the manufacturer and the owner could inspect and control the construction and its costs more efficiently. The obvious answer to this dilemma lies in a quality field engineering job which supplies the contractor with the vital information.

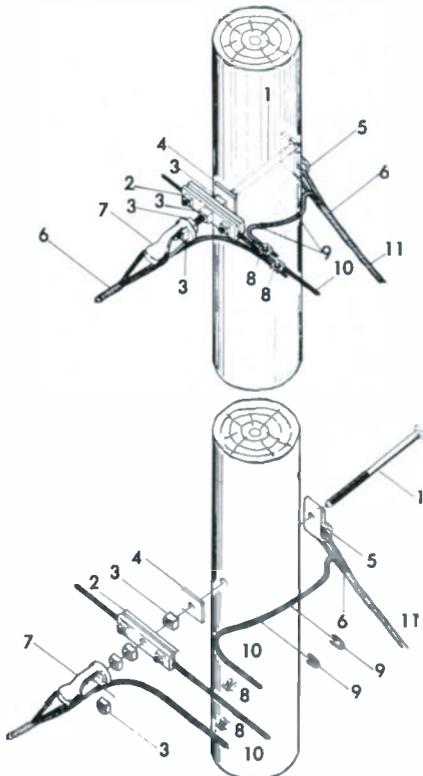
With the rapid growth of CATV installations across the country, the contractor has served as the middleman between the manufacturer and the owner. Working with manufacturer's specifications for the equipment and a few guidelines for installations, and with poor maps and strand routes, the contractor has been forced into the position of assuming the responsibilities of the owner and the equipment manufacturer because of their inadequate and poor quality field engineering work. Many of the contractor's problems — that should not be his at all — include correcting mistakes in the strand maps, overlooked rearrangements, deficiencies in the system design, and overall poor field engineering prior to construction. His delays reflect in additional costs for himself, the manufacturer, and the system owner.

Adequate Field Engineering - A Real Need

The state-of-art today's electronic equipment merits the best in system design and construction. Every

manufacturer knows that even the best equipment performs only as well as the system is designed and constructed. And too, as systems become larger and more complex, the need becomes even more apparent for specialists in the areas of field engineering and system design. During the years of research and development of the equipment, much effort and capital has been invested in thorough laboratory bench-testing to provide equipment of the best possible performance. On the other hand, research in field engineering, which would provide system designs of the highest quality and essential construction information, has been conspicuous by its absence. It is a discredit to the cable TV industry that many systems are presently designed by semi-skilled personnel who have had no field experience. These designers are compelled to use poorly executed and often inaccurate strand maps and field information provided by the owner. A good system demands that the field engineering personnel be experienced, equipped with qual-





ITEM	DESCRIPTION	QTY.
1	5/8" MACHINE BOLT	1
2	SUSPENSION CLAMP	1
3	SQUARE NUT	
4	SQUARE WASHER	
5	GUY ATTACHMENT	
6	1/4" PRE-FORM DEAD END	
7	EYE NUT	
8	BONDING CLAMP	
9	GALV. STAPLES	
10	1/4" STRAND	
11	1/4" GUY STRAND	

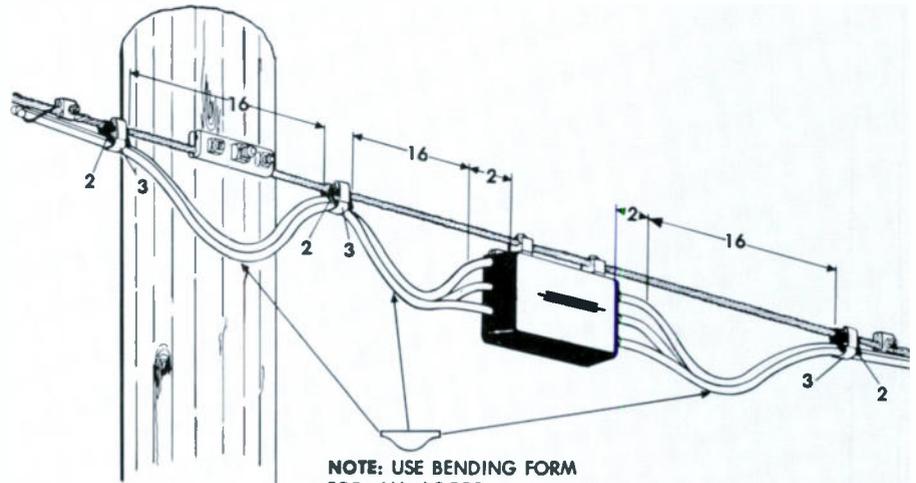
POLE FRAMING —
LINE POLE DEAD END COMBINATION No. 2

Figure 2

ity maps and actually walk the routes pole by pole, noting any map corrections, more desirable routings, rearrangements, and pole contact points. The designer, provided with this detailed information, is then in a position to provide a complete and accurate system design. Equipped with this design and construction information compiled on quality maps and with good construction specifications, the contractor has all the information to make an installation of the best quality in the least time. The manufacturer, through quality field engineering, system design, and construction, is assured of top performance of his equipment during the proof-of-performance tests. He

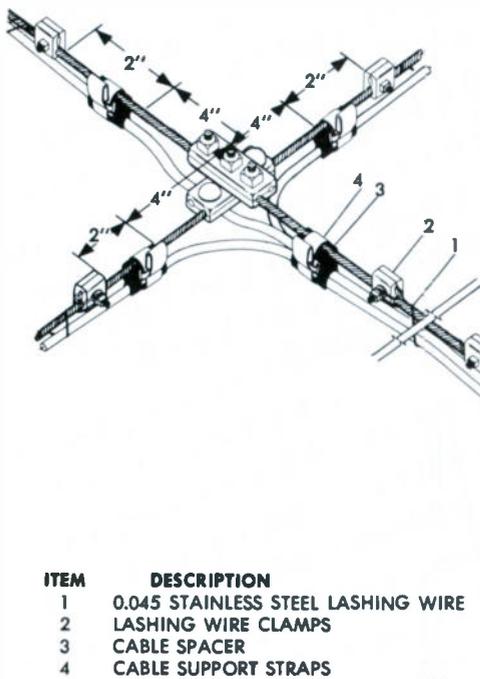
need not compromise equipment or system performance because of deficiencies in design and construction — thereby reducing proof-of-performance time and headaches by one-half or more.

The system owner has much at stake in the system design and construction quality, too, for he must live with the maintenance problems and any deficiencies which result from poor quality in field engineering, design, and/or construction. His investment in public relations and sales promotion, which lay the groundwork for an expanding system, is seriously affected when initial subscribers complain of poor service from an



NOTE: USE BENDING FORM FOR ALL LOOPS

Figure 4



ITEM	DESCRIPTION
1	0.045 STAINLESS STEEL LASHING WIRE
2	LASHING WIRE CLAMPS
3	CABLE SPACER
4	CABLE SUPPORT STRAPS

Figure 3

inadequately designed and constructed system.

But who pays for a good field engineering job, and who does the job? The costs of field engineering should be properly included in the initial budget proposed by the owner and the manufacturer. The expense budgeted would be more than repaid by savings during construction alone. Extra dividends would be realized from the savings in equipment through the more efficient system design provided by thorough field engineering. The most rewarding bonus of a good field engineering job prior to construction is that bad public relations would be avoided — satisfied subscribers are the best source of additional sales.

The "who" of the field engineering job can be an individual endeavor, or better, a joint venture between

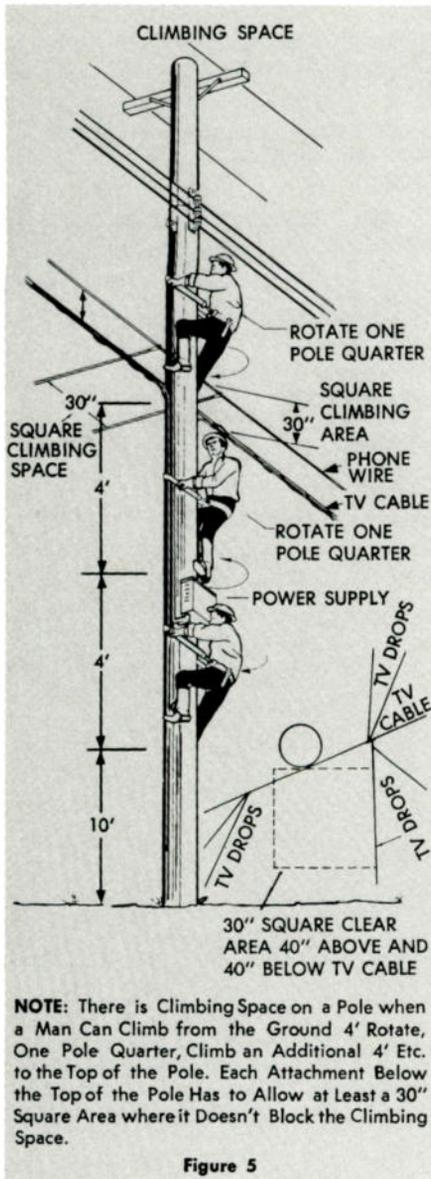


Figure 5

owner, manufacturer, and contractor. At present there are few specialists with this know-how, but the knowledge need not remain a secret if some efforts in research and training are provided. In general, few contractors, alone, are equipped with the personnel, facilities, and experience to do the field engineering and the system design work necessary for a quality system. Contractors specialize in quality construction, and only with good field engineering, good design, and detailed construction specifications and maps can they provide good quality for every cable TV system installation.

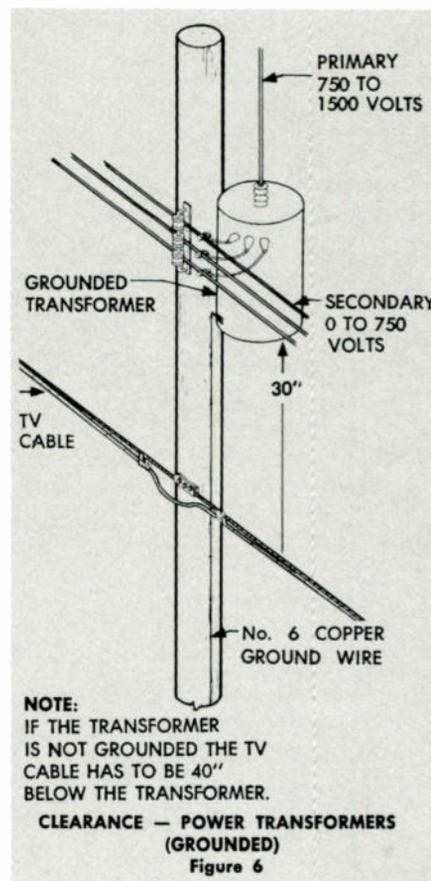
Good CATV System Field Engineering and Design

At the risk of oversimplification, the following steps are basic to

good field engineering and system design from which the contractor can accomplish construction with minimum time and costs. (Figure 1 is part of a typical map, complete with construction details which are keyed to detailed installation drawings.)

(1) Prepared adequate street maps of the area, preferably with a scale of one inch equals 100 feet.

(2) Plot the best pole and strand routes, including all pole lines and underground utilities in the area. Any deficiencies in plotting these routes will result in excessive expense for rearrangements, and in loss of efficiency.



(3) Select all the materials and components to be used in the system, considering performance, quality, availability, and economy.

(4) Design the system of trunk lines and feeder lines with their respective equipment insertions. The system must allow for additional future extensions and house drops with minimum readjustment and maintenance of amplifiers, etc.

(5) Walk the entire area pole by pole to determine rearrangements, pole contact points, any rerouting

necessary, poles to be set, and any underground construction required.

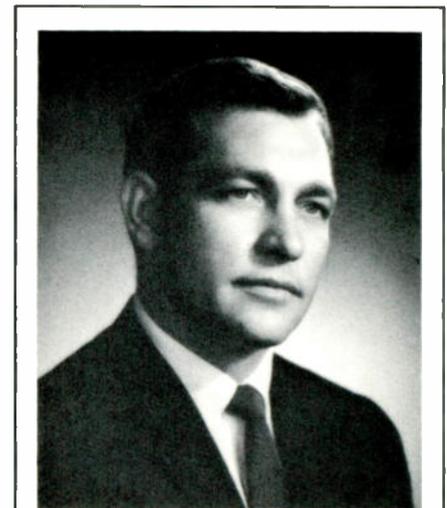
(6) Prepare easy-to-follow construction specifications with detailed illustrations. This step assures quality and uniformity in construction of the CATV system.

(7) Prepare a complete list of materials and a firm estimate of construction costs.

The Construction Process

With all rearrangements completed, and other necessary negotiations with the local telephone and power companies finalized by the system owner, and with adequate material on the job site, the contractor with a good set of system maps and specifications is prepared to do a top-quality installation. Figure 2, keyed to the system maps, shows the details and hardware for framing a specific pole and placing the strand. With similar drawings for each type of installation, the strand construction crew has all the necessary information for this phase of the construction.

The cable construction crew, equipped with detailed drawings as shown in Figure 3, lashes the cable into position. Uniform requirements for the use of cable bending tools



ABOUT THE AUTHOR

Pete Collins began his CATV career in 1955, in Hobbs, New Mexico—one of the first all band systems in that state. Since that time he has managed, designed, and constructed systems coast to coast and in Mexico. The past two years as President of Pete Collins Company, of Denver, Colorado, he has done CATV system design, field engineering and construction for manufacturers and individual cable firms.



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in forming expansion loops, lengths for splicing overlaps, and other specifications as required, leave few unanswered questions for this crew.

The electronics construction (splicing) crew likewise has all the information for each installation as shown by a typical example in Figure 4. Each crew is informed of its responsibilities in guying, bonding and grounding, and safety practices.

Safety Requirements

Safety information is generally available in various forms for all types of cable construction. Those safety requirements and practices which apply to cable TV construction, and which are most frequently encountered, should be supplied to the contractor. Easy-to-follow safety procedures as shown in Figures 5, 6, and 7 can save much time, research, and rework on the part of the contractor. Unfortunately, the contractor is rarely furnished with adequate safety information, thus another area of responsibility he has been forced to assume. The manufacturer can most easily supply general safety requirements, especially those from the "National Electrical Safety Code — Handbook 81" (the source from which these illustrations were prepared) and from Bell System Practices. Local requirements can more easily be furnished by the system owner.

