



April 1968

# *TV Communications*

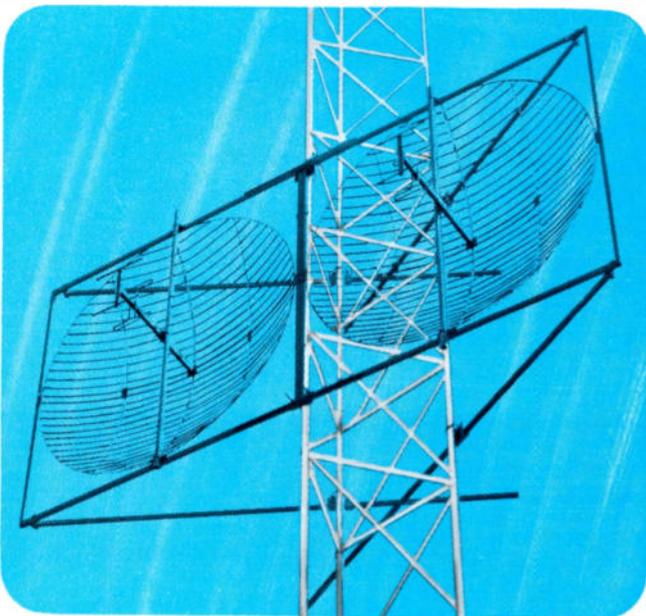
The Professional Journal of Cable Television



**SPECIAL  
CONSTRUCTION  
EDITION**

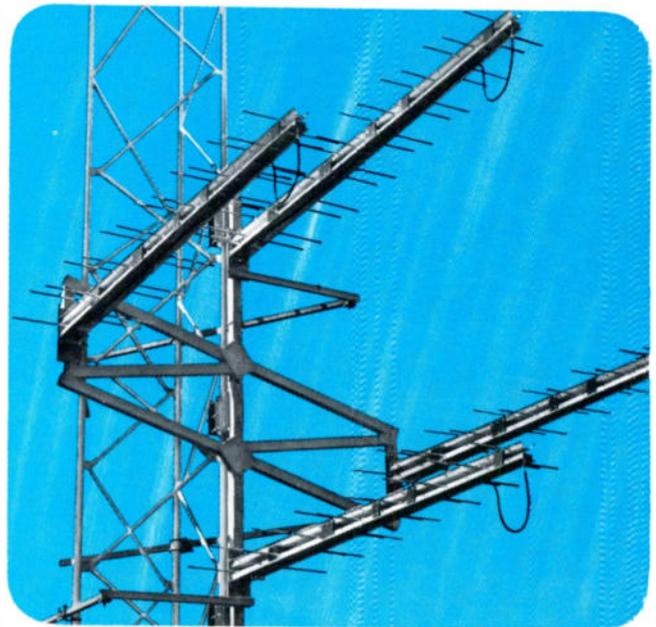
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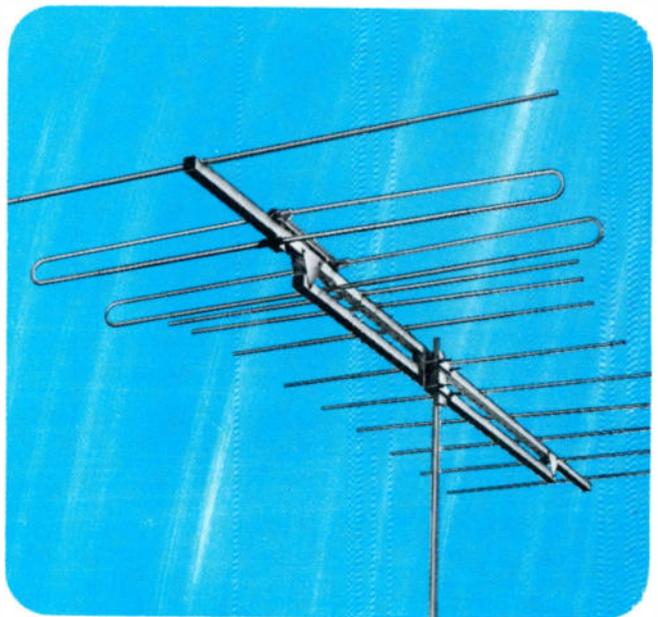


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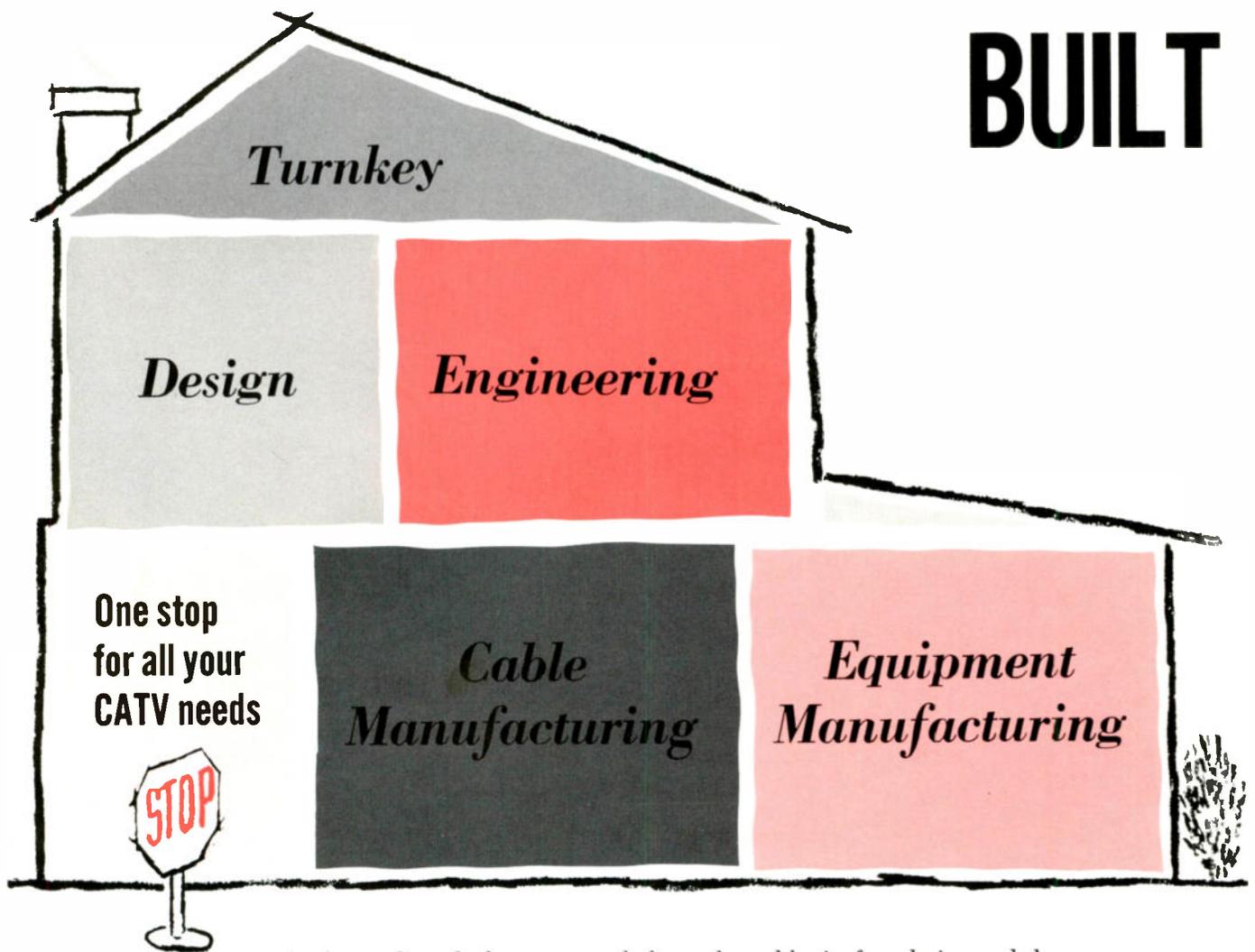
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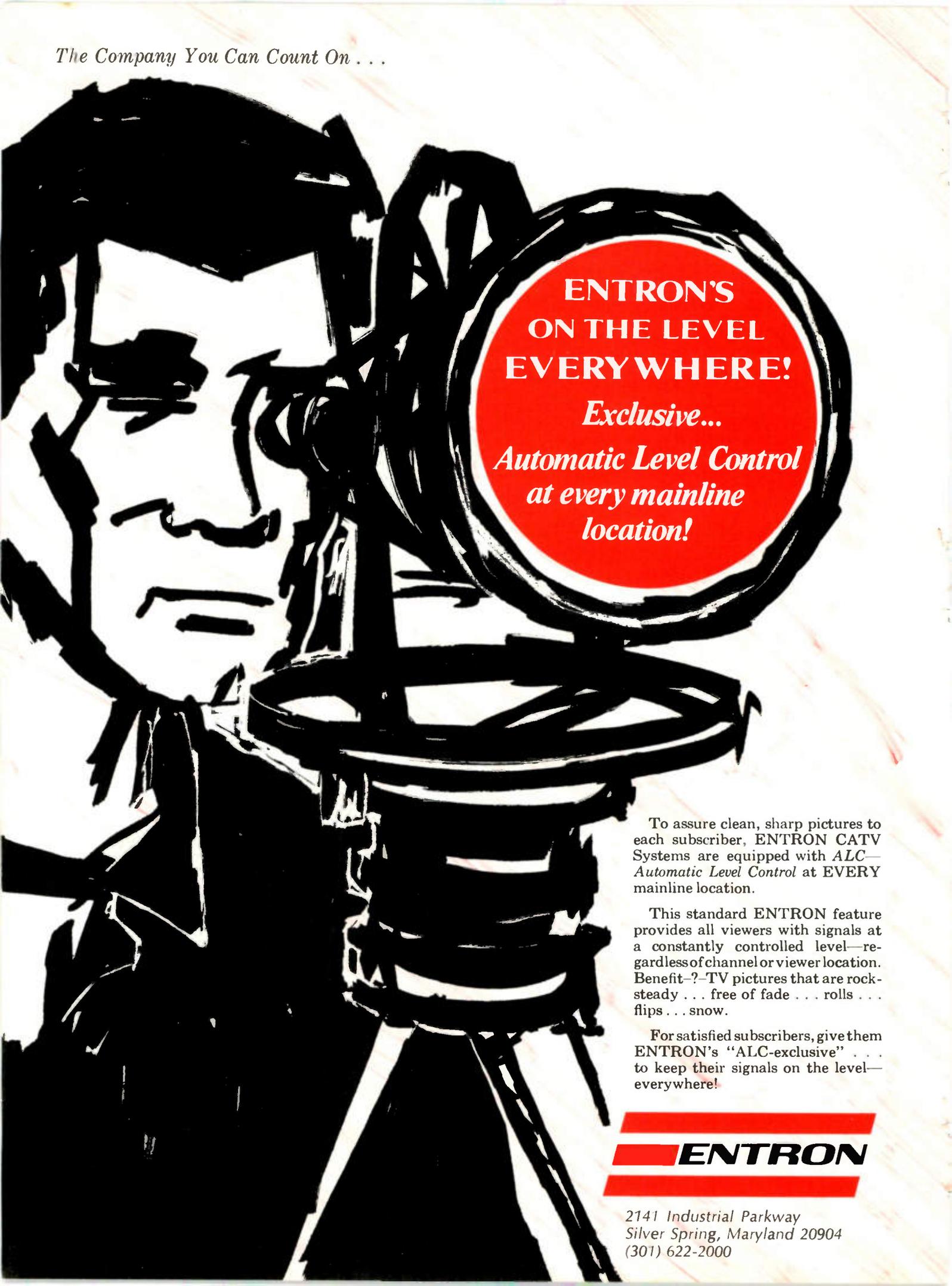
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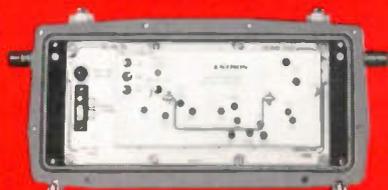
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## IN THIS ISSUE

### Emphasis on Construction...

Beginning on page 44 of this issue, is a review of construction standards as practiced — and occasionally ignored — by the cable television industry. This special TVC staff report and analysis brings into focus the real costs of inferior construction and maintenance to the individual system operator and to the industry as a whole. See *"The Dangerous Minority."*

The presence of system personnel or outside construction crews on your community's streets, and on your customers' property, is a critical point for developing and maintaining good public relations. This will very likely be the most significant contact many residents have with the cable firm, and their attitude and understanding during construction operations can greatly affect your saturation. On page 53 of this issue, read Ed Cooper's article, *"Your Public Image During Construction."*

A readily recognized element of system construction is the selection of equipment and materials to go into the plant. Because of the emphasis usually placed on such major items as amplifiers and distribution cables, the importance of using the proper drop cable might be overlooked. Jerome Cohn's *"Choosing House Drop Cables,"* beginning on page 58 of this issue, is a comprehensive discussion of factors which should dictate this decision.

Several approaches have been brought forth for increasing cable system channel capacity beyond 12 channels. Beginning on page 83, Gay Rogeness discusses *"Engineering Considerations for use of Midband Channels,"* analyzing the variation of system or equipment design necessary to add channels in the 120-174 MHz range.

A standard feature of each TVC Construction edition is a complete quick-reference listing of all active CATV construction firms serving the industry. This ever-growing list will be found starting on page 76.

**Our Cover:** This month's front cover photo was supplied by Davis Manufacturing Company, whose trencher is shown at work on the new system in Colorado Springs. (*TV Communications* pays \$20 for color photos supplied by readers and selected for publication. Both transparencies and glossy prints are accepted — materials returned on request.)

# TV Communications

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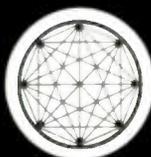
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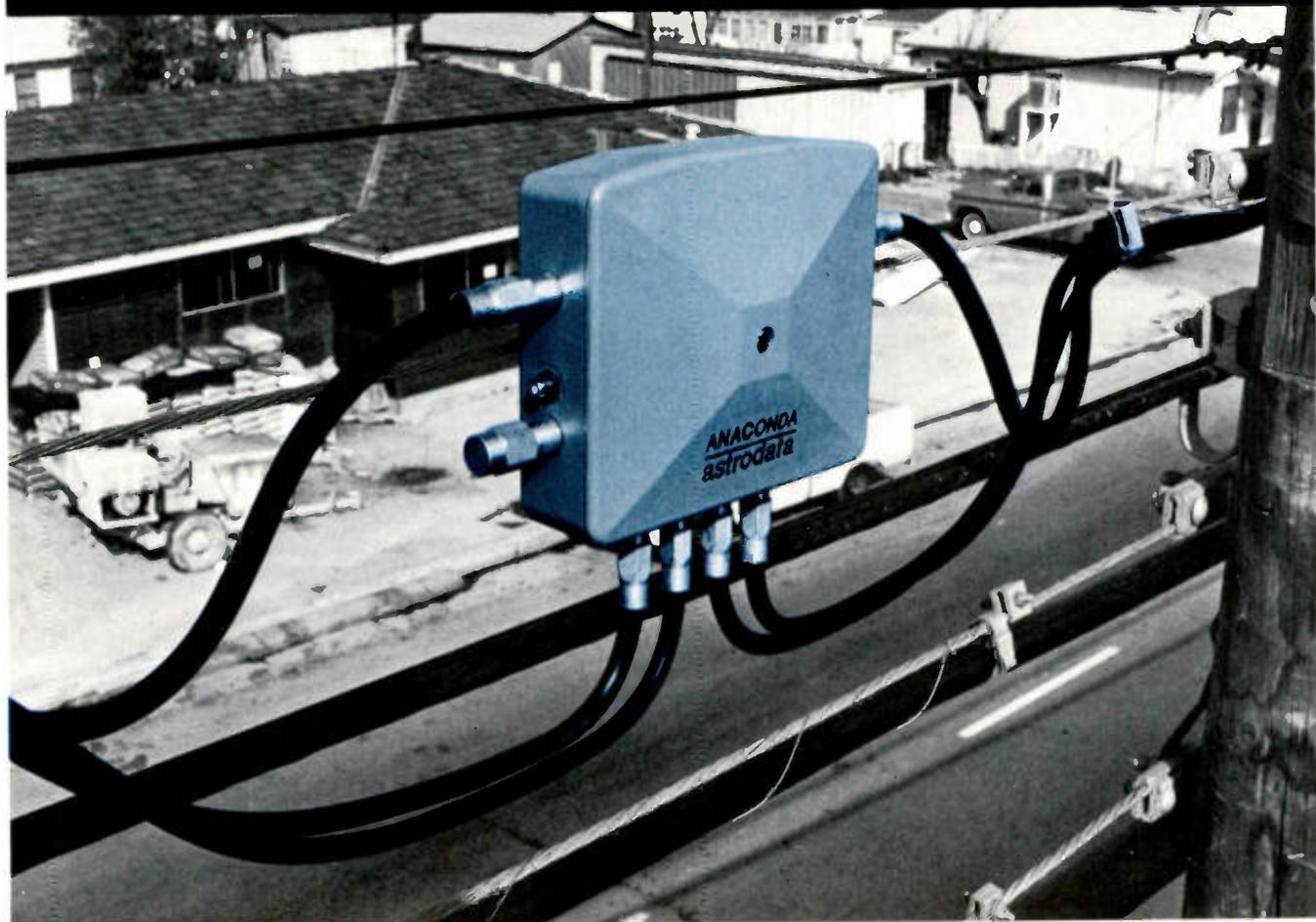
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# The TVC Viewpoint

## EDITORIAL



### A Very Real, Urgent Threat

Every cable operator is thoroughly familiar with the traditional "foes" of CATV. He has encountered some of them first-hand — and has read about all of them in this column. But there's one threat — possibly the most menacing — that we've never mentioned. Hundreds of cable operators live daily with it, apparently in total oblivion!

The "enemy within" the cable television business is the sub-standard, sloppy, frequently unsafe condition of many CATV plants. The threat posed to the future welfare of individual system owners and to the entire industry is very real . . . very urgent.

Far too many systems harbor widespread conditions of unsafe, unsightly and sometimes illegal plant construction. The manner in which the cable plant is constructed and maintained affects (1) service to the subscriber; (2) safety of CATV and public utility personnel; (3) safety of the public; (4) community relations, and (5) the long-term ability of the operator to provide service to the community.

Sub-standard or outmoded cable facilities are an open invitation to public criticism — which can easily take the form of "corrective legislation." In one state, "sloppy construction" was the keynote of a *nearly successful* drive to bring CATV under regulation by the Public Utilities Commission!

Poor service and unsafe or unsightly cable plant frequently figure in franchise renewal difficulties. And some city councils have threatened to cancel permits or have solicited entry of a competitive cable system to "overbuild" an operator they feel is not coming up to reasonable standards.

These are practical, dollars-and-cents reasons for eliminating poor layout and sub-standard construction. But an even bigger reason, overshadowing these, is your obligation to guard the safety of your employees, utility linemen (where poles are in joint use) and the general public. What is the life of a technician worth? Can there be any justification for knowingly tolerating a dangerous violation of climbing space requirements . . . or a few inches' separation between CATV distribution cable and power lines?

There are plenty of "outsiders" waiting to answer that question for you. Local government officials . . . telephone people whose linemen object to having to work around your plant . . . state legislators . . . state safety inspectors . . . and regulation-minded citizens may forcefully bring such matters to your attention.

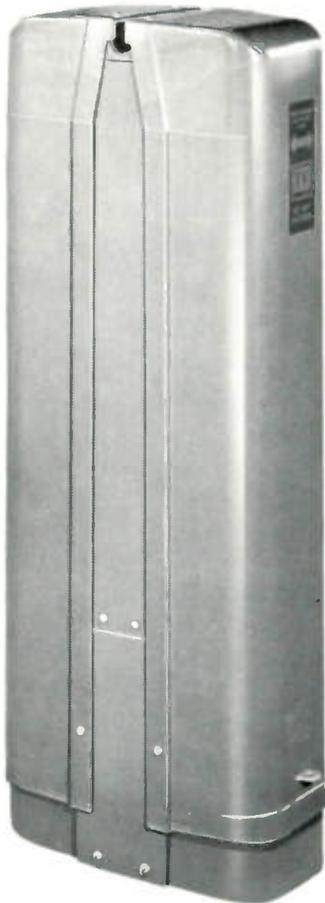
Cable television companies like to talk about "Public Service." Aside from the fact that good pictures result from properly constructed plant, the first step in serving the public is to not endanger the public — including those who work for you.

Cable television has enough enemies and problems without creating new ones. See "The Dangerous Minority," beginning on page 44 of this issue, for some examples of sub-standard conditions that jeopardize the local and national welfare of CATV. Cable operators who recognize similarities to their own systems in the bad examples cited should take immediate remedial steps.

What's that? You say rebuild and rearrangements cost money? So does PUC regulation. Poor utility relations . . . unnecessary outages . . . lawsuits . . . and a bad public image cost money, too. This matter deserves the serious contemplation of everyone in the CATV industry.

*Stan Searle*

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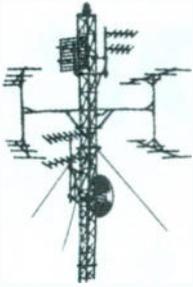
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# CATV Industry PERSPECTIVE

1968 is shaping up as a year of tremendous technological achievement in cable television--at least at the drawing board level. Color origination equipment is already being specially designed for cable television and will be operational in several systems before year end.

Convertors to eliminate local signal interference and to permit more than 12 channel operation are being marketed at a steady rate, while engineers ponder a standard set of frequencies and channel identification for the new polyband equipment.

Performance monitoring equipment is now available which "reads out" any out-of-tolerance signal level condition in the entire CATV system. The Advanced Research Corp. system continuously reports performance status at any desired number of amplifier stations. It also provides head-end monitoring, memory circuits, two-way voice communications and cable system burglar/vandalism alarm service.

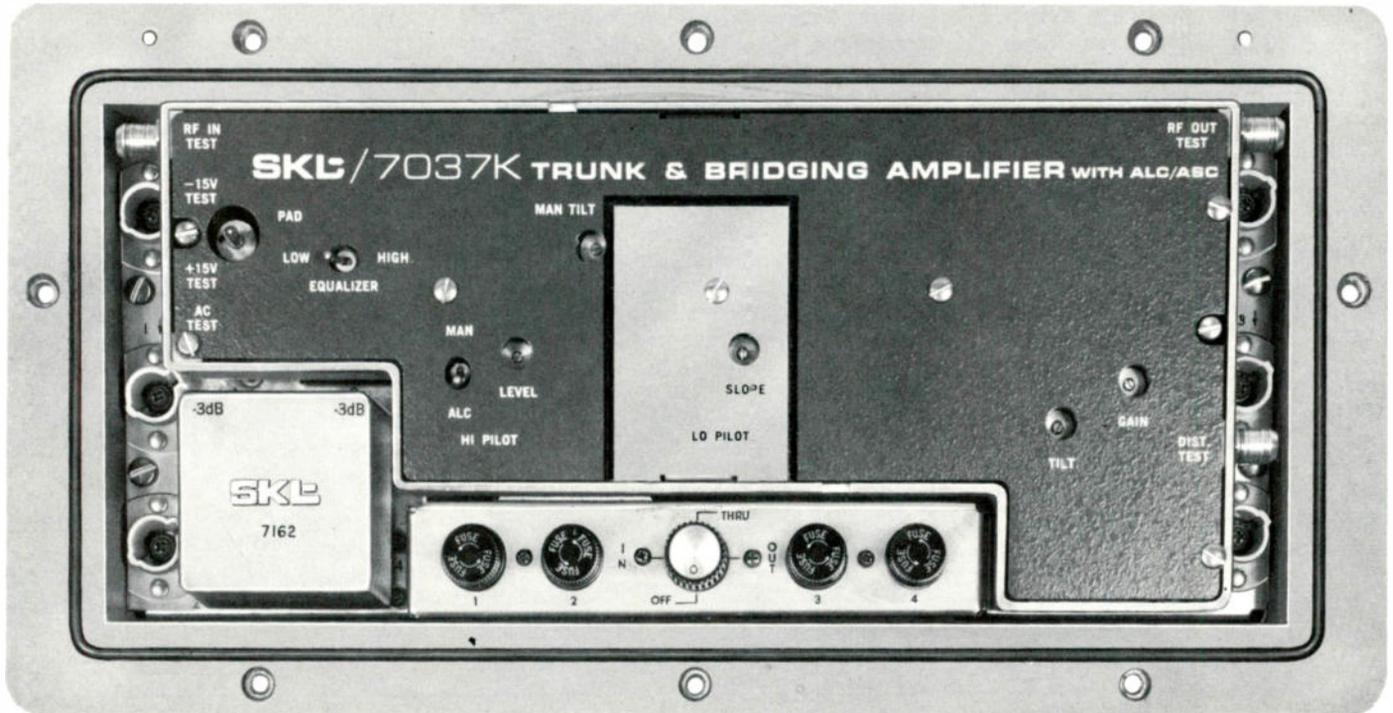
Additional equipment to improve cable system performance and broaden subscriber services potential will undoubtedly be introduced this year. Look for some eye-openers at the NCTA convention in Boston June 30 - July 3. Same old problem of delivering the advertised product will, no doubt, continue to plague manufacturers.

"Software" aspect of local origination market is beginning to shape up. This year will see first serious, qualified attempts to market films for CATV on a national basis. Several firms will be in contention for the market, which is still quite limited. A restrictive copyright ruling--or legislation--could cause demand for locally originated films to explode literally overnight. Systems faced with loss of popular imported channels will immediately try to replace them with films and locally produced material. Some could go to closed circuit operation exclusively.

Microwave-fed cable television systems face serious challenge in recent FCC transfer of 6 Gc CATV common carriers to 11 Gc service. Telco inspired transition spells real trouble for many common carriers and could affect their continued operation. Although not large compared to AT&T, some of the common carriers serving a CATV clientele are capable of putting up a good fight. Final determination of whether microwave for cable systems will be relocated in the higher bands may be made in the courts.

Increase in pole rental rates has been announced by at least one division of the Bell System. Mood of operators suggests that a showdown, rather than compliance, may be industry reaction. Threat of cable service rate increases may be used to enlist public support of cable companies. We predict some rough regional skirmishes.

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# Construction Reports

**Parker, Ariz.** — FCC microwave petition approval was announced recently by Joseph N. Ashford, president of Res-Con Consultants, Inc. The proposed system will bring 3 network channels from Phoenix and a channel from Arizona State College. System construction has begun.

**Blytheville, Arkansas** — A 9-channel system is under construction in this city.

**Ladysmith, B. C.** — L&C Cablevision has awarded a contract to B. C. Cable Contractors Ltd. for a 10-mile cable system.

**California** — Riverside Communications Co. of Rubidoux has completed half of a proposed system to serve Indian Hills, Jurupa Hills, Rubidoux and Sunnyslope. Twenty miles of cable have been installed and over 100 drops have already been made.

**Wailuku, Maui, Hawaii** — Hawaiian Cable Vision Corp. has scheduled its

first house drop. The system, purchased last fall from Lahaina Light and Power, has been undergoing a \$250,000 expansion/improvement program. It will carry signals from Haleakala and FM channels from Oahu.

**Russell, Kan.** — April 1 was set as opening date for cable service by Lee Hallett, president of United Transmissions Co. The Russell system will carry local channels and will also microwave in network affiliates from Kansas City and a Topeka U. A local origination channel will offer music and weather.

**Glen Gardner and Hampton, New Jersey** — Washington Cable Co., which already passes 1200 Washington homes, is installing service to Glen Gardner and Hampton. Leaseback arrangements are being negotiated with the New Jersey Telephone Company.

**Galion, Ohio** — April 1 was the date set for energizing the Galion, Crestline system. The 365-foot tower erected by Advance Industries of Sioux City, Iowa, will receive 11 channels from Columbus, Cleveland and Toledo.

**Ardmore, Okla.** — The addition of

microwave, announced by Bob Lewis, manager of Ardmore Vumore, will allow subscribers to receive ETV channel KTEA from Oklahoma City.

**Burns and Lakeview, Oregon** — Burns Hines Cable Co. announced installation of 55 miles of cable for systems in these communities. Power Line Construction Co. is turnkeying the system for Jerrold Electronics Corp.

**Seattle, Wash.** — Dick Evanson, president of Telecable of Seattle, has announced completion of 50 miles of distribution system in Seattle's Greenlake area. Power Line Construction Co. installed the plant for Telecable.

**Orangeville, Ont.** — Orangeville Cable-Vu has announced that construction has begun on a system for this city. Noram Cable Construction Ltd., shareholders in the corporation, is doing the engineering. Pole rental agreements have been signed with the Orangeville Hydro Electric Commission.

**Manchester, Vt.** — J. J. Mueller of Manchester TV Corp. has announced that engineering has begun on a new system to service the Stratton Ski area. TV

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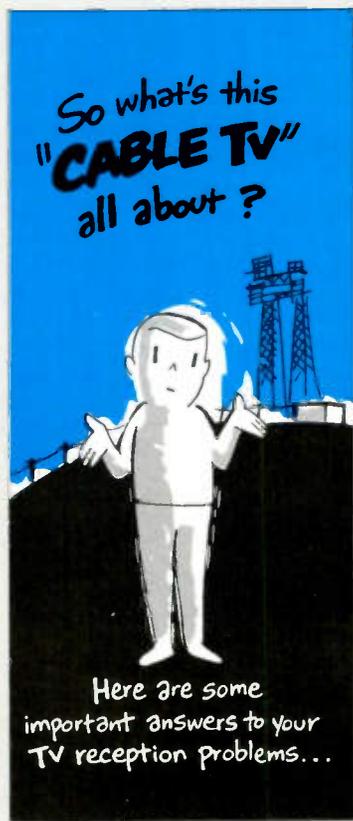
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**Shows how broadcast signals and CATV antennas work.**

**Pictures a typical Cable CATV home installation.**



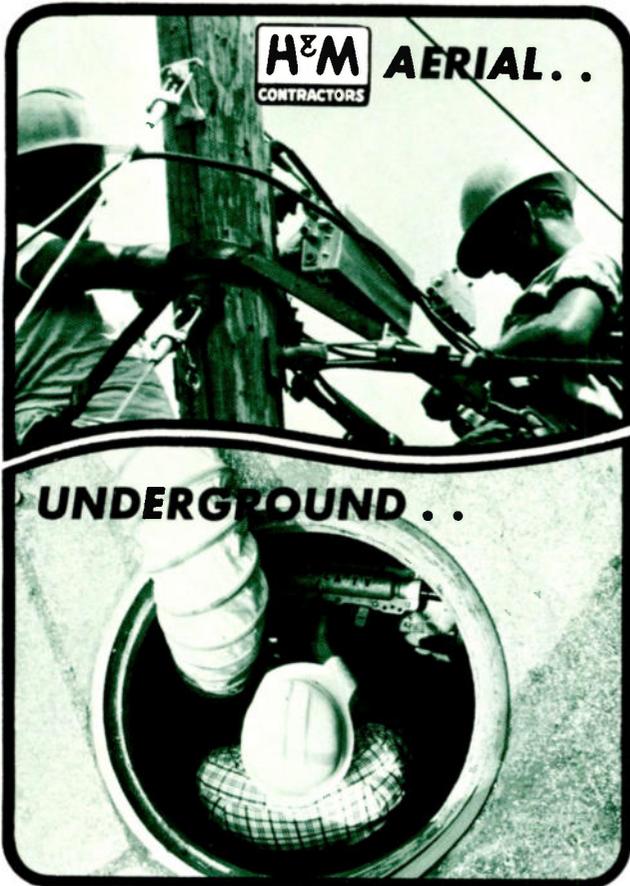
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### CATV MANAGEMENT CORNER

## Management Indecision

The first group Dante met in the Inferno were the wretched souls of those who could not make up their minds. They had lived without blame and without praise. Heaven cast them out and Hell would not receive them.

