

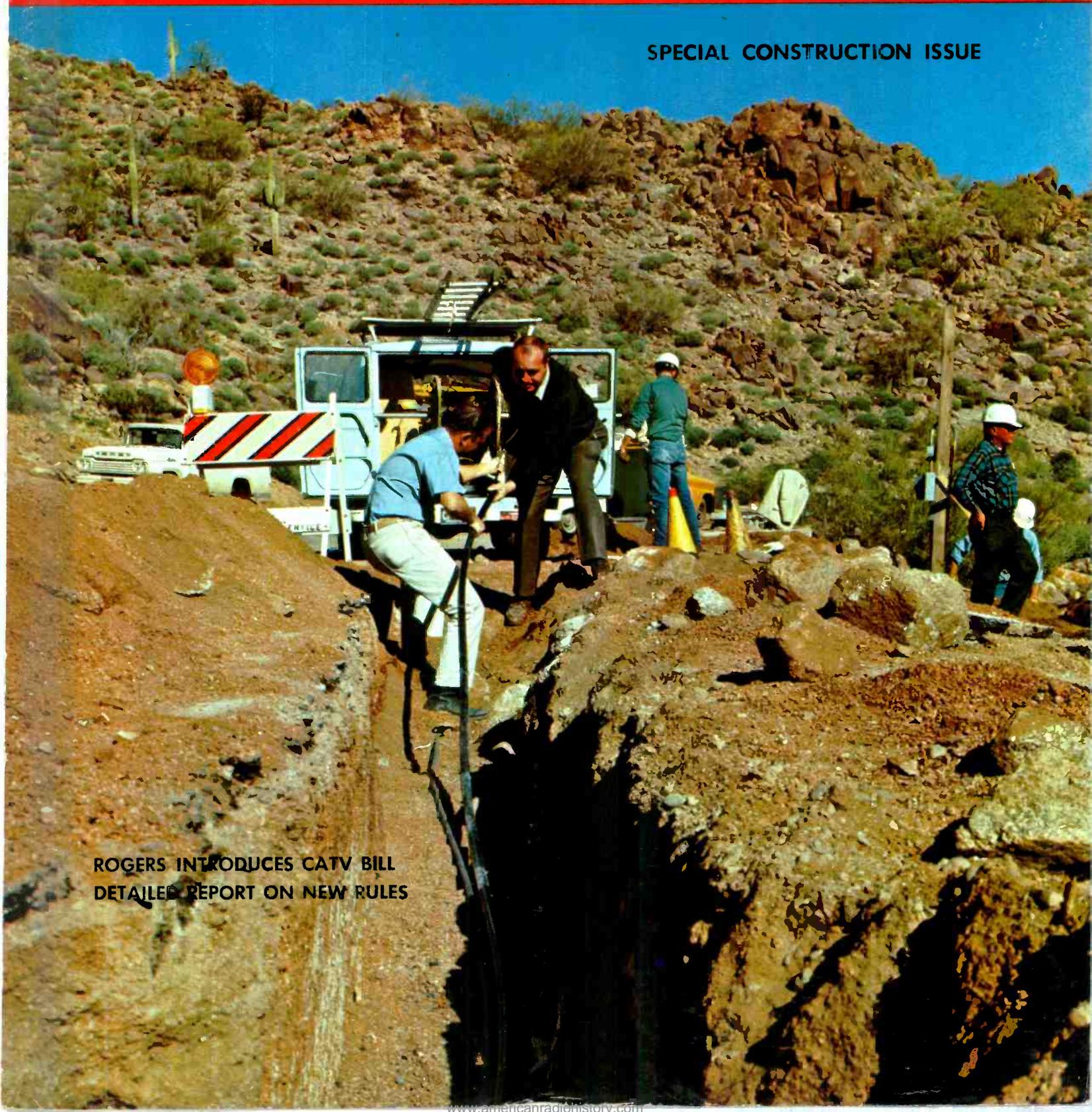


MARCH 1966

TV & Communications

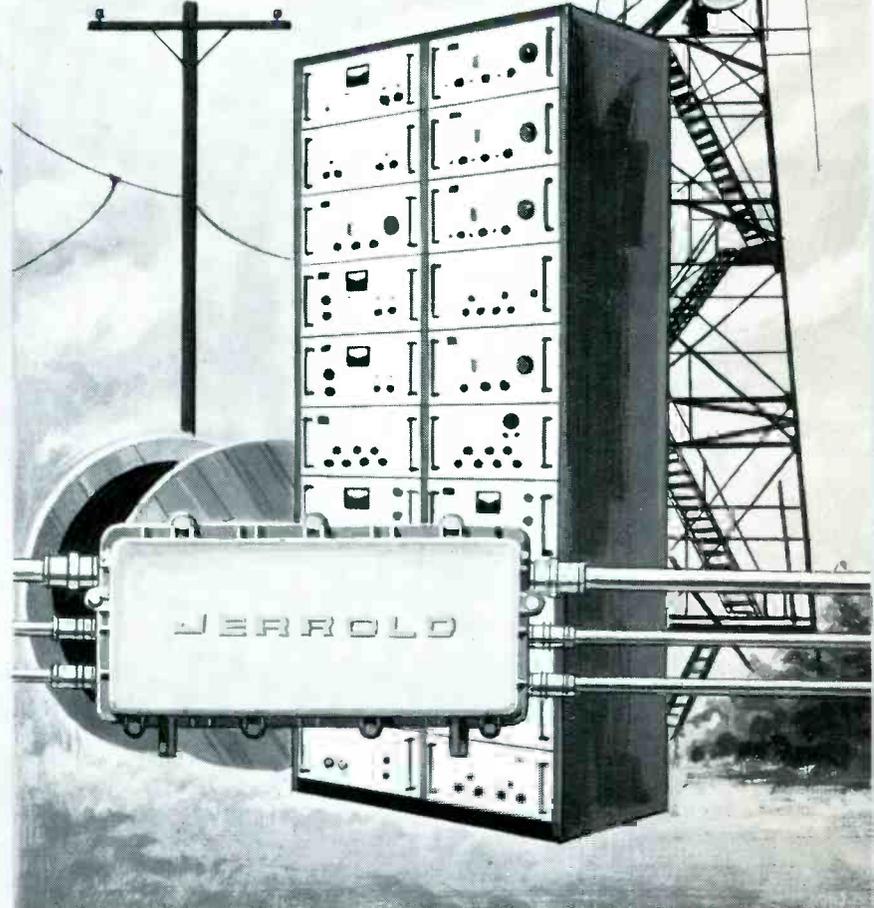
The Professional Journal of the Cable Television Industry

SPECIAL CONSTRUCTION ISSUE



ROGERS INTRODUCES CATV BILL
DETAILED REPORT ON NEW RULES

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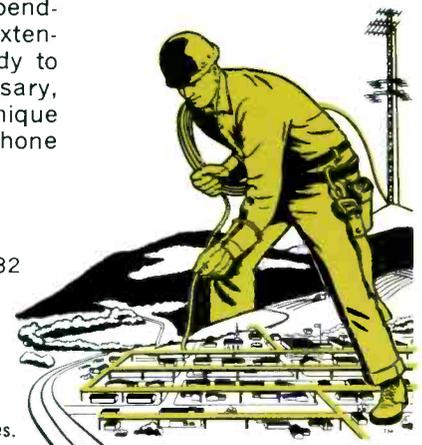
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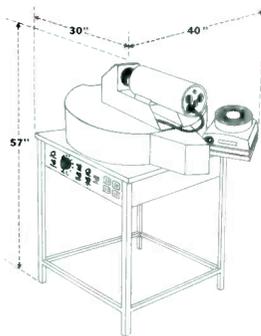
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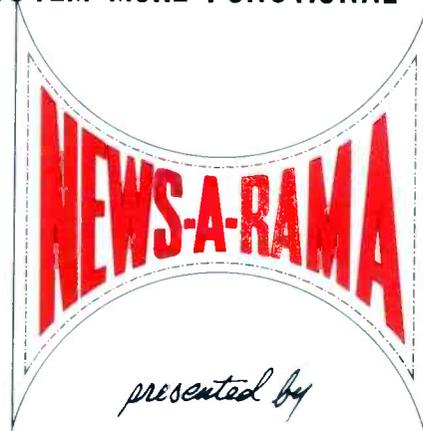
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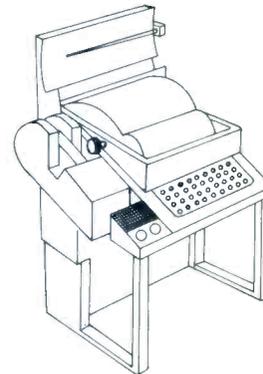


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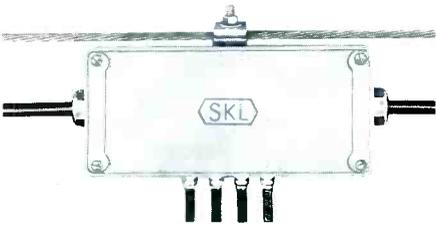
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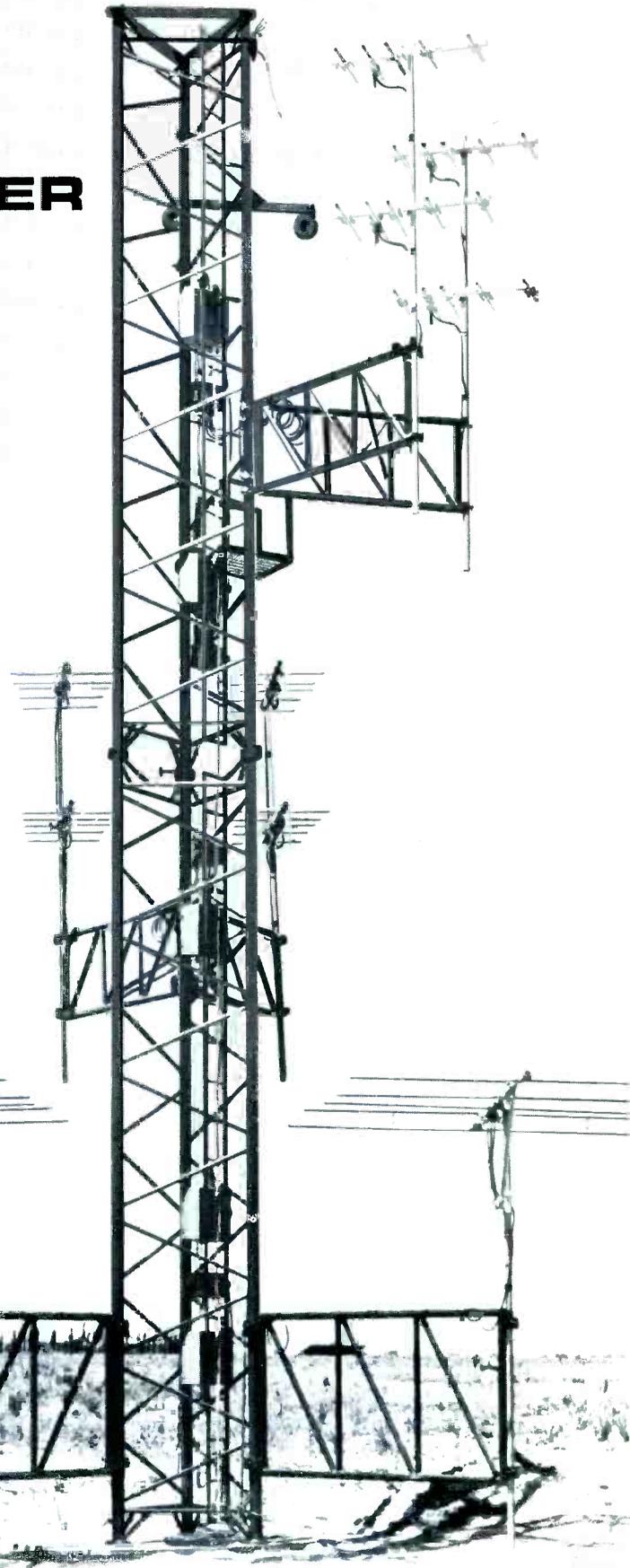
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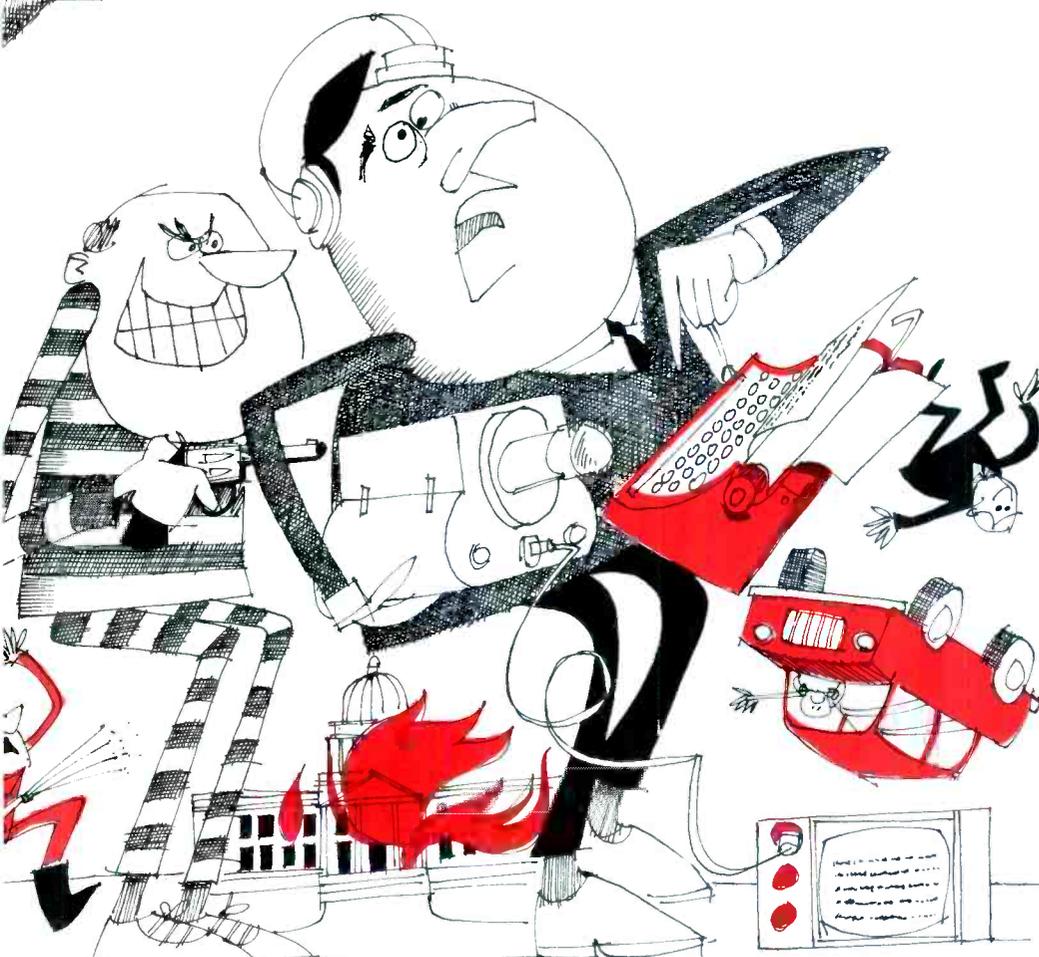
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IN THIS ISSUE . . .

UTILITY TRUCKS FOR CATV



As cable television systems grow larger and enter larger urban markets, mechanized construction and maintenance equipment is of increasing importance to CATV'ers. Utility vehicles are the most significant tools used in construction and maintenance, from the standpoint of both function and cost. For this special staff report, see page 36.

OUTSIDE OF THAT . . .



Winter weather can make routine head-end maintenance a technician's headache. Add to the weather the mountains of the Pacific Northwest, and just getting to the head-end can become a nightmare. For a first-hand account of the problems encountered in one system, see "Outside of That . . . Things Have Been Quiet," page 42.

BURYING CATV PLANT



Long trunkline runs in suitable terrain can be installed underground at reasonable cost. Authors Fette and Wigutow give the pros and cons of buried construction, along with practical pointers for underground installation. Read what their experience has taught on page 50.

OUR COVER: Burial of the tower-to-town run is a technique coming more into the CATV spotlight, and was thus selected as the subject for this Special Construction Issue's cover. Photo courtesy of American Cable Television, Inc.

Stanley M. Searle, Patrick T. Pogue PUBLISHERS

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MARCH 1966
Volume 3, Number 3

TV & COMMUNICATIONS

THE PROFESSIONAL JOURNAL OF THE CABLE TELEVISION INDUSTRY

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NATIONWIDE CATV CONSTRUCTION SERVICE



EDITORIAL

By Stanley M. Searle

False Concept of Regulation

In drastically reducing the amount and degree of regulation they want over CATV, the FCC Commissioners have demonstrated that they are not inflexible; that they can moderate the Commission attitude under the mandate of public and Congressional opinion. We commend the members of the Commission for their decision to bypass many of the regulatory measures urged by their staff.

However, we emphatically object to the basic concept which the Federal Communications Commission still follows. If this concept — of regulation of radio reception devices and systems — is allowed to stand, it will establish an awesome precedent.

I'm afraid that many CATV operators and their subscribers may be lulled into a dangerous complacency by the relative mildness of the announced regulations — as compared with original FCC proposals. But "a little leaven leaveneth the whole loaf" and if the FCC can restrict what a CATV system can receive and carry on its wires, then the same agency can stop a drive-in restaurant or apartment house from distributing a radio station's signals over its sound system. And, carried to the extreme, the FCC concept could stop you from playing your radio at the public beach . . . unless you tune to the designated station for that particular market.

Sounds ridiculous doesn't it? So does the FCC edict which aims at establishing artificial economic protection for the wealthiest TV stations in the country . . . an edict which arbitrarily grants special high status to stations in the "top 100" markets — and special low status to the viewers in certain areas where the Commission does not choose to allow CATV operation.

As if the ambition to govern the reception of radio signals were not bad enough, the FCC has also asked Congress to prohibit the supplying of certain non-broadcast wire communications (local program or-

ganization) by CATV companies. What's next? After asking Congress to prohibit local origination by cable systems, will the FCC want to outlaw "local origination" by apartment houses and motels? Remember that many of these concerns distribute off-the-air radio (television) signals on the **same wires** that they use for locally originated announcements and taped music.

We are aware that the Commission, in asking for local origination prohibition, is concerned with pay-TV. But their intention is just as indefensible in our opinion, as the concept of receiver regulation. All of us who depend upon the cable industry are vitally interested in a healthy advertiser-supported broadcast industry. But we, in good conscience, cannot excuse the discriminatory — and probably unconstitutional — suppression of pay television. Nobody protected radio stations from television; and the only apparent cause of the TV stations getting protection now from CATV and pay TV is that the telecasters are richer and better organized than the radio broadcasters were when TV came along.

Apparently, extreme pressure from certain TV broadcasters forced the FCC to reach far into left field for some means of preserving the profitable status quo of telecasting. The means contrived for the purpose is the concept of receiver regulation. Although the present application of this new control is very moderate, and may even appear harmless to some, it could pave the way for government controls closely resembling censorship and would, at best, be alien to the basic aims of the Communications Act and the legislators who enacted it.

All persons interested in maintaining our freedoms should strenuously object to the FCC assumption of radio receiver regulation. Perhaps it is time, once again, for CATV subscribers and system owners to write to their congressmen.

Tangible Evidence

For a long time we have been hearing comments that the CATV industry is "finally growing up." The increasing number of cable systems, franchise grants in the big cities, tremendous cable footage and quantities of amplifiers being sold are all cited as evidence of this "coming of age."

But these are only signs of **growth**; not proof of **maturity**. However, we can now point to unmistakable signs of genuine maturity in the CATV business. True professionalism, astute business judgment, and wise leadership are increasingly characteristic of the cable television industry.

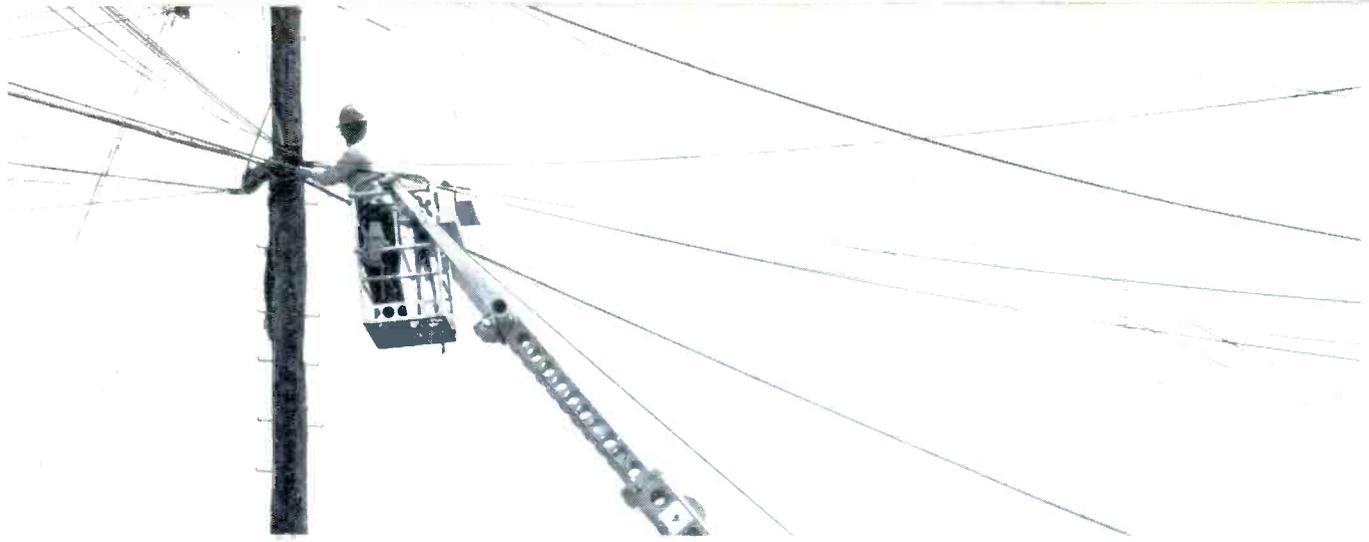
The NCTA financial workshop held recently in Dallas, for example, was well attended by an interested, earnestly seeking group of professionals. Then, late in January, more than 500 men, mostly from

the eastern financial community, were treated to a one day cram course on CATV at the Statler-Hilton in New York City, courtesy of NCTA.

Meanwhile, system owners are displaying an obvious receptiveness to new ideas; a searching for solutions to personnel, regulatory, and management challenges that contrasts noticeably with the tenor of our industry as recently as a year and a half ago. I am tremendously encouraged, and justifiably so.

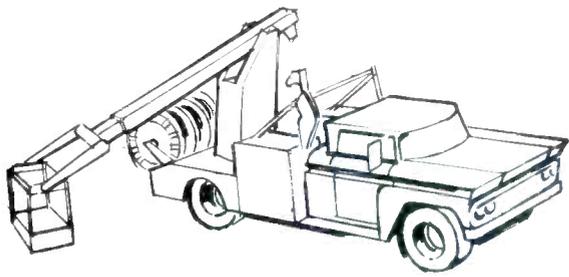
It is a privilege to be a part of, and to be able to render a needed service to, this enthusiastic and energy-charged business. We should all take encouragement from the true signs of maturity so evident in our cable television profession.

Stan Searle



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Normally inaccessible areas, cluttered with existing lines, blocked by trees or cut off by unattended vehicles, can be easily reached with the Telsta. The Telsta Electric Lift is a self-contained system operated by only two men for placing strand and coaxial cable at a fraction of your usual cost.



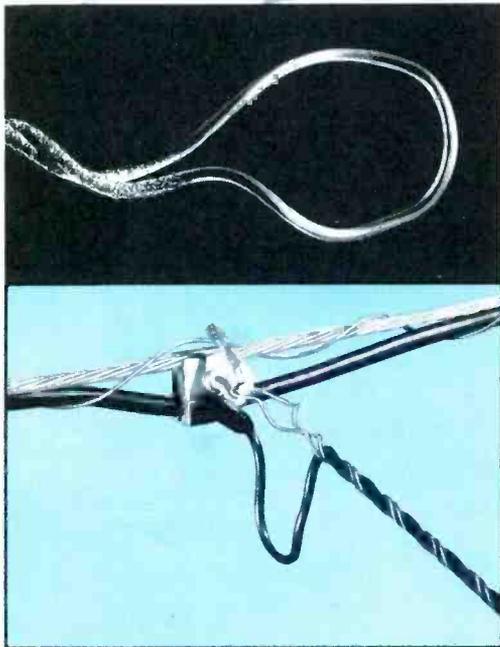
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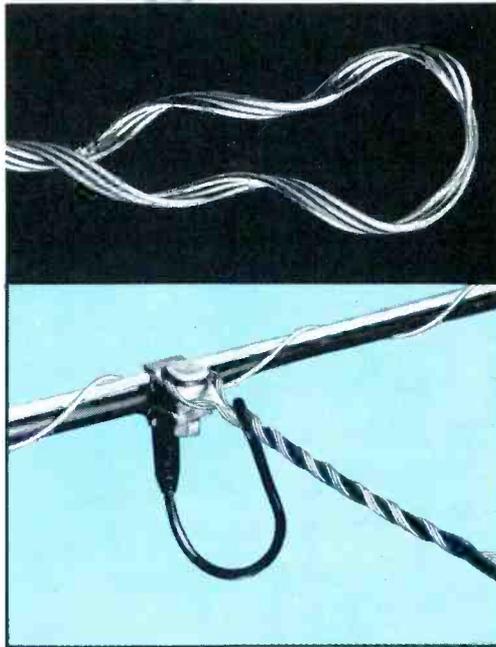
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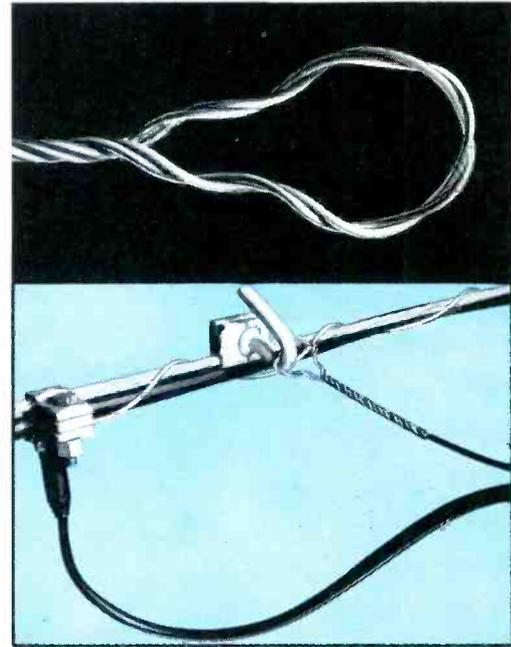
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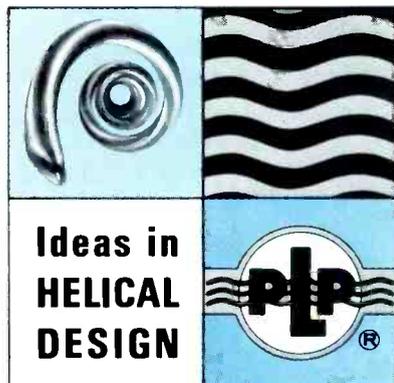
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LETTERS

CABLE OR COMMUNITY

Dear Stan:

I noted with interest your editorial "Cable or Community" in the January issue of *TV & Communications*. I feel that there is too much confusion as to our identity. I have been asked many times the difference between cable television and community antenna television (CATV).