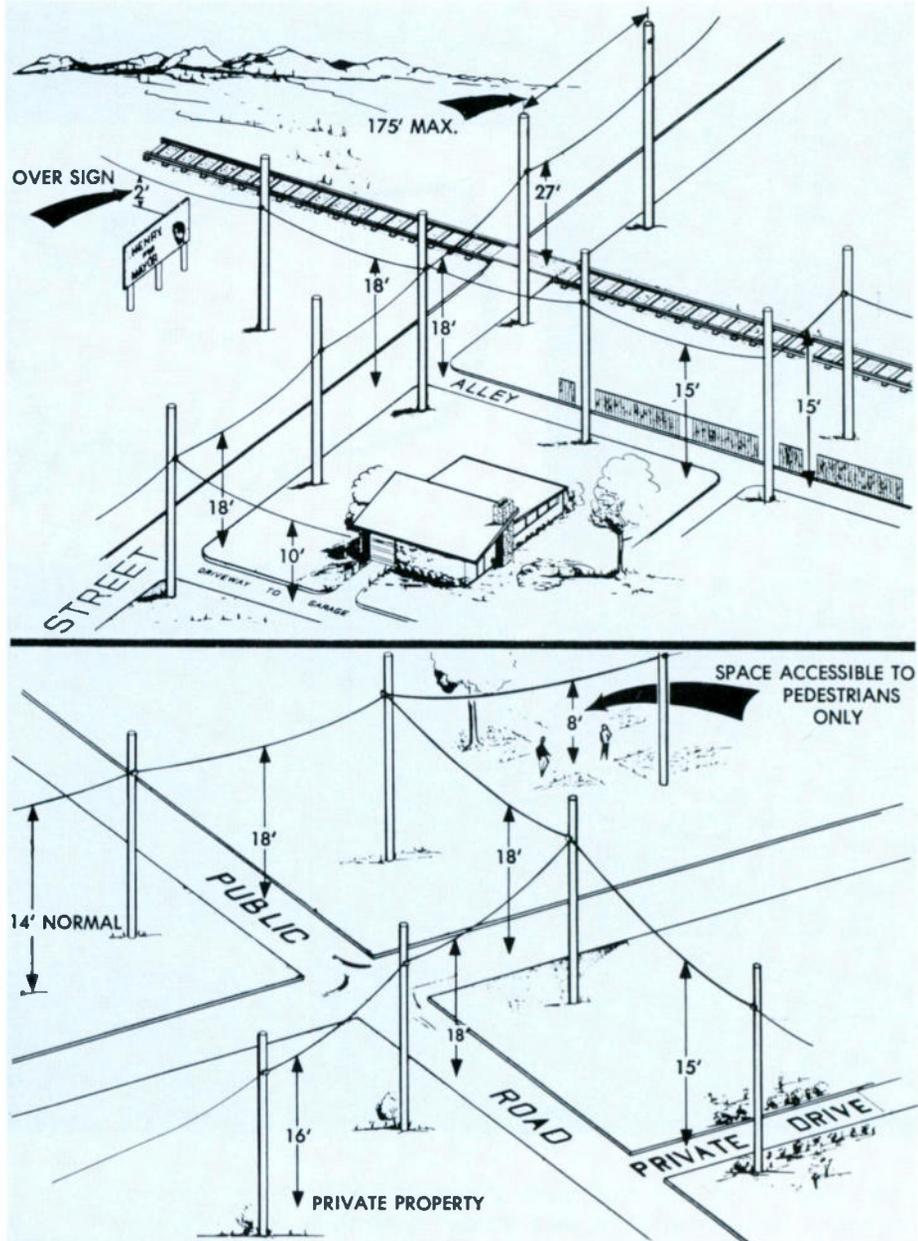


Figure 7

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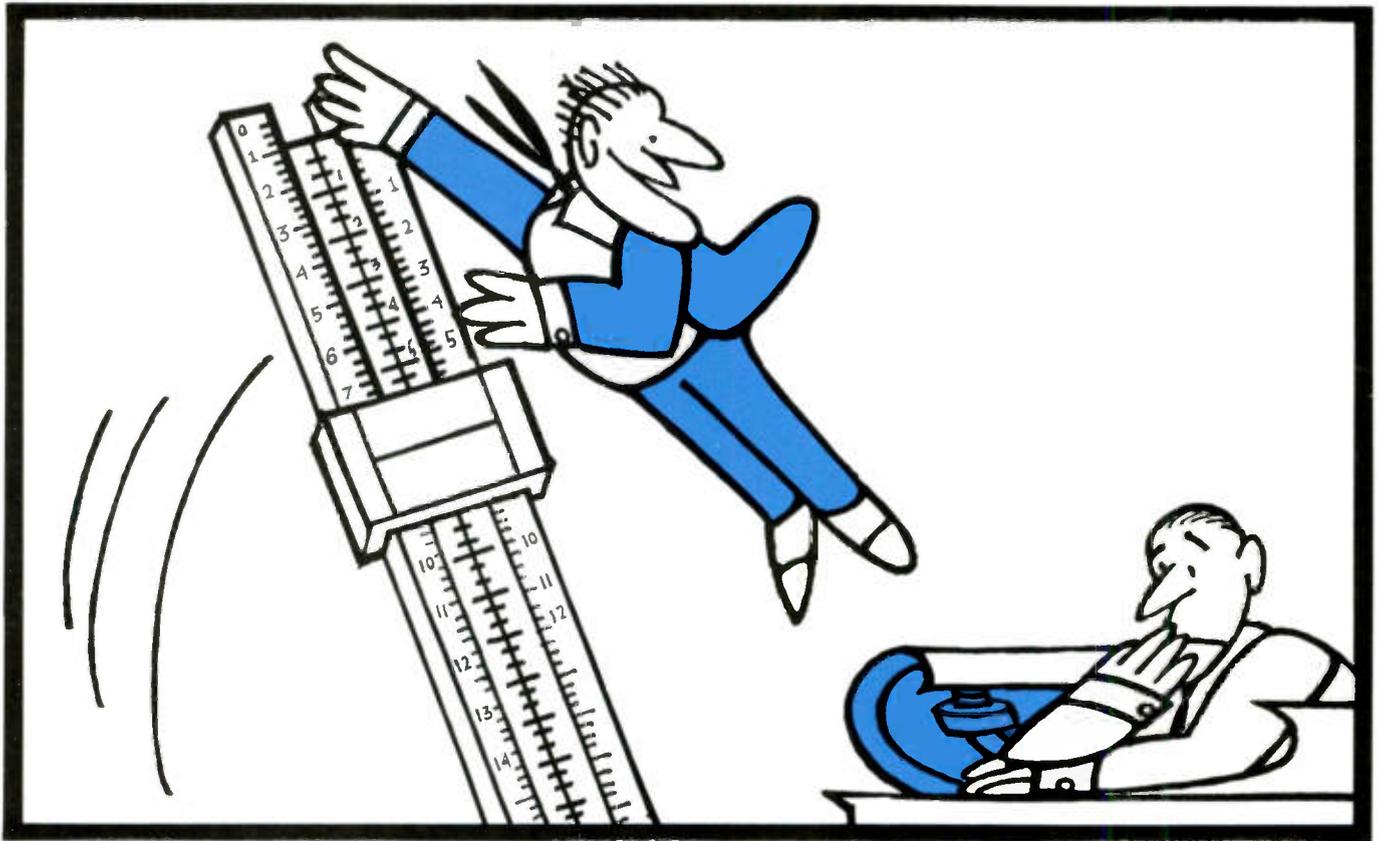
Who Benefits From Such A Plan?

Such detailed information in the form of system design and construction specifications *can* be supplied to the contractor, and everyone involved in the cable TV venture would realize the many benefits. The manufacturer knows his equipment will be used most efficiently in a quality system that portrays the fine characteristics he built into his equipment. The owner knows his subscribers will receive the best TV picture and continuity of service, with minimum maintenance to the system and the maximum of good public relations. The contractor is relieved of headaches accompanying the problems which

should not have been his, and his crews and equipment maintain a busy and on-time schedule. Since the purpose of cable TV is to deliver to every receiver on the system a picture of the same quality as received at the head-end, the subscriber receives the best possible picture and service for his subscription fee.

And how is all of this possible? To summarize briefly, the cable TV system of the highest quality, efficiency, and economy results from (1) quality manufactured and tested electronic equipment and cable, (2) a good *field engineering job*, (3) quality design, and (4) quality construction. These are the backbone of every good system. □

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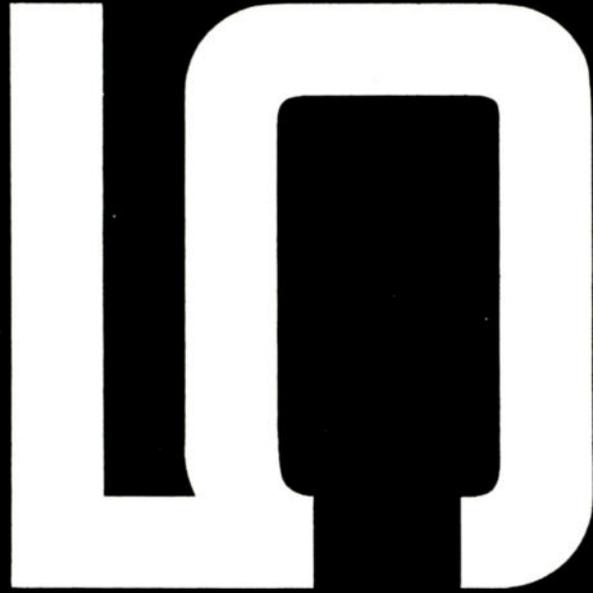
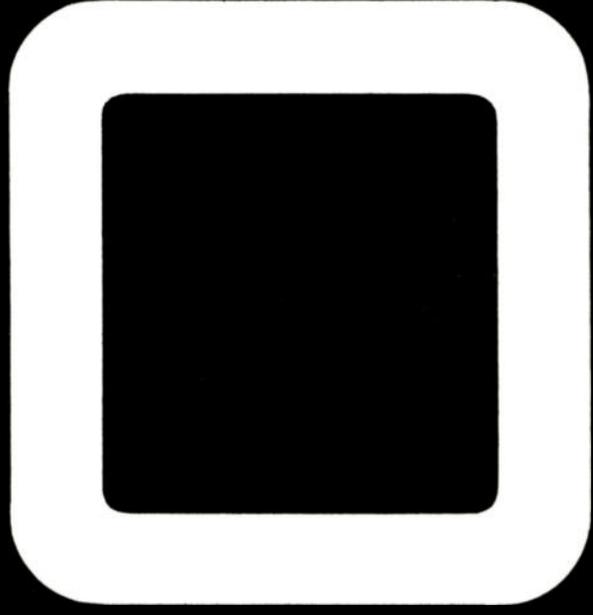
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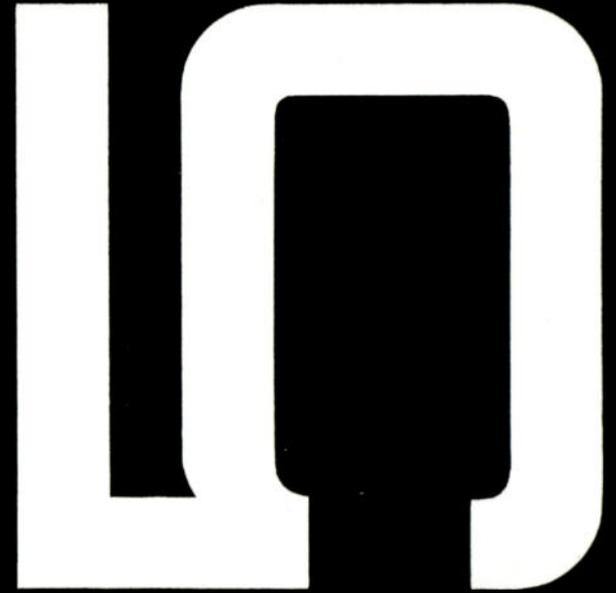
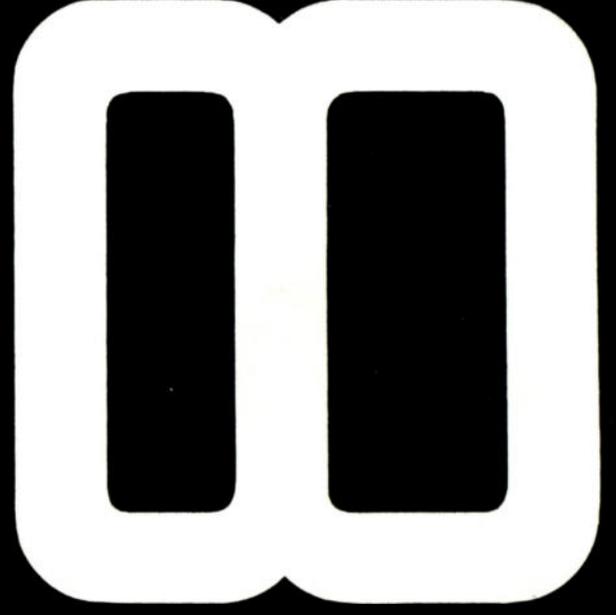
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Yuma's Underground Cable System

*By Marvin Jones, Manager
Valley Telecasting Co.*



Only 5 to 10% of CATV systems use buried construction today—and many of those are in congested metropolitan areas where city ordinances compel the system operator to go underground. Others are in exclusive suburban areas, often where local authorities require buried construction as part of a beautification program.

Yuma is Arizona's seventh largest city and it has its fair share of exclusive neighborhoods. But Yuma is neither a congested metropolitan area nor a "rich man's paradise" where city planning disregards practical economics.

The Yuma system *prefers* buried construction, and for sound business reasons.

The CATV system enjoys a cooperative situation with the utilities, and can put in a joint use feeder trench for about 10¢ a foot. As a result, there are no pole attachment rental fees in these areas. What's



Chief technician Clay Blanco inspects installation in older style pedestal. Even on this type installation, entry into housing is quick and easy.

Yuma system manager Marvin Jones examines damaged pedestal (located near softball field). Vandalism is an insignificant item overall, however, from a dollar loss standpoint.



Installer Sebastian Ponce is shown running field test at pedestal location. Advantage over pole- or strand-mounted equipment is obvious in maintenance work.

more, the polyethelene-jacketed cable for underground installation costs only about \$20 more per thousand feet.

Both the power and telephone companies keep the system manager informed about new developments, and they plan together for new construction.

Depth of a feeder trench is three feet. Power lines are at the bottom, covered by 12 inches of backfill, with CATV and telephone cables at two feet. The coaxial cable is tightly covered by the "poly" jacket to keep out moisture.

Conduit is used only under streets and hard-to-get-at places, although Jones has made it a practice to use a three foot length of conduit at the base of each splice or drop pedestal for added protection. Service cables are buried at 12 inches, sufficient for Yuma's mild climate and in its dry sandy soil that discourages gophers. (Their tunnels would cave in, so they live elsewhere.)*

Another installation savings is constant improvement in the pedestals themselves. The cylindrical model used at Yuma now is easier to install, more weatherproof and sightlier—as well as less expensive—than last year's "best."

Vandalism at pedestal sites? Negligible! In the rare instances system property has been tampered

*Gopher information is available from U. S. Department of Interior, Bureau of Sport Fisheries & Wildlife.

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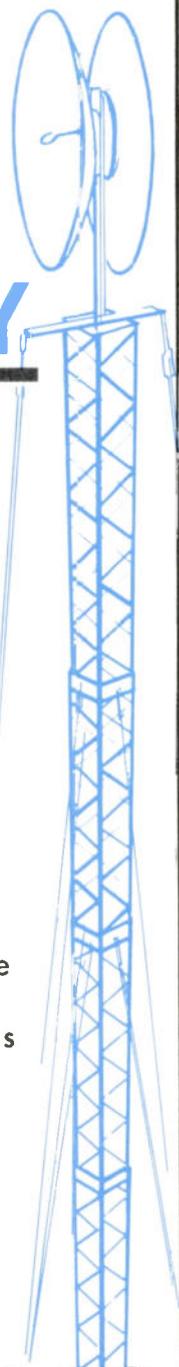
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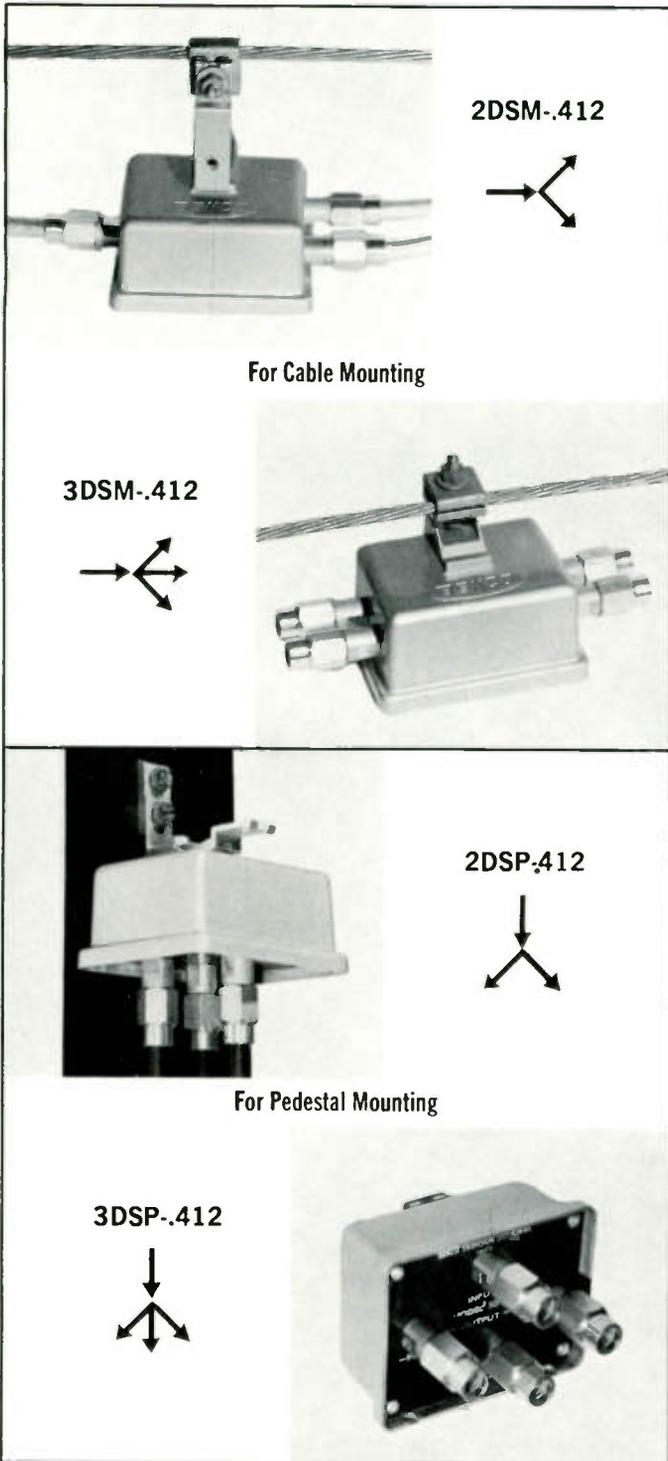
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Road, Rexdale, Ontario



Directional tap is readied for new subscriber drops ... once again, no aerial work is involved.

with, repairs have been simple. Equipment taken by "junior engineers" has been left where a technician can find it when the children discover they can find no use for it.