It's true, fortunately, that decisiveness is a principal and important characteristic of men who operate small businesses; the majority have built their careers on this ability to make good choices. "The buck stops here" may well be written over the desk of the system manager. An automatic calculator cannot be used to take over his responsibilities. A statistical machine clarifies the alternatives or may help narrow the area of risk, yet some risk remains. The manager's final choice remains his own.

Typically, this choice is made under pressure of time, with facts that are far from adequate. Most men must struggle against psychological and emotional blocks as well. Certain operators show few signs of struggle; they always seem to know what to do. A closer look at such a man may reveal that he hasn't faced a major choice in years. He did all his deciding years ago, in those heroic days when he started his system or won his way to its control. Today he may move in a rut deep enough to hide the realities of the world outside.

More common than the man in a rut is the man in a hurry; the manager who plunges into a choice as though driven by devils. Hair-trigger decisions (along with ulcers) form part of the stereotype this man fits into; the urge to decide is part of the essential urge to get things done, and some things get done that might better have been left undone. There's a vast difference between the prompt, adequate decision based on facts and judgment, and the impulsive driven decision.

Still the plunger has one advantage; he does make some sort of choice and thus clears the decks for action which has at least a chance of success. Far more handicapped is the drifter, the man who cannot make up his mind.

Habitual indecision not only prevents the growth of a business, but also disrupts current operations and destroys morale. A frequent cause of employee frustration, and a major factor which contributes to a climate in which cable firms cannot grow and develop is the unavailability of decisions from system managers who reserve the right to make them.

Persons with two opposite types of personality difficulty may have special trouble in deciding. The professional "strong man" who can be happy only when he dominates all situations has a pathological fear of failure. He worries even over small decisions, because if the slightest thing goes wrong it may crack his armor of infallibility and endanger his control.

The dependent character, whose self-esteem hinges on the liking and approval of his associates, has an even tougher time. When forced to make a choice, he tries to appease the contradictory demands of all persons concerned, and thus achieves total confusion.

In an industry such as ours, the system manager who becomes an effective decision maker can reach as far, climb as high, decide as daringly, as his basic abilities will allow. But he must remain aware that all decision is compromise, no plan is perfect. With his eyes open, he must choose from the various alternatives available in each situation. He must use past experience as his guide, yet be careful to give due consideration to the unlimited possibilities of the future. He must develop and nurture his decision-making ability if he is to keep pace with the exploding world of CATV.

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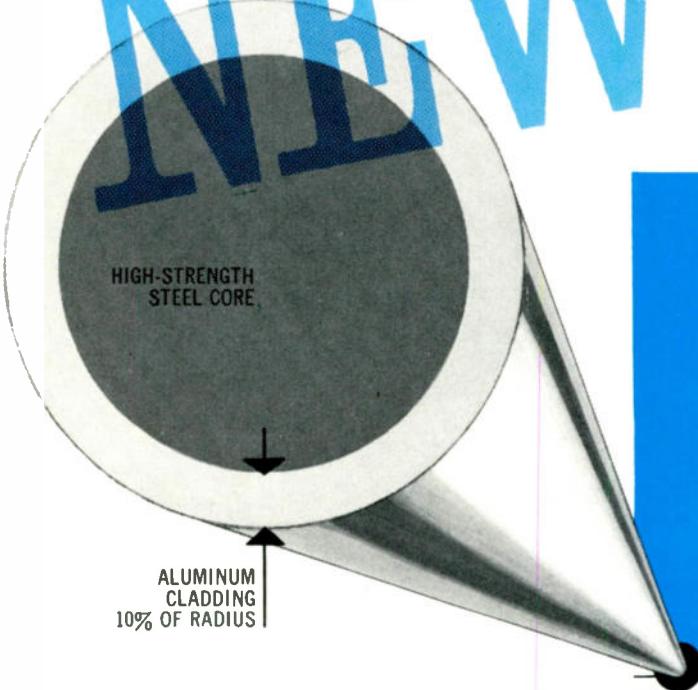
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# Late News

## NAB BUILDING A "WAR CHEST" TO FIGHT WIRED CITY



*John F. Dille, Jr.*

In an earnest speech before broadcasters in attendance at the National Association of Broadcasters show in Chicago, John F. Dille Jr., chairman of the Future of Television Committee denounced the concept of the "wired city" and warned broadcasters that they may be called upon to help fund a "war chest" with which the NAB hopes to defeat the idea. Dille warned that the threat of converting television broadcasting from on-air service to cable must be taken seriously by all broadcasters, saying, the wired city concept "would envision a deliberate national project to phase out broadcasting and phase in wirecasting to the ultimate end that every American home would receive all of its television by cable." He said all broadcasters will be engaged "in what could turn out to be a fight for the very survival of free television in the United States."

Dille went on to say "It benefits us all to identify the problem and to understand the arguments that may be made in support of a new type of telecommunications . . . We must face the fact that many of the points that have been made in favor of a 'wired city' have immediate superficial appeal to those in high places." Dille listed some of the "arguments" put forth by wired city proponents and encouraged broadcasters to be ready to meet these reasonings with counter arguments.

## COPYRIGHT STYMIED WITHOUT HOUSE HEARINGS

The promised hearings by House Commerce Committee on copyright and pay-TV now look unlikely, according to Washington observers. There is nothing on the Committee schedule and no prospect that there will be as the session fades toward the summer rush for adjournment, although Committee Chairman Harley O. Staggers (D—W. Va.) and Communications and Power Subcommittee Chairman Torbert H. Macdonald (D—Mass.) have been toying with the idea of hearings for months. Last year the Committee forestalled FCC activities leading toward approval of pay-TV with a promise of hearings early this year. A Committee resolution calling for another such postponement may be in the offing this session and such a request would almost certainly be honored by the present Commission.

Chairman Staggers and the Committee protested last year when the House Judiciary Committee reported out a bill providing for varying degrees of CATV copyright liability. Commerce felt it was an encroachment by the Judiciary Committee on their territory. Acceding to Chairman Staggers' Committee, the House clipped the entire CATV section on the promise of hearings. The Senate Judiciary Committee presently has a copyright bill. If that bill is passed by the Senate, the House may again block passage of the CATV section over which the Commerce Committee feels it has jurisdiction.

## SYSTEM WINS IMPORTANT STAY FROM 9th CIRCUIT

In a rare move which could be precedent-setting, the Ninth Circuit Court of Appeals has ignored FCC objections and granted a Washington cable firm 60 days in which to prepare legal arguments to be presented to the court. Port Angeles TeleCable originally submitted a petition to the FCC for waiver of an order requiring the system to protect KVOS-TV, Bellingham. The informal petition filed by the system manager failed to include legal reasons

# Late News (Continued)

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why the waiver should be granted—nor did it request a hearing. The FCC denied the petition. When the system secured counsel, Robert D. L'Heureux, and asked for a review of the Commission's decision in the U.S. Court of Appeals, the FCC protested saying that since the legal arguments hadn't been raised in the petition, they could not later be raised in court.

L'Heureux challenged the Commission and requested the court to grant a stay, allowing the system time to prepare its legal arguments. He told the court, "The system manager filed an informal petition prescribed by the Second Report and Order. Port Angeles Cable is also a member of NCTA, and the association has filed extensive briefs regarding waivers." The court upheld L'Heureux's argument and granted the stay, a decision which the attorney called "very encouraging." Several systems have filed their own informal petitions which did not include legal arguments and since the court has approved L'Heureux's argument, the systems may be able to look to the Ninth Circuit for precedent.

## COMMISSIONERS AIR "FAMILY FIGHTS"

When the Senate Judiciary Subcommittee on anti-trust and monopoly requested FCC testimony at recent hearings, they were asking about the effects of the proposed "Failing Newspaper Act" on broadcasting—not about CATV. What they got from FCC Chairman Rosel Hyde was brief testimony on the legislation—and a lengthy recital on cable television.

Hyde presented the majority statement on the newspaper act to the effect that the bill is not within Commission jurisdiction. He testified that newspaper ownership has presented no problems and is being adequately dealt with on a case-by-case basis. The subject of cable TV came up in the context of Hyde's comments on the dangers of monopoly and the Commission's concern with concentration and diversity in communications media. He said, "Jurisdiction has been asserted . . . only to the extent necessary to prevent disruption of our television allocation goals . . . as with newspapers, we can consider joint CATV-broadcast ownership in our broadcast licensing activities." Hyde then went on to give detailed background on the FCC's handling of the systems.

If the subcommittee members were not particularly interested in the Chairman's remarks, the other FCC Commissioners certainly were—and their reactions resulted in the public airing of bitter policy battles which usually take place behind closed doors. Commissioner Lee Loevinger said the FCC is already going too far and that it is tending to substitute the "judgment of regulators for the workings of the free market," to the detriment of genuinely free competition and the public interest. He said, "What has greatly shaken my faith in the ability of a regulatory agency to regulate an industry is its inability to control its own staff." Commissioner Nicholas Johnson commented that it is "a question of whether (broadcasting) interests are already so powerful that the FCC, Congress and the President are unable to control them." On the question of monopoly, the Commissioners were widely divided. Hyde contended that there is no concentration in TV nationally and "it is not characterized by concentration in any market." Commissioner Robert Bartley, on the other hand, said the three networks and multiple owners such as Taft, Cox, Westinghouse and Storer are monopolizing the largest markets. He added that most became multiple owners, not through comparative hearings at which the FCC could choose between applicants, but by the device of buying existing stations. Johnson said that, while advertising and other monopolies of this type are important, "far more important to the FCC is the market for ideas. That is our relevant market."



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# News SPECTRUM

## Supreme Court Hears Copyright, Jurisdiction Arguments

A Supreme Court hearing is always high drama. The justices in their classic robes . . . attorneys in full formal dress . . . impressive arrays of legal volumes. But it is more than storybook drama when the welfare of thousands of men and women in cable television hangs in the balance.

On Tuesday, March 12, the nine justices of the United States Supreme Court heard oral argument on the two major issues facing the cable television industry today — FCC jurisdiction and copyright liability. The San Diego case, argued first, presented basic questions of the Commission's authority to regulate CATV. The Fortnightly case which followed dealt with the issue of copyright payment by cable operators.

These scant four hours of argument climaxed years of litigation in lower courts. The Supreme Court now has before it the full records of the court proceedings thus far; it has voluminous briefs and memoranda on each litigant's position; it has numerous friend-of-the-court briefs from many parties in interest. All designed to aid — and persuade — the justices in making their joint judgment.

What exactly will be the import of the judgment? . . . It is unpredictable. Both cases could be settled on narrow grounds that would leave major questions still unsettled. If the Supreme Court agrees that the FCC had no right to issue the order in San Diego, it could do so on grounds which would still leave the issue of FCC regulation unsettled. However, if it upholds the Commission, it would automatically uphold the right to regulate. In the copyright case, Fortnightly based its argument on nearness to the stations it carries, and if the Supreme Court decides

merely there is no copyright liability in a station's coverage area, this would leave liability outside this area still open to legal question. If, however, it decides CATV is unconditionally liable, that would be a national precedent with tremendous impact.

All of the explanations, defenses, arguments are past now, and all the evidence in. Brief summaries of each of the major arguments are given below. The Supreme Court's decisions, whether narrow or broad, will be based mostly on this information.

### SAN DIEGO ARGUMENTS

Aided by questioning by one of the justices, Southwestern Cable lawyer Arthur Scheiner and Mission Cable TV attorney, Robert L. Heald, mounted a strong attack on the FCC's assertion that it must regulate CATV to preserve local service. Scheiner and Heald asked the Supreme Court to uphold an Appeals Court decision striking down an FCC interim order to San Diego CATV systems not to expand pending a hearing on CATV impact on local San Diego stations. The FCC and Midwest TV, on the other hand, pleaded for reversal in the *San Diego* case.

Henry Geller for the FCC was the first to argue. He attacked CATV, saying that it does not serve rural areas, that it is a form of pay-TV, and that it is not a local service. Geller also contended that ghetto residents will be deprived of television if CATV becomes the major means of distribution. The FCC's rules of local station carriage and non-duplication, he said, are necessary for protection.

He based the Commission's case on CATV's impact on TV alloca-

tions policy and the threat to FCC jurisdiction. Geller emphasized particularly the Congressional and Commission policy of encouraging maximum local TV service and the development of UHF. "CATV can be helpful," he said, but he argued that, in San Diego, cable represented the destruction of local stations, particularly UHF.

### Justices Question Geller

Justice Byron White questioned the issuance of such an order as that in San Diego without an evidentiary hearing. Geller answered that all the pleadings were on record. He said, "The FCC was trying to get the facts and get them before it was too late . . . once a CATV becomes entrenched . . . people come to rely on it . . . and it can't be dug out."

Justice Abe Fortas asked, in view of the FCC desire to protect local TV service, whether the FCC required network affiliates to provide any local program service. Geller admitted that the Commission has no such requirement, but said that average local service by network affiliates on a voluntary basis is 16% of air time. He conceded that about half of that is news. In answer to another question by Justice Fortas, Geller admitted that cable-carrying network affiliates are regulated only through common carrier rules. Fortas asked, "Is there a difference between the power to regulate network cable and power over CATV . . . Is there a meaningful difference?"

Justice White then asked if the FCC would claim jurisdiction if there were no impact on broadcasting, and Geller responded that the Commission would have the jurisdiction but would not use it. He denied the Commission has ever disclaimed jurisdiction in the past and said it merely held CATV at that time had no impact on broadcasting.

### Scheiner Rejects FCC Jurisdiction

Arthur Scheiner for Southwestern Cable was first to argue the CATV position. He claimed the FCC has no jurisdiction over interstate communications by wire, except for common carriers, and that the Commission has never

asserted any such power despite thousands upon thousands of miles of non-common-carrier interstate communications wire. He referred to AP, UPI and network cables over which the FCC had expressly disavowed authority, and he said an "absolute and four-square analogy to the networks," exists in CATV cable.

Chief Justice Earl Warren asked whether there would be any regulation of CATV without FCC regulation. Scheiner said CATV is regulated at the state, county and city levels. Warren replied that the effects of CATV go beyond state lines and that one state is not interested in protecting another. Scheiner pointed out that the FCC can ask Congress for power to regulate CATV, and that the Commission has in fact asked for such power and Congress has not seen fit to confer it.

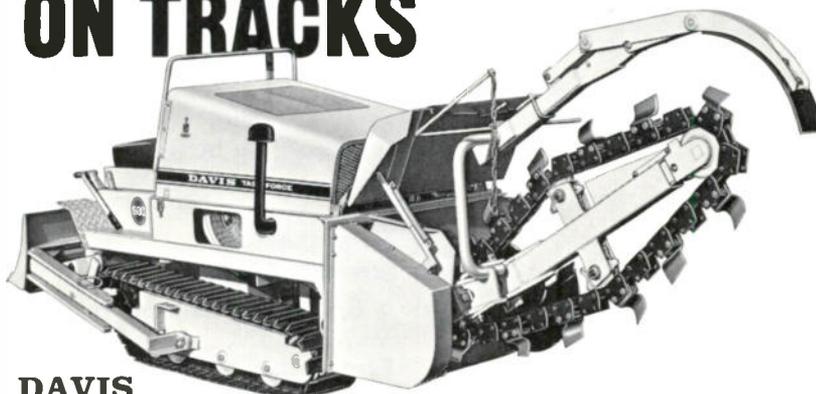
Scheiner also criticized the Second Report & Order. "The first time we will be advised of what the Commission intends to do," he said, "is when the Commission issues its final report . . . we have been in the dark." He accused the FCC of saying, in effect, "we can change the rules of the game at any time we please for anyone we please." And he added, "That is the standard on which our case has been tried." He termed "an anomalous situation" the fact that a microwave system regulated by the FCC could exist side by side with an all-wire system, and said this is only one of the complexities demonstrating that Congress should make the final decisions.

#### "FCC Powers Not Limitless"

Robert L. Heald, lawyer for Mission Cable TV, said the FCC can't regulate CATV because the law specifies that regulation must be in furtherance of the Commission's licensing function. If the FCC is to regulate CATV as radio transmissions, then it must follow procedures laid down by Congress such as qualifications of applicants for licenses, etc., he argued. The FCC's CATV rules, he said, are designed solely to protect stations from competition. Heald added that Congress did confer broad powers on the FCC, but "this court has



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said these powers are not limitless."

Heald pointed out that the Commission was directed by the court to consider economic impact of new broadcasting stations on existing ones, yet it has never withheld a broadcasting license for that reason. Now it seeks to protect stations from CATV which could be a prime source of competition for the networks. If there is a need for protection, he argued, Congress should make the decision. "A federal agency should not be allowed to pick itself up by its own bootstraps and enter a new field."

### **Fortas Questions Broadcasters' Statement**

Ernest W. Jennes, representing Midwest TV, was hit by Justice Fortas when he summed up the case for San Diego broadcasters with the remark that the FCC's power to regulate CATV flows from explicit language in the Communications Act. Fortas said, "Explain to me how CATV fits into that definition" in the Act.

Jennes said the San Diego situation presents a "clear and present danger" of concentrated control of information media in that Los Angeles stations might dominate the San Diego market.

### **COPYRIGHT ARGUMENTS**

Robert C. Barnard, representing Fortnightly Corp., asked the Supreme Court to reverse anti-CATV lower court decisions putting the industry fully under copyright laws. The film industry's Louis Nizer argued for the opposition, asking the high court to sustain the full CATV copyright liability in the *United Artists vs. Fortnightly* case.

Barnard led off the case by divorcing the Fortnightly situation from that of CATV systems which carry distant signals. He told the court the West Virginia systems he represents are in a rugged area within or near the Grade B contours of all stations carried and the public in these areas has been licensed by copyright owners to receive the programs by whatever means they choose.

He said the systems originate no programs, and that, if there is any

rendition of United Artists movies, it is in the private homes of subscribers. In order to come under copyright law, he argued, there must be a public performance.

The key question is whether CATV is any kind of a performance, he added, and mere reception of electromagnetic signals conducting these signals to homes is not a performance. Justice Byron White said that stations don't do anything to network's broadcast signals but receive and transmit them. Barnard replied that this is different because the stations in any event are procuring programs for broadcasting, whereas CATV makes no arrangements for any program and doesn't sell advertising.

The "critical question" he said, is what the public could receive off the air by co-op or apartment house antennas or by their own antennas.

In an area where there's no evidence of Congressional intent, he told the justices, the court should consider the Dept. of Justice charges that copyright owners could gain a monopoly over CATV. Past damages alone could mean a take-over of the CATV industry by copyright owners, and even without damages copyright owners could exert practices which might force systems out of business. He charged that copyright owners "want to control competing television stations for their own purposes through exclusive licenses," and said that the Supreme Court "should not strain to expand the statute for this purpose."

### **Nizer Hits "Unjust Enrichment" of CATV Operators**

The famed Louis Nizer appeared on behalf of United Artists, and began by denying that CATV is essentially small-town and small-business. He quoted the cost of Fortnightly's own equipment and cables as in the millions of dollars and said the company takes in \$630,000 a year from 15,000 subscribers. He added that corporate giants and multiple owners are entering CATV and that the industry is going into the nation's largest markets.

Nizer said, "It all boils down to the fact that CATV is taking copy-

*(Continued on page 26)*

## Calendar

**April 19.** The spring meeting of the Mid-America CATV Association will be held at the Skirvin Hotel, Oklahoma City, Okla.

**April 24.** A special technical meeting of the New York State Community Television Association will be held in Syracuse, New York, at the Country House.

**April 25-27.** The Texas CATV 8th Annual Convention will be held at the Marriott Motor Hotel, Dallas, Texas.

**May 7-8.** The NCTA executive committee will hold a meeting in Washington, D.C.

**May 8-9.** The Pennsylvania Community Antenna Television Association will hold their spring meeting at Allenberry On - The - Yellow - Breeches, near Boiling Springs, Pa.

**May 13-16.** The 12th annual convention and trade show of the National Community Antenna Television Association of Canada will be held at the Empress Hotel, Victoria, British Columbia.

**May 17.** New York State Community Television Association will hold its annual spring membership meeting. Place to be announced.

**June 3-5.** The NCTA board of directors will meet. Place to be announced.

**June 4-6.** The 2nd Annual Microwave Exposition will be held at the San Francisco Hilton Hotel, San Francisco.

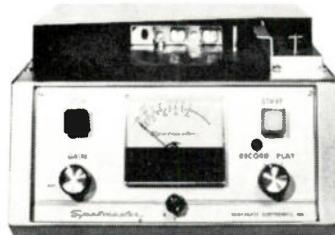
**June 30-July 3.** The 17th annual convention of the NCTA will be held in Boston, Mass., at the Sheraton-Boston.

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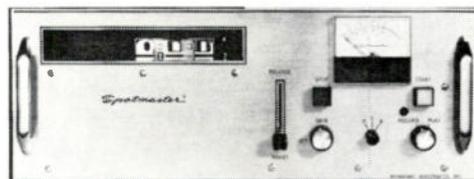
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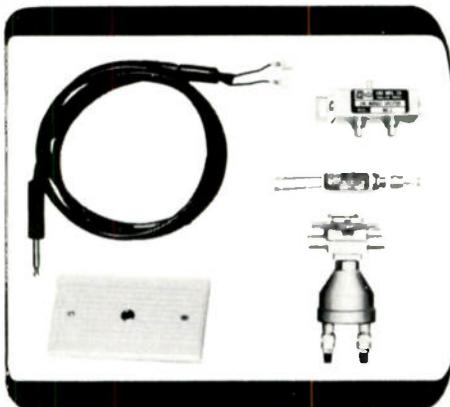
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righters' material free" and terms this "unjust enrichment . . . unfair competition with stations that pay." He also told the court that out of CATV collections, 72% is profit, and he said the average system nets 59% per year on capital investment. These figures are possible, he added, because they don't pay for what they sell.

In answer to questions by Justice Fortas, Nizer promised that the film industry would go easy on CATV copyright terms because "we don't want to hurt our customers." Then Fortas said Nizer appeared to be ignoring the distribution history of the motion picture companies that resulted in a sweeping series of government anti-trust suits against these companies. Nizer said the outcome of these cases, adverse to the industry, guarantees present film industry conduct. He added that "we want to encourage new customers to grow."

He warned that at the rate CATV income is growing, the infant industry will soon outgrow television. He said any exemption of CATV from copyright laws would be changing those laws that are now written, and any effort "to curtail or review or modify the copyright laws is in the province of the Legislature" and not the court.

### **Brennan Questions Grade A CATV Liability**

Justice William Brennan said if there is a CATV system in a Grade A coverage area, there is still only one performance. "How can it become two performances if somebody uses CATV to improve reception . . . what does it matter if in New York City there are a million CATV homes?"

Nizer said that many wouldn't see the program at all if it weren't for CATV, and he added that the first showing of a program usually doesn't pay its costs, that syndication is needed. Brennan persisted, "This is really the nub of this case. Is it another performance?"

Justice Byron White asked why it is a performance if a homeowner with a large-screen set invites people in and charges a dollar. Nizer said reception for profit is a violation, but he said he wants to make clear his industry does not argue for

hampering or for charging for any other reception. He argued against exemption also on the grounds that Congress has always exempted specifically, as in the case of juke boxes — and they bitterly regretted that exemption. CATV, he added, is already the giant that juke boxes have now become.

### **Fortas Questions Benefit To Copyrighters**

Nizer said the only FCC regulatory policy is to lessen unfair competition of CATV with stations, and that the FCC has held much of the problem is due to CATV evasion of copyright payments. He said that only CATV systems will profit by the claimed exemption, but that 16,000 actors, 3,000 writers, 3,300 directors, 17,000 members of ASCAP and 14,000 members of BMI will suffer along with the film companies who have invested millions of dollars in copyrights. Fortas said, "It doesn't shape up that way," the value of copyrights in fact increased by the increased number of viewers provided by CATV. Nizer retorted that copyright owners lose more through loss of outlets than they gain by larger audiences for the fewer stations.

Barnard, in rebuttal, said that if you are going to charge for reception and transmission, you can't exclude master antennas which get their payments through higher rents. Of Nizer, he said, "he wants to prohibit reception so he can practice exclusivity in the market."

These then are the issues. Is CATV detrimental to the local broadcast industry and to UHF stations in particular, or is it simply an extension of existing communications? Is it a threat to necessary FCC regulation of the spectrum, or is it a new medium which provides the prospect of healthy competition with existing media? Is CATV carriage of copyrighted materials "public performance for profit," or is it only a service which improves TV reception? When the decisions of the justices will be announced is unknown . . . the Supreme Court is unpredictable. Hopes are that the opinion will be written before court adjournment in June. But there is no guarantee.

*(News continued on page 28)*

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## 214 Decision Forecast

A full day of oral arguments before the FCC has left the CATV industry hopeful concerning Commission interpretation of Section 214 of the Communications Act and its effect on cable-telephone company leaseback arrangements. Washington attorney John P. Cole, Jr., predicted that a quick decision "would not be unlikely" on the question whether telcos must obtain certificates of convenience and necessity before constructing leaseback systems.

The length of the session was one indication of the importance of the issues. The hearing convened at 9:30 a.m. and lasted until 6 p.m., with only a break for lunch. More than usual interest was evidenced as well, according to Cole, by atten-



*Attorney John P. Cole, Jr. predicts a quick decision on the question whether telephone companies must obtain certificates of convenience and necessity before offering leaseback systems to CATV franchise owners.*

dance of all seven Commissioners

The FCC's Common Carrier Bureau and the CATV Task Force joined with NCTA and other industry representatives, including several state and regional CATV associations, in urging the certificate requirement. Bruce Lovett, NCTA general counsel, raised some of the basic policy questions posed by the case: Does telephone company service include all existing and future telecommunications services under the concept of private-line service?

And who would control construction of telco communications channels if the FCC does not? A Commission refusal to consider such questions, he felt, could result in the Bell System and other companies owning the equipment to provide the telecommunications services of the future "without anyone having made the fundamental decision that this is in the public interest."

Special counsel Harold Farrow was retained to assist Lovett in presenting the issues involved in Section 214 as they relate to companies other than Bell. Farrow said that "the evils of monolithic telephone company control over all forms of land-line communication ...are just as omnipresent within the operating territories of independent telcos as within Bell territories" and that, while General Telephone and United Utilities may be small compared to Bell, they are each of enormous size. "It is no comfort to a man being eaten alive by a tiger," Farrow said, "to learn that he is safe from the risk of being killed by an octopus."

The telephone companies argued that leaseback service is *intrastate* and therefore not subject to federal jurisdiction; and, further, that if the service is held to be *interstate*, it is exempt from Section 214.

Cole, a veteran observer of the Washington scene, predicted that, for once, the Commission and CATV will see eye to eye. "For one thing," he stated, "it is much easier arguing for jurisdiction than it is *against*." But the "real issue" according to Cole, is which way the Commission will move once jurisdiction is asserted. On that, he said he would have to adopt a "wait and see" attitude. Federal regulation alone would not necessarily be a barrier to the take-over of CATV by the telcos which some industry observers foresee. "Telephone companies have lived with federal regulation before," Cole pointed out, "and they can actually turn regulation to their advantage at times." He did, however, discount the likelihood of this happening. He said he thought the Commission had "learned its lesson" and would be reluctant to create another giant monster.

## Mass. Council Report Due On New Cable Regulations

Charges and counter-charges of "irregularities" in the awarding of cable franchises are still flying in Massachusetts. The Mass. Consumers' Council is due to submit its final report on CATV to the legislature this month. Meanwhile the moratorium on granting franchises continues.

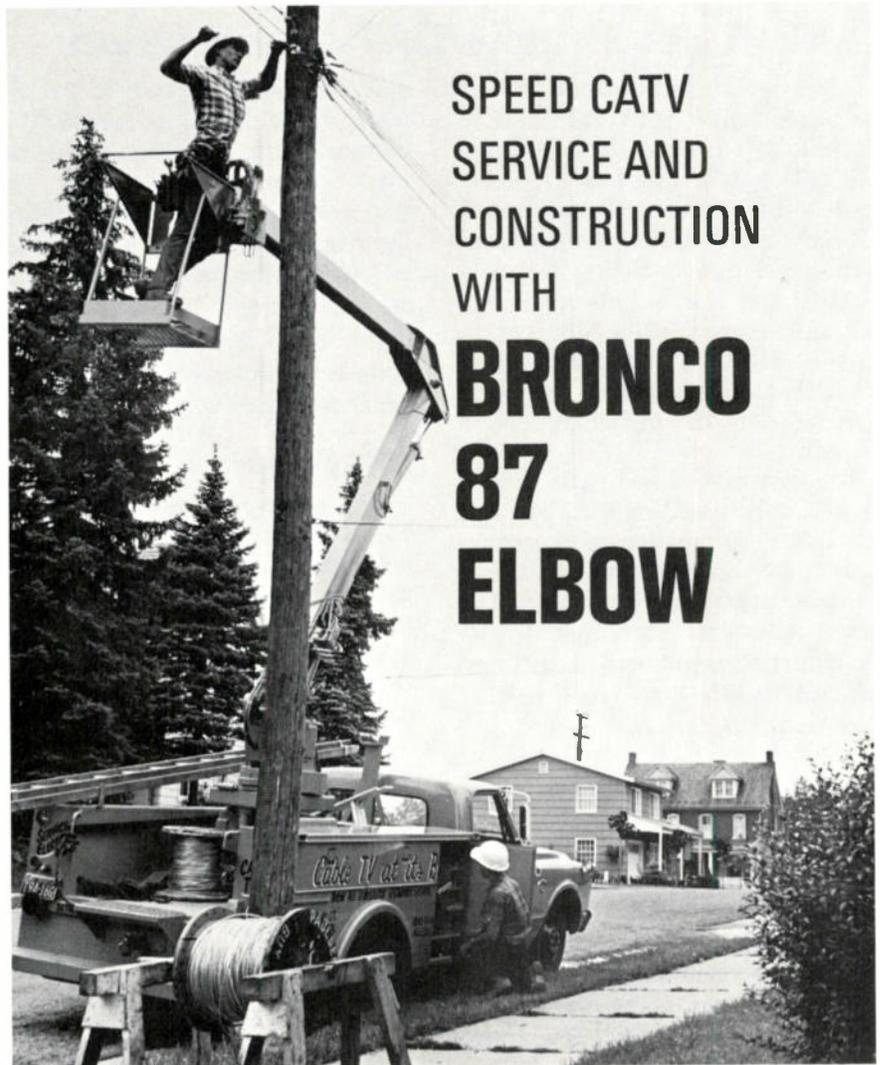
During extensive hearings held by the Council, State Rep. James R. Nolen led the attack on alleged abuses in franchise dealings. In one appearance, Nolen called CATV a "runaway horse" and urged strict regulation of the industry at state and local levels. Following Nolen's charges, the criminal division of the attorney general's office in Boston intensified their investigations. According to one report by the attorney general, matters under investigation include "payoff to local licensing authority" and possible underworld connections with some franchise awards.

The Consumers' Council interim report recommended "governmental regulation of CATV by joint arrangement between the state and municipalities, with primary responsibility for the granting of any franchises resting with the cities and towns." The report stated that such legislation is necessary since the federal government, through the FCC, is not prepared to "regulate CATV rates or the extent and quality of CATV service."

The Consumers' Council final report is expected April 18. According to Dermot P. Shea, executive secretary of the Consumers' Council, "The Council is prepared to recommend to the General Court specific legislation dealing with authorization of CATV systems and recommendations concerning regulation of such systems in the areas of rate charges, technical standards and local organizations, especially of political campaign material.

"These are all facets of the regulatory problems as to which the FCC has disclaimed jurisdiction and which the Council believes should be considered in the public interest."

According to the report, nearly 30 Massachusetts communities are now being served by cable systems.



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## CARS Rules Cripple CATV Origination

Cablemen are still stinging from the latest major blow delivered to the industry by the Federal Communications Commission. All of the implications of the recently released Second Report and Order on Community Antenna Relay Services (CARS) and the simultaneous Notice of Proposed Rule Making (to provide for CATV-originated program transmission) have yet to be realized. But the initial impact is stunning.

