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December

TV Communications

The Professional Journal of Cable Television

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Western Edition

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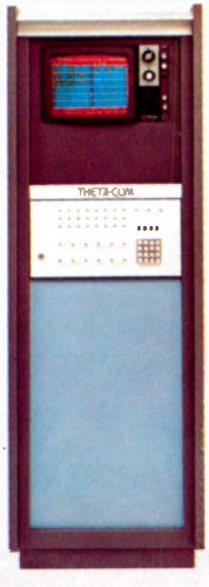

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CATV Technician Section

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This Month's Cover...

A lone technician works late into the night near San Mateo, California. The photo is courtesy of Anaconda Electronics.

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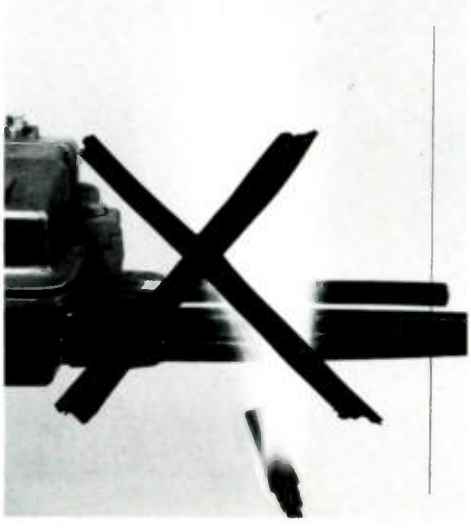

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The TVC Viewpoint

EDITORIAL

Robert A. Searle
Publisher

Whew! I'm Glad This Year Is Almost Over

At the beginning of 1973 I wrote, "The demands of the year before us will be greater than ever." Rarely am I, or for that matter is any other editorial writer, so succinctly correct.

It's been a rough year. From problems with pole attachment rates to problems with even getting on the poles or under the ground, the cable industry has been "blessed" with re-awakened opposition from the National Association of Broadcasters and a thrashing Ma Bell. Dean Burch notwithstanding, cable hasn't begun "to get moving" in the major urban centers. Absurd restrictions on pay-cable haven't exactly made that an easy road either.

"Resolution of some of the old problems," we noted early on, "including and especially copyright – will call for all the industry has in perseverance and tough-minded compromise.

"Standardization of origination to permit interchange of programming . . . development of system testing procedures and standards . . . cable participation in domestic satellites . . . all are going to demand closer cooperation among cable operators and manufacturers . . . "

"Construction demands in the already franchised areas will tax the resources of the industry.

"Franchising processes in all communities will demand the most scrupulous integrity. "And above all, the grave public concern with cable television which we saw this past year can only intensify in 1973."

Well, with the exception of our emphasis on origination, we weren't far off the mark. Yet we, like everyone else, failed to see the tremendous economic downturn as a combined result of the Watergate fiasco and the energy crunch. The stock market got shaky . . . so cable got shaky.

TelePrompTer nearly collapsed under its own weight. An absurd tonnage of fanciful franchise promises, blue sky and a misreading of saturation potentials nearly put the industry's shining light out.

Jack Kent Cooke and Bill Bresnan have clearly taken the glamour out of their contact lenses and focused on the company's real situation. The new marketing team promises a million subscribers by the end of 1974, or, they promise, they'll be "out the door." And those guys will perform.

Construction demands nearly put the company under. They cut their plans off. That did the MSO good; but it didn't help the construction or manufacturing sides of cable. NCTA's David Foster sent a letter to the FCC's Dean Burch asking for help. He noted, "High interest rates, a degree of cynicism from financial institutions, the TelePrompTer situation and the declining rate of certificate processing" had combined at an unfortunate time. He suggested the Commission process those certificate applications with solid financing first. Good move.

The lack of "integrity" (something that usually means you'd like to have done what the other guy did) in franchising may have come to an electronic halt in Vail. After its experience in Boulder, TCI simply pulled the plug in the resort community. Now the industry will find out just what a city and what a cable operator can do about an unhappy franchise situation (see story beginning on page 32).

The pay-cable picture, even though its politics are growing more confusing every day (see *Perspective* on page 14), seems headed for a solution. The Commission is quite likely to loosen the two and ten year rule. And the testimony at the FCC's oral hearings very nearly produced a realignment of forces with the NAB and its "tasteless" (as one Commissioner called it) $600,000 media blitz on the outside looking in.

The suddenly vindictive Ma Bell and General Tel pole problems are headed for some sort of solution; though it may result in a chink in cable's armor. The FCC's reluctant assertion of jurisdiction was a major victory for cable in its attempts to provide a service in the public interest. The negotiations are strained on pole pricing; but they have been smooth in solving scheduling and rearrangement difficulties.

Even our old favorite, copyright, is crawling toward some action. Senator McClellan has requested data to bolster the industry's contention that under-3500 subscriber systems should be exempt (see *CATV*, November 26). And, when the Congress gets over Watergate something might happen.

That interminable Congressional delay proved a bonus on another point: James Quello hasn't been confirmed, hasn't even been heard. It seems unlikely he ever will be. Meanwhile, Nick Johnson proceeds merely on his individual way. Mr. Nixon will have a hard time naming any more broadcasters to the Commission.

The point of all this is simple: there is now action on our industry's problems. Not all the action is swift, not all the action is uniformly favorable.

But it is action. And 1974 will bring a freer climate for cable – barring a major depression. Yet there may even be, for cable at least, aluminum lining in the fuel shortage: people will need cable's additional entertainment value as they sit at home.

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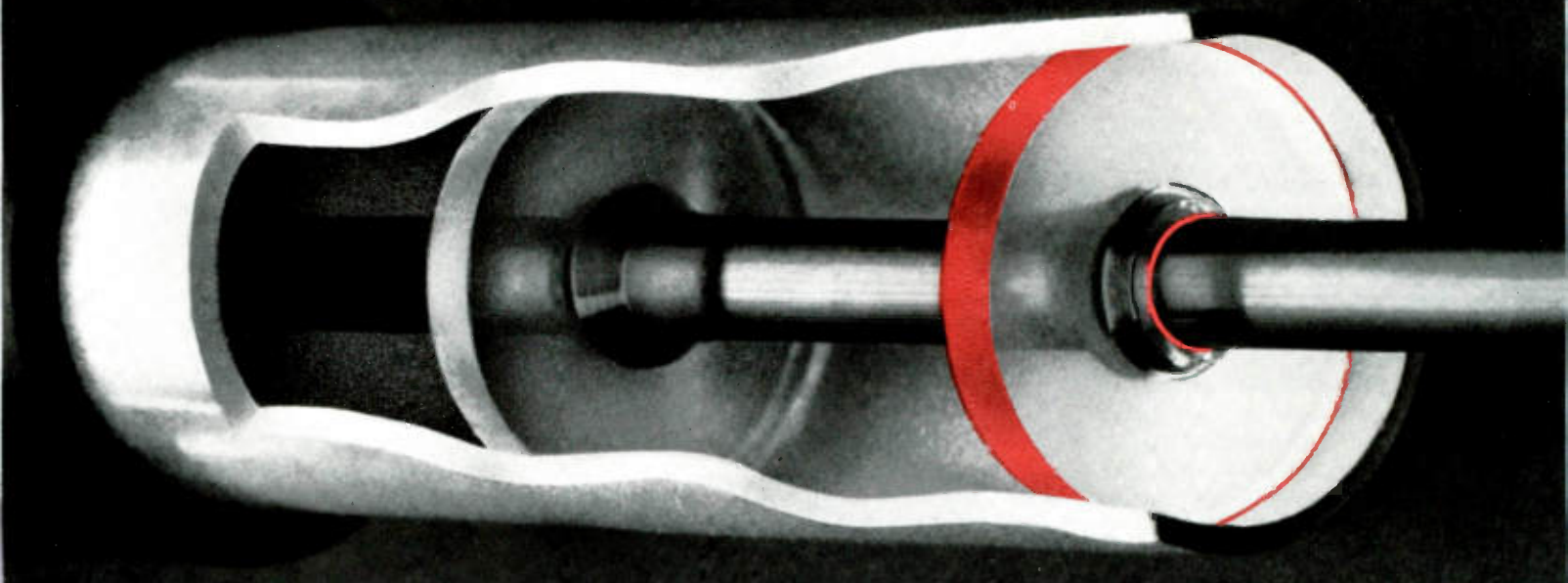

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FACT: Fused Disc cable handles well. Ask any contractor who has installed it.

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Low attenuation for a given size	YES	YES
95% velocity of propagation	YES	NO
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Perspective

on the news

Paul Maxwell
Executive Editor

The politics swirling about the pay-cable/pay-TV question are growing murkier. The Office of Tele-Communications Policy and its director, Clay "Tom" Whitehead, have again surfaced with a $58,000 contract awarded by the beleagured agency to the Stanford Research Institute for a pay-cable market-place study. Amazingly, OTP awarded the contract the same week the Federal Communications Commission was holding its definitive oral hearings! (Also amazingly, pay-cable received fair treatment in TV-Guide's November 17-23 issue.)

OTP, in trouble in Congress (both Houses now, Torbert Macdonald continues his verbal broadsides while Senators Weicker and Ribicoff took the more direct action of introducing a bill to eliminate OTP), is off again on what is obviously another tangent. The only possible result is more delay: delay that cable and the hopes of pay-cable just do not need.

Besides, what ever happened to that famous Cabinet Report on Cable? . . . or more to the point, whatever happened to that cabinet?

The possibility of a split in cable's unified ranks appears just short of likely. Negotiating positions taken by the NCTA utility relations committee as a whole have left some in the California contingent cold. Some Westerners can't see giving up anything more (see analysis "The Pole Problem" on page 26 this issue).

Can't blame them too much, though, sounds too much like "reasonable" position on copyright negotiations.

NCTA, on the other hand, has acted decisively on two other fronts — to the full applause of the entire industry.

First, NCTA filed with FCC asking for non-duplication rulemaking. Petition forthrightly asked for repeal of all non-dup regulation as an "interim measure" pending "further study" by Commission. While not too much might come of it, NCTA action was good and step in right direction. Most likely outcome remains exemption of non-dup for under-500 subscriber systems and maybe (though not as likely) some relief for Rocky Mountaineers.

Secondly, NCTA's president David Foster sent a letter to FCC Chairman Dean Burch (see CATV Magazine, November 19, page 25) asking him to get the Cable Bureau moving on certificate applications with financing set . . . so construction can begin immediately. It's certain that Frank Drendel and his California Association associate members applauded Foster's letter.

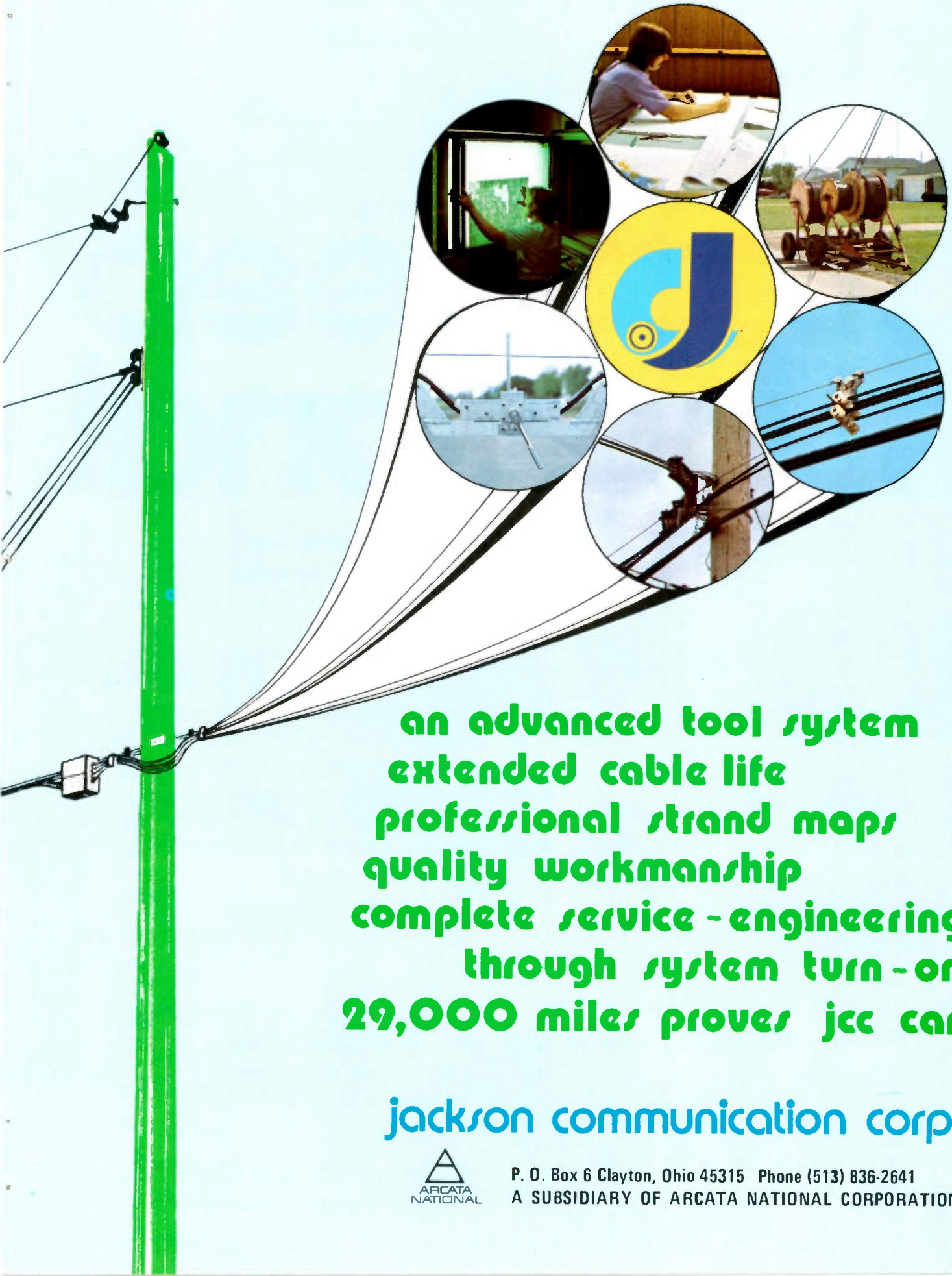
TelePrompTer, cited by Foster, as a factor in the "severe impact" facing cable manufacturers, has done just about everything rational and possible to right itself. Just two weeks before this convention, TPT passed the 900,000 subscriber mark. And, promise new marketing executives Marc Nathanson and Jeff Marcus, "We'll have a million before '74!"

The stock is back, opening low but "not too low" as one investor put it. Unfortunately, it ran head-long into a worsening energy crisis and a jittery market. Nevertheless, long term prospects for TelePrompTer and the cable industry it serves as a flagship look bright (see Publisher Bob Searle's editorial comments on page 11).

The biggest cable MSO is doing things that make financial sense now: a slow down on promises and action aimed at a future kind of cable, a backing out of senseless franchise agreements and a reemphasis on subscriber penetration. If any company can do it; they can and will. Look for at least one more big personnel surprise, though — maybe at the Western Show TPT will announce a new executive vice president of operations.

Another MSO, Number 4 TCI, took unprecedented, lauded action in Vail — They shut the system off in the face of mounting town demands. Pictures and story on page 32.

Does your contractor offer



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LETTERS

Dear Mr. Titsch:

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Mr. Titsch, the concern and trust placed in Synanon by American businessmen like you have enabled us to continue with our work successfully. All of us here at Synanon appreciate this support and will continue to work hard at living up to the expectations of those who have invested in our work.

Should you ever happen to be in this area, please give me a call. I would consider it a privilege to host you for lunch or dinner and for a tour of our facilities.

Greg Hayes
Synanon Foundation, Inc.

Dear Mr. Searle,

I am a team leader of the Research Institute of Telecommunications and Economics in Japan. I and my team members are now engaging in a study of "New Telecommunication Media and Their Social Impacts." At present stage, we are putting study points on wired city concept development in western countries, which may give contribution to urban problems. As well, we are thinking of hearing comments of western authorities about Japan's course in this field, which may lead to comparative study of world wide wired city development.

I think the development of the wired city may be considered from two directions: its impact (or contribution) on business and on community life. Together with the development of information systems for industrial use, that for daily community life is coming up to national concern in Japan now.

I would like to ask you a request. I send you a booklet on Japan's situation by separate mail. Would you write me your comments or suggestions on reading this essay? We are eager to know what points western people evaluate and what points they criticize regarding CATV in my country, in comparison with CATV in their own countries.

The *TV Communications* sometimes introduces CATV news of other than U.S., and my humble petition is that the *TVC* should cover CATV activities of whole world time to time. I would be very grateful if you could afford me your response for my request. We are planning to send similar letters to authorities in U.S., Canada, and European countries. Attached paper shows items that we intend to ask them.

I greatly appreciate your kindness in advance, and with best regards.

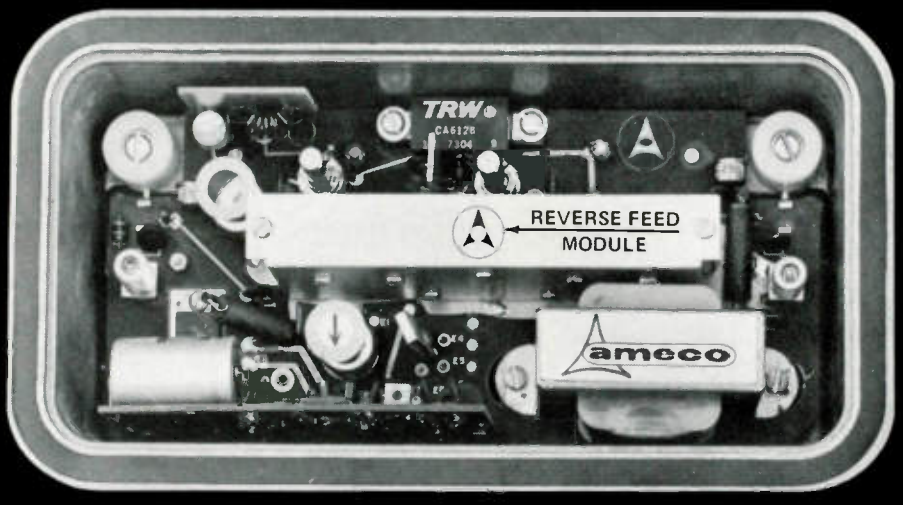
Kinji Matsuda
Tokyo, Japan

Mr. Ekstrom:

In the October issue of *TV Communications* an article was printed concerning Montana Video's activities with the Miss Montana Scholarship Pageant. Your magazine's treatment of the story was excellent. Thank you very much.

Scott R. Blair
Director of Cablecasting
Montana Video

WHY WE MADE TWO-WAY SIMPLE...



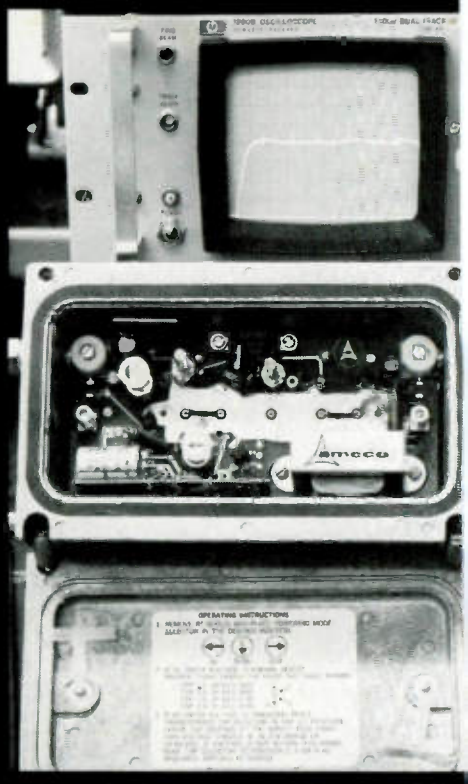
Some people told us they wanted a forward-only line extender with superior operating specs that didn't cost an arm and a leg. Others wanted two-way capability, with forward signals that won't stumble when the reverse amp and filters are plugged in.

So we made this simple little two-way line extender. The Nova LE-2/W. No fancy boxes. No fuss. Just the best uncomplicated performance, forward and reverse.

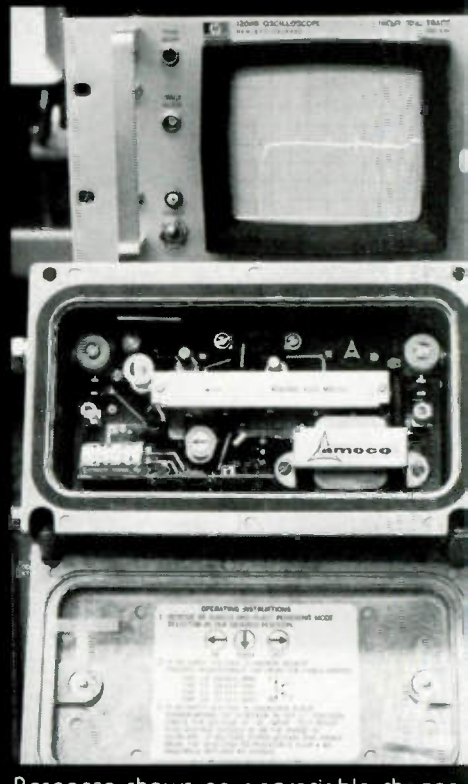
Why not! We've been making cable television simpler for more than 20 years.

	Forward Amp.	Reverse Amp.
Frequency Range	50–300 MHz	5–30 MHz
Minimum Full Gain (no equalizer)	25 dB, 50–300 MHz	12 dB, @ 30 MHz
Cable Equalization Range	0–24 dB	2.5 dB Fixed Slope
Noise Figure (no equalizer, max. gain)	12 dB @ Ch. 13	8 dB
Cross Modulation	–75 dB @ +40 dBmV 12 channel	–72 dB @ +35 dBmV 4 channel
Second Order Beat	–75 dB @ +40 dBmV 12 channel	–70 dB @ +35 dBmV 4 channel
Return Loss	18 dB	20 dB
Envelope Delay (per amplifier)	5 nanoseconds	5 nanoseconds

NOW IN PRODUCTION WATCH FOR INTRODUCTION OF NOVA LA-2/W AGC TWO-WAY TRUNK AMPLIFIER.



Unretouched photos show Nova LE-2/W response curve without reverse amp and filters (above).



Response shows no appreciable change with addition of plug-in reverse amp and filters. No adjustments were made to the amplifier.