New style pedestals used in Yuma system are knifed into loosened earth. Sandy soil in that area makes installation operations even easier.

Maintenance costs of Yuma's buried construction is an attractive consideration even in rural areas where ordinances or Federal Housing Authority directives are not expected for years to come. There is less exposure to the elements in buried plant, and more stable performance during Yuma's hot summers. The men have fewer repair calls, and when they do have one, there is less time required and less hazard involved than on pole-climbing mission.

Finally, how does one measure the cash benefits and savings derived from public relations aspects of buried construction?

Valley Telecasting's contribution to the beauty of the community is appreciated not only by 3,500 system subscribers, but by the entire population! Management feels that the system realizes additional hookups in each new development *because* it has committed no aesthetic offense.

Homes outlining the golf courses are bordered only by street lights in front and out-of-bounds stakes at the rear . . . the U. S. Marine Air Base *welcomes* pre-wiring for cable TV (650 new military dwellings are going in soon) . . . local hotels and motels put up, at their own expense, neon signs advertising 10 television channels available in every room.

Valley Telecasting is a good neighbor and successful business at Yuma for many reasons, but partly because of its buried construction policy.

INSTANT OPERATOR-CREW COMMUNICATIONS

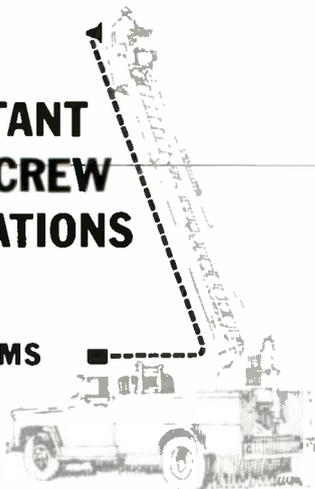
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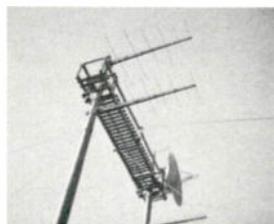
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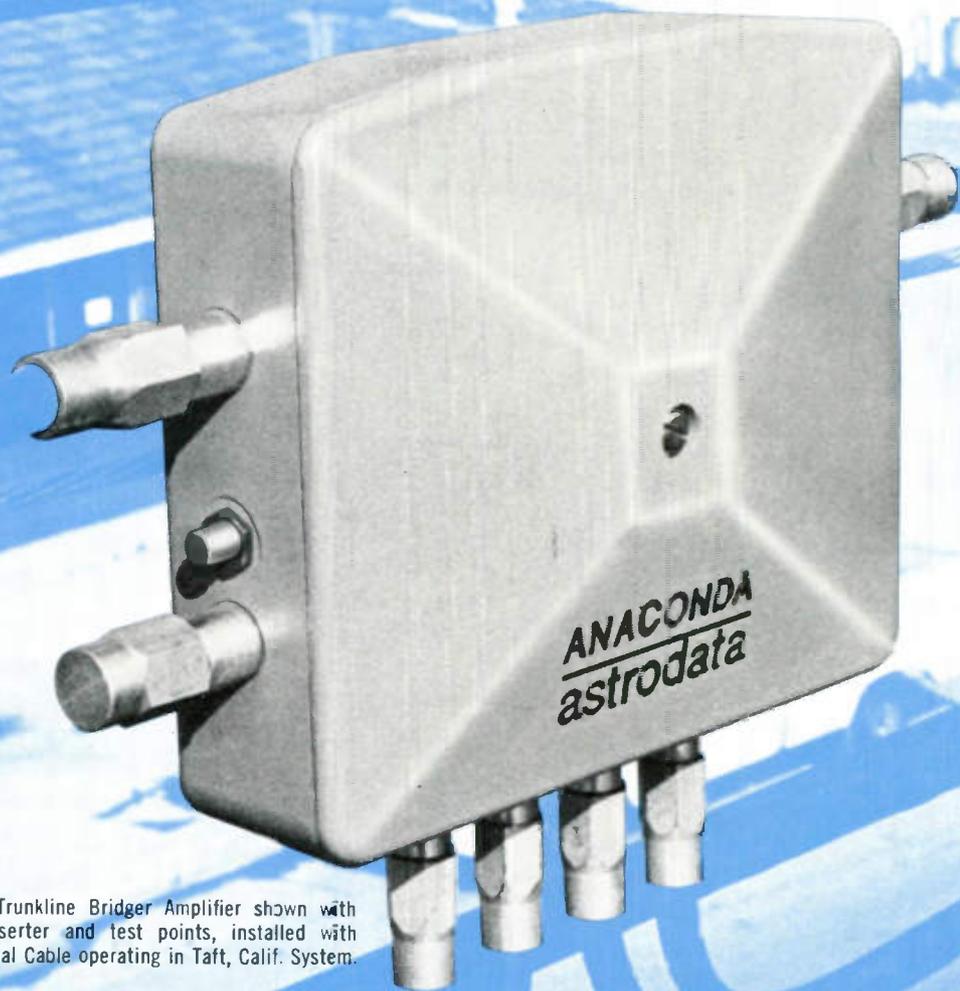
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Model 852 XDR Trunkline Bridger Amplifier shown with capped power inserter and test points, installed with "Sealmetic" Coaxial Cable operating in Taft, Calif. System.

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- UNIVERSAL APPLICATION
- IMPROVED TEMPERATURE STABILITY

XDR (Extended Dynamic Range) amplifiers are high precision devices, factory aligned for new systems. Readily field adjusted when used as replacements for upgrading or extending existing systems. It takes only two controls — built-in gain-compensated tilt control and equalized gain control — both easily accessible behind the unique single bolt cover — all part of the moisture proof functional packaging.

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The firms listed here are actively engaged in cable system construction in North America, and may be contacted for details of construction capabilities and specialties omitted from this quick-reference listing.

Anaconda Astrodata Company, 1430 South Anaheim Blvd., Box 3772, Anaheim, California, ph. (714) 635-0150; Complete system planning and turnkey construction service.

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Burnup & Sims; P.O. Box 2431, West Palm Beach, Florida, ph. (305) 683-8311. Services include power and telephone plant re-arrangement and tree trimming. complete construction.

Cable Construction Co.; 4130 South Adams, P.O. Box 11145, Tacoma, Washington 98404, ph. (206) GR 4-0689; All types of CATV system construction and installation.

Cable TV Construction Inc.; 223 North State Street, P.O. Box 307, Iola, Kansas 66749, ph. EN 5-2177. CATV construction services performed for operators throughout the U.S. and Mexico.

Cal-Tel Construction Company, Inc.; 1698 East 25th Street, Signal Hill, California, ph. (213) 426-7041; Handles all phases of CATV construction.

Cascade Electronics, Ltd.; Electronic Avenue, Port Moody, British Columbia, Canada, ph. (604) 939-1191; Full CATV system design and engineering services, with complete turnkey construction aid available.

Cascade Line Constructors, Inc.; P.O. Box 604, Wenatchee, Washington 98801, ph. (509) TU 4-7161; Specializes in telephone line construction and CATV systems.

CAS Manufacturing Co.; P.O. Box 47066, Dallas, Texas 75207, ph. (214) BL 3-3661; Experienced design, engineering and construction.

CATV Equipment Co.; 1422-34th Avenue, Seattle, Washington 98122, ph. (206) 325-6838; Specialists in all-band systems, providing complete construction services, layout, equipment and installation.

CATV Services Co.; Worland, Wyoming; All kinds of cable system engineering and construction.

C-COR Electronics, Inc.; 60 Decibel Road, State College, Pennsylvania, ph. (814) 238-2461; CATV engineering and construction services.

Co-Ax Construction Co.; 2949 West Osborn Road, Phoenix 17, Arizona, ph. (602) 252-6041; Specializing in complete turnkey construction. Construction representatives provided on all turnkey jobs. (Subsidiary of Ameco, Inc.)

Communication Systems Corp.; 140 East Main Street, Huntington, New York, ph. (516) 271-1262; Complete turnkey and construction capabilities for CATV systems.

Comm/Scope; (a division of Superior Cable Corp.) Hickory, North Carolina 28601; Turnkey construction for CATV systems including planning and engineering.

DAVCO Electronics Corp.; P.O. Box 861, Batesville, Arkansas 72501, ph. (501) RI 3-3816; Complete services include layout, equipment and installation. New system construction or modifying existing systems.

Entron, Inc.; 2141 Industrial Parkway, Silver Spring, Maryland, ph. (301) 622-2000; Utility pole make-ready studies, system layout. Specializes in turnkey construction.

Henkels & McCoy, Inc.; 1800 Johnson Street, Elkhart, Indiana, ph. (219) 264-1121; CATV engineering and construction.

Harris-McBurney Co.; 1006 Airport Road, Box 267, Jackson, Michigan, ph. (517) 787-1800; Complete construction services for CATV systems.

Jerrold Electronics Corp.; 401 Walnut Street, Philadelphia, ph. (215) OS 2-0800; Turnkey construction, engineering and surveys.

Kaiser-Cox Corp.; 2216 West Peoria Ave., Box 9728, Phoenix, Arizona 85020, ph. (602) 944-4411; Construction of partial or complete systems, including complete turnkey.

Killoren Company; 925 N. Bluemound Drive, Appleton, Wisconsin, ph. (414) 734-9278. Engineering construction and maintenance services for CATV systems.

Artie M. Loftis Construction; Box 656, Malakoff, Texas, ph. (214) HU 9-4666. Complete CATV construction services.

Noram Cable Construction Ltd.; 1111 Albion Road, Rexdale, Ontario, ph.

(416) 741-0566; Complete CATV construction services.

Robert G. Owens, Inc.; 150 Washington Blvd., Laurel, Maryland, ph. (301) 498-0555; Total Turnkey capability.

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System Construction Company; 830 Monroe Street, Hoboken, New Jersey, ph. (201) 656-2020. Construction of cable systems anywhere on the continent. New turnkey or rebuild or expansion of existing systems. (Subsidiary of Viking Industries, Inc.)

Systems, Inc.; 235 Bear Hill Blvd., Waltham, Massachusetts, ph. (617) 891-5480, Engineering and construction of all types of CATV systems, including turnkey projects. (Subsidiary of National Teline.)

Telectric Construction Corp.; Kirkwood, Missouri; Complete coaxial plant construction, electric equipment installation, tower erection and maintenance of system.

TeleSystem Services Corp.; 113 South Easton Road, Glenside, Pennsylvania, ph. (215) 884-6635. Offers design, engineering and complete construction services for CATV systems. (Subsidiary of TeleSystems Corp.)

Utilities Contracting Company; 1422 East Michigan, Lansing, Michigan 48915; ph. (517) 482-5248.

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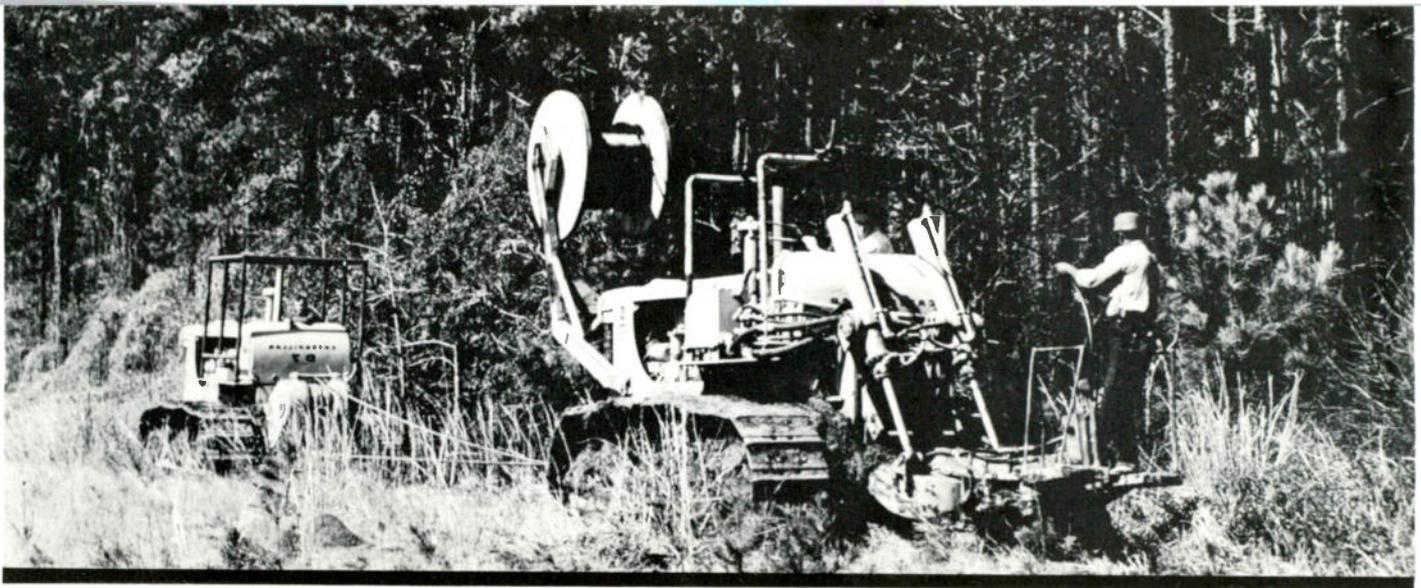
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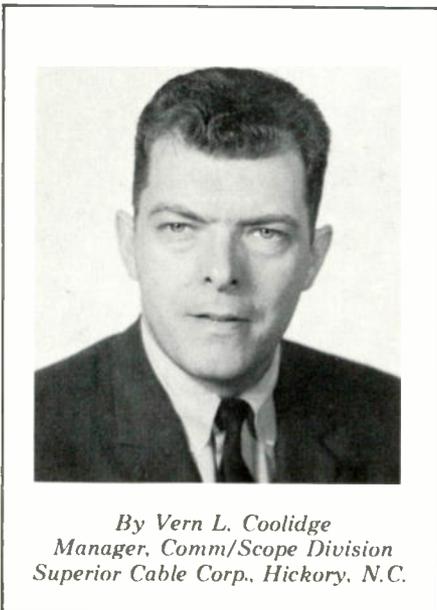
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“Videosyncrasies” of Buried Plant



By Vern L. Coolidge
 Manager, Comm/Scope Division
 Superior Cable Corp., Hickory, N.C.

Not too many years ago, the question of burying a television distribution system was met with raised brow and answers that were usually inadequate and quite often incorrect. The reason for this lack of knowledge was simply a lack of experience. Our industry has grown at such a rapid pace over the past decade that we really haven't given the concept of buried plant our best efforts. Again, the reason is an obvious one. Aerial systems could be erected at a cost estimated at one-half that of a buried plant. Pole attachment agreements were fairly easy to acquire and not too hard to live with. System operators were not too concerned about the few efforts being made to develop the

buried concept. But today the CATV industry is faced with what is certain to be a revolution in system design and construction. Acquisition of a joint use agreement is sometimes no simple matter. Utility companies, recognizing the demand for CATV with its present service capabilities, not to mention its long range possibilities, have quite naturally equipped themselves to provide CATV services. It's obvious, too, that those same companies are providing more underground services year by year, both in the telephone and power fields. It follows, then, that ultimately the CATV service must also go underground.