Several years ago, Brown Walker, of Roswell, Graham, etc., and I discussed this at length. As I remember, he openly expressed his opinion on this at an NCTA meeting. I know that NCTA thinking has been trying to preserve the "community" and "service" only image, but let's face it. Names by the hundreds have been used by cable firms but the subscriber always gets around to calling the system "the TV Cable Co." When a person says FCC, NAB, LBJ or PDQ, everybody knows what he's talking about.

I, for one, would vote for the change, in an effort to simplify our identity.

John G. Campbell, President
CAS Manufacturing Co.

Dear Stan:

Our organization votes with Bill Daniels on the name change of NCTA. "Cable" sounds better! I might add, that it is very fitting for Bill to be the one to suggest changing it.

Norman A. (Chick) Williams
Stan Socia Corp.

Dear Mr. Searle:

I have just finished reading your January issue and want to compliment you on this fine publication . . . it stands out in giving the reader vital information and interesting articles regarding the CATV business.

In answer to your editorial, I vote for the change of the name to National Cable Television Association. We are now in the transitional stage of switching our interests from the name Texas Community Television Service to Telecom Cable Company, Inc. You can readily understand why we are interested in seeing the name change . . .

William A. Clarke, Jr.
Amarillo, Texas

Dear Sir:

I am for the change suggested by Mr. Daniels—that is substituting "Cable" for "Community" in NCTA. I, for one, am growing weary of explaining to people that I have nothing to do with their poor translator pictures.

John J. Murray
Phoenix, Arizona

● Thank you for your votes, gentlemen. In the January editorial, readers were invited to vote: (1) FOR the change, (2) AGAINST the change, or (3) DON'T CARE by virtue of no comment. The invitation still stands.

CATV DIRECTORY

Dear Stan:

Let me add my congratulations to the many I am sure you are receiving on your *CATV Directory*. Your past efforts to represent the industry as a spokesman certainly qualify you to present the most complete directory available. I notice one omission . . . in the listing of "CATV Manufacturers & Suppliers", you neglected to include our company listing.

Edward Shafer
Edward Shafer & Co.

Dear Mr. Searle:

I wish to congratulate you on the excellent job of producing the 1966 *CATV Directory*. You have lived up to making the "only complete CATV reference book." Please send our company 6 additional copies of the Directory.

Preston Spradlin
CAS Manufacturing Co.

CASH-FLOW

Dear Stan:

Received your complimentary CATV System Cash-Flow Projection. To me, this booklet was worth the entire cost of the yearly subscription to your weekly news service. Kindly forward me twelve additional copies and bill us accordingly.

Ralph Hillard
Galena, Illinois

● Thank you Ralph, your additional copies have been mailed. The *Cash-Flow Projection Supplement* was published as part of *TV & Communications*, rather than *Cable Television Review—the weekly CATV news service of TV & Communications*.

SYSTEM SAFETY

Dear Stan:

I read with interest an article in your December issue of *TV&C* entitled "Safety For The CATV Technician" by Don Turley of Vumore Co. Having worked with Mr. Turley for several years, and also having heard him talk at the Vumore technical seminar, I know much can be gained by following his safety suggestions.

Jim Monroe
Santa Rosa, California

Letters may be addressed to:
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32E – 3 or 4 channel toll trunk system. Coordinates with Western Electric's Type C systems over short, medium, or long haul circuits.

33A – 1 to 3 channel stackable toll trunk system used in short and medium haul circuits, especially for drop channel operation.

45A – 12 channel toll trunk system. Coordinates with Western Electric's Type J systems over short, medium, or long haul circuits.

45C – 4 to 16 channel toll trunk system. Coordinates with Western Electric's Type O systems over short or medium haul circuits.

T-FM – 1 to 10 channel transistorized subscriber line system.

CABLE MULTIPLEX SYSTEMS

45BN – 4 to 24 channel exchange or toll trunk system. Coordinates with Western Electric's Type N and ON systems.

46B – 12 to 24 channel transistorized toll trunk system. Works end-to-end with Western Electric's Type N3 systems.

81A2 – 12 to 24 channel transistorized short haul exchange trunk system.

X – 4 to 20 channel transistorized subscriber line or exchange trunk system. (Special equipment options provide a 4 or 8 channel open wire system, or a 20 channel radio multiplex system.)

LN1 & 2 – 12 channel transistorized exchange or toll trunk systems. Work end-to-end with Western Electric's Type N1 and N2 systems.

RADIO MULTIPLEX SYSTEMS

34A – 2 to 24 channel, stackable, transistorized system.

45BX – 12 to 264 channel system.

45CX – 4 channel system.

46A – 4 to 600 channel transistorized system. Compatible with CCITT or Western Electric's Type L systems.

AN/FCC-17 – 12 to 600 channel transistorized class of military multiplexers used for fixed office or tactical microwave radio relay, or tropospheric scatter systems.

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71 – Class of FM systems, operating in the 150, 300, 450, and 900 mc industrial bands, handling up to 24 or 48 channels.

71F – Transistorized FM system, operating in the 2000 mc industrial band, handling up to 120 or 300 channels.

74B*(**AN/FRC-84**) – FM system, operating in the common carrier, industrial, and Government bands between 5925 and 8400 mc, handling up to 300 channels. *(Military designation)

75A – Transistorized FM system, operating in the 6000 mc common carrier band. System uses TWT output amplifiers and heterodyne repeaters, handling up to 960 channels or one TV and program channel.

76A2 and 76D – Transistorized FM systems operating in the 6000 and 11000 mc common carrier bands. Systems handle up to 300, 600, or 960 channels or one TV and program channel and are compatible with Western Electric's type TH-TM and TJ-TL systems.

76B and 76E – Transistorized FM systems operating in the 6575 to 6875 and 12200 to 13250 mc industrial bands, handling up to 300, 420, 600, or 960 channels, or one TV and program channel.

76C*(AN/FRC-109[V1])— Transistorized FM system operating in the 7125 to 8400 mc Government band, handling up to 300, 600, or 960 channels or one TV and program channel. *(Military designation)

76TV— Transistorized FM system operating in the common carrier, industrial, and Government bands between 5925 and 13200 mc. System provides a high-quality black-and-white or color TV and program channel.

TELEGRAPH AND DATA TRANSMISSION SYSTEMS

23A— Transistorized FSK system used to multiplex up to twenty-six 60-bps or eighteen 80-bps telegraph signals for transmission over a single voice channel.

25A— Transistorized FSK system used to multiplex up to twenty-five 75-bps or eighteen 110-bps telegraph signals, or up to seven 200-bps data signals and four 110-bps signals, for transmission over a single voice channel.

26C— Transistorized *Duobinary* FSK system used to convert one 1200-bps or one 2400-bps data signal for transmission over a single voice channel.

27A— Transistorized *Duobinary* FSK system used to convert one 2400-bps data signal for transmission over an HF radio facility.

960A— Transistorized pulse-duration FSK system used to convert analog sensor signals, received from railroad hot-box detectors, to tones suitable for transmission over standard communication facilities.

SUPERVISION, CONTROL, AND SIGNALING SYSTEMS

53C— Transistorized order wire and tone signaling system used with radio transmission facilities.

57B— Transistorized one-for-three microwave

radio path protection system, used with radio systems handling up to 960 channels or one TV signal.

927A— Transistorized multi-option in-band signaling system, compatible with Western Electric's Type E in-band signaling system.

936— Class of transistorized alarm and control systems used to monitor and control test functions at unattended or remote communications facilities.

937A— 6 channel control system used to monitor and control protective relaying functions associated with electric power transmission systems.

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931B— Echo Suppressor

921A— Schedule A or B Program Channel

5203/5204— Noise Loading Test Sets

5249A— Speech Plus Data Panel

5090B— Compandor

26600— E & M and Loop-Dial Signaling Test Set

30231— Delay Equalizer

31041— 4-wire Terminating Unit

90113B— Automatic Gain Adjusting Amplifier Panel (AGAMP)

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ROHN[®] tower

NEWS

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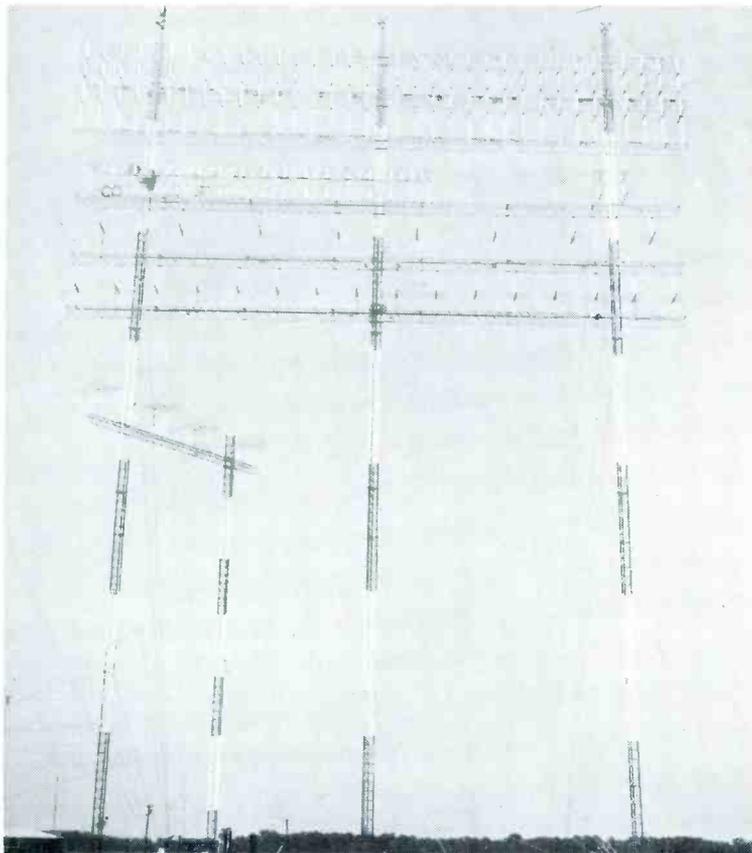
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Rohn Manufacturing Co., Western Office & Warehouse, 310 Quincy Street, Reno, Nevada. Phone 702-322-9300

Rohn Communications Facilities Co., Inc., Southern Office & Warehouse, P. O. Box 877, Richardson, Texas. Phone 214-AD1-3481

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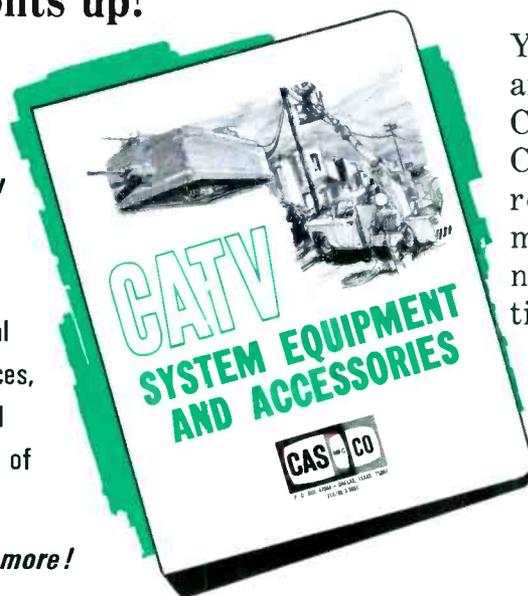
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News SPECTRUM

NEW RULES NEW BILL

Rep. Walter Rogers slapped hard at FCC's new CATV regulations just two days after their announcement. Congressman Roger's bill, H. R. 12914, is short. It reads:

Be it enacted by the United States Senate and House of Representatives in Congress assembled that Section 326 of the Communications Act of 1934 (47 USC 326) is amended by adding a new paragraph as follows: Nothing in this act shall be understood or construed to give the Commission the power to control or regulate the reception of radio communications or signals transmitted by any radio station.

Rogers, among others, objected to FCC assumption of authority in handing down rules for all systems—not to provisions of the rules, which are moderate compared to proposals. Main points of rules are: same day non-duplication (rather than 15 days before and after); and limitation of new systems in top 100 markets. FCC also asked for Congressional guidance in CATV regulation, and recommended action on several points including prohibiting local origination; requiring station's permission to carry its signals; and clarification of whether systems are public utilities. Detailed text of FCC announcement is reported elsewhere in this section.

LEGISLATORS INDIGNANT

Scant hours after the new regulations were announced, the House Commerce Committee invited the Commission up to the Hill for a three-hour closed session. Committee Chairman Harley Staggers (D-W. Va.) took the House floor to explain that a hearing would be held on the FCC rules. Communications Subcommittee Chairman Walter Rogers (D-Tex.) scorched the Commission for assuming authority over CATV. Meanwhile on the Senate floor, Communications Subcommittee Chairman John Pastore (D-R. I.) also pledged a hearing on the rules. (Note: Hearings were scheduled to begin as soon as possible. FCC rules were scheduled to go into effect 30 days after published in the Federal Register.)

Rogers said afterwards that he privately complained to Staggers that the FCC had misled Congress into thinking no rules would be adopted until proposals were cleared with Congress. The Commission, he complained, is trying to regulate television reception. He added that "this is one of the most revolutionary edicts issued by a bureau I've seen since I've been in Washington." FCC Chairman E. William Henry later issued a statement saying he was "surprised" at Rogers and that the Commission had promised only to come back to discuss CATV rules with Congress.

Rep. Fred B. Rooney (D-Pa.), a member of the Communications Subcommittee, followed Rogers onto the House floor to criticize the FCC for its "arrogant backstabbing" in acting with-

out prior Congressional approval. Rooney said, "It is impossible for an independent agency to act for the people when it abrogates to itself law-making or regulation-setting powers which should reside with the people's voice in government—the legislative branch."

The regulatory plan, Staggers commented, "constituted a praiseworthy effort to strike a proper balance between the positions advocated by the broadcasters on the one hand and CATV operators on the other hand." He expressed concern that "the small CATV operators all over the country would be able to continue rendering to their subscribers the same service as they had been in the past." Staggers said the Commerce Committee would keep a constant eye on the FCC to see that CATV viewers were protected.

Rep. John G. Dow (D-N. Y.) said the rules will do "for the time being" but are not a "final solution." He noted that the "great volume of mail played an important part in the FCC relaxing its position and adopting less stringent rules than those originally suggested."

NEGATIVE VOICES

Not all of the reactions to the less stringent FCC rules came from Congress, of course, and not all of them were favorable to the CATV industry. The fastest public reaction to the new rules came from the Association of Maximum Service Telecasters, which rather cautiously issued this statement: "We are encouraged that the Commission has agreed to exercise its jurisdiction over all CATV systems. We are

concerned, however, that the rules will be inadequate in several respects. We are particularly concerned that the rules will fail to preserve opportunities for free local and area television broadcasting service in smaller markets, where the adverse impact of CATV is most severe."

NAB president Vincent Wasilewski praised the FCC for taking jurisdiction over all CATV systems, but added this thought: "We are concerned, however, over the Commission's apparent failure to maintain the existence and to encourage the growth of free television service to the people who live in the smaller cities and surrounding rural areas. Unless modified, the ruling opens the door to a wired television system for which the public would pay for programs they are now receiving free." Wasilewski elaborated on his earlier statement in a luncheon speech to the Federal Communications Bar Association in Washington, in which he sharply criticized some aspects of the new CATV rules issued by the FCC. He emphasized two points:

"1. Duplication protection has been reduced to one day. This is plainly inadequate. There is also a question of whether duplication protection extends to all types of programs — syndicated and feature film as well as network. We have been informed that the rule was intended to do so. If so, it should be clarified.

"2. Stations located outside the top 100 television markets are given no protection against the importation of distant city signals. Their only redress appears to be to petition the Commission that the carriage of such signals would imperil their existence. In such a case, the burden of proof would be on the broadcaster — and on the smaller broadcaster whose resources are less. But more important than this is the near impossibility of proving damage before the system goes into operation."

Wasilewski said NAB is considering submitting a petition for reconsideration on those points, as well as the part of the FCC's position that allows CATV systems to carry TV channels without the permission of the TV stations.

TAME also welcomed the jurisdictional claim, but continued to push its hard line of CATV regulatory philosophy. The meat of TAME's statement: "To protect this public interest to the fullest possible extent, CATV systems should be regarded as 'public utilities' or 'common carriers' and regulated as such. They should be required to apply for FCC certificates of convenience and necessity and establish the need for CATV service; and where such certificates are granted, CATV should be regulated as to rates, service, ownership, and all other pertinent matters."

FORD LOOKS TO CONGRESS

Frederick W. Ford, president of the NCTA, commended the Commission for its intent to seek CATV legislation. Ford's comments were as follows:

"I want to commend the members of the Federal Communications Commission on their efforts in recent weeks to understand more thoroughly the operations of CATV systems and their service to the public.

"The Commission's better grasp of CATV industry problems is typified by the modifications of their earlier issued rules regulating microwave-served CATV systems; for example, the non-duplication protection of local television station programming, reduced from 15 days before-and-after local broadcast to the same day of broadcast, and the exemption from non-duplication protection as to color programs not televised in color by local stations. These are steps toward a closer understanding of CATV's role in serving the public interest.

"To the extent the FCC has attempted in some ways to provide for continued reception of distant stations by currently operating CATV systems, the Commission has shown a respect for the right of the public to view television signals not otherwise available to a community.

"The Commission's recognition of the need for evidentiary hearings in existing and proposed CATV situations demonstrates that the members realize that many CATV problems require a remedy patterned to factual situations that cannot be adequately handled by general rules.

"Nevertheless, regardless of the FCC's intent, the Commission does not possess the authority or jurisdiction to regulate television reception and some of their intended rules will be highly discriminatory.

"We laud and welcome the Commission's intention to seek legislation to define a national policy with respect to CATV. Legislative action to establish guidelines for a national television policy embodying both wire and broadcast services has long been urged by the National Community Television Association. Now that the FCC is agreed that legislation is needed, we welcome the opportunity to cooperate with the Commission and television broadcasters in recommending a Congressional policy. We pledge our continued full and complete assistance looking toward a legislative resolution of industry problems, to the end that the public be protected in its right to select programs of their choice without impairing the very important contributions made by local television broadcast services."

LOCAL ORIGATION DEFENDED

While other members of the CATV industry expressed varied opinions on the outcome of the FCC meetings, Lyle O. Keys, president of TeleMation Inc., voiced strong objections toward the Commission's major negative action — requesting Congressional prohibitions of local origination. Keys stated that, "We feel certain that neither the FCC nor Congress will tolerate, let alone foster any legislation that will deprive the American viewer of full access to valuable weather and news information." Adding that, "We do not consider use of our Weather Channel and News Channel to be local origination *per se*," he declared, "However, we are adopting a protective policy for systems purchasing Weather Channel, in the unlikely event that the FCC and/or Congress should prohibit their use. News Channel users are already protected by agreement with Associated Press."

COMMISSIONERS' DISSENT

Although the new rules are moderate compared to earlier proposals, Commissioners were far from unanimous agreement on basic issues. Commissioners Bartley, Cox, and Loevinger appended the written FCC plan with the following statements:

Commissioner Bartley:

"I cannot agree that the Communications Act confers jurisdiction over CATV; however, I endorse legislation which would prohibit a CATV system from originating program matter."

Commissioner Cox:

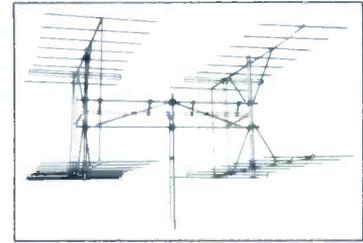
"I agree with what is done but believe it falls far short of protecting the public interest in an expanding television service . . . I think much of my colleagues' reluctance to take more meaningful action now stems from fear of disrupting the existing service of a rather small number of CATV subscribers who have been galvanized into pressuring Congress and the Commission by a campaign of outright misrepresentation by the CATV industry . . . New York City signals have already been carried to points near the Ohio border, and service from Los Angeles is proposed for Oklahoma and Texas. Once such service is instituted, I am afraid it is impossible to roll it back . . ."

"I do not mean to suggest that I know or can prove that the consequences I fear will actually result — though I think my concerns are shared by many leaders of the broadcast industry, by certain organizations which represent elements of the public who stand to be disadvantaged by increased

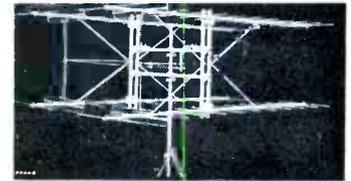
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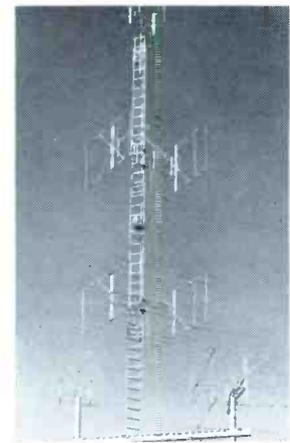
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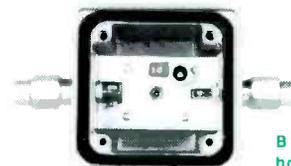
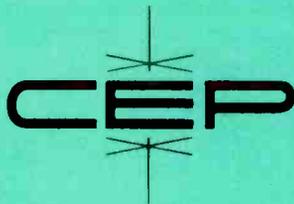
THE NEW CRAFTSMAN MODULAR DIRECTIONAL TAP

Here's one way to keep your labor costs down, profits up. Craftsman's new Modular Directional Tap, shown above, is one proven way to easily, surely, service

subscriber line changes using labor that can change connections from one to four subscribers in less than five minutes, tops. Here's all there is to it.

Don't Disconnect ... **INTERCHANGE!**

The four plates shown here are the outlet connecting plates for use with our new Modular Directional Tap. They are easily interchangeable in the bottom of the housing, a simple matter of unscrewing four permanently held screws, removing one plate and replacing it with another. Each bottom plate has a cut-off corner which allows it to be connected in only one way—the right way. They provide a perfect connection every time, even when the subscriber is not home. Each unit has a radiation-proof gasket to prevent signal leakage. And these new Craftsman Modular Directional Taps provide extremely low through loss (only .25 db for 18 db tap attenuation), and high return loss. Try a few of these Modular Directional Taps on for size in your system. We believe you'll find they are among the most significant advances ever made in CATV. We'll be glad to send you more technical information. Just write to us at the address below or call us collect.



Bottom view of housing with module plate removed.



Four way module plate



Three way module plate



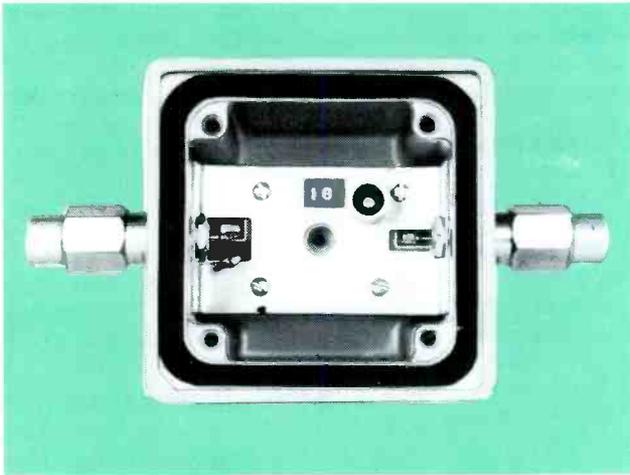
Two way module plate



One way module plate

CRAFTSMAN ELECTRONIC PRODUCTS, INC.

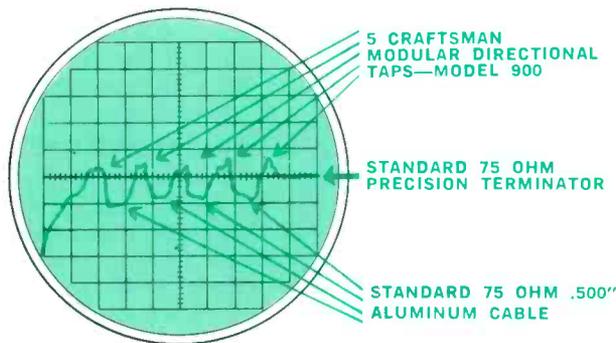
133 WEST SENECA ST., MANLIUS, N.Y. 13104 AREA CODE 315—OVerbrook 2-9105



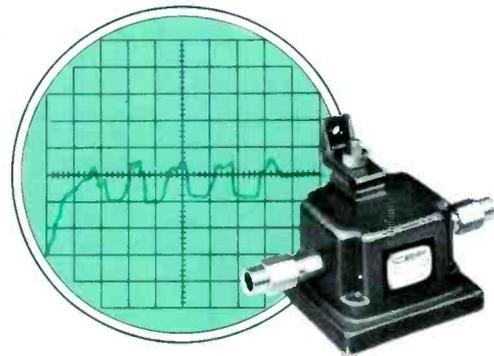
Bottom view of housing with module plate removed illustrating RFI gasket.