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CATV News Briefs

A Summary of News from *CATV*, the Newsweekly of Cable Television

TelePrompTer Releases Statement, Trading Resumes: TelePrompTer Corporation released the financial statement, which the SEC said, when it suspended TPT on September 7, would be required before TPT stock went back on the board. The statement was cleared through the Securities and Exchange Commission, and trading of TPT common was set to resume November 15. TPT's nine page statement said it has received an agreement in principle with its consortium of banks, which, under revised terms, will allow the company to take down the remaining $48,000,000 of its $150,000,000 credit line. The statement said the company is now concentrating efforts on obtaining new subscribers in existing systems. New credit terms require that TPT have 960,000 subs by the end of this year and 1.11 million by the end of 1974 to avoid defaulting on its loan. The company's projected earnings for 1973, given in the statement, will be approximately $2,000,000 or $.12 per share, subject however, to still unresolved questions of write-downs. Projection takes into consideration a write-down for deferred program origination of $.19 per share. TPT's previously announced spending limitation on construction for 1973 ($65,000,000) and 1974 ($14,500,000) might, the company warned, result in franchise forfeitures necessitating further write-downs and even lower earnings. Prior to disclosure of its financial status, TPT board of directors elected Jack Kent Cooke to the dual post of chairman and chief executive officer of the company. Board also named Jerry B. Greene as vice president-corporate development; Harry P. Simon, vice president and general counsel; and Richard M. Sykes, director of accounting. Former TPT chief officer Raymond Shafer was appointed chairman emeritus and vice chairman. To get the needed increase in subscriber saturation levels, Marc Nathanson, formerly of Cypress, was put in charge of the overall marketing effort and Jeff Marcus, formerly of Sammons, will handle direct marketing subscriber sales under Nathanson. (*CATV* 10/29 p.7, 11/12, p.3)

TCI Turns Off Vail System: Following Tele-Communications, Inc.'s action of November 1 in turning off cable service to Vail, Colorado as a result of the town manager's letter terminating the TCI subsidiary's franchise, the Town Council and TCI agreed to disagree and service was restored the following Monday afternoon. Vail town manager and assistant manager attempted to force TCI to renegotiate a 10-year franchise granted in 1966. Terms of the original franchise carried a provision for renegotiation of rates after a five year period. (Vail, a ski resort community 110 miles west of Denver, has a small year round population with a large number of motels and condominiums. Vail Cable has between 1200 and 1300 subscribers.) Violations of the original franchise, as alleged by the Town, included: failure to file plant plats; failure to file insurance certificates; failure to file bond; an allegation that the "general public has indicated that in its opinion the rate they are being charged is not fair and reasonable"; failure to notify of interrupted service; failure to provide adequate service and failure to file requested reports to the Town. TCI categorically denied all allegations. The company plans to file in Eagle County Circuit Court for a declaratory judgment making clear that the Town of Vail cannot revoke TCI's franchise by "unilateral action." TCI is asking for a court opinion on town manager's action for the Town of Vail and is demanding "due process." (*CATV* News Bulletin 11/12, CATV 11/12 p. 16)

FCC Waives Leapfrogging Rules for Albany: The FCC waived its leapfrogging rules to permit Albany New York area cable systems carriage of two highly desirable New York City independent television stations. Waiver, applicable to systems in the nation's 34th largest market, will allow carriage of stations

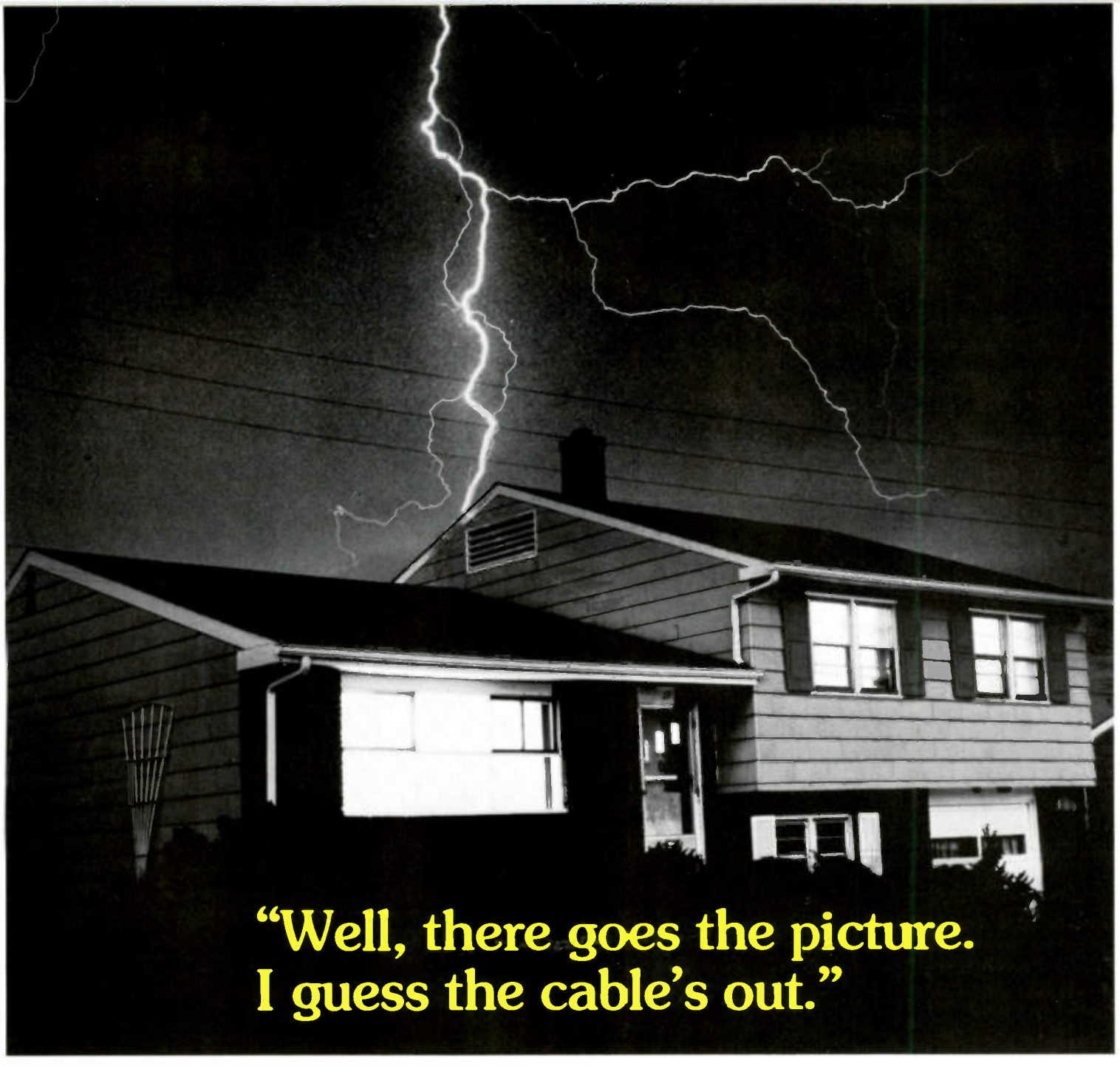
CATV News Briefs

WPIX and WOR-TV in place of signals from the closer Boston and Hartford markets that the systems would have been able to carry in accordance with Section 76.61 of the Commission's rules. Rationale behind the waiver grant was the community of interest shared by Albany with New York City. Proponents of the argument before the Commission included the New York Cable Commission. (*CATV* 11/5 p.3)

Pay-Cable Showmen Present Cases: Pay-cable advocates and opponents presented oral arguments before the FCC on Docket 19554, "Amendment to part 76, subpart G of the Commission's rules pertaining to the cablecasting of programs for which a per-channel or per-program charge is made." The proceedings November 5-7 featured over 30 spokesmen representing a variety of opinions on pay-cable, and 12 of the "heavy hitters" from the effected industries during Thursday morning panel discussions. Some participants sought to broaden the issues before the Commission and touched on such topics as copyright, access channels and carriage of baseball games via distant signals. For the most part, oral presentations followed strict, and familiar, party lines. NATO's Martin Firestone charged that pay-cable operators have an unfair advantage over theatre owners. NATO now, according to Firestone, does not seek the total prohibition of cable, only the removal of the unfair advantage which NATO thinks allows pay cable to deliver films for as little as $.35 per person. NAB president Vincent Wasilewski brandished the charge that cable, which has never paid copyright for the broadcast signals on which it has lived, is now trying to appropriate the same programming product for pay-cable. NCTA president David Foster and Optical Systems president Geoffrey Nathanson were the prime spokesmen for the pay-cable cause. Both made case that pay-cable restrictions should be eased to allow greater film and cultural production, to provide cable with needed revenues. They also denied charges that pay-cable would kill over-the-air broadcasting. Other cable spokesmen were Warner's Al Stern, American Cable's Bruce Merrill, ATC's Monroe Rifkin, and Dore Schary for Theatre Vision. The biggest event in pro-cable was the appearance of Jack Valenti for MPPAA and his troupes. Valenti urged relaxation of the rules to allow the growth of what he called "Family Choice Cable," but was cautious on how much of a relaxation was necessary. (*CATV* 11/12 p.7)

New York Cable Commission Enters Subscription Regulation: The New York Cable Television Commission has entered the field of regulation of subscription cablecasting based on two provisions of the state's executive law. First provision required that all money charged to subscribers for any form of service be specified in franchises, and second, preclude any change in rates without amendment to franchise. Franchises and their amendments must be certified through the New York Commission which contends that it can legally regulate at least the rates charge for subscription cablecasting. Commission directed that all such rates be included in all franchises. (*CATV* 11/5 p. 7)

Financial Developments: Cox Cable Communications, Inc., announced that it has closed two loans totaling $30 million in new financing . . . A newly-formed limited partnership, Bauce Cable Associates, has acquired a group of CATV systems serving the towns of Luray, Stanley, Woodstock, Toms Brook and Strasburg, Virginia . . . CBS posted new high in sales and earning for the third quarter and nine months. Company estimates third quarter net income of $23.4 million on estimated net sales of $370.4 million, a 13 percent increase in earnings and an eight percent increase in revenues over the same period in 1972. (*CATV* 11/12 p. 13, 11/5 p. 11, 10/29 p. 11)



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Management Guidelines

Time Is of the Essence

Respect for the time of others wins their respect. Wasting others' time irritates them and results in the offender being questioned as to his capabilities to do his job. He is marked as unreliable, irresponsible, a bit thoughtless, qualities which are not benchmarks of success in the cable business or any other.

Lost money, lost possessions can be replaced, but not lost time. As with money, no one ever knows how much time he is going to have in life, but unlike money, when it is lost it cannot be regained. Time is most precious, and normally we do not like those who thoughtlessly take it away from us.

Most irritating is the CATV service representative or installer who agrees to be in your plant or home at a given time and then not only doesn't show up at a specified hour but doesn't show up on that day and may be even not in that week. A call to discover the reason usually produces a humble apology and a promise to come "tomorrow." It would be much more thoughtful for your office to set a realistic time in the first place and to call if it proves impossible to live up to the commitment.

Some people have an easy way of saying "yes" to practically every request without any intention of doing what they have agreed to do. They find it easier to say "yes" than to make the decision at that time. The reputation they acquire by failing to keep their word doesn't seem to disturb them.

Then there is the person who is never on time for an appointment, never sends a message that he will be late, and frequently does not make it at all. He wastes the time not only of the person with whom he had an appointment but of others whose appointments were held up because of it.

And the most thoughtless are chairmen of meetings who do not start, run and end on time. It is highly inconsiderate for a chairman not even to be present when a meeting is to begin, unless he has sent a message that he will be late.

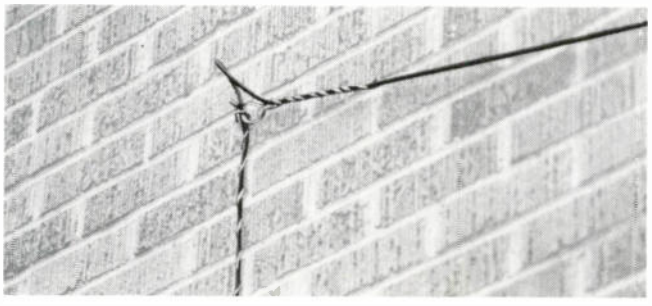
Another thoughtless tactic many of us are guilty of is calling meetings irregularly or quickly. Appointments have to be changed and other arrangements altered; as a result, plans are upset and time wasted. Unfortunately there seems to be a tradition in many organizations that whenever the boss calls you should drop everything and go at once. Many meetings are abandoned, customers left sitting, and others suspended in uncertainty while some timid soul runs for the boss's office. If informed of the situation, most bosses would say, "Well call me when you're free." Few bosses want to force others to be thoughtless.

People who are the busiest and who accomplish the most are usually not time wasters. You can depend upon them. Regardless of how much they have to do, they are where they agreed to be at the time they agreed to be there. Perhaps that is why they are successful. Maybe they are successful because they are considerate of others and because they can be relied on to do as they had agreed or to give plenty of notice of a change of plan. TVC

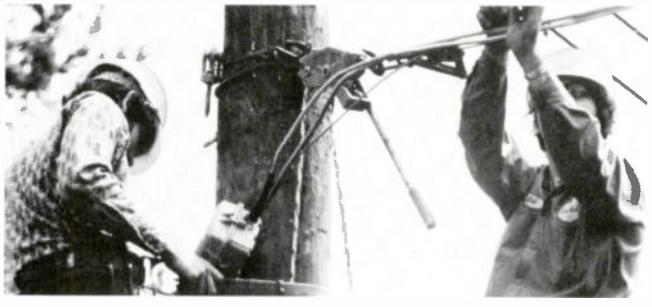
Marion Nowak, Facilities Planning Manager, Centre Video, a subsidiary of Tele-Communications, Inc.

"Buying cheap hardware is false economy," says Marion Nowak.

Construction crewman needs only seconds to apply PREFORMED Custom Coaxial Dead-end while making a pole transfer. One piece construction is quickly applied by hand without tools.



Two PREFORMED connectors are used to secure house drop cable. A firm but gentle grip prevents crushing or abraiding of cable.



Messenger which supports feeder cable is tensioned with come-along prior to permanent attachment to pole fitting with PREFORMED GUY-GRIP® Dead-end.

"Every dollar saved on maintenance is an extra dollar earned in company profits. That's why we specify PREFORMED hardware to support our cable plant," explains Marion Nowak, Facilities Planning Manager of Centre Video, a subsidiary of Tele-Communications, Inc., Carnegie, Pa.

With 18 antenna sites inside and outside the Pittsburgh area, Centre Video is one of the fastest-growing, multiple-system operators in the country. It pipes TV to 72,000 subscribers in lower West Virginia, Ohio and Pennsylvania. In 1973, Centre Video expects to complete 200 miles of cable plant. The company has 140 employees, including a six-man construction crew that performs the service work on pole transfers and drop wires to houses and apartment buildings.

To keep pace with Centre Video's rapid growth, Marion Nowak makes sure that a minimum of four weeks of supplies is always on hand in the company's two warehouses. He buys 10 miles of construction materials at a time plus the PREFORMED products to support them.

When asked what they look for in a support system, Marion said, "In our service area, we are confronted with many elements that stress coaxial cable, such as ice loading, quick temperature changes, corrosive atmospheres, you name it. What we look for is long life with little or no maintenance and ease of application."

According to Marion Nowak, PREFORMED products meet all these requirements. Crewmen merely wrap on PREFORMED hardware for a quick, permanent, neat installation. Exclusive helical design and a unique gripping principle allow PREFORMED connectors to develop 100% of the rated breaking strength of the cable or strand to which they are applied. They're designed to meet high wind and ice loading conditions. The kinking and bending that cause "snow" and picture distortion are eliminated.

Marion and his construction line foreman, Ed Betz, use GUY-GRIP® Dead-ends, False Dead-ends and PREFORMED Strand Splice to terminate and splice strand for trunk and feeder cable plus Preformed Custom Coaxial Dead-ends and Telegrips and Telesplices for house drop wire. In fact, Ed Betz considers Telegrip "the only modern way to support service drops."

If your company is a profit-conscious organization like Centre Video, be sure and specify PREFORMED support systems the next time you build cable plant. Write for Bulletin SP-2073. PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland, Ohio 44103. Dial 216-881-4900.

PREFORMED

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FOCUS ... On People

Suppliers

B. W. Hughes, former associate director of the National Cable Television Association, is the new CATV sales manager for Utility Tool Corporation of East Haddam, Conn., a subsidiary of Ripley Co., Inc.

In the Theta-Com of California sales organization, Ben W. Forte will continue to have overall responsibility of the Western Region. Ed Foust, assistant Western Regional sales manager, will be responsible for Northern California and Nevada. Maynard Polkinghorn has joined the company as assistant regional sales manager covering Washington, Oregon, Idaho and Montana.

The promotion of Scott E. Goff to product sales manager, video products, at 3M Company's Mincom division has been announced. Goff joined 3M in 1962 as a service representative at the Camarillo, Calif., facility.

R. J. Schlicht, vice president of marketing for Cohu, Inc., Electronics Division, announced that James O. Palmer will assume direct sales responsibilities for the San Diego based firm in the state of Texas, Oklahoma, Arkansas, and Louisiana. His office will be located in Arlington, Texas.

Donald W. Phillips has been appointed to the newly-created position of North Central Regional Sales Manager for the CATV equipment and installation operation of GTE Sylvania Inc.

Donald K. Mathison has been named marketing manager of Warner Cable of Eastern Massachusetts, Inc. Mathison joined Warner this year from TelePrompTer Corp., for which he served as sales manager in Westchester County, N.Y., for two years.

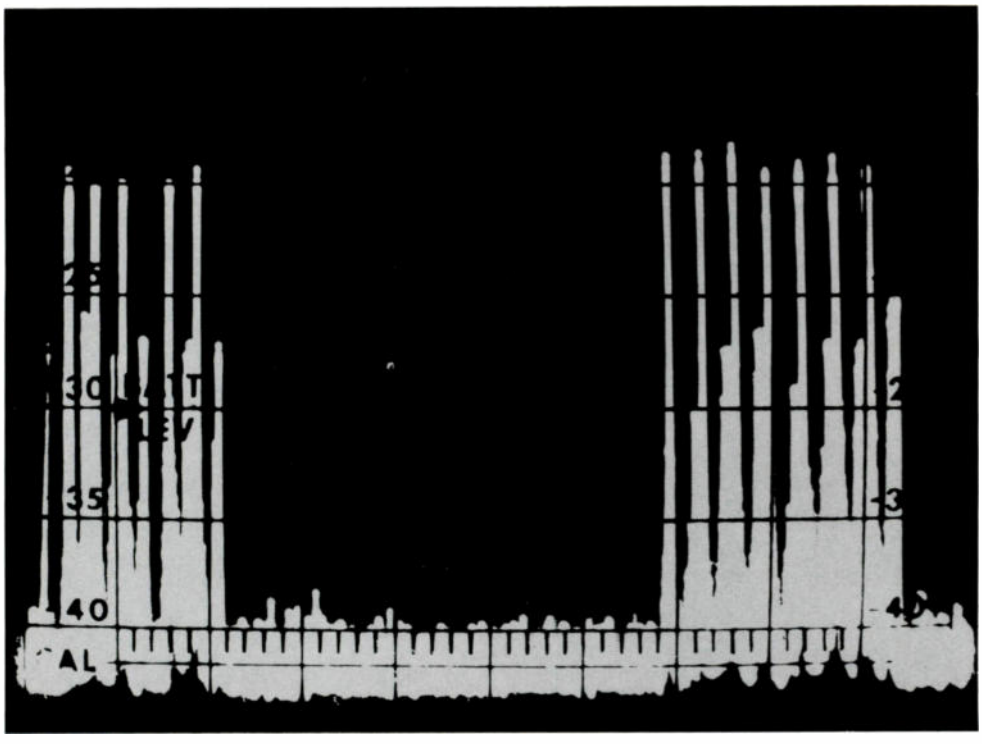
Systems

John E. Dolan has been named vice president of Cable Dynamics, Inc., heading the Toledo, Ohio office. Dolan has acted as an outside consultant on head-end problems and has been responsible for the design of head-ends on CATV systems throughout the country.

With an extensive background in microwave, Joseph Van Loan was appointed vice president/director of engineering for Cable Dynamics, Inc. Van Loan works out of the corporate offices in Burlingame, Calif.

TelePrompTer Corporation board of directors elected Jack Kent Cooke as chairman and chief executive officer. The board named Jerry B. Green vice president-corporate development, Harry P. Simon, vice president and general counsel; and Richard M. Sykes, director of accounting. Marc Nathanson, formerly of Cypress, was put in charge of the overall marketing effort while Jeff Marcus, formerly of Sammons, will handle direct marketing subscriber sales under Nathanson.

Peter Nisselson, president of Cable Information Systems, Inc., announced the appointment of Ira Katz as general manager of Good-Vue CATV, Inc. Katz was formerly associated with TelePrompTer Corporation where he was marketing manager for Broadband Communications Services in New York City.



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THE
POLE
PROBLEM

Red Tape
Make-Ready and Attachments; The Confusion of Climbing Costs

Commentary and Analysis
By Paul S. Maxwell
Executive Editor

Pole problems are not a permutation of some bad taste ethnic joke . . . or maybe they are. Like the classic confusion of the lightbulb replacer who got his friends to turn the ladder, the telephone companies are telling the beleagured cable communications industry that it must subsidize the telephone pole costs.

All the while, the telephone companies do not have the slightest idea . . . not the slightest! . . . what their pole costs are. No telephone company knows just what any of its costs are; not one has ever had to know what costs how much and why.

Telcos are asking, led by an aggressive anti-cable Pacific Telephone & Telegraph on the West Coast, "What is rental of our support structures worth to the CATV industry?" Or, put another way, "How much can we get from those guys?"

Buttressing their self-centered position is the inescapable fact they have the poles. Poles that are, generally, standing along city easements. Few cities will allow the cable industry to construct its own poles along those same easements; and no cable company wants to contribute to waste through needless duplication. That pole monopoly seemingly leaves the telephone industry holding all the cards.

Those poles, though, are on public easements dedicated to public service presumably in the public interest.

"Trend Line Concept"

The bad guys, from our industry's standpoint, have formulated their position that the cable industry must pay whatever the market will bear through their proposal of the "trend line concept." Under this unique plan an arbitrary pole rental rate is set for the first year and is then increased at a compounded interest rate for a period of ten years.

Just think: an arbitrary set fee, unrelated to actual costs (and less related to any fairness except a transitory political one), and a built-in yearly escalation!

Pole rental rates currently vary from $1 to $5 per pole per year. There has, of course, never been any utility justification for those rates: they just exist. There have been formulas and elaborate, point-missing rationales though. One is the so-called fully-allocated cost formula. Using that plan, which figures annual pole costs at 25 percent of the depreciated value of the pole, the annual fee would work out to about $25.

But, has anyone ever been able to figure out how it is conceivable that a utility could find itself spending $25 a year to maintain a pole which has been sitting in the ground for 30 years?