The new microwave rules, which became effective March 22, had two purposes: to reallocate common carriers on the spectrum and to set technical standards for CARS. The effect, however, according to no less than three members of the Commission itself, is to erect further barriers to the growth of cable.

### Common Carrier Reallocation

Common carriers serving CATV have been moved from the lower 4,000-6,000 megacycle band to the higher 10,700 to 11,700 band. All new and pending applications must ask for this new band, and when existing licenses come up for renewal in February of 1971, they, too, will be assigned here. Lower frequency renewals may be made, but only on a secondary basis to general and satellite-earth station uses. And all microwave stations within 50 miles of the 25 largest cities (census rank) *must* be in the upper band.

In adopting the Second Order on common carriers, the Commission denied reconsideration of the First Order. Those asking reconsideration were the NCTA; the National Association of Miscellaneous Com-

mon Carriers; a group of 39 common carrier licensees; Jerrold Electronics Corporation and Video Service Company; Micro-Relay Inc.; and the Association of Maximum Service Telecasters. Most of these objected to the rule that to be classed as "common," a carrier had to show that 50 percent of its customers are unrelated to it. The new order retains this rule.

### CARS Standards

The order also set a new bandwidth for CARS, allowing 10 channels, each 25 megacycles wide, in the band between 12,700 and 12,950 mcs. If these prove insufficient, additional channels must be obtained from common carriers. Under "special circumstances," the Commission said, another 10 channels in the same bandwidth might be used. However these (also used by TV broadcast auxiliary stations) are still 25 megacycles wide and overlap the first 10.

To cable operators, the shift to higher, more limited frequencies means higher expenses. According to NCTA, "these higher frequencies will, in many instances, require a greater number of microwave hops to cover the same distance previously negotiated in the lower ranges."

### Original Program Transmission

Significantly, the Commission refused to provide for transmission of CATV-originated programming. Last fall the Commission prohibited using microwave stations in the Business Radio Service (the frequencies previously used by CATV)

for relaying CATV-originated programs. That interdiction still stands, despite a proposal by the Commission's own CATV Task Force which "would have explicitly sanctioned carriage of original programming."

In lieu of making provisions at this time, the FCC issued a Notice of Proposed Rule Making on the subject. The majority proposal pointed out that "CATV systems may need a point-to-point microwave link between the head-end of the cable system and the studio.

### Three Commissioners Dissent

Negative response to the Commission's actions was not limited to the cable industry. Commissioners Robert T. Bartley, Lee Loevinger, and Nicholas Johnson all condemned the order and proposal either wholly or in part. Commissioner Bartley called the entire order an "unjustified impediment to the advancement of CATV." He said the shift in frequencies was not supported by a valid showing and added, "to transfer to more costly and less efficient relay service in the 12,000 mc band will logically result in CATV subscribers' paying higher prices or receiving lower quality service."

Commissioner Lee Loevinger branded the new limits as "technical sleight of hand." He said, "Under guise of making a purely technical shift in frequencies, the Commission has again erected a bureaucratic obstacle to technological development which is unwarranted."

While Commissioner Nicholas Johnson concurred with the allocations portion of the order, he spoke out strongly on the program orig-

*(Continued on page 32)*



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ination issue. "The Commission," he said, "has today manipulated a technical-seeming rule-making to screen from public view a warning which it once flashed to the cable television industry. That warning reads, for those versed in the complexities of FCC regulations: 'If you had any interest in developing CATV as a new source of television programming, forget it; the FCC intends to fight at every turn attempts to encroach on territory reserved exclusively for the broadcast industry.'" His statement goes on to say, "Given a chance to make things difficult for CATV operators interested in origination, this Commission will jump—no matter how small that chance is." Commissioner Johnson charges that the rule-making proposal is an attempt to evade charges of industry protectionism, but the FCC's "favoritism for the broadcasting industry" continues to undermine cable promise of program variety.

Commissioners Kenneth Cox and Robert Lee denied the charges contained in their colleagues' statements.

## Texas CATV'er Receives Air Force Award



*Erwin Sharp, manager of the McAllen, Texas CATV system receives an Air Force award for outstanding television public service. A series of recruiting programs which resulted in "highest in the nation" enlistments were cablecast by the firm in cooperation with the U.S. Air Force. This is but one of the case histories featured in "Cableburst '68," a special insert in the Feb. 26 issue of CATV Weekly.*

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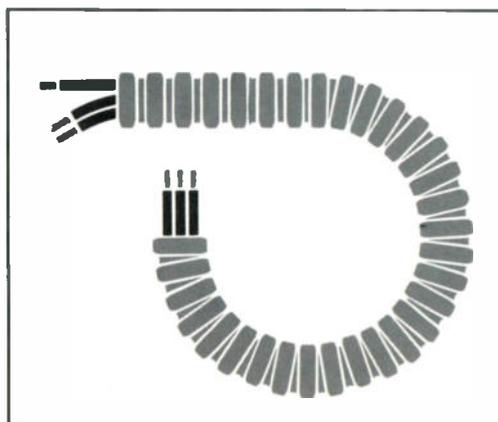
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## 100 Attend NCTA Cablecasting Seminar



*CATV'ers received expert instruction and first-hand experience at NCTA's second annual cablecasting seminar held in Salt Lake City. The busy three-day program included panel discussions, lectures and workshop sessions as well as recreation on local ski slopes. Shown above, Keith Covey of Color-Tran Industries conducts session on studio lighting. For complete coverage, turn to page 64.*

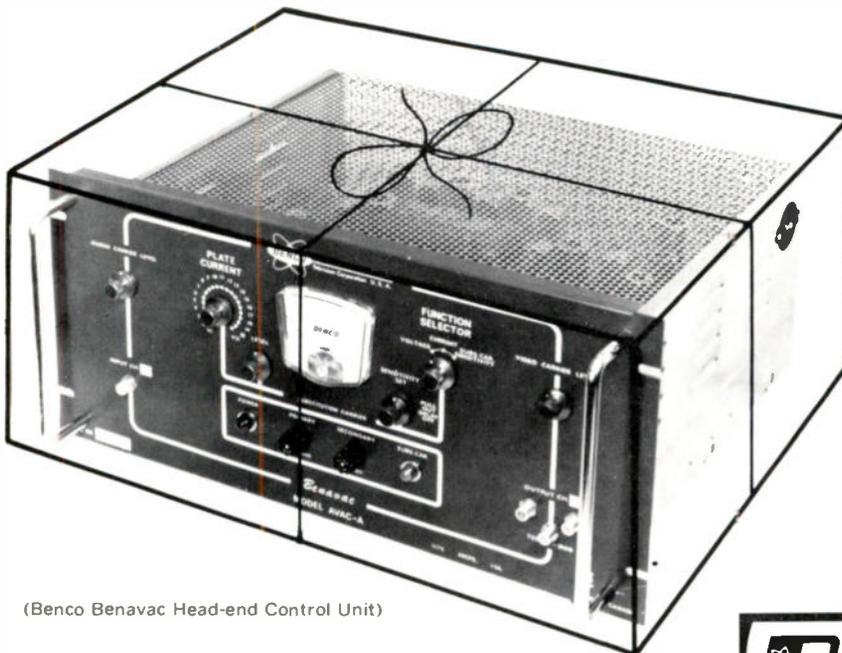
## Hyde Named to Council

Rosel H. Hyde, Chairman of the FCC is one of five top-ranking civil servants appointed by President Johnson to the council of the new U.S. Administrative Conference. Jerre S. Williams, former University of Texas law professor who is heading the conference, described its purpose as being "the vehicle through which we can look at the administrative process and see how it is working and how it could be improved and how it could best serve the public interest."

Government figures other than Hyde who are serving are: Leonard Marks of the U.S. Information Agency; Commissioner Willard Deason of the Interstate Commerce Commission; Manuel F. Cohen of the Securities & Exchange Commission; Frank M. Wozencraft, assistant attorney general of the office of legal counsel, Dept. of Justice.

The FCC chairman served on a temporary conference that preceded this one in 1961. He headed a committee on compliance, enforcement and disciplinary proceedings.

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## Study Supports Cable Aid to UHF: Ford

In a recent membership letter, NCTA president Frederick W. Ford claimed that a study by the American Research Bureau has "exploded another myth concocted by anti-cable television forces — that cable systems have an adverse effect on UHF broadcasters." The ARB report, conducted for Triangle Stations, dealt with television viewing in Binghamton, N.Y.

Nearly 80% of the cable-con-

ed homes in Binghamton watch one or more UHF stations at least once a week, according to ARB.

But less than 47% of the non-CATV-subscribers watch a UHF station every week.

Ford notes that "cable is responsible for almost a 70 percent boost in UHF viewing — comparing cable-connected homes with those minus cable." He added that "the ARB results come at a time when organizations like the All-Channel Television Society are reportedly plotting new moves to deny the

public the benefits of cable television and themselves the benefit of additional viewers."

Ford reiterated the NCTA view that ACTS was trying to create "a bogeyman outside the UHF industry to avoid an introspective analysis of UHF television's symptoms" when the UHF group petitioned the FCC to extend top-100 market rules to all markets. Noting limited coverage of UHF station signals, Ford said "cable television is the great equalizer in . . . disparity between UHF and VHF."

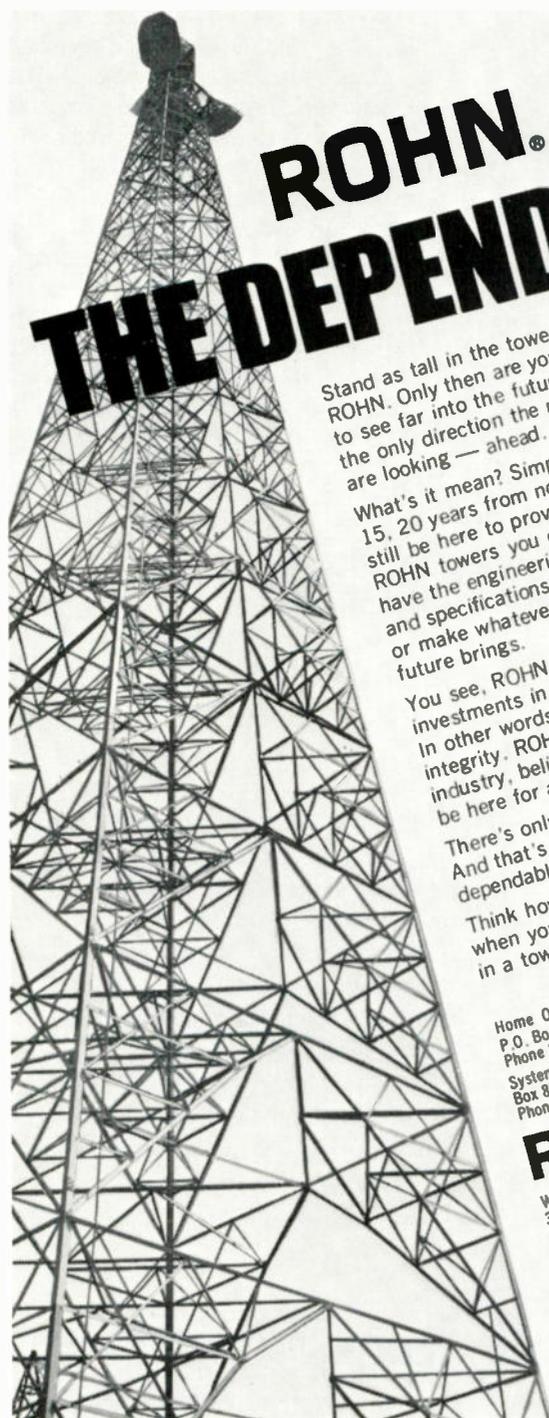
Suggesting that ACTS has acted as an unwitting tool of AMST, he claimed that "the VHF-controlled Association of Maximum Service Telecasters worked diligently to gain passage of the all-channel receiver law, in order to preserve a token form of competition between VHF and UHF stations . . . AMST's greatest accomplishment has been the embracing by ACTS of a policy that would freeze cable and thereby prevent UHF from competing with VHF on equal terms."

## FCC Plays Unwanted Big Brother to Broadcaster

Recently, WBOY-TV, Clarksburg, West Virginia, filed cease and desist proceedings against Bettervision Systems, which operates several CATV systems in that state. The broadcaster and cable operator, however, settled their differences without FCC intervention. Carroll Rollyson, president of Bettervision Systems, told trade publication *CATV Weekly*, "We were both happy with the settlement."

But the FCC had other ideas. The Broadcast Bureau advised the Commission that the settlement didn't fully comply with WBOY's non-duplication "rights."

Rollyson went on to say, "I guess the FCC doesn't think we can make an agreement. There were to be hearings in Washington about the cease and desist action of WBOY. However, before the hearings were held, we arrived at a mutual agreement concerning four systems. The FCC then said they would lay over the hearings until they got our agreement." The pact, however, was voted unacceptable by the Commission.



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## Firms Bid For Las Vegas System

Although seven firms made presentations last month seeking the franchise to serve Las Vegas, Nevada, it will be summer before the Public Service Commission rules which firm is chosen. The commission spent the entire month of March hearing the cablemen outline their programs: the method of bringing in service, the areas to be served, financial data on the companies, programming plans, estimated costs of operation and suggested charges to customers.

Commission Chairman Reese Taylor said the commission will have to set the charges.

Firms and their principals making presentations were: Community Cable TV, Jack Kent Cook, a California financier, and Hank Greenspun, publisher of the *Las Vegas Sun*; Nevada Cablevision, Donald W. Reynolds, publisher of the *Las Vegas Review-Journal*; Nevada Utilities, William A. Gentry, a California systems

operator; Clark County Cable TV, Sidney and Norman Lipkins, Long Island, N.Y., manufacturers of cable system equipment; Nevada Cable System, Phillip Zonne, a California systems operator; Time-Life Broadcast, Central Telephone Co.

## Model CATV Franchise

In order to guide cities and towns in issuing cable TV franchises, the International City Managers' Association has formulated a model franchise. Among the items covered

in the document are: provisions for the franchise fee to be paid the town; municipal power to review all records and reports of the company; an option by which the city may either buy or renew the franchise at expiration date; a provision for adding further regulations as the need arises; and transfer and assignment rights of the franchise holder.

The International City Managers' Association, founded in 1914, has over 3,000 members. Their headquarters is in Chicago, Ill. 

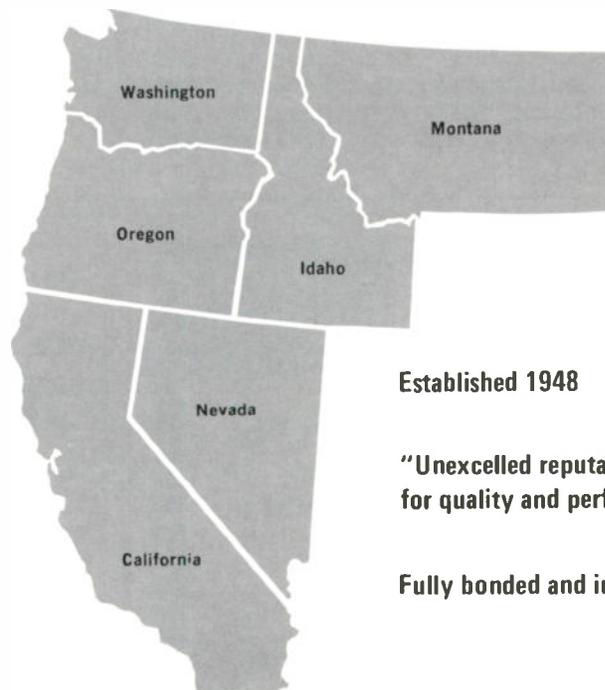
## Loevinger Plans Retirement



*FCC Commissioner Lee Loevinger has announced plans to retire from the Commission. He plans to return to private life when his current term expires June 30. Loevinger has notified the White House that not only does he not seek but also would not accept reappointment. The Minnesota Democrat will return to family obligations and the education of his three children. It is not known at this time if Loevinger will enter private law practice in Washington or accept a corporate appointment.*

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# System Sales

**See-More Cable Company**, Marietta, Oklahoma, has been purchased by **Charles and W.C. Whitecotton**. The system, which has been in operation since August, 1965, will do business under the name of **Telstar TV Inc.** No immediate changes in operation are foreseen. Besides the local time and weather channel, the system currently carries 8 TV stations.

**Livingston Oil Co.** recently announced purchase of the **Effingham (Ill.) TV Cable Co.** Jack R. Crosby and Ben Conroy, president and vice president of GenCoE, recently merged with Livingston, are the principle stockholders in the Effingham company. The cable firm, serving more than 2,000 customers in Effingham and Teutopolis, will become a wholly owned subsidiary of Livingston.

**H & B American Corp.** has acquired an 80% interest, with an option on the remaining 20%, in

**Radiant Cable Systems, Inc.**, of Portland, Oregon. Radiant Cable has a franchise to operate in Multnomah County adjacent to Portland. **H & B** has also agreed to purchase four systems in western Montana. The systems serve over 5,000 subscribers in **Kalispell, Polson, Columbia Falls and Big Fork**. Purchase price, including liabilities assumed, exceeds \$1 million.

**Foote, Cone & Belding Inc.** has announced an agreement "in principle" to purchase controlling interest in **WEOK Cablevision, Poughkeepsie, N.Y.**

Part ownership of **Lakeland (Fla.) Cablevision, Inc.**, has been purchased by the **Tribune Co.** of Tampa, publishers of the Tampa Tribune, and the Tampa Times and owner of WFLA-TV and WFLA-AM and FM.

**King Videocable Company** has agreed to purchase **Precision Service**, Portland, Oregon, CATV firm, from **James B. DeFreitas**. The Portland city council granted King Videocable permission to take over operation of the franchise serving Southwest Portland.

**Mid-Continent Telephone Corp.** reports it has acquired **Hoopeston Cable TV Co.**, Hoopeston, Ill., through an exchange of stock. Mid-Continent operates telephone companies in 10 states and also owns **Valley Master Cable Inc.**, Kittanning, Pa. and leases distribution cable facilities to other CATV firms in Ohio and Pa. Hoopeston Cable wire was strung on poles belonging to Eastern Illinois Telephone Corp., an operating affiliate of Mid-Continent. The cable system provides nine channels, and over 80% of the city's residents are subscribers.

A special stockholders' meeting was called March 20 to approve the **Reeves Broadcasting Corp.** purchase of cable systems in Huntsville, Alabama. Reeves now owns **Television Distribution System** in Huntsville and has agreed to purchase **Video Cable Systems, Inc.**, and **T&G Cable Co.** Total subscribers in Huntsville number 15,500. The agreement called for retention of **William O. Neal**, 85% owner of Video, as an advisor. 

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Model HG 501—500° F. 115V—\$49.90  
(Others \$44.30 to \$67.85)

### AIR HEATER BLOWER

For quick electrically heated air up to 750° F. For accelerating drying processes or for localized heating. B.T.U. 3400. Air velocity 2000 FPM. 110-230 V. AC only. 3-wire plug. All 110 V. models equipped with adapter for 2-prong receptacle. 8 ft. heavy duty cord. Continuous duty. 2" dia. x 3" long discharge nozzle.

Model AH 501—500° F. 115V—\$59.95  
(Others \$56.65 to \$90.25)



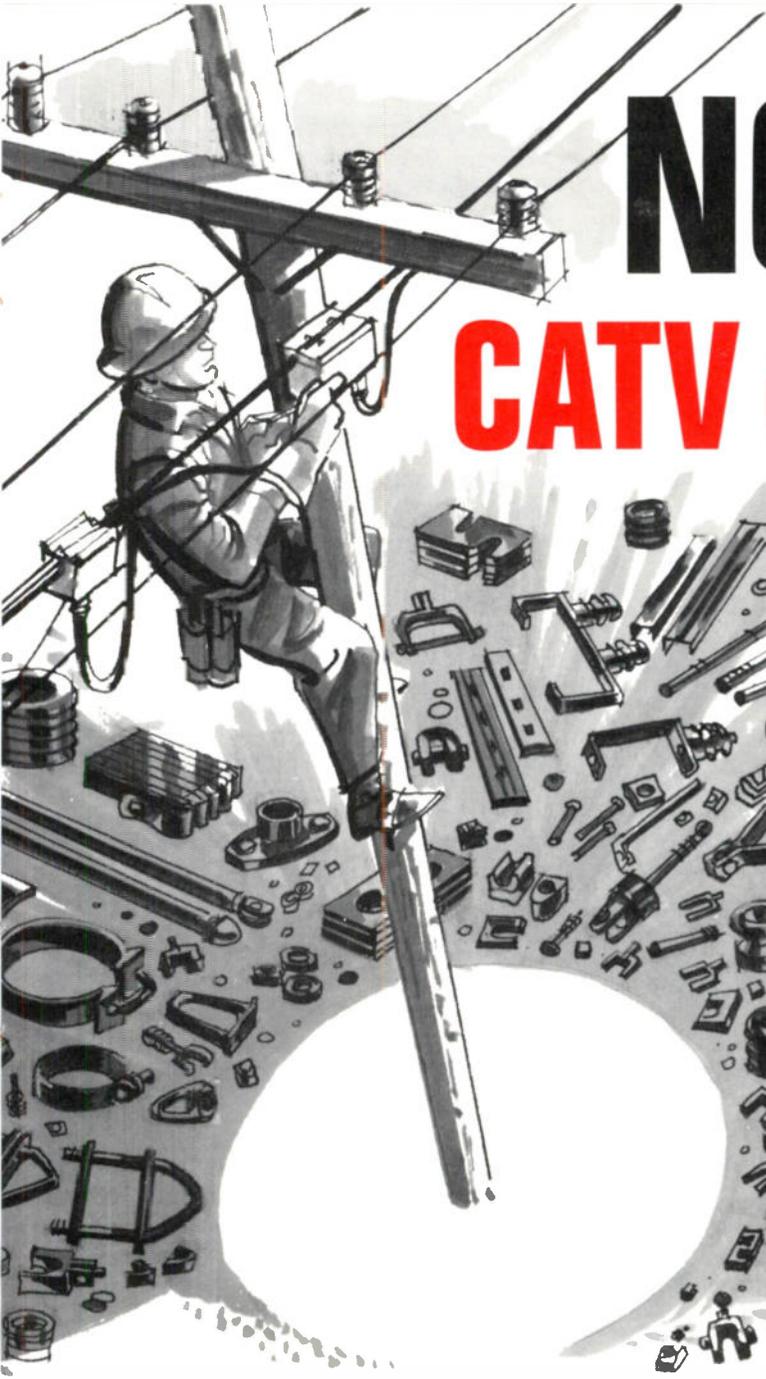
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TVC-48

# FINANCIAL REPORTS

Vikoa Inc. has agreed in principle to acquire Intercontinental Wire Co., Inc, Robesonia. At present market values, the purchase amounts to about \$1.2 million. Intercontinental's gross assets amount to approximately \$1.5 million, and Vikoa has assets of about \$12 million. According to Vikoa president, Ted Baum, Intercontinental's present management would be retained.

The National Association of Securities Dealers has notified HTV Systems Inc. that its stock will be listed in local over-the-counter quotations. The manufacturing firm offered its stock to the public last fall. Development of CATV trunk-line amplifiers is proceeding on schedule, according to management, and the company staff is being increased as required.

Entron, Inc. reports per share losses of \$1.30 for the year ending December 31. This compares with \$.07 loss for the preceding year. Figures are based on a net loss of \$789,579 and \$39,656 for the two periods respectively. Net sales for

1967 were \$2,848,683 and \$2,843,990 for 1966. These figures include both Entron, Inc. and a wholly owned subsidiary, Systems Construction Corp. Entron is engaged in CATV equipment manufacture, cable system construction and system ownership. During 1967 the company brought its total operating systems to seven, and at the end of the year, cable mileage totaled 614.3 miles

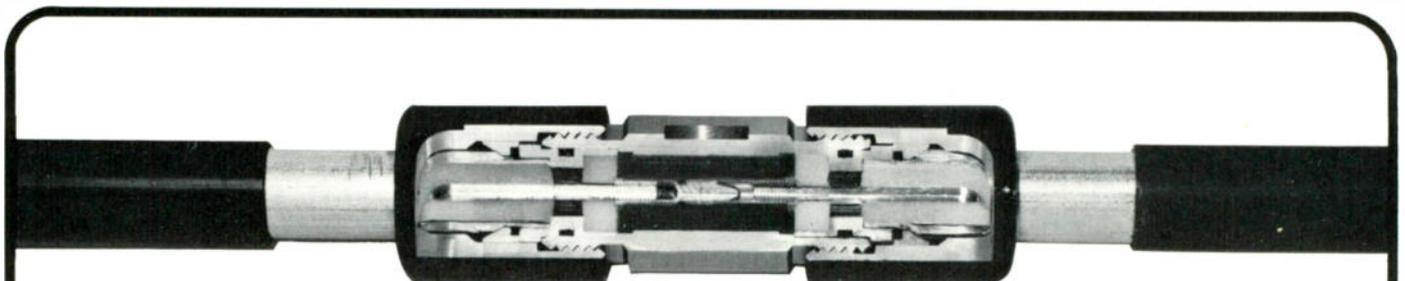
Triangle Cable Co. last month published its formal offering of stock. Authorized capitalization of the Oakdale cable firm is for 200,000 shares: 52,000 shares are being offered the public at \$5 per share. According to Pete Hall, the system's organizer, the stock will be offered first to local investors.

Farnham W. Smith, president of Atlee Corporation of Winchester Mass., and Charles H. Wright, president of Spencer-Kennedy Laboratories, Inc. of Boston, have announced agreement in principle for the merger of Atlee into Spencer-Kennedy. Holders of 115,435 outstanding shares of Atlee will receive four shares of Spencer-Kennedy for

each three shares of Atlee held. Wright said the merger would "broaden Spencer-Kennedy engineering and design base, manufacturing capabilities and capital base." Atlee ended the fiscal year with sales of \$1,900,000 and profit of \$180,000.

Milton Blakemore, a Liberal, Kan. financier, and Larry Hudson of Iola, Kan. have announced the formation of General Communications Inc. which will own all the cable television systems formerly owned by the Hudson family as well as systems the company is presently seeking to establish. Hudson is president of Fredonia Cable Television and operates systems in Iola, Eureka, Humboldt and Coffeyville. Blakemore will serve as chairman of the board and Hudson as president of the new company. The firm has also been awarded franchises in Hutchinson and Madison, Kan. and in Santa Fe, N. Mex.

Collins Radio Company reports per share earnings of \$1.91 for the 6 months ending February 2, 1968. This compares with per share earnings of \$2.15 a year ago. Earnings figures are based on net incomes of \$5,549,000 and \$5,873,000 for the two periods respectively. Sales were \$222,777,000 in 1968 and \$206,181,000 for 1967. Collins declared a cash dividend of \$.20 per share on common stock, payable in April to stockholders of record on March 25, 1968. 



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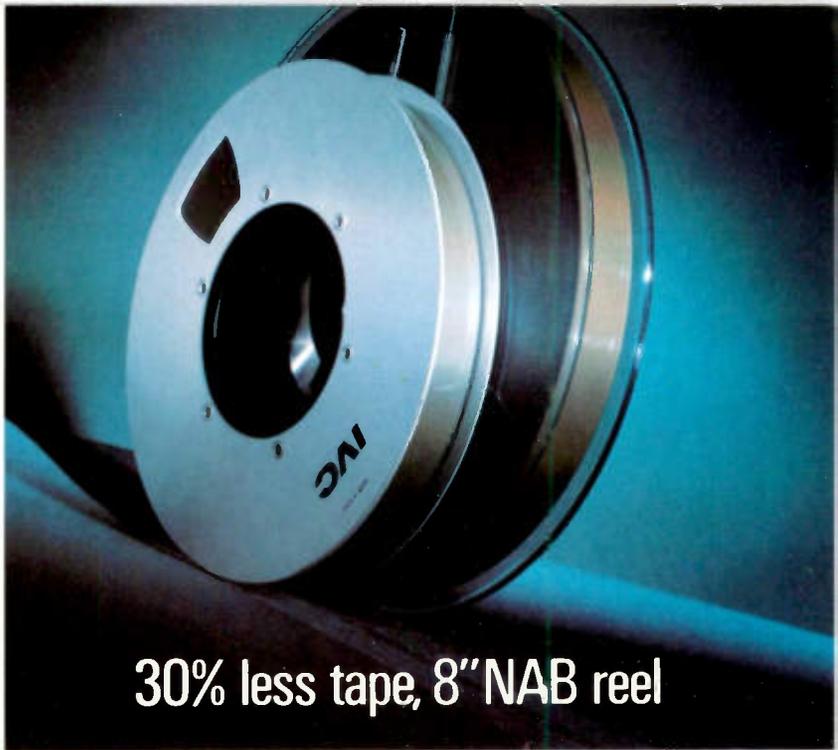


**COMMUNICATION DYNAMICS**

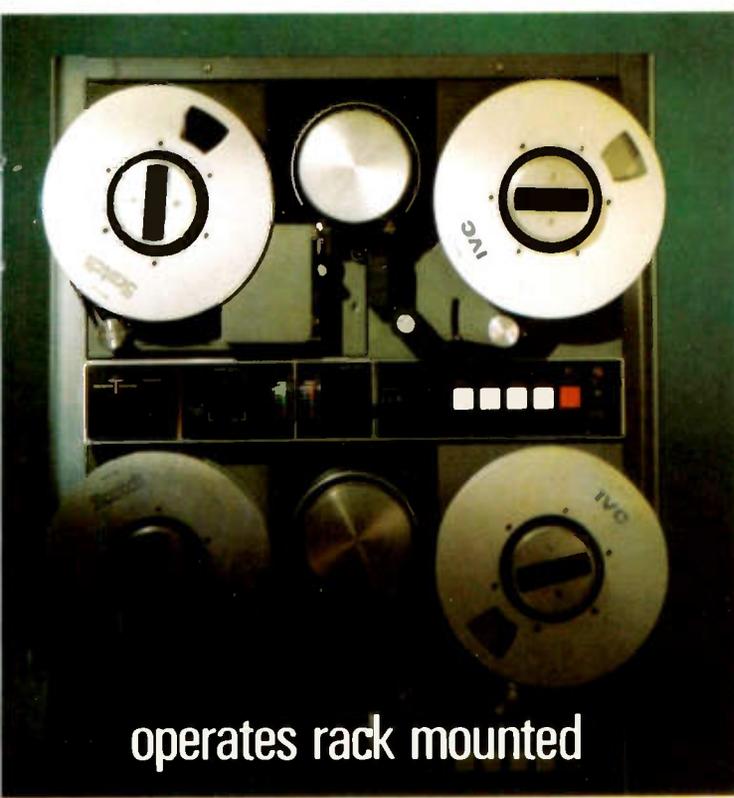
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just thread it, and push the button



30% less tape, 8" NAB reel



operates rack mounted



award-winning design

## all this and NTSC color too!

The IVC-800, engineered and manufactured by International Video Corporation, Mountain View, California, is the first helical-scan video recorder to offer this exciting combination of features at any price. A recorder that's not only low-cost, but is versatile, easy-to-operate and maintain. NTSC color system results in more faithful reproduction with chroma stability not previously attainable. The IVC-800 is a significant breakthrough in helical-scan recorder design. Turn the page for price and details.





## All this for \$4200 complete! (monochrome \$3800)

### Full NTSC Color capability

All monochrome machines will record NTSC color signals. Single plug-in circuit board instantly converts unit for NTSC color playback. Conversion may be accomplished by anyone in the field purchasing a plug-in circuit board for \$400.00.

### High resolution

Patented pulse interval modulation signal system provides bandwidth exceeding 4.2 MHz resulting in 400 lines of picture information.

### Just thread it and push the button

Electrical push-button control of transport permits all tape motion functions to be remotely controlled. Advance "Alpha" helical-scan tape path configuration with precisely fixed tape guides eliminates "lost" picture information and allows easier threading.