THE CRAFTSMAN QUALITY STORY...

Aside from the prospects of faster service, lower labor costs, and resulting higher profit margins for subscriber service changes, perhaps the most intriguing features of the new Craftsman Modular Directional Taps are the extremely low through loss (only .25 db for 18 db tap attenuation), and high return loss. We feel the easiest and most believable way to show this to you is to show you a TDR test simulating actual field conditions, terminated and unterminated at the tap.



In the top scope trace, 5 Craftsman Modular Directional Taps (14, 18, 22, 26, and 30 db tap units) are connected to a section of standard 75 ohm .500" aluminum cable. They are unterminated at the tap port. Notice how the peaks representing the Modular Tap Units are closer to the ideal 75 ohm reference line than the .500" aluminum cable. Thus we may reasonably state the Craftsman Taps are more ideally matched than the cable itself.



In the bottom scope trace the only difference is the tap off ports of the five units are terminated. As you can see, the difference between the two scope traces is negligible. No appreciable impedance mismatch is introduced to the feeder line in either case.

Now add this to the lower labor costs, and faster changeover from 1 to 4 units (less than five minutes), and you'll begin to see why we believe this Craftsman Modular Directional Tap is a uniquely significant advance in CATV. We'll be glad to send you more technical information. Just write to us at the address below or call us collect.

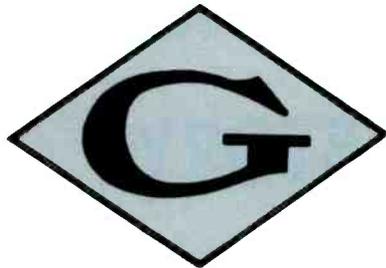


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reliance on wired television, and by other interested and informed parties. But on the other hand, my colleagues cannot prove that my fears are groundless. . .

"By not taking the admittedly more rigorous course which I favor, the majority has, I believe, invited developments which may make further study futile, may stifle UHF development which otherwise would have occurred, and may make it politically difficult, or even impossible, to adhere to normal copyright principles. . . I think we are at a real turning point as far as the development of American television is concerned — and I think the majority has taken the wrong direction."

Commissioner Loevinger:

"The analysis of jurisdiction set forth in my prior opinion in this proceeding, 38 FCC 683, 746 (1965), still represents my view. The significance of that analysis and its divergence from the course now adopted by the Commission need no elaboration. On the other hand, the substantive position now adopted by the Commission seems to me to be a moderate and reasonable compromise of conflicting views and positions, and the Commission now recognizes the desirability, if not necessity, of requesting Congress to legislate on jurisdiction and other important aspects of this subject. In these circumstances I think it is more constructive and useful to support affirmative action by the Commission, leaving the jurisdictional issue to be decided by Congress and the courts, rather than stand on legalistic grounds or inflexibly insist on complete adoption of my own ideas. Accordingly, with a dubitante recorded as to jurisdiction, I concur in the plan now approved by a majority of the Commission for regulating community antenna television systems."

COPYRIGHT SUIT GOES TO TRIAL

The United Artists vs TelePrompTer CATV copyright suit, which has been kicking around the courts since 1960, has finally gone to trial. Presiding Judge William B. Herlands of the New York Southern District Federal Court previously denied a request by CBS to consolidate its copyright suit against TelePrompTer with the United Artists' case. The trial, which will stretch out over several months, will be broken down into four stages, each of which will be devoted to a primary legal point. The first of these — the basic copyright issue — is currently being argued. Knowledgeable legal authorities believe that it will take 4 to 6 weeks to present pros and cons of whether a CATV system infringes on the signal initiator's copyright.

WMRI FINED FOR ANTI-CATV ADS

Radio WMRI-AM-FM Marion, Ind., faces a \$2,500 fine by the FCC because of the spot announcements it carried about a CATV system. The FCC held Federated liable for the fine "for violating sponsorship identification, station identification and logging rules. The violations involved spot announcements derogatory to Marion Cable which is competing with Radio WMRI for a local CATV franchise." WMRI has 30 days to either pay the fine or contest it.

OHIO CATV'ers FORM ASSOCIATION

Ohio CATV operators gathered at the Columbus Holliday Inn on Friday, February 18 to form the Ohio CATV Association. According to Claude Stevanus, Coschocton operator who handled the arrangements, interest in the formation of a state association has rapidly mounted since the NCTA Congressional campaign began a month ago.

SMALL BUSINESS HEARINGS

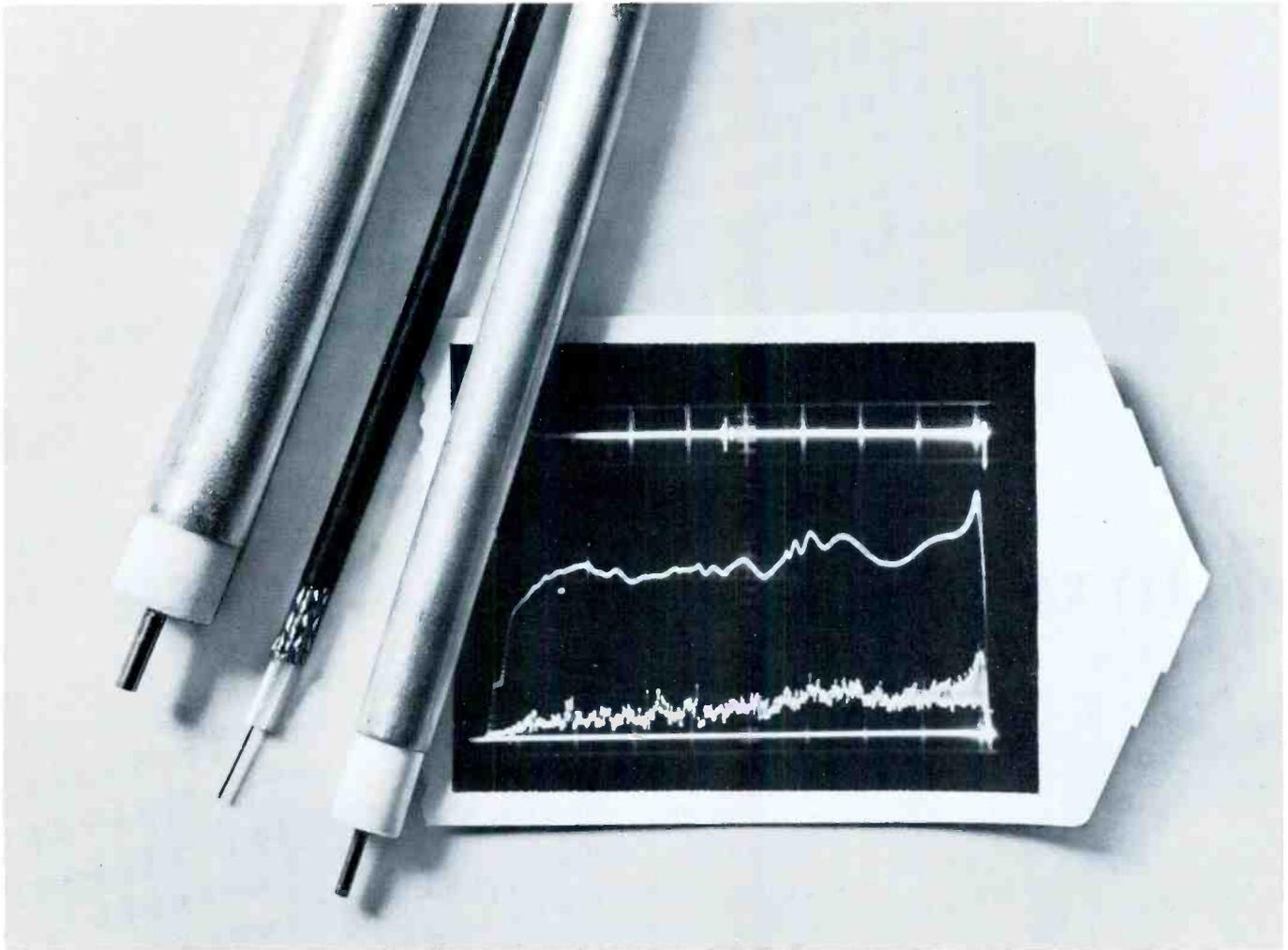
A tentative hearing schedule set for the House Subcommittee probe of the FCC's effect on small business has as one of its more prominent items the investigation of CATV. The probe is headed by Rep. John D. Dingell (D-Mich.), chairman of the House Small Business Committee's Subcommittee on Regulatory and Enforcement Agencies.

According to a subcommittee spokesman, CATV was tentatively slated to come under discussion during the first week of March, with hearings held two days a week until conclusion. Both the NCTA and the opposing Association of Maximum Service Telecasters were to testify. However, a Capitol Hill source said preliminary discussions had already been held by the subcommittee, with CATV industry representatives as well as with advocates of strict CATV regulation in attendance. After official announcement of the hearing, he said, all interested parties — CATV people, broadcasters, station representatives, etc. — would be invited to testify.

(Continued)

RADIO ADVERTISING

"Radio Advertising for Cable Systems" in January *TV & Communications*, contained a misleading typographical error. The faulty sentence, which should have read, "But do not expect \$10 worth of radio to produce as much revenue as \$100 in some other medium," resulted from a production error, not that of author Virgil Evans.



**Three proven Amphenol CATV cables offer you
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3. HOUSE-DROP CABLE. Performance proved, Century 59/U drop-line cable features Amphenol quality polyethylene dielectric and copper braid shielding for best signal transmission. Attenuation is uniformly low: 2.4 db/100' at channel 2, 4.9 db at channel 13. Polyfoam® version available to satisfy lower attenuation needs.

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DEPEND ON KAISER-COX FOR CATV LEADERSHIP TODAY AND TOMORROW

VERMONT HOUSE PASSES UTILITY BILL

The Vermont House of Representatives has passed a bill which seeks to place the Green Mountain state's 17 CATV systems under the control of the Public Service Board. House bill H-8 has been championed throughout the state by PSB chairman, Commissioner Ernest W. Gibson, III, who saw a similar bill go down to defeat in the

House last fall by a slim 21-vote margin.

This bill was introduced in the Senate on the day following its House passage.

EQUIPMENT FIRM FORMED

Anaconda Wire & Cable and Astrodata, Inc. have announced the formation of a joint company, Anaconda Astrodata Co. The new company will

manufacture and market electronic communication equipment for the telephone and communications industry. The announcement was made by Howard J. Libby, executive vice president of Astrodata and a board member of the new firm. Libby also announced that the new company will operate from Astrodata's main plant at Anaheim, and "will set up additional facilities at Anaheim as required."

OFFICIAL RELEASE ON NEW RULES

The following is the complete text released to the press concurrent with the February 15 press conference on the new CATV regulations. Official text of the rules themselves will be published in the Federal Register after final, legal-draft is prepared. Rules go into effect 30 days after publication in the Register.

Following meetings held February 10, 11, and 14, the Commission has reached agreement on a broad plan for the regulation of community antenna television systems, including a legislative program. To insure the effective integration of CATV with a fully developed television service, the new regulations will apply equally to all CATV systems, including those which require microwave licenses, and those which receive their signal off the air. Excluded from these rules will be those CATV systems which serve less than fifty customers, or which serve only as an apartment house master antenna. The CATV rules concurrently in effect for microwave-fed systems will be revised to reflect the new rules adopted for all systems.

Coupled with the new CATV rules, to be incorporated in a Report and Order shortly to be issued, the Commission will send recommended legislation to Congress to codify and supplement its regulatory program in this important area.

The Commission's new CATV program includes eight major points:

(1) **Carriage of local stations.** A CATV system will be required to carry without material degradation the signals of all local television stations within whose Grade B contours the CATV system is located. The carriage requirements thus made applicable to all CATV systems will be substantially the same as those applied to microwave-served systems by the Commission's First Report and Order in Dockets 14895 and 15233, adopted in April, 1965.

(2) **Same day non-duplication.** A CATV system will be required to avoid duplication of the programs of local television stations during the same day that such programs are broadcast by the local stations. This non-duplication protection, as under the existing rules, will apply to "prime-time" (network programs only if such programs are presented by the local station entirely within what is locally considered to be "prime-time.") It will also give the CATV subscribers access to network programs on the same day that they are presented on the network. Non-duplication protection will not be afforded to programs which are carried in black and white by the local station and are available in color from a more distant station on the CATV system.

The new non-duplication rules thus embody two substantial changes from those adopted in the First Report and Order. First, the time period during which non-duplication protection must be afforded has been reduced from fifteen days before and after local broadcast to the

single day of local broadcast. Second, a new exemption from the non-duplication requirement has been added as to color programs not carried in color by local stations.

(3) **Private agreements and ad hoc procedures.** The Commission will continue to give full effect to private agreements between CATV operators and local television stations which provide for a different type or degree of protection for the local station than do the Commission's rules. Moreover, the Commission will give ad hoc consideration to petitions from local television stations seeking a greater degree of protection than provided by the rules, or from CATV operators seeking a waiver of the rules.

(4) **Distant City Signals — New CATV systems in the top 100 television markets.** Parties who obtain state or local franchises to operate CATV systems in the 100 highest ranked television markets (according to American Research Bureau (ARB) net weekly circulation figures), which proposed to extend the signals of television broadcast stations beyond their Grade B contours, will be required to obtain FCC approval before CATV service to subscribers may be commenced. This aspect of the Commission's decision is effective immediately, and will be applicable to all CATV operation commenced after February 15, 1966.

An evidentiary hearing will be held as to all such requests for FCC approval, subject, of course, to the general waiver provisions of the Commission's rules. These hearings will be concerned primarily with (a) the potential effects of the proposed CATV operation on the full development of off-the-air television outlets (particularly UHF) for that market, and (b) the relationship, if any, of proposed CATV operations and the development of pay television in that market. The hearing requirement will apply to all CATV operations proposed to communities lying within the predicted Grade A service contour of all existing television stations in that market.

Service presently being rendered to CATV subscribers will be unaffected. However, the Commission will entertain petitions objecting to the geographical extension to new areas of CATV systems already in operation in the top 100 television markets.

(5) **Distant City Signals — New CATV systems in smaller television markets.** The Commission's prior approval after an evidentiary hearing will not be required by rule for proposed CATV systems or operations in markets below 100 in the ARB ranking. However, the Commission

will entertain, on an ad hoc basis, petitions from interested parties concerning the carriage of distant signals by CATV systems located in such smaller markets.

(6) **Information to be filed by CATV owners.** Pursuant to its authority under Section 403 of the Communications Act, the Commission will, within an appropriate time to be prescribed, require all CATV operations to submit the following data with respect to each of their CATV systems: (a) the names, addresses and business interests of all officers, directors, and persons having substantial ownership interests in each system; (b) the number of subscribers to each system; (c) the television stations carried on each system; and (d) the extent of any existing or proposed program origination by each CATV system.

(7) **Assertion of jurisdiction.** To the extent necessary to carry out the regulatory program set forth above, the Commission asserts its present jurisdiction over all CATV systems, whether or not served by microwave relay.

(8) **Legislation to be recommended to Congress.** The Commission will recommend, with specific proposals where appropriate, that Congress consider and enact legislation designed to express basic national policy in the CATV field. Such legislation would include those matters over which the Commission has exercised its jurisdiction, as well as those matters which are still under consideration.

Included in these recommendations will be the following:

(a) Clarification and confirmation of FCC jurisdiction over CATV systems generally, along with such specific provisions as are deemed appropriate.

(b) Prohibition of the origination of program or other material by a CATV system with such limitations or exceptions, if any, as are deemed appropriate.

(c) Consideration of whether, to what extent, and under what circumstances CATV systems should be required to obtain the consent of the originating broadcast station for the retransmission of the signal by the CATV system.

(d) Consideration of whether CATV systems should or should not be deemed public utilities. In this connection, Congress will be asked to consider the appropriate relationship of federal to state-local jurisdiction in the CATV field, with particular reference to initial franchising, rate regulation, and extension of service.

The Commission, of course, stands ready to discuss all of the above matters with the appropriate Congressional committees at any time. □

INDIANA OPINION

An official opinion issued by Indiana state attorney general John J. Dillon restricts the issuance of exclusive CATV franchises by that state's cities. In Dillon's opinion, cities may issue only non-exclusive franchises. Dillon stated that one factor which prompted the opinion was the number of reports from some communities that existing television stations have sought exclusive franchises only for purposes of excluding others from bringing in signals from other communities. Also covered in Dillon's opinion is the extent to

which the Indiana Public Service Commission has jurisdiction over CATV. He ruled that the Commission's jurisdiction is limited to cases in which a Public Service Commission-regulated utility operates such a business.

GROWTH PROMPTS TOWER STUDY

CATV towers in the state of Wisconsin are now being studied carefully by the Wisconsin State Board of Aeronautics. The board has initiated a staff study of the towers and the steps which must be taken to integrate them into a comprehensive air safety program. Gor-

don Leonard, chairman of the board, reports that the rapid increase of CATV activity has been the principal factor in prompting the study.

PAY-TV BAN IS UNCONSTITUTIONAL

On March 2, the California Supreme Court ruled the voters ban on pay-TV unconstitutional, based on the guarantee of freedom of speech in the First Amendment. The court foreseeing no threat to the public welfare by pay television at this time, stated that, "If the public interest actually suffers or if ignored it will then be time enough to apply appropriate regulations within the constitutionally permissible limits."

Sylvester L. "Pat" Weaver's Subscription Television Inc. ceased operation of its Los Angeles and San Francisco systems in November, 1964.

Now, Weaver states, S.T.V. "Does not have the resources" to reactivate the pay-TV plants in the two cities.

Weaver told *TV&C* "We are hopeful that we will be able to emerge from these proceedings and ultimately to resume Subscription TV operation."

FCC ANNUAL REPORT

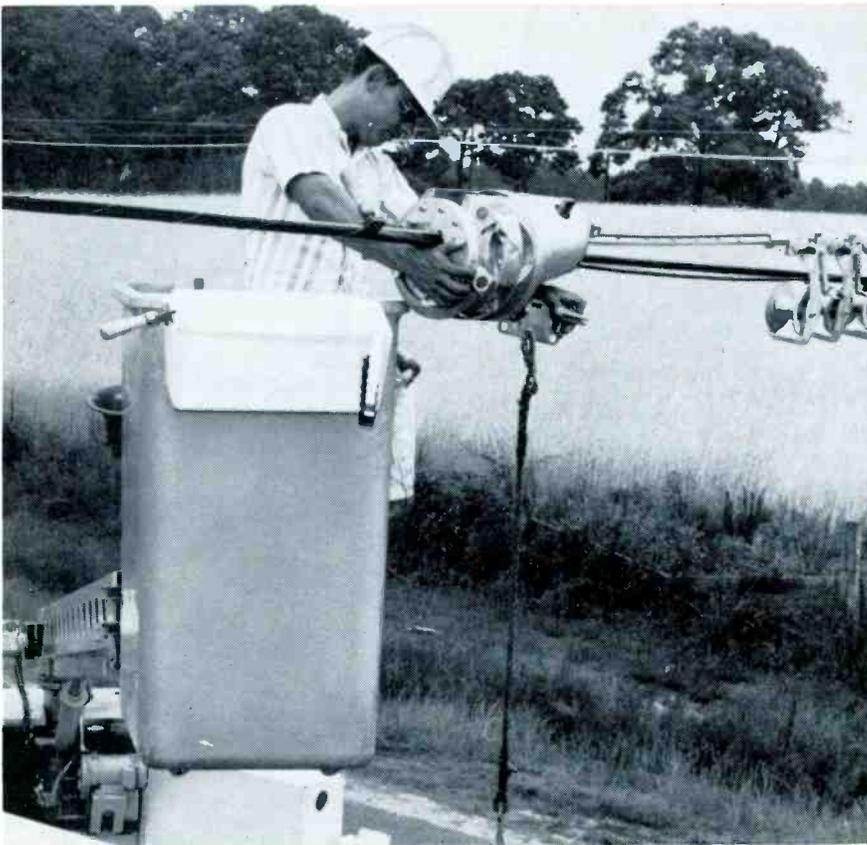
CATV figured prominently in the FCC's thirty-first annual report to Congress, which is meant to be a for-the-record journal for Congressional reference. The publication is a fairly routine wrap-up of FCC activities for the fiscal year that ended June 30, 1965.

In a "Letter of Transmittal" preceding the text, FCC Chairman E. William Henry said, "Because of the wide interest in community antenna television (CATV) systems, the report contains a separate chapter on that subject. . ."

"About 1,700 CATV systems are now in operation," the FCC told Congress in the CATV chapter, "Serving over four-and-one-half million viewers." It also said that "The present largest CATV system has more than 15,000 customers. About 90 percent have fewer than 3,000 subscribers, the average being about 655. The average subscriber pays about \$60 a year for CATV service in addition to an initial installation charge. Costs of establishing CATV systems vary widely. Exclusive of antenna, they range between \$3,500 and \$4,000 a mile. The estimated cost of a system serving 1,000 customers is about \$150,000; for 5,000 customers, \$400,000; for 10,000 customers, \$800,000."

The Commission said it "recognizes the valuable contribution of CATV in bringing new or supplementary service to many places and the desirability of furthering the orderly development of these systems." but said CATV "should be supplementary to and not cripple local TV."

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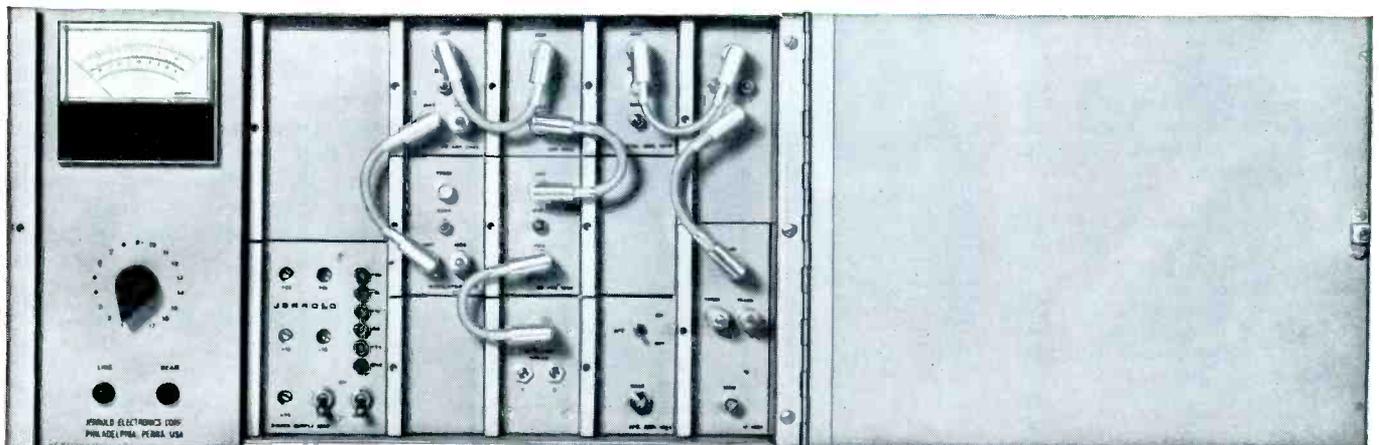
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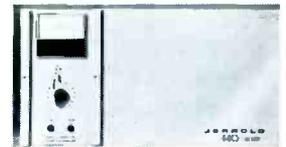
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Philadelphia, Pa. 19132

COPYRIGHT HEARINGS

The question of whether CATV systems should be subject to copyright licensing fees is coming to a head in the legislative subcommittees assigned to do battle over it. The House Copyright Subcommittee, headed by Rep. Robert W. Kastenmeir (D-Wis.), was host to long and exhaustive hearings last year. And early-year indications were that the subcommittee, its hearings over, planned two closed meetings per week until agreement on new legislation could be reached. However, the Senate version of the drama, headed by Sen. John McClellan (D-Ark.), has yet to begin. Rumors are that Senate

Copyright Subcommittee hearings will most likely wait until after the Arkansas Senator's bid for reelection in July.

SEMINAR TRANSCRIPT AVAILABLE

The transcript of the highly successful January 27 NCTA financial seminar, which was held in New York City, will soon be available for around \$10. NCTA director of information Don Andersson states that the publication was necessitated by the great demand for copies of the speeches. Those wanting a permanent record of this industry landmark should contact Mr. Andersson at: National Community Television Association, 535 Transportation Building, Washington 6, D.C.

SYSTEM SALES

GT&E Communications Inc., a subsidiary of General Telephone, has purchased **Arlington Better Community Television Inc.**, in Arlington, Washington. Ben L. Slack, Tucson, Arizona, and Vern Teague, Arlington, are the former owners.

State Loan & Finance Corp., Washington, D.C., has purchased 90 percent interest in **Jefferson Cable Corp.**, owners of systems serving 3,900 subscribers in Charlottesville and Waynesboro, Virginia. Plans are underway to expand the plants to serve 16,000 homes.

Community Cable Corp., Prattsburg, New York, has acquired **Naples TV Tower Service**, Naples, New York. Community Cable, which also operates a system in East Smithfield, has appointed David Hoag as general manager of the Naples operation.

Gregg Cablevision Inc., Nashville, has purchased **Hobbs Cable TV Co.** from National Trans-Video.

Spencer - Kennedy Labs, Boston, Massachusetts, has sold **Fairbury (Nebraska) TV Cable Inc.** to **T-V Transmission Inc.**, a subsidiary of Lincoln Telephone and Telegraph Co., Lincoln, Nebraska. T-V Transmission recently received a franchise in Superior, Nebraska, and has applications pending in other Nebraska cities.

General Electric Cablevision Corp. has purchased the existing CATV system in Watertown, New York. The system, which serves over 5,600 subscribers in Watertown and nearby communities, is one of the country's pioneer CATV systems, having begun operation in 1951.

Gene Grengs and Arthur Rubinstein have announced the sale of their **Eau Clair, Wisconsin**, CATV system. The all-channel system with 6,200 subscribers was sold for an undisclosed sum to **Wisconsin CATV, Inc.**, headed by Alvin H. Hartman of Providence, Rhode Island.

Gen Halker, Ashland, Wisconsin, has reported that **Bay Television, Inc.**, has purchased **Spooner Abel Cable, Inc.** in Spooner, Wisconsin. The firm was formerly headed by Donald Grengs.