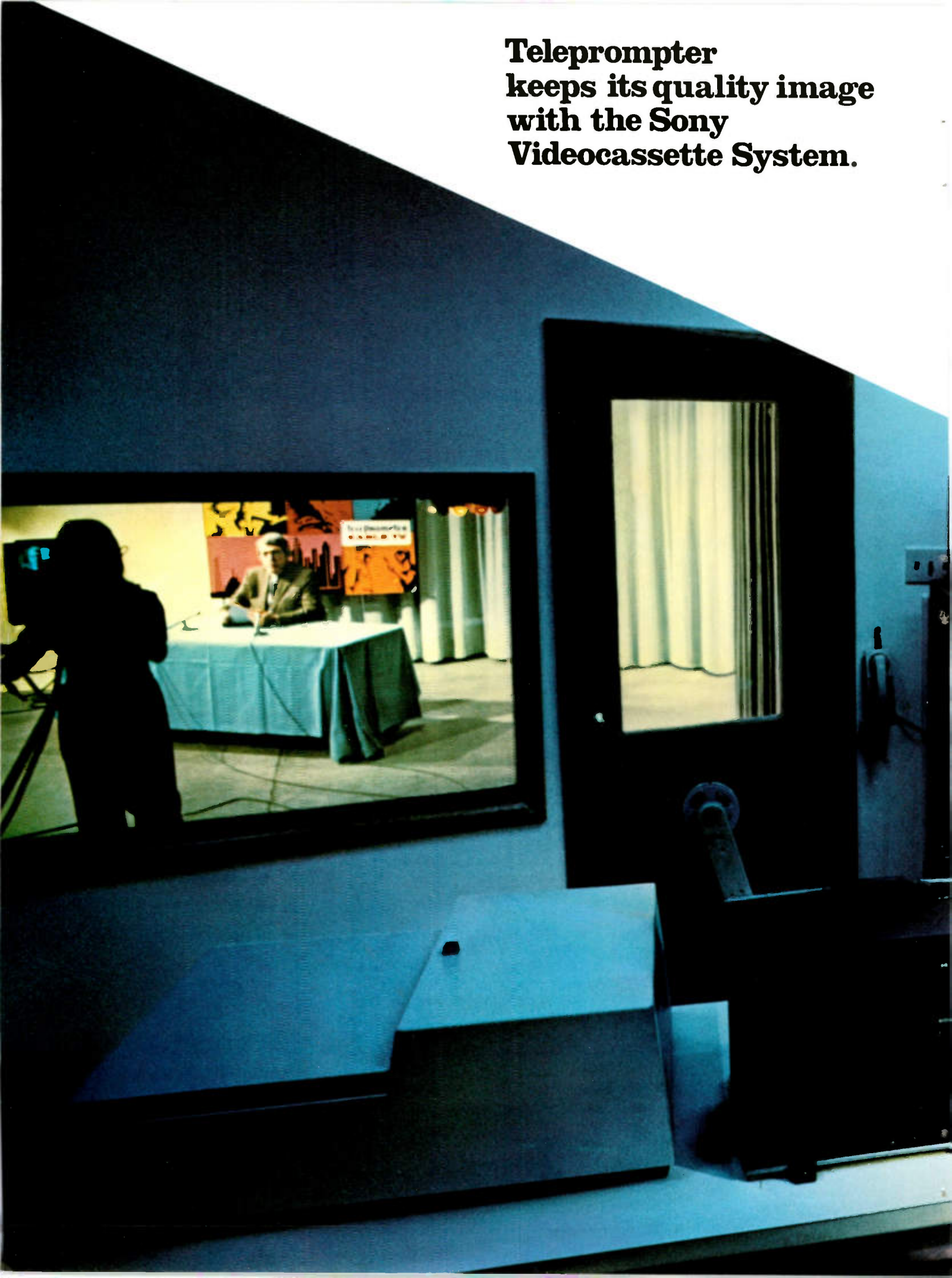
The California Community Television Association has compiled information which indicates the actual cost to the utility of having a coaxial cable on its poles is closer to a quarter — that's right, two bits — per pole per year. The only isolated additional costs to the telephone utility the California Association could find were related to billing and record-keeping. Nothing else.

Hold That Line

Those California figures, coupled with a belligerent Bell talking about $4 or $5 starting points, put the cable industry in a quandary. Should we ask for a rollback in pole rates? Should we give in and pay what they ask? Or, if we are going to negotiate, where should we start, and just how far should we go?

The possibility of an industry split, 49 states v. one, exists. Many in California are adamant.

Teleprompter keeps its quality image with the Sony Videocassette System.



Take a look at Teleprompter: a leading cable TV company. Committed to quality programming through cable transmission. Operating 143 cable TV systems across 460 communities in 34 states and two Canadian provinces. Consistent winner of numerous NCTA awards. Teleprompter means quality cable TV.

And to help keep their quality at its peak, Teleprompter uses the Sony U-Matic Videocassette System as the standard medium of program distribution.

Teleprompter uses the Sony Videocassette System to supply their subscribers with programs ranging from sports to newscasts to education.

"We use the Sony Videocassette units," says Mr. William J. Bresnan, Teleprompter president, "because we found them to be compatible with other types of studio units used by our systems."

"Then, the Sony's ease of use is a big plus. Our people quickly become comfortable with the Sony units."

"As for quality, what can you say about Sony quality except it's consistent and reliable across most of our operating conditions."

Easy to operate. Compatible. Reliable. That's what makes the Sony Videocassette System the standard for Teleprompter. And that's why it's fast becoming the standard of almost every industry using it.

With a ¾ inch format that delivers a picture superior in resolution, color fidelity and stability!

With playing time of up to 60 minutes, twice that of some other systems!

With a feature that lets you remove the videocassette at any point . . . without rewinding it!

With recording quality that gives you optimum results for critical mastering or duplication needs!

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With the name that's synonymous with quality and reliability . . . SONY!

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Many within NCTA leadership think the best possible is that the line might be held. And some within NCTA think even that is absurd.

Informed Washington opinion (whatever that is) thinks that, while the Federal Communications Commission really doesn't want jurisdiction over this question, it will take it. And, if it is forced to take it by a recalcitrant cable industry, it will vent its anger by wrapping the cable around more pole problems. There is now a natural tendency on the part of various Commissioners to take the side of the little guy, cable, in his fight with mighty Ma Bell. But that tendency extends only to thinking Bell shouldn't get too much, which leaves room for Bell to still get more.

One Washington cable observer says, "we've got a tentative victory now." In the same breath he warns that we cannot blow it. And, he notes quietly, that if California is the recalcitrant part of the cable industry, then the rest of the industry may just try to make a 49-state settlement.

The cable industry is clearly between a rock and a hard place. In a classic "damned if you do, damned if you don't" situation, the cable industry is going to have to work out its own internal problems before it can effectively negotiate with the telephone industry . . . a united monolith if there ever was one.

This emphasis on pole attachment rate disputes is not meant to preclude other problems with telephone companies and other pole owning utilities. Every cable operator knows of the difficulties involved in working with the telephone company regarding rearrangements, scheduling, mapping and more. Excessive technical requirements imposed for cable construction far exceed most national and local regulatory codes — which are okay for the phone company but often not for the cable company. For example, the normal one or two feet vertical separations required between communications lines: remember all those overlashed lease-back cables on telephone lines the phone companies used to build?

Another sore point is the need for purchasing some poles, anchors, guard-arms and other utility support structure items from Western Electric. In a childishly obvious case of anti-trust violations, the cable industry is forced to purchase from A.T.&T.'s own captive . . . under the dubious guise of protecting telephone plant (from what?). How can there be any justification for this when the cable industry is willing to provide material that complies with and even exceeds the utility standards for equipment?

Natural Tensions

Perhaps the tensions, both with the industry and between the industry and the telephone companies, are natural. Even if they are, though, something needs to be done. And quickly.

A good start would be reasonable compromise. Perhaps like another bad joke we got in copyright negotiations.

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The Mark IV system can be initially installed as a single cable forward system only. Bi-Directional capabilities may also be installed initially or at a later date, and only when necessary. Initial costs are minimized and no obsolescence results when Bi-Directional capability is required.

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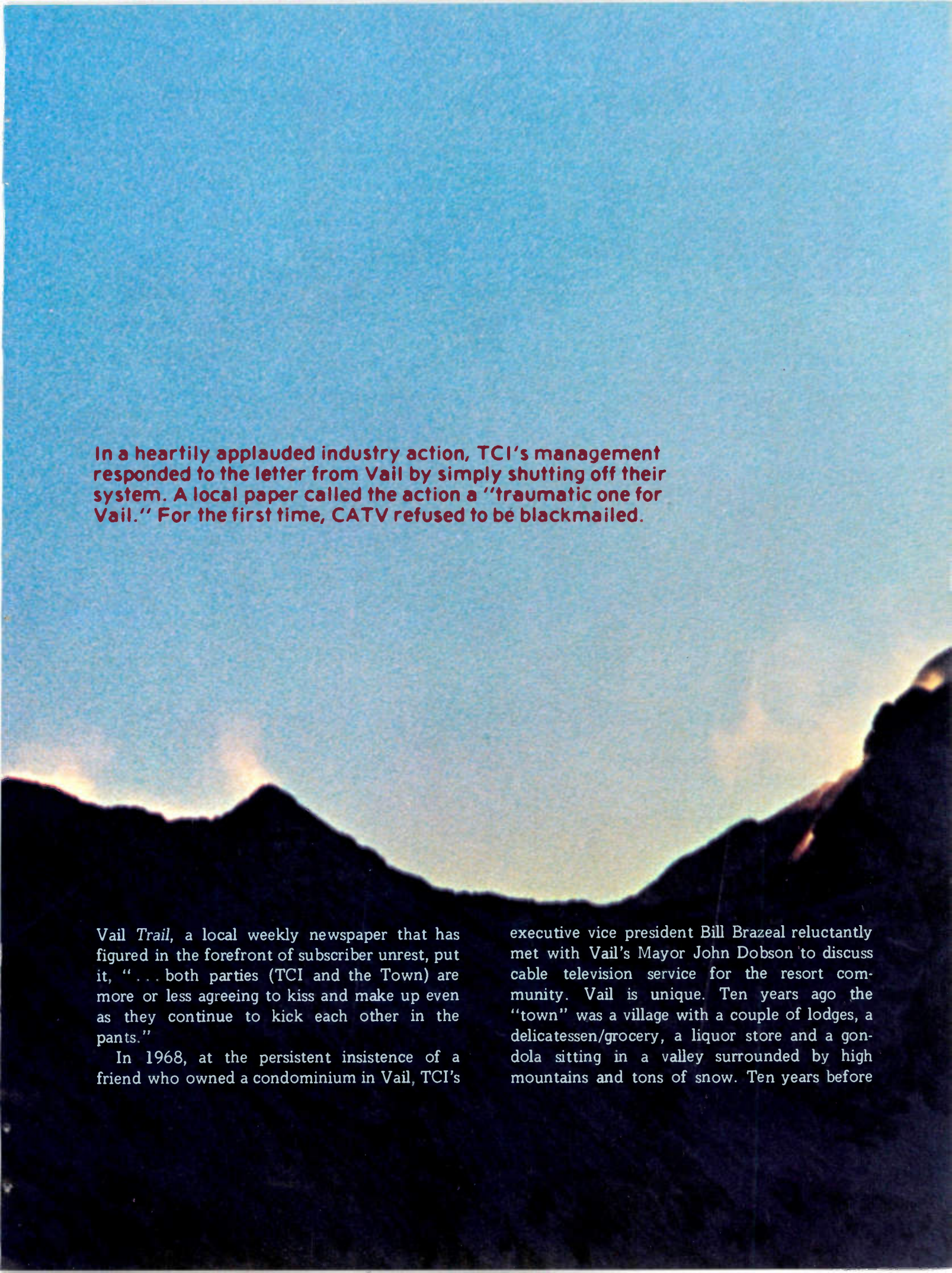
"The Town of Vail Hereby Terminates The Existing Franchise Agreement..."

By Paul S. Maxwell
Executive Editor

Football, including a Denver Broncos game, was totally blacked out in the resort community of Vail, Colorado the long weekend of November 1 through 5. In an industry first, the top management of Denver-based multiple system operator Community Tele-Communications, Inc. (TCI) took the unprecedented step of terminating service when the town's manager, Terrill Minger, rather precipitously terminated the MSO's franchise. (See *CATV* News Bulletin, Friday, Nov. 2 and *CATV* Nov. 12, page 16.)

The system is back on now, and the matter is in the courts. TCI has filed in Eagle County, Colorado Circuit Court asking for a declaratory judgment setting out the ground rules for the termination of a franchise agreement. As the



In a heartily applauded industry action, TCI's management responded to the letter from Vail by simply shutting off their system. A local paper called the action a "traumatic one for Vail." For the first time, CATV refused to be blackmailed.

Vail *Trail*, a local weekly newspaper that has figured in the forefront of subscriber unrest, put it, "... both parties (TCI and the Town) are more or less agreeing to kiss and make up even as they continue to kick each other in the pants."

In 1968, at the persistent insistence of a friend who owned a condominium in Vail, TCI's executive vice president Bill Brazeal reluctantly met with Vail's Mayor John Dobson to discuss cable television service for the resort community. Vail is unique. Ten years ago the "town" was a village with a couple of lodges, a delicatessen/grocery, a liquor store and a gondola sitting in a valley surrounded by high mountains and tons of snow. Ten years before

that, it was sheep ranch in the high Rockies. A group of enterprising financiers, mostly Texans, formed a company called Vail Associates and created, literally, a village/ski resort modeled on the European type. Vail contrasts sharply with Colorado's oldest major ski area; Aspen was a town first, then a ski area. Vail was a ski area first, now it is almost a town.

As Mayor Dobson put it, the Town "begged" Brazeal and TCI to build a cable system. No other cable company expressed much interest in serving the 500 plus permanent residents.

Brazeal reluctantly agreed.

Today Vail boasts a fully functioning city government and somewhere around 1500 permanent residents. The "population" rarely plunges below 7500 on any given day, however. And peak "population" during the ski season approaches 27,000. Vail Cable TV now has 1143 subscribers (as of November 15) paying a $9.00 fee for three network channels and an educational station from Denver (by microwave, via most of Colorado instead of straight over the passes . . . the microwave, Western, serves a number of other rural Colorado communities). Brazeal remembers his surprise that the Town's powers didn't want anything more in 1968 . . . seems they wanted to keep people in restaurants and bars.

The Vail town manager, Terrill Minger, used to be an assistant city manager in Boulder, Colorado. He, naturally, heard about Boulder's "great success" in renegotiating its CATV franchise and winning major concessions from the new winner: TelePrompTer. TPT out-promised an "economically blackmailed" TCI — as then cable negotiator for Boulder, Bob Sample, put it. The new franchise appeared to promise the heralded coming of super-sophisticated cable communications . . . economics be damned.

"Community Frustration"

Jim Lamont, Minger's assistant at Vail, allegedly went so far as to literally cross out "Boulder" on a request for franchise and scratch in "Vail." In any event, the Town decided to reopen franchise negotiations after five years of growth. The franchise specifically permitted only rate renegotiations after five years.

But Minger said that "after two or three years of continuing community frustration" he felt he had to act. Act he did. So did TCI.

Unfortunately, Minger noted, "our problem hasn't got a damned thing to do with Vail." He was referring to TCI's Boulder experience. He is, in part, right. TCI was burned in Boulder . . . and faced the same prospect in Vail. Leacom, part of the Leavel Company out of El Paso, has been actively soliciting local support, presumably to either buy the TCI plant and franchise or enter Vail as a competitor. Leacom has already secured a second franchise in nearby Breckenridge (which its own company literature calls "tiny") and has overbuilt Pan-American Cablevision. Dick Elias, who runs the condominium complex Manor Vail, is president of the Vail Resort Association and is a candidate for the council, told the town council meeting that he had raised $25,000 of his own

Left: TCI Regional Manager Don Morris tripped the power switch at 6:30 p.m. MST. Right: TCI Executive Vice President Bill Brazeal, Vail Cable Manager Gary Herbst and TCI General Manager J.C. Sparkman (left to right) watched the screen's snow match that outside.

money to join with Leacom in securing a franchise in Vail. Elias has already led a variety of fights, chiefly over rates, with Vail Cable.

Like Prairie Village ?

The industry's franchising Waterloo in Boulder, along with the fables of blue sky, continues to haunt the cable industry. One recently-arrived Vail resident wanted to know, during the council meeting, why Vail couldn't have CATV at $5.25 per month with local origination, all-band FM, 24 channels of video, public access and more . . . just like his former home town of Prairie Village, Kansas. That community is served by TeleCable of Overland Park, has a potential of 56,000, is in a Top-100 market, and currently has a subscriber base of

about 7300 and 610 miles of plant. No representative of Vail Cable has ever explained the difference to the Vail community.

Nor have the local newspapers (the *Trail* and the *Villager*) ever really explained cable. Following the council meeting, the *Trail*'s editor wondered why "Cable TV's (shouldn't) be termed a Public Utility and be under the jurisdiction of the PUC or FCC?" Colorado's Utility Commission has repeatedly declared that cable service is not a utility; and, of course, the FCC exercises some jurisdiction.

Admittedly, the cable system and its parent have been neglectful in presenting their side of the story.

The story is one of malcontent among the subscribers, according to the *Trail*, the town and most of the subscribers *TVC* talked with. According to the *Trail*, one subscriber wrote, "I am torn between selling my TV and burning it in protest in front of the CATV office (if, indeed, anyone is really there to notice.) Its hard to understand how such an inept, irresponsible, ill-qualified bunch ever got this business in the first place. I'm tired of having to call every week (sometimes daily) to report partial or total outages, tired of being sympathetic because the help is new or simply untrained. Is there no licensing or quality control for this type of operation?"

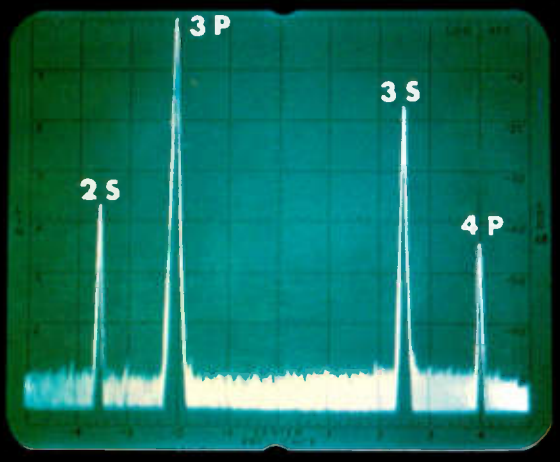
Less $ for Lifts?

The *Trail's* editor charges Vail Cable with "questionable service and practically no PR." A so-called "unsolicited" petition turned up with the signatures of 250 disgruntled subscribers who, in essence, demanded cheaper rates (one observor noted, however, that anyone could get a much larger petition if they simply stood alongside the lengthy ski lift lines and asked "Would you prefer less expensive lift tickets?").

Subscriber complaints, when not about the $9 rates, centered around signals. Because of the lengthy microwave hops, the signals suffered. Minger mentioned the Elliot Richardson press conference as an example. "Just as Richardson started to answer an important question." he said, "a skier appeared on the screen! No more Richardson; just a skier and white snow . . . on the ground, not the snow we usually get on the screen."

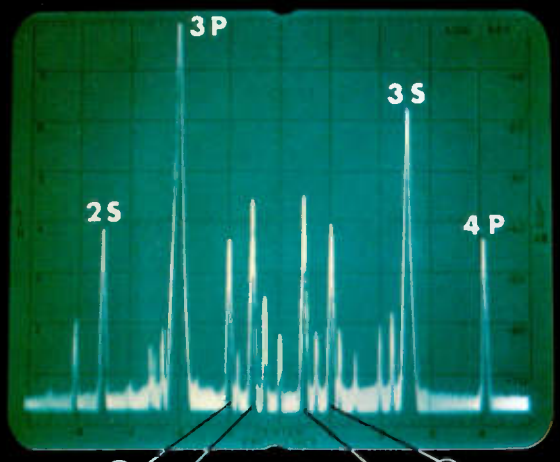
Service could be better, even Brazeal and TCI General Manager J.C. Sparkman admit; yet, they say, it would be more expensive and the whole operation is not exactly profitable. With a capital investment of between $250,000 and $500,000 and the constant costs of repairing cut cable, the system is not, they emphasize, a gold mine.

Yet some in the town want local origination, more channels, FM and, at first, even asked that the LVO local origination channel 3 in Grand Junction (which, by the way, runs hours of "What To Do in Grand Junction" film) be imported! Minger insists, though, "we don't want space age blue sky . . . and the minutes of the



OURS

Blonder-Tongue MWT sound trap, BPF-3 channel filter, and MCA-BTVa-3 processor. MWT sound trap set to attenuate sound carrier 10 dB below the received input level. (H-P spectrum analyzer photos are 1 MHz/horizontal block, 10 dB/vertical block, full scale + 54dBmV)

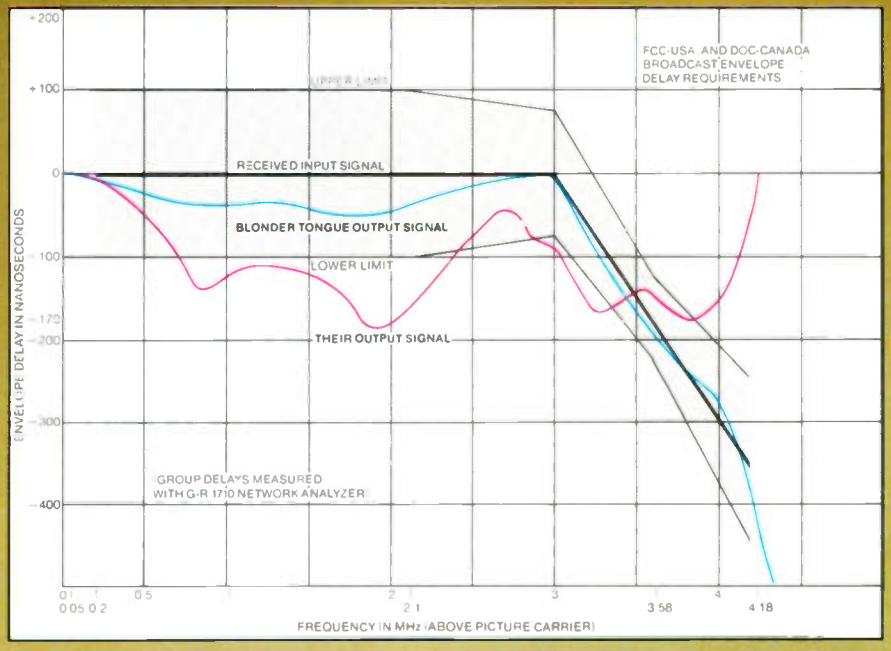


THEIRS

(Typical heterodyne processor)
— Visable intermodulation products —

1. 62.25 MHz ch4S + I.F. Pix ch2P,
2. 62.75 MHz 2xch4P ch4S and 2xch3P ch2S,
3. 63.75 MHz ch2P + ch2S ch4S 43.25 MHz 107 MHz Osc. 43.25 MHz 63.75 MHz
4. 64.25 MHz 2xch2S ch2P and 2xch3S ch4P.

WHEN A PICTURE IS WORTH A THOUSAND WORDS



"Our" headend produces better results than "theirs." The Hewlett-Packard spectrum analyzer photos, at the top, and the chart to the right, tell why.

The above photos show the results of processing CH3 carriers at a level of +10 dbmv when CH2 and CH4 carriers are present at an input level of +20 dbmv. The Blonder-Tongue processor shows no 2nd order or 3rd order beats with unbalanced input levels even greater than shown above.

Competitors recommend the use of input and output bandpass filters to attenuate in-channel and out-of-channel beats present at the input and output of typical heterodyne processors. However, this procedure is at the risk of incurring excessive group delay. (See "Theirs" red line in graph).

Blonder-Tongue headend processors insure distortion-free color with no added luminance transient ringing. Negligible change is added to FCC specified group delay. (See blue line in graph.)

Newest Blonder-Tongue headend component: MCA-BTVb, a top-performance headend processor amplifier. Includes: 3 switchable delay times for automatic carrier and program substitution; LED readout of signal-on conditions; PIN diode RF switching; integrated circuit switching sensor; AC power switch; ultra-reliable, regulated and clamped power supply; all enclosed in rack-mounting chassis for quick replacement of four fiberglass printed circuit boards.

For better pictures for your cable customers, go Blonder-Tongue today. Blonder-Tongue Laboratories, Inc. One Jake Brown Road, Old Bridge, N.J. 08857

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The variables of drop cable performance are many. Belden knows. And has developed a better way to help isolate the right coax answer for your specific system and environment needs.

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Belden offers a range of standard drop cable answers. Single and dual cable designs. With and without messengers. A variety of shielding. If you want definitive answers to coax problems right now, call (317) 966-6681. Or mail the coupon.