### Full electrical remote control

Electrical push-button control with interlocked logic circuit permits all tape functions to be remotely controlled. Tape is automatically relaxed when stopped thereby eliminating unnecessary wear. These features permit the IVC-800 to be used in dial access applications.

### 90 second fast forward and rewind

Separate turntable motors for take-up and supply permit rapid fast forward, rewind and shuttling. Dynamic braking eliminates the possibility of tape damage. End of tape sensor activates stop circuit preventing tape spillage.

### 30% less tape, 8" NAB reel

Full one hour recording requires only 2150 feet of 1" tape operating at 6.9 ips, an average saving of \$15.00 per hour.

### Operates rack mounted

IVC-800 is the only recorder which can be rack mounted in 12 1/4"

of vertical space. Maintenance is made easier through use of full-suspension, pull-out mounting slides.

### 60 second head replacement

Video head may be quickly replaced by anyone anywhere using the special tool that is stored under the scanner cover. The head automatically seats itself in the correct position. Advanced design ferrite head is guaranteed for 500 hours (or six months).

### Audio cue track

Second audio channel is provided for secondary audio or dial access control signals.

### Weighs only 52 pounds

Precision casting and state-of-the-art engineering techniques have produced a rugged, yet truly portable recorder. Dust-proof cover eliminates tape contamination possibility.

### Machine-to-machine compatibility guaranteed

All tapes recorded on any IVC-800 can be played back on any recorder using the 1" IVC format.\*

### Stop-Motion feature

All units are equipped with stop-motion as standard feature. Electronic editing and slow-motion are options available.

**NATIONAL SERVICE PROGRAM** Field service, applications engineering, and systems engineering back-up are provided every IVC customer. Factory trained service personnel are available through our franchise distributors or on a direct factory basis. Standard industry warranty on all IVC products.

**FULL NTSC COLOR SYSTEMS CAPABILITY WITH THE IVC LOW COST CCTV NTSC COLOR CAMERA.** A demonstration of the complete IVC CCTV color system can be arranged by contacting IVC Marketing Operations, (415 — 968-7650). International Video Corporation, 67 E. Evelyn Avenue, Mountain View, California 94040. Detailed product literature on request. \*Bell & Howell/GPL/RCA

# FOCUS

## ... On People

### Systems

**Joseph W. Benes** has been elected vice president of Cable TV of Santa Barbara, Inc., according to an announcement made by president Harry C. Butcher. Benes joined the system as general manager in February, 1967.

Metro Cable TV, Ltd., Toronto, Ontario, has announced the following appointments: **Frank Del Bosco**



Joseph W. Benes

Frank Del Bosco

is the firm's new project engineer; **Vic F. Robins** is system engineer; and **W. J. Dobson** has been named assistant to the general manager.

**Chester Richardson** has been appointed manager of Tomah State-wide TV, Tomah, Wisconsin.

**Kelly Coats** is the new manager of Llano TV Cable, Marble Falls, Texas.

**Charles Williams** has been promoted to chief engineer of American Cablevision's new El Paso System.

Clear Site TV-Cable Co. of Las Vegas announced the appointment of **Rex King**, as the new general manager. King is a former newspaper and radio executive.

**Bob Cooper, Jr.** has been engaged to supervise the technical operations for Valley Vision Cable TV's Amador County (Calif.) system.

**James O. Marlowe** has been named systems manager at Pioneer Valley Cablevision. He has been director of marketing and development at Pioneer since 1967 and will

continue in this capacity in addition to his new duties.

**Ervin Grant** assumes the responsibility of general manager of the Pueblo, Colo., CATV system this month. He is presently vice president and account supervisor in the Los Angeles office of ad agency Foote, Cone & Belding, which has a majority interest in the system.

**Edward E. Drake**, manager of Town Television Co., Moab, Colo.,



Vic F. Robins

W. J. Dobson

has been promoted to administrative vice president of its parent firm, GenCoE Corp.

**Harold Hux**, manager of the Cablevision office in Whiteville, North Carolina, has been transferred to the Lumberton office, and **Alton Ward** has been named system manager for Whiteville and Chadbourn. Cablevision also announced the employment of **Walter Johnson** as technician for the system.

### Suppliers

The Brand-Rex Division of American Enka Corp. has announced the appointment of **Bruce Van Wagner** as general manager. He was formerly director of sales and marketing for Enka's Wire & Cable Division. Brand-Rex has also announced several shifts in their sales staff. **Duane Neville** has been appointed branch manager for sales in Wisconsin, Illinois, Minnesota, Iowa, Nebraska and the Dakotas. Three new sales representatives

have been appointed: **Paul Ekstrand** is responsible for sales in Minnesota, Iowa, Nebraska and the Dakotas; **Robert O. Hardey** is industrial market salesman in the Gulf Coast area; and **William Lloyd Driver** is sales representative for the Carolinas and Virginia.

TeleMation, Inc. has announced the opening of an Eastern affiliate office, TeleMation Atlanta, Inc. in Doraville, Georgia. **John P. Weeks**, former southern regional manager of CCTV for Diamond Power Specialty Corp., has been appointed district manager of that office. Weeks has 20 years experience in the field, having served as CATV project engineer for Muscle Shoals TV Cable Company and as southern CCTV sales manager for Motorola. He will be assisted by **Edward D. Matthews**, sales engineer for the new office. Matthews, formerly with the Calhoun Company, will be responsible for direct ETV and broadcast equipment sales primarily in Georgia and parts of the Carolinas. TeleMation Atlanta, Inc. will serve Georgia, Louisiana, Alabama, Arkansas, Mississippi, Tennessee, Kentucky, Virginia, Florida and the Carolinas.

Anaconda Wire and Cable Co. has named **Andrew C. Verock** chief engineer, overhead products. He has been with the company since 1966.

**Duane W. Crist** has been promoted to marketing manager, CATV at Anaconda Astrodata. He will direct the firm's marketing program to the CATV industry, including direction of field sales and marketing of turnkey systems.

Kaiser CATV Corp. has announced the appointment of **George**



Duane Crist

George Henderson

**W. Henderson** as field engineer. Henderson's CATV experience includes field engineering for

Ameco and Jerrold, and he has also worked as chief engineer for Cable TV of Santa Barbara.

Blonder-Tongue Inc. has announced that the Pruzan Company will serve as its representative for CATV products in the west.

International Telemeter Corp. has named Richard W. Loftus director of marketing. Formerly manager of special accounts for Entron, Inc., Loftus has also served as assistant to the U. S. Attorney for the District of Columbia and

vice president of Jacksonville, N.C. Cable TV Co. Loftus is a member of the Maryland and D.C. bars.

Ronald N. Kahill has been appointed product manager, wire and cable for Superior Continental Corp. In his new position, Kahill will be responsible for the development of marketing and sales plans for all wire and cable products. In other personnel changes in the company, J. Allen Oxford has been promoted to plant manager of Superior's recently opened coaxial cable plant

at Sherrill's Ford, North Carolina. Oxford has been with Superior since 1963. Frank J. Logan has moved from the position of assistant man-



Carroll Oxford

Frank Logan

ager, customer service, to sales representative serving Delaware, Maryland, Virginia, West Virginia and the District of Columbia. Field representative Carroll B. Oxford has been transferred from the southwestern sales district to the Dixie region where he will serve accounts in Alabama, Mississippi, and Tennessee.

Thomas B. Bauer has moved to Ameco, Inc. as test and alignment supervisor. His experience includes work on missile programs, and he most recently was a member of the Motorola Aerospace Center staff.

Roger D. Parton has been named general manager of Remcor, an Ameco/Merrill affiliate company manufacturing printed circuit boards. Parton has 13 years of aerospace, electronics and systems experience.

International Video Corp. has appointed Carter G. Elliott manager, public relations and advertising. Prior to joining IVC, Elliott was regional public relations manager for Ampex Corp.

## Professional

Barash Advertising has recently been retained by Direct Channels, Inc., Ohio CATV group owner, to handle advertising and sales promotion for their systems in Defiance and Shelby, Ohio. Barash presently serves cable firms and two state CATV associations in seven states.

William H. Watkins, former deputy chief engineer of the FCC, has become chief engineer. Watkins has been with the Commission for 22 years. He succeeds Ralph J. Renton who has retired. 



# CATV EQUIPMENT CLOSURES

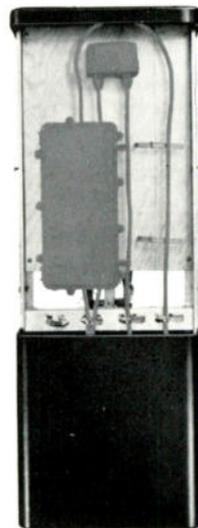
TV-600



2360 Cubic inches

Backboard can be used to mount CATV components on one side, telephone termination on other side. Separate entry for either CATV or Tel. Termination.

TV-1600

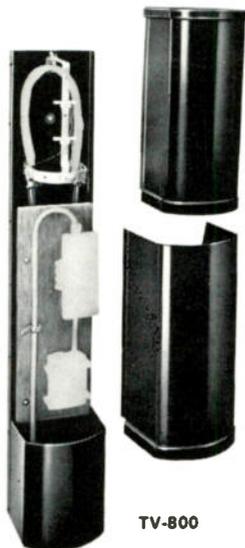


4320 Cubic inches

Backboard can be used to mount CATV components on one side, telephone termination on other side. Also available in 6200 Cubic inches. Separate entry for either CATV or Tel. Termination.



280 Cubic inches  
Mounting Bracket  
furnished for multi  
tap mounting.



TV-800

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**On a job like this  
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that will last forever.**

Amphenol seamless aluminum jacketed coax.

Just lay the cable and forget it. Years from now your Amphenol cable will still deliver the same high electrical characteristics that were documented in our test lab.

Our .500" and .412" feeders deliver 26 db or above structural return loss. Uniform 75 ohm impedance. Attenu-

ation is low. For .412" at channel 6, 1.05 db/100' maximum, channel 13 is 1.65; the .500" is .84 db/100' maximum for channel 6, 1.40 for 13.

On a job like this, lay cable once ... with Amphenol. Your Amphenol Sales Engineer can give you the facts. Or write **Amphenol Cable Division**, 6235 S. Harlem Avenue, Chicago, Illinois 60638.



**AMPHENOL**

# The Dangerous Minority

**Construction standards for cable television plant are the key to safe, legal and efficient system operation, as well as to good relations with both your subscribers and utility companies. For the minority of systems failing to meet such standards, it is time to review and upgrade . . .**

**W**hile jeopardizing the entire cable television industry, a minority of system operators apparently remain oblivious to their responsibility to properly construct and maintain cable plant. The citizens' safety and welfare — not to mention the quality of TV viewing — are threatened in many cases by sloppy system construction. In such instances the safety of CATV and utility linemen is also imperiled. Are some of the faults mentioned below present in your system? If the answer is "yes," you owe it to yourself, your community and other cable television operators to take immediate remedial action.

Two decades ago, when the first cable television systems were built, there were no construction standards. In fact there were not even suitable materials, plans, tools . . . or trained personnel. Most of the early system builders lacked another ingredient — adequate financing. The result was a hodge-podge of open wire, steel sheathed military surplus cable, home-brew amplifiers . . . plus lots and lots of tape and imagination! (That the early cable systems

worked at all is a tribute to the kind of innovating entrepreneur-adventurers who founded the CATV business.)

Lines were installed on utility poles, trees, lamp posts, buildings and an occasional fence post. Some systems alternated between aerial construction and direct burial of cable. In the arduous task of trying to get a viewable picture down the wire, some operators didn't worry about the finer points — such as pole attachment agreements, adequate climbing space or clearances. City franchises were not universally required.

But CATV owners weren't dissuaded by these details — and certainly their subscribers were not. While utility companies may have been concerned, few took cable television seriously. Even fewer rigidly policed their policies regarding the manner in which the new joint-users attached their cables and hardware to poles. In numerous cases the pole changeout or rearrangements would have been prohibitive and, thus, strict enforcement might have deprived some com-

An all too common sight: a cable television installer who left his hardhat in the truck. He is also supporting his ladder on telco line — which can create utility relations problem.



Recently installed drop cable has been conveniently draped across telephone line, apparently to avoid the expense of setting a pole or making a buried street crossing.



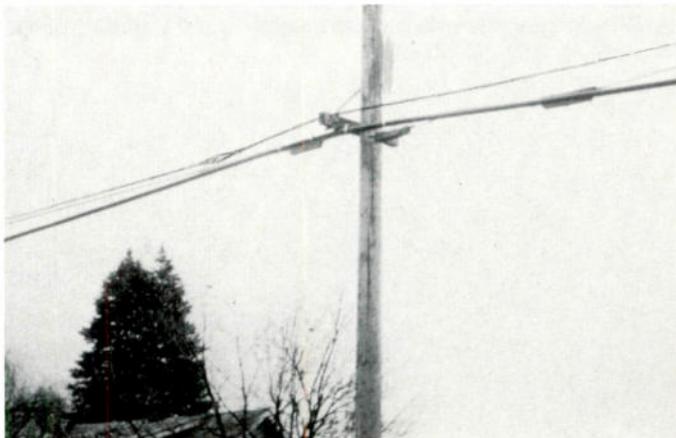
munities of their only possible source of satisfactory television.

But during the nearly twenty years since cable TV came to Astoria, Lansford, Mahanoy City, Mineral Wells and Batesville, the fledgling industry has undergone transforming changes. Today cable television typically provides a half dozen or more crystal clear, snow-free channels — instead of just one or two. The sophisticated tastes of cable subscribers now dictate a higher degree of reliability and community service from the cable company. And city fathers demand a healthy franchise tax, plus consistent, high quality service. Most cable operators earn the patronage and loyal support of their communities through a constant effort to provide excellent TV viewing . . . while keeping a sharp eye on their public relations.

The “dangerous minority” constitute the exception. They are a danger to themselves, to their communities and to the cable television industry of which they are a part.

Who are they? They are the cable television operators

Cable is draped across telephone cross arm and could wear through aluminum sheath. Also, cable will flatten under wind and ice load, causing degradation of signal.



TV Communications



Above: Fiberglass measuring pole is used by TVC publisher Stan Searle to check clearance over street. Drop cable is 14'1" over traveled portion of roadway, nearly 4 ft. below minimum.

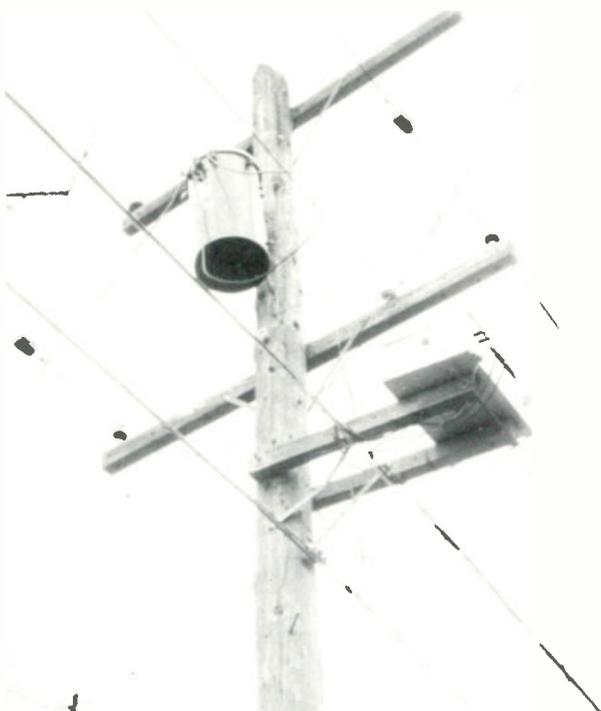
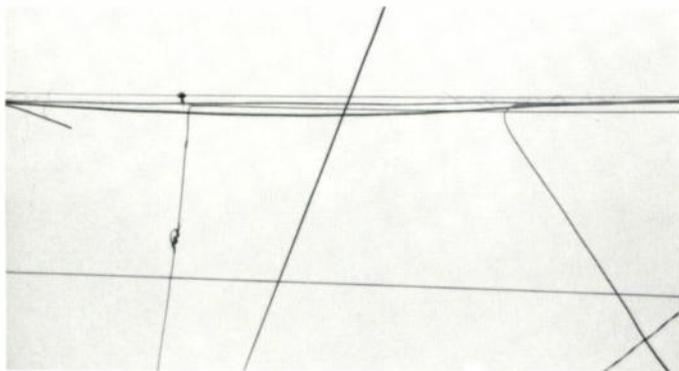
Below: Although plenty of legitimate communications space was available, television cable was installed 10 inches below power line bracket.





Above: Cable on top of this pole is just 3 inches from 220 v. power conductor. Even attached at top of pole, the cable is 4 ft. below minimum clearance over adjacent street. However, the cable was attached at the 15 ft. level on pole across the street, and could have been elevated 4'6" without rearrangements.

Below: "Sloppy drop." Cable loops to within 6 ft. of ground in yard next to this drop. Note broken lashing wire and clamp not fastened to span clamp. This eyesore violates state law and, more significantly, is a safety hazard.



who, for a variety of reasons, have failed to recognize the absolute necessity for high standards of system construction. Cable plants operated by this minority endanger lives in some cases . . . violate state and local safety laws in almost every case . . . detract from the esthetic appearance of the community . . . aggravate relations with other joint-users of poles . . . and usually fail to deliver the best possible pictures to the paying customer.

Like Burdick and Lederer's "Ugly American," this type of cable system reflects unfavorably — and unfairly — on the great majority of highly responsible and responsive CATV operators. But unfortunately for the CATV owners, while their industry was becoming profitable it was also accumulating detractors.

To those who seek to portray cable television as a profiteering, irresponsible industry, this "dangerous minority" supplies grist for propaganda mills. To regulation-minded legislators and regulators, the sub-standard cable system is an excuse which may be used in an attempt to justify specific state and local controls.

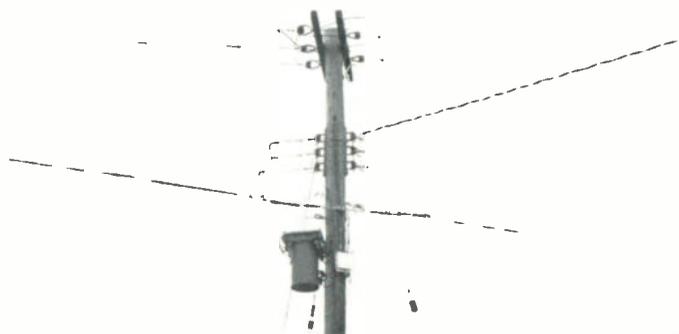
The operator whose plant is sub-standard poses many problems for others who are operating or attempting to get franchises in the same area. Poor quality pictures, labor problems, bad public image and poor utility relations spread fast by word of mouth.

What are the most frequent problems? Number one is undoubtedly, insufficient clearances. Cable television lines are frequently strung less than forty inches from power lines; sometimes practically in direct contact. From a safety standpoint, proximity of television cables to telephone lines may be somewhat less serious — but clearance violations are correspondingly more frequent and flagrant. Cable television house drops in direct contact with the phone lines are quite numerous in some systems. In a small southwestern town, cable is *routinely* draped across both power and telephone lines, apparently in order to avoid paying pole rental.

Failure to maintain climbing space is another wide-

At left: Equipment cabinet is only 18 inches from secondary conductors. Lid of enclosure, could easily contact with hot secondary. Also, the telephone cable and CATV cable are not bonded together, although a power company ground wire passes through communications space.

Below: CATV'ers don't have a monopoly on poor construction. A large independent telco attached lines to this pole above transformer, leaving insufficient clearance between both transformer and secondary. (Photo courtesy of William F. Karnes.)

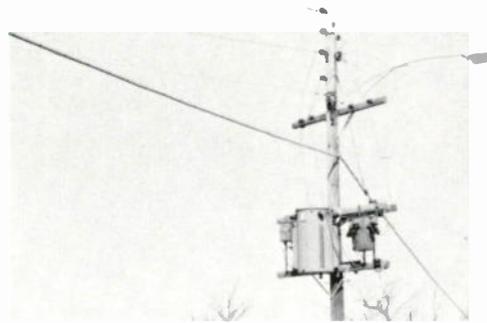
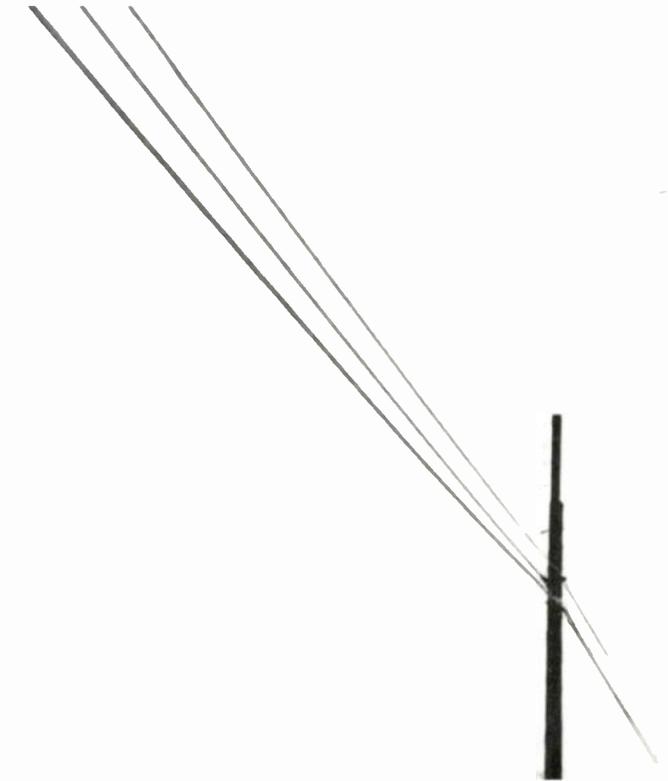


spread problem. It is especially serious because it directly affects the ability of the lineman to move freely and safely on the pole. Failure to tie to common ground with telephone and power utilities is another way to jeopardize a lineman. A Washington technician, for example, was injured when he had to "cut out" and drop after becoming "frozen" between the TV cable and a lamp bracket by a potential between the two.

A less common discrepancy — but one latent with tragedy — is the placement of CATV lines outside the "communications space" on a pole. In an old Pacific Northwest system operated by a publicly owned corporation, we noted television cable installed *over* the secondary power lines on one pole. A man climbing the pole at night could very easily mistake the power for the television cable, because the two are simply transposed. Although the mistake would be understandable . . . it could also prove fatal. The responsibility for such an accident would fall squarely upon the shoulders of those who installed the cable on the pole, and upon the system operator who allowed the unsafe condition to remain.

Although it is perhaps a separate subject (and will be discussed in a future issue) the use of safety equipment deserves mention. It is the responsibility of the cable operator to provide his people with all necessary safety-tested tools and accessories, and to instruct linemen in their correct use. The right kind of ladder, regularly cleaned and inspected . . . gloves that are periodically tested . . . properly maintained climbing hooks, sharpened only by someone who knows the principles involved. An approved "hard hat" . . . proper clothing and footwear . . . safety cones . . . utility belt . . . and the right vehicle for the job are all essential to the lineman's safety and performance.

Although cable operators and telephone companies seem to have very little in common, other than the fact that they both use the same poles, CATV people would do well to emulate the Bell System's regard for safety. Bell obviously has the funds to equip crews and con-

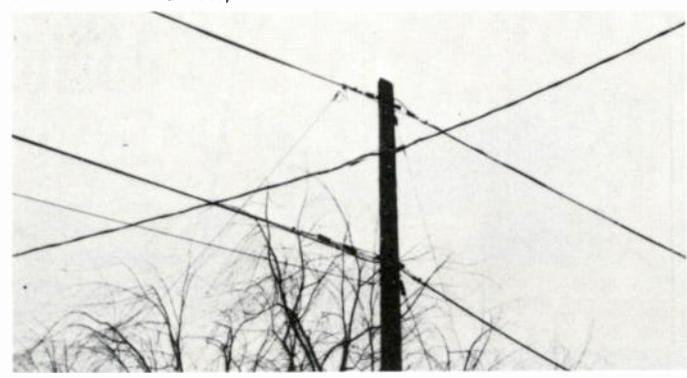


Below: Instead of required 40" minimum, only 12" vertical clearance between cable and power bracket is provided. Obviously, the CATV cable was crowded in to avoid replacing pole. Telephone plant was already minimum clearance over street.

Top above: In recently constructed portion of plant, nearby pole is ignored; house drop is supported by phone lines. It doesn't take an engineer to spot crude short cuts such as this.

Below, right: Cable is installed above power line, violating state law, telephone company policy and good construction practices. Lineman must climb past hot lines to service house drop. Accepted procedure: add pole-top extension and raise power line.

Immediately above: Independent telco set this trap in Missouri. Phone line is between primary and secondary power conductors. Lineman must literally crawl among hot lines to reach telephone plant. (Photo courtesy of William F. Karnes.)



struct outside plants in a fashion that is beyond most cable systems' grasp. But the basics of clearance, climbing space, grounding and accepted pole line construction techniques can and should be observed by all joint users of pole plants. Tools and equipment, as well, can be adequate for safety without being prohibitive in cost.

The "dangerous minority" of cable operators, whose systems are inadequately constructed, probably have excellent "excuses," such as unavailability of financing for rebuild. And they may also take consolation in the fact that the telephone and power companies have pole violations, too. However, cable television is a luxury, not a utility, and doesn't have the protection from competitive forces that the public utilities enjoy. Consequently, cable television operators should strive to build and maintain a *better* and *safer* plant than do the telephone and power companies.

In summary, the unsafe, unsightly cable television plant is a bad advertisement for the cable system locally, for cable operators regionally and for the entire industry nationally.

Thoughtful cable system managers and owners will



The correct safety equipment is essential for construction and maintenance personnel.

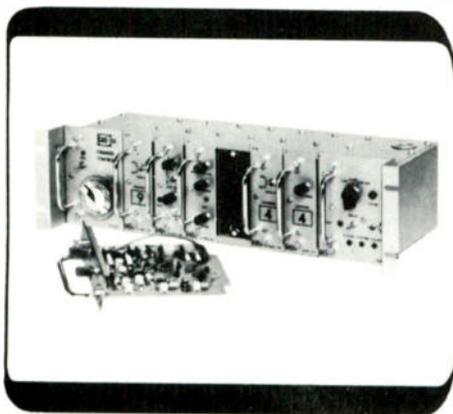
## The Potential Risks of Improper Plant Construction

- Personal safety of system personnel jeopardized
- Legal liability for death or injury due to contributory negligence through sub-standard plant construction
- Impaired service to customers — in picture quality and service interruptions
- Possible damage to private property, including subscribers' TV receivers (from improper grounding, etc.)
- Possible increase in insurance rates
- Poor public image due to conspicuously unworkman-like cable plant
- Possible loss of CATV franchise
- Difficulties in renewing franchise with a minimum of resistance and competition
- Bad relationship with utility companies due to inconvenience or expense to them resulting from sub-standard CATV plant construction
- Possible cancellation of pole contract agreement
- Possibility of being billed for CATV plant rearrangement by utility, if conditions are not promptly corrected by cable company
- Encouragement of state regulation of cable systems
- Difficulty in hiring qualified linemen because of unsafe or unpleasant working conditions
- Expense of equipment repair and replacement caused by improperly placed lines (due to damage from vehicles, excavation, lightning; short circuits)

not willfully imperil their own employees or other linemen. Neither do they wish to create a hazard to their community's citizens, nor impair the signals delivered, due to slipshod plant construction.

Those who have unwittingly become a part of the "dangerous minority" should take appropriate action now to protect themselves and the CATV industry. Others should objectively review the condition of their cable plant and eliminate any isolated instances of sub-standard construction. Whatever the cost, it will be reasonable as compared to the possible consequences of inaction.

TVC



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neering Project Mgr.

Seated (left to right) are Dick Loftus, Director of Marketing; Pat Court, Vice President-Research & Development; John Nyberg, Chief Mechanical Engineer; George Brownstein, Vice President-CATV Operations; and Carl Akrell, Engineering Project Mgr.

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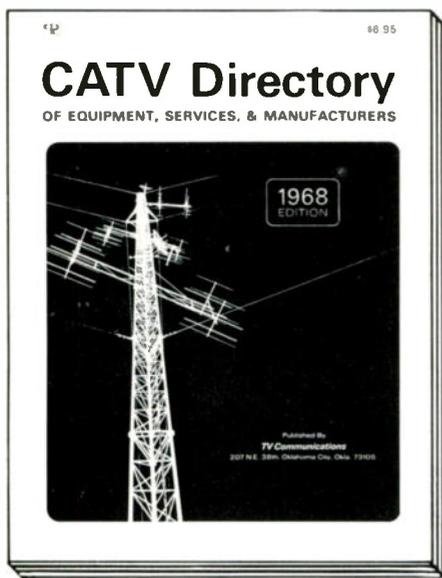
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## CATV Directory

OF EQUIPMENT, SERVICES, & MANUFACTURERS

TO ORDER, TURN TO PAGE 101-102

# Your Public Image During Construction

**Advance planning; cooperation between system operator and construction contractor; and adequate preventive advertising and publicity can ease the strain on your relations with the public during a critical period for PR.**

*By Ed Cooper  
Cal-Tel Construction Co.*

In practically every business, the term "Public Relations" should be given primary consideration in everyday functions and decision making. The public, in almost every instance, is the final deciding factor as to just how successful a product or service company shall be.

From the beginning, the closely associated, community involved CATV operator is totally vulnerable to public criticism, and, therefore, subject to a very profitable or possibly disastrous public relationship. All of us, of course, prefer the profit side of any situation and want to do everything in our power to see that our business gets off on the right foot and stays there.

CATV system operators will normally go to great lengths to create the proper atmosphere and impression while competing for a franchise, business permit, or whatever is necessary for them to begin business. Subsequently, however, some of them tend to sit back, secure with the idea that all that remains is to build the plant and hook up the customers. Immediately, we recognize that the next contact with a very fickle public will be by those men who will actually construct the system. Men who will be on and around the property of every potential customer the CATV operator is seeking. Men who, with the proper training, would be a tremendous asset to the current and future sales efforts. On the other hand, their actions could create a most harmful impression if not directed intelligently.

One way to assure that construction crews will aid your public image, therefore, your eventual sales effort, is to prime the community by keeping it informed as to approximately where and when the construction crews will be in their neighborhood. This may be accomplished by simply using the most effective and convenient means of communications available in the area such as direct mail, local newspapers or even a salesman going from door to door just ahead of the construction crews. Whichever approach is used, it should be incorporated with an extensive pre-sales effort preparing the neighborhood of the appearance of construction crews and equipment as well as informing them of the service to be offered by the system. Each lineman may be supplied with convenient pocket-sized cards which may be handed to the inquisitive housewife. This card should



contain a brief explanation of the service offered and a telephone number to call for further information. This will tend to hold conversations between the crews and the public to a minimum and assure that erroneous information is not being passed out by linemen who are not oriented in public relations.

There is no substitute for respecting someone's right to privacy, their integrity or their property.

The construction crew working on private property is subject to every possible accusation with little possibility of a strong defense. Therefore, it is most important to the contractor and the operator that good judgment be exercised in preparing the area and in handling of subsequent claims whether valid or not.

Work with civic groups; keep the local law enforcement informed; if there is a homeowner's association, meet with them and keep them aware of construction progress. Follow up on any complaint or inquiry immediately. The longer you put off responding to a customer's claim, the more irritated he becomes and the more time he has to pass his attitude to others. In the public's eyes, a construction crew represents your company, whether they are in fact yours or a contractor's. Close cooperation between a contractor and the operator is a prerequisite. Insist on the contractor of your choice recognizing your public relations requirements, and follow up to see that they are put to use and are effective.

I do not intend to give the impression that everything will be "peaches and cream" when using the proper approach. No matter what extent you go to in preparing your area, there will always be a few distasteful situations which must be dealt with. As I mentioned before, the public is very fickle and more apt to condemn rather than applaud.