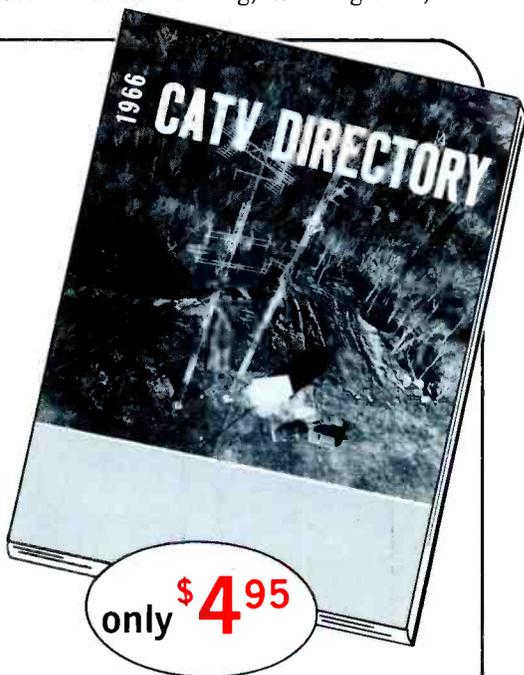
Kenneth Thomson, president of Thomson Newspapers, has announced the acquisition of 50 percent of **Cablevue Ltd.**, which is preparing to serve the Ontario town of Belleville. The Morton broadcasting interests in Belleville own the other half. Cablevue expects to serve 5,000 to 6,000 homes.

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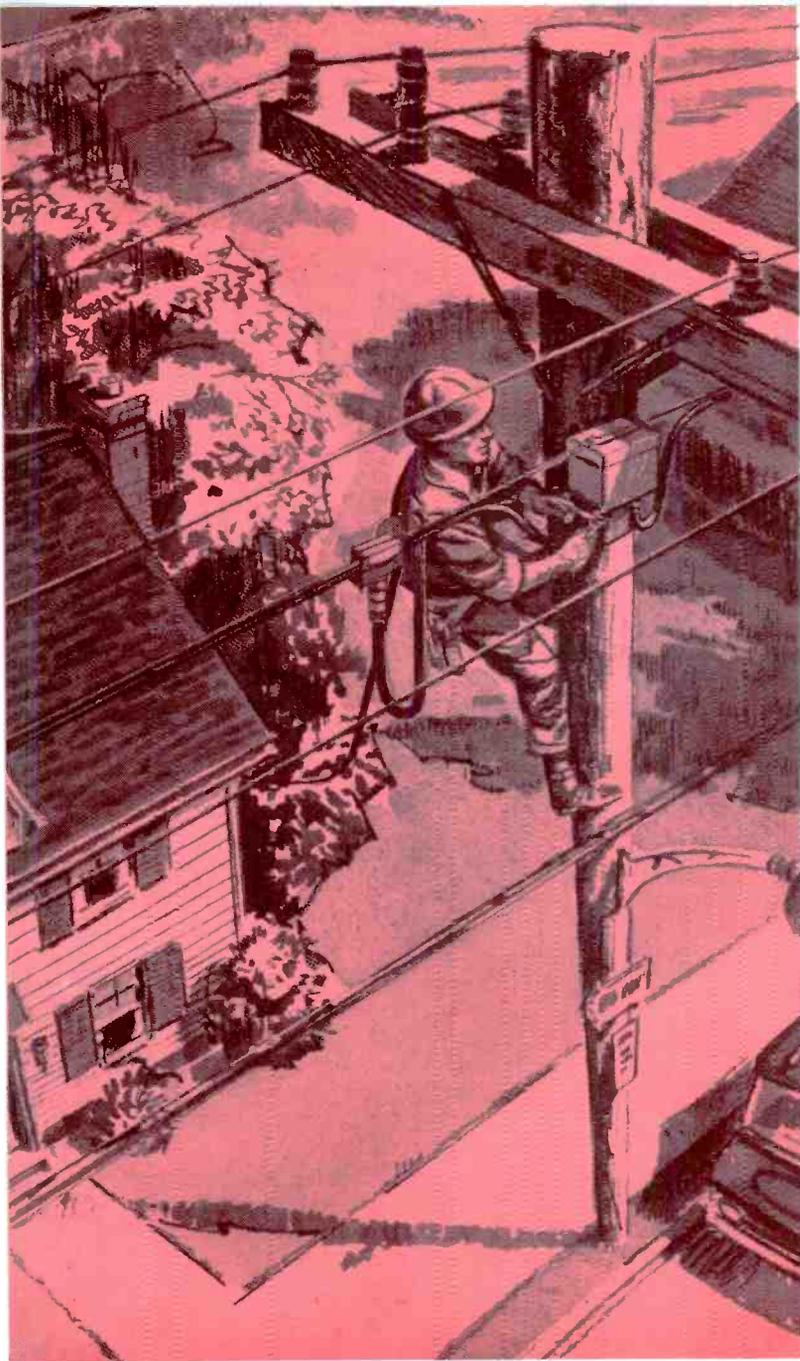
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TIMES
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Systems

Doug Talbott has been named vice president for Video Service Company, a microwave complex serving systems in Illinois and Indiana. Video Service Company is a subsidiary of Cox Cablevision.

G. L. Davenport has been named Pacific Northwest regional manager for Cox Cablevision Corp. Davenport was formerly manager of The Dalles TV Company, where he is succeeded by Earl T. Ake.

Walter Veth has been appointed systems manager of Centre Video, State College, Pa.; **Harold Gerstner** will serve as sales manager for the firm. Centre Video presently operates six systems in Pennsylvania, Ohio and West Virginia.

Mike Cullen has been named manager of Brownfield Cable TV System, Brownfield, Texas.

Douglas Shank was named chief accountant of CATV systems in an announcement by Carter Page, treasurer of Ameco, Inc. Shank moves up from general manager of a Kentucky cable television system operated by American Cable Television, Inc.

Frank E. Pellegrin has disposed of his interests in H-R Television, Inc., of which he was president and co-founder. He is now heading Pellin Enterprises, Inc., N.Y., which will be active in the cable industry as both an operator and a construction company.

Michael A. Strobbe has been named general manager of the Massena Antenna Systems, Inc., Massena, N.Y., which serves homes in Massena, Potsdam and Canton.

Robert W. (Kelly) Robbins has been appointed systems manager for Mar-

ion Cable Television, Inc., Marion, Indiana.

Robert H. Smith, Captain U.S.N. (Ret.) has been named regional manager for United Transmission, Inc., CATV operating affiliate of United Utilities, Inc.

Capt. Charles Blenman Jr., U.S. Navy (Ret.) has been named vice president and general manager of Kern Cable Co. The firm is franchised to bring cable service to the unincorporated areas of Kern County, Calif.

Jack Worley has been named manager of Shamrock Community TV System, Shamrock, Texas.

William R. Webber has been appointed general manager of the CATV division of Brush-Moore Newspapers, Inc.

Don Cripe, business manager of the WFBM stations, has been appointed CATV operations director for the Indianapolis based Time-Life property.

John Campbell has been named vice president of Video Service Company, a seven-relay microwave common carrier system serving CATV systems in Indiana and Illinois. Video Service is a subsidiary of Cox Cablevision.

Pete Schroder has been named manager of the Vumore, Inc., system in Cottonwood, Arizona. Schroder has been a technician in all of the company's Arizona systems.

Albert J. Eicholzer has been named general manager of microwave operations at New Channels Inc., WSyr-TV subsidiary operating cable systems. **Joel Fleming** has been named general manager of CATV operations; **Robert Winn** has been appointed comptroller; **Lyle Kneeskern** will be the new technical director; and **Dorothy Zwick** has been named assistant comptroller.

Ken Arnold has been named manager of the Sidney (Ohio) Cable Television Co. Arnold was formerly associated with station WOHP in Bellefontaine, Ohio.

C. J. Pendarvis has been named manager of the Cosmos Cablevision Corp. system in North Augusta, South Carolina.

James E. Daley has been appointed manager of the Muskegon Television System, Inc., which is constructing a system in Muskegon, Michigan.

Jim Yardley has been appointed manager of the Newmarket, Ontario, Canada, system belonging to Jarman Cable TV, Ltd.

Meredith-Avco, Inc. reports a relocation of home offices. New address is 2630 Glendale-Milford Road, Cincinnati, Ohio 45241, telephone 513-771-3980.

Cox Broadcasting Corporation directors have declared a regular quarterly cash dividend of 10 cents a share on common stock to holders of record of December 27, 1965.

Suppliers

George W. Green, former vice president in charge of marketing at Ameco, has joined Spencer-Kennedy Labs, Boston, according to SKL president Charles Wright. Green will head the marketing and finance departments of SKL.

Vroman W. Riley has been named manager of the communications systems division of Jerrold Electronics. Riley's background in the field of microwave communications includes previous service as microwave sales manager for RCA's broadcast and communications product division.

R. Bruce Walters, vice president-products at Ameco, Inc., has been appointed president of Remcor — the printed circuit board manufacturer which recently became an Ameco subsidiary. Walters has already announced that former Remcor owners, **Paul Ehrlich** and **Ron Stewart** will serve as vice presidents of the firm.

Robert N. Vendeland has been elected to the position of vice president, marketing, of Dynair Electronics, Inc. Vendeland comes to Dynair from the Conrac Division of Gianini Controls Corporation, where he held the position of sales manager. Prior to that, he was with Jerrold Electronics Corporation.

Donald Wyckoff has been named director of multiple systems owners and telephone sales for Kaiser-Cox Corp., Phoenix. Wyckoff has had 18



Mr. Green



Mr. Riley



Mr. Vendeland



Mr. Talbott

years marketing experience with General Electric.

Hank Shapiro has resigned as executive vice president of Westbury CATV, Inc. Shapiro was responsible for design and construction of the first all-silicon transistorized CATV system, located at Cocoa Beach, Florida. His future plans have not been announced.

Sherrill D. Dunn has been named advertising director of Ameco, Inc. Dunn, who moves up from sales promotion manager for the firm, was vice president of Communications Publishing Corp. and managing editor of TV & Communications, prior to joining Ameco.

Pruzan Company, Seattle, Wash., now offers Phelps Dodge coaxial cable for both trunk and feeder CATV lines. Stocks of coaxial cable are being maintained in both the Pacific Northwest and in California.

Ferrell Anderson has been appointed director of the new department of purchasing and component evaluation at Cascade Electronics Ltd., Port Moody, British Columbia.

Hosken Cable TV Antennas Ltd. has moved to a new 10,000 square foot plant. New address for the manufacturer of tropo-scatter antennas is 335 Frankcom Street, Ajax, Ontario, Canada.

Donald F. Stacy, a senior sales engineer at Lenkurt Electric Co., Inc., has been named field services manager, a newly-created position in the marketing department.

Rep-Tronics has announced a change in mailing address. The new address is P.O. Box 17447, Dallas, Texas 75217.

Professional

Max D. Paglin, former general counsel for the FCC, has returned to the Commission from private practice with the Washington law firm of Grove, Paglin, Jaskiewicz, Sells, Gilliam, and Putbrese. He has been appointed executive director, a highly coveted position rated the top administrative post on the FCC staff.

Malarkey, Taylor and Associates, Inc., a new Washington CATV consulting firm, is now open for business. Martin F. Malarkey, CATV pioneer who founded the National Community Television Association and was its president for five years, is the majority owner of the firm. Archer S. Taylor, the other owner, owns a system in Kalispell, Montana. Offices of the firm are located at 1101 17th Street N.W., Washington, D.C. 20036, telephone 223-2345.



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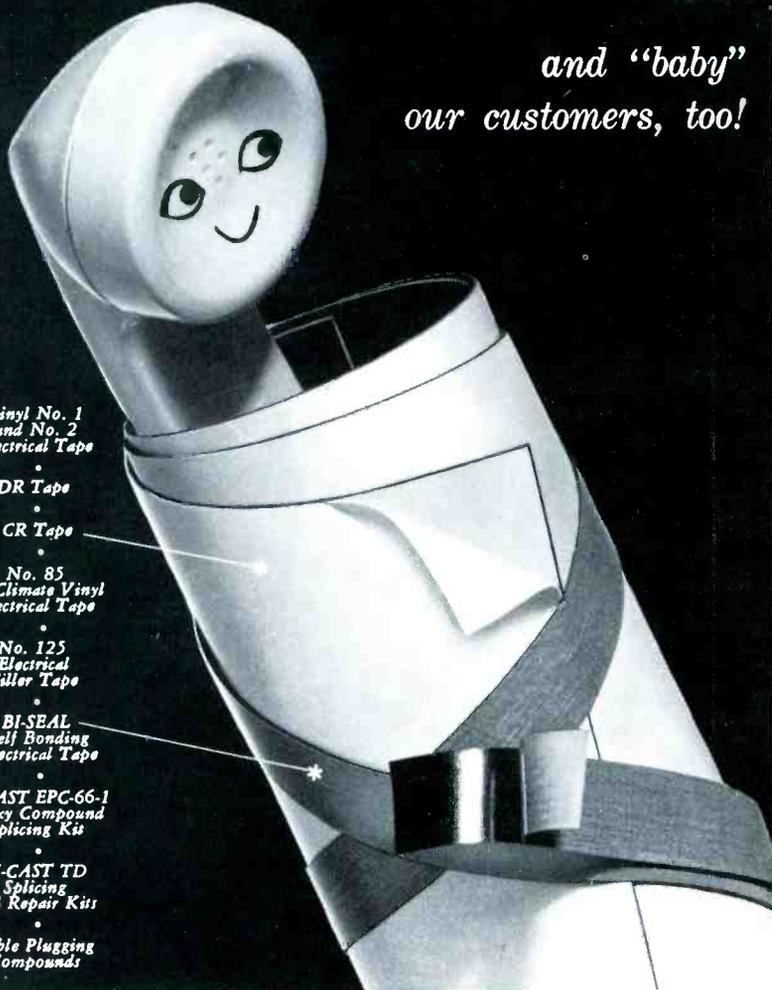
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CALENDAR

March 20-22 The Pacific Northwest Community TV Association will hold its spring display meeting at the Ridpath Hotel & Motor Inn, Spokane, Washington. Information may be obtained from H. W. McClure, secretary - treasurer, Box "M," Toledo, Oregon, ph. 336-2057.

March 23-26 The annual meeting of the Southern CATV Association will be held at the Broadwater Beach Hotel in Biloxi, Mississippi. For details contact president Bob Jernigan, Forest Royale Apartments, 620 South 28th Avenue, Apartment 122, Hattiesburg, Mississippi.

March 25 The Chicago Broadcast Advertising Club will hold an all-day CATV seminar for broadcast and advertising people. Contact Harry Smart of Blair Television Advertising, 645 North Michigan Avenue, Chicago, telephone 312 SU 7-2300.

March 29-30 Jerrold Electronics will hold a two-day technical school in conjunction with the Texas Association meeting at the Marriott Motor Hotel in Dallas, Texas.

March 31-April 1-2 The Texas CATV Association will meet at the Marriott Motor Hotel in Dallas, Texas. Highlights include: election of officers; a luncheon address by Congressman Walter Rogers; and banquet address by Governor John Connally. Contact Johnny Manikin, Box 989, Tyler, Texas.

May 9-12 The National Community Antenna Television Association (NCATA) of Canada will hold its 1966 Convention and Trade Show at the Bayshore Inn, Vancouver, British Columbia.

We Pay for Tech Tips

Short (or long) technical articles on any aspect of CATV maintenance, construction or equipment modification . . . can be worth extra dollars to you. Submit typed, double-spaced material to:

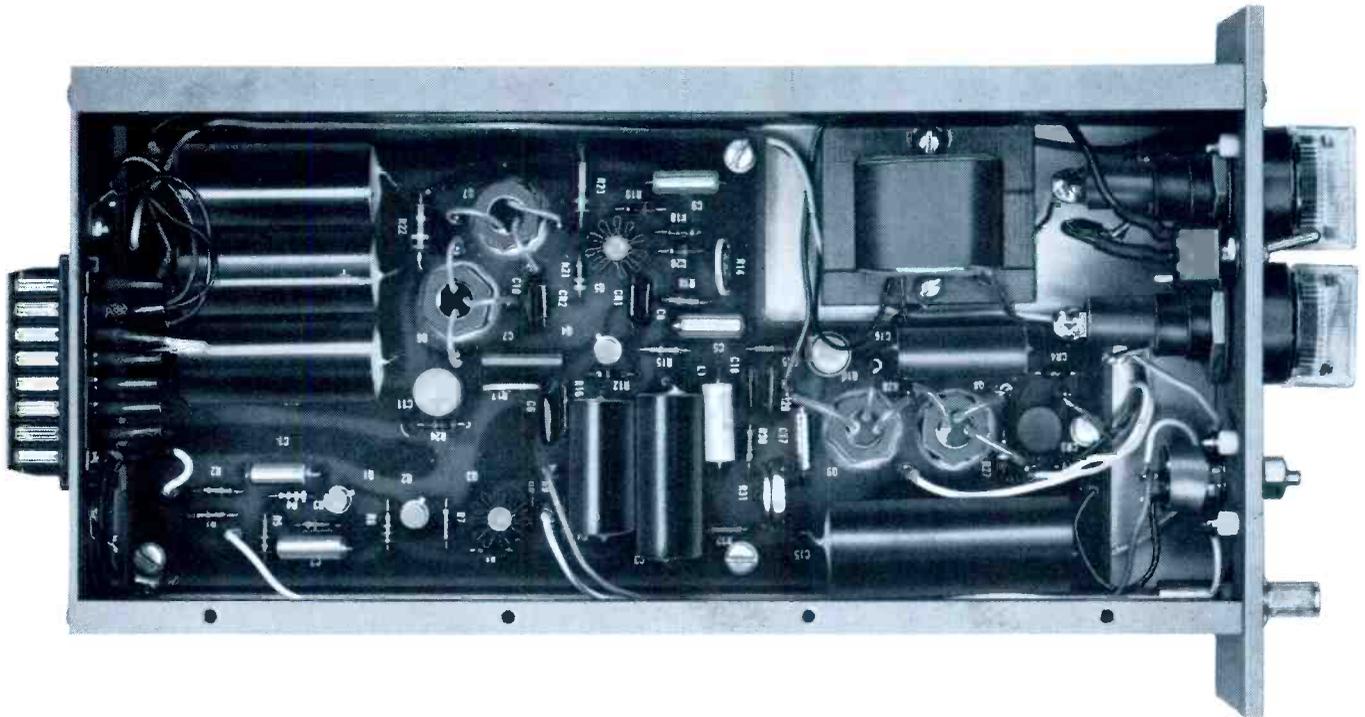
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UTILITY TRUCKS FOR CATV



The primary tool for construction and maintenance of cable systems is the utility truck. The importance of the utility truck to the system builder and operator is measured not only by its major function in line work, but also by the major investment which it represents. Just as CATV operations vary widely in size and other characteristics, the types of trucks used reflect a variety of needs and practices among the different systems.

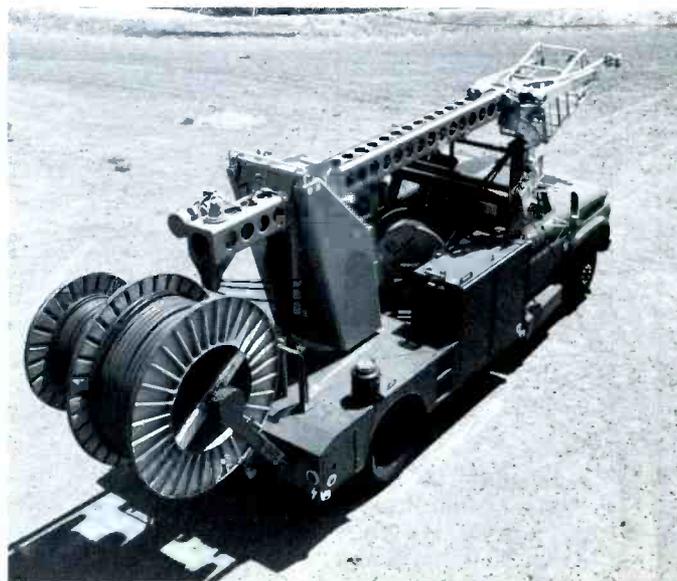
Unlike many facets of CATV development which were unique to this new industry, the incorporation of utility trucks from existing industries was a relatively easy and natural step. It is not surprising, therefore, that most suppliers of utility truck bodies

and accessories for CATV are established suppliers of the telephone and related communications industries. This is not to say, however, that firms such as Calhoun, Holan, Pitman, Telsta, Utility Body, and others have not given ample consideration to the specific needs of the cable television industry. But these needs, they have found, are not so different from other communications industries' as to require the design of completely different equipment.

When one mentions utility trucks for CATV, the type most often referred to is the "bucket truck." This is the most sophisticated of truck body designs normally found in CATV work, and is the backbone of many construction operations. An example of what



One of the trucks used by Systems Engineering Inc.



The Telsta T-36 bucket unit offers several construction features.

such trucks can mean to system builders is found in the following report from Systems Engineering, Inc., in Athens, Georgia.

"Advantages which we have found in using mobile 'bucket trucks' in CATV construction are:

(1) Reduction of crews

from: 1 foreman	to: 1 foreman
4 linemen	1 lineman
3 groundmen	1 apprentice
	2 groundmen

(2) Reduction in mobile units per crew from three units to two.

(3) Reduction in other equipment—no auxiliary power unit required.

(4) Additional line construction accomplished: From 60% to 100% increase in line installed due to (a) ease in pulling through massed tree limbs, (b) easy access to work area because of boom length, (c) all necessary tools within easy reach of lineman in bucket, (d) steady rate at which bucket truck travels during line installation, and (e) transfer of men from pole to pole not necessary.



Systems Engineering crew installing strand through trees.

(5) Other advantages: Sufficient room for pole hardware on boom truck; sufficient work area on truck for crew members; and crew operation more compact for easier supervision and better organization."

Kermit S. Littleton of Systems Engineering reports, "Frankly, our crews were not too sure of the trucks at first, and were a bit hesitant in predicting a rate of construction progress. However, within two weeks they were completely sold on the idea, and were using the new equipment like real 'pros.' We think the trucks are the solution to many of our problems, and with a few minor changes and adjustments, these trucks will help erect many, many miles of CATV lines."

In choosing utility truck designs, one encounters a variety of models for each general application. In bucket trucks, for example, there are hydraulic and electric types; telescoping and elbow designs; small

HURRICANE BETSY FAILS TO SHAKE FORT WORTH TOWER COMPANY INSTALLATION!

"personnel are already on the job salvaging as much of the many miles of plant as possible. The tower, installed by Fort Worth Tower Company remained intact despite 170 mile winds and a tremendous tidal wave which destroyed the chain-link fence at the base, and actually blew the paint off the tower" . . .

An on-site inspection report by Jim Davidson, president of DAVCO Electronics Corporation, the firm who is rebuilding the cable television system at Buras, Louisiana. The system was almost completely destroyed by Hurricane Betsy.

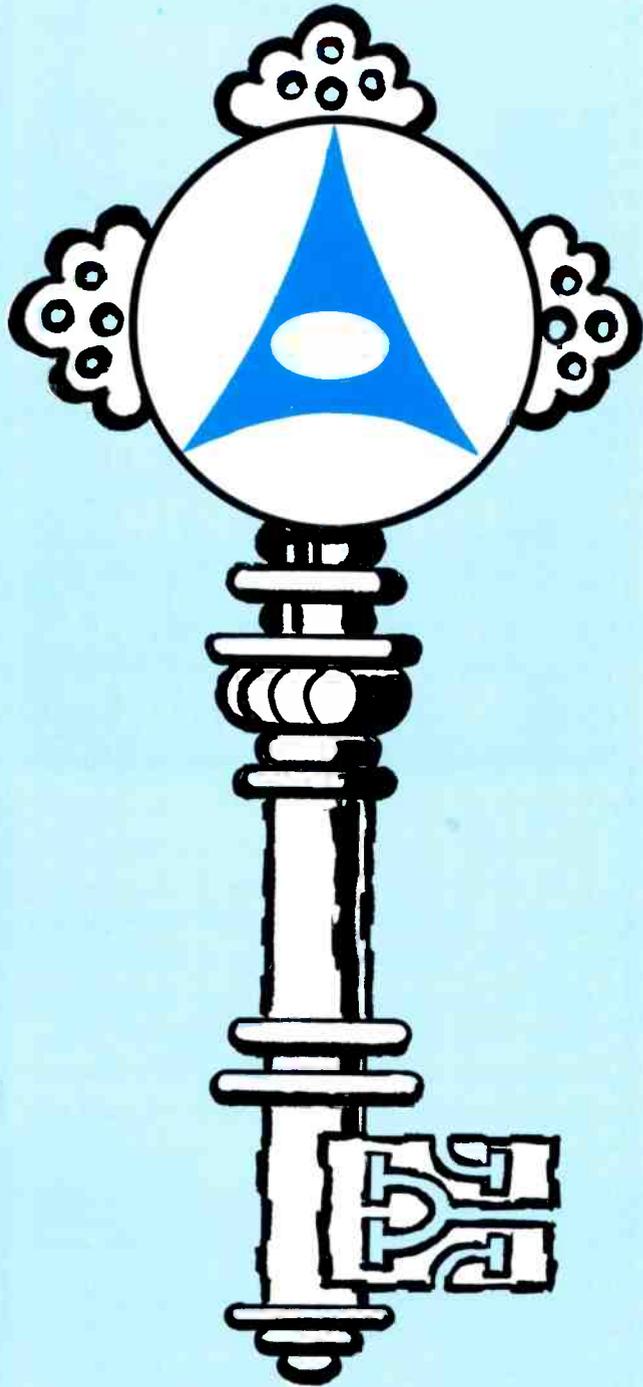
Your Fort Worth Tower installation will probably never have to prove itself in a hurricane but isn't it assuring to know that it could. You can't do better than to specify towers designed, manufactured and erected by FORT WORTH TOWER COMPANY for every communications purpose. For COMPLETE information WRITE — PHONE — WIRE.