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8-7-72

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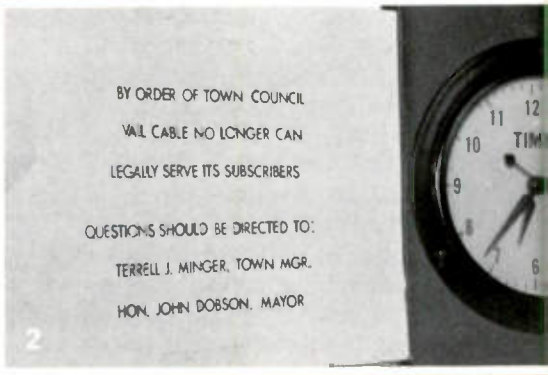


1) Mayor John Dobson explains a point during the crowded Town Council Meeting Tuesday, Nov. 6. 2) The information channel's message . . . the only thing viewable. 3) Manor Vail's Dick Elias, a council candidate. 4) Mayor Dobson and 5) Town Manager Terry Minger at the midnight negotiations Thursday, Nov. 1.

negotiations show we backed off when something wasn't economically feasible."

Among the complaints of the system's operators is the problem of contractors cutting their underground plant. The day service was temporarily cut off, one Vail Cable employee staked out the cable's location for a contractor. One hour later it was cut. On the other hand, Minger says the town built a circular playground . . . and cut the cable five times! "Nobody knows where it is," he says.

Revocation Reasons

In the town's letter to TCI president John Malone, Minger listed a variety of complaints termed "adequate grounds for termination" of the franchise. The six-page letter included the alleged violations: failure to file plant plats; failure to file insurance certificates; failure to file bond; an allegation that the "general public has indicated that in its opinion the rate they are being charged is not fair and reasonable; failure to notify of interrupted service (TCI notes that Vail's 16 miles of plant has "in excess of 350 splices . . . "); failure to proved adequate service and failure to file

requested reports to the town. TCI denied all; and Minger later admitted that all the points listed "weren't what the problem is really about."

When service was terminated it became even more of a political issue. No cable system had ever responded in quite that way and, as Dobson noted, "we never anticipated that."

He later said, "This has been a hell of an education."

Dobson is running for reelection to the Town Council. The elections were November 20 (too late to be included here, though). Obviously cognizant of that and although he hadn't thought "TV important enough to be a campaign issue," Dobson said the council was "making sure everyone can have service." Elias told the council that "citizens did not demand the interruption of service."

Vail has more problems, too, that show a certain disregard for some. The town has a sign code with unexpectedly stringent provisions. Minger, admitting he hadn't read the ordinance, said, "The only ones who complain are those with a financial interest." The city removed one lodge's sign without even mentioning it to the lodge's owners . . . the lodge has sued.

And, neither Minger nor his assistant Lamont live in areas served by TCI. Lamont's wife is a reporter for the *Trail.*

An Industry Service

Forgotten in all the rhetoric was the simple point that Vail was lucky to have television service at all. And Bill Brazeal probably regrets doing a favor.

But this time he did the cable industry a favor. At 6:35 p.m. on Thursday, November 1, Bill pulled the plug on cable in Vail by "complying under protest." The matter is now in the courts.

It was the first time a cable company has stood firm. As some observors in the industry noted, "It was about time; TCI did the industry a great service."

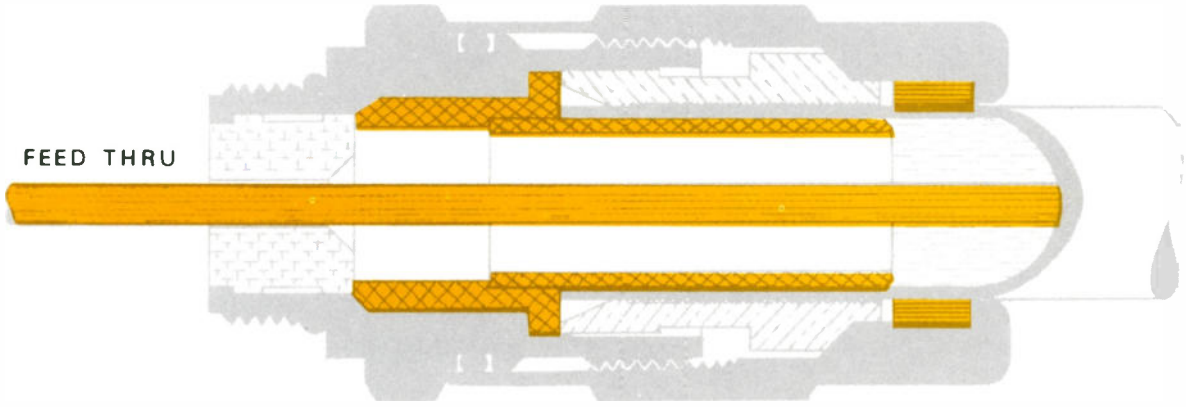
Yet, the situation did not have to degenerate to such an extent. There remains a very basic problem: CATV is being haunted by its own promises of blue sky. There are still clouds.

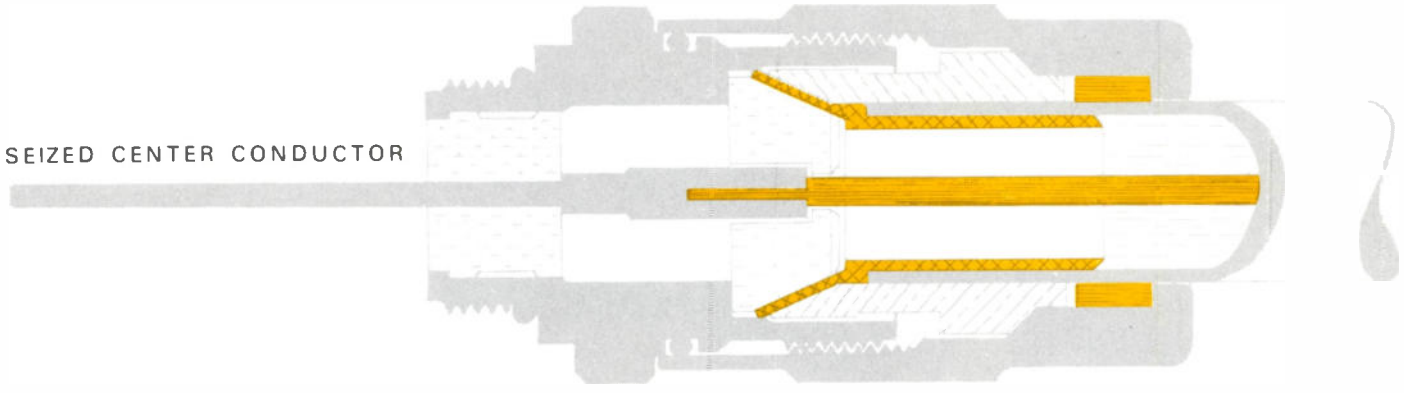
A repeat could be prevented through simple — but complete — education. The National Cable Television Association's pamphlets should deemphasize cable's promise and talk about what it can and does feasibly deliver today. Cities and towns must be made aware of their own particular situation . . . why, for instance, could someone in Vail ever hope to get the same as a town in a Top-100 market? And, simple electronics need to be explained to the public in cable markets, present and future.

An additional possibility is some sort of joint board composed of cable industry (probably NCTA) and city officials (probably from the League of Cities) to serve as a source for reasonable answers.

But most of all, a franchising code of ethics is overdue. TVC

WHY PAY MORE FOR LESS,
WHEN CAMBRIDGE HAS YOU COVERED AT BOTH ENDS!





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  Upstream 5-30, 5-110, or 50-110 MHz
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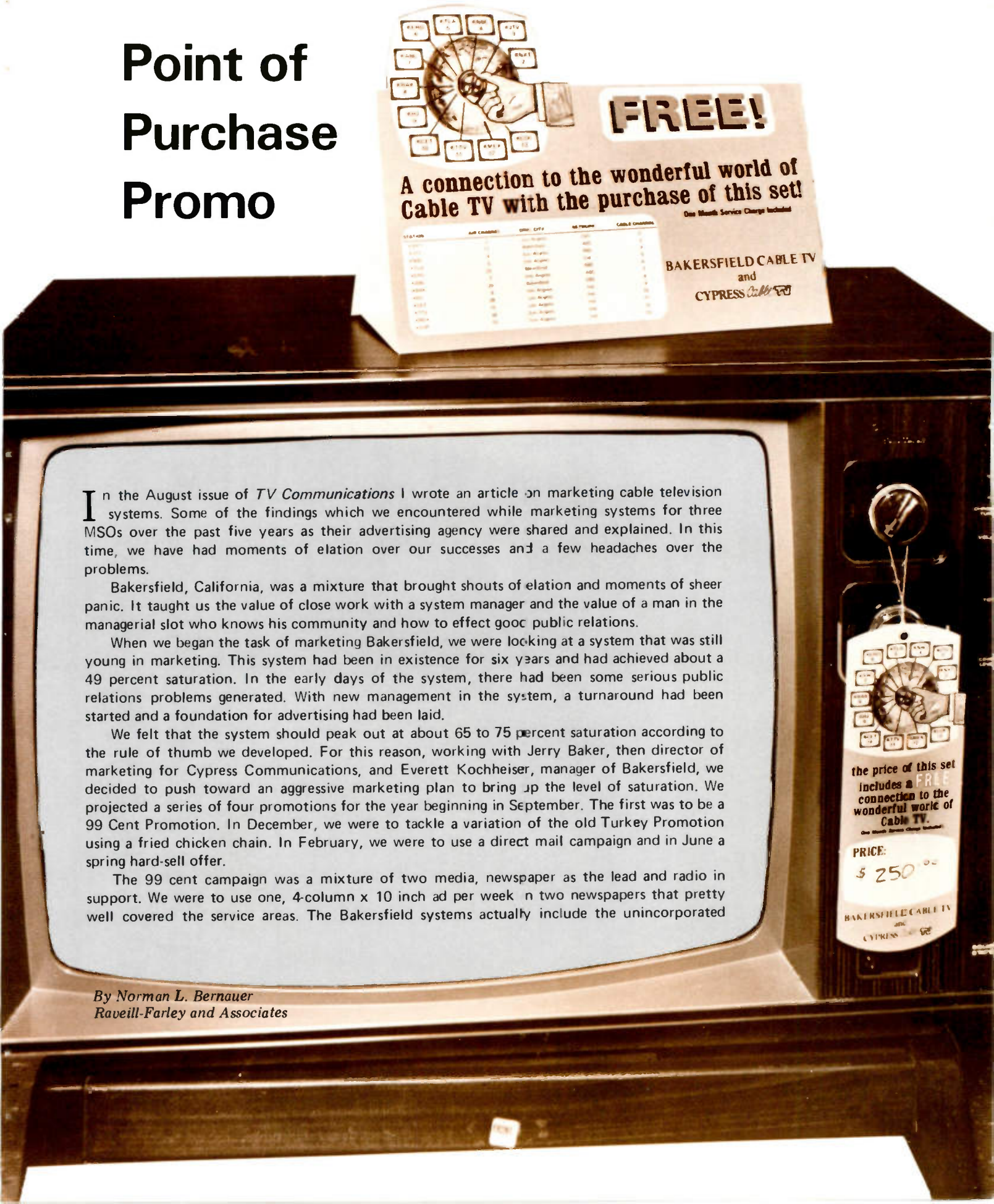
See us at
Western Cable TV Show
Booth 144

Point of Purchase Promo



In the August issue of *TV Communications* I wrote an article on marketing cable television systems. Some of the findings which we encountered while marketing systems for three MSOs over the past five years as their advertising agency were shared and explained. In this time, we have had moments of elation over our successes and a few headaches over the problems.

Bakersfield, California, was a mixture that brought shouts of elation and moments of sheer panic. It taught us the value of close work with a system manager and the value of a man in the managerial slot who knows his community and how to effect good public relations.

When we began the task of marketing Bakersfield, we were looking at a system that was still young in marketing. This system had been in existence for six years and had achieved about a 49 percent saturation. In the early days of the system, there had been some serious public relations problems generated. With new management in the system, a turnaround had been started and a foundation for advertising had been laid.

We felt that the system should peak out at about 65 to 75 percent saturation according to the rule of thumb we developed. For this reason, working with Jerry Baker, then director of marketing for Cypress Communications, and Everett Kochheiser, manager of Bakersfield, we decided to push toward an aggressive marketing plan to bring up the level of saturation. We projected a series of four promotions for the year beginning in September. The first was to be a 99 Cent Promotion. In December, we were to tackle a variation of the old Turkey Promotion using a fried chicken chain. In February, we were to use a direct mail campaign and in June a spring hard-sell offer.

The 99 cent campaign was a mixture of two media, newspaper as the lead and radio in support. We were to use one, 4-column x 10 inch ad per week in two newspapers that pretty well covered the service areas. The Bakersfield systems actually include the unincorporated

By Norman L. Bernauer
Raveill-Farley and Associates

GUIDELINES for Realistic Percentage of Penetration of Cable TV:

developed by Raveill-Farley and Associates, Inc., Advertising., Independence, Missouri 64050

OFF-AIR RECEPTION	CABLE OFFERINGS	PERCENTAGE OF REALISTIC SATURATION
3 Nets Grade A	3 Nets, No Additional Offerings	5 - 10%
3 Nets Grade A	3 Nets, Newswire, Weather Scan	10 - 15%
3 Nets Grade A	3 Nets, Newswire, Weather Scan, Local UHF, ETV, Film Origination	25 - 30%
3 Nets Grade A	3 Nets, Full Origination, Newswire, Weather, UHF, ETV & Message Wire	30 - 40%
2 Nets Grade A W/ 1 Net Grade B or Less	3 Nets, All Cable Signals Excellent	50 - 60%
2 Nets Grade B or Less, 1 Net Grade A	3 Nets, All Cable Signals Excellent	70 - 80%
Grade B or Less on All Nets	3 Nets, All Cable Signals Excellent	80 - 90%

NOTE: 5 to 7% of homes either unoccupied or do not have television. Approximately 10% additional penetration can be expected for adding a distant independent signal.

Percentage of penetration may vary slightly depending upon which networks are weak or strong in signal, topography, and economic stature of the community.

Bakersfield systems actually include the unincorporated areas of Greater Bakersfield and certain parts of the city annexed since 1965 plus Wasco, Shafter, Delano and McFarland. The ads were to run once a week during September and were supported by about three, 30-second spots per day on two Bakersfield radio stations.

For about the first few days the campaign was going well and as expected. Then one day I received a call from Everett Kochheiser, manager of the Bakersfield system. He, not too tactfully, suggested that I join him in Bakersfield and start climbing poles. It seemed that the roof had fallen in and the service crews were swamped. In a matter of two or three days, the connect requests had come in with such a rush that we had built over a two-week backlog. I asked him if he was having community problems. "Nothing I can't handle," was his reply. I then asked if he wanted to turn it off. I'll never forget the answer I got. You could hear the grin in his voice as he told me that he'd come to Kansas City and kick me all the way back to California if I did. I was still concerned with the public relations problems of not being able to handle the connects within a reasonable time. He told me not to worry. He had more crews coming in and would work them around the clock if necessary, but they would get the customers hooked up on time.

Job Well Done

I can't say enough about the work that was done by Ev and his crews in getting what seemed like an impossible task completed. The residual effects of the promotion and the good will created in these communities caused us to cancel the chicken promotion, for the connects were still coming in well after the 99 cent promotion was finished. This then was coupled with a door-to-door sales campaign that effectively brought the saturation up to a more realistic level. The direct mail campaign was carried out in the spring with excellent results. The residual effect of this also continued on into the spring. For this reason, the beginning summer campaign was cancelled.

We had, in the meantime, projected for a number of Cypress systems a special campaign. We refer to it as our TV Dealer Campaign. After discussing this with Everett Kochheiser, he wanted to try this one in Bakersfield. But Ev went a step further. He contacted the Cox Cable Company which has the franchise for Bakersfield proper. Since both cable companies were carrying the same signals on the respective systems, Ev knew that this promotion would work with the systems cooperating on the project. In cooperation, the two companies began by inviting all the TV dealers in the Bakersfield area to a dinner where they would explain the promotion and how it would work. The dinner was in celebration of the Sixth Anniversary of cable in the Bakersfield area. Historically, TV dealers are not too happy about cable. It cuts

down on the sale of outdoor antennas, but in this case, the dinner was well attended.

Our agency prepared a tent sign for use on the top of floor display TV sets in the dealers' showrooms. It announced that a free connection to cable TV would be given with the purchase of that set. It also showed the channels available in that area. As part of the package there were also colorful price tags that the dealer could use to show the price of the set which conveyed the same information as the tent sign. The dealers were informed that if they would use these tents and price tags, it would eliminate a headache for themselves — antenna service. And they would have the extra sales feature in selling their sets of a free cable connection. In addition, they were informed that there would be a sales commission of $5.00 for every cable connection they sent to the systems.

The dealers bought the program and it has worked. In speaking with Ev at the last marketing workshop in Dallas, he informed me that this has been the most successful on-going campaign that he has ever used.

He has informed me that well over $6,000 has been given out by the two systems in sales commissions to TV dealers. That amounts to over 1200 connections in 13 months. The retention of these connects has been excellent. The Bakersfield system has been experiencing nearly 100 connects per month due to this promotion.

Several lessons were learned through these marketing programs. First of all, when you have a system that is more than 20 percent below realistic saturation, market cautiously. Be prepared for the connections. Evaluate your manager and his ability to handle the influx. Serious backlogs of connects can cause irreparable damage to your community image from which the system may never recover. If you have a top notch man who can keep up the morale of his crews and the men are willing to work, large influxes of connects can be handled.

Close Cooperation

The second lesson learned here is to work closely with the local manager. Without the full support of Everett Kochheiser, Bakersfield could have been a disaster. Some other managers sometimes have to be pushed, but if the man knows his community, can handle his men and is not afraid of work . . . -open up the marketing throttles and go!

The third lesson is in finances. Just because you set up a program and a budget, that doesn't mean that you have to spend it all or go through with the program. Flexible planning with a no-nonsense approach can and will save marketing dollars and increase the income of a system.

Finally, when you have a particular problem in your community, don't avoid it. Look it square in the face and find a solution. If the TV dealers are giving you problems, put together a package that will include them to their advantage and get them selling on your side.

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After years of research and development, plus the experience of building more than seven million feet of polystyrene cable, Cerro has finally developed CERROFOAM. The name indicates how proud we are of the final result. Try it. We think you'll agree it's the best CATV cable you've ever used.

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...Cabledata Computers Crack

By John Harris

Pay cable with all its promises as a new entertainment medium obviously poses a number of new considerations for an existing CATV system.

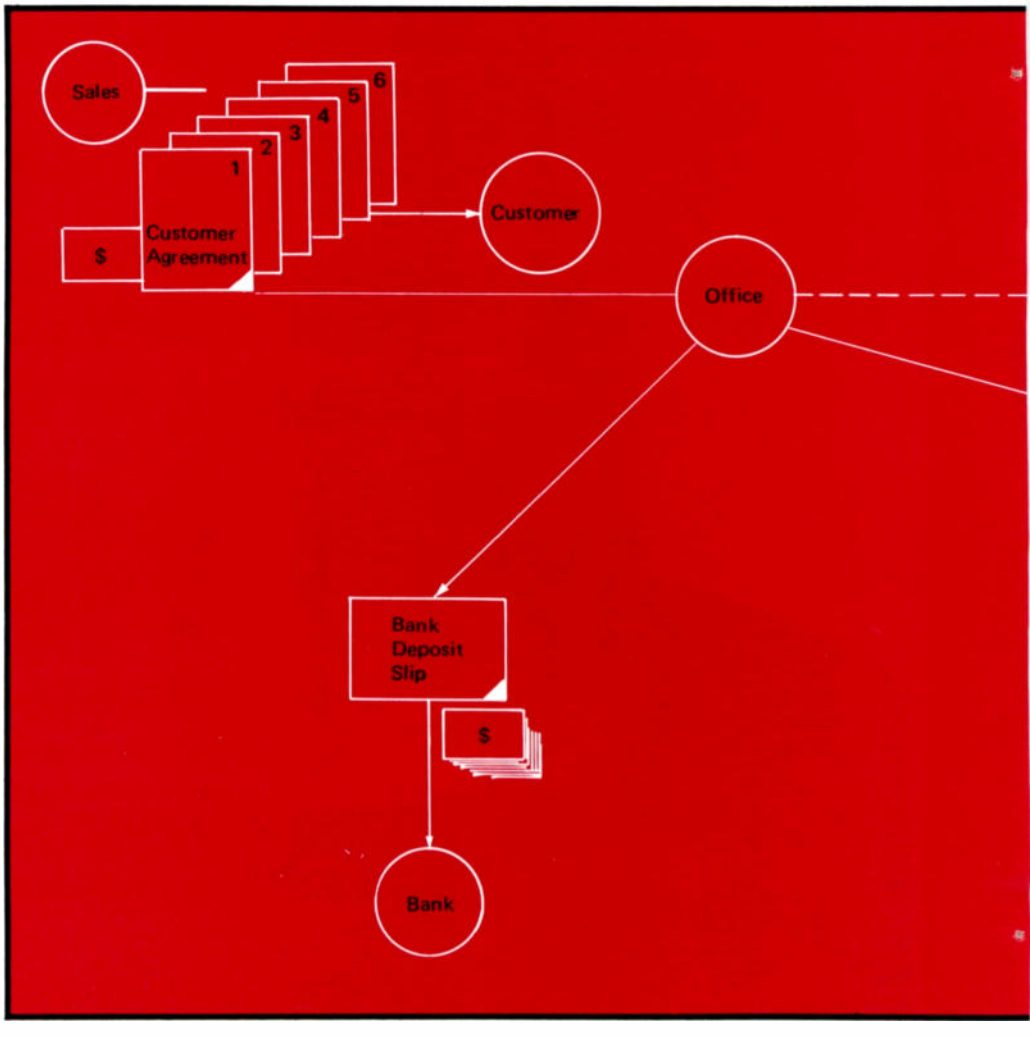
Of these, none looms larger than the need for an accurate, economical means of customer billing that faithfully records and reports the variable whims of the in-home, ticket-buying cable subscriber. And organizes, sorts and adjusts to a system's constantly changing subscriber inventory and the viewing options available to each.