# Fire at Cablevision— Opportunity for Promotion!

**A case history of how an alert CATV firm responded immediately to an apparent catastrophe, restored service in a phenomenally short time, and ingeniously used the situation for publicity.**

**W**hen fire destroyed Victoria (B.C.) Cablevision's offices and head-end, system personnel reacted with a feat of technical heroics that had the head-end relocated and service restored almost by the time the fire was out.

Twenty-nine thousand subscriber sets went blank and hundreds of people flocked to Shelborne Plaza shopping center to witness the ravaging blaze. By 6:30 Saturday night, January 13 the gas-fed fire was well on its way, and before long had completely gutted the building. The offices and head-end equipment of Victoria, B.C. Cablevision were totally destroyed.

Even while a crew of 15 firemen fought the blaze, a crew of 12 technicians and engineers made plans to re-energize the system, and then set about to do it. Ten policemen attempted in vain to control the massive crowd, and youngsters skipped about the burning building, ignoring repeated hailer warnings to stay clear. At one point, dense boiling smoke made it impossible for firemen to get closer than 50 yards to the front of the burning building without masks, and at another time Cablevision linemen could be seen rerouting the main cable in the light of the blaze itself.

Since the main down cable ran

in front of the home of chief technician John Foss, plans were made to use his basement as a temporary head-end. By padding the antenna inputs in order to level them out, technicians were able to utilize a single broadband line amplifier for all channels to restore service. By 10:30, less than four hours after the alarm had been turned in, 85% of Cablevision's service had been restored and was functioning very smoothly, and by noon the next day, all 10 channels, with the exception of the FM channel, were back in service. Meanwhile, 150 miles away, system personnel from Vancouver Cablevision drove 40 miles



*Flames belch from inside the Victoria (B.C.) Cablevision offices and head-end building which was completely gutted in the \$100,000 fire. At right, linemen put finishing touches on the trunk rerouting job done during the fire the night before.*

Another Times' first for the CATV industry: not just testing every reel of Alumifoam® coaxial cable that's shipped out of our plant, but testing to guarantee that every reel will meet db and frequency ratings unmatched by anyone else.

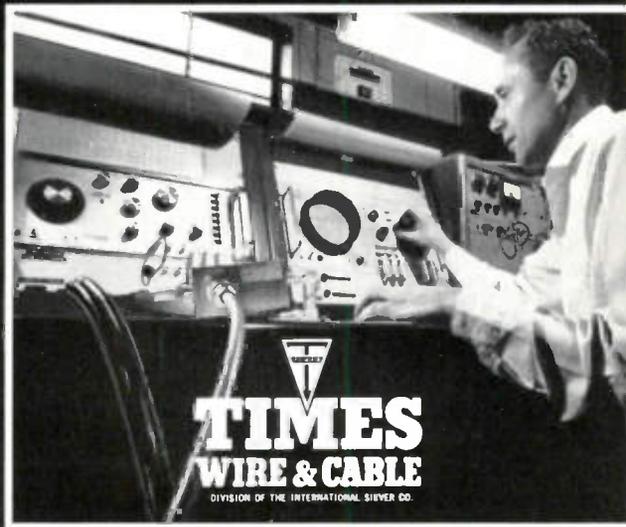
This testing is unique in the industry—because the equipment to accomplish it is unique. We literally designed and built it ourselves, from the ground up, to do the precise testing we wanted—so that we could guarantee every reel at 30 db to 240 megacycles. In fact, at a slight cost, we can use our equipment to test at 28 db to 300 megacycles, and guarantee that too!

It's this kind of extra performance that Times engineers constantly strive for—and it means that you get first-quality cable every time you order.

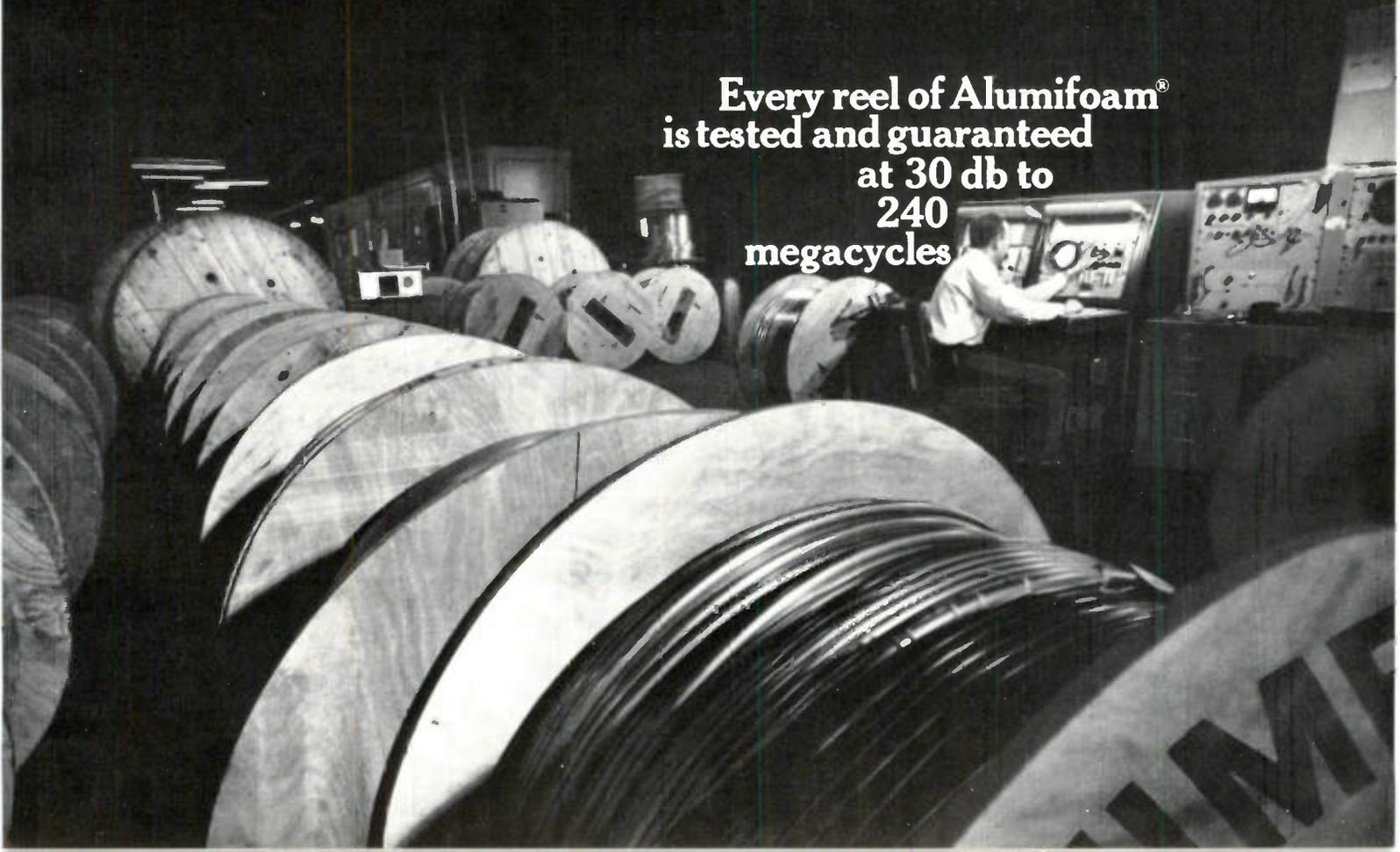
You get other advantages too. Alumifoam® is made in continuous seamless lengths up to ½ mile—which makes for fewer splices, fewer trouble spots, less maintenance and lower installation costs. Also there's no internal ridge to create a path for the longitudinal transmission of water or vapor—so it's moisture-proof.

Alumifoam's long life, based on tests and actual use, assures you of continuous quality performance for years. And that performance includes carrying color signals without degradation and the availability of many additional channels beyond the normal 12 (a good point to remember when you expand your operation.)

So now you can be sure of the cable in your Cable TV... sure of 30 db to 240 megacycles—even 28 db to 300 megacycles... because Times tests and guarantees every reel. Doesn't it make sense to get in touch with Times? Times Wire and Cable/a division of The International Silver Company/Wallingford/Conn. 06492. Phone (203) 269-3381.



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is tested and guaranteed  
at 30 db to  
240  
megacycles





Although the firm's offices were destroyed, bookkeeping and sales departments continued working, first in an employee's home, then in an abandoned office building. At right, Cablevision personnel are seen installing the new head-end equipment.

to Haney where a new head-end sat idle, waiting for the firm's new system there to be started up. After cutting through a storm fence and breaking the lock on the door, the men removed the necessary equipment and were soon back on the road with enough gear to replace Victoria's loss almost entirely. In a matter of a couple of days Cablevision had replaced all major equipment lost in the fire.

The sales and billing operations were relocated, first in the home of another employee, then in the old unemployment insurance building downtown. Although Cablevision had suffered the loss of \$20,000 in channel control equipment, \$8,000 in test equipment, \$8,000 in a new time/weather unit and \$20,000 invested in recent office renovation, none of the 50 employees was out

of work. According to assistant manager Stan Mahan, "The fire seems to have been a major inconvenience rather than an administrative or service catastrophe." Local radio news coverage continued until the following afternoon, and a second issue of the local paper gave the fire major coverage.

Handling of the incident at the administrative level was almost as dramatic as that at the technical level. The image of a defeated and ruined business was entirely avoided. Instead, the press was encouraged to emphasize the remarkable engineering "miracle" of getting service back on so quickly and publicity was handled in a manner which pictured Victoria Cablevision as a firm able to take a major upset in stride. A ¼ page newspaper ad was placed by the firm and was headed,

"We sure had a hot time in the old town Saturday night." The ad copy stated, "We aren't exactly ready to receive visitors as yet, we have a few ashes on the rug—matter of fact the ashes *was* the rug... Warmly yours, Victoria Cablevision."

Total damage from the fire, including that done to an adjacent bank, was estimated at \$100,000. Fortunately, the majority of the system's files escaped damage. Metal filing cabinets withstood the heat and were so thickly packed that in most cases only the folders' edges were scorched or water damaged. Now, as a result of what could have been a major catastrophe, all of Victoria's citizenry, non-subscribers as well as the 60% of the residents on the cable, have focused their attention on the operations and crew of Victoria Cablevision. 



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we'll make your problems our problems.

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**COMPLETE SYSTEM CAPABILITY**

# Choosing Drop Cable For Your CATV System

Drop cables vary widely in both intended application and quality; selecting the best one for each application is a major factor in system performance and endurance . . .

By Jerome Cohn  
Product Manager,  
Alpha Communications Division

The wrong drop cables might work well at first, but cause customer complaints and unnecessary expense years after your system has been installed. You build a high tower to hold the best antenna you can find. You use preamps and filters and amplifiers and signal processors to get the strongest, cleanest signals possible. You choose reliable, cascable amplifiers and top quality trunk feeder and distribution amplifiers.

But all of this expense and effort can be wasted unless your house drop cables are good.

A chain is only as strong as its weakest link. And the house drop cable is the last link between your cable system and your subscriber's set. Therefore, it will pay you to choose your house drop cables with care.

There are literally dozens of types of house drop cables available. This article will give you an understanding of how to select the right drop cable for each CATV system, and discuss the most useful types from which you can choose.

All drop cables, of course, have a characteristic nominal impedance of 75 ohms. The formula for characteristic impedance is

$$Z_0 = \frac{138}{\sqrt{\epsilon}} \log_{10} D/d$$

where D is the diameter of the dielectric under the outer shield, d is the diameter of the center conductor, and  $\epsilon$  is the dielectric constant of the dielectric. In other words, two factors govern the characteristic impedance:

- (1) The ratio between the diameters of the inner and outer conductors, and
- (2) the dielectric constant of the dielectric material.

## Center Conductors

Every CATV Cable generates some signal loss, or attenuation. In a typical drop cable, the center conductor is responsible for about 75% of the attenuation. Generally speaking, the larger the center conductor, the less loss it causes. However, there is a limitation to a center conductor size. To main-



Jerome Cohn

tain the 75 ohm impedance necessary for CATV, we have to increase the diameter of the dielectric when we increase the diameter of the center conductor.

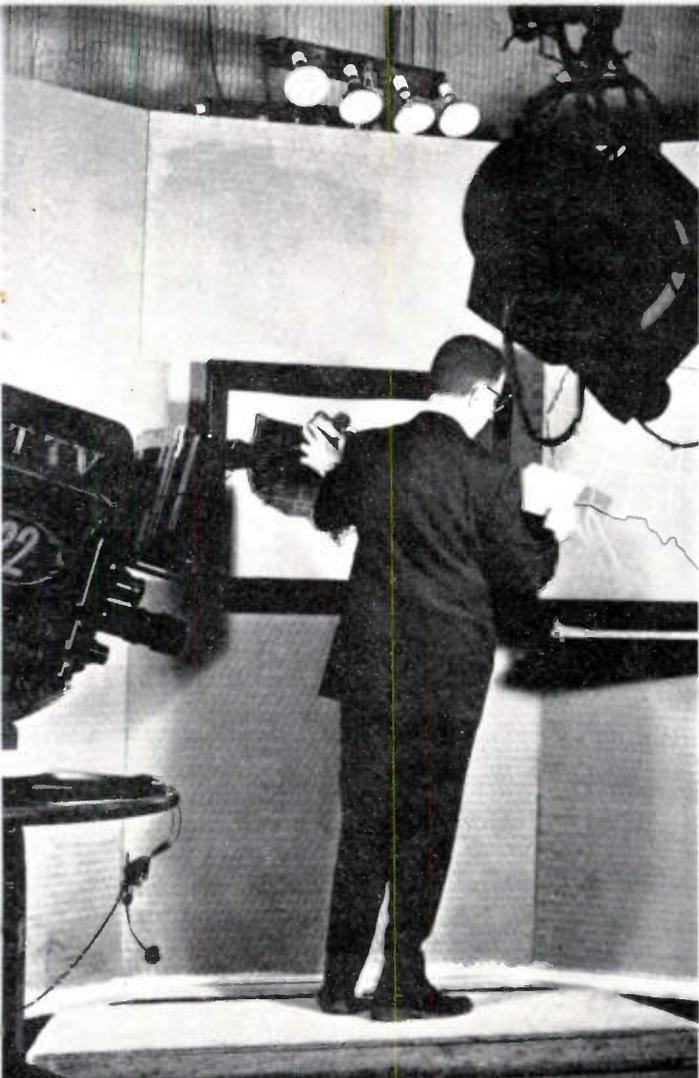
Drop cables are generally about 1/4" in outer diameter (O.D.) and of the RG-59 or RG-6 type. The largest practical center conductor for drop cables is #18 AWG, with a diameter of 0.0403". This cable will have an outer diameter of slightly more than 1/4", putting it in the RG-6 class. RG-59 types, with O.D.'s less than 1/4", cannot use center conductors larger than #20 AWG (0.032").

The most common metal used for cable center conductors is pure, solid copper. However, trunk and distribution cables sometimes use aluminum covered with a thin layer of copper. This tends to minimize cold-weather pullouts caused by the unequal expansion characteristics of aluminum shields and copper center conductors. In drop cables,

Table I

### PROPERTIES OF JACKET MATERIALS

CHARACTERISTIC	JACKET MATERIAL				
	POLYETHYLENE (PE) (POLY)	POLYVINYL CHLORIDE (PVC) (VINYL)	POLYVINYL CHLORIDE (PVC) (-50°C VINYL) -50°C	NON-CONTAMINATIVE VINYL (NCV) TYPE "IIa"	
FLAME RETARDANT	NO	YES	YES	YES	
WEATHERING RESISTANCE	EXCELLENT	GOOD	GOOD	GOOD	
CRACK RESISTANT	YES	NO	NO	NO	
ABRASION RESISTANCE	EXCELLENT	GOOD	GOOD	GOOD	
CONTAMINATION	NON-CONTAMINATING	CONTAMINATING—WOULD TEND TO INCREASE CABLE ATTENUATION OVER A LONG PERIOD OF TIME (APPROX. 5-10 YEARS) WITH ENVIRONMENTAL EXTREMES.		NON-CONTAMINATING	
FLEXIBILITY	ROOM TEMP	FAIR	GOOD	GOOD	GOOD
	LOW TEMP	POOR	FAIR	GOOD	GOOD
DIRECT BURIAL	RECOMMENDED	NO	NO	YES	



# The Year-'Round Lavalier

**E-V** Around most TV stations, E-V lavaliers are taken pretty much for granted. Just hang one around your neck, or clip it onto lapel or pocket—and start talking.

Nothing could make us happier. Because we take great pains to insure the absolute reliability of these tiny microphones. And frankly, no other type of microphone poses a bigger design problem. The lavalier gets dropped, stepped on, swung by its cord, smashed and banged—not once, but often during its life. Most of the abuse is accidental—but inevitable.

So we developed a “nesting” principle of construction that is based on tolerances so tight that the internal element acts as a solid mass, reducing damage due to shock. And we use nothing but Acoustalloy® diaphragms . . . almost indestructible despite heat, humidity, dirt, or high intensity noise or shock.

We've also spent years developing cable specifications—and methods for attaching it. We've taken into account all the tugs and twists that are the fate of any lavalier cable. That's why our strain relief is so effective. And knowing that no cable can last forever, we've made replacement easy and fast.

Of course reliability by itself is not enough. So our field testing of E-V lavaliers is also devoted to sound quality. We must satisfy major network and independent stations on every score. As a result, E-V lavaliers can be mixed in the same program with stand microphones with no change in voice quality.

In the process of developing the lavalier, we've also made it smaller. Our original model was 7" long and 1" in diameter. Today's Model 649B is just 2-1/4" long, 3/4" in diameter, and weighs a mere 31 grams!



Normal trade discounts apply to list prices shown.

Of course TV studios aren't the only places you'll find E-V lavaliers. They're used in classrooms, lecture halls, conferences, stages and business meetings. And they offer the same year-round reliability with no compromise of sound quality.

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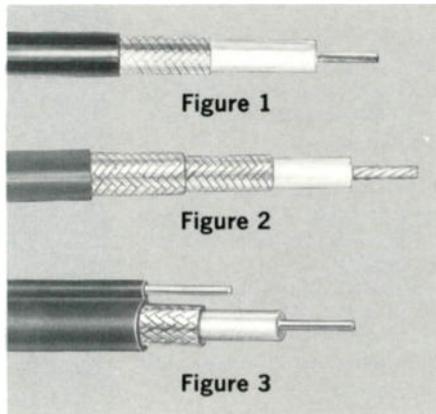


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pullout is no problem, but mechanical strength is.

Therefore, some drop cable center conductors are made of copperclad steel. Since copper is a much better



conductor than steel, we might expect copperclad steel center conductors to cause extra attenuation. Fortunately, they don't. At high frequencies, "skin effect" confines signals to the outer surface of the center conductor. Because of skin effect, only a thousandth of an inch of metal actually carries CATV signals. Thus, if the copper coating is at least .001" thick, a copperclad steel center conductor causes no more signal loss than pure copper.

The advantage of copperclad steel center conductors is that steel is a lot stronger than copper.

CATV Cables use only two types of dielectrics — solid polyethylene and foam polyethylene. Each has its advantages and disadvantages.

The dielectric constant of solid polyethylene is 2.28 compared with

1.5 for foam polyethylene. Because of this difference, the outer-to-inner conductor diameter ratio (D/d) of solid cable must be 6.61, compared with only 4.64 for foam cables. Foam causes less signal attenuation, but solid polyethylene is more rugged, more moisture resistant, and more crush resistant.

### Jackets

Four basic jacket types are available on CATV drop cables: Polyethylene, ordinary polyvinylchloride, -50° C polyvinylchloride, and non-contaminating polyvinylchloride. Table I shows the properties of each.

Polyethylene (PE) is used a great deal for drop cables because it is tough and abrasion resistant. Polyethylene does not contaminate and protects against ultraviolet radiation damage.

Ordinary polyvinylchloride (PVC) is more flexible and more resistant to fire than polyethylene. However, it does have two disadvantages: (1) It becomes brittle in cold weather and (2) it contaminates. What happens is that the plasticizer used in PVC is volatile and it migrates through to the dielectric core, changing the dielectric constant and thereby increasing the attenuation. The decrease in plasticizer in the jacket causes the PVC to become even more brittle at low temperatures. Of course, contamination is a very slow process, but within 5 or 10 years, PVC drop

cables can cause significant problems.

-50° C polyvinylchloride is similar to ordinary PVC. It also contaminates over a period of time. However, it retains its flexibility at much lower temperatures.

Non-contaminating polyvinylchloride, (NCV), as the name implies, does not contaminate. It is just as flexible and flame retardant as ordinary PVC, but its plasticizer is not volatile. NCV does not cause increased signal loss with time, nor does it lose its flexibility.

All jackets look pretty much alike. But it is possible for a manufacturer to use substandard or scrap materials in order to save money. This is why "bargain" cable can be so expensive in the long run. If you have to replace drop cables, you lose a lot more in time and labor than the cable costs.

Therefore, it pays to use good cable initially, to make sure you know exactly what you are ordering, and to install cables carefully.

There is probably more confusion in the field about jackets than on any other subject — probably because there are so many variables. Even experienced CATV men sometimes ask for "Poly" when they mean polyvinylchloride or just say "Vinyl" when they really want non-contaminating polyvinylchloride. Table I includes the most commonly used nicknames and designations of each type of jacket. Your safest bet, aside from spelling out the entire formal name, is to order your drop cables

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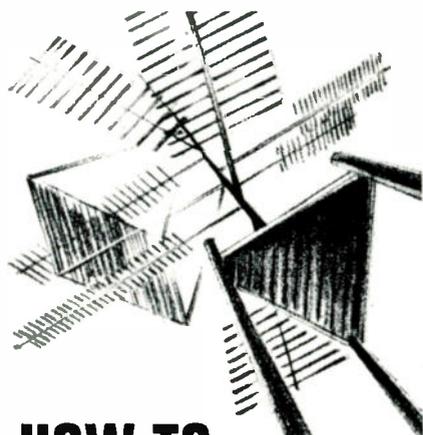


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by letter designation as follows. Name, Polyethylene—Letter Designation, PE; Ordinary Polyvinylchloride—PVC; -50° C Polyvinylchloride— -50° PVC; Non-contaminating polyvinylchloride—NCV.

Then you can be sure of getting the jacket you order made of pure, virgin materials. A substandard jacket, or the wrong type, will generally work OK initially. Only after a few years of use will you start to get subscriber complaints.

## Shields

Trunk cables frequently use solid aluminum outer conductors which

double shielding as shown in Figure 2. "Triaxials," as double shielded cables are often called, may use single or double jackets. They are recommended only for problem areas.

## Messenger Drop Cables

In discussing center conductors, we talked about the need for mechanical strength in drop cables. Copperclad steel center conductors help a lot, but this alone is not always adequate. Where strands are long, or ice is heavy or winds are fierce, integral messenger drop cables are required (see Figure 3). Messenger

Table II

CABLE TYPE	CONDUCTOR	DIELECTRIC CORE	SHIELD COVER	NOM. O.D.
RG-59	#22 AWG (0.0253") BARE COPPER COVERED STEEL	SOLID POLYETHYLENE (0.146" NOM. O.D.)	COMM'L STANDARD	0.242"
			MIL-C-17 STANDARD	0.242"
			TRIAxIAL (DSDJ)	0.325"
		UNICELLAR FOAMED POLYETHYLENE (0.146" NOM. O.D.)	COMM'L STANDARD	0.242"
			MIL-C-17 STANDARD	0.242"
			TRIAxIAL (DSDJ)	0.325"
RG-59 (75 ± 3Ω)	#20 AWG (0.032") BARE COPPER	UNICELLAR FOAMED POLYETHYLENE (0.146" NOM. O.D.)	MIL-C-17 STANDARD	0.242"
			TRIAxIAL (DSDJ)	0.325"
VIDIAX "82" CHANNEL (75 ± 3Ω)	#18 AWG (0.0403") BARE COPPER	UNICELLAR FOAMED POLYETHYLENE (0.185" NOM. O.D.)	COMM'L STANDARD	0.275"
			MIL-C-17 STANDARD	0.275"
RG-11 (75 ± 3Ω)	#14 AWG (0.064") BARE COPPER	UNICELLAR FOAMED POLYETHYLENE (0.285" NOM. O.D.)	MIL-C-17 STANDARD	0.405"
			TRIAxIAL (DSDJ)	0.470"

provide 100% shielding. But solid aluminum is too inflexible for drop cables. Almost invariably, house drop cables use braided shields. This doesn't simplify selection much, however, because many, many types of braided shields are available. Generally speaking, the more copper used, the better the shielding. "Bargain" cables often skimp on shield braiding, and, more important, increasing the problems of radiation and direct pick-up. Commonly available cables generally provide 80% to 90% coverage. Since the amount of shielding has a significant effect on the cost of manufacturing a drop cable, there is almost no minimum to the amount of shielding offered by some producers.

The amount of shielding you actually require depends upon the location of your system. In isolated areas you can often get by with a minimum of shielding. In areas where there is a strong local channel, heavy industry, or other sources of interference, good shielding is essential. Some areas require

drop cables cost a little more but they can save you a lot of callbacks on cold, windy nights. When in doubt, it pays to use messenger supported drop cables. The initial effort and expense are more than compensated for over years of trouble free service.

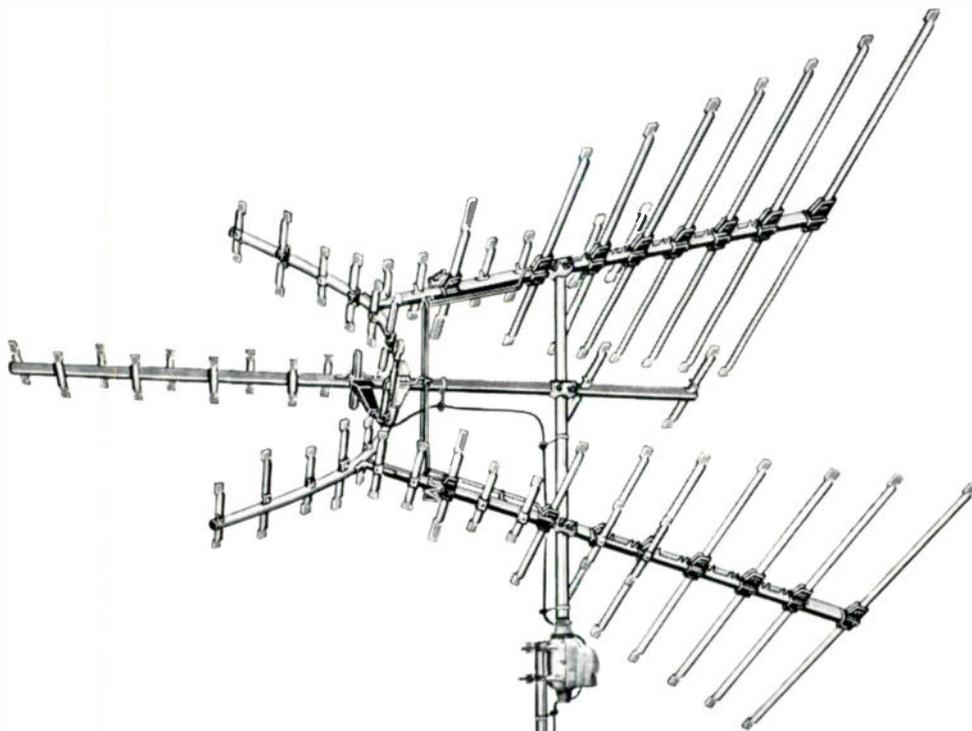
It is obvious from the foregoing discussion that there is no such thing as "just an ordinary drop cable." Using these criteria together with your knowledge of local conditions you should be able to specify the optimum drop cables for your system.

Table II shows the basic types of drop cables available from most manufacturers such as our firm. Each of these cables is available in your choice of four jacket types, with varying amounts of shield coverage, and with and without messengers.

Remember that you are better off to overspecify than to underspecify. In CATV, this is even more true, because labor is such an important portion of the cost of stringing house drop cables. PVC

# We did not, we repeat, we did not create the Winegard SC-1000 to complicate CATV.

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Suddenly CATV consultants and technicians and even telephone companies involved in cable tv want to know what the SC-1000 is all about. They want to know if it's as powerful and as different as they've heard.

It is. That's no rumor.

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# Cablecasting Seminar Draws High Operator Interest

Three-day cram course brings 100 operators and programming experts to second NCTA session...

**B**right and early on February 28th, eighty-seven participants (including a navy commander who operates 17 cable systems in the Pacific Fleet), 18 instructors and several members of the press met in Salt Lake City to explore concepts and practicalities of a very vital aspect of communications . . . cablecasting. Sponsored by the National Cable Television Association, the second annual cablecasting seminar was conducted in a far different frame of mind than the first seminar held last March in Cleveland.

In contrast to the visible apprehension and skeptical reservations voiced last year, enthusiasm ran high from opening remarks on Wednesday to noon on Friday when the weary but more knowledgeable cablemen began to head for home.

TeleMation, Inc., a leading supplier of cablecasting equipment, hosted the two and a half-day meeting which also featured equipment and services from a dozen other leading broadcast/CATV companies. TeleMation's President Lyle Keys welcomed the cablemen to Salt Lake City and the cablecasting seminar. Samuel S. Street, Director of Convention and Field Services, NCTA, then opened the seminar. Keeping his remarks brief in view of the extensive, in-depth program outlined for that day, Street remarked on the evident different climate of feeling concerning cablecasting: "This year, there are few doubts about whether to cablecast or not; this year, the question is, 'what's the best and most practical way for me?'"

The scope of curriculum outlined for the seminar covered basically the following points:

(1) Technical aspects — video, lighting and audio-theory and practice.

(2) "How to" — 3 studio setups, designated Studios I, II and III, or, a typical one-man studio, a full production studio and a CATV color studio.

(3) Programming, including the use of film packages; case histories from large and small systems; and current and future legal aspects of cablecasting in view of current copyright legislation.

Panelists and speakers (pictured on these pages)



CATV'ers attending Salt Lake City seminar work with live subject during lighting theory session. Rosalie Parr of TeleMation acts as model.

The one man studio, one of three studios in use during the seminar, is demonstrated by Ken Lawson, Manager-CATV Sales at host-firm TeleMation. Agenda provided opportunity for groups of CATV'ers to work with all studio equipment.



were all well known in CATV communications and are either cablecasting equipment manufacturers or cablemen currently using cablecasting techniques in systems throughout the country.

Lyle Keys led off that morning's session, speaking on "Video Theory and Practice in CATV." Presenting some of the technical aspects of cablecasting, Keys discussed video signal components and types of synchronizing signals; the importance of "levels" and termination and characteristics and operating guidelines with vidicon cameras. Using a comparison chart, he described the types of camera systems cablemen may want to use in setting up their studios.

Keith Covey, Colortran Industries, Inc., covered the second major technical point — "Lighting Theory and Practice in Television." Explaining the types of light necessary in view of camera operating requirements and achievement of desired effects, Covey gave a demonstration with "Camera on" in Studio II. (Mr. Covey's talk was later videotaped and will be made available to NCTA members by the association.)

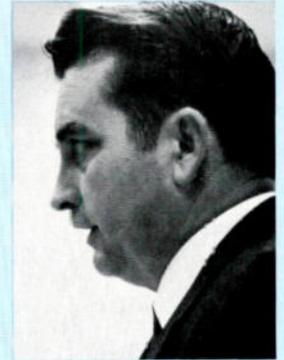
"Audio Theory and Practice," presented by J. Lawson, Sparta Electronic Corp. covered the third major technical aspect of the morning session. Detailing the importance of audio, he discussed microphones, background music (taped), spot announcements, off-air tuning high and low levels and impedance matching, as well as other important audio techniques.