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the leader in
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TOTAL SERVICE — TOTAL CATV

Ameco, Inc. with more than \$13 million dollars in assets, has the capability to provide the total products and services required to build, rebuild, or expand CATV systems. Now listed on the American Stock Exchange, Ameco is out-pacing every other CATV manufacturer. Ameco has five buildings with an over-all capacity of 100,000 square feet. Since 1962, Ameco has produced over 78,000 solid-state amplifiers. More than 10,000 Ameco 70 Series amplifiers are in use in CATV systems throughout the U. S. And, 80% of the CATV systems in the United States and Canada rely in whole or in part on Ameco equipment.

Ameco sales have increased dramatically. In 1961, sales totaled \$500,000. In 1965, sales rose to the \$10,000,000 mark. Currently, sales are running more than \$2,000,000 per month.

Ameco services enable you to provide your customers with the best cable television viewing available in the United States today. Two of Ameco's services are now pacing the industry.

The Ameco Acceptance Corporation offers financing for new system construction and rebuilds. AAC has established an unlimited line of credit and will tailor financing to meet your individual system requirements.

Co-ax Construction Company has built more than 7,500 miles of turnkey plant. This Ameco subsidiary utilizes its own construction personnel and can handle any size construction job throughout the nation.

Ameco has the people, products, resources, and knowledge to serve all your CATV requirements. **When quality counts — count on Ameco!**



Y TO TOTAL CATV!

AMECO, INC., A CATV PIONEER WITH OVER 14 YEARS EXPERIENCE IN EVERY PHASE OF CABLE TELEVISION

Engineering Research & Development Engineering is the keystone of any CATV system. Ameco's engineers are experts in all phases of engineering: construction and installation, signal surveys, system layout, head-end alignment.



Financing Ameco's "custom finance plans" enable you to obtain finances with terms tailored to your particular needs. Headed by Dick Peterson, Ameco's finance subsidiary offers the personnel, experience and backing to assist you in building a new system or rebuilding an old one.

Construction Coax Construction Co., newly formed subsidiary of Ameco, Inc., is staffed with experienced CATV construction personnel. CCC offers system owners a complete turnkey package, or, qualified assistance on any construction problem.



Sales Service Regional warehouses are located in major cities; 10 contract sales representatives, and 23 CATV sales engineers, are located strategically throughout the U. S. and Canada. This coordinated sales-service program assures you and your customers of consistent, continuous system performance.

LOOKING AHEAD We've come a long way in CATV, but the future promises even more, especially in the field of public service. CATV will shine as color TV becomes more readily available. Educational TV will benefit from CATV service. Weather channels will multiply, news and information services will become readily available to subscribers.

Ameco has all the necessary qualifications — plus the vision and ingenuity to anticipate and fulfill the ever growing needs of CATV.

When Quality Counts — Count on Ameco!



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Look to Diamond for the best in pole line hardware.

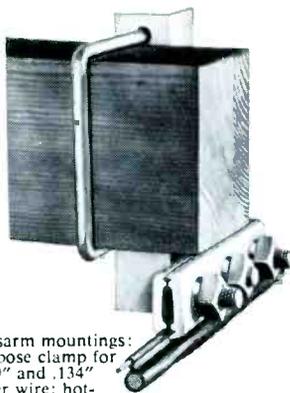
Diamond, a pioneer maker of specialty pole line hardware, has consistently led in product design and quality control. Specify Diamond and you get hardware that's unexcelled in ease of installation, safety, long life and reliability. Shown here are merely a few of the items in the Diamond complete line.

Diamond Support Clamps for Figure 8 Distribution Wire

These two types are approved by REA Specification #PE-48 to prevent "migration of spiral". Both are suitable for CATV as well as telephone line applications.



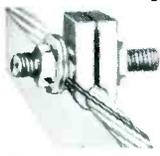
Dual-purpose clamp for both .109" and .134" messenger wire; hot-galvanized bolts, nuts and washers; aluminum alloy clamp. Catalog No. T-961.



For crossarm mountings: dual-purpose clamp for both .109" and .134" messenger wire; hot-galvanized bolts, nuts and washers; aluminum alloy clamp. Catalog No. T-966.

Diamond Cable Lashing Clamps

Improved design; furnished with double-ended stud bolt and washers and free running nuts, all galvanized by the Diamond process after fabrication.



Type D-901. Two-piece construction, as shown.



Type E-902. Similar to the "D" type except that the plates are of one-piece construction for faster application.



Diamond Span Clamp for Multi-Pair Distribution Wire
There are two types, both REA approved. Type T-980 is for .109" and .134" messenger wire sizes. Type T-985 for aerial cable is for 1/4" and .148" strand messenger.



DIAMOND EXPANSION BOLT COMPANY, INC.
Garwood, New Jersey
a Division of General Cable Corporation

units for light trucks; and large units with facilities for carrying cable and messenger for automatic lashing during installation. Obviously, many of these designs and features lend themselves primarily to original installation of systems, but many models are designed and priced to fit well into the maintenance operations of existing systems.

The rapid pace of new CATV construction and the continued expansion and rebuilding of existing systems has greatly outrun the supply of trained



Lineman uses a Utility Body Co. aerial ladder for maintenance.



Pitman "Pelican" bucket in use over busy street.

construction and maintenance personnel in most areas. The careful selection and imaginative use of mechanized equipment can be a tremendous help in overcoming this situation in most instances. If the rate of CATV industry growth continues to soar as it has in recent years, especially in larger and larger urban communities, the use of more productive, specialized vehicles is sure to increase significantly. In fact, for many operators on a tight budget, the use of specially designed utility trucks will be a prime factor in their systems' profit picture. □



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C-COR Electronics, Inc.

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"Outside of that . . . Everything Was Quiet"



(Editor's Note: The following letter reads like an expedition fighting to reach the summit of Mt. Everest; yet every word is true and chances are that hundreds of cable technicians throughout the country have gone through similar experiences.

More than that, it serves to point up two important facts. One, the technicians who serve the CATV systems of this nation are without a shadow of a doubt the unsung heroes of the growth and popularity of cable television. On days when the mailman wouldn't give his "appointed rounds" a second thought, these men are fighting a winning battle with the weather.

The letter also points up the valuable service performed by a conscientious, community-minded cable system owner. A reputable CATV operation doesn't have to take a back seat to either the telephone or power companies when it comes to serving the public. In fact, many of them could take lessons from this cable company. But let the letter speak for itself:)

Mr. Douglas Talbott
Cox Cablevision Corporation
1601 W. Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Doug:

I am sure you have heard our weather has been pretty foul around here lately. In fact, Capitol Peak has had enough snow to prevent even four-wheel drive vehicles from going more than halfway to the top since December 22nd. This has resulted in some serious problems for us, and the purpose of this letter will be to give you a detailed report on these events.

You will recall the proposal to buy a snow sled for winter transportation to our head end at Capitol Peak. There are many versions of snow sleds available. I felt we should try several before deciding on the one to buy. Accordingly, on

December 23rd, I arranged for Jerry Raines and myself to pick up a snow sled in Tacoma and give it a trial run at Capitol Peak. This was a Mustang made by the Polaris Company. It has a 14 horsepower motor, a track 60 inches long by 16 inches wide, two skis to steer with, weighs 350 pounds, and is representative of many brands on the market. This one made about three fourths of the hill and then lost power. The apparent problem is that this particular model is designed for use on level ground rather than prolonged up-hill running. Also, it is obviously designed to operate at faster speeds than our problem dictates.

Over the Christmas weekend we received more snow. On December 26th and 27th there were interruptions of commercial power at Capitol Peak, and by noon on the 27th we were having some problems with reception. I took Calvin Harpster along and headed for Capitol Peak by Jeep, and after snowshoeing up the last half of the hill, we arrived at dark. We located and repaired our troubles, which were mostly detuning due to power switchings. We decided to stay overnight because it was dark and a full-fledged blizzard was blowing. We did not have radio communication with Aberdeen because we are still using vehicle radios up there.

We started out early the next morning and reached the Jeep around 10:00 a.m. In turning around, we got stuck in a small ditch. Fortunately, a four-wheel drive truck happened along and pulled us out of the ditch. The truck was from Cascade Two-way Radio in Tacoma. That firm is the Motorola Two-Way radio representative in the area and has equipment in the same building we occupy at Capitol Peak.

On the way back to Aberdeen, the Jeep developed a knock. It turned out to be a connecting rod, and this caused us to be without the use of the Jeep until January 12. Shortly after we arrived back in Aberdeen, Channel 7 developed some problems that made it unusable. A check-out indicated the trouble was at Capitol Peak. This is our main CBS channel,

so I headed back for the Peak. This time I took Jerry Raines along and also removed the radio from the Jeep and packed it in. We arrived at 9:00 in the morning and, after locating and replacing a defective oscillator tube in the tuner, spent the night there.

The next morning, before we could leave, the commercial power went off. We stayed until it came back on to be sure this didn't create more problems. As we were checking out by radio with Aberdeen, our transmitter failed. We didn't stop for repairs, but left right away. There had been about 10 inches of snow during the night, and it took over 2 hours to get our truck turned around. Then the snow was so deep the bumper and axle dragged, and we couldn't move. Again, our luck held. The State Patrol had been on another part of the hill with a Weasel and a Sno-Cat. They came along and used the Sno-Cat to pull our truck down the hill to where it could operate. The Sno-Cat had been used to rescue the Weasel. It is a terrific snow vehicle.

After this everything operated O.K. until 11:00 New Year's night. At this time everything went off for a few minutes and indicated a power failure at Capitol Peak. In about 10 minutes all channels, except 2 and 9, slowly went dim and off. A check indicated no microwave signal from Capitol Peak.

I left for the Peak at midnight, with my 16 year old son. We arrived at the top at 6:00 a.m. after snowshoeing from the bottom of the hill. We found three spans of the power line down and a broken pole. A transformer and service to our building had been on this pole.

Our generator was operating but fuses were blown on three of our microwave power supplies. These power supplies were wet. Investigation showed that moisture had been blown into a small hole in the 1"x12" casing around the wave-guide where it runs between buildings. From there it had blown through the hole in the wall and about 10 feet into the building. I plugged the hole around the wave-guide and started drying equipment. By 8:00 a.m. all channels were operating again. This was the day of the N.F.L. Championship game—catastrophe avoided!

The next morning I called Puget Sound Power and Light Company and talked to Mr. Dickson, head of the maintenance department. He was not aware of the exact nature of their trouble at Capitol Peak before I called. He couldn't even estimate when their service might be restored. One of their crews was on the way up to survey the damage. I urged him to expedite the repairs and suggested we might even help finance opening the road. He said he would have to think this over and let me know.

I then contacted Mr. Roy Day in Olympia. Mr. Day had opened the road with a D-8 Cat in 1963. He said he would be available again if needed. Meanwhile, I had Jack Smith survey a site where Channel 4 and 5 could be received by antenna. By reversing 6 amplifiers this signal could be fed to the Finch Building and into the system. I located a rental IOKW generator and had it available on short notice.

I called Lew Davenport and brought him up-to-date on the situation, and he suggested that we also have a helicopter available. A helicopter based at Boeing Field in Seattle was the closest one that could lift the 1,000 lb. generator. I had a phone number where the owner could be reached day or night.

On January 4, I received a call from Mr. Carroll Courtnier, manager of Cascade Two-Way Radio. Two of his men had spent the night at Capitol Peak and used our room for warmth. Mr. Courtnier had heard we were without a radio and he offered the use of a portable two-way radio if we went in again. He also offered me a key to their room. This would enable us to use their repeater station, which is answered 24 hours a day. It is answered in Tacoma,

but they would relay a message by phone. He also inquired about the possibility of buying stand-by power from us if our generator had the spare capacity. I agreed to this providing we could work out something on a radio.

I had intended to send two men onto the Peak this same day. Our Portland stations were giving very poor reception, and the generator needed looking over. I wound up sending Calvin Harpster in with a man from Cascade Two-Way Radio. They did not get there until dark. They checked in by radio to Tacoma, and Carroll Courtnier called me. They repaired our radio that night. The next morning our Portland stations were off completely. The trouble proved to be a pulled splice in our line coming up the hill. When this was repaired our picture quality returned to normal. Cal arrived home around 8:00 p.m. At 10:50 p.m. we lost all reception in Aberdeen. A check showed no microwave reception from Capitol Peak. I called the helicopter owner in Seattle, but they couldn't budge until morning. I dispatched Jerry Raines and Dave Jarvinen to Capitol Peak. Their instructions were to repair the trouble or get information on what had happened. If I hadn't heard from them by daylight, I would try the helicopter and send up a storage battery, in case the one there was too dead to operate the radio. In the meantime, I called Jack Smith and told him to carry out the plan to get reception from an antenna. Also, I tried to contact Lew Davenport but could not reach him.

By 7:00 a.m., we still had not heard from Capitol Peak. I called the helicopter owner again, and he said the ceiling was only 1,700 feet, but that he would keep checking and call me if it cleared. We needed to go 2,600 feet, the elevation of the Peak. I then contacted Roy Day and told him to start moving his Caterpillar.



I called Mr. Dickson of Puget Sound Power and Light, and he promised they would do all they could. They had arranged to use a State Patrol Weasel and were sending a crew and equipment up. He said the crew would be ordered to stay up there until power had been restored, even if the secondary was just strung on top of the snow. He also said there were two more spans of their line down on the hillside, now.

I located Lew Davenport in Portland. He asked me to meet him at the restaurant at Mud Bay and contact Bob McCaw to see if he could meet us there also. Roy Day called to report he could not get permission to cross the Waddell Creek bridge with the Caterpillar. I suggested he check the other four access roads and contact Lew or myself at Mud Bay. I arranged to use a demonstrator Toyota

Jeep and picked up the rental generator and equipment. When I reached Mud Bay, Lew, Bob McCaw, Jerry Raines, Dave Jarvinen, and Roy Day were already there.

Jerry reported a bolt from a brush holder had vibrated loose and gotten into the armature of the generator. The generator would have to come off the mountain for repairs. Roy Day reported the only road he could get permission to use was the Rock Candy Mountain Road. He was not familiar with this road and asked if I knew it. I was not sure of it, as it had been three years since I had been over it. After a brief discussion, Bob McCaw and Roy Day left to get a map, confirm permission to use Rock Candy Mountain Road and make one more attempt to get permission to cross Waddell Creek bridge with the Cat.

Lew had obtained the name of a local owner of a type of snow vehicle, called a Jiger. We had heard good reports of this vehicle's performance. Lew arranged for one of our men to be taken up the mountain if this vehicle could make it. Carroll Courtnier called, and he had located a helicopter in Tacoma. It would be closer and cheaper if conditions changed so we could use it. He had also been able to contact the power line crew. They had gone up in a Sno-Cat instead of the Weasel. The Sno-Cat had broken down a mile from the top. They had a battery with them that we could have if they got to the top and we needed it.

Bob McCaw and Roy Day returned with a map. To use Rock Candy Mountain Road would require clearing 8 to 10 miles of road. This is twice the distance of the Waddell Creek Road route. They had been unable to get permission to cross the Waddell Creek bridge. Roy had previously been trying through the County Engineers Office, and he and Bob had gone to see a Commissioner, but he couldn't or wouldn't help. They had also picked up some information about a possible cross-country detour around the bridge.

In the meantime, the owner of the Jiger arrived. He and Jerry Raines were to try the trip up. Carroll Courtnier had sent us some portable two-way radios. While Jerry took one along, Dave Jarvinen would man one at the base of the mountain. If the Jiger made it up, they would bring the generator out with them.

Lew, Bob, Roy and I checked out the cross-country detour. It was not good. We returned to the cafe, and Lew and Bob waited here for word from the mountain. Roy and I took the Jeep and went to look at snow conditions on Rock Candy Mountain Road. Roy estimated 2 or 3 days to go in by this route. We returned to the cafe.

Jerry reported that they were forced to turn back about a mile from the top. A Weasel taking parts up to the Sno-Cat had become stuck and they couldn't get around it. Also, the tracked vehicles had made ruts that were causing them trouble in the dark.

Roy Day left to see the County Engineer. He was going to propose laying extra timbers across the Waddell Creek bridge, and driving the Caterpillar across on them. We were to call him at home to see if he had accomplished anything. Bob McCaw left to return to Seattle. Carroll Courtnier arrived to lend any assistance he could. Jerry and Dave arrived and after they had eaten, we sent them home.

Lew and I checked into a motel. We joined Carroll Courtnier for dinner and worked out details of exchanging a radio for stand-by power for his repeater. Directly after dinner we checked with Roy Day. We definitely would not be able to cross the Waddell Creek bridge. We called Puget Sound Power and Light. They had repaired the Sno-Cat and expected to restore power around 2 or 3 a.m., but couldn't promise for how long. We called Jack Smith in Aberdeen and alerted him to be ready to restore the 6 amplifiers to normal.



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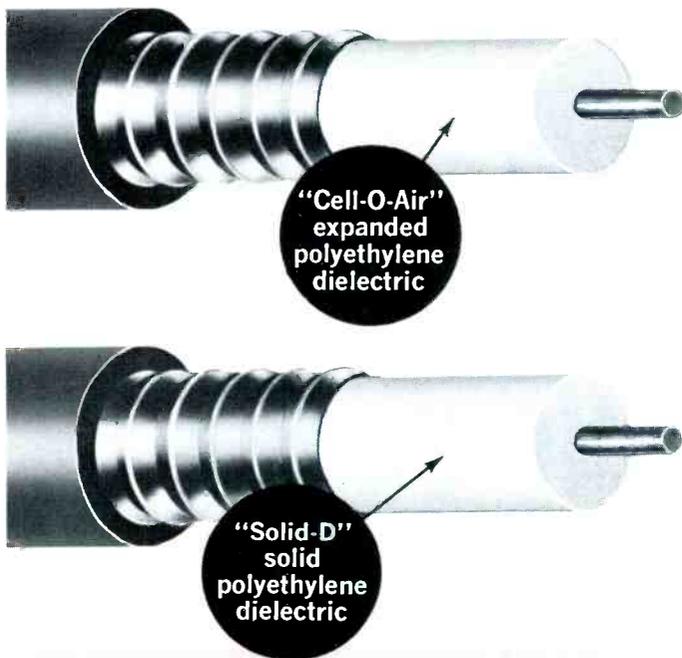
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HICKORY, NORTH CAROLINA 28601

By the next morning power had been restored and Aberdeen had all channels operating except 9. I called Mr. Dickson to thank him, and he repeated that this could go out at any time as our service was dependent on two spans of wire on the snow. During breakfast Carroll Courtnier called to see if we would want the helicopter. The weather appeared to be clearing, but we decided to call the Olympia Weather Bureau. They told us we should be able to land on Capitol Peak in the morning, and that in the afternoon conditions would clear even more. We arranged to meet the helicopter at Mud Bay at noon and arranged for Jerry Raines to be there at noon.

Carroll Courtnier arrived with the helicopter at noon. It was a small two-man Hughes. Bud Gandio was the owner-pilot. We sent Jerry up with Bud. After a half hour or so, they reported that Capitol Peak was fogged in from 1,900 feet, up. They returned to the cafe. We moved operations to the base of the hill and had Bud take Jerry as far up as possible. Next, he took me up. What a ride! The wind was getting up around 40 miles an hour and as soon as he set me down, Bud left. He did stop long enough at the foot of the hill to get Carroll.

Before Carroll left he had called in one of his crew with their four-wheel drive one-ton pick-up. Lew and this man managed to get the truck in about 2 miles, as there had been some melting of snow. Meanwhile, Carroll was locating someone to work on the generator.

Jerry and I snowshoed in, got the generator, less motor, and put it on an improvised sled. This we pulled, and let pull us, down to the truck. From there we all went to Mud Bay. Here, we transferred the generator to Lew's car, and he left for Tacoma. Jerry and I went home.

The following morning I returned all rented and borrowed equipment, and about 2:00 p.m. Lew called and said the

generator had not been as seriously damaged as we had thought. It would not require re-winding, and a man had been working on it all day. It would be ready around 5:00 p.m. and Carroll was going to pick it up. Lew was returning to Astoria.

I contacted Gene Colson regarding the possibility of using his Jiger to take the generator up Capitol Peak. He was agreeable if we would go the next day. He had just returned from the Peak and said there was a blizzard starting when he left. He was afraid we might not make it if we waited until Monday. I then contacted Carroll and he offered to bring the generator to Colson's in Olympia and let us use his four-wheel drive truck to haul the Jiger in.

The following day Gene and Jerry took the generator up the hill, and I manned the radio at the truck. Everything went fine except that the battery would not charge. The motor had to be hand cranked. The next morning I sent Jim Hatfield and Calvin Harpster in on snow shoes with a battery. This cleared up the last problem. We are still operating on the power service strung across the snow. I anticipate that it will be another couple of weeks before we can drive up the Peak.

Even though this letter contains much detail, it doesn't do justice to the help and cooperation we received from Carroll Courtnier and his men. His company also incurred considerable expense. Carroll and some of his men also spent many hours of their own time assisting us. Will you please advise us who is responsible for the expenses of this operation?

Outside of that . . . things have been quiet.

Sincerely,
Harbor Television Corporation
Joseph F. Kusky,
Chief Engineer



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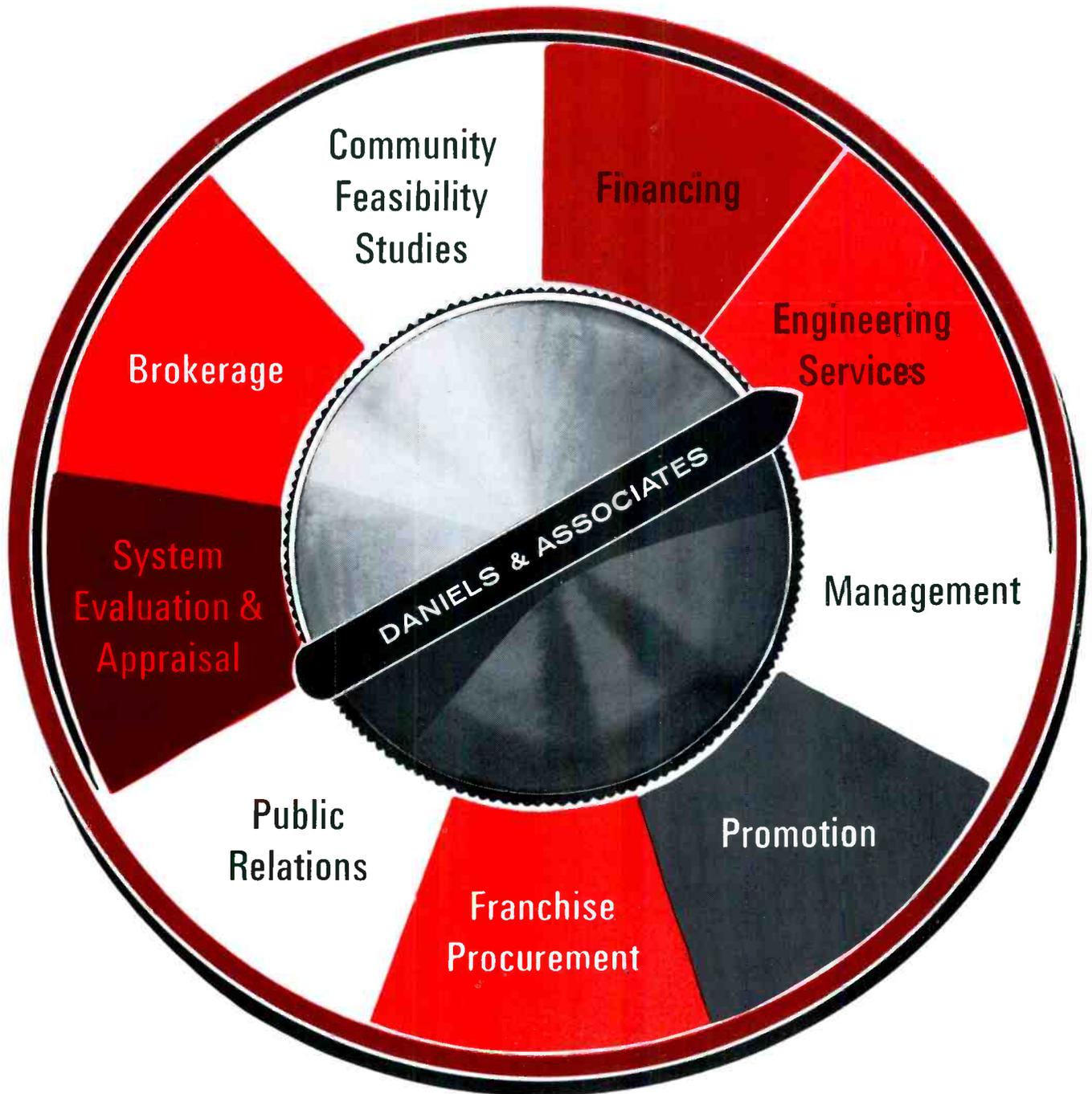
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MINIMUM LINE EXTENDERS

To eliminate or minimize line extenders a larger, lower loss distribution cable can be used, such as .650 size instead of the .480. To decide which size to use, one must know the operating output of the distribution amplifier and the distance involved. With an operating output of 42 db at Ch. 13 a distance of 1,000 to 1,100 feet can easily be accomplished with .480 cable. If its 1,100 to 1,500 feet, .650 cable is recommended, or a loss factor of 1.5 and 1.2 db/100 feet respectively. If additional 200 ft. is desired it can be done by using a four output nonpowered directional tap 11 db down which will still furnish sufficient signal to four homes near the end of the cable. Moreover, a distance of 2,400 ft. (with .650 cable or 1.2 db/100 loss) can be a reality if a four output cabled powered *unity gain* directional tap is employed at end of cable. However, the latter method is not recommended if there are homes to be connected between the 1,700 ft. point and near the end of cable. The reason is that the signal will be too weak between the two above points to tap and realize a +3 db of signal to operate the TV sets. Otherwise a line extender is desired at or near the 1,700 ft. point (see Figure II).

Remember, the signals at the end of the distribution cable should never be less than 15 db after all losses are considered (such as cable loss, ageing of cable and insertion loss from pressure or directional taps). The signal on the distribution cable is constantly changing even though the output of the distribution amplifier remains the same—that is, as the cable ages, or as taps are added or both. So to avoid embarrassment at a later date one should consider the above cumulative losses in his initial layout. For an example, consider 1,000 ft. of cable with an attenuation factor of 1.5 db/100 feet at Ch. 13 plus an average insertion loss of .3 db/tap plus another 3 db/1000 feet for ageing. Now with a fully saturated 1,000 feet of cable, or about 14 taps, one can figure the total eventual loss — or 15 db cable loss +5 db insertion loss +3 db ageing loss =23 db. Next, assume an output of 42 db from the distribution amplifier less 23 db total losses will leave 19 db at the end of cable, which is adequately above the minimum of 15.