Big Headache

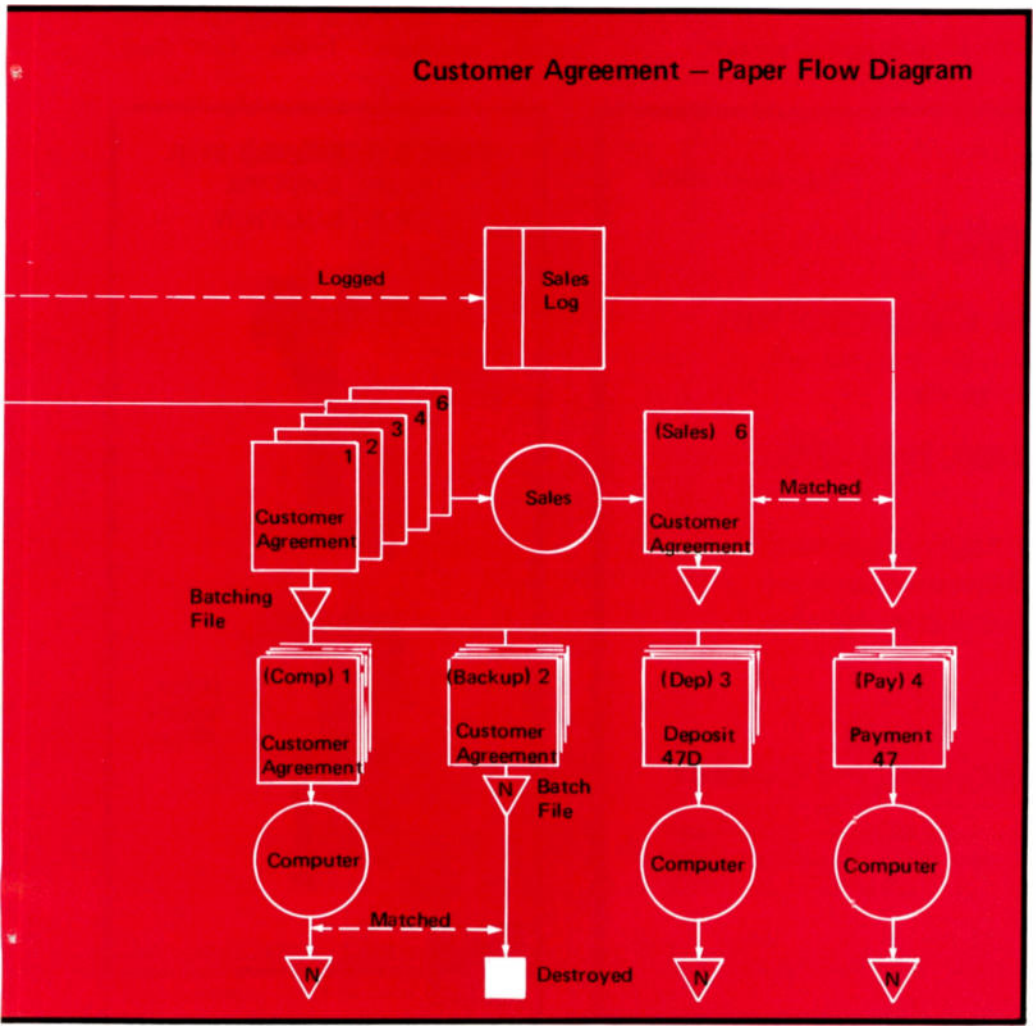
In short, billing and monthly subscriber accounting can become monumental headaches for CATV systems incorporating pay television with existing subscriber services.

Cable television's billing variables hardly compare with those presented by pay cable's "viewer's choice" of first-run movies, athletic events, home study courses or whatever. Each subscriber becomes a distinctly individual billing consideration.

Cabledata, headquartered in



Complex Customer Charges...



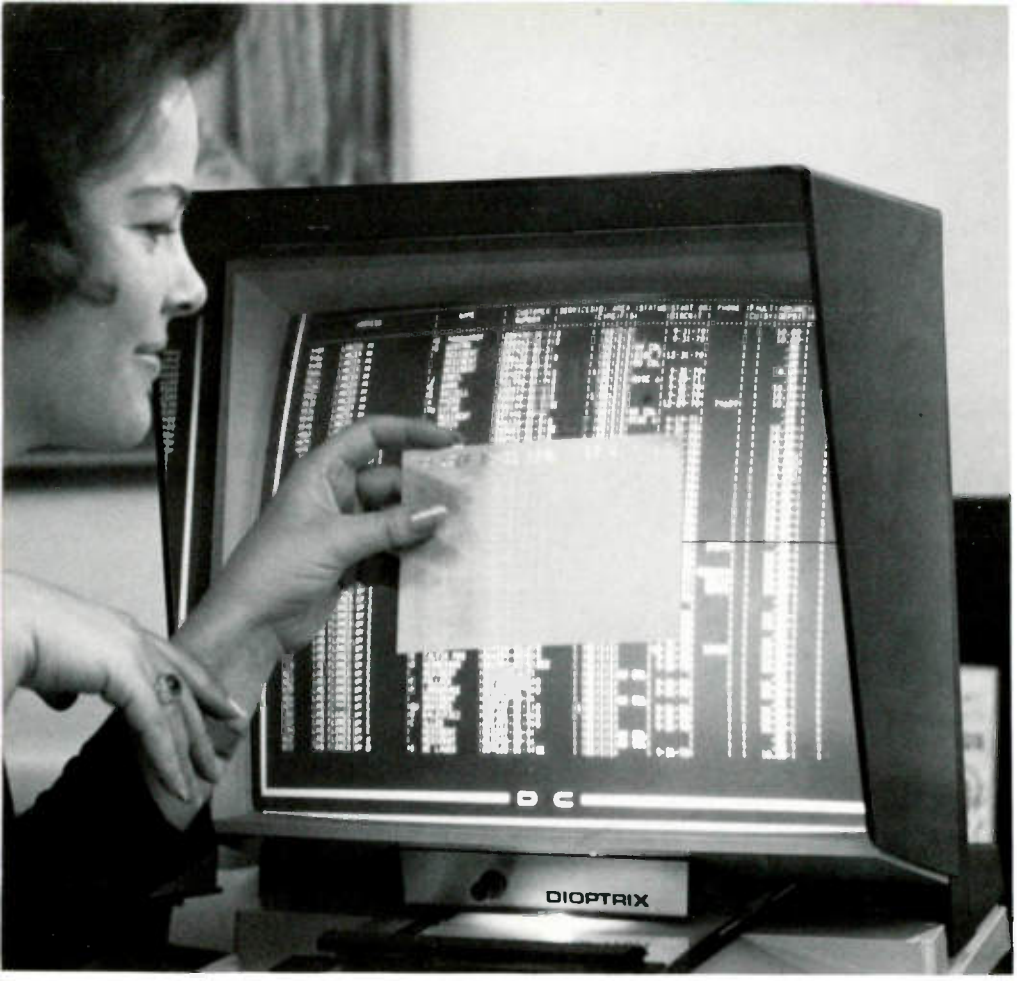
Sacramento, California, is well aware of the billing variables inherent in "viewer's choice television".

Cabledata executives have for some months pioneered a computerized variable billing system in cooperation with Optical Systems' Channel 100 in San Diego — presently the largest pay television operation in the country.

Revising and Redesigning

"Channel 100's operation, still in experimental development, has presented us with constant challenge. We are revising instruction manuals and redesigning computer programming to solve each variable billing need as it arises", said Frank Bradford, Cabledata's Vice President for Research & Development. "Fortunately, our years of cable experience gave us a 90 percent headstart in designing a system for pay cable.

"Such integral parts of our standard service for cable systems as the Historical Customer Ledger — a complete accounting history for every subscriber in a system contained on small microfiche cards — becomes even more valu-



Microfiche cards contain a complete accounting history of each subscriber.

able for a pay cable operation."

Bradford in conjunction with program design teams under Ken Giese, Cabledata's VP for Programming, has written a 45 page User's Manual for Pay Cable with revisions as needed. The manual is used as a step-by-step guide for Channel 100 personnel.

Starting with the work order or sales agreement, the manual completely details office-form procedure and diagrams the information flow from San Diego to the computer banks in Sacramento, the billing to system subscribers and the microfiche-record return to Channel 100 files.

All necessary manual forms are supplied to the system along with the User's Manual for Pay Cable. System Input Forms such as the Event Charge Form and the Event Adjustment Form are explained in the manual.

Once the customer billing mode is established and the computer prepared to receive variable billing and adjustment information, Cabledata computers have 10 auxiliary fields for each

account and each field can contain a maximum of 12 characters and can be programmed to remain with a particular address, or customer name. These variable information capabilities can prove extremely valuable in recording converter and tag numbers, customer demographics and so on.

Half the Story

Information input for computerized billing and microfiche records is only half the story of services available in Cabledata's expanding program for pay cable.

System management receives three event reports twice-monthly: the event table lists all programming events and their charges; the events by type report is an analysis of programs sold and revenue produced for each; and an events by supplier report gives the program supplier revenue amounts collected from his programs and other data.

In addition to the historical customer ledger, Cabledata also

The complex nature of pay cable television requires a flexible billing system.

Computer billing is helping Optical System's pay cable experiment work.

supplies a customized cross reference or street guide listing every house, and every service that house receives, in the system's market area.

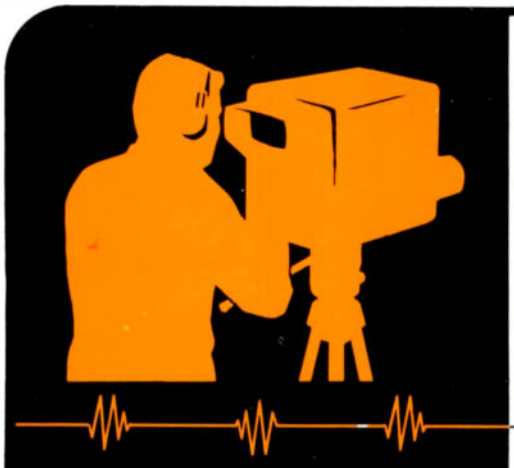
Along with other month-end reports, system management also receives a report on all non-gold card accounts (Channel 100 identifies regular monthly subscribers as Gold Card Accounts), those subscribers who receive only six pack or Wild Card service; and an HTU Inventory Report allowing management to account for and immediately pinpoint the location of all HTU equipment in the system.

In addition to the manuals, reports, forms and diagrams supplied a system for smoothest possible transition to computerized accounting and report preparation, Cabledata maintains a customer relations department for system-problem solving and are on on-call availability.

Rod Hansen, VP for Marketing and responsible for corporate customer relations, said "We are pleased to have the opportunity of developing a variable billing system for Optical System's Channel 100. Combined with our experience in serving the cable industry, we can add the first major programming experience for the pay cable industry to our service capabilities portfolio. If 1974 opens the door to the long anticipated plunge into pay cable by CATV operators, we'll be ready to answer their questions and solve their problems."

Pay cable, undoubtedly, will not slide in on greased runways to immediate public acceptance and acclaim. There will be starts, struggles and restarts. And it seems axiomatic that problem recognition through early planning can forestall problem reality.

If good subscriber relations and immediate, dependable cash flow are cherished goals for a new pay cable system — and we have to presume they are, it would seem likely that the study for an efficient means of variable billing and bookkeeping would be given early-agenda priority. If not there already.



STUDIO Cablecasting

A special monthly section devoted to TV programming operations in small studios

To Film or Not to Film, Is There a Question?

Production problems become more complex as local sales increase. Knowing when to choose between video tape and film can help save you money and satisfy your advertisers.

By Richard L. Williams
Telemation Training Manager

In recent months, there has been much talk about film versus videotape production equipment. Some have maintained that elaborate film production and processing equipment should replace videotape production facilities. Others, however, have declared that film equipment is a frill that adds nothing to a well-equipped videotape facility. What situations dictate the use of film production equipment

To illustrate the different production requirements, let's see how a typical CATV local origination channel could approach the production of several TV commercials for a local hardware store. Our typical local origination channel, Channel 9, has an active staff of four people. The system itself serves about 3,500 subscribers in a town of 35,000 people. Channel 9's video production equipment consists of two monochrome TV cameras, modest but adequate control and switching equipment, a color film chain, but no remote TV van.

Ajax Lumber Store

The hardware store, Ajax Lumber and Hardware, is going to run a number of television spots on Channel 9 in the next month. The first of these spots, the owner explains, will feature himself "talking right to the people." He wants to talk about his good service, his easy credit terms and the number of years his family has served the community. In the same commercial, he wants to show slides of his newly-remodeled store. In the next two spots, he wants to feature first a power drill and driver set and then he wants to show a 48-piece tool kit.

These first three commercials, Channel 9's production manager explains, should be produced in the studio. The lighting and audio in the studio are necessary for the

AKAI's complete portable Color VTR System... eliminates film forever!

Stop gambling with film and film processing. And start saving a lot of time and money.

The better way is here. AKAI's new CVT-150 is a *complete* and *totally portable* COLOR VTR system. For half the price you'd expect to pay. Only $5,995.

Instant, on-the-spot playback eliminates the gamble, delay and waste of film processing. Shows you *immediately* what you've shot. And the AKAI CVT-150 is a smaller and simpler system than you've been using. So there's less to go wrong—with both the equipment and the crew.

The amazingly efficient AKAI color camera provides better than 300 line horizontal resolution, a servo-controlled iris, 6-to-1 zoom lens, and a built-in viewfinder/playback monitor. And a unidirectional microphone that's an integral part of the camera.

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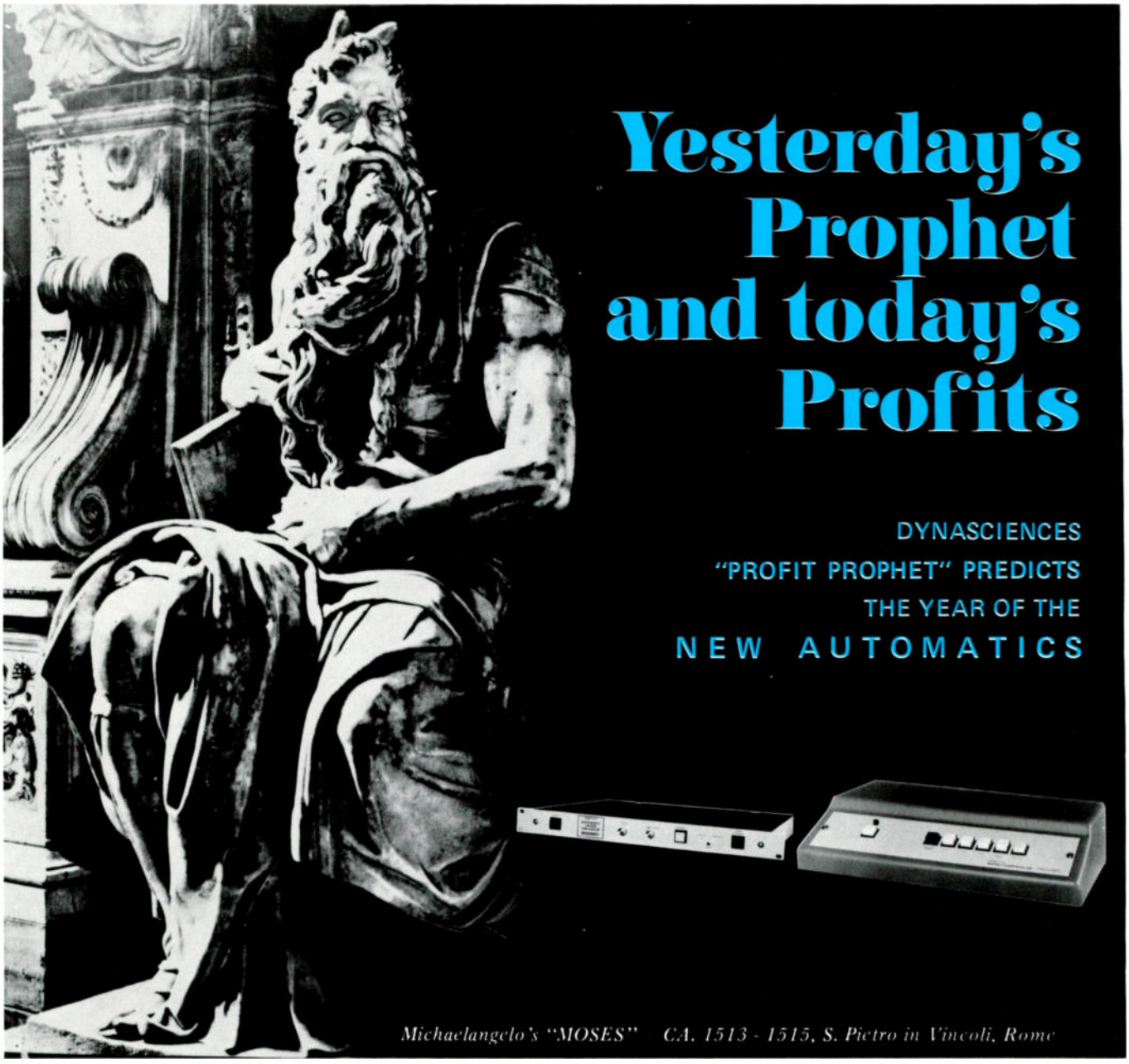

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owner to look and sound his best when he "talks right to the people." The film chain is also useful to show the slides. And, since it is necessary to use some special effects in the second and third spots, the production manager can use the special effects generator in the studio. Finally, it is not necessary to produce the spots in color, so all the taping can be done with the studio's two monochrome cameras.

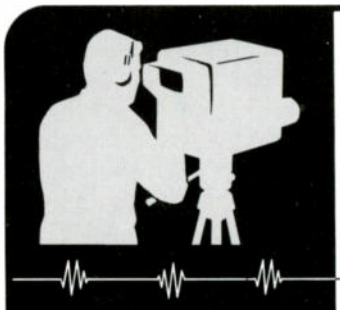
The requirements for the next three spots, however, are much different. In the first of these spots, the hardware store owner wants to feature several kinds of 4 X 8 wall paneling he has on sale; this spot must be in color. The next spot will feature complete bathrooms; the owner wants to show the displays he has set up in the store. In the last spot, he wants to demonstrate several features of a radial arm saw and a table saw; since motion is necessary to tell the story, slides are unacceptable. Since this series of spots must be produced at the store, all three must be filmed.

At this point, the production manager should point out the drawbacks of filming the spots. First is the expense; second, the "turn-around" time could be as long as 10 days (assuming there are no facilities for developing the film in the town); third, lighting and audio in the store would not be nearly as good as in the studio; and, fourth, production techniques would have to be kept very simple. Nevertheless, the original requirements for a color production "at the scene" would require the use of film.

In Agreement

Most production people agree that if something can be videotaped in the studio, it is cheaper and easier than filming at a remote location. However, as we pointed out in the illustration above, there are some instances when production cannot be done in the studio. When the production is done on film, the cablecaster must have a means to televise it. Such a device may be called a uniplexer, a multiplexer, a telecine chain, a film island or a film chain. A film chain selects by means of movable mirrors one or more (up to four) film or slide sources. Commonly, a 35mm slide projector is mounted on one side of a 3:1 (three "inputs, one output"); a 16mm film projector is mounted on the other side and, now a Super 8mm projector may be mounted on the third side.

A film chain as we have described above would normally perform three important functions: it adjusts the light levels of the projectors so as not to burn the camera's pick-up tube; it overcomes the problem of "flutter" caused by the different frame speed; and, it reverses the "backwards" image that comes out of the projectors. Any CATV production manager that wants "Burbank proficiency" should understand the proper application of film sources and film chains in a television production. If there is a rule of thumb in deciding whether to "film or videotape," it is this: Use the studio facilities whenever possible, but don't overlook the conveniences of film. TVC



STUDIO Equipment

A special monthly section devoted to TV programming operations in small studios

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Both units play up to 60-minute cassettes, are simple to operate and broadcast sharp, clear color or black and white pictures. The Sony line also includes cameras, monitors and complete videoprocessing equipment. Complete packages or single items of Sony local origination equipment are available for sale or by a leasing arrangement through Anixter-Pruzan, CATV distributor.

New Multiplexer Marketed

Kalart Victor Corporation has announced the introduction of a low cost table top Optical Multiplexer. The OM 300T is a table top version of the Kalart Victor Model OM 300 Optical Multiplexer, with the same instant transfer (175 milliseconds) of any of three projector inputs into one camera output.

A protective cover houses the optical transfer assembly, which utilizes a field lens and a first surface mirror.

Priced at $930, it provides CATV systems with a professional, low cost optical transfer.

Sony VP - 1600

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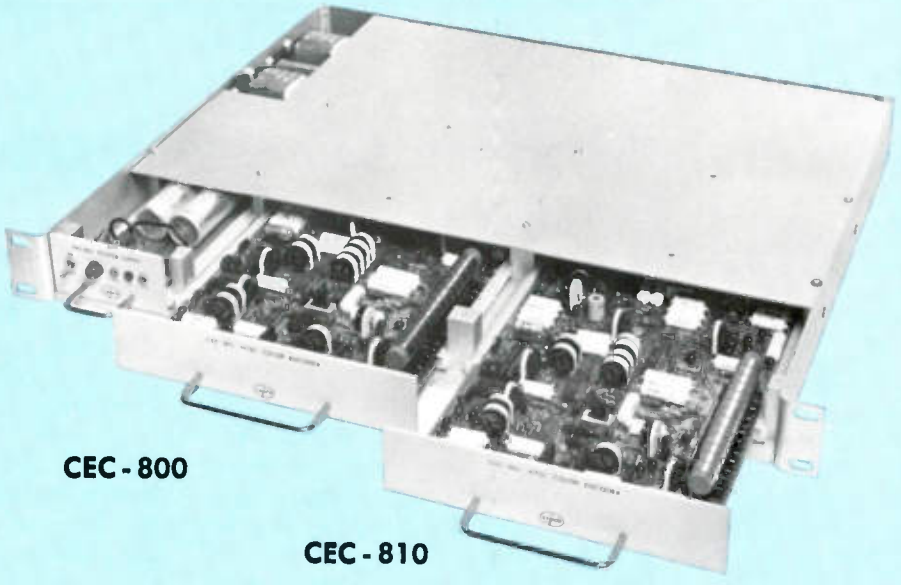

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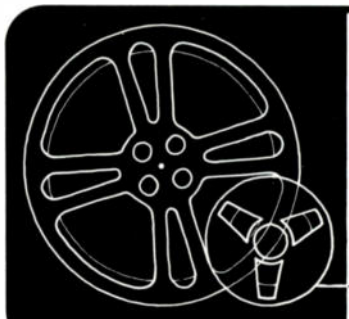

CATV Programming

software news and tips

Report Issued on Wired Island

A study of the first two years of New York cable television's public access channels concludes that the channels are being used, are being watched and are performing a useful function. But the report also warns that the new communications medium faces serious problems of accessibility, funding and public unfamiliarity.

"The original concern about public access — that no one would use it — is unfounded," the report declares. "The most pressing need is to inform the viewing public about its existence and availability."

Under terms of the City's licenses with Manhattan's two cable television operators (Sterling Manhattan and TelePrompTer), two channels are provided at little or no cost to organizations or individuals for transmitting information, entertainment or service programs. Three studios are available on a first-come, first-served basis. But the channels, C and D, can be received only by the 114,000 cable television subscribers in Manhattan.

The report, written by David Othmer, includes statistics on public access use, plus a directory of major users. It is based on extensive interviews with users, cable operators and city officials, on questionnaires sent to public access users and 3,000 potential users, and on a telephone survey.

The variety of public access fare, and the controversial daring of some producers (notably Anton Perich, whose "sexual comedies" sometime turned screens blank), has sharpened the issue of censorship of programs. Under present law, cable operators share liability for program content with producers. This inhibits live programming and saddles cable operators with the expense of pre-viewing taped shows. The report recommends that the Federal Communications Commission designate the public access channels as common carriers, so that only producers bear the legal responsibility.

Franchise Requirements

The report also recommends that the Office of Telecommunications require the two cable TV companies to comply with their franchise requirements by setting up 20 live origination points for public access.

As for financing, the report states that money to produce programs eventually should come from the people and organizations which benefit from public access to cable television — the producers and viewers, whether they be private, corporate or public.

The report, entitled "The Wired Island", points out that "public access programs are relatively easy and inexpensive to produce," and describes for potential users both the equipment required and how to take advantage of the channels' availability. Warning of the possible domination of public access TV by a few funding groups, the report declares: "For PA to thrive, it must have a varied diet — the product of many unrelated cooks working in many kitchens."