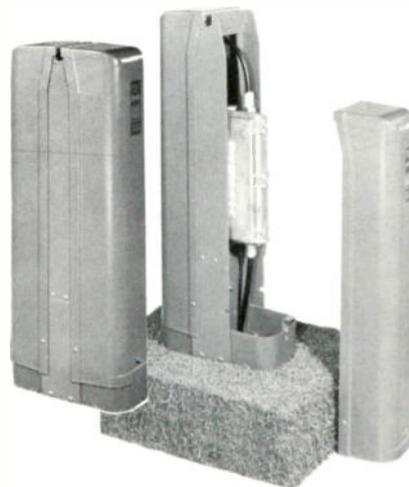
The problems with underground CATV construction and operation

are more imagined than real. To put those problems in proper perspective, we should analyze them one at a time.

First, let's look at stability. An aerial plant, exposed to the ravages of heat and cold, is burdened with the problem of efficient cable equalization before the first customer is connected. Equipment manufacturers have solved the problem quite satisfactorily with a variety of thermatic equalizers, temperature compensating amplifiers, and automatic level control circuitry. While these components do an efficient job in effectively recapturing the stability of the coaxial cable, the fact remains that loss of stability due to ambient temperature fluctuations would not be a factor were the cable properly buried. Another advantage provided by underground plant is the improved safety factor.

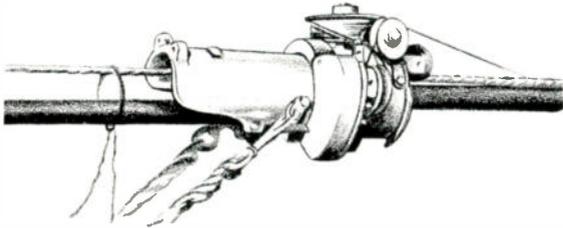
Except for drop wire attachments to homes, and an occasional check of pole-mounted power locations, the distribution plant can be maintained without use of hooks or ladder. The problem of relocating facilities due to pole change-outs is also eliminated - thus reducing cost as well as increasing safety.

Second, the problem of moisture. Most every system operator experienced in aerial construction has at one time or another drained water from a connector or splice. Probably the most common cause of moisture in cable is lack of care in protecting cable ends prior to splice and con-



Superior Cable pedestal model F-70-TV is shown close-up, both closed and with one equipment access panel removed.

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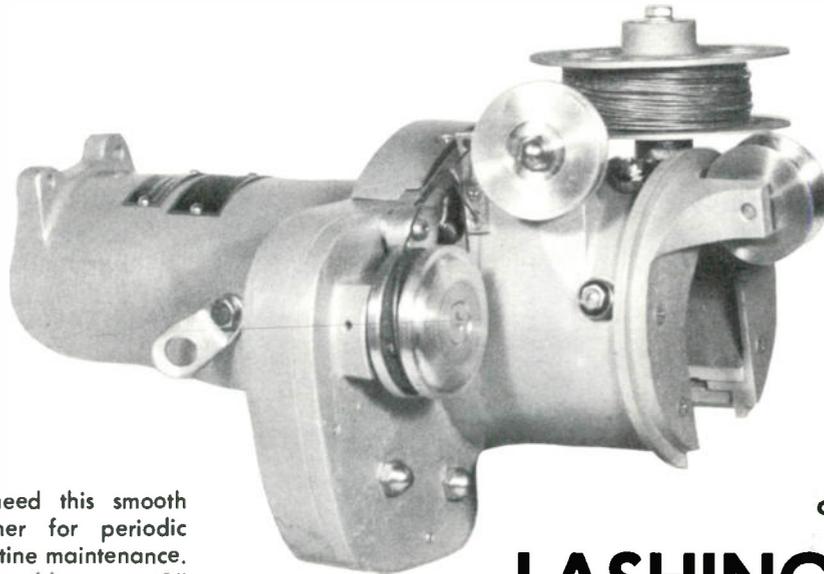
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nector application. Improper installation of splices and connectors can be a major factor in moisture penetration also, and the system operator should consider the possi-



Here the F-70-TV pedestal is pictured with both access panels removed, showing equipment mounting configuration.

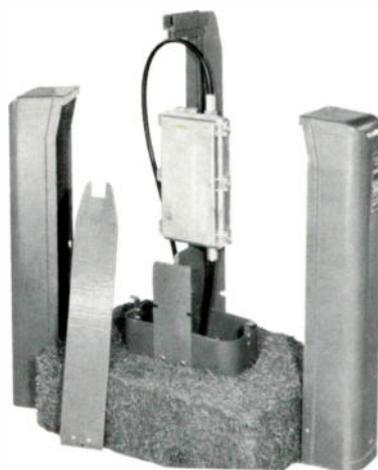
bility of a rupture in the outer jacket of the cable due to careless handling in construction. No matter how the moisture is introduced into the cable, it's a cause for major concern.

Droplets of water in a connector or splice will cause transmission problems of crippling proportion. The difficulty in analyzing the problem is compounded by the fact that as the elements of humidity, temperature, and air pressure fluctuate along the cable, the water droplets migrate from the connector or splice back into the cable, out of sight and temporarily relaxed as an RF deterrent. (Most cable technicians would agree that moisture in a connector usually withdraws to the cable on cue from a ladder tapping the strand and returns to the connector sometime during the dinner hour in the evening.) Unless the moisture can be isolated and the contaminated portion of cable removed from the plant, the problem of migration will continue to cause harassing hours of maintenance problems and viewer frustration.

Now, let's consider the moisture problem in buried plant. First of all, should water find its way into an underground line, its position along the line is not dictated by varying elements. The buried plant is relatively free from the overhead variables that tend to subtract from cable efficiency and stability.

The problem of splicing is practically non-existent since cables suggested for buried application are available in continuous lengths. This means that for a system utilizing amplified spacing of twenty-two to thirty-five db, no splices would be required between equipment locations.

The cable we suggest for use underground is a solid polyethylene dielectric cable with a longitudinally applied corrugated copper shield, covered with an outer jacket of polyethylene. Prior to extrusion of the outer polyethylene jacket, the entire core and shield of the cable is flooded with a specially prepared non-conductive, semi-liquid substance. This special application gives the cable a remarkable ability to reject moisture that might present itself at a jacket break caused by inadvertent digging operations, frost heave or rodent damage. Further, if moisture were able to penetrate the cable, this viscous "grease" will absolutely prevent



With both access panels and one side panel removed from the F-70-TV, entire equipment installation is exposed.

migration due to elevation of the cable. This cable presents optimum overall characteristics to the buried plant operator. The solid polyethylene dielectric offers strength far in excess of expanded polyethylene, or "foam" dielectric cables. Its inherent ruggedness lends well to the physical abuses encountered in construction. Not only does the solid polyethylene dielectric provide a high degree of crush resistance, it also provides a positive moisture barrier between the inner and outer conductors. Summarily, such a cable offers splice free construction, ruggedness,



The pedestals, as installed here in residential area, are permanently colored to blend with vegetation.

and excellent moisture resistance.

Now the problem of equipment. The ideal amplifier for pedestal mounting would have both input and output connectors on the same chassis surface, preferably on one end. This would allow use of a smaller pedestal for a given amplifier, and eliminate the need for sharp bends or elbow adapters. The introduction of the "suitcase" amplifier housing more or less precludes any radical design changes, so until an amplifier is designed more suited to pedestal mounting, the pedestal is necessarily adapted to the amplifier. The Superior Model F-70-TV (pictured) is suitable for suitcase housing installation. It is constructed of high strength fiberglass, is light in weight, rust proof, corrosion proof, non-conductive and is permanently colored in forest-green. Dual opening allows for ease in installation and maintenance. There are several manufacturers whose equipment is well suited to pedestal mounting. It can be seen from the photos that a neat installation can be made without use of adapters or need for sharp cable bends. The primary objective in selection and installation of equipment for the underground plant, assuming electrical criteria has been satisfied, is to keep the pedestal or housing free from excessive connectors and adaptors, maintain straight line cable routing as much as practicable,

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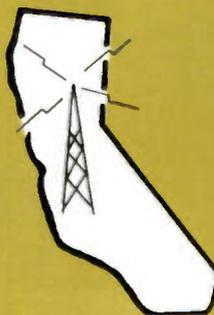
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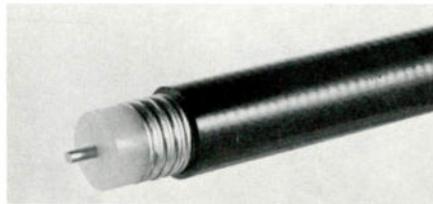
and avoid underbuying in pedestal size.

Now, about the economics. Monetary requirements for the average aerial plant compared to the average buried plant look something like this:

	Aerial	Buried
Strand and hardware (per mile)	\$350.00	-
Make ready (average per mile)	\$400.00	-
Labor (per mile)	\$685.00	\$1,320.00
Totals	\$1,435.00	\$1,320.00

At this point, the cost of the buried plant compares very favorably with that of the aerial plant. The first consideration that will tend to reflect a higher cost of the buried plant is that involving the *type* of cable to be used. The solid dielectric cable suggested earlier is about 75% higher in cost than the types normally used for aerial construction. However, if the operator elects to bury aluminum sheathed cable, the cable should be protected with a polyethylene jacket, and this would reduce the cost differential to about 50%. Let us assume that a system operator elects to use Superior Type 6030 solid dielectric cable for trunk line application in a buried plant. Because this cable is available in continuous lengths to 3000 feet, it's possible for the operator to order cable lengths to exactly

meet his amplifier spacing requirement. This does the operator two favors. Number one, it eliminates cutting standard reel lengths to meet spacing requirements. Number two, if the operator is installing a high level system (i.e., 35db spacing), he eliminates the need for any splicing between amplifier locations. These two factors alone act impressively to further reduce the initial cost differential. Just as important is the element of attenuation. For example, the unit loss per hundred feet for Superior Type 6030 cable at channel 13 is 1.19db maximum as

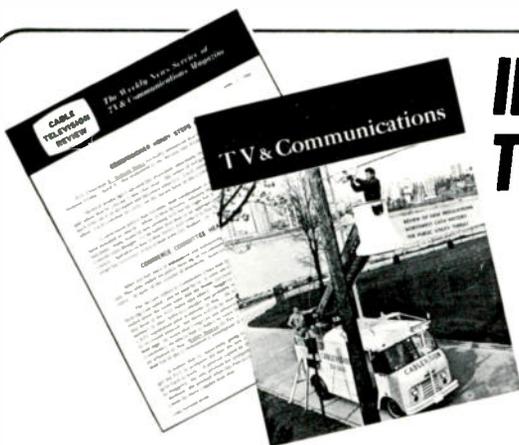


Solid dielectric cable with corrugated copper shield is advantageous for burial, though more expensive.

compared to 1.37db maximum for .500 aluminum. The lower attenuation means that fewer amplifiers will have to be installed in the total system which not only affords a lower capital outlay for electronic equipment, but reduces the recurring expense for maintenance. If the system operator were to apply a hypothetical dollar value on the increased strength and ruggedness of the solid dielectric cable, the cable cost differential would likely be reduced to near zero.

The second consideration would be the *amount* of cable required for a given system. Ideally, distribution cables are located in service alleys and neutral areas at the rear of property lines. This is not always possible, and it may be required that distribution lines be located on opposite sides of a street. Should much of this distribution, or feeder duplication be required, the distribution trunk ratio for a particular system could easily grow to 7 or 8 to 1, as opposed to the 3 or 4 to 1 for the same system utilizing aerial construction. In an extreme case where distribution line duplication is required on most every street of the system, the total cash outlay for coaxial cables would likely be increased by 40-50%.

It appears now that the cost of the solid dielectric cable has been justifiably reduced with savings in waste, splicing and increased ruggedness, only to be reinflated by the need for more cable. However, the redemptive factor is in savings realized on pole attachments. The biggest cash bite here is in make ready charges, which we estimate at about \$400.00 per mile. Apply this to the seeming high cost of going buried and suddenly things look better. Now apply another savings of \$150.00 per mile per year for pole rental, remembering that this expense is of an annual recurring nature. From here, simple arithmetic points up the soundness of CATV going underground. □



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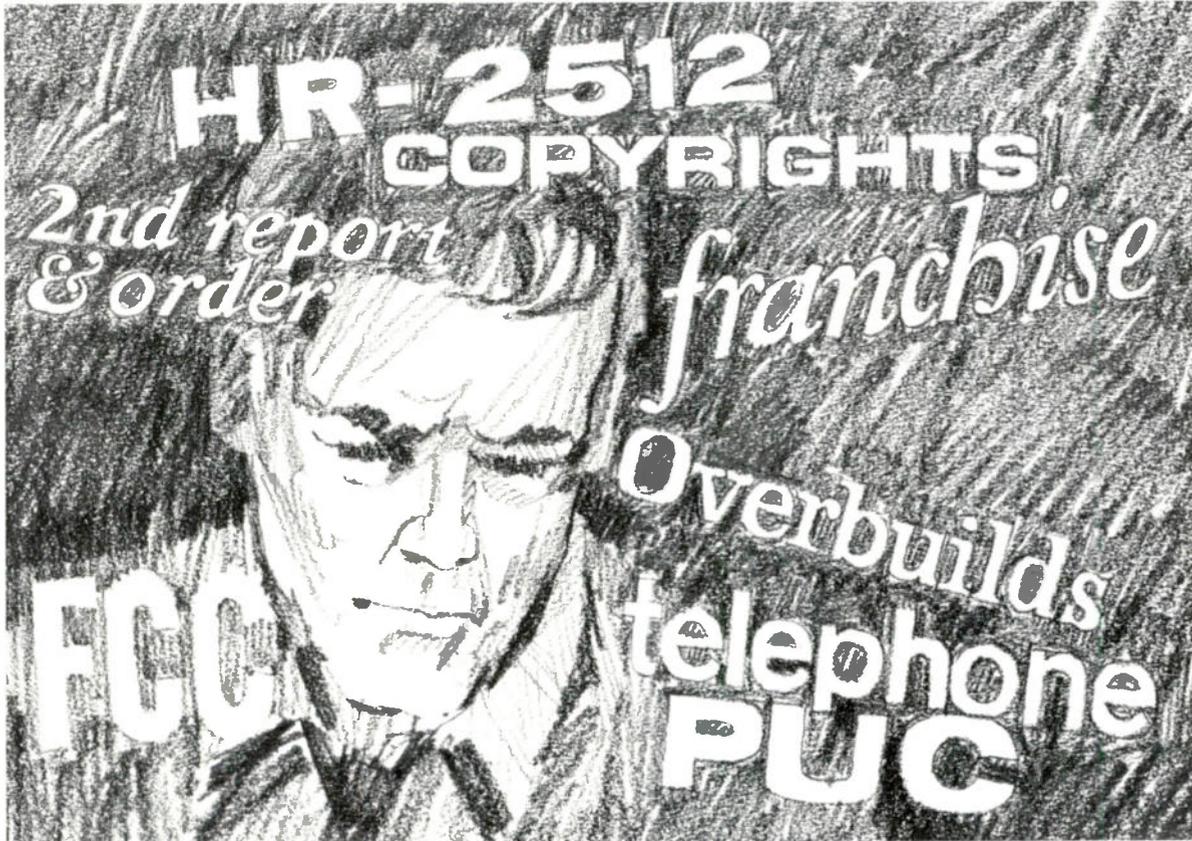
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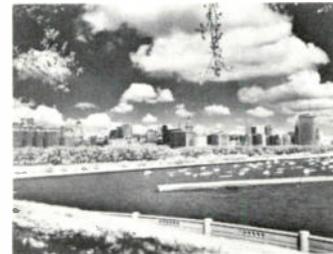
Survival, copyright, FCC, PUC, a future . . .

The reasons are many, the concept is essential.

Membership in NCTA is necessary for all companies concerned about their future in CATV. Your Association provides a national voice that is heard and respected in Washington. As a member, you help decide what that voice will say. Continuous liaison with members of Congress and the FCC keeps the policy makers aware of your problems and needs. NCTA legal assistance and guidance helps members make decisive business judgments while safeguarding their investments.

NCTA members receive weekly Membership Bulletins in addition to a constant flow of subscriber promotions. Effective management and technical information help upgrade and stimulate your business.

NCTA is working hard to help CATV grow and prosper. Your Association needs your help and your support, and you need the Association.