Of course, the larger, lower loss cable idea should be seriously considered throughout the entire system. When you eliminate amplifiers of any type you are not only minimizing future troubles and operating cost but more important you reduce noise in the system. □

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	Make ready cost (average)	\$200.00/mile	3 miles =	\$ 600.00
15,840 ft.	1/4 High Strength Strand (4750 lb. test)		\$28.00/1,000	\$ 420.00
128	6" 3 bolt clamps for 1/4" strand	@ \$	.70	89.00
100	5/8"x12" Machine bolts	@ \$	.30	30.00
10	5/8"x12" Straight Thimbleye bolts	@ \$	.60	6.00
18	5/8"x12" Angle Thimbleye bolts	@ \$	.60	10.80
128	2 1/2"x2 1/2"x3/16" Curved washers	@ \$	.07	8.96
20	4"x4 1/2 ft. Tripleye Screw Anchors	@ \$	2.35	47.00
4	8 Way Expanding Anchors	@ \$	2.25	9.00
60	1/4" Strandwise	@ \$	1.20	72.00
10	1/4" Strand Link	@ \$	.55	5.50
5	Cross Over Clamps	@ \$	.95	4.75
10	5/8" Angle Bolt Eye	@ \$	.60	6.00
5	5/8" Eye Nuts	@ \$	.50	2.50
5	5/8"x3/4" Auxiliary Eye (for anchor rods)	@ \$	2.25	11.25
3	5/8"x6 ft. Hot Galvanized Ground Rods with Copper Wire	@ \$	1.50	4.50
36	7/16 to 1/2" Flip on Clamps for bonding TV strand to telephone messenger	@ \$	.50	18.00
8,440 ft.	*.650 Trunk and Distribution Cable 1.2 db loss/100' (Corrugated Copper)	@ \$125.00/1,000		1,055.00
12,540 ft.	*.480 Distribution Cable (corrugated copper)	@ \$ 80.00/1,000		1,000.00
16	Coils of .045 gal. steel lashing wire	@ \$	6.00	96.00
260	"D" 3/4" cable spacers (2 at each pole)	@ \$	8.00/100	22.00
260	Aerial Cable Supports 10" long	@ \$	8.00/100	22.00
260	Lashing wire clamps (Fargo)	@ \$	.25	65.00
1	Main Line Amplifier with Distribution and AGC			590.00
2	Main Line Amplifiers with Distribution			800.00
1	Power Supply with Lightning Protector			105.00
8	4930 BAF Connectors	@ \$	5.00	40.00
12	4920 BAF Connectors	@ \$	2.00	24.00
14	Termination Resistors	@ \$	.75	10.50
2	Tubes of Silicone	@ \$	2.25	4.50
3	Rolls of Plastic Tape	@ \$	1.50	4.50
	Plus Miscellaneous Materials			100.00
	TOTAL COST OF MATERIALS			\$5,283.76
	200 Man hours (experienced) to build 3 miles of complete system @ \$3.50/hour average including Social Security and Unemployment Insurance etc.			700.00
	TOTAL COST OF 3 MILES OF SYSTEM			\$5,983.76
	DIVIDED BY THREE =			\$1,994.59/Mile

* To figure the cost of an aluminum cable system all one needs to do is add the additional cost of aluminum cable plus about \$50.00 extra per mile for labor.

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BURYING CATV PLANT

*By Clyde Fette and Charles Wigutow
American Cable Television Inc.*

Cable system operators facing construction of long trunk line runs are giving increased consideration to buried cable installation. Going underground has many unique advantages, some unique disadvantages, and a variety of requirements which differ from pole line installation.

The most desirable technical advantages of buried cable installation result from the removal of the cable from the forces of nature. Especially in areas subject to wide temperature variations, the relatively constant temperature of the soil looks very inviting when one considers amplifier level and tilt adjustments in solid state equipment. Not only are costs of such maintenance greatly reduced in buried installations, but customer relations are also enhanced by more consistent system performance.

In addition, the havoc that wind can play on connectors must be considered, when comparing aerial plants with buried systems.

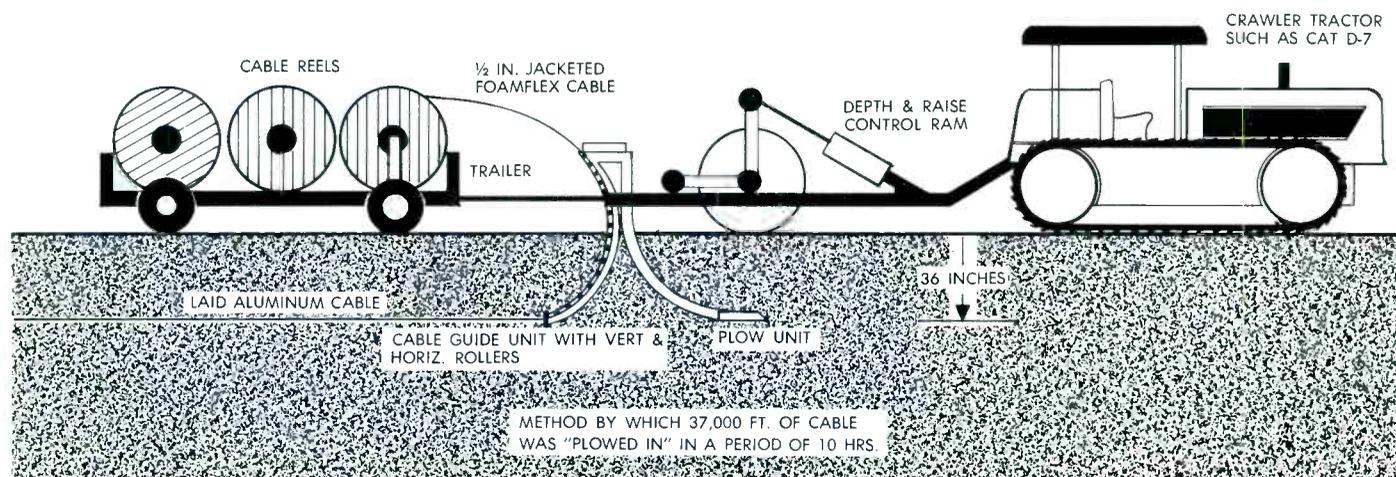
Of equal importance, are the considerations of pole rental costs, rearrangement charges (both of which show rising trends) and legal and management involvement in dealing with pole owners. Possible delay in reaching pole use agreements, and the uncertainty of future pole-owner action in

some areas must be added to the case for buried installation. In larger urban areas, pole rearrangement charges can run into five figures for single poles, due to the complexities of utility installations. And although Bell affiliates' policies presently allow for a pole rental agreement in every community they serve, their apparent preference of leasebacks, combined with the actions and attitudes of some independent phone interests, are of prime concern to many CATV's undertaking major construction.

The esthetic appeal of buried cable might well prove advantageous in dealings with community leaders, and could also be utilized in creating good public relations generally.

Other notable advantages to the buried plant builder include the elimination of messenger strand, lashing wire, and other supporting materials and devices required for aerial installation.

On the minus side, are problems of physical obstacles—both man-made and natural—and in some instances, problems of right-of-way. Buried installations are not practical in some types of terrain, such as mountainous or forested country, and cost factors increase greatly where runs are broken by frequent obstacles. Adequate ground clearance





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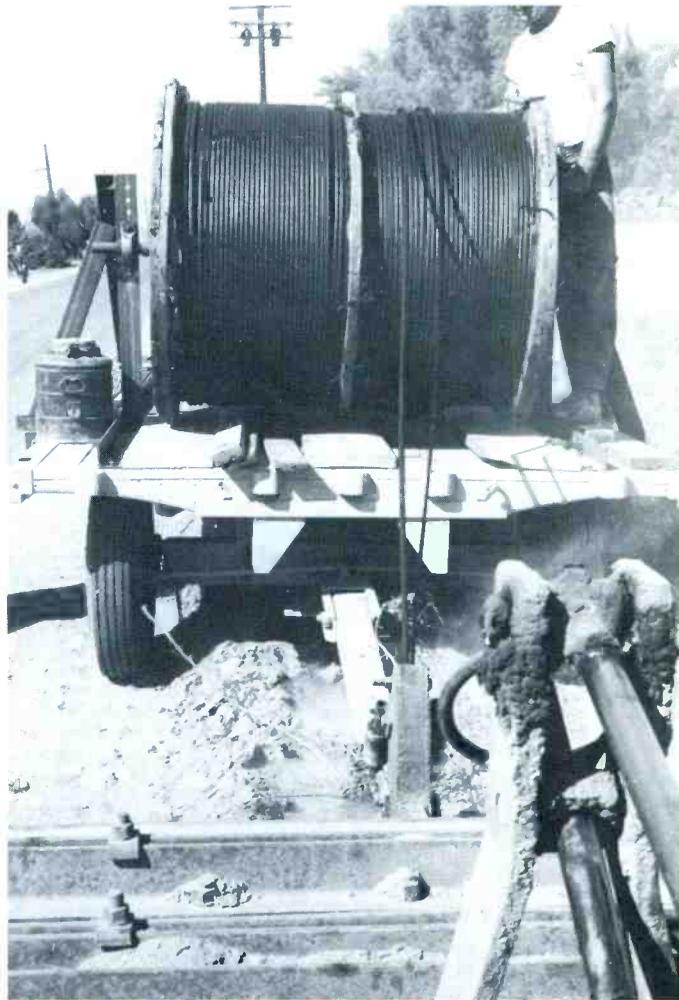


DK61 Series

for installation equipment is a consideration, as is the nature of the soil itself. Negative considerations are therefore minimal in flat, sandy-soiled areas where extended runs are possible.

While experience of the authors indicate little effect on buried cable from chemical makeup of the soil, it might become a factor in some areas. In the Imperial, California system, we might note, a trunk span has been buried under a large cattle feeding yard. But despite the high acidity of the soil, no deterioration of electronic characteristics has been observed in five years of operation.

Amplifier locations above ground might prove to be weak links in buried plants, although high quality housings are available designed specifically for this application. Where the cable rises out of the safe depth, there may be water,



Cable runs underground smoothly at reasonable tractor speed. Four-wheel trailer carries cable spools for custom-built plow.

condensation, high acidity or alkalinity which could damage the line over extended periods.

Another problem encountered in buried construction is the possibility of damage to other buried lines or other types of underground equipment. Both the cost of such damage and the public relations aspect of this possibility deserve consideration.

Since cable laying is a one-time operation, the cost of machinery may prove disadvantageous if total cost must be applied against one installation. Availability of such equipment, along with amount of use for it, will be a prime consideration in many cases.

Experiences of the authors indicate that burying cable need not be expensive in many instances. Under proper conditions, it is possible to install a buried plant more rapidly

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Buried cable installation proceeds rapidly in long trunk runs through open, sandy-soiled country.

than aerial lines. System manager Marvin Jones, for example, reported that installation of 37,000 feet of 1/2-inch jacketed foam flex cable between El Centro and Calexico, California took only ten hours. Even this rate of installation can be bettered. When Mr. Jones supervised the job mentioned, the cable came in 1,000-foot lengths. Today the availability of much greater continuous lengths eliminate many of the time-consuming splices.

For the El Centro-Calexico run, a specially designed burial plow was built (see photos and figure) to be hydraulically operated from a crawler tractor. A four-wheel trailer was hitched behind the plow, and carried six spools of cable on steel jacks. Commercially built burial units are available, incorporating extensive experiences in telephone line burial.

One menace unique to buried plants is the appeal of cable



Commercially-built units, such as the ATECO plow shown here, require small crew; provide "plus" features such as steerable plow and hydraulic loading spool carrier.

to gophers. Inserting the jacketed cable into plastic tubing is considered ample protection from these coax gourmets.

The problem of adequately protecting splices in buried lines has been met by several methods, as well as by specially designed products now available to operators. In the installation previously mentioned, experimentation led to the use of a mold which could be placed around such splices and poured full of hot paraffin before burial.

The balance of advantages versus problems encountered in going underground can best be judged by starting with the expected benefits of buried installation under ideal conditions (i.e. long runs in flat, sandy country where aerial plants are subject to extreme weather conditions). As projected disadvantages of the actual situation are added up and weighed against the ideal situation, the net benefits or disadvantages can be more clearly evaluated. In an increasing number of systems, operators are likely to find buried cable installation well on the plus side of such a comparison. □



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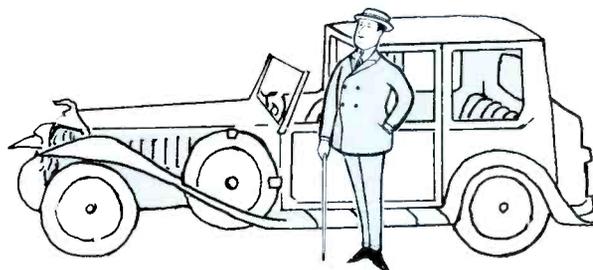
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BURAS VIDEO vs. HURRICANE BETSY

*Photos courtesy Jim Davidson,
Davco Electronics*

On September 9, 1965, Buras Video Inc. had just energized part of its newly-built plant. About 100 subscribers were receiving service. On September 9, 1965, Hurricane Betsy hit Buras, Louisiana — hard.

The story of Buras Video reflects the drama of that entire community since the hurricane hit: appalling loss, followed by energetic and optimistic reconstruction.

The Buras system is owned by Virgil and H. E. Jackson. As originally built, it was an all-band plant using Entron equipment and a Davco "functional design" head-end. Betsy took down 75% of the aluminum-sheath cable, submerged all 40 LHR-45 trunkline amplifiers, and laid waste to the head-end facilities.

On January 8 of this year, just four months later, the reconstructed system was energized — with head-end equipment, new Weather-Scan, and 32 of the original amplifiers!

The Buras community and Buras Video are unique in many ways. System builder (and rebuilder) Jim Davidson describes Buras like this:

"It is unlike any other place I know of. Most people think the mouth of the Mississippi is at New Orleans, but this is certainly not true—accounting for the unusual geography that made CATV feasible in the Buras area. The mighty river extends in a southeasterly direction for about 100 miles from New Orleans, through swamplands that form a peninsula into the Gulf of Mexico.

"Parallel and very close to the river are a levee, a railroad, and a highway. There are very few side roads or streets, and those that exist are short. In other words, one must envision this as being a long thin town stretched out for miles and miles along State Highway 23.

"The resulting CATV system consists of about 30 miles of straight trunk line. Most of the feeder line parallels the trunk; however, there are a few lateral feeders.

"Dry land is at a premium there, and the long strip adjacent to the levee serves as the artery of all traffic and communications—including television signals via CATV."

As the photos taken by Jim Davidson clearly illustrate, rebuilding of the



Homes of the Buras community piled on the main highway by Hurricane Betsy.



No communications pole lines remained intact—all CATV amplifiers were submerged.



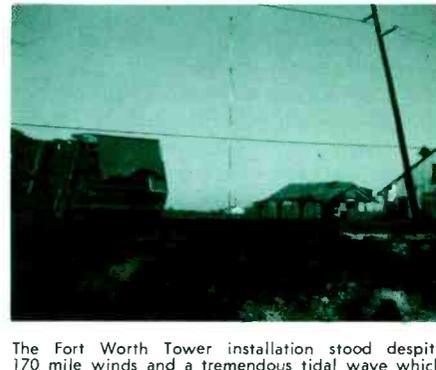
Enough weather for a lifetime—in just a few hours!



The Buras Video office after Betsy. Note trunkline on the ground in foreground.



One of the few undamaged pole locations, with buildings washed up around it. Dan's Barber Shop was in operation when photo was taken!



The Fort Worth Tower installation stood despite 170 mile winds and a tremendous tidal wave which wiped out chain-link fence at its base. Salt water and sand in Betsy's high winds blasted all paint off the tower!



Hurricane Betsy left little for anyone to work with.

Buras cable service meant overcoming many physical obstacles, as well as the disappointment of seeing the new plant destroyed before it was fully energized.

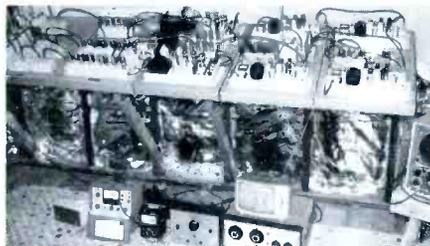
In addition to the damage mentioned above and shown in the photos, the Davco crews (based in Batesville, Arkansas) were unable to find public

little the storm left of the system required painstaking repair and checking. Only the head-end equipment, incidentally, was insured against the loss.

Though it will still be some time before all facets of life are back to normal in the Buras area, the residents



75% of the cable was beyond salvage—only part is shown.



New Davco "functional design" head-end equipment was installed.



Virgil (left) and H. E. Jackson announced opening of their rebuilt system via Weather-Scan audio.



Davco field engineer Tommy Kinion applies finishing touches to rebuilt and re-installed Entron trunk amplifier.

accommodations even seven weeks after the storm when they began the rebuilding operation. Damage to utility lines and other property, and an unbelievable amount of debris in the area, hampered many phases of salvage and installation work. Even what

do have their new cable service. Service in the public's interest is the heart of CATV. Only a desire to render such service could have provided sufficient motivation for the Jackson brothers to pick up the pieces and start all over in Buras. □



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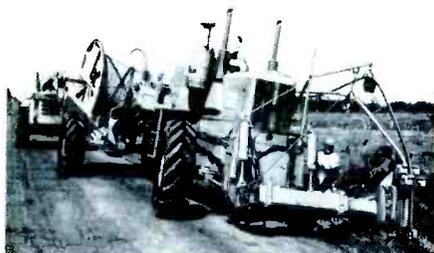
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Broadway Maintenance Corp.; Long Island City, New York 11101, ph. (212) 286-3700; CATV design, installation, and maintenance.

Burnup & Sims; P.O. Box 2431, West Palm Beach, Florida, ph. (305) 832-1607; Services include power and telephone plant re-arrangement and tree trimming. Also handle complete construction.

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CAS Manufacturing Co.; P.O. Box 47066, Dallas, Texas 75207, ph. (214) BL 3-3661; Construction capabilities for new system turnkeys and expansion or modernization of existing systems.

CATV Equipment Co.; 144 Lakeside Avenue, Seattle, Washington 98122, ph. (206) EA 9-1798; Specialists in all-band systems, providing complete construction services, layout, equipment and installation.

Clearvision Construction Company, Inc.; Press Building, Binghamton, New York 13901. All phases of system construction.

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.)

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

Electroline Television Equipment, Inc.; 16 East 23rd Street, New York, New York 10010, ph. (212) OR 3-5670; Engineering and construction services for CATV firms.

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*By Cliff Collins, President
Columbia Basin Microwave, Inc.*

Each winter the storm fronts sweep in from the Pacific Ocean and down from the Arctic to heap deep blankets of snow across the rugged Cascade Mountains. Gale force winds hurl snow, ice and rain across jagged peaks, piling the snow into drifts of 30 feet or more. In the Cascades, snow falls to a level depth of 12 to 20 feet, totally obliterating access roads. Wind and snow also bring down trees to block roads and fire trails through the mountains. More often than not, these conditions are coupled with sub-zero temperatures.

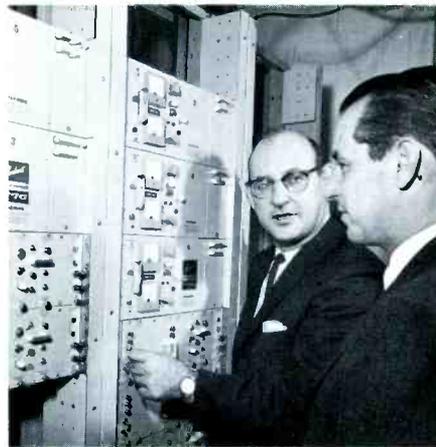
For the microwave operator whose network of repeater stations punctuates the high peaks of this mountain country, a normal winter can be a series of crises, as equipment outages occur at the remote locations. To provide our many common carrier customers with a high quality, consistent service, Columbia Basin Microwave has installed new transistorized microwave equipment incorporating elaborate alarm systems and auxiliary power units. For

One of the larger common carriers serving CATV systems in the country, Columbia Basin Microwave covers about half the state of Washington with its transmission facilities. Counties served include Walla Walla, Yakima, Benton, Franklin, Adams, Grant, Chelan and Okanogan.

In 1961 when the company was founded by its present co-owners, Mrs. Pat Hughes, secretary-treasurer, and Cliff Collins, president, the company had approximately \$20,000 invested in plant and equipment. Today, its investment is over \$400,000. The firm's monthly gross revenue is now over \$10,000 and this is expected to increase several times over the next five years.

winter time maintenance the company utilizes two Kristi snow tractors and a 1 1/2 ton army-type Weasel. In case of vehicle breakdown, maintenance personnel have to resort to snowshoes, dragging a toboggan loaded with gear and supplies.

Columbia Basin Microwave, Inc., Ephrata, Washington, is a common car-



Cliff Collins, president of Columbia Basin Microwave, Inc., left, and Richard Lawrence, chief engineer, examine the Lenkurt microwave installation in Wenatchee, Wash., which serves Consolidated TV Cable in Wenatchee.

rier serving 11 CATV systems and one educational TV broadcast station. To overcome adverse winter weather conditions in the rugged mountain terrain, and to provide better service with lower maintenance costs, the firm recently replaced a tube-type microwave system. New transistorized Type 76 TV equipment was installed by Lenkurt Electric Co., Inc., San Carlos, Calif. The installation of the solid state gear has resulted in a 50% increase in the quality of television transmission and we are now confident that Columbia Basin Microwave provides an "A contour" quality picture to all of our customers.

Maintenance Costs Cut

In addition, the maintenance cost on the new transistorized equipment is

under half what it was on our old tube system. Since some of the microwave sites are located on remote mountain tops, which are accessible only by snow vehicles in the winter, it was essential to have equipment operating with little or no maintenance. For example, the sites at Mission Ridge (elevation 6,754 feet) in the Wenatchee Mountains, and Ravens Roost (elevation 6,200 feet) in the Cascades, are fairly accessible in the summer. In the winter, it's another story!

It is readily apparent that we must have microwave equipment that will provide uninterrupted service. The newly installed system is providing a 99.99 per cent transmission reliability. The manufacturer's use of transistorized, tested components assures dependability. This dependability, coupled with the system's over-all transmission reliability, makes the probability of an outage very remote. However, for additional protection, we carry essential modules in inventory.

Maintenance on the system is ex-



Microwave antenna atop the Consolidated TV Cable Co., Wenatchee, Wash., receives television signals from Columbia Basin's Mission Ridge site.

tremely simple. When alarms indicate equipment failure, our Ephrata office sends maintenance personnel to the station involved. Using built-in jacks and meters, the faulty module is quickly located and replaced. Within 24 hours, a unit to restock the inventory will be on the way from Lenkurt, and



Ravens Roost microwave site in the Cascades at 6,200 feet elevation. Third floor of the building houses the microwave antennas.

we will return the faulty module to the factory for repair.

Unique Power Facility

Since commercial power is not available at our Mission Ridge site, we had to install a unique power facility to operate the microwave equipment. The station is operated from a 48-volt d-c battery bank. Power is provided by a primary 10-kilowatt diesel generator. In case of a failure of the first diesel generator, a second 10-kilowatt diesel generator is automatically switched on for power. Should both diesel generators fail, a 10-kilowatt propane gas generator is automatically switched on as a power source. Should it fail, the battery bank will operate the station for 12 hours.

Fuel storage at Mission Ridge holds 6,300 gallons of diesel oil and 1,000 gallons of propane gas. The 6,300 gallons of diesel oil, which is delivered to the site in the summer months, is enough to operate the station for a year. The 1,000 gallons of propane gas is capable of operating the site for six weeks.

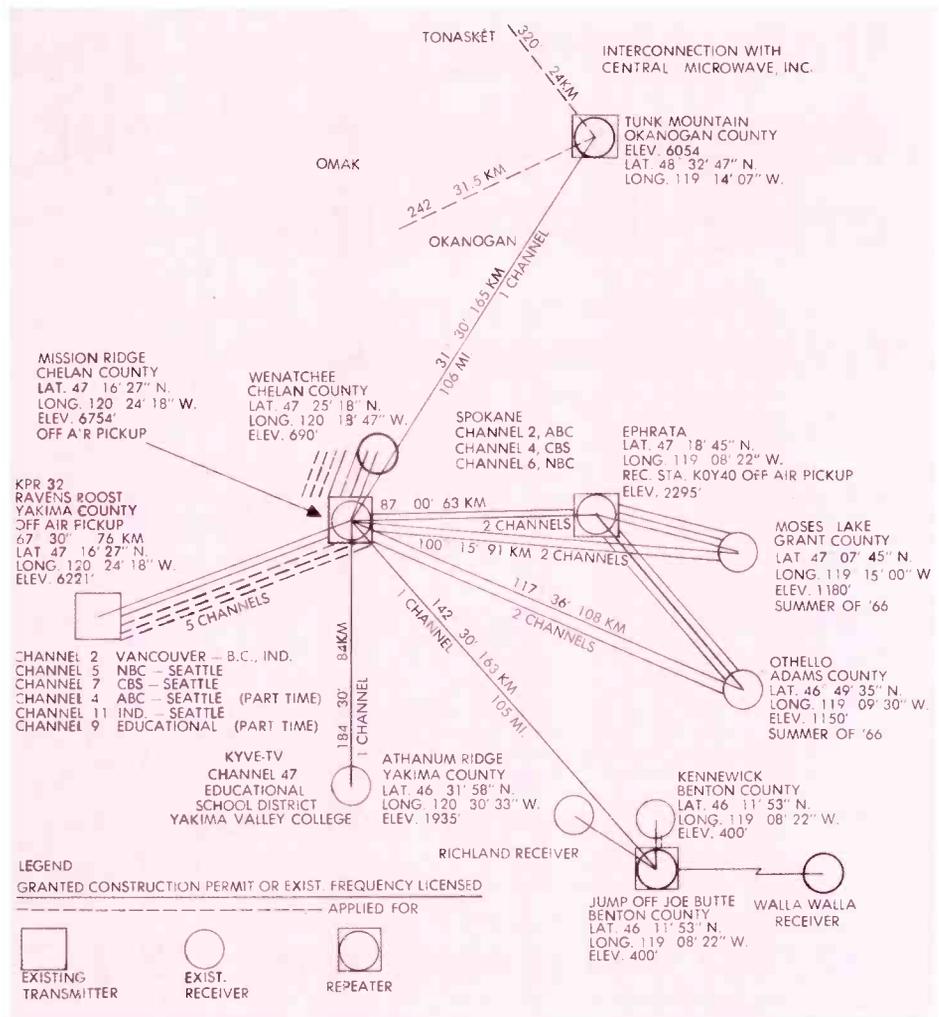
Physical Plant

The equipment buildings at Mission Ridge and Ravens Roost are essentially the same. Both are designed to withstand weather and snow load, sturdily constructed of trussed steel and concrete block. Each has three floors. The first floor houses the power equipment and living quarters; the second floor contains the microwave terminals and the third floor, surrounded by plastic panels, houses the microwave parabolic antennas and sleeping quarters.