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PART I

By Owen McCaughey
and Gaylord Rogeness
Anaconda Electronics

CORROSION

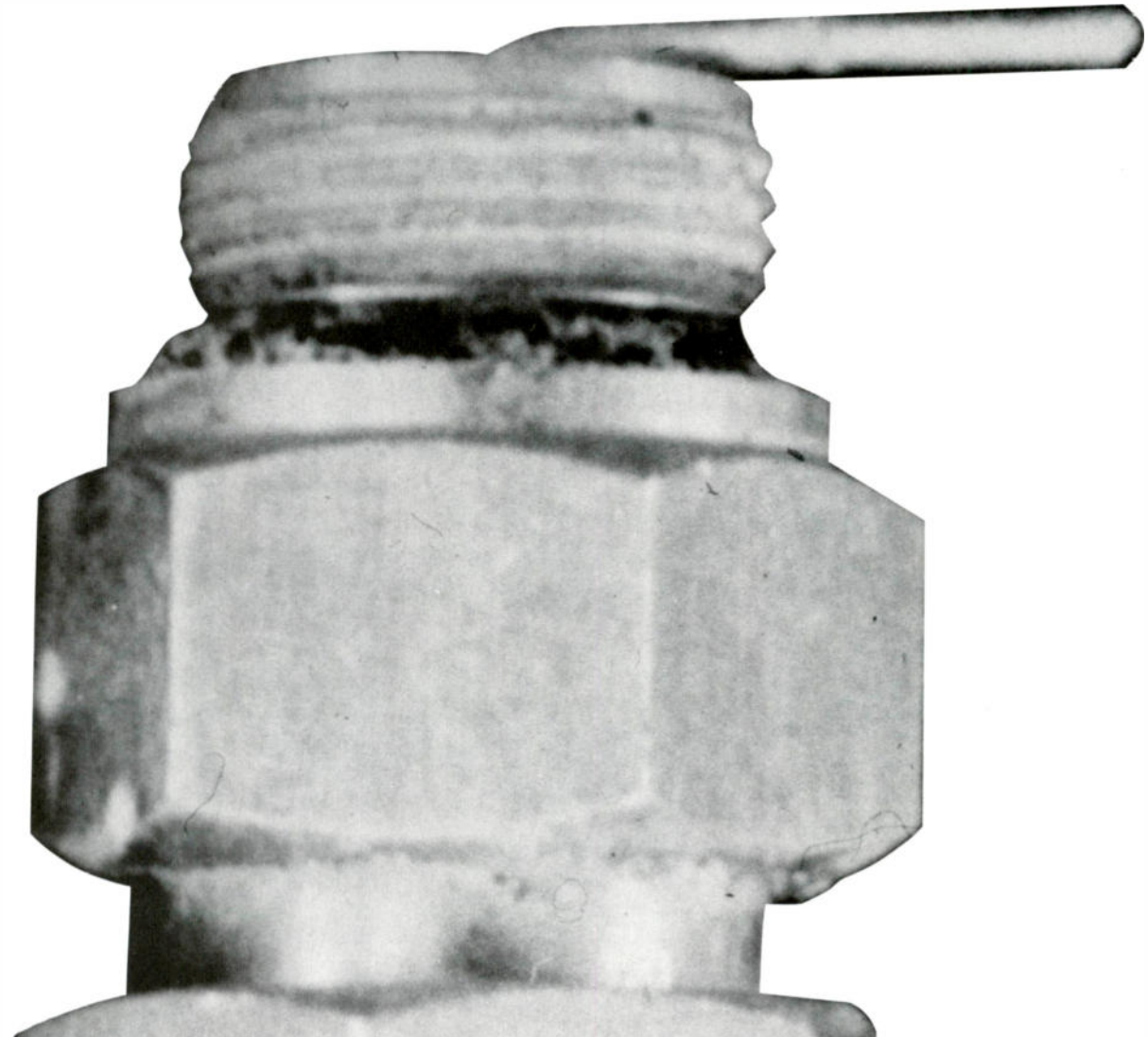
Corrosion can be a serious problem for CATV distribution system equipment, as it is for most types of equipment fabricated from metal which must operate out of doors in a wide range of uncontrolled environments.

The overall magnitude of the metal corrosion problem is indicated by the fact that the cost of corrosion and of protection against it has been estimated recently by various authorities at from six to twenty billion dollars annually for the United States alone.

The phenomenon of corrosion has been defined in several ways. A good consensus definition might be:

Corrosion is the destruction or deterioration of a metal or alloy by chemical or electrochemical reaction with its environment.

Most definitions exclude non-metals from the defini-



tion of corrosion; all exclude mechanical deterioration, such as erosion.

Destructive corrosion of CATV distribution system equipment is used here in the sense of corrosion which proceeds to the point of causing an item of equipment to fail in some manner, requiring that it be replaced or repaired. Corrosion which merely causes a deterioration of appearance is not considered in any detail here, even though it is not necessarily a trivial consideration in CATV plants.

Corrosion can definitely cause failures in CATV distribution equipment of all types. The various forms of corrosion are described, mostly from a phenomenological rather than a theoretical standpoint, and some of the causes, mechanisms, and preventative design methods which apply to CATV equipment are discussed in this article.

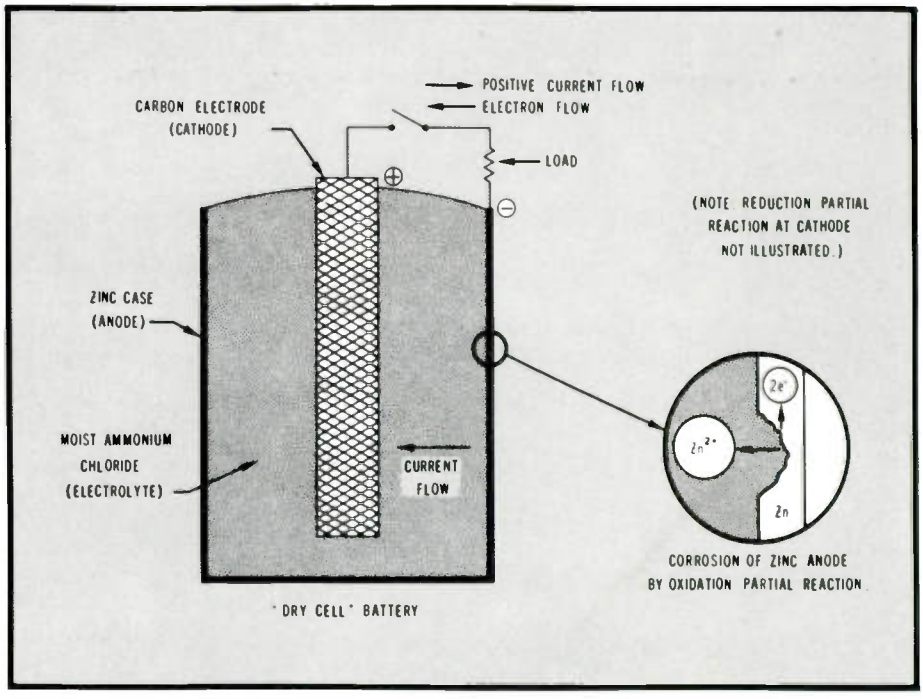


Figure 1. Illustration of electrochemical nature of corrosion – corrosion of zinc anode in dry cell battery.

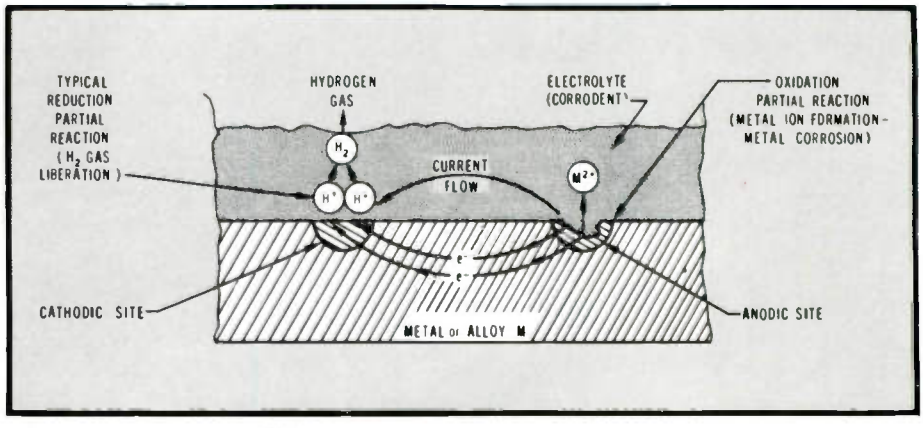


Figure 2. Illustration of electrochemical nature of corrosion – corrosion of single mental in contact with corrodent.

One common way of classifying corrosion is as either *wet* or *dry*. Wet corrosion occurs only when a liquid (including a condensed vapor) is present, while dry corrosion occurs in the absence of a liquid, usually at elevated temperatures. Virtually all known corrosion problems in CATV equipment are of the wet variety — that is, a liquid must be present for corrosion to occur. We will be discussing only wet corrosion in any detail.

Most wet corrosion processes are electrochemical in nature. The electrochemical nature of corrosion is illustrated in figures 1 and 2. Figure 1 shows how the flow of electric current from a dry cell battery (actually an ammonium chloride moist paste cell) is directly associated with the "corrosion" of the zinc case (the anode). An analogous electrochemical process occurs during the corrosion of a metal or alloy in contact with a conductive fluid, as illustrated in figure 2.

In order for electrochemical corrosion to occur in any metal or combination of metals, there must be a cathodic surface (cathode) and an anodic surface (anode) at different potentials in electrical contact with each other, and with both in contact with a conductive fluid (electrolyte).

Direct current must flow between the cathode and anode. Within this electrochemical system an oxidation-reduction (redox) reaction occurs, with the oxidation reaction occurring at the anode and the reduction reaction occurring at the cathode. The anode and cathode can be any two metallic surfaces at differing potentials in electrical contact, ranging from two immediately adjacent surfaces of a single piece of metal (figure 2) to two separate and dissimilar pieces of metal connected by an electrical conductor and in contact with a common electrolyte (see figure 3 in the section on galvanic corrosion).

The anode is the area where current leaves the metal and enters the fluid, and that is where the principal corrosion occurs. The cathode is the area where, usually, no corrosion occurs and where current enters the metal from the fluid. Anodes and cathodes can form on a single piece of metal because of local differences either in the metal or in the electrolyte in contact with the metal.

Any overall oxidation-reduction reaction in electrochemical corrosion can be separated, for purposes of better understanding, into two or more partial reactions of oxidation and reduction. When viewed from the standpoint of partial processes of oxidation and reduction, all corrosion can be classified into a few generalized reactions.

The anodic reaction in every corrosion reaction is the oxidation of a metal to its ion. Letting M_a represent the chemical symbol for the anodic metal, the oxidation reaction can be written as

$$M_a \rightarrow M_a^{+n} + n$$

when n represents the valence of the anodic element. For example:

$$Al \rightarrow Al^{+3} + 3e$$
$$Fe \rightarrow Fe^{+2} + 2e$$

In these cases the anode metal ions leave the anode surface and go into solution in the electrolyte where they then usually combine with negative ions to form insoluble precipitates which becomes the corrosion product such as rust. These oxidation partial reactions are the destructive part of the oxidation-reduction pair. (In some cases, the liberation of hydrogen gas in a reduction partial reaction can damage the cathodic area.)

In the electrochemical corrosion process the rate of electron production by the oxidation partial reaction at the anode must be matched by an equal rate of electron consumption by the reduction partial reactions at the cathode, since charge neutrality must be maintained. The reduction partial reactions can be more complex and varied than the oxidation partial reactions.

Two examples of reduction partial reactions which commonly occur in an aqueous electrolyte are:

$$2H^{+} + 2e \rightarrow H_2\uparrow \text{(hydrogen evolution)} \qquad (2a)$$

$$O_2 + 2H_2O + 4e \rightarrow 4\,OH^{-} \text{ (oxygen reduction)} \qquad (2b)$$

There are several other reduction partial reactions which commonly occur at the cathode, but reduction partial reactions occurring at the cathode will not be emphasized in this article.

A simple example of the corrosion of a single metal in contact with a liquid is the corrosion of iron to form rust when in contact with aerated (oxygenated) water. The corrosive first stage of the process can be written as

$$2Fe + 2H_20 + 0_2 \rightarrow 2Fe^{+2} + 4OH^{-}$$
$$\rightarrow 2Fe(OH)_2\downarrow$$

where the precipitate $Fe(OH)_2$ is an unstable intermediate compound which eventually oxidizes further to form common rust.

In any given corrosion cell (metal + corrodent) the possibility of electrochemical corrosion occurring, and the rate and extent of its occurrence, are all governed by complex relationships involving such factors as electrolyte compositions and concentrations, pH values, corrosion potentials, electrode film resistances, and electrode polarization tendencies as a function of corrosion current and time. Frequently, several different reduction reactions occur simultaneously at the cathodic surface. Electrode resistance and polarization effects tend to limit (often substantially) the rate at which corrosion actually occurs with various metal combinations, compared to that which would be expected from open-circuit potential values alone that is particularly true for passivating metals such as the stainless steels.

All of these and related considerations form the subject matter for the study of electrochemical corrosion theory in greater depth, but for the most part that is beyond the scope of this article.

Much can be accomplished in the way of corrosion control from a practical standpoint without a detailed

understanding of the more complex aspects of corrosion theory, provided that one is aware of the various forms which corrosion can take and of the more common causes and preventative measures for each form. That is the approach which will be emphasized in this article.

Corrosion Takes Many Forms

The effects of corrosive action take many different and distinct forms. The form of the corrosion, if it can be correctly recognized, will usually provide a strong clue as to its cause, its mechanisms, and the means that can be taken to prevent or minimize damage that it can cause.

There is no universal agreement among corrosion authorities on exactly how to categorize the various forms of corrosion, but the categories listed in Table 1 seem to represent a good consensus. Most of the categories listed in Table 1 can be broken down further into subcategories for more detailed consideration.

Table 1. Forms of Corrosion.

* 1. Uniform attack.
* 2. Galvanic (dissimilar metal, two-metal) corrosion.
* 3. Stress-corrosion cracking.
* 4. Intergranular corrosion.
* 5. Concentration cell (crevice) corrosion.
* 6. Pitting.
* 7. Stray-current corrosion.
8. Dealloying (selective attack, selective leaching).
9. Erosion corrosion.
10. High temperature (dry) corrosion.

* Indicates a form of corrosion of concern in CATV distribution system equipment.

In uniform attack the metal corrodes rather evenly over the entire exposed surface. It is the most common form of corrosion (the rusting of steel, for example) and it is usually the most obvious and most easily recognized form of corrosion. It usually occurs when a metal surface is exposed over a large part of its area to a fluid which is generally corrosive to that metal.

Dissimilar Metals Corrode

Galvanic or dissimilar metal corrosion occurs when two dissimilar metal parts are in electrical contact with each other and both are in contact with a common body of conductive fluid (an electrolyte — liquid, paste, or similar).

The extent of galvanic corrosion damage can vary from negligible to extensive, depending on the various parameters. Galvanic corrosion is a rather common and well known effect, at least in principle, but it may not be so readily recognized or easily detected in

practice because of the fact that the two (or more) dissimilar metals may be separated physically by quite a distance if they are connected together by a good electrical conductor and both make contact with the same body of conductive fluid.

In any galvanic cell (i.e. two dissimilar metals in electrical contact with each other and with an electrolyte) one of the metals is anodic with respect to the other, and it is the more anodic of the two metals which is subject to extensive corrosion damage.

Normally, the more cathodic of the two metals remains relatively undamaged. In fact, it is protected from even a normal degree of corrosion by the sacrificial action of the anodic metal, which can be destroyed very rapidly under unfavorable conditions. Galvanic corrosion concepts are illustrated in Figures 3A and 3B.

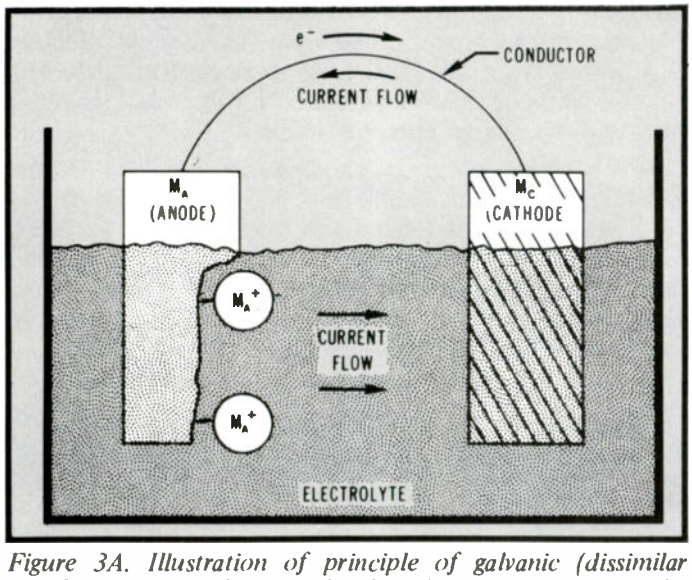


Figure 3A. Illustration of principle of galvanic (dissimilar metal) corrosion, showing the four key elements – anodic metal, cathodic metal electrical contact or conductor, and electrolyte – which must be present for galvanic corrosion to occur.

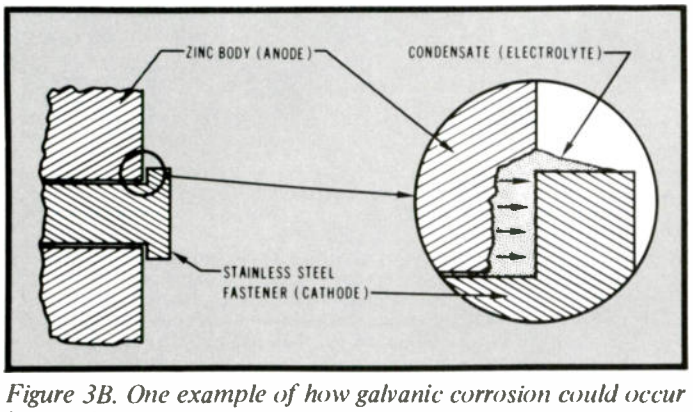


Figure 3B. One example of how galvanic corrosion could occur in practice.

The mass (m) of metal corroded away from the anode in steady galvanic corrosion in any given length of time is given by the expression

$$m \backsimeq k\, I_{galv}\, t_c, \text{ grams} \qquad (3)$$

where k = electrochemical equivalent constant for the anode metal, grams/coulomb

I_{galv} = galvanic corrosion current, amps

t_c = duration of corrosion, seconds

For non-steady corrosion current — the usual real-life case — the expression for the mass of metal corroded would be

$$m \simeq k \int_0^{t_c} I_{galv} dt, \text{ grams} \qquad (4)$$

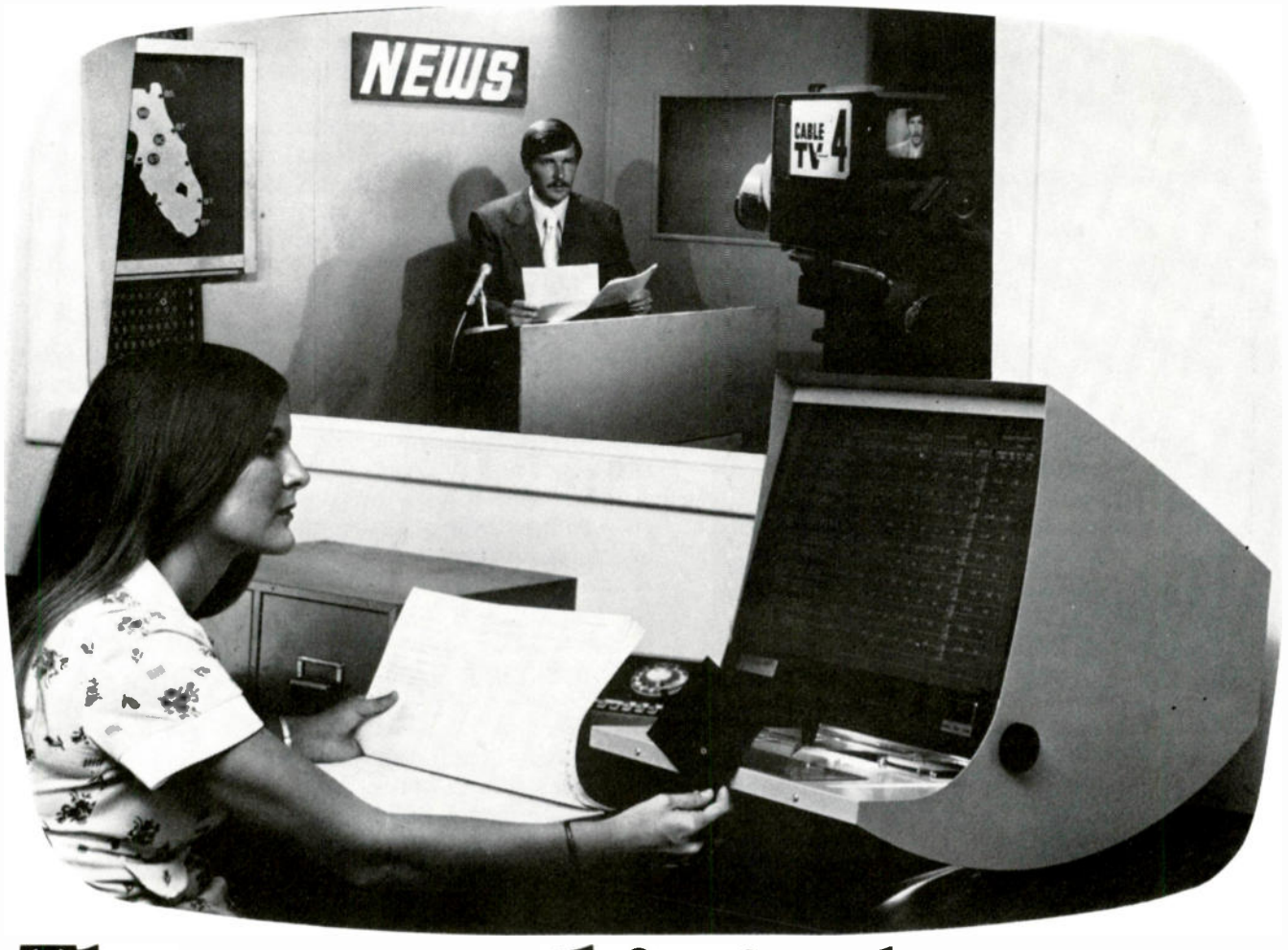
As an example, one ampere of corrosion current flowing for one year would result in the loss of 6.5 lbs. from an aluminum anode. The value of k for aluminum is 9.32×10^{-5} grams/coulomb; the values of k for other metals can be found in tables of electrochemical equivalents.

The open-circuit potential difference between the two dissimilar metals in any galvanic couple determines the direction of flow of the galvanic current. The polarization characteristics of the electrodes in the electrolyte, in combination with the conductivity characteristics of the electrolyte, and the cathode-to-anode conduction path, determine the magnitude of the corrosion current.

In a corrosion situation the corrosion current almost always varies with time. The magnitude of the corrosion current, and particularly the density of current at the anode-electrolyte interface (in amps/sq. in., say), determine the rate at which the anode is damaged. For example, if a given amount of corrosion current is forced to flow through a small exposed area of anode, such as the surface of a very small part, or a scratch in the protective coating on a large part, the small exposed surface can corrode away rather quickly and destroy the part in a short time.

The relative tendency for pairs of dissimilar metals to form galvanic couples in conductive solutions is often expressed for engineering design purposes in the form of galvanic series charts, which lists metals and alloys in descending order from the most cathodic (most noble) to the most anodic (most active) for a specific electrolyte. The practical application of such a series in equipment design and installation lies in avoiding the use of dissimilar metals which are not very close together in the series if there is any probability that they may be exposed to a conductive fluid. One limitation of a conventional galvanic series is that it is more qualitative than quantitative; another is that it does not reflect the different degrees of polarization which occur in actual galvanic cells with corrosion current flowing.