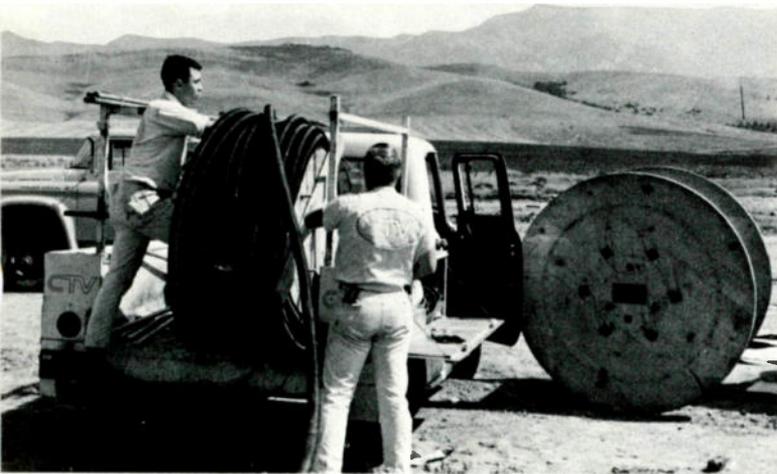
Each year NCTA hosts a national convention for the convenience of its members, who gather to exchange ideas and information. The latest technical and management techniques are explored in depth by recognized authorities. Associate members display the newest equipment and services available to the industry. Annual achievement awards are presented to individuals and companies; new officers elected and important policy decisions reached.

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NATIONAL COMMUNITY TELEVISION ASSOCIATION, 1634 EYE STREET, N.W., WASHINGTON, D. C. 20006



Flexible Conduit For Buried Cable Protection



Top photo shows Cable TV of Santa Barbara personnel unloading spools of the flexible conduit at construction site. 1000-foot coil is said to weigh 180 pounds. Center photo illustrates installation of buried plant using "Pipe-A-Flex" conduit in a new housing development being wired by CTV crews. Photo below shows flexibility and special "profile" of the conduit as used at pedestal location in Santa Barbara system extension. Heat-shrinkable or clamp-type sleeves are available for use on the conduit, which comes in inside diameters of 1", 1 1/4" and 1 1/2" in lengths of up to 1000 feet



CATV Technology changes at a rapid pace. To parallel this pace, United States Extruded Vinyl Products, Inc. of Sherman Oaks, California, has developed a new type of flexible corrugated conduit for buried system protection. This flexible conduit was recently put to use by two different CATV firms which gave us their comments.

Mike Kelly of Cable TV of Santa Barbara tried this flexible conduit in a recent installation and was quite pleased with it. He says that because of its light weight, the "Pipe-A-Flex" material makes installation much easier. (A 1000-foot roll of this product weighs approximately 180 pounds.) Because it comes in 500 to 1000 foot lengths, he pointed out, a considerable amount of splicing is eliminated. When splicing was necessary, Kelly used a 6" heat shrinkable tube. As the tube shrinks over the conduit ends, the glue inside is said to give a strong, watertight splice. In road crossings, or after trenching where compaction is required, Kelly exercised caution and avoided potential damage to the conduit by specifying fill and sand, free of boulders or jagged rocks to be 18 inches in depth before high compaction.

Because fish tapes frequently hang up in metal, clay or plastic conduit, Kelly felt this flexible conduit could speed up pull-wire insertion. By sucking a ball on a string through the conduit with a household vacuum attachment, he found that he did save considerable time on runs of 500 feet or more.

Kelly completed his praise of the flexible conduit with the statement "I wouldn't use anything else. It was a snap".

Another company with substantial experience in underground conduit installation, Communications Constructors, Inc., says that one of the big advantages of this flexible conduit is that it does not take on a coiled shape from the reel, and can be installed without worry about curled ends or failure of the conduit to conform to the trench. The construction company also noted that the flexible conduit has considerable strength, and in most circumstances will return to its original shape after having been crushed.

This plastic conduit can also be bought in a pre-assembled package eliminating the return trip to install the cable. This package is known as "Cable-In-Duct".

United States Extruded Vinyl Products, Inc., is the sole manufacturer of this new product making its entry into the CATV underground installation field. □

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Copper Clad Aluminum

New Money-Saver For CATV Cables?

By Harry Friedman
Marketing Manager, Wire and Tube Department
Materials Division, Texas Instruments

Clad wires are not new in the high frequency field. Copper clad steel has been used for many years as the center conductor in RG59u and other coaxial cables. The copper clad steel however, served a dual role, conductor and strength member. While the copper clad steel certainly made good use of the well known skin effect, it was never intended to be an economical copper substitute.

More recently a new clad metal conductor has been developed to answer many of the technical and economic needs of the rapidly growing CATV market. The basic design criteria were:

- (1.) compatibility with aluminum shield
- (2.) light weight
- (3.) good DC conductivity
- (4.) no change in conductor diameter over TV frequencies (including sub channels)
- (5.) availability
- (6.) lower cost than copper

Apparently these fundamental criteria can now be met, without exception, by copper clad aluminum.

Although copper clad aluminum is produced in three basic cladding ratios, we shall discuss only the 10% cu/al as it is the most economical.

Copper clad aluminum with 10% copper by cross sectional area, was designed to maximize the desirable features of a high frequency coaxial conductor. Refer for a moment to the basic skin effect formula:

$$T = \frac{3.5}{\sqrt{f}} \sqrt{\frac{P}{r P_c}}$$

T = "skin" thickness in inches

r = 1 for cu and non magnetic metals

P = resistivity of cladding at any temperature

P_c = resistivity of copper at 20°C

f = frequency in cps of the signal to be carried

Since the cladding is copper:

$$\sqrt{\frac{P}{r P_c}} = 1$$

Therefore the formula simplifies to:

$$T = \frac{3.5}{\sqrt{f}}$$

Considering the normal TV and sub channel frequencies, a range of skin thickness can be calculated.

$$\text{at 20 MC} \quad T = \frac{3.5}{\sqrt{20 \times 10^6}} = .000745 \text{ inches}$$

$$\text{at 100 MC} \quad T = \frac{3.5}{\sqrt{100 \times 10^6}} = .00035 \text{ inches}$$

$$\text{at 250 MC} \quad T = \frac{3.5}{\sqrt{250 \times 10^6}} = .000223 \text{ inches}$$

The smallest center conductor normally used in CATV work is .075 inches diameter. Using 10% cu/al with a skin thickness of approximately 5.5% on radius, the conductor would have a copper cladding:

$$\frac{.075}{2} \times .055 = .00206 \text{ inches}$$

This would provide a safety factor of 2.77 on the cladding thickness. The excess copper, while not absolutely necessary, does give some added DC current carrying capacity.

The basic physical and electrical data for 10% cu/al are presented in Table 1.

TABLE I		
	COPPER	10% Cu/A1
Density lb/in ³	.323	.121
Density SP-GR	8.92	3.02
Conductivity IACS	101	64.5
Resistivity ohms/cm ²	10.27	16.08
Weight % Cu	100	26.8
Tensile strength (nom)		
Hard KPSI	65.0	30.0
Annealed KPSI	35.0	17.0
Elongation Annealed	38.0	25.0

Another important consideration in the use of copper clad aluminum is the close match of thermal expansion with solid aluminum.

Here are 4 prime reasons why **COMMUNICATION SYSTEMS CORP.** is your best choice for **CATV turnkey construction:**

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2. Construction

CSC backs every project with nationwide experience in CATV system construction, including both aerial and underground techniques. Only full-time, permanent personnel—people that know CATV—form CSC's crews. Surveyors . . . linemen . . . technicians . . . all are craftsmen whose only standard is to give you maximum quality. Veteran experience guides every step of construction.

3. Independence

Benefit from the unique services of an independent contractor. No direct ties with equipment manufacturers or suppliers assures selection of equipment based on maximum return for your investment. CSC is completely objective in this vital function. Selection is made for **your** system's requirements . . . done with your unique problems in mind. CSC works full-time **with** you as well as for you.

4. Extra Service

CSC handles the entire system design and construction project for you. Every detail is planned to remove the worry from your shoulders. This includes all liaison with telephone and power companies to determine pole line rearrangements. Total CATV experience guarantees superior workmanship in every phase of construction, done by people who enjoy working for you.

Let CSC handle your turnkey project . . .
we'll make your problems our problems.



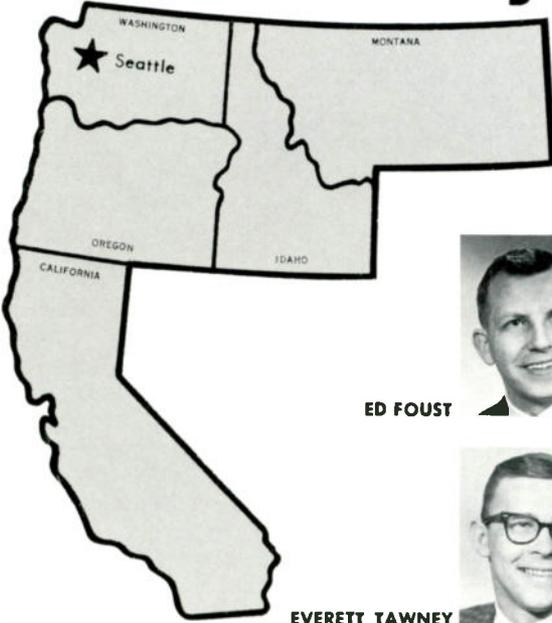
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Material	Temp. Range	Coefficient of Linear Expansion / °C
Copper	25 - 100° C	16.8 x 10 ⁻⁶
Aluminum	20 - 100° C	23.8 x 10 ⁻⁶
* 10% cu/al	20 - 100° C	23.0 x 10 ⁻⁶

* calculated

This close match of 10% cu/al and aluminum should ease the problem of expansion and contraction at the connectors.

The lighter weight of the 10% copper clad aluminum can also mean easier handling and lower shipping costs. The 10% cu/al is lighter than copper by the ratio of their densities:

$$.323 \div .121 = 2.67$$

The 10% composite is less than half the weight of a similar size copper conductor. In a cable with a center conductor .146" diameter, the conductor weight savings would be:

Conductor	Dia.	lbs/1000 ft.	weight savings
Cu	.146	65	
10% cu/al	.146	24.3	62.5%

The 10% copper clad aluminum is now in production in a new wire mill recently completed by Texas Instruments. The current mill capacity is over one million pounds of 10% cu/al per month, making this new conductor readily available.

Finally, the economics of the 10% cu/al make it a very promising new material. The redraw rod is now priced at about \$.68/lb. Considering that it is used at the same diameter as copper, this is like buying copper rod at \$.225/lb.

Copper clad aluminum conductor would appear to solve many of the technical problems now associated with the copper conductor — aluminum sheath system. It also has the potential of lowering finished cable costs to the end user.

Copper clad aluminum is also available in sheet form and can be seam welded into cable sheath just like aluminum. While more expensive than aluminum sheet, it can provide lower attenuation in the cable and thereby allow longer unamplified runs. Thus, the total economics of the copper clad aluminum sheath may overcome the higher initial cost.

In summary, copper clad aluminum conductors and sheet may provide the basis for new technical advances in coaxial cable construction.

(Continued from page 12)

the reception room to give him a fast hello, explain that you're tied up, and suggest when you might be free.

Once a visitor sits down to talk with you, your problem often is how to get him up and out again. If you have an intercom system, you can do what one manager does: He presses a hidden button which, by prearrangement, brings somebody with a little note, at which he frowns and says, "Tell him I'll be with him in a few minutes." Not quite so elaborate, but also effective, are phrases like, "Next time you're in the neighborhood, let's talk about this further," "When we're both not so pressed for him," etc.

In all business situations, the most important unwritten rule of business manners is: Act according to your common sense and your consideration for others.



The Fanner Banner

Communications
Edition

R&D PROGRESS: NEW DEAD-END DEVICES GIVE GUYS TOP STRENGTH



Fanner Straight-Bight Fanngrip dead-end (U.S. Patent No. 3,295,311 issued January 3, 1967)

Two Basic Methods Satisfy Engineers

Fanner R&D has developed grip-type (Fanngrip® Dead-Ends) and looped-strand (Superlock™ Clamp) dead-end devices that assure maximum tension and impact strength plus maximum resistance to unwinding. Yet, installations are more versatile and easier.

When the first dead-ends were made by looping the strand and serving, they often proved unreliable because individual techniques and skills differed. Served dead-ends sometimes slipped. An improvement was the use of "U"-bolts and guy clamps. However, clamp pressures required to develop strand strengths were hard to achieve. Strands sometimes slipped or were damaged.

Early-type helical grip was improvement

Following the initial development of machine-formed helical wires for armoring T&D lines, an early-type helical wire grip was introduced. In application, it looped through terminal hardware and wrapped spirally onto a guy-strand. Bulky hardware was thus eliminated and terminal strength improved. This early grip design had several drawbacks. It caused strand twist and induced torque. On guys at high working loads, the grips could untwist enough to permit slippage. Another problem was the difficulty in pulling final guy tension.

Two dead-ends fill construction needs

Many engineers accepted the helical grip dead-ending device. However, many still preferred the looped-strand system which had stronger basic mechanical advantages and was easier to tension. Fanner R&D recognized this dual need and developed both a safer, stronger straight-bight helical dead-end grip and a new helical clamping device to secure and lock looped-strand dead-ends.

To eliminate strand slippage, torsion unwinding and stretching of the loop, Fanner redesigned the earlier helical

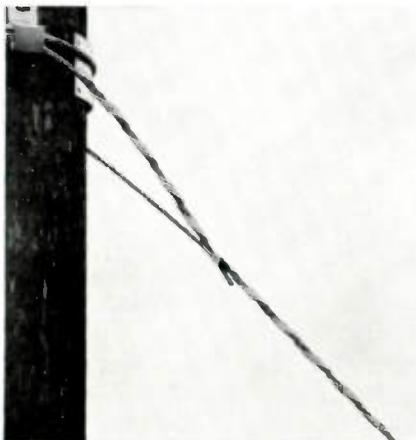
grip. The new and different less-than-half-lay design with straight wire loop, called the Straight-Bight Fanngrip dead-end, will not slip, twist or elongate. Its tested strength exceeds strand strength ratings.

Installations can be made on both larger or smaller diameter hardware than the earlier-type helical grip and are easier to install.

New helical clamp for looped-strand dead-ends

For those preferring looped-strand dead-ending, Fanner R&D created a completely new strand-clamping concept called the Superlock Clamp. Extensive laboratory and field tests were conducted to assure performance and reliability. Simple and easy to install, Superlock Clamp dead-ends provide terminal strengths in excess of rated strand strengths, regardless of guy length or loop length. Superlock Clamps simplify construction while completely eliminating strand slippage and cutting by bolted clamps. Final guy tensioning is accurate and fast with the lowest possible cost.

Fanner Straight-Bight Fanngrip and Superlock Clamp dead-ends are available in sizes and materials compatible with every popular strand. With two new Fanner dead-ends, any type guy construction can be specified and installed with complete holding confidence, at a minimum cost.



Fanner Superlock Clamp

Yellow Guy Protectors Are Safety Markers Too

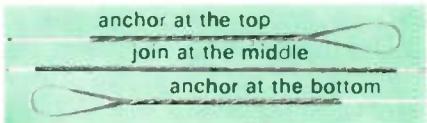
Motorists, off-highway equipment drivers and pedestrians are likely to run into guy wires if they can't be seen. Guys should be clearly marked.

Fanner has the solution with high visibility "Safety Yellow" Safety Guards for use on guys in high traffic areas. Their use on guys at construction sites can also reduce accidental damage to overhead systems.

Fanner Safety Guards are made of strong flexible plastic with metal clamps at three points. Highly resistant to corrosion, they have no sharp, jagged edges hazardous to pedestrians. Available in two widths and two lengths for 3/16" through 5/8" strands. Also offered in a standard neutral grey.

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THE ABC-ITT MERGER

A Review and Analysis—How CATV Fits In

The American Broadcasting Companies—which changed its name from American Broadcasting-Paramount Theatres two years ago—agreed a little over a year ago to merger with International Telephone and Telegraph Corporation in a business venture that would bring undoubted benefits to the stockholders of both companies. ABC would have the enormous financial backing of the common carrier firm to offset the flighty fortunes of network broadcasting, and ITT would have a large stake in an area of communications that is of paramount importance and holds the potential for enormous profit. It seemed to be a marriage made in some sort of corporate heaven.

The FCC held hearings last September, and it was immediately apparent that the required majority seemed to approve the merger. Chairman Rosel H. Hyde, plus Commissioners Robert E. Lee, Lee Loevinger and James J. Wadsworth appeared to view the merger with benevolence, despite the active skepticism of the minority, Commissioners Robert T. Bartley, Kenneth A. Cox and Nicholas Johnson. At the end of March, after a long sparring match between the FCC and the Justice Department, a new hearing was set—and the result should be of considerable interest to the CATV industry.