Following a hastily eaten box lunch, the afternoon session continued with a panel discussion of "Community Public Relations." Panelists included Sam Street, NCTA; Gregg Liptak, program director for Cleveland Area Television, Lakewood, Ohio; and Ed Drake, manager of CCTV projects for GenCoE, Inc., Casper, Wyoming. Outlining the progress made in a major metropolitan area, Gregg Liptak emphasized the "counter programming" approach, which he feels has worked well for the Cleveland Area system. Programming includes sports, kiddie shows, teenage discussion, religious programs and a variety of films. Stressing the necessity of adherence to the NCTA

Lyle Keys: "Cablecasting offers the community a medium of true local expression."



Ed Drake: "There is nothing immoral about cable systems accepting advertising."



Gary Christensen: "Legal problems incidental to cablecasting are not insurmountable."



Stan Searle: "... an urgent need for fully trained personnel to operate cablecasting equipment."



John S. Brunson: "Feature films offer cable systems an important sales tool."



Code of Ethics (see TVC, March, 1967) the experience in Lakewood presents a strong case for successful cablecasting in metropolitan areas.

Backup for cablecasting in smaller systems was presented by GenCoE's Ed Drake. Urging cablemen to find and utilize both community needs and available services, he cited the bilateral use of equipment and manpower in conjunction with local schools and programs such as "adult education." As another source of cable casting material, he recommends "community to community" exchange of videotaped productions where feasible.

The discussion really got lively on the subject of film packages in open discussion following the panel. Three film distributors had described their various film packages and services available to cablecasters.

The film distributors present were John Brunson, Program Corporation of America; Gene Dodge, Modern TV; and Bob Weisburg, of the newly formed TeleMation Program Services. All have come up with new and definite formats, available on request to interested cablemen. Free Films, which boasts a library of 50,000 films on sports, travel, industry, etc., provides films at the cost of the return postage only. Currently, the entire library is being converted to 1", videotape to encourage wider use.

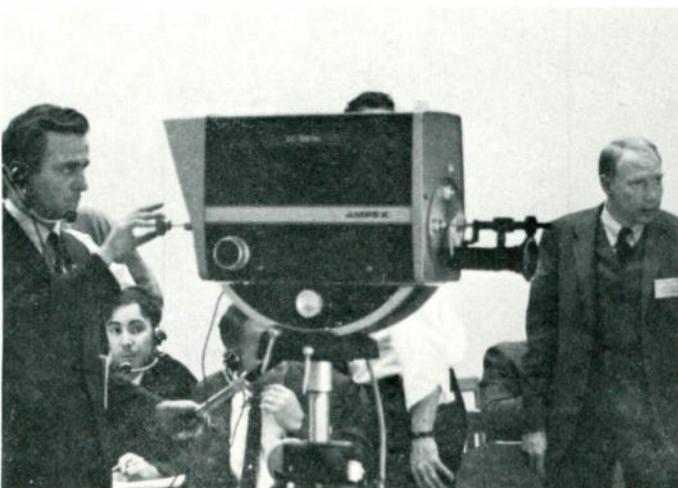
From the viewpoint of many attending, the best was yet to come — workshop sessions in the three fully equipped studios down the hall. Divided into 6 work groups with 14 cablemen in each, the men were given a studio assignment which had been carefully worked out in advance to allow everyone to participate.

Before the cablemen were turned loose in the studio,

Robb Rusom, of the University of Utah CCTV Department, explains script development for cablecasting applications.

George Green, Jefferson-Carolina Cablevision, operates camera, with Don Witheridge of NCTA picking shots, and Bob Parchman (at right), KUTV Creative Director supervising.

Panel session on "Future of Cablecasting" was taped by students. Panel members (left to right) Sam Street, Ed Drake, and Gary Christensen; not shown are Bill Daniels, Lyle Keys, and George Hatch.



## Panelists Disagree On Regulation of Local CATV Programming

Lively session on "Future of  
Cablecasting" rounds out successful  
NCTA seminar agenda...

About the only controversy during the three day Cablecasting Seminar came on the final morning in a panel discussion which included Bill Daniels, George Hatch, Lyle Keys, Ed Drake and Gary Christensen. The session was moderated by Sam Street. Suggesting that cable operators should proceed with local origination, Hatch stated, however, that "federal regulation will be the price of originating." Daniels responded in adamant disagreement, declaring that "federal regulation of local origination would be in violation of the first amendment to the U.S. Constitution!" TeleMation president Lyle Keys said that if all cable operators were to engage in local origination at this time, both the FCC and Congress would have to bend to the "weight of public opinion" and allow CATV origination.

Looking to the future, there was agreement that color programming will become an important part

of CATV local origination. Keys told operators that a basic color studio can be installed for \$20,000, compared to about \$10,000 for a basic monochrome origination studio. During the seminar Daniels announced that his company will install a complete, three-camera color studio at the Palm Desert, California system. Estimated cost, according to Daniels, will be \$65,000. The system serves 10,000 subscribers.

A variance of viewpoints was also present on the subject of advertising sales by cable television systems. Daniels indicated that his company's Fort Madison, Iowa system sells advertising but limits it to the institutional type. However "revenues are sufficient to fully amortize the cost of our local origination of equipment," he stated. Ed Drake, who manages closed circuit projects for GenCoE, Inc., said that his company was less restrictive and would carry conventional television commercials. "We don't turn down anything," he said.

NCTA attorney Gary Christensen told operators that a nationwide grid to carry all types of communications is "being discussed by some very influential people in government." Cable operators, he said, would have to have their franchises and pole attachment agreements amended in order to become a part of such a nationwide grid. George Hatch, who is both a broadcaster and cable operator flatly declared, "I don't think it will happen." He reasoned that many substantial businesses could be adversely affected by such a total changeover.

Matt Spinello and Jim Crooks of the Ampex Training Institute outlined proven theory and practice of program preparation, stressing thorough thought and attention to detail as requisites for smooth operation. Preparation of the script, placement of cameras and guests for maximum effect, timing and proper equipment in good working order were all emphasized as basic necessities for a good show. Spinello and Crooks suggested making a checklist to follow for each cablecasting stint.

Ken Lawson was in charge of Studio I (one-man studio production). Equipment in this studio was provided by TeleMation with production format as follows:

(1) Ten interviews at approximately two minutes each. Five movie spots at approximately one minute each. Thus, each of five moderators does two interviews sandwiched with one film spot.

(2) Start and Stop tape recorder (Record Mode) with each new moderator/operator.

(3) Moderator/operator uses lavalier microphone. Guest uses hand microphone.

(4) Each of eight guests takes one turn at camera for zoom practice.

Studio II (full-studio production) featured equipment by Ampex, TeleMation and Sony and provided the scope necessary for larger systems.

(1) Three of the persons who operated controls in Studio I watch and evaluate.

(2) Other ten take following positions:

- |                          |                     |
|--------------------------|---------------------|
| a. Camera I              | f. Moderator        |
| b. Camera II             | g. Guest I          |
| c. VTR                   | h. Guest II         |
| d. Video Control Console | i. Guest III        |
| e. Audio Console         | j. Program Director |

(3) Tape 10 minutes of interview.

Studio III (color origination for CATV) was designed to demonstrate International Video Corporation's new low-cost color equipment. This studio opened the door to "cable color."

During the luncheon at the Hotel Utah, George Hatch, vice president of Community CATV, president of Salt Lake City's KUTV and co-chairman of the ad hoc copyright negotiating committee, warned cable operators that "in all likelihood, what Congress will enact will be the last (copyright) legislation for 45 years," so "you'd better talk to your Senators and Congressmen in a hurry."

Noting that the Copyright Act has been rewritten only three times in the past 178 years, and that television and motion pictures have been developed since the last revision, he called for a practical copyright settlement that would take into account all new technologies.

Discussing several proposals that might be incorporated in the new law, Hatch predicted that the life of copyrights probably will be extended to the life of the

author, plus 50 years. Current law provides for an initial copyright of 28 years and one renewal for the same period.

Senator Frank Moss, (d), Utah, in a ten-minute telephone speech to attending cablemen, stressed cablecasting as a unique method for local expression. Moss, a leading sponsor of communications legislation, strongly endorsed program origination by cable systems and called for a summit conference of broadcast, copyright, government and cable interests to help develop a national communications policy. He urged inter-industry cooperation so that the public can benefit fully from "whatever the entrepreneur and technological advances have to offer."

Moss said the cable television industry's cablecasting operations promise to "close the gap between national and local TV programming." Describing cable-originated programming as "a sort of electronic daily newspaper" for small communities, Moss said this service should be encouraged. "Cablecasting gives people in communities of this type their only opportunity to originate programs about their local affairs — to discuss local bond issues, to hear debates between local political candidates and to celebrate local events. In other words, cablecasting promotes democracy."

Moss said he believes that broadcasting, cable television and translators "can live side by side, provided a national policy with appropriate guidelines is adopted and adequate authority is given the FCC to regulate." He said he is "hopeful that when we complete the negotiations — the painfully slow negotiations — and arrive at a consensus between CATV, broadcasters and copyright interests, and when we end the legal skirmishes currently under way in the Supreme Court, that the collective heads responsible for leadership in broadcasting, in copyright matters, in CATV and in government will be able to sit down and agree on a set of principles and guidelines that will lead to the establishment of a national policy.

"This must be done, for each has a role to serve. Above all, it is the general public that must be pro-

tected and have available to it whatever the entrepreneur and technological advances have to offer. Bickering must stop and the public interest must be enhanced," he concluded.

During the final session Friday morning, CATV pioneer Bill Daniels, endorsing the potential of cablecasting, illustrated his talk with a slide presentation of his existing systems in operation, in addition to explaining cablecasting plans for his soon-to-be completed system in Colorado Springs. He advocates underground construction as in the long run being less expensive, and concurrently, eliminating problems with the telephone company.

Gary Christensen, assistant general counsel, NCTA, followed a general panel discussion on the future of CATV and cablecasting with the legal aspect of copyright and other considerations in relation to CATV and cablecasting. (See separate report on panel discussion.)

Following the panel discussion, TVC publisher Stan Searle spoke on what he considers the "one challenging problem that overshadows all others" with respect to the future of local origination. The cable industry, he said, lacks the trained personnel to do "a respectable job of local programming on any broad scale." The equipment for local programming is "years ahead of the available human resources to utilize it," he declared. Searle urged cable operators to develop the manpower now "to complement your local origination hardware."

"The best equipped cablecasting studio in the world will not be well equipped," he stated, "unless it is manned by a well-trained, qualified technical staff." He reported to the group on the local origination subjects which are included in the Chief Technician course being offered by National Cable Television Institute, of which he is a co-founder and a director.

Eighty-seven weary but eager cablemen were then granted an open lunch hour; invited to tour the KUTV — Salt Lake studios for a demonstration of television techniques — most of them turned up and then departed for home.

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## CATV Industry Profile:

# Entron, Inc.

**From an apartment house basement to spacious Silver Spring manufacturing and management facilities, this mainline CATV equipment supplier has logged 16 years of rapid growth**

**E**ntron, Inc., firmly established in its spacious suburban Washington, D.C. headquarters, has moved many steps upwards from its 1952 birth in the basement of a Georgetown apartment house.

The fledgling company was formed as a subsidiary of Trans Continental Systems which, in turn, was a subsidiary of Bellmore Company. Trans Continental, Bellmore's electrical installation company had started to install master antenna systems in Washington apartments. Several employees of Trans Continental saw the time was ripe to create a manufacturing company supplying electronic equipment to owners and operators of community antenna systems. The goal set by these founders was "engineering electronics" which was later abbreviated to become the company's name of Entron.

It was in the basement of this apartment house that the FasTee and ShuVee were designed and manufactured. It was here that production started to roll. In the

Above: Quality control procedures and performance testing are emphasized throughout Entron's production facilities.

Discussing strand map at right are Entron's Heinz Blum, v-p advanced engineering; John G. Russell, v-p marketing; O.D. Page, v-p product engineering; Edward P. Whitney, president, and Anthony Vendemia, v-p production.

limited space available, business was soon very hectic.

The young company managed to meet those early challenges through the efforts of CATV pioneers like Hank Diambra, Bob McGeehan, Henry Kannee and George Edlen. In those days it was not uncommon to find staff members literally working "round the clock" in order to get Entron established in the industry.

Entron manufactured just three basic products in the apartment basement. They were successful. With that acceptance, and looking

towards the future, the firm moved to a converted warehouse in suburban Bladensburg, Md. Due to the growth of CATV systems, and to aggressive management, the product line grew from three to several hundred in just a few years.

Entron's major selling point in the early days was the pioneering of a five-channel CATV system. At that time, competitors were able to put only three television channels on a system using strip amplifiers in the trunkline. Entron advocated that broadband amplifiers be utilized.





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Chief engineer Glynn McCready states: "The Sony Videocorder fits in perfectly with our type of operation, where simplicity, portability and sturdiness are important. The BV-120 meets all these requirements. We have over 700 hours on the Videocorder and have not had a single major problem. When 70 percent of your programming is on tape and you have only one machine, you know how important it is!"

No matter how large or small your audience, to find out how you can bring them together – profitably and practically – call or write us today.

*For complete details on this application, ask for APB 107.*

Problems were encountered of course, but it is interesting to note that they are similar to the pro-



A Separate 10,000 square foot building houses production line for Entron's solid-state equipment line.

blems CATV people talk about today when discussing 20-channel versus 12-channel systems.

By 1955, Entron's product line was complete and it began to sell entire CATV systems. Soon Entron was installing turnkeys. And in 1958 it began manufacturing and selling master antenna systems.

By 1960 the growth of the company and of the entire CATV industry made another increase in plant facilities necessary. Entron moved in 1962 to its present facilities, which were designed for more sophistication in all areas of Entron's business.

Entron launched a system acquisition program in 1966 and presently operates seven systems. These operations are located in Du-Bois, Sharon and North Braddock/Swissvale, Pennsylvania; Jacksonville and Wilmington, North Carolina; and Houma and New Iberia, Louisiana. A wholly owned subsidiary — Systems Construction Corporation — is the company's service organization for providing turnkey construction, design, and field engineering for systems operators.

Entron President Edward P. Whitney feels systems acquisition

provides a measure of diversification. "We intend to maintain a balance between equipment manufacture and system ownership/operation," he says.

Whitney, a CATV pioneer who was hired as the first Executive Director of NCTA in 1957 and later as sales manager for Ameco, Inc., stated that Entron started its move after a majority of the company's public stock was acquired by the Boston Herald-Traveler Corporation in 1966.

"This financial and management backup made Entron a soundly financed CATV organization and afforded us the opportunity to develop a more comprehensive state-of-the-art product line. This is balanced by our knowledgeable sales staff — under the guidance of our VP/Marketing John G. Russell — which is able to talk the language of the customers who are using the equipment in the field," Whitney states.

Another indication of the strong support by the Boston Herald-Traveler was the recent Entron Board decision to immediately in-

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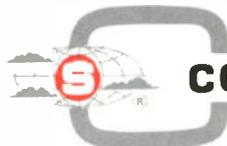


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crease the company's research and development budget by 40% to "develop new products looking toward expansion of the transmission of intelligence over coaxial cable." In the face of tight CATV market for business while awaiting the legal and congressional effects of the FCC's Second Report and Order, Whitney feels the company's step was a significant one and an indicator of the confidence Entron has in the future growth of the community antenna television industry.

"In the short life span of CATV," he states, "we have seen tremendous progress in the technology of audio-visual transmission via coaxial cable. We are convinced that the CATV industry must soon implement the much broader concept of wire communications including sending as well as receiving, push-button shopping, scores of TV channels, access to stored data, and other services that today are only imagined."

In the hardware category, Entron has taken an equally aggressive step in changing from its workhorse tube equipment to a complete solid-

state line as well as a new packaging concept and advanced state-of-the-art equipment. Major component hardware manufactured by Entron includes trunkline amplifiers, VHF preamplifiers, distribution/termination amplifiers, intermediate bridging amplifiers, combination trunkline bridging amplifiers, line extenders, and remote power insertion units. Entron features include automatic gain control and dual pilot carriers.

The company has recently streamlined its engineering department and promoted Heinz Blum to Senior Vice President in charge of advanced engineering. He will direct the company's program of looking at CATV two to five years from now and working out equipment/systems designs accordingly.

Inheriting the day-by-day engineering activity from Blum is Orville D. Page as Vice President/Product Engineering. Page is working with the new solid-state amplifier line which has been designed to take advantage of modularization of the circuit functions.

Even the manufacturing facilities have been up-dated, and Anthony Vendemia, VP/Production now has a separate 10,000 square foot assembly building in addition to a three-story 30,000 square foot headquarters building. Full-time personnel total about 170, including two members of the production staff that have been with Entron for the entire 15 years of the company's existence.

Mr. Whitney also observes that, "Entron has made it a strong point to hire technical and sales people outside the CATV industry and to train them in the business, particularly field service personnel." "We have taken people in allied fields such as microwave and CCTV and trained them in CATV techniques, similar to what IBM has done in the computer industry. We feel this has been one of our major, long-range contributions to CATV."

Thus, with a vigorous management, sound financial, backing and a comprehensive product line, Entron's role in CATV's future seems well assured. (TVC)



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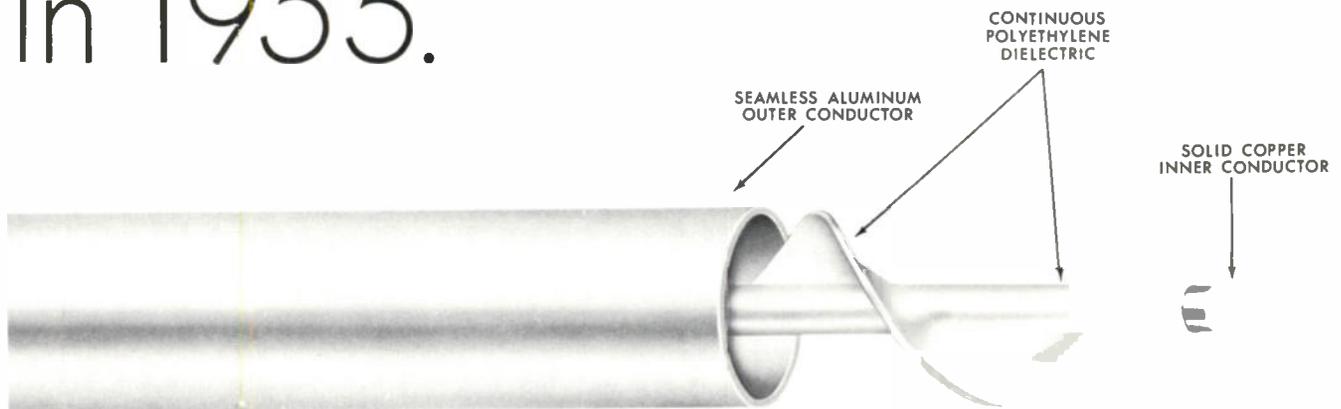


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The firms listed here are actively engaged in cable system construction in North America and may be contacted for details of construction capabilities and specialties omitted from this quick-reference listing.

**David B. Adams Construction Company;** Uniontown, Pennsylvania 15401; Ph. (412) 438-7560; Complete CATV construction services, including cable plowing.

**Ameco Inc.;** 2949 W. Osborn Road, P.O. Box 13741, Phoenix, Arizona 85002, Ph. (602) 262-5500; Provides engineering, planning and installation. Specializing in complete "turnkey" completions. Complete design of CATV systems from customer maps. Tower site survey. Microwave systems also designed.

**American Matador;** 982 North Batavia, Bldg. B, Suite 8, Orange, Calif. 92667; Ph. (714) 639-3200; Signal surveys, layout and design, headend installation, aerial and underground plant construction, placing of electronic components, installing house drops, and system balancing capabilities.

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

**B. C. Cable Contractors Ltd.;** 1947 Kingsway, Vancouver, B. C., Canada; Ph. (604) 879-2631; CATV engineering and construction.

**Benco Television Associates;** 27 Taber Road, Rexdale, Ontario, Canada; Ph. (416) 244-4296; Expert assistance in complete CATV systems planning, both new and rebuilt.

**Broadway Maintenance Corp.;** Long Island City, New York 11101; Ph. (212) 286-3700; CATV design, installation, and maintenance.

**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 Company;** 514½ River Road, P.O. Box 190, Puyallup, Washington 98371; Ph. (206) 845-7541; Furnishing all types of system construction.

**Cable TV Construction, Inc.;** 223 N. State, Iola, Kansas; all types of aerial and underground construction.

**Cable TV, Inc.;** P.O. Box 982, Salisbury, Maryland 21801; Ph. (301) 742-5043; Complete construction capabilities for cable systems.

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

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

**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.;** P.O. Box 574, Worland, Wyoming 82401; 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.)

**Pete Collins Co.;** 835 Delaware Ave., Denver, Colorado 80204; Ph. (303) 355-8919. Engineering, construction and maintenance on cable systems.

**Communication Systems Corp.;** 140 East Main Street, Huntington, New York; Ph. (516) 271-1262; Complete

turnkey and construction capabilities for CATV systems.

**Communications Constructors, Inc.;** 1852 East Pacific Coast Hiway, Wilmington, California 90744; Ph. (213) 835-0137; Complete CATV construction services.

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

**Com-Tel Construction, Inc.;** 1721 West Monroe Street, Decatur, Indiana 46733; Ph. (219) 724-2581 or 2690; Aerial and underground system construction, including cable plowing, and system engineering services.

**Daniels & Associates, Inc.;** 2930 East Third Avenue, Denver, Colo.; Ph. (303) 388-5888; Complete engineering for cable system layout, turnkey, estimates, and engineering studies.

**DAVCO Electronics Corp.;** P.O. Box 861, Batesville, Arkansas 72501; Ph. (501) 743-3816; Complete services include layout, equipment and installation.

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

**Great West Construction, Inc.;** Box 468, Mexia, Texas 76667; Ph. (817) 496-4662; Complete services include field engineering, signal surveys, layout engineering, installation of all electronic components, and testing both aerial and underground systems.

**Gregory Electric Company, CATV Division;** P.O. Box 76, Columbia, South Carolina 29202; Ph. (803) 256-9926; Complete system design, engineering, and turnkey construction capabilities.

**Harris-McBurney Co.;** 1006 Airport Road, Box 267, Jackson, Mich.; Ph. (517) 787-1800; Complete construction services for CATV.

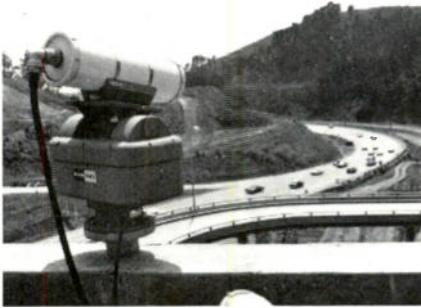
**Henkels & McCoy, Inc.;** 1800 Johnson Street, Elkhart, Indiana; Ph. (219) 264-1121; CATV engineering and construction.

**Highland Associates, Inc.;** 600 Marble St., Broomfield, Colo. 80020; Ph. (303) 466-3851; Construction and equipment sales, serving area within 500 mile radius around Denver.

**J. H. B. Construction;** Box 132, Alexandria, Minn.; Tower erection, painting and complete CATV construction.

**Jerrold Electronics Corp.;** 401 Walnut St., Philadelphia, Pa.; Ph. (215) 672-

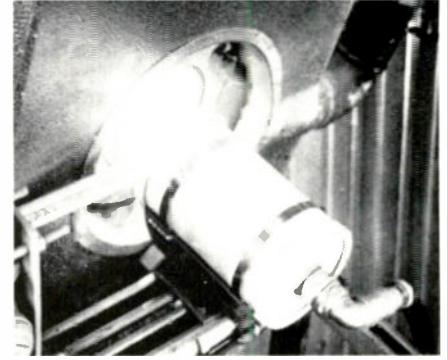
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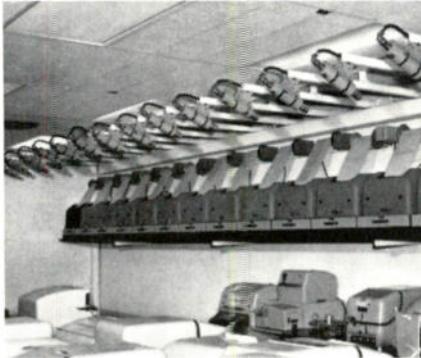
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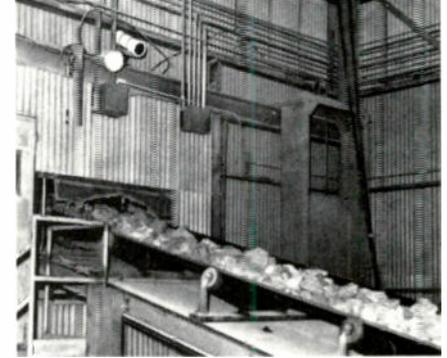
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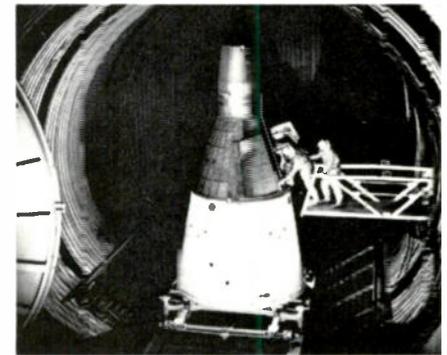


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**Kaiser-Cox Corp.:** 2216 West Peoria Ave., Box 9728, Phoenix, Arizona 85020; Ph. (602) 944-4411; Construction of partial or complete systems, including complete turnkey.

**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 service.

**Malarkey, Taylor & Assoc.:** 1101 17th Street N. W., Rm. 1303, Wash. D.C.; Professional engineering services including signal surveys, head-end, system and component design, preparation of pole line and strand maps, proof of performance tests, trouble shooting, engineering statements, and qualified testimony in FCC proceedings or courts as an expert witness.

**Master Antenna Service:** 248 Wave Street, Laguna Beach, California 92651, Ph. (714) 494-0253; All construction services except overhead and buried trunk.

**Multi Media Engineering, Inc.:** 2385 Lewis Ave., Rockville, Md., 20851; Ph. (301) 726-1340; Cable television construction and engineering services.

**Noram Cable Construction Ltd.:** 1111 Albion Road, Rexdale, Ontario; Ph. (416) 741-0566; Complete CATV construction services.

**Pacific Pipeline Construction Co.:** 1632 S. Greenwood, Montebello, California.

**Power Line Construction Co.:** 2019 S. E. Hemlock, Portland, Oregon 97214.

**Robert G. Owens, Inc.:** 150 Washington Blvd., Laurel, Maryland; Ph. (301) 498-0555; Total turnkey capability.

**Richards & Associates, Inc.:** P.O. Drawer 400, 809 Cedar St., Carrollton, Ga. 30117; Ph. (404) 832-7001; Fully capable and experienced in CATV construction. 25 years experience in installation of communications facilities.

**Edward Shafer & Co., Inc.:** 1101 17th St. N. W., Wash. D. C. 20036; Engineering feasibility studies including signal surveys, tower site location and head-end designs.

**Stan Socia Corp.:** 734 Petroleum Building, Tyler, Texas; Ph. (214) 593-0911; Complete CATV system construction and engineering services.

**Spencer-Kennedy Labs:** 1320 Soldiers Field Road, Boston, Mass. 02135; Ph. (617) 254-5400; Staff of TV systems engineers maintained to perform signal and pole line surveys, strand-mapping, system layout and design plus installation supervision for antenna site and distribution plant construction.

**Superior Continental Corporation, Comm/Scope Division:** P.O. Box 489, Hickory, N. C., 28601; Ph. (704) 328-2171; Comm/Scope provides total CATV services or assistance in any phase of planning, engineering and construction.

**System Construction Company:** 830 Monroe Street, Hoboken, New Jersey; Ph. (201) 656-2020; New turnkey or rebuild or expansion of existing systems. (Subsidiary of Vikoa, Inc.)

**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.)

**Teline 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.)

**Unicom Inc.:** 245 Park Avenue, New York, N. Y. 10017; Ph. (212) 661-4865; Engineering and construction of CATV systems on a turnkey basis.

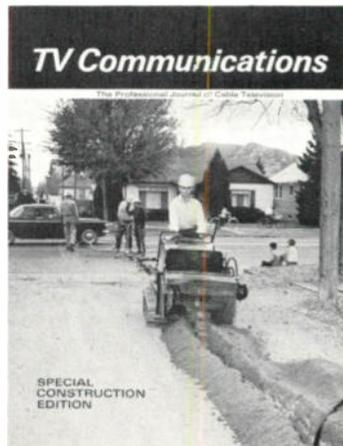
**Utilities Contracting Company:** 1422 East Michigan, Lansing, Michigan 48915; Ph. (517) 482-5248.

**Vikoa Construction Co.:** 400 Ninth St., Hoboken, N. J. 07030; Ph. (201) 656-2020; Complete facilities to construct CATV systems including surveys, engineering and planning. Complete turnkey operations. Special assistance in obtaining financing and leasing programs. (Subsidiary of Vikoa, Inc.)

**Village Cablevision Corp.:** (Subsidiary of Advance Communication), 236 East Washington Street, Lisbon, Ohio 44432; Ph. (216) 424-7273; Specializing in CATV plant construction. Buried or aerial installations and rebuilds.

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## Literature for microwave system engineers and buyers



### **PASSIVE REPEATER ENGINEERING MANUAL 161**

A 52 page manual which outlines in detail design considerations, bearing and gain calculations and selection of passives.

### **PR 864B**

Passive Repeater brochure. 28 models from 8' x 10' to 40' x 60'. Design information, dimensions and configurations are shown. Site and foundation data included.

### **BULLETIN 1166**

Describes a microwave system in the Rocky Mountains along the Continental Divide which uses 7 passive repeaters in 6 paths. Also gives calculations.

### **TM 366**

Five elliptical, tower mounted reflector models, 4 x 6, 6 x 8, 8 x 12, 10 x 15 and 12 x 17. Describes construction, mounting and adjustment features.

### **TM 466**

Periscope antenna-reflector parameters for determination of gain. Optimizing method and adjustment of elliptical reflectors is also described.

### **L & M TOWERS**

Self supporting towers in 3 and 4 leg models from 40 to 310 feet in height. Catalog gives typical antenna loading for proper choice of model.

### **T 367**

Hex tower brochure listing 10 models in single and two bay configurations for major repeater stations. 2 bays will mount up to 12 parabolic antennas.

### **T 365**

Swing pipe towers, pylons, KS towers K frames and H frames in one stub tower and roof mount catalog that shows 52 models and 16 drawings.

### **S 867**

Single antenna tripod mount with folding legs for easy storage or shipment. Brochure contains ordering information, wind load chart and drawing for specs.

### **Q 965**

Brochure showing 4 models of 4 leg towers. Heights are 15, 20, 25 and 30 ft. with single antenna mounting bay at the top. Also lists pipe mounts.

### **QH 965**

A 4 page brochure showing 2 models of 4 leg towers with 2 mounting bays at two levels for pipe mounts and antennas. Pipe mounts are also shown.

### **QL 965**

Brochure shows 2 models in 2 heights, 15 and 20 ft. The 3 leg structure has one mounting bay and lists available pipe mounts.

### **HD TOWERS**

6 models in 4 leg basic design for mounting 4 cornucopias and a transition structure on top for mounting 4 more. Add-on feature for high density systems.

### **PRODUCTS AND SERVICES**

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*Underground Construction. Gulf Coast Television, Naples, Florida. Photo courtesy of Sod-Master.*

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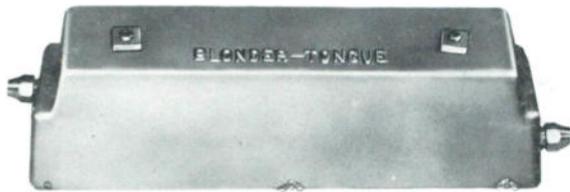
Features variable gain and tilt controls which permit adaptation of unit to all types and lengths of cable normally used. Power links enable unit to be powered from line input or line output with power stop provision. Specifications: **Bandpass:** 50 to 220 MHz  $\pm$  0.25 dB maximum; **Gain:** 24.5 dB minimum; **Output Capability:** 51 dBmV for each of 12 channels, 1 amplifier, for  $-57$  dB cross modulation.