Microwave System

Hub of the Columbia Basin Microwave system is Mission Ridge in Chelan County. An off-the-air pickup facility at the site receives three Spokane network stations (channel 2, ABC; channel 4, CBS; and channel 6, NBC) and feeds them into the common carrier system. Tied into the hub repeater station over a 47.2 mile microwave path from the west is another off-the-air pickup facility at Ravens Roost. This facility brings in six channels from Seattle, Washington, and Vancouver, British Columbia.

From the microwave hub repeater station at Mission Ridge, eight channels are transmitted over a 12-mile path to Consolidated Television, Inc. in Wenatchee for distribution to its 1,600 subscribers. Two channels of TV are transmitted from Mission Ridge over a 39-mile path to Empire Television, Inc., Ephrata, a CATV serving 1,400 subscribers. At Ephrata, site of another off-the-air pickup, the three



Spokane channels are microwaved over a 22-mile path to Moses Lake Television, Inc., a Moses Lake CATV serving 3500 homes. Moses Lake also re-

ceives two additional Seattle channels over a 56.5 mile microwave path directly from Mission Ridge. The cable (Continued on page 73)

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The horizontal sweep rate of 60 cps, derived from the power line, is available as a sine wave at the front panel for connection to the oscilloscope. Use of the sine-wave horizontal permits oscilloscopes to be fed by available local line voltage for summation sweeps of large distribution systems.

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RF switcher (dc to 900 mc) 4102

Electronically-actuated, high-speed switch, solid-state, permits two signal tracings to be simultaneously displayed on an oscilloscope, either superimposed or alternately, at the rate of 30 cps. Either tracing can be seen independently for making direct, immediate comparisons between input and output voltages of any circuit under test for precisely measuring VSWR, amplifier gain, or attenuation and other applications involving equipment performance evaluation against given standards. Provision for 360 degree phase adjustments.

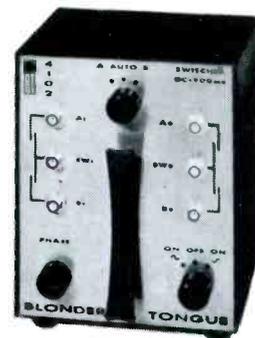
Delay line (dc to 900 mc) 4107

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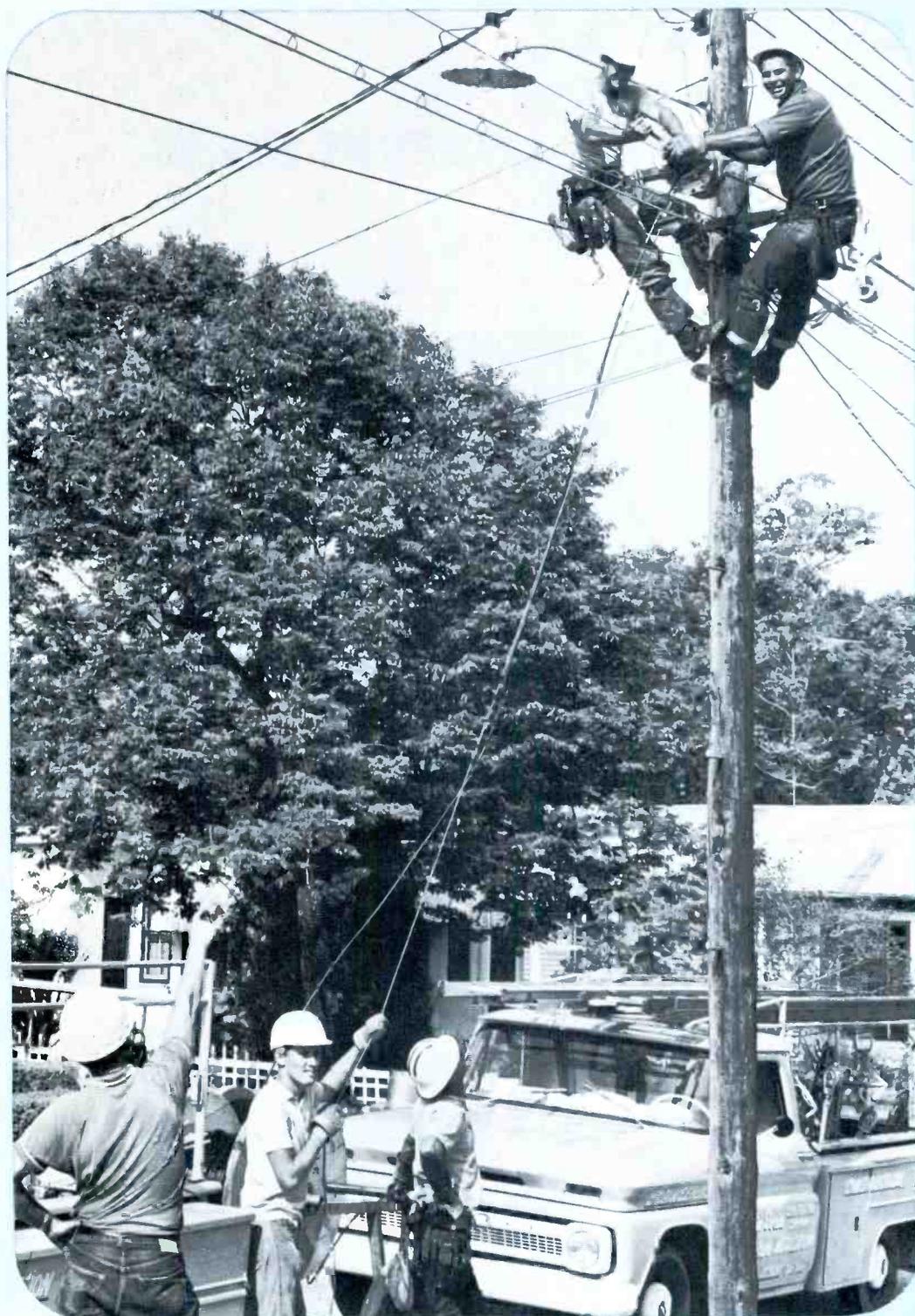
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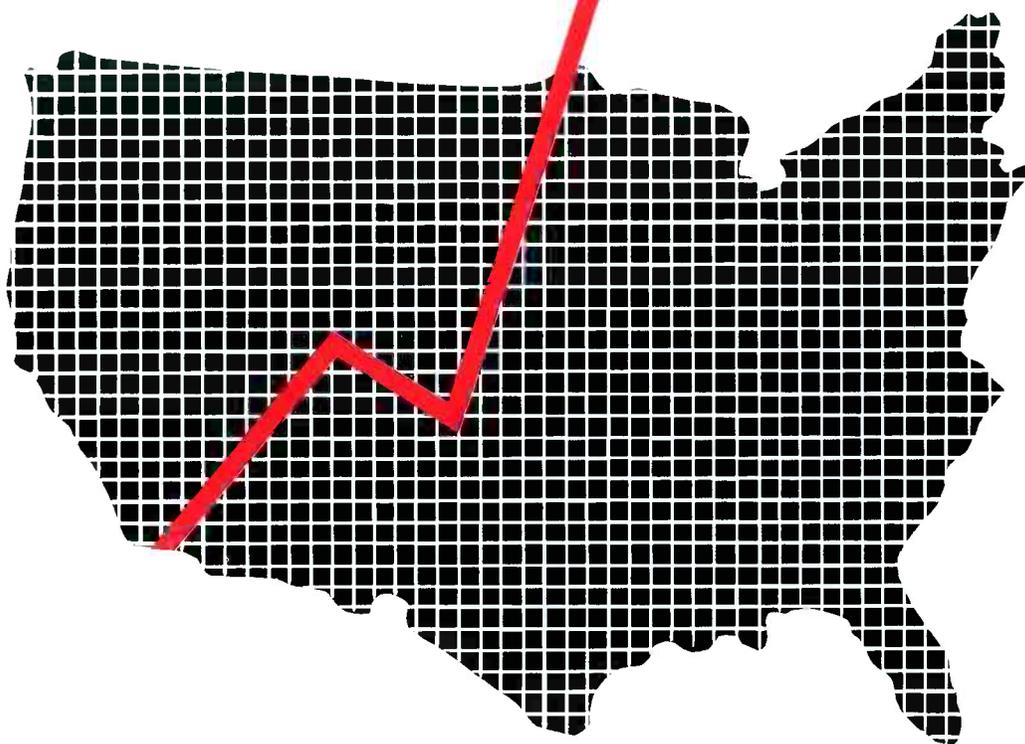


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A PROPOSED QUALITY FACTOR

FOR REPEATER AMPLIFIERS IN CATV SYSTEMS

By Brian L. Jones

In CATV systems with long trunk distances the attenuation of the coaxial cable is overcome by properly spaced repeater amplifiers having transfer characteristics complementary to that of the cable. One limitation on the length of such a system is the thermal noise level which rises linearly with the number of amplifiers. In order to maintain an adequate signal to noise ratio it is necessary to use repeater amplifiers having low noise figure and ability to operate at high output powers with negligible cross talk between channels or generation of spurious signals.

The measurement of an amplifier's noise performance is relatively easy and unambiguous. Unfortunately, this is not the case with output capability since the degradation of television picture quality due to cross talk or other interference is a subjective phenomenon. Resort may be had to the results of A. D. Fowler¹ who evaluated the reactions of many viewers to video cross talk. Fowler established the now widely used criterion that cross talk should be -58 db relative to the required video signal amplitude.

However, in the case of community antenna systems using as many as 12 modulated carriers, the cross modulation occurring on one channel will depend upon the time relations of the horizontal synchronizing pulses. These pulses represent the maximum modulation amplitude and cause the well known "windshield wiper" effect when cross-modulating another carrier. The cross modulation is greater when the interfering carriers are in synchronism, a situation which obtains when all the transmitters are located in a single metropolitan area.

Cross modulation may not be the only factor limiting the output power of a trunk amplifier. It is possible to design amplifiers with cancellation effects which reduce the cross modulation considerably. In fact, many transistor amplifier designs inherently tend to cancel the cross modulation.^{2 3 4} When this is the case, more subtle effects degrading the picture quality become important. Among these are second and third order heterodynes, amplitude compression envelope delay and differential phase. Specifications which do not include these distortions, implicitly or explicitly, do not provide enough information for the design of a high quality system.

When many identical amplifiers are operated in cascade, the distortion in-

creases with the number of amplifiers. As the system length increases it is necessary to reduce the output power of each amplifier in order to maintain distortion products below acceptable levels. It is well known⁵ that third order distortions grow at a faster rate than second order distortions and in a long system set an upper limit to amplifier output. In the following, signal power is given in dbmv is referred to 1 mv across 75 ohms.

Noise Considerations

The noise voltage appearing across a 75 ohm resistor is usually taken as -59 dbmv at a 4 mc bandwidth and a temperature of 290° k. In order to

obtain the apparent noise in the input circuitry of a trunk amplifier, it is necessary to add the noise figure of the amplifier to the noise level viz:

Equation 1

$$N^1 = F-59 \text{ dbmv}$$

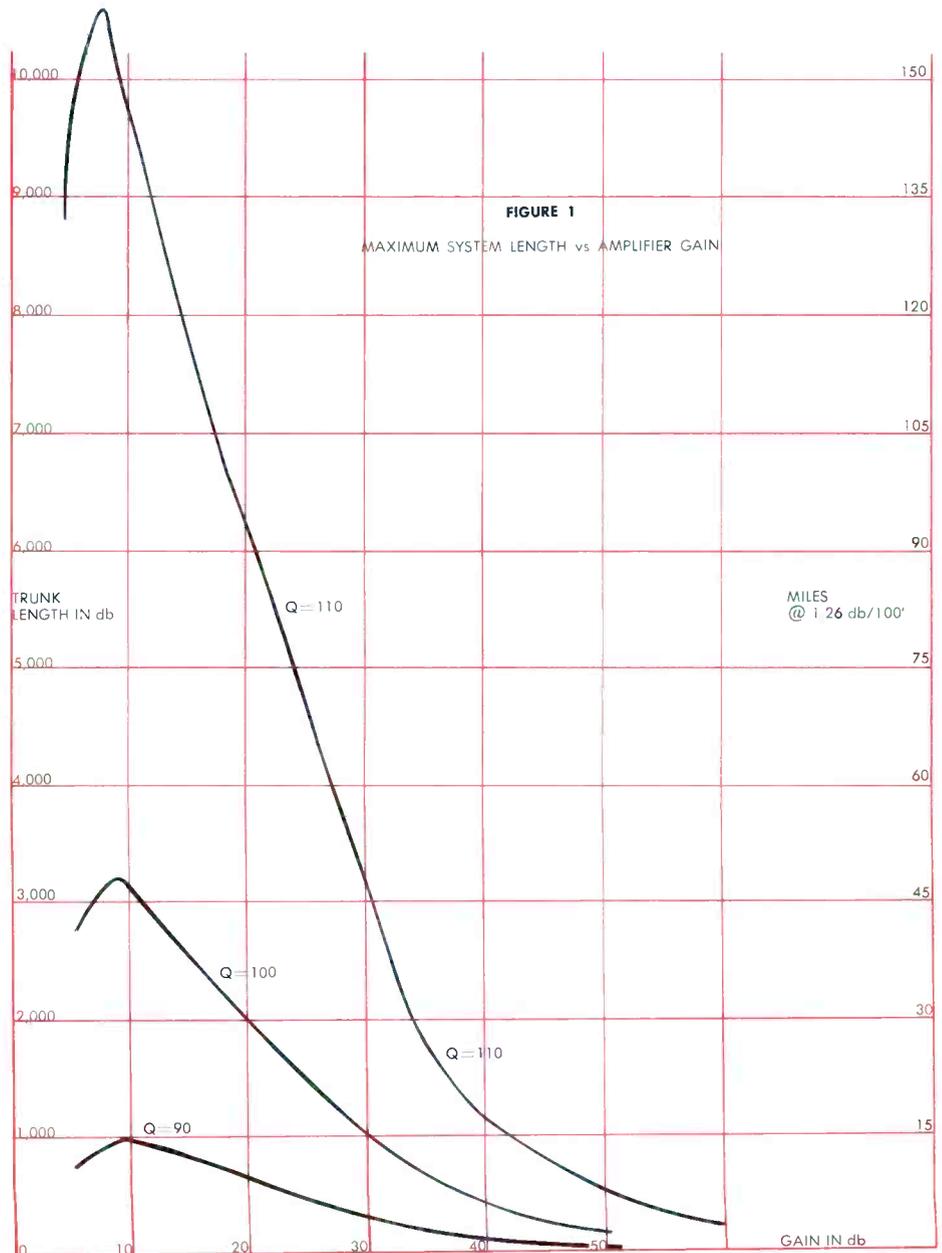
If the amplifier is the last of a cascaded chain, the individual noise contributions of the amplifiers add on a power basis, i.e.,

Equation 2

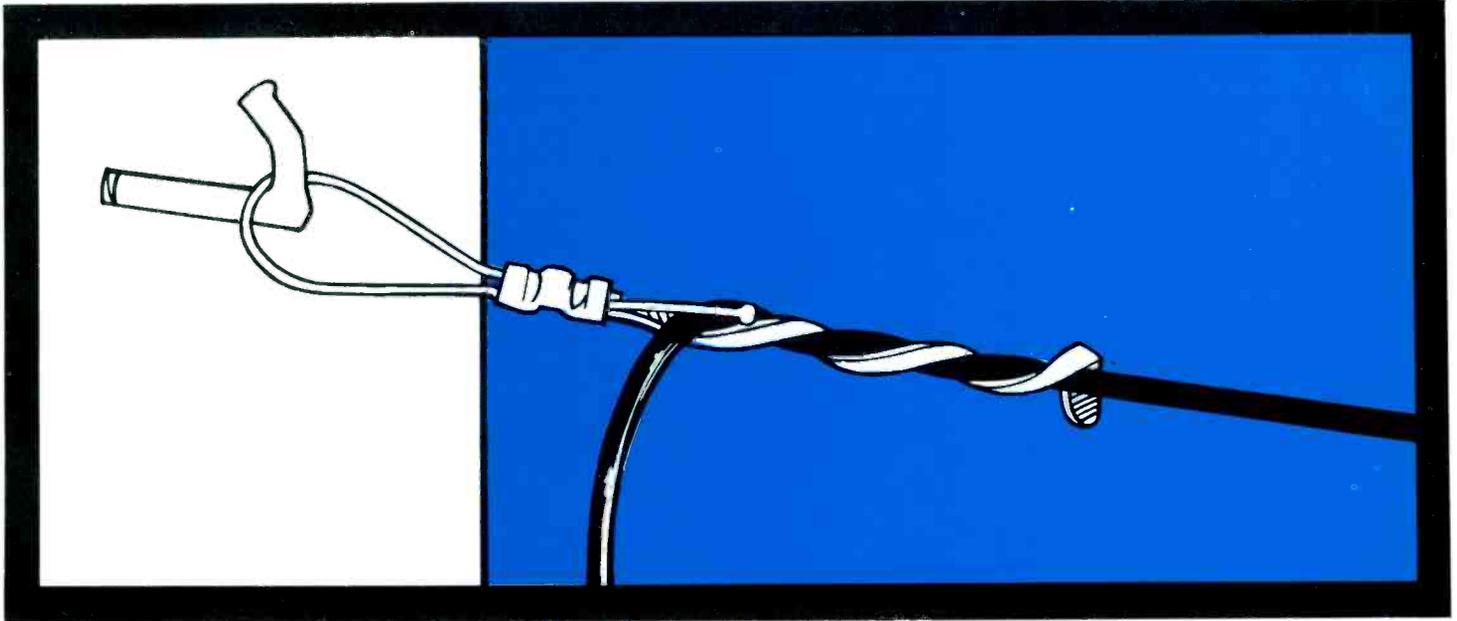
$$N_k^1 = F-59 + 10 \log_{10} K$$

where K is the number of amplifiers in cascade, all having a noise figure of F db.

It is required that the signal level,



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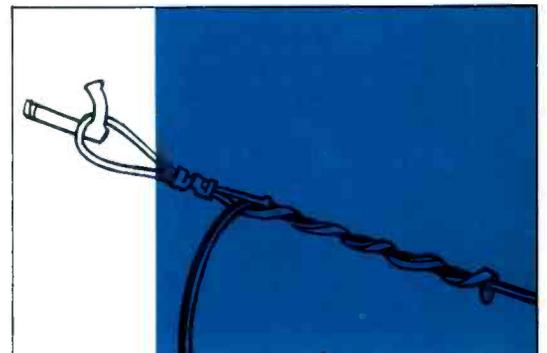
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S_K , at the input to the K^{th} amplifier be greater than the noise level, N_K^1 by the required signal to noise ratio M . Thus:

Equation 3

$$S^K \text{ (dbmv)} - N_K^1 \text{ (dbmv)} = M \text{ (db)}$$

Output Level Considerations

The output level, V_{ox} , required to present a signal of S^K to the input terminals of the last amplifier can be calculated from the spacing, which is the same as the amplifier gain, A .

Equation 4

$$V_{ox} = A + S_K$$

In order to keep cross modulation products to the desired level, it is necessary to derate the amplifier output on a power basis as the number of amplifiers is increased. If the output level at acceptable cross modulation is V_o for one amplifier, the output level level for K amplifiers becomes:

Equation 5

$$V_{ox} = V_o - 10 \log_{10} K$$

Combining equations 2, 3, 4, and 5 yields

Equation 6

$$V_o - 10 \log_{10} K = A + M + F - 59 + 10 \log_{10} K \text{ or}$$

$20 \log_{10} K = V_o - A - M - F + 59$
The quantity $(V_o - F + 59)$ consists only of measurable characteristics of the amplifier: output capability and noise level. This will be called the amplifier "quality factor", Q . Using this substitution (6) can be written:

Equation 7

$$20 \log_{10} K = Q - A - M$$

The number of amplifiers in a trunk run is equal to the total attenuation, L , divided by the gain A , when both are expressed in decibels. Therefore, from equation 7,

Equation 8

$$20 \log_{10} \frac{L}{A} = Q - A - M$$

$$\text{or } 20 \log_{10} L = Q - A + 20 \log_{10} A - M$$

It is of interest to calculate the gain A , which will give the maximum cascaded system length. This is done by the usual method of differentiation and setting the derivative equal to zero and yields:

Equation 9

$$A = 8.68 \text{ db}$$

Gain As A System Specification

If it is assumed that amplifiers may be manufactured with arbitrary gain, and that the Q factor does not depend upon the gain, then it is possible to calculate the variation of maximum system length with the gain. Equation 8 may be rearranged:

Equation 10

$$L = A \cdot 10^{20 \frac{1}{20} (Q - M - A)} \text{ db}$$

As noted above, this expression is maximum for a gain of 8.7 db. Figure 1 is a plot of L versus A with amplifier Q as a parameter. M , the signal to noise ratio at the end of the system, is taken to be 40 db. The total length, in miles, for a typical aluminum cable at 1.26 db/100 ft. at 216 mcs is also shown on the ordinate.

As a typical problem, assume that amplifiers are to be cascaded for a distance of 30 miles, 2000 db, with an overall signal to noise ratio, M , of 40 db. It is clear from Figure 1 that an amplifier with a Q of 90 cannot be used in such a system. An amplifier with a Q of 110 could be used at a gain of 33 db or an amplifier with a Q of 100 could be used at a gain of 20 db. If a safety margin of 3 db were used in each case, the number of amplifiers would be:

$$Q = 100 K = \frac{L}{A} = \frac{2000}{20.3} = 118$$

$$Q = 110 K = \frac{L}{A} = \frac{2000}{30} = 67$$

Many systems are designed for an M of 50 db. Equation 10 shows that increasing this specification has the same result as decreasing the amplifier Q . It follows that the curve for a Q of 100 in Figure 1 is also valid for a Q of 110 and an M of 50. The other curves can be similarly interpreted.

Equation 10 may be further re-arranged to give the maximum number of cascaded amplifiers for a given performance:

Equation 11

$$K = \frac{L}{A} = 10^{\frac{1}{20} (Q - M - A)}$$

Conclusions

It has been shown that maximum trunk length for a given signal to noise ratio is a very sensitive function of amplifier performance and gain. An amplifier quality factor, Q , was defined and is proposed as a standard of amplifier performance. The effect of maximum usable gain upon system economy was considered.

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BY J BENNETT

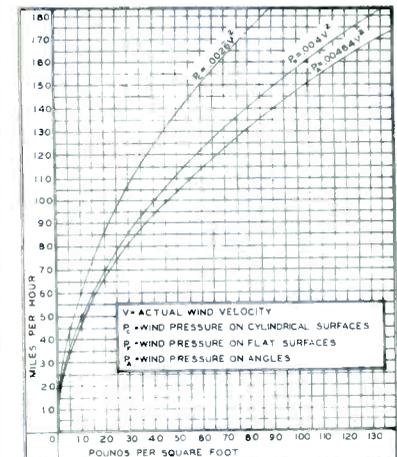
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To establish a standard, the drag on a flat shape is used in tower terminology. The tower designer modifies this with a shape factor to obtain the actual drag for the shape being utilized in the tower. The drag for a pipe or round rod is approximately 33% less than a flat strap of the same dimensions. The angle iron has about 16% more drag than a flat strap.

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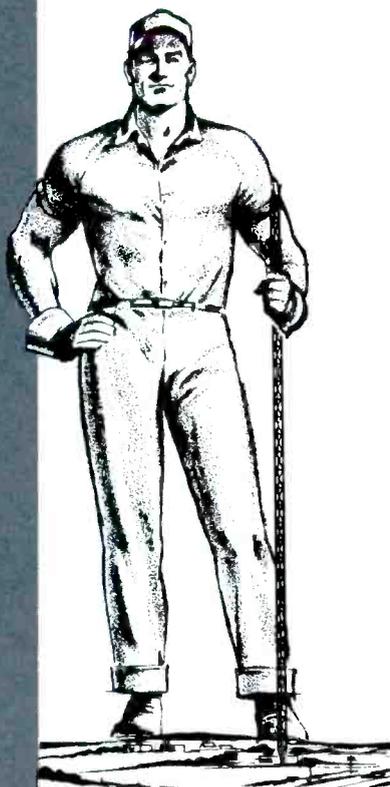
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TURNKEY

CATV SYSTEM SPECIFICATIONS

Milford G. Richey
Vice President, Engineering
Ameco, Inc.

(The following specifications not only give a detailed account of what an operator should expect from a turnkey contractor, but also represent a useful guide for system personnel. At least two large group owners of systems have endorsed Mr. Richey's specifications as construction and maintenance guides for their system's personnel.)

SCOPE:

This specification is to provide a set of standards for a community antenna television system so that such system will conform to the highest present state of the art in the field of closed circuit television transmission. These specifications, as set forth, are to be used as a guide to the design and construction of the system which will have the ability to provide distribution of television signals, FM signals, and locally originated programming.

GENERAL:

The community antenna television system as defined herein will include all necessary electronic equipment, power supplies, controls, coaxial cables, fittings, and other parts, components and equipment necessary to provide a complete and operational system.