The importance of ITT's real and possible CATV activities has grown from an almost passing reference, to a major concern in the Justice Department's reluctance to give its nod to the ABC-ITT merger.

The FCC approved the merger Dec. 21, 1966, after receiving a filing from the Justice Department the day before. The Anti-trust Division of the Justice Department, headed by Donald Turner, had told the Commission that although "there are several anti-competitive consequences that may flow from an ABC-ITT merger . . . the possibilities of such anti-competitive consequences seem sufficiently speculative that we are not presently contemplating an action under the antitrust laws to enjoin consummation of the merger." At the time, this seem like a tacit admission by the Justice Department that it didn't think it could win a court battle against the merger and decided to give the corporate marriage its stamp of approval.

In outlining possible anti-trust objections to the merger at that time, the Justice Department singled out what have become the major issues in the case. Anti-trust concerns considered by the Justice Department, Turner's filing said, included "possible techni-

cal developments or contributions in the broadcasting field by ITT, ITT interest in some CATV's, the possible development of domestic satellites and their use in broadcasting transmission, the possibility of difficulty arising out of integration of a network by a large diversified industrial concern, and the possibility that ABC might be able to provide its needed capital from profit." That was the essence of the mention of CATV by the Justice Department.

Considering the Justice Department's apparent admission that it would not file suit to stop the merger, in spite of the disclaimer that "we do treat the matter as closed," the FCC approved the merger in a hotly contested 4-3 vote, with Commissioners Robert T. Bartley, Kenneth A. Cox and Nicholas Johnson dissenting, the latter with an extensive and strongly worded statement. The dissents mainly charged that the Commission gave too little time to considering all the consequences of the ABC-ITT merger—a view that was heartily seconded by a small but vocal group on Capitol Hill. Senators Philip A. Hart (D-Mich.), chairman of the Senate Antitrust Subcommittee; Wayne Morse (D-Ore.) a vocal critic of practically everything; and Gaylord Nelson (D-Wis.), another powerful liberal, had been strongly criticizing the proposed merger for some time.

In spite of the strong reaction by the FCC minority and a handful of Congressional critics, the merger seemed to be an accomplished fact. After approximately a year of maneuvering, ABC and ITT appeared to have a clear road ahead. Then the Justice Department dropped its bombshell.

A matter of scant days before the merger was to legally be consummated, Turner and his Anti-trust Division asked the FCC to re-open the case and hold a new hearing at which the Justice Department could present its evidence that anti-trust questions had not been adequately considered by the Commission. The Commission, stunned by the unexpected twist in an otherwise logical proceeding, finally decided to consider the Justice Department's question formally.

And what of CATV's role in the complex wrangling? It has grown from the almost casual mention in the Justice Department's December filing to a major concern.

The Justice Department says that the merger might be undesirable because it thinks that ITT has abandoned the CATV industry as a result, thus eliminating ITT as possible competition to broadcasting

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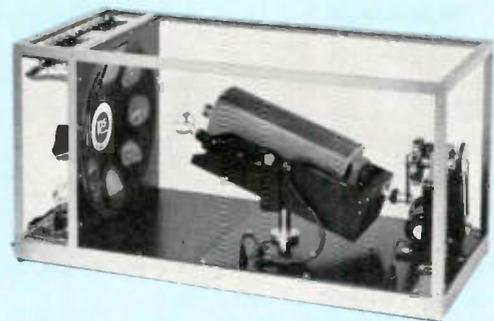
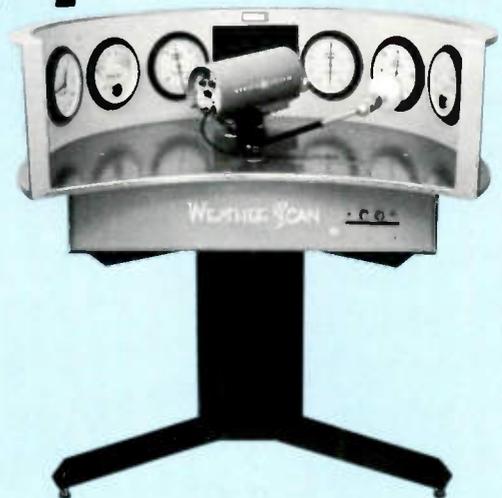
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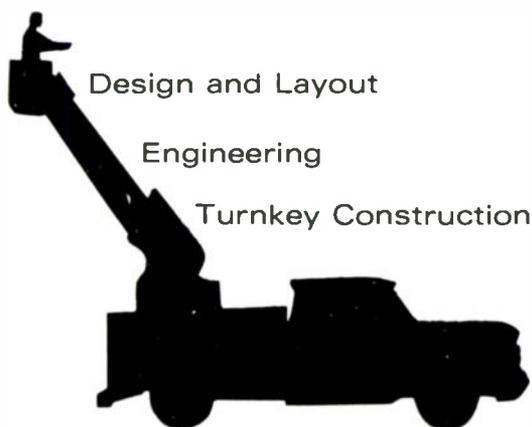
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through CATV. The Justice Department contends that available documents "clearly show that ITT's interest in CATV goes back as far as 1964; that by 1965 ITT had authorized \$10 million for construction of CATV systems in which it would eventually have a majority ownership interest or effective control; that projections contemplated that ITT might invest an additional \$10 million by June 1966; that ITT was examining at least twenty CATV systems worth an estimated \$103 million, with a view toward purchase; and that ITT's interest extended beyond CATV to the possibility of pay TV and theater TV and, more importantly, to "the possibility of creating a network linking whole areas of local CATV franchises and possibly further marketing of the services of the group."

The Justice Department maintains that ITT considered CATV as a field of vast potential, but, immediately after the merger with ABC was decided on, abandoned plans entirely pending a study of CATV industry problems. The Justice Department also noted that "ABC has been prominent among those insisting upon confining CATV development because of its competitive impact upon existing broadcasters."

The real heart of the Justice Department petition is not that the merger is wrong, but that the Commission has grossly insufficient evidence on such subjects as CATV on which to base any decision on the merger, and for that reason the Anti-trust Division wants a new hearing, open to full cross-examination. □

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CATV DIVISION

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page 14)

ta Fe, the Commission regard to Santa public interest would ermitting immediate oution of six Los gnals; but that, with iquerque, the public uires evidentiary the question of oution of four Los ls should be per- practical purposes, g in Albuquerque currently are able entical television in its wisdom — ed, upon consider- ic interest" — the s determined that nts are entitled, if to subscribe to sified and increased ices via CATV its of Albuquerque ly await the full local off-air broad- to satisfy their petite. How long, Commission real- npose artificial re- ny the people of : same program- h is available to ta Fe? How long ystem of discrimi- ned?

sincere, dedicated strictive CATV d agree, we are present rules of roduce less than s and, as applied ill consistently ntirely unsatisf- from a public- . The rules as n are virtually ept to retard owth under the s and to generate aper and words oided in every- except possibly t noble profes-

e fear that the ration by the s CATV rules, ed by consider- , will produce and undesirable hat there is an

excellent prospect that the courts will find the Commission's machinery for examining and granting waivers to be little more than superficial and therefore unlawful. It is our feeling that the courts will be shocked by the "template" facade of due process afforded by the Commission to waiver situations; and, unfortunately, where some CATV interests have prevailed in obtaining prompt waivers of the Top-100 rules, we fear that the Commission's own approach to this matter will literally invite anti-CATV interests to take judicial appeal. All too often, reviewing courts seem little interested in the ultimate question of what an agency did or did not do, dit grant or deny. Courts rather seem attuned to reviewing the process of agency decision; they seem particularly interested in the simple question of whether the adversely affected parties were allowed to present their views in a full evidentiary hearing. Absent a hearing, chances are better than not that an adversely affected person will be successful in persuading the court to nullify the agency action and require a hearing.

The sensible course for the Commission to follow, it seems to us, is to junk the present unworkable CATV rules and to rely upon its experience to produce a new set of rules consistent with the real interest of the public as well as with the interest of the regulated industries. If the Commission is truly inclined to fulfill its public-interest obligation, its energies could more profitably be expended in the direction of enacting rational, reasonable and realistic rules rather than attempting to perpetuate a set of impractical regulations. □

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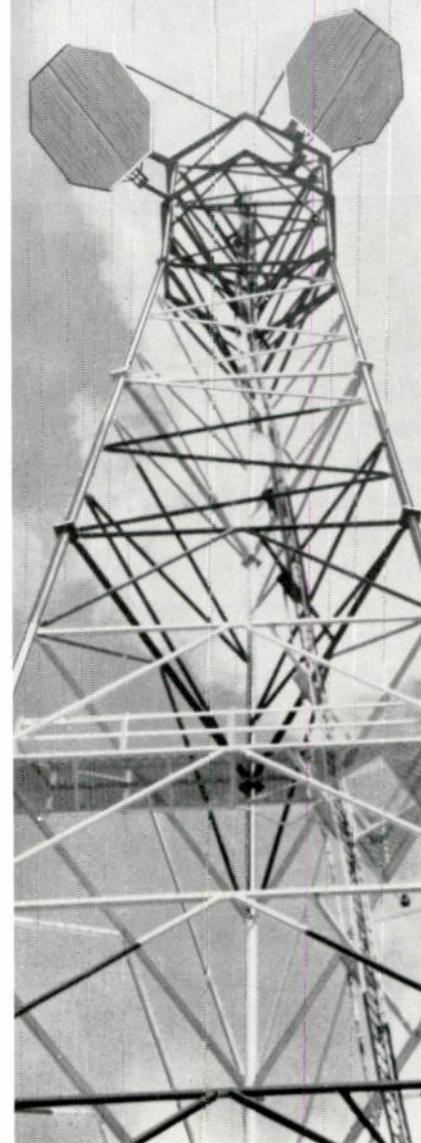
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only by unanimous approval. No matter how long it takes. This sort of improvement is hard to make, since state-of-the-art concepts are always used in every standard design.

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APRIL, 1967

CATV TECHNICIAN



Photo courtesy of Fort Worth Tower Co.

- Heat-Shrink Splice Covers
- CATV Transmission Lines
- Latest CATV Products

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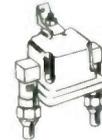
APRIL'S CATV PROBLEM SOLVERS from PRUZAN

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Model 900/UE for pedestal mounting



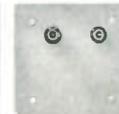
Bottom view of housing with module plate removed.



9-104
Four way module plate



9-103
Three way module plate



9-102
Two way module plate



9-101
One way module plate

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100 or more—\$1.00 each.

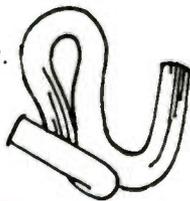


Handle RG59U with care! Deadend with the TV-S Grip. Fast, economical, trouble-free. Galvanized grip only 13¢ each in quantity of 2000.



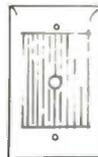
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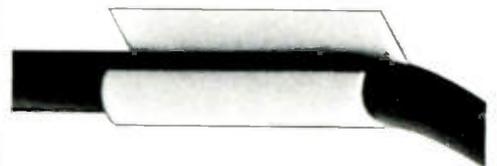
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Splicing With Heat-Shrinks

Report on a Time-Saving Construction Technique

According to Standard Radio & TV Co., the use of new heat-shrinkable tubing has reduced the time to make splice covers on cable by up to 80% in that firm's California CATV operations.

"During a full year's usage in our Northern California operations, we have found the heat-shrinkable splice covers invariably provide a completely watertight seal," says Standard's chief engineer, Bob Latham. "In overhead plant, the self-sealing splice covers add strain relief, and the material cost for both overhead and underground applications is slightly less than that for multilayer splice wraps," Latham went on.

"Among this organization's technicians, the average time to provide a permanent waterproof splice cover with 'heat-shrinks' is approximately two minutes, as opposed to 12 minutes or longer with tape wraps. Of course, the latter figure is often higher for splices at inaccessible locations—a factor which doesn't greatly affect the application of heat-shrinkable covers," he concludes.



Standard Radio and TV chief engineer Robert Latham (right) discusses plant material requirements for construction at a new subdivision with draftsman Joe Hooker.

The "thick-wall" splice covers used by the Standard Radio & TV are available in 3-inch to 12-inch lengths. These "Sigmaform" splice covers are produced by Sigma Industries of Menlo Park, California, and come with four expanded inside diameters ranging from 0.75-inch to 2.0-inch.



Here San Jose Cable TV technician Joe Hepburn makes a heat-shrinkable splice cover on an overhead coax. Propane torch adds little weight to climbing gear.

After application of 250 F., these shrink by 66%, e.g., a 2.0-inch cover becomes 0.75-inch. The thicknesses of the walls after shrinking range from 0.060-inch to 0.125-inch. Molded caps for use as cable seals and terminations are a part of the same product line, with sizes to match all standard cable. The materials are supplied with a water-proof, non-setting sealant applied to the inside wall. The meltable sealant softens and flows at the 250 F. temperature required to initiate shrinkage of the part.

The accompanying photographs record the activity of a two-man construction crew from Standard's San Jose Cable TV during the underground installation of a new residential development in the Santa Clara Valley—one of California's highest growth areas. This particular tract, which Standard's subsidiary San Jose Cable TV will serve, will ultimately have 4,000 homes with all roof-top TV antennas prohibited.

Standard's strand maps, which



Close-up of a heat-shrinkable splice cover in action. Flame spreader produces even heat, making flame invisible.



A completed splice cover is shown installed at line extender amplifier.

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are drawn in 1" = 200' scales for overhead installation and 1" = 100' for underground plant, provide bases for determining inventory requirements for the "heat-shrink-



500 watt electric heat gun putting out 500 F. is used to make splice cover in tight quarters at this house-drop from tap. Tape wraps would be difficult and time-consuming here.

able" products, as well, of course, as for cable amplifiers, connectors, splitters, and other hardware.

At the start of each work day, construction teams itemize the number of "heat-shrinks" withdrawn from inventory on a requisition form. Typical notations read "30 shrinks—SST 12-11," etc. This material requisition form is used by the accounting department to maintain a running inventory control.

Aside from the normal complement of cutters, pliers, and open-end wrenches, the only additional tool needed to make heat-shrinkable splice covers is a standard propane torch. Generally, both a flexible extension and a rigid nozzle

Standard Radio & TV Co. is headquartered in San Jose, California where it owns and operates KNTV—Channel 11, an ABC outlet serving the San Jose metropolitan area. Its northern division, Sierra TV, operates CATV systems in Chico, Grass Valley, and Nevada City (Calif.), all currently serving some 7,000 subscribers. Another division, San Jose Cable TV, recently franchised to operate within that city's limits, plans construction of well more than 1,000 plant-miles. About 20% of this plant will be underground. San Jose Cable TV provides 12-channel service, and FM distribution. Robert Latham is chief engineer for both broadcast and CATV operations of Standard Radio & TV Co.

zle are carried in the service vehicle. Many technicians prefer to use a flame spreader attachment to provide even heat application. Portable electric heat guns also are used in the field.

"Another consideration of utmost importance in the construction and maintenance of coax plant is the training of personnel," Bob Latham observes. "A single in-shop session in heat-shrinking, followed by a quick field practice application has proved sufficient for us. This is substantially less time than is usually required for mastering multiple tape splices," Latham noted.

Essentially all that is required to make a heat-shrinkable splice cover is as follows: After the hex nuts are tightened, the splice cover is held in place with a



1,500 watt portable generator weighs only 40 lbs. and provides plenty of power for field use of electric heat guns.

wrench and the heat is applied evenly, working from middle of the cover out. Besides making sure that the splice cover is on the line before tightening the coupling, the technician need only select the proper size cover. The inside diameter of the splice cover is determined by the maximum outside diameter of the fitting—from tip of hex to tip of hex. The tubing should easily slip over the fitting. The cover should extend at least one inch from both ends of the metal coupling. The splice covers may be removed with a knife. Technicians often will apply some heat first to soften the cover.

The price of "Sigmaform" heat-shrinkable splice covers depends on size and quantity. The most expensive is about \$2.00, while the least expensive is about 50c. □



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CATV Transmission Lines

Part II of Two Parts by Gay Kleykamp
 Director of Products, Kaiser-Cox Corporation

A special type of transmission line device is used on coaxial cable television systems, called a directional coupler. It couples a branch line only to a wave traveling in a particular direction on the primary line and almost entirely ignores the wave traveling in the opposite direction. If the wave traveling in the opposite direction is a reflected wave, or ghost, the advantages of using directional couplers are obvious. The design of directional couplers is rather complexed and is, therefore, briefly described in simplified form.