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# Using Midband to Increase Cable System Channel Capacity

A discussion of engineering considerations involved in utilizing the 120-174 MHz frequency range for CATV...

By Gaylord Rogeness  
Director of CATV Research  
Anaconda Astrodata Co.

A number of different approaches have been taken to increase cable system television channel capacity beyond twelve channels. Each approach has its advantages and disadvantages. This article discusses a number of technical considerations necessary for utilizing the midband frequency range (120-174 MHz).

When the midband is selected for additional channels, amplifier operating levels must be reduced compared to standard VHF 12 channel operation. Level reduction is re-

quired mainly for reduction of second order beat interference and may require shorter spacing with today's amplifiers (i. e. less than 22 dB at channel 13). An amplifier with a low operating noise figure may allow standard twelve channel spacing.

## System Levels

The operating level of an amplifier in a CATV system is selected to insure a minimum acceptable cross-modulation and minimum signal to noise ratio at the output of the last amplifier in the cascade.

Cross-modulation measurements on most CATV amplifiers manufactured today are based on 12 channels, as are system operating levels. When more than 12 channels are applied to an amplifier, cross-modulation in a single channel will increase approximately  $20 \log(n/12)$ , where  $n$  is the number of channels. For example, if 4 channels are added to a 12 channel system, an increase in cross-modulation of 2.4 dB ( $20 \log 16/12$ ) can be expected. To maintain cross-modulation at the same level as in the 12 channel system, all levels must be reduced by 1.2 dB. This assumes that the cross-modulation is predominantly third order and, therefore, decreases 2 dB for each 1 dB that the signal level is reduced. The system level diagram (Figure 1) shows two maximum output level lines based on third order cross-modulation for 10 and 20 channel systems. The maximum output for a system loaded with 13 to 19 channels would fall between these two lines.

Tests conducted at Anaconda Astrodata have shown that use of the

midband frequency band for additional channels is not limited by cross-modulation, but by second order beat products. These products are the sum and difference of all frequencies present in the system. The values of the beat frequencies (due to picture carriers) are shown in Figure 2. Table I summarizes the midband channel frequency allocations. Frequencies above the dashed diagonal line are differences of picture carrier frequencies and those below are the sum of picture carrier frequencies. The picture carrier frequencies selected for midband channels are based on availability of existing converters and minimizing interference due to beat products.

The level of sum and difference frequencies are proportional to the operating level and the second order coefficient  $A_2$ , as discussed in the next section. The levels of second order products, unlike cross-modulation, are reduced 1 dB for each 1 dB of level reduction.

Since products of second order distortion sum on a power basis<sup>1</sup>, the level of second order products after  $n$  amplifiers will be  $10 \log n$  greater than those of a single amplifier. The next section describes the generation of distortion components in amplifiers.

## Intermodulation And Cross-Modulation

A mathematical model of a CATV amplifier relating output and input is shown by the following equation:

<sup>1</sup>"The L3 System-Design"—C.H. Elmen-dorf et al. Bell System Technical Journal. New York, N. Y. Vol. 57, Nov. 1951, pp. 416-24.

### ABOUT THE AUTHOR



Gaylord G. Rogeness has an MSEE degree from University of Illinois. Prior to joining Anaconda Astrodata he was Director of Engineering at Ameco, Inc. He is well known in the CATV industry, both as a result of the papers he has presented at the last three NCTA conventions, and through his membership in various technical and professional societies.

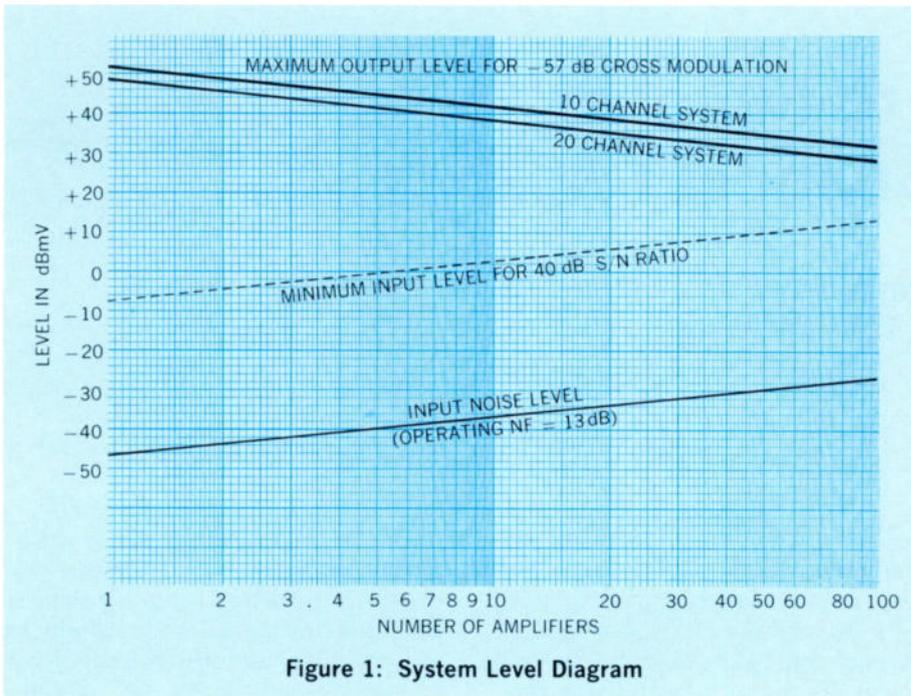


Figure 1: System Level Diagram

$$e_{out} = A_1 e_{in} + A_2 e_{in}^2 + A_3 e_{in}^3 + \text{higher order terms}$$

This relationship is not peculiar to CATV amplifiers alone, but is used to describe amplifiers used for many other applications.

The first term on the right side of the equation produces, at the output of the amplifier, only those signals applied to the input multiplied by gain factor  $A_1$ . An ideal or perfect amplifier would have an  $A_1$  term only.

The third term, with the  $A_3$  coefficient, is the term that generates the cross-modulation components that plague systems today. Usually the spurious frequencies generated by the higher order terms are less significant than those generated by the  $A_1$ ,  $A_2$ , and  $A_3$  terms are therefore ignored in this discussion.

The second order term is the product of the  $A_2$  coefficient and the square of the input signals, and is responsible for the generation of the

second harmonics, and the sum and difference frequencies, of signals applied to the input of the amplifier. Hence, second harmonics and beat products appear at the output of the amplifier.

Because of the frequency allocations for the 12 VHF channels, spurious responses due to second order distortion have not caused interference in systems which use only Channels 2 through 6, and 7 through 13. However, second order beats between Channels 2 through 13 will occur in the midband frequency range. Therefore, the  $A_2$  coefficient must be minimized to avoid beat product interference in the midband range. With the addition of channels in the midband frequency range, beat products will now appear in Channels 2 through 13. The amplitude of the beats will depend on the signal level and the  $A_2$  coefficient.

The amplitude of second order beats can be reduced 1 dB for each 1 dB of signal level reduction. This compares with a 2 dB reduction for cross-modulation components with each 1 dB of signal level reduction.

### Sum And Difference Products

In Figure 2 is shown the sum and difference frequencies of picture carriers for Channels 2 through 13 and Channels A through I. The amplitude of these beats at the output of an amplifier depends upon the  $A_2$

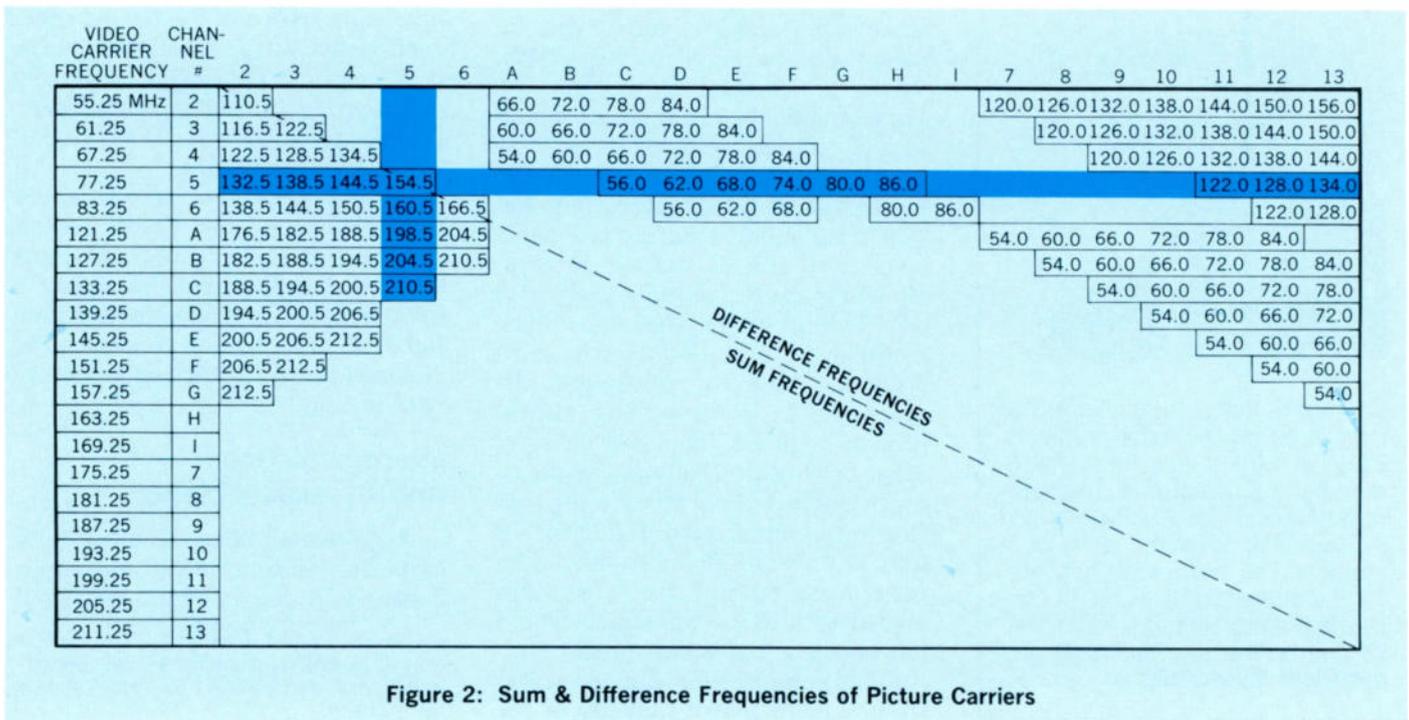


Figure 2: Sum & Difference Frequencies of Picture Carriers

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coefficient and signal level applied to the amplifier.

The Channel 5 row and column in Figure 2 are shaded for example purposes. All sum and difference frequencies due to Channel 5 and any other picture carrier are contained within the shaded row and column. For instance, the beat frequency 132.5 MHz is generated by the sum of Channel 5 (77.25 MHz) picture carrier and Channel 2 (55.25 MHz) picture carrier. The beat frequency 56 MHz is generated by the difference between Channel 5 picture carrier (77.25 MHz) and Channel C picture carrier (133.25 MHz).

Note that as a result of the carrier frequencies selected, a number of beats fall in the guard bands of the selected channels.

Note also, however, that Figure 2 shows only sum and difference frequencies of the picture carriers. The sound carrier and color subcarrier will also produce beats but at much lower level, since the sound carrier is 15 dB below the picture carrier.

### Relative Effect Of Interfering Frequency

The effect of an interfering frequency is also related to its relationship with the picture carrier. Figure 3 shows this relationship for black and white only<sup>2</sup>. As an example, an interfering beat displaced by 2 MHz from the picture carrier has 18 dB less effect than an equal amplitude beat occurring at the picture carrier frequency. Subjective tests have indicated that the relative effect of an interference occurring

MIDBAND CHANNEL FREQUENCY ALLOCATION	
CHANNEL	FREQUENCY (MHz)
A	120-126
B	126-132
C	132-138
D	138-144
E	144-150
F	150-156
G	156-162
H	162-168
I	168-174

Table I

directly at the color subcarrier is about 4 dB less than one appearing directly at the picture carrier.<sup>2</sup>

<sup>2</sup>"Noise and Intermodulation Problems in Multichannel Closed-Circuit TV Systems" by G. A. Collins and A. D. Williams, Bell System Monograph 4051.

### Example Of 12 Plus System Design

When adding channels in the mid-band frequency range to increase system capacity, there is a preference for the order in which channels are added. For instance, if the system were to be expanded from a 12 to 16 channel system, those mid-band channels which have the least chance of producing interfering beats would be added first. This provides an added margin for efficient operating performance. To determine the beat products that could affect the 16 channel system, refer to Figure 4. Beat products occurring as a result of the addition of four midband Channels F through I are enclosed by the shaded area. Beat products due to the standard VHF channels which fall in the mid-band range (A through I) are enclosed by the heavy outline. Note that this chart shows what beat frequencies will occur for the  $A_2$  coefficient unequal to zero, but does not indicate the amplitude of these beat frequencies. The amplitude is proportional to the  $A_2$  coefficient (which is a function of the amplifier design) and the operating signal levels.

A point worthy of note is that midband channel interference increases as the frequency decreases from Channel 7. Channel I picture carrier will produce only one beat in another channel, Channel H picture carrier beats in two channels, etc. No beats produced by the picture carrier of standard VHF Channel interfere with Channel I, only one beat with Channel H, etc. Therefore, a CATV system with a pilot carrier AGC System with pilot carrier *outside of the midband range* (such as 220 MHz), provides full selection of all of midband channels.

As a system design example, consider a 16 channel system with 24 amplifiers in cascade. The addition of 4 channels requires that the trunk line operating level be reduced by 1.2 dB for the same cross-modulation as the 12 channel system. By reducing the level another 2.8 dB the second order beats will be reduced a total of 4 dB.

Anaconda Astrodata 800 series main trunk amplifiers normally operate at an operating level of +34 dBmV. A 4 dB reduction in

amplitude results in an operating level of +30 dBmV. Maintaining the same spacing as a 12 channel system, i.e., 22 dB, the minimum

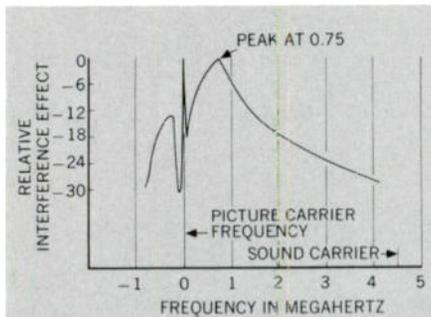


Figure 3: Relative Effects of Single Frequency Interferences (Black & White Only)

input level on the main trunk is +8 dBmV. Referring to Figure 1, note that the minimum signal-to-noise ratio at the end of 24 amplifiers is greater than 40 dB (4 MHz bandwidth). This is possible because of the low operating noise figure of the 800 series trunk amplifiers.

### Conclusion

In considering use of the mid-band frequency range for expanding system capability beyond 13 channels, the following points must be considered:

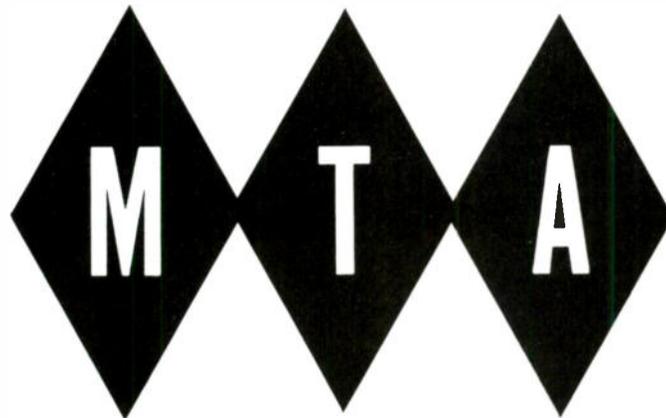
(1) A reduction in signal level with the addition of channels to maintain minimum cross-modulation at the system extremity. A reduction in signal level to reduce the amplitude of second order beats.

(2) The minimum operating signal level to maintain the minimum system signal to noise ratio. Amplifiers with the lowest noise figure have the best advantage since maximum spacing can be obtained.

(3) Use of amplifiers with the lowest  $A_2$  coefficient. Note that while an amplifier may have low cross-modulation (related to third order distortion), it does not necessarily follow that its second order beats are the lowest.

(4) Add channels starting with Channel I, decreasing sequentially through Channel A.

Unfortunately for the system operator, manufacturers today are reluctant to publish engineering performance specifications related to midband operation. Rather, the performance evaluation of systems utilizing midband channels is mainly



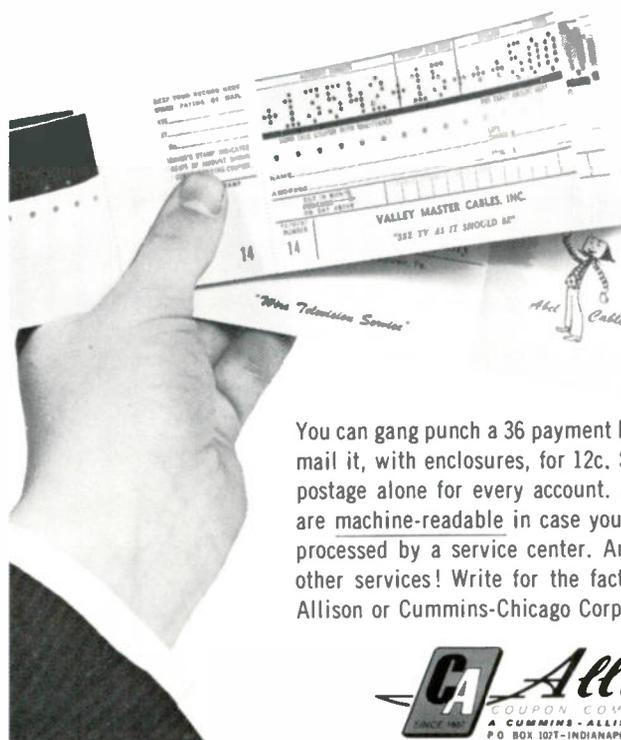
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VIDEO CARRIER FREQUENCY	CHAN-NEL #	2	3	4	5	6	A	B	C	D	E	F	G	H	I	7	8	9	10	11	12	13
55.25 MHz	2	110.5					66.0	72.0	78.0	84.0						120.0	126.0	132.0	138.0	144.0	150.0	156.0
61.25	3	116.5	122.5				60.0	66.0	72.0	78.0	84.0						120.0	126.0	132.0	138.0	144.0	150.0
67.25	4	122.5	128.5	134.5			54.0	60.0	66.0	72.0	78.0	84.0						120.0	126.0	132.0	138.0	144.0
77.25	5	132.5	138.5	144.5	154.5				56.0	62.0	68.0	74.0	80.0	86.0						122.0	128.0	134.0
83.25	6	138.5	144.5	150.5	160.5	166.5				56.0	62.0	68.0		80.0	86.0						122.0	128.0
121.25	A	176.5	182.5	188.5	198.5	204.5										54.0	60.0	66.0	72.0	78.0	84.0	
127.25	B	182.5	188.5	194.5	204.5	210.5											54.0	60.0	66.0	72.0	78.0	
133.25	C	188.5	194.5	200.5	210.5													54.0	60.0	66.0	72.0	
139.25	D	194.5	200.5	206.5															54.0	60.0	66.0	
145.25	E	200.5	206.5	212.5																54.0	60.0	
151.25	F	206.5	212.5																		54.0	60.0
157.25	G	212.5																				54.0
163.25	H																					
169.25	I																					
175.25	7																					
181.25	8																					
187.25	9																					
193.25	10																					
199.25	11																					
205.25	12																					
211.25	13																					

Figure 4: Sum & Difference Frequencies of Picture Carriers

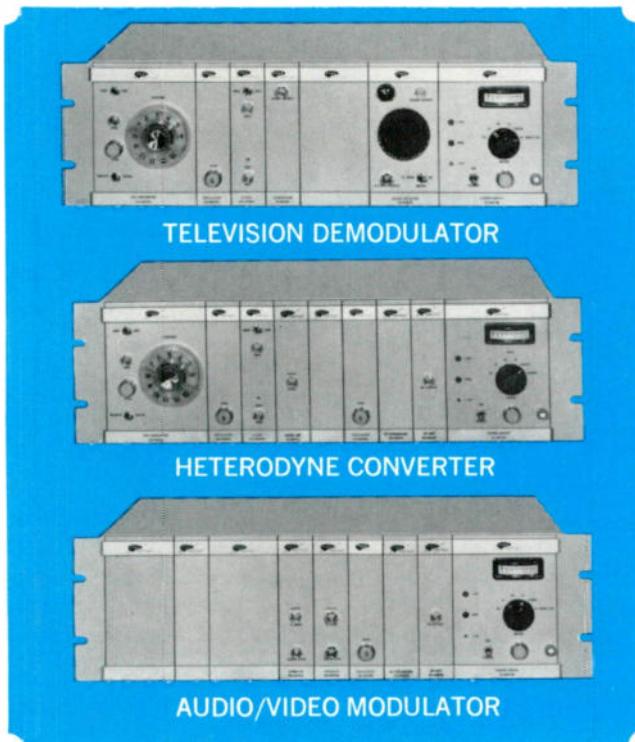
subjective, i.e., acceptable pictures at the end of an N amplifier cascade. The objective of the cable system is to provide acceptable pictures. However, a basis of comparing equipment is difficult by

subjective testing alone. This situation is similar to the cross-modulation-overload-wipe specifications before standard tests and numbers were defined by the NCTA Standards Committee. I believe that

it is only a matter of time before engineering performance specifications and tests will be defined for equipment comparison for systems requiring greater than twelve channel operation. TVC

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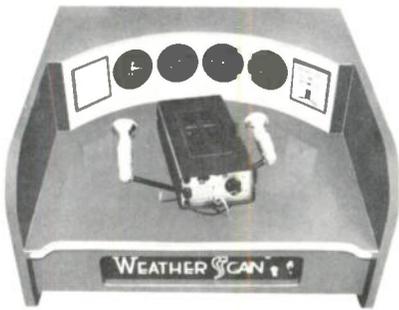
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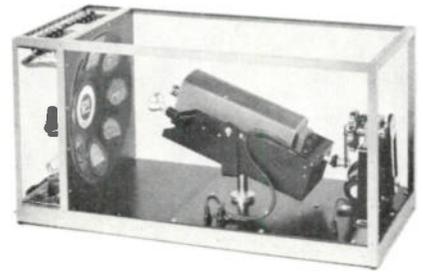
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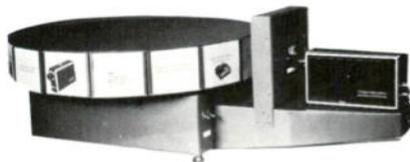
**WEATHER-SCAN**



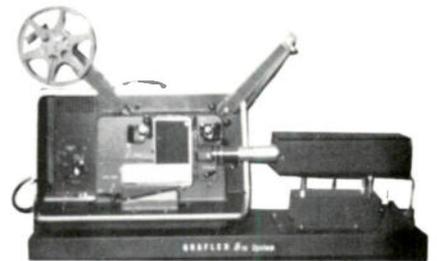
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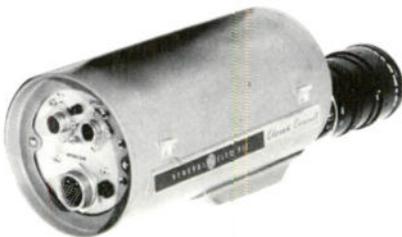
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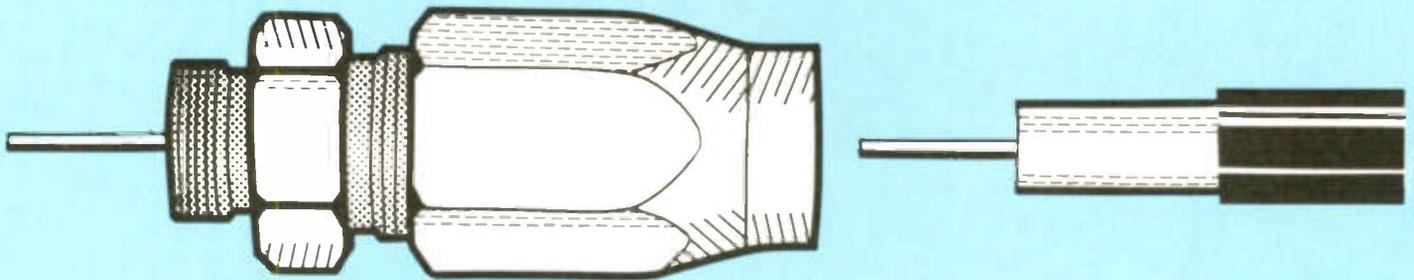
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### NEW CASCADE CONNECTOR ANSWERS DEMAND!

Connectors come and connectors go, but it isn't every day that something really new and valuable comes along. Most of us carry on, using standard fittings that make only a sliding contact with the cable center conductor, or go to the trouble of using types where the center conductor must be clamped down inside the housing. It boils down to a choice between putting up with the possibility of center conductor pullout, or investing extra time during installation and any subsequent rework.

More than a year ago, we decided that there must be a better way, and undertook a cooperative development program to produce an all-new and thoroughly practical CATV cable connector.

The requirements were these:

- (1) The center conductor must be firmly seized - to end any possibility of pullout.
- (2) Seizing must be external, so the amplifier housing can remain sealed during installation.

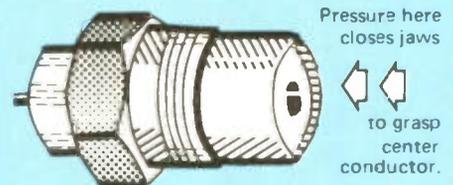
- (3) The connector must release both the sheath and the center conductor for quick, convenient removal - again, without opening the housing.
- (4) To maintain a constant 75 ohm impedance, the connector must be concentric in all respects.
- (5) It must be completely waterproof to prevent moisture entry to the amplifier housing, to the cable, and to the connector itself.
- (6) The connector must be highly corrosion-resistant.
- (7) It must be foolproof, with no possibility of over- or under-tightening of the connector, internal damage, or other installation faults.
- (8) The mount must have standard 5/8-24 threading, and require no special tools for installation.

- (9) The connector must have no loose pieces so that if disassembled in the field, parts cannot be lost or incorrectly replaced.
- (10) It must be realistically priced and represent good value to the system operator.

The new Cascade connector meets all of these requirements, and is available right now!

### EXTERNAL SEIZING THAT WORKS!

The big feature, of course, is the external seizing of the center conductor. Here's how it works:



continued →

**CASCADE** 

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continued

As the connector cap is tightened down, the ferrule which grips the outer sheath also presses against a tapered polysulfone insert which closes the jaws of the center conductor clamp. This clamping is so positive that the copper conductor will actually stretch before it can be pulled from the tightened connector.

Positive release is assured as well: when the connector cap is loosened, the insulating insert moves back and allows the jaws of the center conductor clamp to spring open.

Most Cascade amplifiers are designed to accept these new 5/8-24 connectors... or, for that matter, any 5/8-24 fittings you might choose. All Cascade "Phase Two" trunk units have a unique internal seizing system which allows the use of non-seizing, internal-seizing or the new external seizing connectors. Within the housings center conductor clamps are incorporated into cast aluminum inserts which also serve as guides and heat sinks for the plug-in modules. A simple turn of a screwdriver operates the clamp and produces a firm anchor with a minimum of impedance disturbance.

Other units, such as the new CELA-2/22 Line Amplifier, can be ordered in a variety of configurations: with non-seizing 3/8-mount connectors, with internal seizing blocks for VSF-type fittings, or for the new Cascade connectors □



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Now you can save time, save money, and reduce subscriber complaints with this new CASCADE Wallplate Coupler. It incorporates a true transformer-type directional coupler with a high degree of isolation and directivity, accurate 75-ohm impedance matching, and flat frequency response. Unusually low insertion losses mean longer runs and fewer amplifiers.

Installation is quick and neat. The CEDW-2 mounts in a regular outlet box with room to spare, and accepts standard F59 fittings for input, output and tap connections. Rugged and reliable, it features circuitry on a rigidly-mounted glass-epoxy board.

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					In	Out	Top	
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CEDW-1/12	12db	.5db	.5db	.50db	22	22	16	18db
CEDW-1/16	16db	.5db	.5db	.50db	22	22	18	18db
CEDW-1/20	20db	1db	.5db	.50db	22	22	18	16db
CEDW-1/24	24db	1db	.5db	.50db	22	22	20	16db
CEDW-1/28	28db	1db	.5db	.50db	22	22	20	16db

\* Linear relationship between Ch. 2 and Ch. 13 levels.  
† Maximum peak to valley deviation over bandwidth 40-250 MHz.

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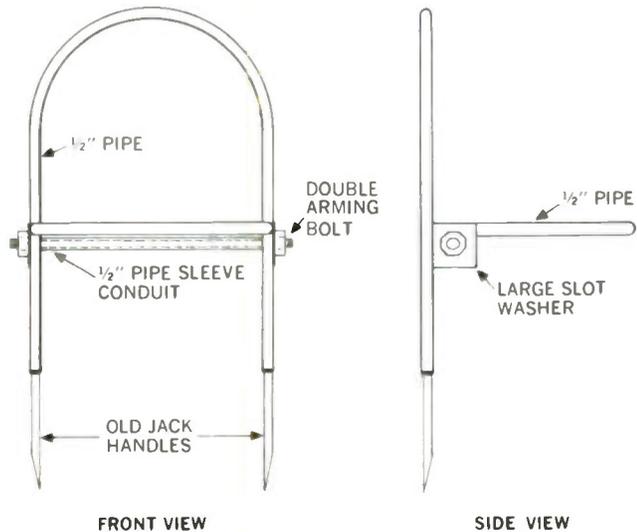
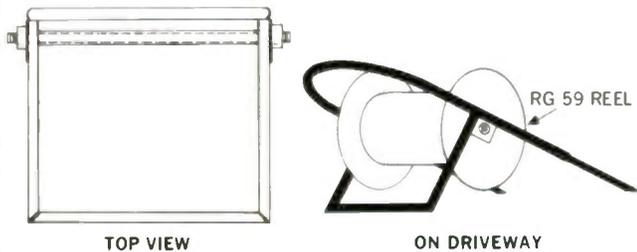
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# RG-59 Reel Stand Construction Plans

Shown here are drawings of an RG-59 cable reel stand designed by Gary Potter of Moscow (Idaho) TV Cable Company. According to Potter, construction costs and parts for the stand amount to less than \$5. The device is lightweight, simple, and easy to carry. The only moving part is the 1/2" pipe sleeve which rotates on the double arming bolt. Versatility in use is a major feature of this innovation, in that it can be either firmly implanted in the ground, or simply set down on a driveway or other flat surface.