In order to minimize those and other limitations, various types of dissimilar metal compatibility charts have been developed from the basic galvanic series in order to aid the designer. One example of a compatibility chart is shown in Figure 4, reproduced (with slight modification) from MIL-R-5757F. It is probably overly restrictive for all but very aggressive



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environments. Other more elaborate charts with more graduations in degrees of compatibility and environment have also been published. [1, 2(a), 33, 34, for example].

Each of the various methods of presentation has advantages and disadvantages. Probably the best way for a designer to make an important decision on compatibility of any pair of metals, if testing is not feasible, is to refer to as many reliable charts as are available to him.

There are two comments worth making about galvanic series and dissimilar metal compatibility charts. One is that published galvanic series charts — and the dissimilar metal compatibility charts derived from them — are really based on a specspecific electrolyte — almost always seawater — a fact which the compatibility charts often neglect to mention.

Other electrolytes cause some differences in relative compatibilities, even to the point of reversing cathodes and anodes in a few instances. However, a chart based on seawater as the electrolyte seems to be the single most appropriate one for most CATV purposes. The other point worth mentioning is that published compatibility charts do not always agree with each other with regard to the degree of compatibility of certain important pairs of metals. That alone is a good reason for referring to more than one reliable chart before making a decision.

To summarize the implications of galvanic corrosion briefly, it is not an uncommon occurrence on CATV equipment because all of the ingredients of galvanic cells are frequently present but not always recognized. Fortunately, not all galvanic corrosion actually renders the equipment inoperative, but enough does to make it a matter of serious concern.

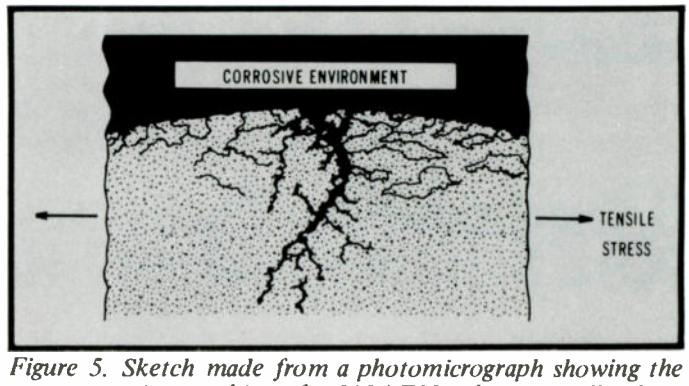

Figure 5. Sketch made from a photomicrograph showing the stress-corrosion cracking of a 2024-T351 aluminum alloy hose fitting loaded in hoop stress.

Stress-corrosion cracking is defined as the spontaneous failure of a metal resulting from the combined effects of corrosion and stress. Stress-corrosion cracking is a particularly insidious form of destructive corrosion because it may develop as very fine intercrystalline cracks within the material, with little or no visible evidence of corrosion until failure occurs suddenly by destructive cracking of the material. Figure 5 illustrates a typical stress-corrosion cracking failure in an aluminum hose fitting.

Like other forms of corrosion, stress-corrosion cracking occurs in specific metal alloys subjected to

specific environmental conditions. One common denominator of stress-corrosion cracking is that it occurs only while the material is being subjected to a tensile stress of some minimum or threshold level which depends on the specific alloy and the specific corrodent. Therefore, the possibility of it occurrring should be considered for all CATV equipment parts in which any of the material is stressed in tension. It should be noted that unrelieved residual internal stresses in a metal as a result of the fabrication process can create or contribute to the requisite tensile stresses just as readily as can externally applied stresses.

In CATV equipment there are probably only two areas in which the combination of stresses, materials and environments are likely to cause stress-corrosion cracking problems. They are 1) aluminum alloy coaxial cable connector hardware, but only with certain susceptible alloys, and 2) stainless steel fasteners, but again only with certain susceptible alloys. Several references on susceptibility [6, 9-14, 18-22] are available to assist the designer in avoiding the stress-corrosion-prone aluminum and stainless steel alloys.

For aluminum, there should be no problem in selecting a non-susceptible alloy with all of the other desirable characteristics. For stainless steel, the otherwise desirable 300 series 18/8 austenitic types are known to be somewhat susceptible to stress-corrosion cracking in the presence of hot chloride solutions, but at atmospheric temperatures the susceptibility is believed to be quite low, permitting their use with low risk.

Certain types of protective coatings can also be

Dissimilar Metals Compatibility Chart*

	Group No.	Metallurgical category	EMF (volt)	Anodic Index (0.01 v)	Compatible couples #
	1	Gold, solid and plated; gold-platinum alloys; wrought platinum (most cathodic)	+0.15	0	
Noble or Cathodic ↑	2	Rhodium plated on silver-plated copper	+0.05	10	
	3	Silver, solid or plated; high silver alloys	0	15	
	4	Nickel, solid or plated; monel metal, high nickel-copper alloys	-0.15	30	
	5	Copper, solid or plated; low brasses or bronzes; silver solder; German silver; high copper-nickel alloys; nickel-chromium alloys; austenitic corrosion-resistant steels	-0.20	35	
	6	Commercial yellow brasses and bronzes	-0.25	40	
	7	High brasses and bronzes; naval brass; Muntz metal	-0.30	45	
	8	18 percent chromium type corrosion-resistant steels	-0.35	50	
	9	Chromium, plated; tin, plated; 12 percent chromium type corrosion-resistant steels	-0.45	60	
	10	Tin-plate; terneplate; tin-lead solder	-0.50	65	
	11	Lead, solid or plated; high lead alloys	-0.55	70	
	12	Aluminum, wrought alloys of the duralumin type	-0.60	75	
	13	Iron, wrought, gray, or malleable; plain carbon and low alloy steels, armco iron	-0.70	85	
	14	Aluminum, wrought alloys other than duralumin type; aluminum, case alloys of the silicon type	-0.75	90	
	15	Aluminum, cast alloys other than silicon type; cadmium, plated and chromated	-0.80	95	
Active or Anodic ↓	16	Hot-dip-zinc plate; galvanized steel	-1.05	120	
	17	Zinc, wrought; zinc-base die-casting alloys; sinc, plated	-1.10	125	
	18	Magnesium and magnesium-base alloys, cast or wrought (most anodic)	-1.60	175	

Compatible couples - potential difference of 0.25 volt maximum between groups.
* From MIL-R-5757F.

effective in minimizing the stress-corrosion cracking tendencies of marginally-susceptible alloys [9].

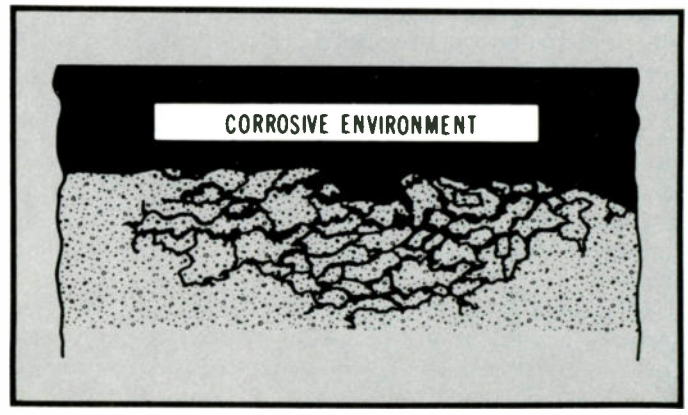

Figure 6. Sketch made from a photomicrograph showing intergranular corrosion in an aluminum alloy.

Intergranular corrosion is a form of localized subsurface attack in which a narrow path is corroded out preferentially along the grain boundaries of a metal. The mechanism is electrochemical and is usually caused by the presence of second-phase precipitates in the grain boundaries which differ in potential from the primary phase. In other words, grain boundary material of small area acts as anode in contact with large areas of grains acting as cathode. The attack is often rapid, penetrating deeply into the metal and sometimes causing catastrophic failures. Figure 6 is a sketch illustrating an occurrence of aluminum intergranular corrosion which had not progressed to the point of failure.

Improperly heat-treated austenitic stainless steels, most precipitation-hardening high strength aluminum alloys, and certain other aluminum alloys are susceptible to intergranular corrosion in varying degrees. Again references [6, 9-14, 17] are available which indicate the degree of susceptibility of the various alloys, and low-susceptibility alloys can easily be selected for CATV applications. Most copper-bearing aluminum alloys, both wrought and cast, should be avoided in order to minimize the risk of both intergranular corrosion and stress-corrosion cracking.

Concentration Cell Corrosion

Concentration cell or crevice corrosion is corrosion which results from the trapping or stagnation of electrolyte in holes and surface deposits, in crevices under bolt heads, washers, strand clamps and rivets, and in closely fitted regions, such as gasket surfaces, flange spaces and lap joints. In concentration cell corrosion there need not be any dissimilar metals, either on a microscopic or a macroscopic scale.

Anodic and cathodic zones can be created on a perfectly uniform single-phase metal surface by local variations in oxygen or metal ion concentration which develop within the trapped, stagnant electrolyte. These variations in composition give rise to a flow of corrosion current, resulting in the corrosion

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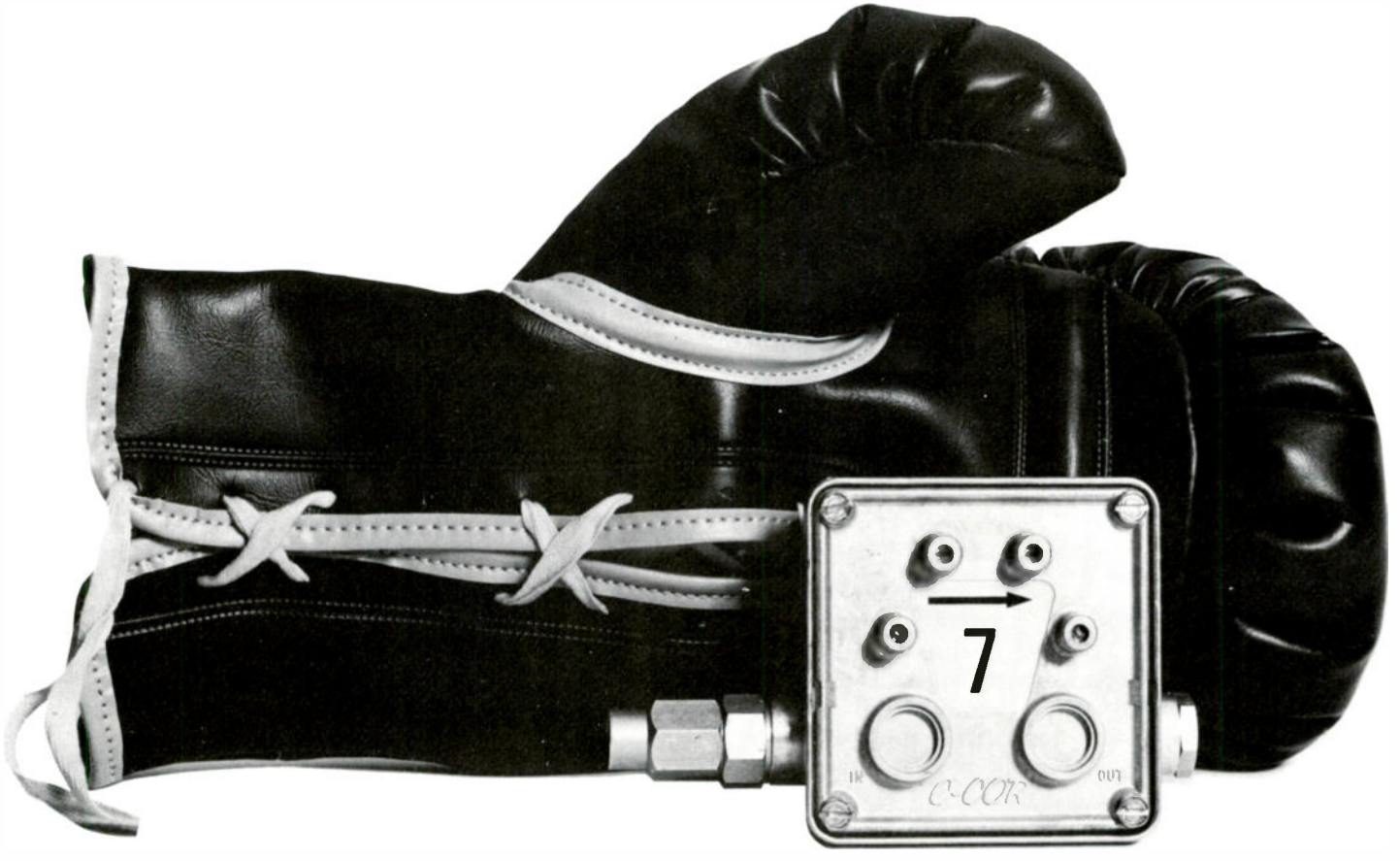

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of the anodic zones of the metal. The oxygen concentration form of concentration cell corrosion is illustrated in Figure 7.

Concentration cell corrosion usually results in an open pitting of the corroded surfaces. Since it usually (but not always) occurs in very narrow crevices, it is almost never visible in a casual inspection of the equipment, only becoming apparent when the parts creating the crevice are disassembled. It can be destructive in CATV equipment, particularly at sealing surfaces.

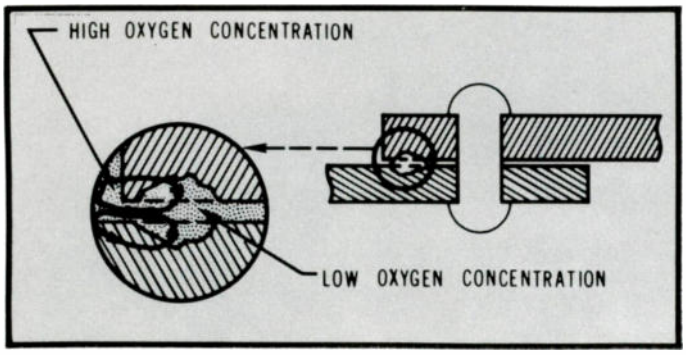

Figure 7. Sketch illustrating the occurence of the oxygen concentrations form of concentration cell corrosion.

In addition to the formation of pits in crevices, there is a more general form of pitting corrosion to which certain metals are particularly susceptible. That type of pitting occurs most commonly on metals which develop their own protective surface film, under conditions in which the film is almost, but not completely, protective.

The two metals most susceptible to pitting of those commonly used in CATV equipment are stainless steel alloys and aluminum alloys. The early stages of pitting corrosion of an aluminum alloy is illustrated in Figure 8. In some circumstances, pitting is self-limiting; in other circumstances it continues until the wall is penetrated.

Pitting is the result of electrochemical action in local cells on the surface of a metal. At the point of initiation, corrosion occurs at the local anodes, while the local cathode is the immediately surrounding metal surface. One reference [9], quoting a paper by Mears and Brown, lists 18 possible causes of local cell formation leading to pitting. Of those 18, local variations in metal composition due to the presence of either a second phase or impurities and local damage to the protective surface film on the metal from either chemical or mechanical effects are probably the two most important causes.

Both stainless steel and aluminum are particularly susceptible to electrolytes containing chloride ions, such as seawater spray or condensate. Among the stainless steel alloys, molybdenum-bearing type 316 provides the best resistance to chloride-induced pitting.

Stray-current corrosion is corrosion resulting from the flow of current through paths other than the intended circuit of electrical conductors, in conjunction with the operation of electrically powered equipment. The stray current may be either alternating current, direct current, or one superimposed on the other. Destructive stray currents frequently occur in conjunction with multiply-grounded circuits. In such cases, only part of the return current flows through the ground return conductor, no matter how low its impedance, while the remaining current flows through unintended paths which may include structures.

If a path through a structure involves a mechanically-connected joint, or a gap, in which an electrolyte is trapped, the metal in the area where the d.c. leaves the surface to enter the electrolyte is subject to stray current corrosion which can be severe if the level of stray current is high.

The amount of metal corroded by stray d.c. leaving the metal and entering the electrolyte is given approximately by

$$m \backsimeq k\, I_{stray}\, t_c, \text{ grams} \qquad (5)$$

where the variables are as previously defined (equation (3)), except that I_{galv} is replaced by I_{stray}.

As a general rule, stray a.c. causes substantially less damage to most metals than does stray d.c. of the same magnitude under otherwise identical circumstances, and the corrosion damage usually decreases with increasing frequency. For metals like steel, lead and copper, it is estimated that 60 Hz a.c. causes only about 1 percent of the damage of an equal level of d.c. On the other hand, for passive metals such as stainless steel and aluminum which develop their own protective films, there is recent evidence that 60 Hz a.c. can damage or destroy the protective film and cause much greater than 1 percent of the damage of the equivalent d.c. Alternating current damage levels of from five to 31 percent of the equivalent d.c. damage levels have been reported for an aluminum alloy under specific test conditions.

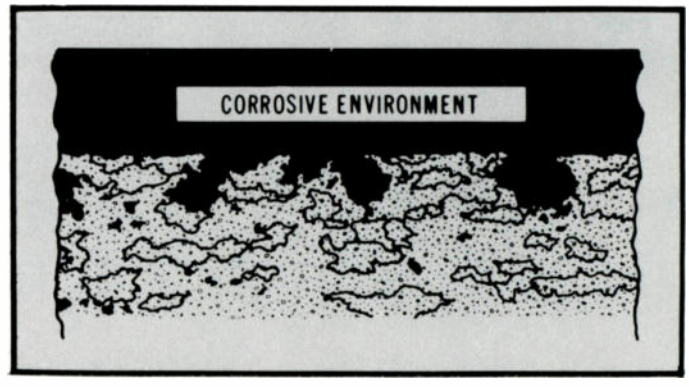

Figure 8. Sketch made from a photomicrograph showing a possibly early stage of pitting corrosion in an aluminum alloy.

Ground Loop Corrosion

In CATV equipment, it is possible for both stray d.c. and stray 60 Hz a.c. to be present in ground loops. Damage by a.c. can be increased by partial or

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complete rectification to d.c. Earth soil often causes rectifier action and aggravates corrosion where a.c. ground loops are working. Corrosion products themselves could cause rectifier action and corrosion rates could increase with time for situation involving a stray alternating potential, since an increasing percentage of the a.c. would be rectified to the more destructive d.c.

When stray-current corosion situations occur they are usually both nonobvious and quite destructive. That suggests that some attention should be paid to the problem at or before the time of equipment installation, by both analysis and testing, to ensure that conditions conducive to stray current corrosion do not exist.

There is another potential form of corrosion which is related to stray-current corrosion and which should also be given proper attention, although it does not normally appear among the standard categories of corrosion. For lack of a better name known to the authors, it might be termed either non-stray-current corrosion or current-induced corrosion. It can occur along *intended* conduction paths at points where current flows through mechanical contacts between separate metal pieces. If the design is such that an electrolyte can accumulate around or between the contacts, current-induced corrosion of one or both contact surfaces is likely to occur.

Virtually all of the discussions concerning the effects of stray-current corrosion is equally applicable to non-stray-current corrosion. The other forms of corrosion listed in Table 1 are generally not significant for CATV equipment and will not be discussed here.

CATV equipment must function in a variety of environments which generally range from mild and unpolluted to aggressive and/or badly polluted natural environments. Aerial installations of equipment are exposed to the full range of weather conditions and atmospheric environments. Underground installations are exposed to atmosphere environments as modified by the weather protection provided by the enclosures, plus, in some instances, to rain water, drainage waters, ground water, and/or soils.

The general aggressiveness of the atmosphere varies over a wide range from one location and type of environment to another. In the more aggressive areas, it may even vary widely from one point to another within a small locality, depending on the proximity to sources of corrodents, the direction of the prevailing winds, the presence of sheltering terrain, and many similar factors. In short, it is really the micro-environment at each specific installation site which actually determines the general corrosivity of the atmosphere at that site.

The term general corrosivity as used here is convenient for discussion purposes but is actually an oversimplified concept. The concept of corrosivity can really only be applied to the effects of specific corrodents on specific metals and coatings, effects which vary from one type of material to another and from one form of corrosion to another. For example, one metal may be most susceptible to damaging pitting attack by a marine environment, while a different type may be most susceptible to damaging intergranular attack by a polluted industrial atmosphere.

Sulfur Dioxide Reactions

In the industrial areas sulfur dioxide is released to the atmosphere by fuel-burning power plants, chemical plants, refineries, diesel-powered vehicles and the like. Sulfur dioxide reacts with moisture in the atmosphere and condensate on equipment to form corrosive sulfurous and sulfuric acid solutions. Gaseous chlorine, also released by some chemical plants, reacts with moisture to form a corrosive combination of hypochlorous and hydrochloric acids.

For underground systems which come into contact with drainage water or ground water, there are any number of possible corrosive agents, including chemicals used for soil treatment. Factors which have a strong bearing on the pitting corrosivity of water toward certain aluminum alloys, for example, include the pH level, conductivity, dissolved oxygen content, and concentrations of sulfate, chloride carbonate and copper ions.

One potential corrodent which could affect both aerial installations and underground installations is the chloride salts (principally calcium chloride) used in many areas of the country to remove ice and snow from the streets in the winter. Snow plows undoubtedly throw salt-bearing ice and snow up onto aerial equipment installations, while melted ice and snow may drain into vaults.

In an earlier section of this article, corrosion was neatly separated into about 10 distinct forms for purposes of analysis and discussion. When corrosion actually occurs in CATV equipment, however, it is not always confined to a single clearly identifiable form, but is more likely to appear as an inseparable and almost unidentifiable mixture of several different forms of corrosion. The end result often is simply a badly corroded and functionally damaged item of equipment which must be replaced.

Next month, examples of how various types of corrosion may occur in and affect items of CATV equipment will be described and discussed.

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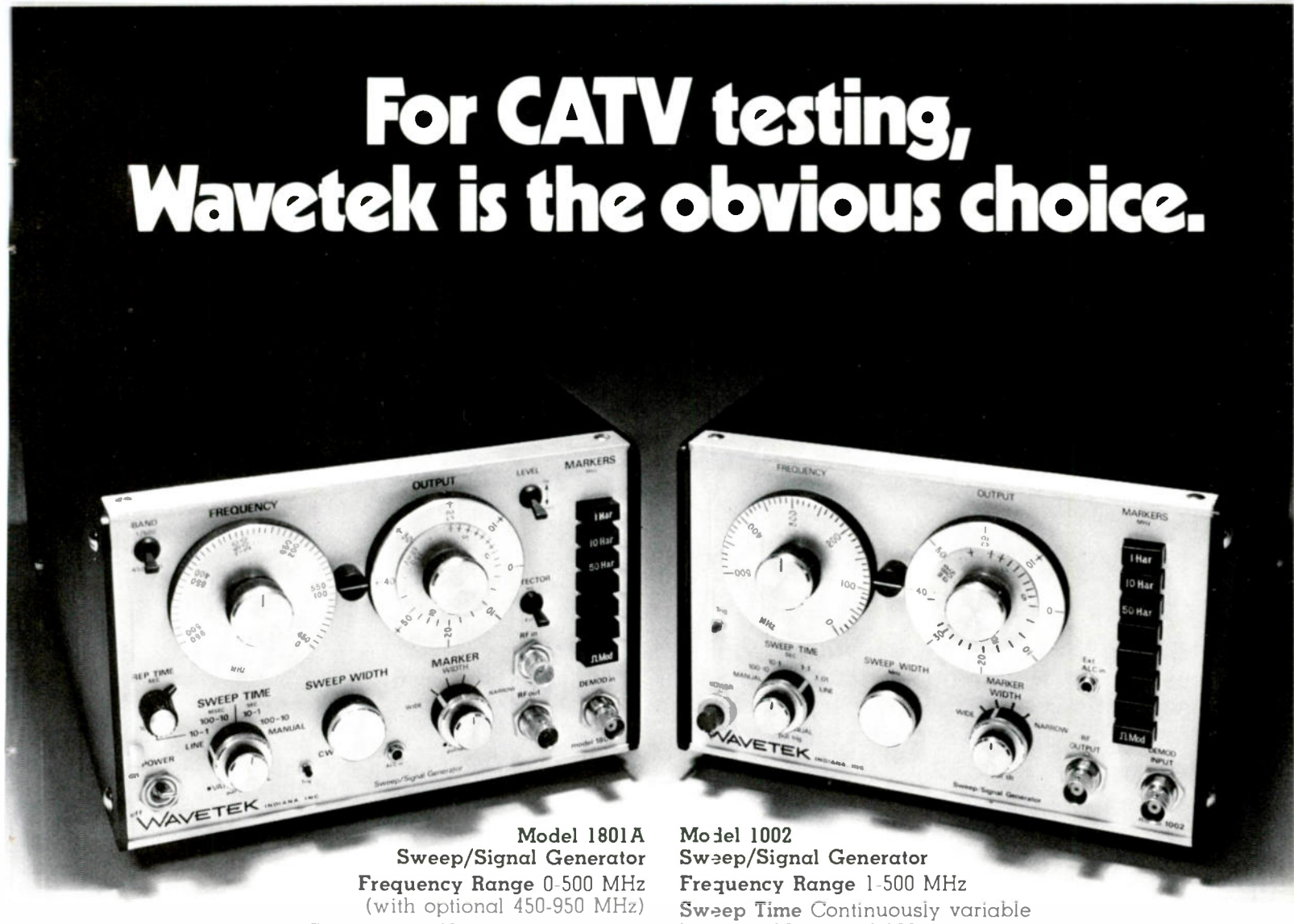

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Got Those CATV Drop Cable Picking Blues Again!