In the diagram, the two transformers are so constructed that the line (through) has only one (1) turn, as does the winding between the Tap input and the 75 ohm resistor to ground. The two transformers are identical with N turns on the secondary or grounded windings. The number of turns (N) in these secondary windings determines the insertion loss (E) and Tap Voltage (value in db). The 75 ohm resistor does not affect the signal when it originates at the input (E) as the entire signal at the tap (E) is dropped across the primary winding of Transformer T and the 75 ohm resistor. Inasmuch as the impedance of this single turn primary winding is much less than 75 ohms, the reflection will appear across the resistor (for the most part) and will be cancelled out by the out-of-phase signal across the secondary of Transformer T.

The number of turns in transformers T and T is determined as follows:

If $E = E \cdot E$, then $E = E \cdot E$. As E will appear across transformer T, no signal will appear across the resistor ($E = O$).

$$E = \frac{E_j}{N^2} \text{ as } \frac{E_j}{N} = NE, \text{ which may be seen from the fact that the signal at the tap } (E_t) \text{ appears across the primary of } T_2 \text{ and the secondary of } T_1. \text{ Also, } E_t = NE, \text{ or } N \frac{E_j}{N^2} = E.$$

If, for purposes of design, we consider $E_j = 1$ — that is, we use E_j as our reference — the following transformer design formulae are obtained by substitution:

$$E \text{ (Tap Signal)} = \frac{1}{N}$$

$$E \text{ (Thru Signal)} = 1 \cdot \frac{1}{N^2}$$

$$E \text{ (Insertion Signal Drop)} = \frac{1}{N^2}$$

$$E_o = E_j \cdot E_1$$

$$E_1 = E_j \cdot E_o$$

$$\text{If } E = O: \frac{E_j}{N} = NE_1 \text{ and}$$

$$E_o = E \cdot \frac{E_j}{N^2} = N^2 (E_j \cdot 1)$$

$$E_1 = \frac{E_j}{N^2} \quad E_i = N^2 E_1$$

$$\text{and } E_j = N^2 (E_i \cdot E_o)$$

$$E_t = NE = N (E_i \cdot E_o)$$

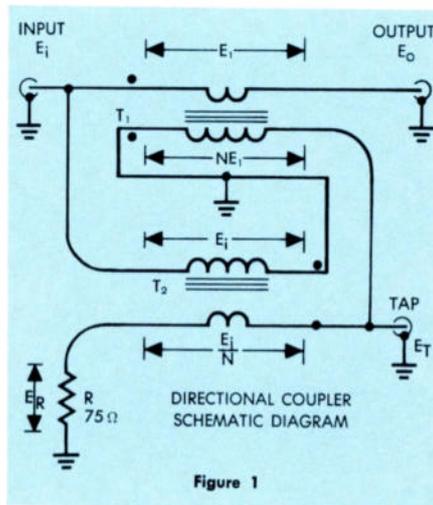
$$E_i = 1: E_t = N \left(\frac{1}{N^2}\right) = \frac{1}{N}$$

$$\text{(Tap Loss) } E_o = 1 \cdot \frac{1}{N^2}$$

$$\text{(Output Signal)}$$

$$E_1 = \frac{1}{N^2} \text{ (Insertion Loss)}$$

It is necessary to remove a portion of the signal from the coaxial cable so as to provide a usable signal level to the subscribers television receiver. The average television receiver requires a signal of at least a minus 4 dbmv and will accommodate signal levels as high as plus 10 dbmv. The zero dbmv level (1 millivolt across 75 ohms) has been determined to be about the optimum signal level required at the subscriber's television receiver. The devices to remove a portion of the signal from the feeder cable, so as to provide a zero dbmv level to the subscriber's television receiver, are called taps. The principle desirable features in a tap are:



The ratio of these signals to the input signal (E) then provides the "tap value", in db, and insertion loss in db. This is shown in tabular form for various transformer turns ratio figures (N). Of course, these are ideal circuit values which neglect the Q of the coils and transformer losses. The values in the table are then the best possible theoretical values — and practical devices must be somewhat less in efficiency.

(1) A uniformly predictable tap value or reduction in signal strength to the subscriber's drop line.

(2) A low insertion loss or reduction in signal strength along the feeder cable due to the insertion of the tap.

(3) Proper characteristic impedance match at all terminals of the tap.

(4) A flat frequency response across the band of television



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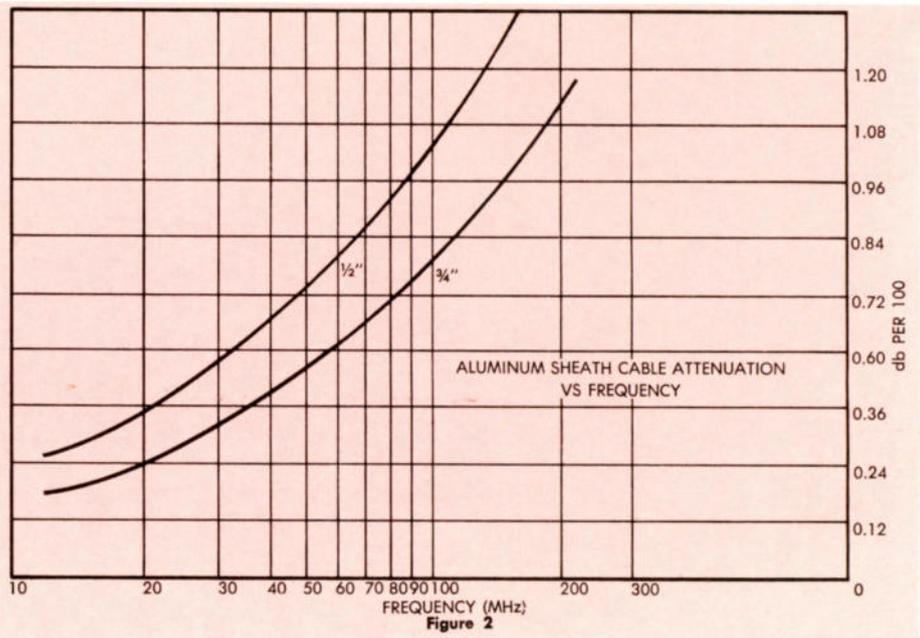
frequencies being transmitted.

(5) Isolation of the subscriber's television receiver from the feeder line to prevent the coupling of undesired signals from the subscriber unto the feeder cable.

(6) Proper mechanical design characteristics to minimize the effect of moisture or temperature, to provide a small light weight unit, and also, to provide for convenient installation and removal.

(7) The tap should be economical in cost as a large number are required.

Inasmuch as direct connection of the subscriber's drop line to the feeder cable would not provide a reduction in signal strength to the subscriber's drop line, nor would it provide the proper impedance match, several types of taps have been devised. A resistive "T" pad would provide the impedance match and signal reduction but would have a high insertion loss. The resistive pad is, therefore, considered uneconomical to use inasmuch as the insertion loss is



prohibitive. A capacitive tap has less insertion loss, although still excessive, but has the added disadvantage of a poor frequency response. It also presents a poor impedance match at the drop line and is conducive to generating ghosts or reflections. So, although,

low in cost due to the simplicity of design, the resistive and capacitive taps are not satisfactory for good cable television system operation.

A transformer tap when properly designed for impedance match to the drop line (back-match) provides many of the desirable features, however, existing designs of the back-matched transformer tap do not provide the desired decoupling or isolation of the subscriber's television set from the feeder line and also have a significant insertion loss.

The most satisfactory design employed today for taps is the directional tap which uses the principles of a directional coupler to obtain all of the desirable electrical characteristics. This more sophisticated approach is naturally higher in cost; however, the more conscientious cable television system operators have determined that the additional cost is not out of proportion to the improved performance. Further, it is anticipated that as the CATV industry grows and as television, in general, progresses each component of a cable television system will need to be improved upon to maintain the required quality for the viewer. So, although the directional tap now costs several times as much as the other types, it is gaining in popularity. Engineering, design and development is concentrating upon the development of a directional tap which will sacrifice

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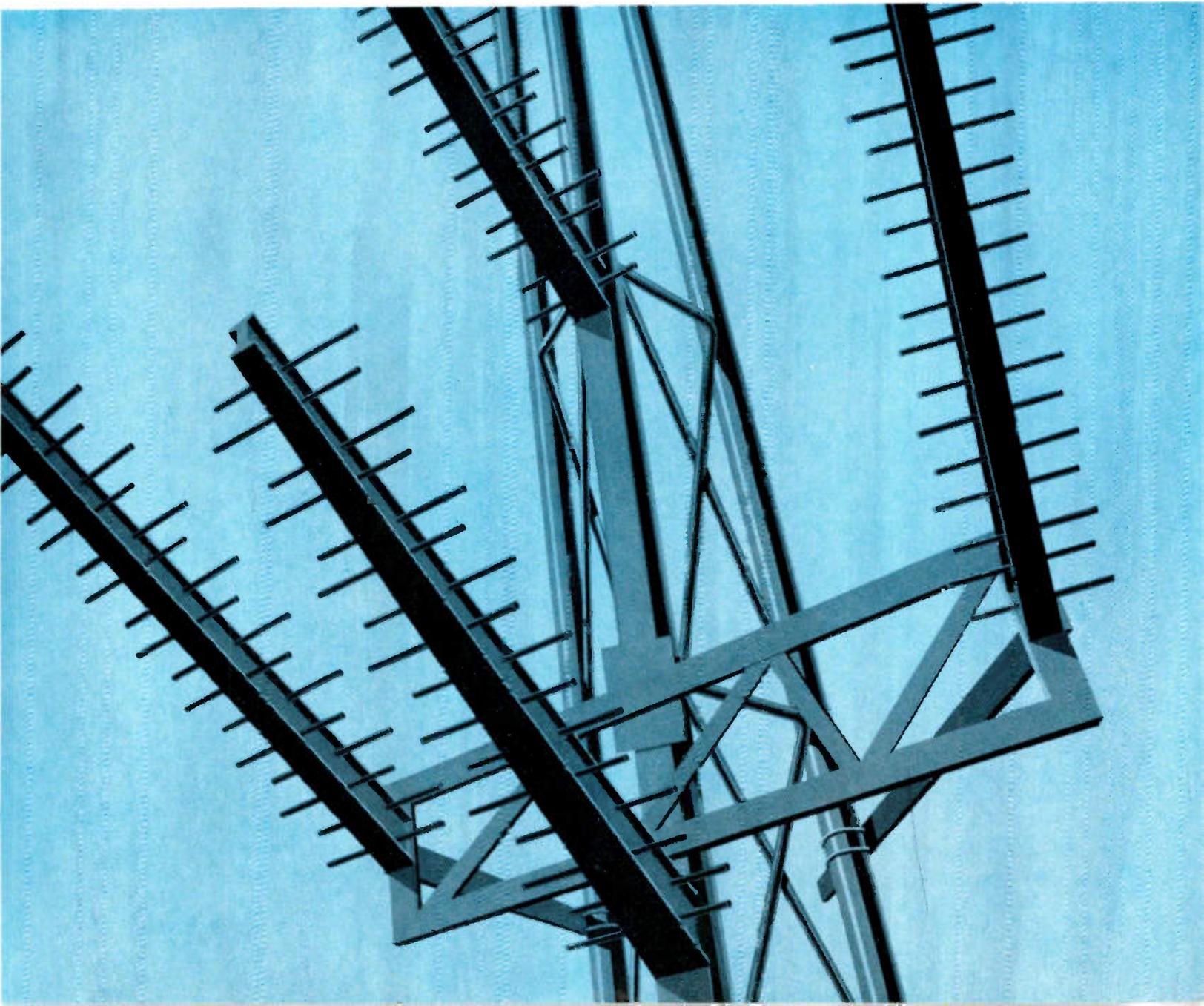
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	$1/N$	$1/N^2$	$1-1/N^2$	— db		— db		E_o
				E_i		E_i		E_i
1	1	2	0	1	—	1	—	—
2	1/2	1/4	3/4	5	6.02	.25	2.498	.75
3	1/3	1/9	8/9	.333	9.63	.111	1.022	.889
4	1/4	1/16	15/16	.25	12.04	.0625	.566	.937
5	1/5	1/25	24/25	.20	13.98	.04	.354	.96
6	1/6	1/36	35/36	.1667	15.564	.0277	.246	.972
7	1/7	1/49	48/49	.1429	16.902	.022	.176	.980
8	1/8	1/64	63/64	.125	18.062	.0156	.14	.984
9	1/9	1/81	80/81	.111	19.084	.0123	.104	.988
10	1/10	1/100	99/100	.10	20	.01	.086	.99

none of the desirable features but which may be produced at lower costs.

For ease of installation, the original taps were constructed so as to pierce the outer conductor and contact the center conductor with insulation between, of course. In other words, a hole was drilled into the outer sheath and a "block" was bolted onto the outer conductor with a pin penetrating the dielectric to contact the center conductor. This type of tap is referred to as a "pressure" tap. Present-day directional taps require the feeder cable to be cut and connection made to the device through connectors or fittings. Inasmuch as operators

have had considerable problems with moisture entry into the cable, they have been reluctant to accept the directional tap which required them to cut the cable. The use of well designed fittings eliminates the validity of this objection.

As the signal attenuates as it is transmitted along the cable, it is necessary to periodically reamplify the signal. Various types of specialized amplifiers have been designed for this purpose. The amplifiers which are designed to reamplify the signals along the trunk line are variously termed, "trunk-line" or "mainline" amplifiers. As these amplifiers are connected essentially in series or

cascade, the cascadeability of the amplifier is extremely important. The cascadeability of an amplifier is primarily a function of the amplifier's noise figure and distortion factor or cross modulation. A good trunk line amplifier would have a low noise figure and a high output capability for a given amount of cross modulation products or distortion. It can be shown theoretically that the higher an amplifier's gain the less its cascadeability and that there are optimum compromises which can be made between gain and cascadeability.

Feeder lines are coupled to the trunk or mainline by means of bridging amplifiers. A bridging amplifier is connected to the trunk line by means of a directional coupler and provides one or more feeder line outputs using a line splitter technique on the output of the amplifier. Bridging amplifiers may be considered as being the final amplifier in the mainline's cascaded system and may, therefore, be operated at higher levels than the trunk line. At the end of the trunk line a final trunk line amplifier may feed directly the feeder line existing at that point. Such an amplifier is termed a "terminating amplifier". Again, as this is the final amplifier in the cascaded run, it may be operated at slightly higher levels than the regular trunk line amplifier.

Reamplification of the signal level along the feeder line is accomplished by so called "line extender" amplifiers. This term originated when it was found necessary to reamplify the signal levels for additional extensions to the feeder line beyond those planned. Inasmuch as the feeder lines are at the most remote point from the source, most operators feel that the line extender amplifier may be of slightly less quality in performance than the trunk line amplifier.

In order to prevent undue affect of temperature upon the signal, it is desirable to have no more than two line extenders cascaded and the most remote line extender amplifier should be no farther than three amplifiers away from an automatically controlled or AGC amplifier.

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83	25	10	27	8

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PRODUCT REVIEW

NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

NEW TOWER DESIGN

A new microwave tower for major repeater stations offers a wide choice of antenna locations and covers all possible path bearings. The new "Hex Towers" are three legged structures with hexagonal antenna bays. Hex Towers incorporate the following features and design criteria: Design loading: 40 psf (100 m.p.h. wind) with 1/2 inch radial ice on



350 square feet of antenna surface, or the equivalent of six, 10 foot antennas per bay. Structural design is based on RS-222. All material is hot-dip galvanized after fabrication. Erection and detail drawings, foundation layout and anchor bolts are furnished with each Hex Tower. For further information contact Microflect Co., Inc., 3575 25th St. Southeast, Salem, Oregon 97302.