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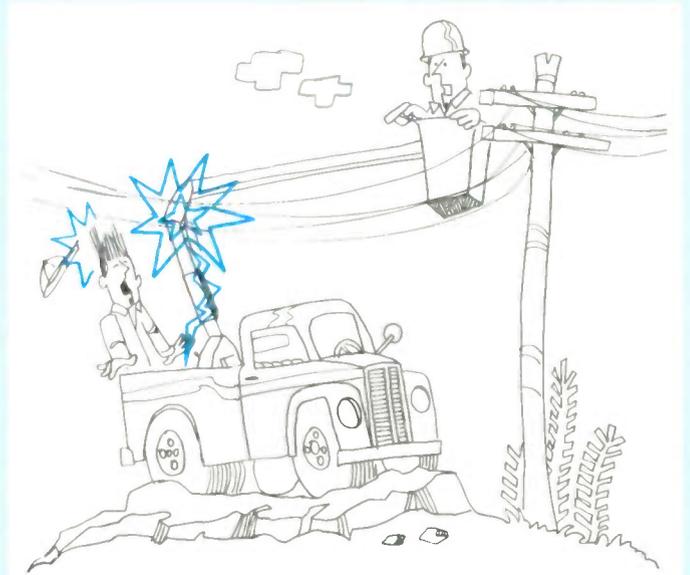
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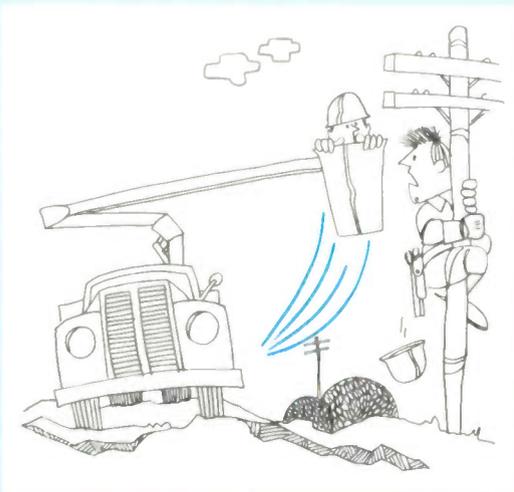
The "human factor" in the operation of aerial units for CATV constitutes the weakest link in any safety program

# "TRIPLE TROUBLE"

To assure safety of operation and maintenance of aerial towers, many hours can be devoted to eliminating perilous habits, hazardous situations; nevertheless, the human factor always remains in the use of man and machine. So, the Baker Equipment Manufacturing Company has created three characters who are forever taking chances or do not follow necessary precautions in the operation and maintenance of aerial units. So meet Norman Naive, Fred Fearless and Sam Slipshod. Norman is the apprentice, green as grass, with limited instruction about the operation of aerial units, and is not likely to learn much from Fred, the know-it-all, experienced technician. Fred is a sharp dresser and extremely confident. He has the idea he can fly and that he's made of copper, due to the chances he takes. Last but not least, none other than 'ol Sam, the maintenance man. Sam has a careless attitude and, needless to say, is a sloppy workman. Safety of the equipment and the operators is just something he's not wholly concerned with. A sad tale of woe follows as to what this threesome can manage to do with the equipment and themselves.



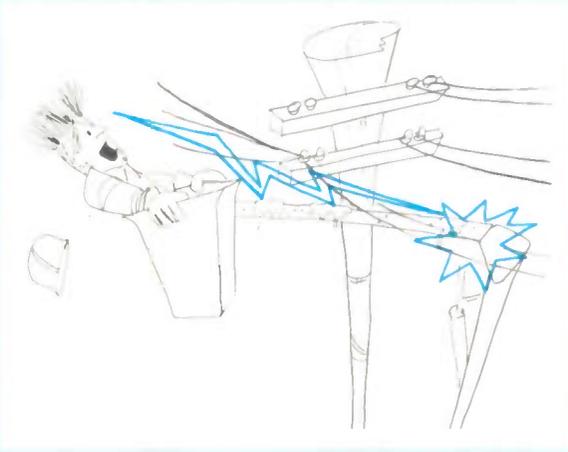
What's happened? Norman gets a jolt. How? Well, it seems Sam noticed one of the fittings on the hose crossing the fiberglass insert in the boom was loose. So Sam proceeded to tighten the fitting and broke it. He replaced it with the nearest available hose. Insulated hose? Of course not! Wire braid. Fred and Norman are in for a visit to the hospital.



This job required two men aloft. Fred tells Norman to get in the basket and Fred then proceeds up the pole. Norman pays little attention to where he is headed and Fred is hanging onto the pole in hopes Norman doesn't knock him off.

Fred "forgot" to attach his safety belt. He never bothers to check the leveling system before climbing into the basket. Sam may have haphazardly attempted to adjust it and either loosened it, overtightened or overstressed it in some manner. Anyway, Fred takes a tumble.





A dirty boom touches two conductors and bang! The boom will be badly damaged and probably will need replacement. A regular cleaning program must be followed, daily inspection of both inside and outside and cleaning whenever dirt is noticed, is mandatory. Usually hot water with a household detergent is recommended, followed by a thorough rinsing with clean water and allowed to dry before use.

Somehow Fred's handline has gotten caught under the tire of the truck. Naturally, Fred has it hooked to the edge of the basket and enormous force is produced as Fred raises the basket and—snap—off comes the basket.



Standing on the lip of the basket and perhaps one foot on a cross-arm is inviting disaster, especially when Sam is the maintenance man. The lower boom cylinder starts creeping down and Fred gets stretched. No unit should be operated if the cylinders do not hold the boom solidly in position. Also, when adjusting or repairing the cylinders extreme care should be taken.

Fred's scream can probably be heard in the next county. The aerial unit and truck (due to a broken torsion bar) are about to tip over, and who knows where poor Fred is headed. How often are the torsion bar or the attaching bolts inspected?



Sam has decided to make several minor adjustments in the field . . . while Norman tries his hand at some work. Sam fiddled around the lower controls and left a tool lying on them. The tool, of course, actuates the rotation lever and Norman is off on an unscheduled trip.





Power tools operable from the basket make work a great deal easier and faster, but also dangerous. Operators should make sure that the tools are well clear of all parts of the machine. Here Fred has started to cut off a large limb, but he is also cutting into the basket and he will be most of the way through the boom before he knows it.

Norman just joined the turtle club! Of course, he shouldn't be under the basket, nor should Fred have allowed the tool to drop. Hose couplers must be inspected frequently. Properly designed and maintained tool and material holders should be used to avoid this type of accident.

Fred can't resist showing visitors his new toys. Norman hasn't been told to keep his hands off the trigger and Fred is about to lose that finger. Disconnect tools before putting anything near the business end of the tool.



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Somebody had to make a coaxial cable like this.

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COMPLETELY OVER SHIELD

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# "Diat"—A Solid-State Current-Controlled Attenuator

A technical report on the CATV amplifier gain control approach used by American Electronic Labs

By P. Bartol and  
S. Edelman, Engineers  
American Electronic Labs

One problem which constantly plagues broad-band amplifier designers is the control of amplifier gain. Broad-band gain control must be achieved with an absolute minimum of frequency response and input/output VSWR changes. In addition, the attenuator itself must not introduce distortion products into the amplifier output signal.

Manually-controlled resistive networks have long been available to meet the requirements of broad-band signal attenuation. However, for remote gain control, or for automatic gain control applications, requiring DC current control of attenuation, devices previously used have, in general, failed to meet the critical requirements of flatness, range and no degradation of amplifier output capability.

Used as a gain control element, a transistor has a tendency to distort the signal as its gain is varied. Ordinary diodes, on the other hand, are non-linear devices, and subject a signal to cross-modulation and other distortions, especially at

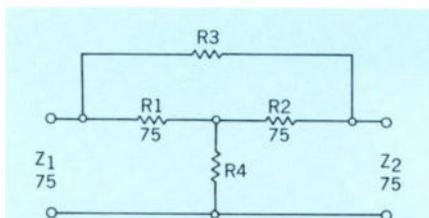


Figure 1: Bridged-T Pad. (For  $Z_1 = Z_2 = 75\Omega$ ,  $R_1 = R_2 = 75\Omega$ )

the levels encountered in CATV line amplifiers.

A new pin-diode semiconductor device, called the Diat,\* has been designed and developed by American Electronic Labs, Inc. These de-

\*"Diat" is a registered trademark of American Electronic Laboratories, Inc.

VICES have been made for use as current-controlled attenuators and levelers, and have been in use for more than a year in AEL's Colorvue series of modular trunk-line amplifiers. The Diat performs its duties with greater ease and predictability and with less distortion, than do transistors and ordinary diodes.

Let us review some of the theory behind this product, then see how the pin-diode device is applied as a gain control element: An ordinary diode consists of P-type and N-type semiconductor material layered one on the other, with the interface between them forming a junction which yields a common rectifier diode. If a layer of very pure semiconductor material is situated between the P-type and N-type materials, thus preventing a direct P-N junction from being formed, a phenomenon occurs which gives this new three-layer device a new property. The layer of very pure semiconductor is known as the "intrinsic" layer. An intrinsic semiconductor is one with no doping, i.e., the number of current-carrying particles of each polarity (holes and electrons) is the same. Thus, since neither polarity of current carrier is favored, the intrinsic material is of very low conductance.

When the device is forward biased, free carriers (electrons in the N-material, holes in the P-material) are caused to move about and are carried into the intrinsic region. This current flow through the intrinsic material increases its conductivity over the zero-bias value. In other words, the resistance between the two terminals of the device is a function of the (forward) current through it.

We have been talking thus far about DC (static) conditions. But

what happens if a radio-frequency signal is superimposed on the DC level? In an ordinary diode, the static and dynamic characteristics represented by the V-I curve can be quite different, since the dynamic

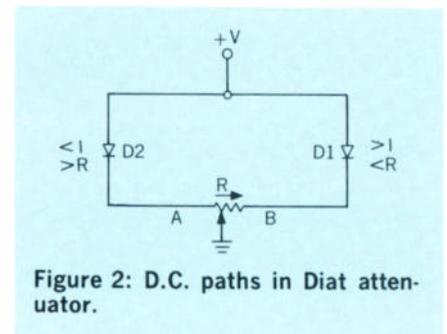


Figure 2: D.C. paths in Diat attenuator.

(AC) condition is represented by the tangent to the curve at the static (DC) bias point. Once beyond the forward knee of conduction, an ordinary diode exhibits a low dynamic resistance which is not radically altered as the forward current increases. This brings us to the aforementioned "new" property of the Diat.

Remember that the conductivity of the intrinsic layer is a function of the free carriers swept into it by the application of a forward bias. Now, these free carriers do not exist for all time; they have a limited life because eventually these holes and electron pairs will recombine. The free carrier lifetime in the intrinsic layer is controlled by the properties of the crystalline material. Furthermore, if a change in the electric field across the intrinsic layer occurs more slowly than the length of the free carrier lifetime, then that change is significant in determining the effective current, and thus the conductivity of the intrinsic layer. If the field change is very rapid (short) compared to

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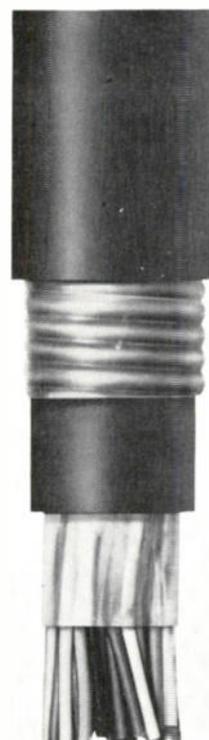
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the free carrier lifetime, then the field change is not significant in determining the conductivity. The effect is analogous to a time constant and a charge on a capacitor: a capacitor requires a finite time for the voltage across its terminals to change. Thus, a fast pulse of energy can pass through the capacitor before it can change its state, if the time constant of the circuit is long compared to the duration of the pulse.

The free-carrier lifetime of Diats is adjusted so that it is long compared to the period of low-frequency RF signals (well below 50 MHz). Thus radio-frequency currents of this and higher frequency do not alter the effective current flow through the intrinsic layer, which is set up by the DC forward bias current on which the RF signal is riding.

Since the intrinsic layer conductivity does not change as the RF signal passes through its cycle, the Diat device appears to the RF signal as a linear resistance, the value of which is adjusted by the DC forward bias current. The

The type of construction described yields a very low capacity, high breakdown voltage device (because of the wide intrinsic layer), with negligible inductance. Also, because the conductance does not vary over the RF signal cycle, dis-

requiring only two variable resistances to control the attenuation, the values of which are determined by the desired line impedance. The other two elements are resistances each equal to the impedance of the line into which the pad is inserted:

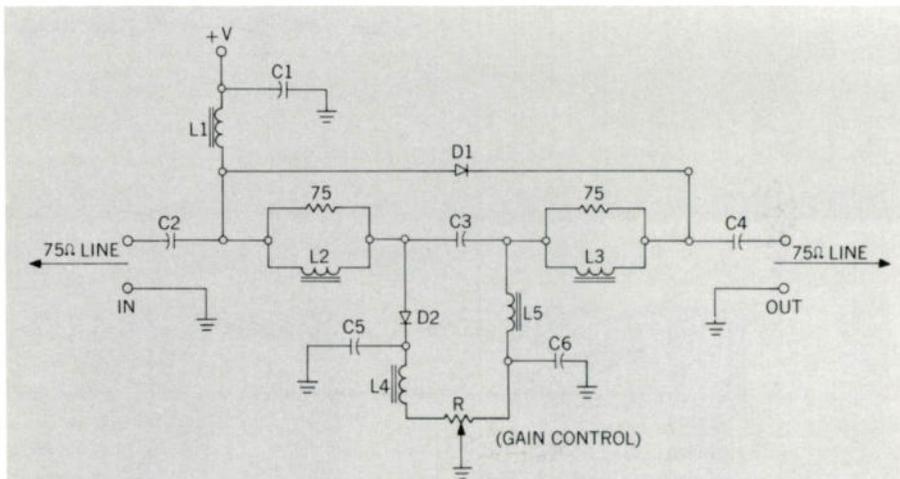


Figure 4: Bridged-T Diat attenuator, complete.

tortion products are not generated at the high signal levels encountered in CATV amplifiers, as long as the diode remains forward biased. Modulation and intermodulation are negligible because the device appears as a linear resistance to the RF signals applied. Finally, the effective RF resistance can be DC controlled through a broad range of resistance.

A bridge-T network has been used for the basic attenuator configuration (see Figure 1). A T-pad requires three variable resistances in order to control both attenuation and input-output impedance levels. An L-pad needs only two variable resistances for control, but is not suitable for precise matching of source and load impedances. The bridged-T pad has the advantage of

thus, matching of input and output is easily maintained.

In Figure 1, for a 75 ohm system,  $R_1 = R_2 = Z_1 = Z_2 = 75$  ohms. The values of  $R_3$  and  $R_4$  necessary to maintain a 75 ohm level and give the desired attenuation may be computed by reference to any tabulation of attenuator pad designs.

Consider the replacement of the resistors  $R_3$  and  $R_4$  of Figure 1 with Diats, using suitably arranged DC and RF circuitry. This is difficult, however, because the desirable attenuation range, coupled with AGC amplifier and DC drive requirements, necessitates the design of a special semiconductor. AEL's Solid State Components Laboratory has produced a reproducible Diat for a 75 ohm system, which is easily DC controlled over a 10 dB (mini-

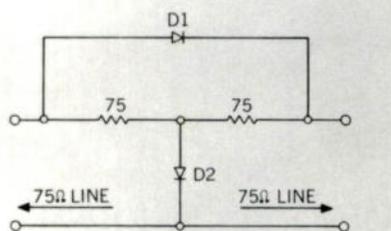


Figure 3: R.F. paths in Diat attenuator, showing bridged-T configuration.

unique property of the Diat is that it is a DC controlled, variable resistor, over an extremely wide range of radio frequencies.



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Figure 2 shows only the DC portion of the attenuator. It is seen

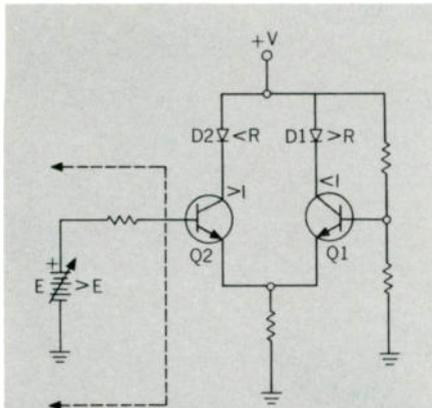


Figure 5: Simplified D.C. drive circuitry for AGC use. D1 and D2 are the Diats of previous figures. (Voltage "E" represents the amplified and detected pilot tone signal).

that as R is varied, the currents through the diodes vary: as the center-tap of R is moved from left to right (A to B), the current through D2 decreases, while the current through D1 increases. As a result, the resistance of D2 increases, while that of D1 decreases. This yields the necessary inverse resistance variation between the two diodes, which will be the variable arms of the bridged-T attenuator. Of course, just the reverse effect occurs as the pot center-tap is moved from right to left (B to A).

The RF portion of the attenuator is shown in Figure 3. The bridged-T attenuator configuration is clear when one considers that the diodes D1 and D2 are actually variable resistances.

The circuits of Figures 2 and 3 are combined in Figure 4. Inductors L1 through L5 are broad-band RF chokes having negligible DC resistance. Capacitors C2, C3, and C4 are RF coupling and DC blocking units, while C1, C5, and C6 decouple the RF signal to ground. An inspection of this Figure will reveal the DC and RF paths described earlier, and it is drawn to show the bridged-T nature of the circuit. R is now seen to be a manually operable gain control.

There remains the problem of incorporating the device as part of an AGC loop to control the gain of the

trunk amplifier: Since the Diats are current-controlled devices, and since the resistances of D1 and D2 (and thus the currents through them) must vary in an inverse relationship, the obvious choice for the DC control element is a differential amplifier, with a Diat in series (for DC) with each collector current path. Thus, if the RF signal level at the output of the trunk amplifier is sensed and detected, the DC obtained (which is proportional to the RF output level) can be used to control the operation of the differential amplifier, and thus the attenuation of the attenuator.

The differential amplifier connection is shown, simplified, in Figure 5. The source E represents the detected pilot tone signal. As E increases, the collector current of Q2 increases, and thus the resistance of D2 decreases. Simultaneously, through emitter coupling, the collector current of Q1 decreases, thus, causing the resistance of D1 to increase. Diodes D1 and D2 are the

attenuator decreases its attenuation so that the station output may rise. An automatic gain control is thus realized.

The defined control range is that variation of input signal which results in a 0.5 dB increase in station output, measured from the level of the initial latch (delay) point. This range is ample and in excess of 10 dB. The circuit of Figure 6 shows the DC circuitry employed in our Colorvue amplifiers and the connection to the Diat. This circuitry has proven stable and repeatable over a wide variation of transistor parameters and temperature.

The frequency response and VSWR characteristics of the attenuator are shown to be satisfactory in that for manual or AGC operation, flatness and VSWR are maintained through at least a 10 dB gain control range. The distortion characteristics of the attenuator do not limit the output capability of the trunk amplifier, and the wide range of operation and inherent reliability of this AGC circuitry as-

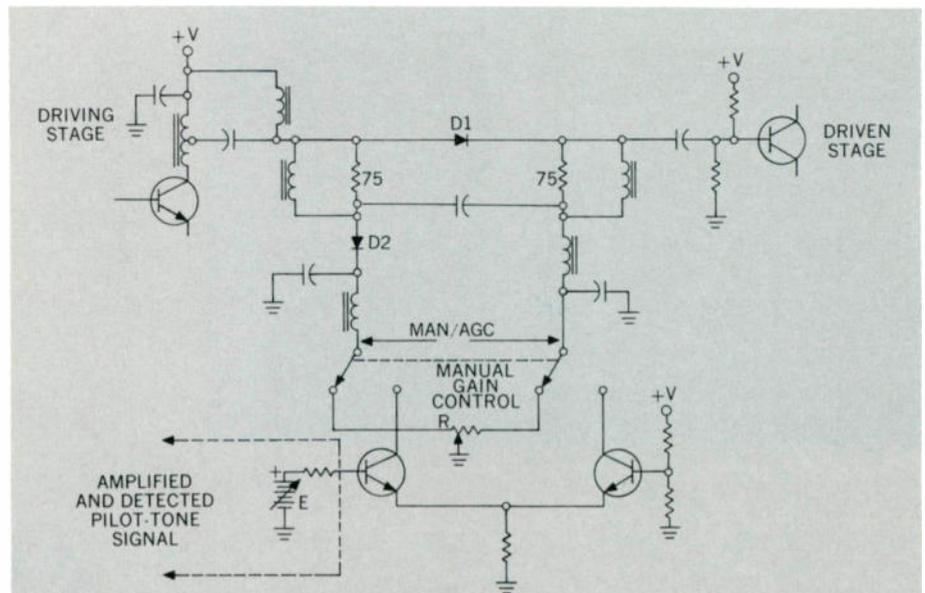


Figure 6: Insertion of Diat attenuator in AEL Colorvue trunk line amplifier.

Diats of the earlier Figures. D1 is the series pass diode, while D2 is the shunting diode. Thus, if E increases (through an increase in station output), the simultaneous changes in resistance of D1 and D2 are in a direction to decrease the station output. Conversely, if E decreases (caused by a decrease in station output), just the reverse situation obtains, and the atten-

tures minimum set-up time and maintenance.

The original attenuator design and Diat specifications were the results of a development program carried out in the AEL CATV Laboratory, under the supervision of Frank Pennypacker. The Diat design and fabrication was done by Donald Greene of the AEL Solid State Laboratory. 

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# PRODUCT REVIEW

NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

## VIKOA MODULAR DIRECTIONAL TAP

A new high performance, multi-outlet directional coupler has been introduced by Vikoa, Inc. The device, designated Futura Directional Tap, model 470, features tap levels determined by the choice of plug-in directional. The modular feature permits the CATV technician to adjust for changes in attenuation values. According to the manufacturer, the single bolt, hinged, die cast case allows easy access to the plug-in directional and the "seized center conductor" feed through fittings. The case design is said to provide complete weather and RFI proofing. The housing uses either feed through 412, or feed through 500 fittings, and provides four "F" fittings for subscriber taps. The thru-line is capable of passing a maximum current of 8 amps AC or DC and can operate through a temperature range of -40 degrees F to +140 degrees F, according to the manufacturer.

For further information on this new product contact Vikoa, Inc., 400 9th Street, Hoboken, New Jersey.

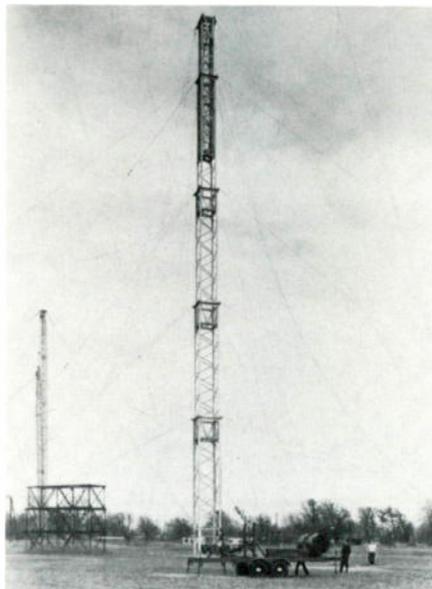
## MTI VIDICON CAMERA

Maryland Telecommunications, Incorporated has announced the availability of a new low light level vidicon television camera which features self-contained EIA synchronization. The 800-line resolution camera is designated Model VC-41. The internally generated synchronization in the VC-41 meets or exceeds all pulse widths and timing criteria of the EIA specification RS-170, sections 3.3.3 to 3.3.10 inclusive, according to the manufacturer. All operating controls are located on the 13-pound camera and include beam current, target voltage, electrical and optical focus, and power switch. The unit features solid-state regulated circuitry and electrical focus circuitry which automatically regulates to compensate for warm-up time to insure that the camera will remain in focus at all times. Solid-state circuitry is used throughout with the exception of the vidicon tube and the video pre-amplifier. The VC-41, complete with MTI Type S-V-110 pre-selected vidicon tube, is priced at \$2495.00.

For further information on this new product contact Maryland Telecommunications, Inc., York and Video Roads, Cockeysville, Md.

## PORTABLE TOWER

A 100-foot portable tower has been announced by Andrews Towers, Inc. The self-contained tower is mounted on a trailer and can be pulled by a pick-up truck of 1-ton capacity. It is



mechanically raised and lowered, and based on the rear of the trailer platform, with outriggers built into the trailer bed for stabilization, balancing and levelling. The newly developed tower has all the features of the previously developed 300-foot high quick erect tower, except for power features. The only power activated feature of the 100-foot tower is a motorized post-hole digger used to dig anchor holes. Six 20-foot sections with an over-all height of 105 feet, make up the tower. Height can be varied from 25' to 105' in 3' increments. Cost of the 100-foot quick erect tower is some \$20,000 compared to \$60,000 for the 300-foot quick erect.

## PRESS RELEASE KIT FROM BARASH

Barash Advertising has announced the addition of a press release kit to

their line of prepared promotion materials for CATV systems. The kit includes 25 press releases with instructions and guidelines which new CATV system operators can follow to begin publicizing the newsworthy aspects of their systems. The manufacturer states that the chief advantages of the kit are that it enables the operator to keep information on his system flowing at a regular rate and that it makes it easy for him to gather the right information and to relay it to the public at the proper time and in a logical sequence. The complete set of press releases and a guide on proper news release procedure is available for \$30.00.

For further information contact Barash Advertising, 403 S. Allen Street, State College, Pa. 16801.

## TELSTA AERIAL LIFT

A new "SU" Series Electric Aerial Lift, a variant of the van-mounted "S" Series lift introduced last year has been announced by the Telsta division of General Cable Corp. The lift incorporates Telsta's stress-cone boom support structure that places the elevation drive system at the focal point of the truck frame. This is said to achieve two significant advantages: (1) It optimizes lifting leverage, and (2) eliminates dangerous boom overhang. Unitized construction of elevation and rotation drive units and of the extension drive on the telescoping boom reduces costly downtime for repair, according to the manufacturer. The tubular extension boom rides on sealed ball bearings and has a horizontal reach of 21' 11" to the rim of the basket. Load rating is 300# when mounted on a one-ton chassis (10,000 #GVW).

For further information on this new



product contact Telsta division of General Cable Corporation, 1700 Industrial Road, San Carlos, California

## REMOTE-CONTROLLED VTR

A portable video tape recorder which features remote-controlled recording and playback has been introduced by Concord Communications Systems. The major feature of the unit, designated VTR-70C, is the hand-size remote control panel which allows the operator to control all functions of the recorder remotely. Also featured is an automatic rewind which allows



the operator to program the recorder for automatic recording or playback continuously, or for a selected time period. Instant replay is accomplished through any standard television receiver or video monitor. A still-frame monitoring feature permits subject to be viewed during a stop-frame or controlled frame-by-frame progression. The VTR-70C is a helical-scan, dual rotating head system operating at 12 ips with 1/2 inch video tape. Recording time is 40 minutes on a 7 inch reel, with other tape lengths available.

Weight is 52 lbs. Dimensions are 16 1/2" (w), 16 1/2" (d), 10" (h).

For further information on this new product contact Concord Electronics Corp., Communications System Division, 1935 Armacost Ave., Los Angeles, Calif. 90025.

## NEW HOSKEN ANTENNA

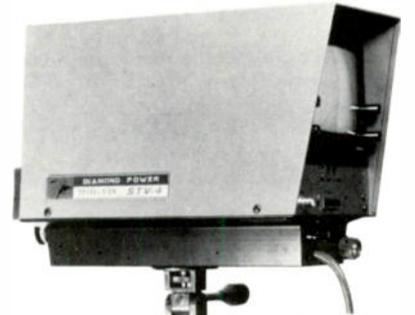
Hosken Cable TV Antennas Ltd., has recently announced the development of an exponential curved boom CATV antenna. According to the developer, the exponential characteristics of the antenna afford better match over a wide range of frequencies, and directivity and gain are increased without losing any of the broad band characteristics by extending the length of the boom.

For further information on this new product contact Hosken Cable TV Antennas Ltd., 335 Frankcom St., Ajax, Ontario, Canada.

## TWO DIAMOND POWER CAMERAS

Two low-cost portable TV cameras, the STV-4 viewfinder and the ST-4, have been introduced by Diamond Power Specialty Corporation. The units are priced at \$1095 and \$695 respectively. According to the manufacturer, both cameras feature 650-line horizontal resolution and each contains shading correction. The cameras automatically adjust to vary-

ing light conditions. Changes in voltage supply between 100 V and 130 V are said not to affect picture stability. Both cameras have silicon transistors and glass epoxy circuit boards, and both provide solid-state



sweep failure protection. The STV-4 viewfinder weighs 16 lbs. making it



easy to maneuver and transport from one location to another.

For further information on this new product contact Diamond Power Specialty Corp., P.O. Box 415, Lancaster, Ohio 43130. TVC

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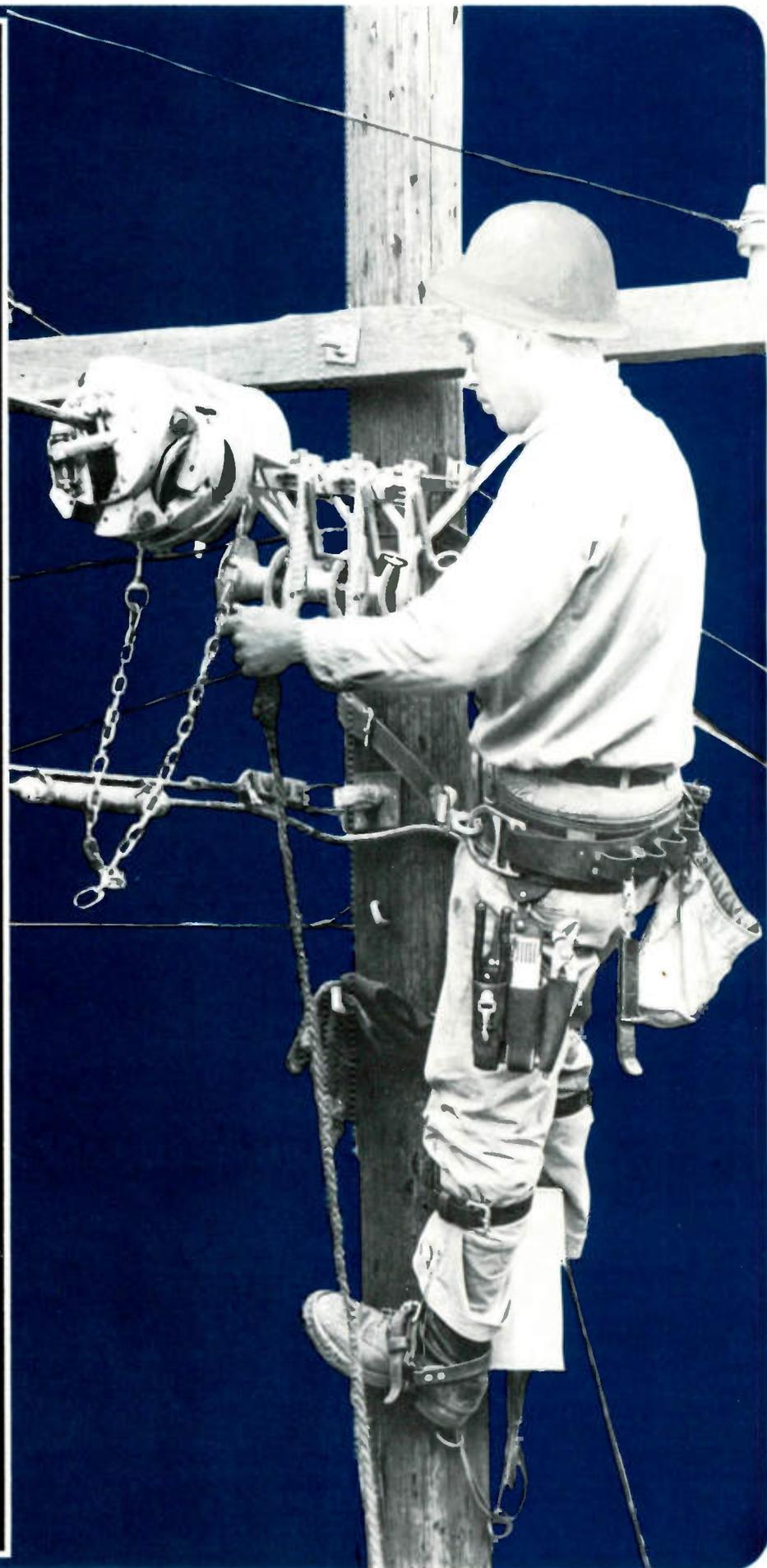
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