The system will be installed in accordance with the best engineering practices. The installation will conform to the National Electrical Safety Code, Bureau of Standards Handbook #130 and Bell System Practices which govern joint attachment practices and will conform to all city and county codes and ordinances.

The system design and layouts will be on maps with the scale not less than one inch equals 200 feet if available. System maps will clearly indicate the type of cables, electronic equipment, and other components.

All electronic equipment utilized in the system will be supplied with complete operating instructions and circuit diagrams.

The transmission and distribution system will be so engineered as to provide for the distribution of all television signals on very high frequency

channels 2 through 13 and will also have the ability to distribute FM radio signals in the frequency range of 88 to 108 megacycles.

SYSTEM CAPABILITIES:

The system will be capable of delivering all NTSC color and monochrome signals to standard EIA television receivers both monochrome and color and FM receivers without modifications or other attachments.

The signals will be distributed to individual subscriber's television sets without noticeable degradation of color fidelity, picture intelligence, audio distortion, or cross channel interference.

The system will be capable of delivering a signal level of two millivolt, (+10 to -4 db) as measured across 300 ohm receiver terminals to any individual television receiver.

The system will be designed and rated for continuous 24 hour daily operation under temperature ranges encountered in the area. Trunk line cables will have a minimum number of splices as is practical. This cable shall not be tapped except at those points required to provide insertion of electronic equipment for amplification and for bridging devices to electronic or passive distribution equipment.

Feeder coaxial cables will be utilized to provide tapoffs to individual subscribers. The installation of such feeder lines will be made in such a way as to permit "mid-span" subscriber connection. (Unless specified in the construction agreement Supplier/Contractor is not responsible for installing house drops.)

The system signal-to-noise ratio will not be less than 40 db as measured between any point in the system.

The hum modulation of the picture signal observed at any point throughout the system will be less than 5%. The input voltage standing wave ratio of electronic and passive devices in the system will have a ratio of 1.4 to 1 or less except in the case of tapoffs.

Cross-channel intermodulations components will be such that no visible components shall appear on a blank white screen on any channel of the

system with all other channels operating with modulation at their rated levels.

The radiation of the coaxial cables and electronic equipments will be less than 10 microvolts per meter at 10 feet as measured across 75 ohms.

Ghost and echo signals are to be a minimum of 15 db below the desired signal at any point in the system. The peak to valley response of the system will be such that the amplitude variation of the signals shall not deviate more than 2 db across any 6 megacycle segment of the system.

The signal level of all feeder lines will have not less than 16 db at the end of the line.

The remote power supplies for the electronic equipment of the trunk line will contain self-regulating transformers to maintain all voltages applied to the amplifier within 2% for AC line variations of 100 to 130 volts.

At all power stations electronic equipment will be provided with lightning protectors which are self healing.

Fuses or circuit breakers will be provided in the equipment load circuits for protection of the equipment from damage due to overload and/or excessive heat.

All components will have a nominal impedance of 75 ohms and this shall include all coaxial cable connectors.

All trunk line amplifiers will be so designed into the system that there is a 3 db minimum of reserve gain at the point where this amplifier is utilized.

The trunk line automatic gain control amplifiers will be fully transistorized, and shall have internal automatic slope control circuitry to provide compensation for the effects of temperature variation of the coaxial cables. External thermatic equalization devices will not be used.

Automatic level control circuitry will be provided in the trunk line electronic system.

All coaxial cable connectors will be of the solderless type with nominal impedance of 75 ohms. All RF current carrying surfaces will be silver-plated brass, in order to insure optimum RF

conductivity. All connectors to be used with aluminum sheathed cables will be made of aluminum to prevent corrosion caused by mating of dissimilar metals.

All aluminum sheathed cable connectors will be of the type having an "O" ring on both the thread side and aluminum cable side of the connector for positive moisture protection.

Bridging amplifiers will be fully transistorized and shall have an input capable of insertion into a trunk line with not more than 1 db loss. Line extension amplifiers will be of the all-band transistorized type capable of amplifying signals throughout the specified frequency range. They will be used for the purpose of extending feeders.

Amplifiers of the self-contained weatherproof type capable of strand mounting will be used for line extension.

All coaxial cable feeder lines shall be terminated in their characteristic impedance of 75 ohms.

Each power supply will be equipped with a suitable RF power line filter which will provide not less than 36 db of attenuation to all signals transmitted in the system.

WEATHER ENCLOSURES:

Electronic equipment will be protected against weather by a weatherproof housing suitable for cross-arm mounting, or strand mounting.

All such equipment will be installed so as to be readily accessible for maintenance. No equipment will be placed in such a manner as may necessitate its removal in order to gain access to other equipment.

All such equipment will be located so as not to interfere with the climbing space or servicing of other pole mounted equipment.

At power locations, each housing will be constructed of aluminum or of any suitable corrosion resistant material. To reduce overheating due to direct sunlight, all housing will be coated with a reflective paint, and will be properly ventilated.

All cabinets will be properly bonded to the messenger strand and will be properly grounded.

COAXIAL CABLE:

(Will be aluminum sheathed type unless otherwise specified by customer).

All coaxial cables used in the system will have a nominal characteristic impedance of 75 ohms over the entire frequency range to be utilized in the system. The impedance shall not vary more than plus or minus 3 ohms.

The attenuation/frequency characteristics shall be such that the attenuation will not vary more than plus or

minus 1 db in 25 db from the design frequency response characteristic of the cable.

Trunk and feeder cables will have solid copper center conductors.

All coaxial feeder cables will be of the aluminum sheath type.

Dielectric materials will be of a cellular or foamed polyethylene material.

All materials used in the manufacture of the coaxial cables will be of a virgin nature and no reprocessed or reclaimed materials will be used.

INSTALLATION AND CONSTRUCTION:

Pole line construction will be in accordance with standard utilities practices, utility pole line agreements, franchises, State statutes and regulations, City and County ordinances, Edison Electric Institute Handbooks M-12 and E-3, Bureau of Standards Handbook #130 and the National Electrical Safety Code.

High strength $\frac{1}{4}$ " seven strand messenger wire will be used for average pole spans. Where spans exceed 150 feet, the messenger wire used will be at the discretion of field construction engineers.

Lashing wire will be .045 inch diameter, stainless steel. The rate of spiral should not be less than 1,200 feet of wire to 1,000 feet of messenger.

Hardware will be as follows:

$\frac{5}{8}$ " machine bolts (for suspension clamp attachments)

$\frac{5}{8}$ " machine bolts (for equipment location attachments)

$\frac{5}{8}$ " thimbleye bolts (for dead-ends and guys)

Three (3) bolt-type suspension clamps (Hubbard #8903), or equal

Two (2) strand guy clamp, bolt-type (Hubbard #7448), or equal

Strand ground clamp

$\frac{1}{2}$ " x 6' copper-clad steel or copper ground rods

#6 solid, soft-drawn copper wire, (bonding and grounding)

$3\frac{1}{2}$ " x $4\frac{1}{2}$ " x 4' wooden cross arms (for mounting and supporting equipment cabinets)

#8 two (2) wire service entrance weatherproof cable (from service head to fused cutout cabinet)

All strand will be installed on the field side of the pole; except when the telephone facilities are already installed on the street side of the pole, the television attachment will also be on the street side. The television strand will always be attached on the side of the pole to which the telephone strand has been attached, be it field or street side.

All attachments to power utility secondaries, which are made to power television transmission system equipment, will conform to the standards and specifications governing such attachments which are defined in the Joint Use Agreement with respective utility. Where such attachment practices are not specified in the Joint Use Attachment Agreement, such power attachments will satisfy the following minimal requirement:

A two-wire #8 weatherproof entrance cable will be used from the service head to the fused cutout cabinet and from the cutout cabinet to the pole-mounted equipment enclosure.

The neutral side of the power drop will be continuous and unfused.

The neutral line will also be bonded to the cutout cabinet, which in turn, will be grounded to a driven earth ground at the pole.

The television strand will be bonded to the telephone strand at the first, the last, and at every tenth pole. All cabinets, housings, fused cutout cabinets, metal socket bases, etc., on a common pole will be commonly bonded to each other and to the TV and telephone strand with a bonding and grounding clamp.

Except where local telephone or utility company specifications differ, all anchor guys shall be effectively grounded and electrically continuous to earth through the anchor.

If the strand at dead-ends is not effectively earth-grounded, it will be so grounded by a length of #6 solid bare copper wire bonded to the messenger with strand ground clamps and the copper wire bonded to a ground rod driven its full length (and 6 inches below the surface) into the earth.

All equipment cabinets, cans, fused cutout cabinets, metal meter socket bases (if required), etc., will be grounded through a length of #6 solid bare copper wire bonded to a minimum 6' ground rod driven its full length (and 6" below the surface) into the earth.

SUBSCRIBER SERVICE DROPS:

(This section is for the guidance of customers only. Unless specified in the construction agreement, Supplier/Connector is not responsible for making subscriber drops.)

A single entry cable will be installed for each building with suitable distribution devices which will divide the signal for distribution to multiple receivers if such multiple connections are required.

The building television attachment will have a clearance from power and

telephone attachments of at least 12 inches. The same clearances will apply along the length of the building run when the television cable parallels power and telephone service wires.

The television service drop will not enter the building through the entrance hole or tube used for entrance of telephone or power service wires.

Cable will attach to the building high enough to provide all required clearances. The other end will be properly secured to the feeder strand or nearby pole. All cable attached to the outside of the building will be in a secure and workman-like manner, using approved hardware devices. Entrance will be made through a hole that has been suitably covered and weatherproofed. Interior cable will be run from the point of entrance to the terminal outlet or outlets without conduit but routed so as to avoid the hazards of damage to the cable and areas adjacent to intense heat. Interior cable will be attached by suitable clamps or staples to floor joists, wall studs and wood trim.

Cable will terminate in terminal boxes for connection to receivers. Directional type taps are preferred for connection to the feed cable. The terminal boxes and taps in combination will provide the following characteristics:

The taps must be compatible with the type feeder cables installed by Supplier/Contractor.

Provide 300 ohm terminals to the receiver.

Meet all system specifications at the 300 ohm output terminals.

Provide isolation between the cable and "hot chassis" receivers.

DESCRIPTION OF THE SYSTEM TO BE CONSTRUCTED:

Strand will be erected on existing poles, or those placed by the purchaser, in the city and certain adjacent areas.

It is desirable to sectionize and feed as much of the system as economically feasible from the Hub. Therefore, distribution trunk and feeders from the main trunk will be held at a minimum.

Trunk cable is defined as those portions of coaxial utilized to feed amplifiers (excluding feeder extension amplifiers) and electronic distribution equipment.

Feeder cable is defined as those portions of coaxial cable which feed no electronic equipment except line extension amplifiers.

Trunk and feeder cables shall be furnished, and multiple lashed throughout the system wherever practical.

Transistorized line extension amplifiers are used in cascade on long feeder lines.

GENERAL EQUIPMENT REQUIREMENTS:

Socket Identification — The type, designation of each tube and/or transistor and the appropriate reference designation will be marked adjacent to the socket on the side of the chassis or supporting structure for identification of the particular device.

All identification markings will be permanent and legible.

Overload protection of primary power circuits will be by direct grounding as provided in NESC specifications.

Protective overload devices will be provided within equipment enclosures for primary circuits and such other circuits as are required for protection of the equipment from damage due to overload and excessive heating. All parts which are likely to carry an overload due to malfunction of circuits, poor adjustments, or other deleterious effects, will be designed to withstand the overload. Where this is impracticable, circuit breakers, relays, fuses or other devices will be included to protect the affected parts. The use of secondary protective devices will be held to a minimum consistent with good engineering practices.

Fusing of all equipment will be adequate in such circuits as B plus or B minus, primary and secondaries of power transformers, etc.

Fusing of the equipment will not be dependent on fuses of a given type having other than average specifications for the type.

Fuses will be easily replaceable and will be mounted in a convenient location to insure a minimum service requirement.

PROOF OF PERFORMANCE:

Upon completion of installation of the system, supplier/contractor will demonstrate to the satisfaction of an authorized representative of the purchaser, by means of the measurements and tests listed below that the system is performing properly and meets the overall system performance specifications as outlined herein. Contractor will make available all equipment necessary to perform these tests.

SYSTEM FREQUENCY RESPONSE

—The frequency response at the extremity of any trunk line shall not vary more than plus or minus 2 db in any 6 megacycle segment from 54 to 108 Mc and 174 to 216 Mc.

SYSTEM SIGNAL-TO-NOISE RATIO

—In order to provide television signals having the highest order of broadcast quality, it is necessary that the system maintain a signal-to-noise ratio in excess of 40 db. The signal-to-noise ratio

will be measured by proceeding as follows:

At the extremities of any trunk in the system, feed the system signal into a field strength meter tuned to the picture carrier of each channel under test. Note the reading obtained on the meter.

Now, tune the field strength meter to mid-channel of each channel under test. In the absence of signal, note the readings obtained.

to-noise ratio. This difference should

The difference between the two readings will give the system signal-to-noise ratio of 40 db. Since a signal-to-noise ratio of 40 db can only be measured successfully if a highly selective field strength meter is available for the proper separation of sound and picture carriers of each channel, these measurements shall be repeated in the guard band between Channels 4 and 5, and all spare or unspecified channels.

SYSTEM HUM MODULATION—Insert into the transmission system a CW signal for the picture carrier of any channel to be used on the system—the level of the signal inserted should be approximately equal to the mean value of the signals which will be received from the system feed point. At the extremities of the trunk line of the system, insert a detector and examine the resultant signal on an oscilloscope.

Measure the average level of the dc signal.

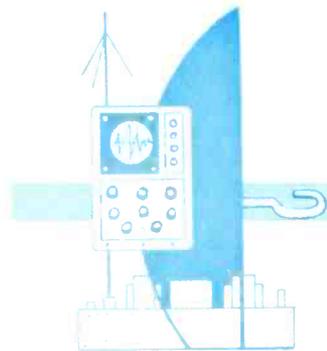
Measure the peak-to-peak ac hum variation.

The ratio in percentage of the peak-to-peak ac variation to the average dc is the percent system hum modulation and should not be more than 5%.

Normal modulation shall be applied to all channels except one which will have a carrier but without modulation. Observation of the white screen of the unmodulated channel shall be made. No visible components shall appear on this blank screen and this test shall be repeated for all channels utilized in the system.

VOLTAGE REGULATION — Via means of an autotransformer, or similar device, vary the ac input of several amplifiers simultaneously: first down to 105 volts and then up to 125 volts. The system should continue to meet all previous performance tests under both of these sets of line voltage conditions.

TEST FOR PROPER AMOUNT OF SIGNAL AT TAPOFFS—Using a field strength meter, measure the rf signals at any tap on the system at random. Signals on each specified channel should read two millivolts, deviation not less than minus 4 db or plus 10 db, when measured across 300 ohms.



PRODUCT REVIEW

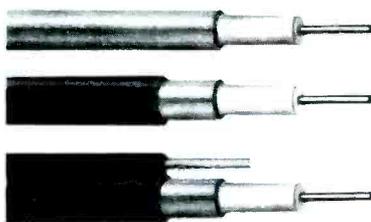
½-MILE LENGTH SEAMLESS ALUMINUM CABLE

Viking has introduced ½ mile continuous length "VIKAL" seamless aluminum sheathed coaxial cables for use as 75 ohm CATV transmission lines.

The long lengths are available in .412" O.D., .500" O.D. and .750" O.D. and can be provided with additional protective polyethylene jacketing for direct burial or usage in areas that have corrosion problems. The .412" O.D. and .500" O.D. constructions are also made with optional integrated messenger strand.

Viking has designed a new "Super-Match Series" of 75 ohm connectors to be used with these coaxial cables. The connectors provide a full one

inch engagement of the cable conductor to the contact area and a full two inch insertion of the aluminum



jacket into the body of the connector to eliminate problems due to thermal contraction. For additional information write: **Viking Industries, 830 Monroe St., Hoboken, New Jersey.**

NEW ABERDEEN CLAMP

Aberdeen Company has announced the availability of a new clamp for drop-wire hookups. Designated the Model "A", the one piece clamp is constructed of stainless steel. The



clamps are available in quantities of 100, and may be purchased from Aberdeen distributors or direct from **Aberdeen Company, 3833 Wilshire Blvd., Los Angeles, California.**

SIDEBAND ANALYZER FOR CATV

Dynair Electronics, Inc. has announced the development of a solid-state sideband analyzer for use in alignment of CATV modulators or television transmitters. The Model TS-100A Television Sideband Analyzer is tunable through all 12 VHF chan-



nels and provides complete facilities for video modulation of the unit under test plus detection of the RF output according to the manufacturer.

By presenting the detected output on an oscilloscope the user is able to analyze the response characteristics of his modulator and make any required adjustments. As a spectrum analyzer the TS-100A may be used to observe the RF output of a modulator being fed with standard test signals or live programming. In addition to video sweep output is available for test or alignment at video frequencies. For additional information, contact **Dynair Electronics, Inc., 6360 Federal Blvd., San Diego, California 92114.**

CABLE BURIAL PIPE

United States Extruded Vinyl Products, Inc. has introduced a high density polyethylene utility pipe for use in underground CATV installations. Called Pipe-A-Flex, the pipe has a corrugated profile designed to meet the needs of CATV applications, according to the manufacturer. For details on sizes available and other information, contact **United States Extruded Vinyl Products, Inc., 4627 Van Nuys Blvd., Sherman Oaks, California.**

NEW POWER SUPPLIERS

Viking Industries is now manufacturing the model 580 Remote Power Supply that provides 6 amperes of regulated 30 volts A.C. to solid-state systems from either of two connectors. The output voltage is regulated to within 2% for load variations between 2 and 6 amperes, according to Viking. The power supply has a built-in automatic re-set circuit breaker. An RF/power filter provides a minimum of 60db isolation between power lines and the RF terminals. A meter permits constant monitoring of output current. The unit may be rack, wall or cabinet mounted. Price is \$102.00 each.

Viking's model 561 Remote Power Supply is designed to duplex 24 or 30 V.A.C. on CATV systems. It supplies power for any combination of transistor amplifiers up to a maximum of two amperes. The power supply has a built-in automatic re-set circuit breaker. An RF filter is said to provide a minimum of 60 db isolation between the power lines and the RF terminals; and a switch provides for either 24 or 30 V.A.C. to compensate for line length. The unit is designed for indoor or outdoor application in its weather-proof housing. A bracket on the rear of the unit provides mounting to pole or cabinet. Price is \$30.00 each. For additional information contact **Viking Industries, 830 Monroe Street, Hoboken, New Jersey.**

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Type of business

(Continued)

company in Othello, which serves 400 subscribers, receives two channels via a 67-mile microwave path from Mission Ridge and three channels from the site near Ephrata.

One ETV channel is received at Jump-Off-Joe Butte south of Kennewick, Washington, over a 105-mile microwave path from Mission Ridge. At this point it is relayed to Richland Television Cable Co., in Richland, Blue Mountain TV Cable Co. in Walla Walla and Columbia Television, Inc., in Kennewick. These CATV companies distribute the educational channel throughout the Richland, Walla Walla, Kennewick and Pasco School Districts as part of the regular curriculum.

Another educational channel is transmitted over a 106-mile microwave path from Mission Ridge to Central Microwave, Inc., a cable system in Tonasket, which serves the Omak, Okanogan and Tonasket School Districts. In addition, Columbia Basin Microwave provides the Yakima School District's KYVE-TV (channel 47) with an educational channel from Mission Ridge over a 52-mile microwave path to Ahtanum Ridge, site of their station's transmitting facility.

Alarm System

The microwave station status reporting system, being engineered by Columbia Basin Microwave, is unique in that it utilizes both the microwave system and a CATV system.

The Lenkurt 936A status reporting system, riding above a video channel on a program channel, will provide 20 alarm points from Ravens Roost and ultimately 40 alarm points from Mission Ridge. The master display panel which will be located in our building at Ephrata, will handle up to five stations as the system continues to grow.

At the Columbia Basin Microwave Test Center the status carrier tones will be de-modulated and fed into the master display panel. Utilizing the cable system facilities, as outlined, will also allow secondary status display panels to be placed anywhere in the city, such as the home of the manager, chief engineer or maintenance personnel.

To prevent the possibility of losing the status reporting system due to the failure or fade of the microwave on which it is riding, the program channel is dual-fed into two microwave systems in the high and low areas of the frequency spectrum. We believe that being able to determine the location, type of equipment and nature of the problem, should one arise, will save hours of needless travel time and many dollars for the company. □

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Complete Closed Circuit facilities which include: 2 Bell & Howell 614 CDVM projectors, 1 Dage optical multi-plexer, 2 Studio cameras with view finders, 2 tripods with dollies, intercom, 6 input console (video) with mixers and faders, 8 input audio console with limiter, 6 low imp. microphones, turntable and all other necessary equipment.

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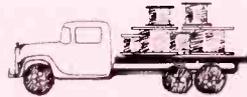
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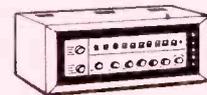
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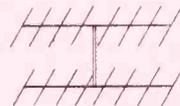
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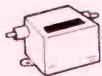
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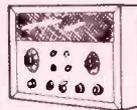
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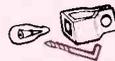
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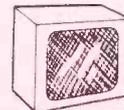


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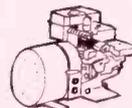
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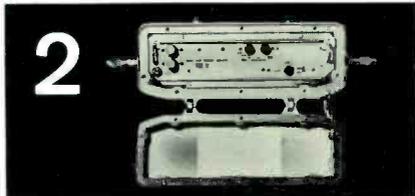
13 Reasons Why The **viking** SOLID STATE AMPLIFIERS Are Best!

Although the number "13" has always been considered a "bad omen", Viking is so confident that its new "GOLDLINE SERIES" of high level modular solid state CATV amplifiers represents the most advanced engineering concept of solid state design, that we challenge fate and present only 13 reasons (out of the innumerable reasons that can be stated) to show why you should THINK VIKING when you THINK SOLID STATE.

Here are the 13 reasons why you will now consider number "13" to be the luckiest number in CATV.



1 "Push-Pull" construction allows one man to replace the internal amplifier unit within seconds without unsoldering wires nor disturbing cable fittings.



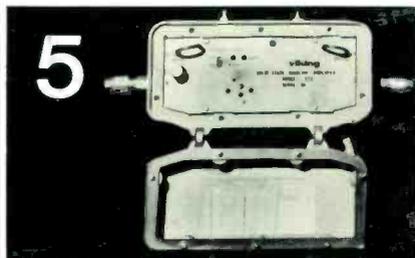
2 Two piece hinged housing with seal-on gasket and captive screws permits easy accessibility to all controls and test points.



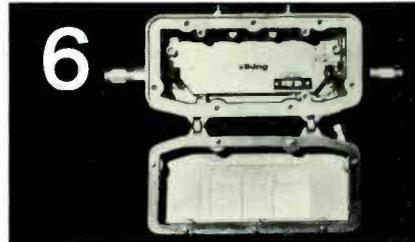
3 Inline amplifier die-cast aluminum housing provides complete weather and moisture proof enclosure with "VIK-O-PROCESS" protection for salt air regions.



4 Greater cascability allows a 12 channel system bigger than 60 mainline amplifiers in series or better than 1400db of cable can be built for a signal-to-noise ratio in excess of 40db.



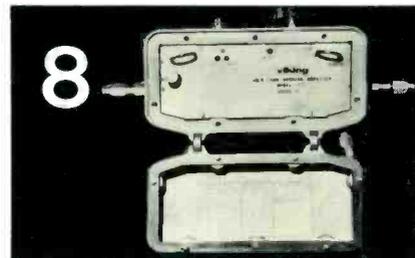
5 Amplifiers designed with lowest noise figures, 10db maximum and highest output capability, 51dbmv.



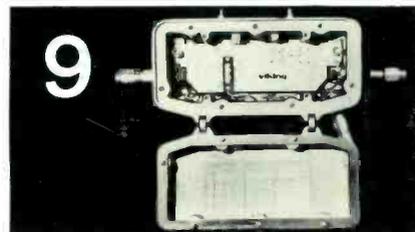
6 Mainline amplifier AGC circuit compensates for thermal changes in the cable with no extra cost or insertion loss.



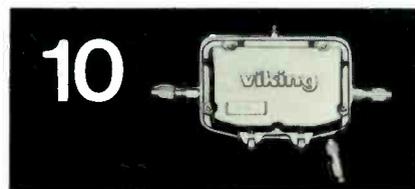
7 Only AGC amplifiers available with separate high and low band plug-in pads and full-wave power supply.



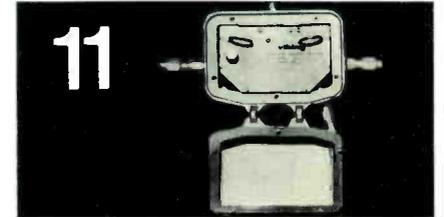
8 Lightning and surge protection beyond 10,000 volts.



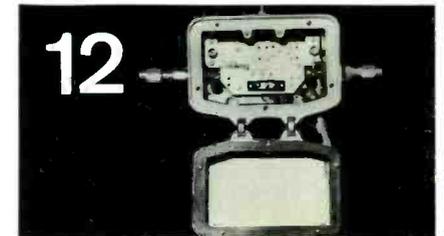
9 Both RF and AC power feed through bridger amplifier locations where internal amplifier unit is removed from amplifier housing.



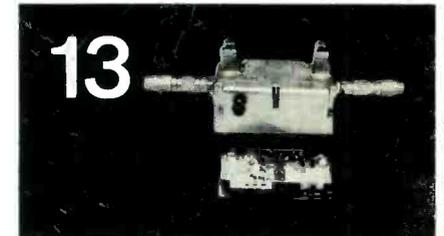
10 All silicon RF transistors in sockets and heat-sunk.



11 Built-in external -10db output directional tap for powering associated bridging or line extender amplifier and external easy to service fuses.



12 All input and output connectors are of the revolutionary new Viking "Super Match" true 75 ohm series.



13 "Super Match" connectors permit full one inch engagement of cable conductor into spring finger contact area of connector body allowing for maximum thermal contraction of the conductor during extreme temperature variances — No more conductor "pull-out" problems.

Phone or write for your free brochure on Viking's new "GOLDLINE SERIES" of solid state amplifiers