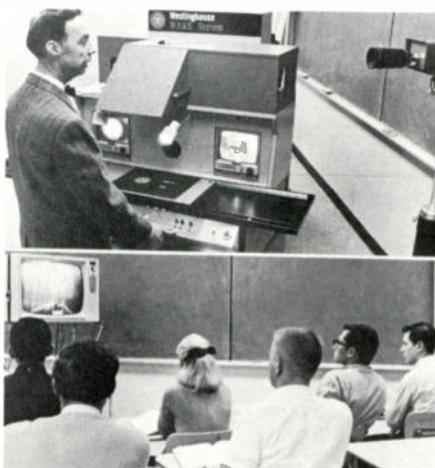
HEAVY DUTY PLOW

A re-engineered and restyled heavy duty plow has been announced by Midwest Lawn-Saver Equipment Company. Midwest's Mainline, which buries cable up to 52" in the ground, has been equipped with an 18-horsepower self-starting gasoline engine to power the self-contained hydraulic system. The unit now weighs in excess of 13,000 lbs. The re-designed Mainline also features greater operator protection with a complete canopy supported by structural tubing. A center control panel enables the operator to watch plow operation and cable tension at the same time. For further

information contact Midwest Lawn-Saver Equipment Company, 925 N. Bluemound Drive, Appleton, Wisconsin 54911.

ONE-MAN TV STUDIO

A one-man television studio designed for classroom and industrial training has been developed by Westinghouse Electric Corporation. The unit combines



two television cameras and standard audio-visual aids with simplified "up front" controls. The basic studio, called WAVE (Westinghouse Audio-Visual Electronics), will sell for about \$12,000. A

companion audio-visual recorder, capable of recording video and as many as five different audio tracks, is also available for storing lessons for later playback. The studio is easily adapted to microwave transmission of programs to remote areas and can also be tied in with a community cable TV system. For further information contact Westinghouse, Box 2278, Pittsburgh, Pa. 15230.

NEW CATV Literature

AMECO CATALOG SUPPLEMENT

Ameco, Inc.'s CATV equipment catalog supplement is now available, containing descriptions, specifications and price list for Pacesetter series of amplifying and control devices. For catalog supplement write Ameco Inc., P.O. Box 31741, Phoenix, Arizona 85002.

AEL AMPLIFIERS DESCRIBED

Data on four new Colorvue-line amplifiers is available from the CATV Division of American Electronic Laboratories, Inc. The new technical data bulletins describe the modular, solid-state units which feature color amplification and open-cover testing and adjustments. Copies are available from American Electronic Laboratories, Inc., CATV Division, Box 552, Lansdale, Pennsylvania 19446.

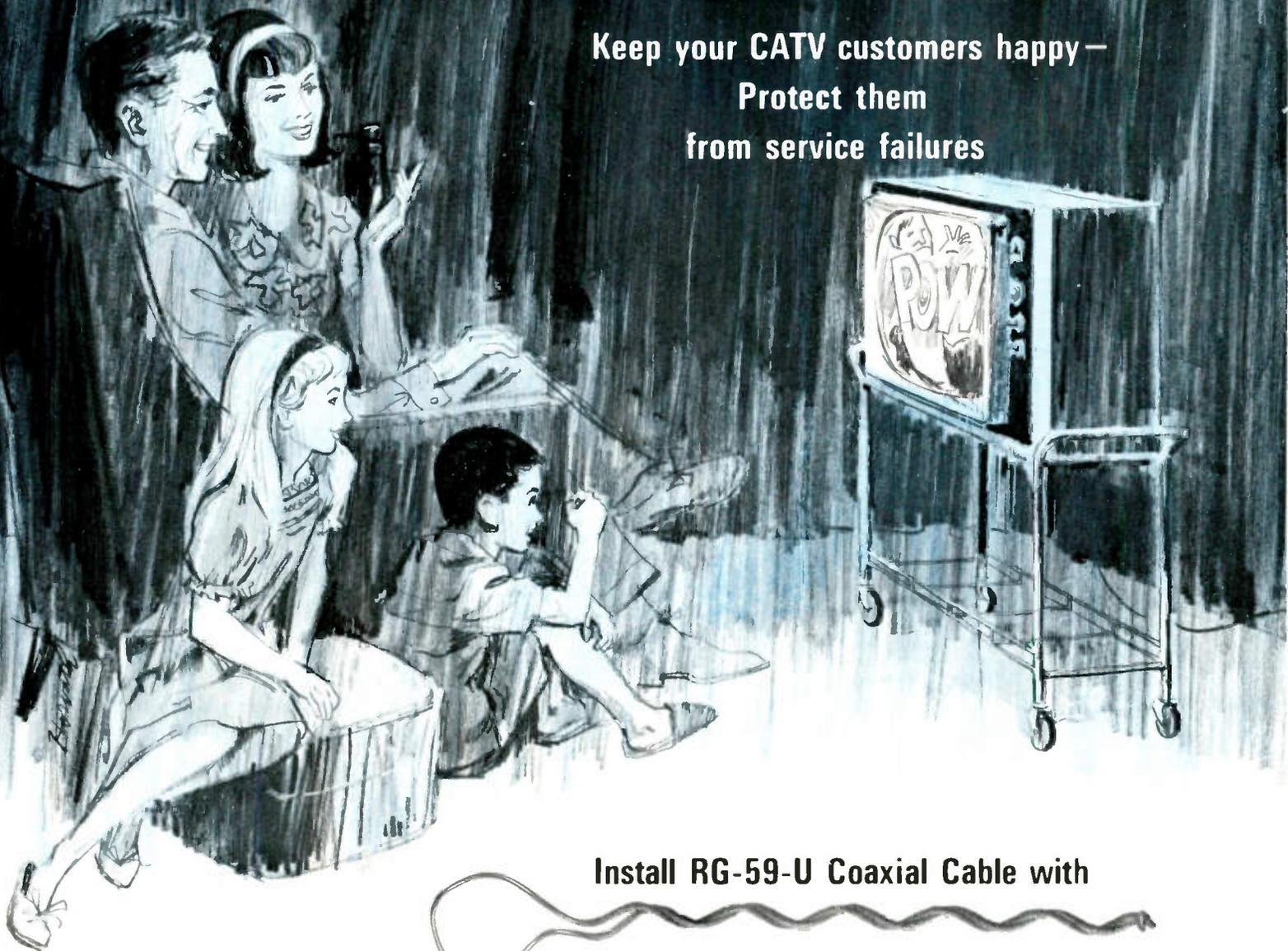
PIERCE CATALOG

A 1967 catalog with 85 illustrations showing a wide range of options offered for low-lowside service—maintenance truck bodies by Pierce Auto Body Works, Inc. Specifications and the 1967 catalog are available from Pierce Auto Body Works, Inc., Box 616, Appleton, Wisconsin 54911. □

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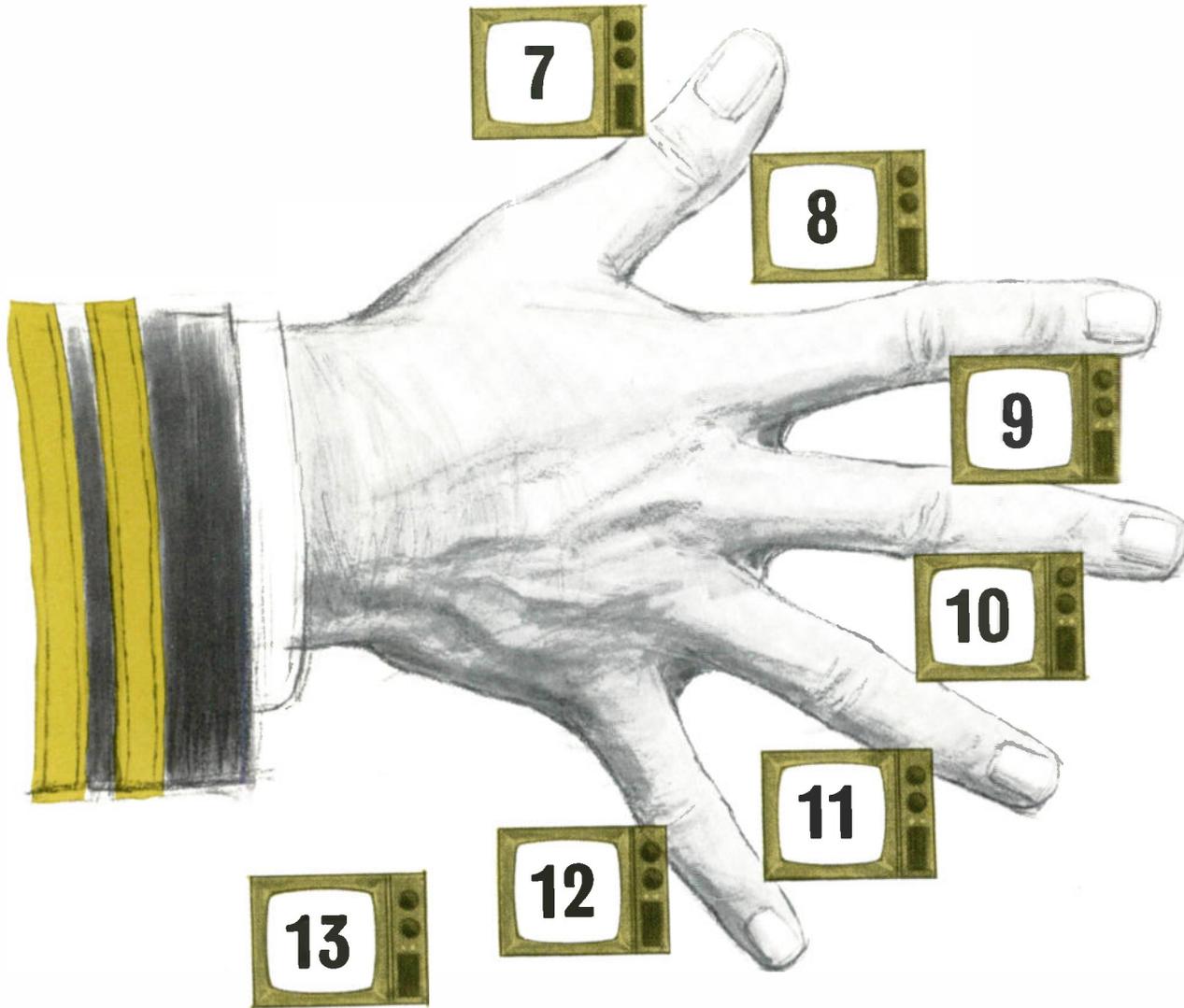
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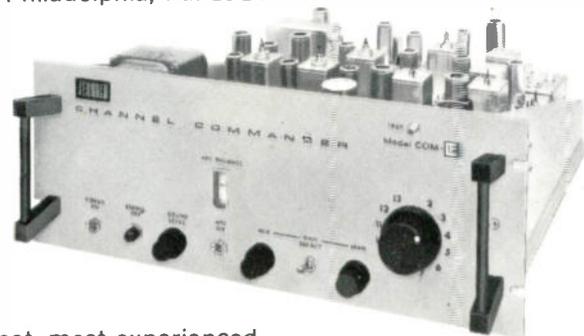
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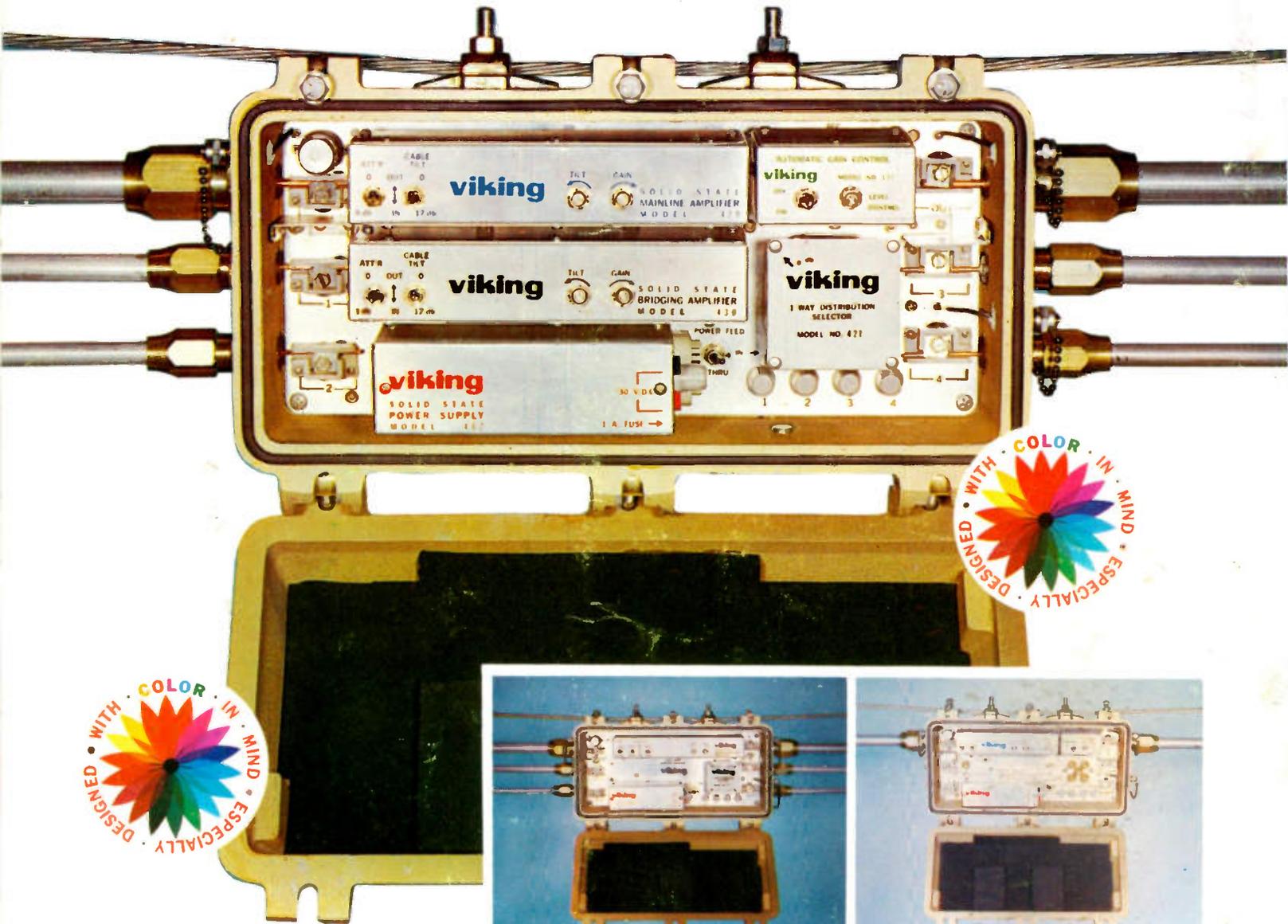
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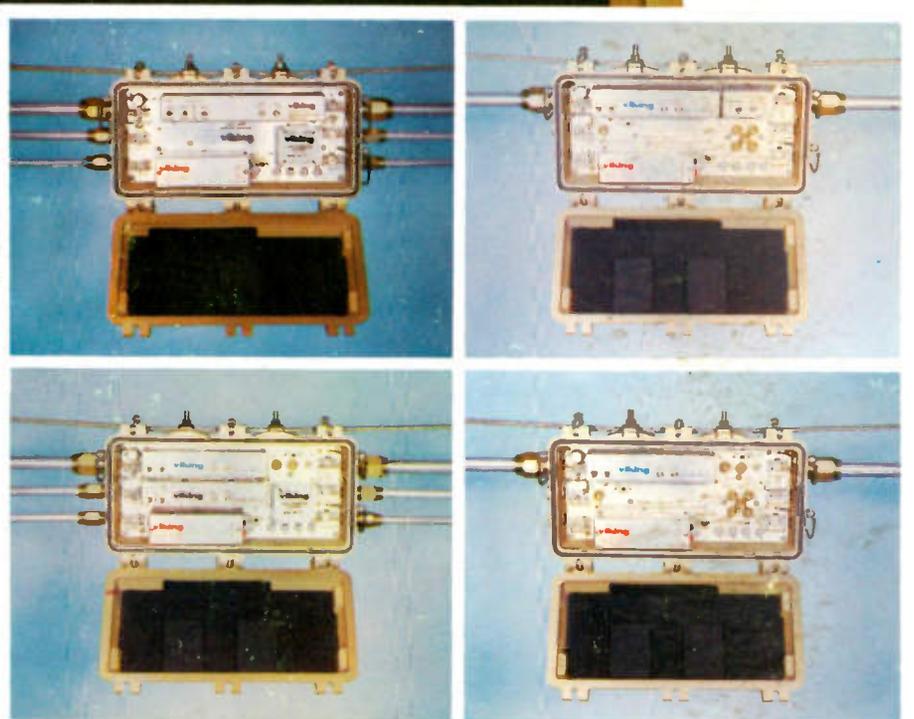
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