Choosing the best drop cable for your particular system now requires a thorough understanding of all the characteristics and specifications available from each manufacturer. There is more to making a decision than size and shielding.

By Frank A. Spexarth
Cerro Wire and Cable

Not too long ago, choosing drop cable for a CATV system was easy. Requirements were not too stringent and the choice was limited. Today, an almost bewildering variety of drop cables are available. New system standards and the wiring of large metropolitan areas have made CATV operators seek many different kinds of cables to link their system with subscribers. In strong signal areas, for example, shielding is vitally important.

We cannot recommend one type of cable as best for every system. We can, however, list the types of cables available, explain the characteristics and specifications of each and help you to make your choice.

To choose the best drop cable for your system, you must consider the following factors:

1) Impedance; 2) Attenuation; 3) Center Conductors; 4) Size; 5) Shielding; 6) Construction; 7) Durability.

Of course, all CATV systems should use 75 ohm coaxial drop cable. Unfortunately, however, not all cable sold for CATV systems use actually has a characteristic impedance of 75 ohms.

The characteristic impedance of coaxial cable is independent of its length. It is determined by the diameters of the center conductor and the shield, plus the type of dielectric. The formula for characteristic impedance is:

$$Z_O = \frac{138 \text{ LOG } D/d}{E}$$

Where: Z_O is characteristic impedance; D is inner diameter of shield; d is outer diameter of center conductor; E is dielectric constant.

The earliest CATV systems used military type RG-59/U coaxial cables for drops. RG-59/U was readily available and worked quite well.

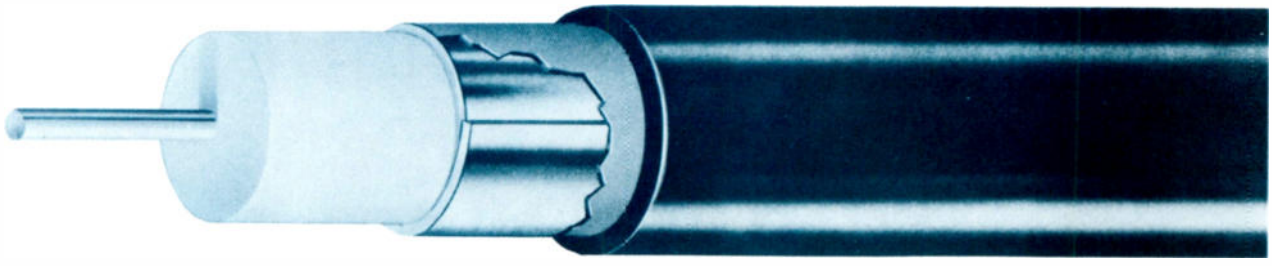
It wasn't long, however, before manufacturers started to try to reduce attenuation. This was done by substituting foam polyethylene (with a dielectric constant of 1.5) for the solid polyethylene (2.3 dielectric constant) previously used as the dielectric.

RG-59/U uses a 22 gauge copper-clad steel center conductor. When foam dielectric was developed, many manufacturers continued to use 22 gauge center conductors.

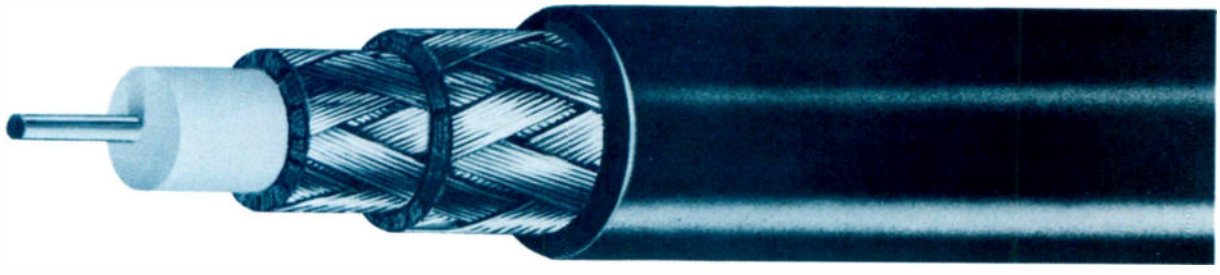
Foam dielectric causes less signal attenuation than solid, but its dielectric constant is lower. A glance at the formula will show you that if you decrease E without changing any of the other variables, the characteristic impedance of the cable will change. With foam dielectric, a #22 center conductor and an RG-59/U size insulation, the impedance comes out to be about 85 ohms, instead of 75 ohms. This mismatch can cause color smears on subscriber sets.

If you want to restore the impedance of foam dielectric cable to 75 ohms, you have to increase the size of the center conductor (or decrease the diameter of the shield). A 20

Mini-coax



Bonded Tape Cable



Double Shield Cable

gauge center conductor does the job very nicely.

Why then, don't all manufacturers use #20 center conductors with foam 59 size cable? It costs more. However, the cost saving involved in using the small center conductor is not worth the sacrifice in quality.

Distinct Designations

Quarter inch cable with a #20 center conductor and foam dielectric is not RG-59/U. Manufacturers generally designate it by their own model numbers and say it is RG-59 size. Some systems also use RG-6 size and RG-11 size cables. More and more RG-6 is used, because of lower losses.

Most cable operators choose foam dielectric cables for aerial use, but solid dielectric is used in underground systems because it is considerably more moisture resistant.

Every transmission line causes some signal loss, or attenuation. Generally speaking, attenuation increases with frequency and is inversely proportional to the diameter of the cable. Attenuation also varies directly with temperature.

The earliest CATV systems were restricted to the low VHF band. When more than five channels were required, cable operators went to the high VHF band. Today's CATV cable must be capable of handling 5 to 300 MHz, in order to accommodate sub, mid and super bands.

Attenuation is directly proportional to dielectric constant. Since foam has a dielectric constant of 1.5 and the dielectric constant of solid polyethylene is 2.3, foam generally gives you about a 20 percent decrease in attenuation. Foam is less moisture resistant and more easily collapsed than solid dielectric, but because of the advantage it provides in attenuation it is used widely in trunk and distribution cables as well as drop cables.

Unless otherwise indicated, cable attenuation is specified at +70 degrees F. Attenuation increases or decreases by one percent for each 10 degrees F change in temperature. This change is significant for trunk cables, but drop cables are short enough that temperature changes can be ignored.

Cost Per Decibel

One way to look at drop cables is in terms of the cost per decibel of improvement in attenuation. If we take RG-59 size cable as a base, we find that moving up to RG-6 saves 6 dB per 1000 feet at 216 MHz, while using RG-11 decreases attenuation by 16.5 dB per thousand feet. At first glance, RG-11 would seem to have all the advantages. However, RG-6 only costs about eight dollars per thousand feet more than RG-59, while RG-11 costs forty dollars per thousand feet more.

Copper and copper-clad aluminum are often used for trunk and

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distribution cables, while copper-clad steel is used for most drop cables. Copper-clad steel is the mil spec standard for RG-59/U cable.

Copper-clad center conductors work just as well as pure copper because of "skin effect." At television frequencies, signals are confined to a very small amount of area at the circumference of the wire. For example, less than one thousandth of an inch of copper is required around the center conductor to carry Channel 13 signals.

Copper-clad steel center conductors are just as good at carrying signals as pure copper. The advantage of steel is that it is tougher than copper, which means that the drop cable has more mechanical strength. Besides, most drop cable connectors use the center conductor as a center pin and steel is less likely to be bent than copper.

Shielding Changes

In recent years, shields have changed more than any other part of CATV cables. These changes have been precipitated primarily by the opening of the top 100 TV markets. Ordinary RG-59/U just doesn't do the job in a metropolitan area with strong local signals. The drop cable acts as an antenna, picking up signals out of the air. These signals go to the TV set along with the CATV signals, causing interference.

One approach to eliminating the problem of direct pickup on the drop cable is to convert the signals at the CATV head end to unused channels. Unfortunately, this method is not practical in a system that carries more than five or six channels.

Radiation and Pickup

The answer is improved shielding on drop cables. This is by no means easy. Any cable that picks up direct signals will also radiate signals. Radiation and direct pickup are actually two sides of the same coin. The new FCC Technical Standards, Part 76, limits radiation to 20 microvolts per meter at 10 feet on the low VHF band and 50 microvolts per meter high band.

This is an interesting specification, but as yet no one has developed a practical way to test drop cables against this specification. What's more, meeting the FCC specification may not provide enough shielding to insure good, clean pictures in metropolitan areas.

At the moment, manufacturers such as Cerro, Jerrold and others are making an attempt to measure the relative merits of various types of shields. This effort is complicated by several factors. For one thing, cable shield effectiveness measurements are affected a great deal by connectors. In fact, drop cable connectors are definitely a weak link at present. Jerrold recently developed an improved method of attaching F connectors to foil/braid shield drop cables. They and other manufacturers are also working on the development of improved connectors.

Another complicating factor is that the shield that works best when installed doesn't necessarily work best for the long haul. Nobody really has all the answers on drop cable shielding at this time, but let's look at the various types of shielding available today.

Braided Copper

RG-59/U uses braided copper shielding. It works reasonably well, is flexible and wears well. Braided shields are generally rated by percentage of coverage, usually 70 percent, 80 percent, 93 percent or 97 percent. The greater the percentage of coverage, the better the shielding.

Copper isn't the only possible shielding material. Because of skin effect, copper clad aluminum braid works very well. In fact, some people feel that because copper clad aluminum springs back less than solid copper can be braided more uniformly. Braid can also be made of aluminum without copper cladding. Some drop cables are equipped with double braided shields. Double

In Comparison

Cable Size	Reduction in Attenuation Compared with RG-59	Increase in Price Compared With RG 59	Price/dB @ 216 MHz Ratio	Price/dB @ 216 MHz Cost
RG-6	6 dB/1000'	$8/1000'	$8/6 dB	$1.30/dB Improvement
RG-11	16.5 dB/1000'	$40/1000'	$40/16.5 dB	$2.50/dB Improvement

TAPE AND FOIL CONSTRUCTIONS
ATTENUATION dB/100' NOM.

FREQUENCY MHz	5	30	50	216	240	260	270	300
TYPE								
59 Solid	.70	1.70	2.25	4.75	5.00	5.20	5.30	5.60
59 Foam	.50	1.30	1.70	3.60	3.80	3.95	4.05	4.25
6 Solid	.55	1.35	1.75	3.80	4.00	4.20	4.30	4.50
6 Foam	.40	1.05	1.40	3.00	3.15	3.30	3.35	3.55
11 Foam	.30	.70	.90	1.95	2.05	2.15	2.20	2.30

SINGLE AND DOUBLE BRAIDED CONSTRUCTIONS
ATTENUATION dB/100' NOM.

FREQUENCY MHz	5	30	50	216	240	260	270	300
TYPE								
59 Solid	.72	1.72	2.28	4.80	5.05	5.25	5.35	5.70
59 Foam	.53	1.35	1.75	3.80	4.00	4.20	4.30	4.50
6 Solid	.55	1.40	1.85	3.85	4.20	4.35	4.45	4.70
6 Foam	.52	1.10	1.45	3.15	3.30	3.45	3.50	3.70
11 Foam	.32	.75	.95	2.05	2.15	2.25	2.30	2.40


ANAVISION

"I knew it the moment the producer showed me the script.

"But more important than the Emmys and other awards that 'Brian's Song' won was the fact that it was the highest-rated made-for-tv movie ever. I mean, people wanted to see this movie. Maybe even needed to.

"That's why thousands of them packed Chicago theaters to see 'Brian's Song' just a few weeks after it had been on television.

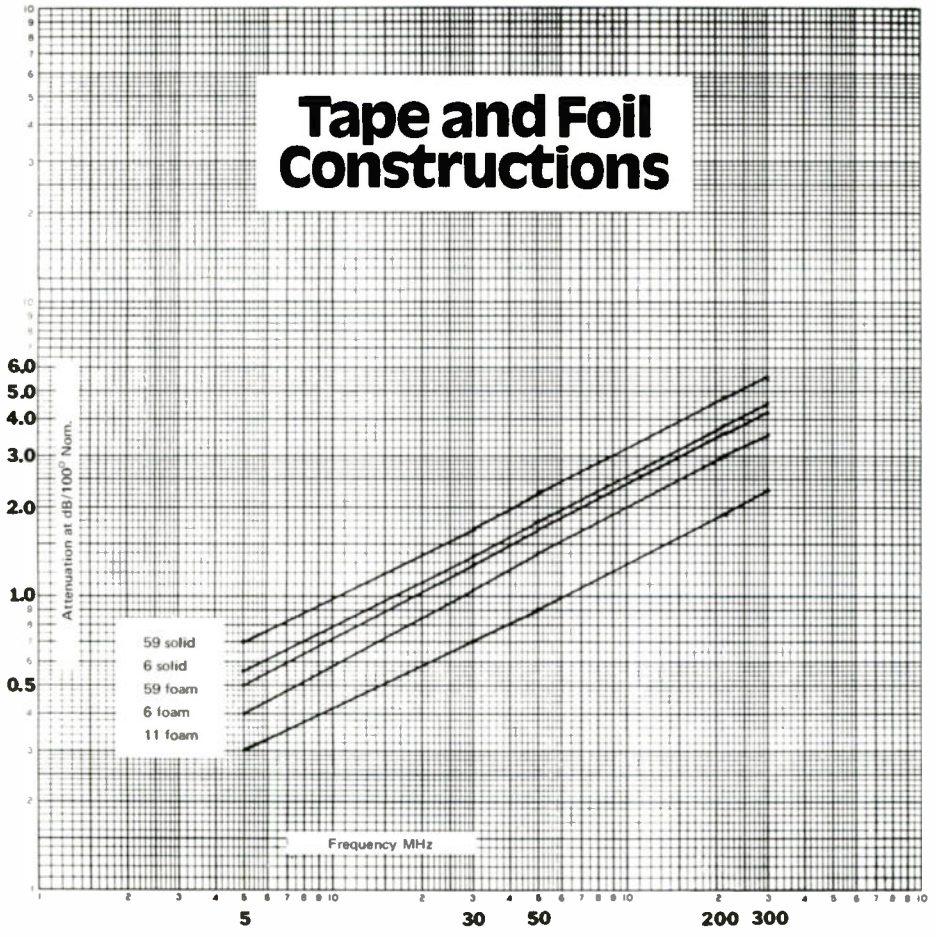
"And, as a cameraman who has been in the business for fifty years, working on 'Brian's Song' made me feel good. You know, jumping from one medium to another without a hitch.

"That's why I like the flexibility and freedom of something like Eastman film. And why I'll stick with it.

"After all, I never know when another 'Brian's Song' might come along."

Joseph Biroc. Award winning
Director of Photography, "Brian's Song."

Be sure to watch " The Men Who Made The Movies, " an eight part series made possible by Kodak Grant and scheduled for PBS broadcasting in November and December



braided shielded cable costs more but it does a much better job of preventing direct pickup.

Metallic Shielding

Relatively new on the market are drop cables with metallic tape shields. The original metallic shields were made of a mylar tape with aluminum foil bonded to both sides. This tape was flexible and provided initially 100 percent shield coverage.

Newer metallic shields are made the same way except that oriented polypropylene, which is stronger than polyester, is used as the base. Applying metallic tape to drop cable is something of a problem. Tape can be wrapped either helically or longitudinally. Helical wrapping is flexible, but provides very poor shielding. Longitudinal wrapping is quite effective as a shield but is somewhat less flexible.

Metallic tapes are generally covered by drain wires or aluminum braid. Aluminum braid over

Thorough diagnosis of your system, 24 hours a day.

Avantek's noninterfering CATV Remote Automatic Sweep System offers plant diagnosis in two modes—swept frequency response and spectrum analysis.

This versatility, coupled with lightweight rugged portability, allows you to perform preventative maintenance while substantially reducing trouble and service calls.

The equipment will typically pay for itself in less than one year through better system performance and increased profits.

Only Avantek's CR/CT-1000 system is field-qualified to perform all of these tests:

Spectrum Analysis The CR-1000 (photo) may be connected at any test point in your CATV system to detect undesired or spurious signals (beats). The instrument performs the function of a costly spectrum analyzer in the measurement of intermodulation products as low as −66 dBmv.

Signal Level The level of any signal between 50 and 300 MHz in your system can be accurately measured with the internal calibration provided in the CR-1000 (guaranteed flatness ±0.5 dB over the temperature range of −10 to 130°F).

Remote Sweep The Model CT-1000 Cable Transmitter, connected at the headend, continuously transmits a low-level, noninterfering, sweeping signal to all points of your CATV system. The Cable Receiver detects and displays this signal, giving the operator an instantaneous picture of his system response between the headend and the point where the receiver is connected. Avantek's innovative circuit design provides for signal tracking without scan loss.

Spurious Radiation The CR-1000 is designed to quickly measure spurious emissions from your CATV system as required by the FCC.

Return Loss (VSWR) The system, in conjunction with a directional coupler, is capable of making swept return loss measurements on any component installed in your CATV system.

Component Isolation Avantek's system can be used effectively to isolate bad subscriber taps and splitters.

Signal-to-Noise Ratio Operating in the spectrum analyzer mode, the CR-1000 Cable Receiver efficiently measures signal-to-noise ratio on your CATV system.

Find out how the CATV Remote Automatic Sweep System can benefit your operation through versatile, cost-effective, easy operation anywhere in your system under extreme environmental conditions. Call the Avantek sales office or field representative nearest you collect.

Avantek Eastern Region Office, Falls Church, Virginia (703) 533-2260; **Avantek Central Region Office,** Shawnee Mission, Kansas (913) 362-9511; **Avantek Western Region Office,** Santa Clara, California (408) 249-1354; **Corporate Headquarters,** Santa Clara, California (408) 249-0700. In the Southeast, call **Gentry Associates,** Huntsville, Alabama (205) 534-9771; Orlando, Florida (305) 894-4401; Burlington, North Carolina (919) 227-2581. In Canada, call **Fred Welsh Antenna Systems,** B.C.

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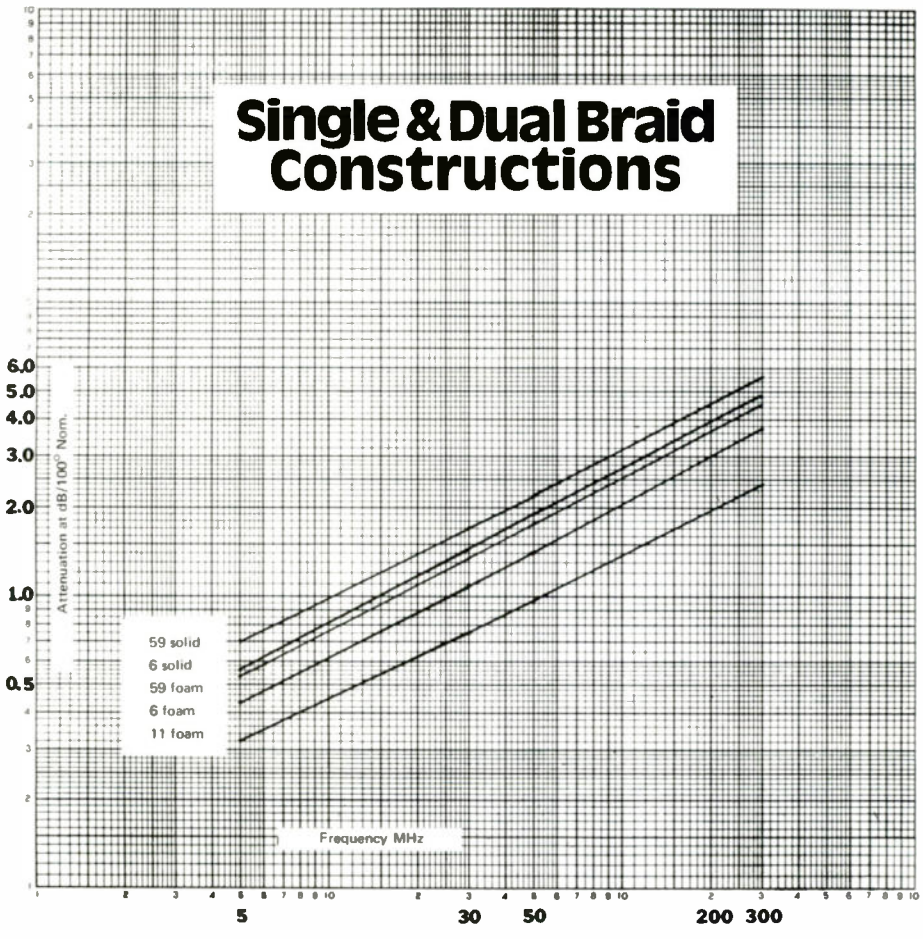

the metallic tape eliminates the slot antenna effect and lowers DC resistance. It also provides continuity if the aluminum tape should fail.

Aluminum Shielding

Another type of drop cable shield is heavy aluminum tape. This tape is made of aluminum about eight mils thick. It is longitudinally wrapped with an overlap of 1/8 inch to 1/4 inch. Heavy tape shields are bonded permanently to the cable jacket, providing moisture proofing.

Unfortunately, thick tape drop cables are neither very flexible nor strong. In RG-59 and RG-6 size, this type of cable must be used with integral messenger for aerial applications.

Common Jackets

Two types of jackets are commonly used for CATV drop cables: polyethylene (poly) and

Should a tough-minded purchasing agent care if the guys in the field have to struggle a little to mount equipment in a pedestal?

Ask any tough-minded purchasing agent...

When it comes to underground cable closures, a purchasing agent will probably be the first to tell you that a few hours of "jury-rigging" by the field crew can cost more than the pedestal itself. He might also tell you that he really likes the way Utility Products pedestals have been engineered so all equipment mounts quickly and easily. And he might even admit that we have made his work easier by providing easy installation with just four universal brackets... which makes ordering simpler. Of course, we have an advantage when it comes to pleasing demanding buyers... 17 years as the Number One supplier to the communication industry. It figures.

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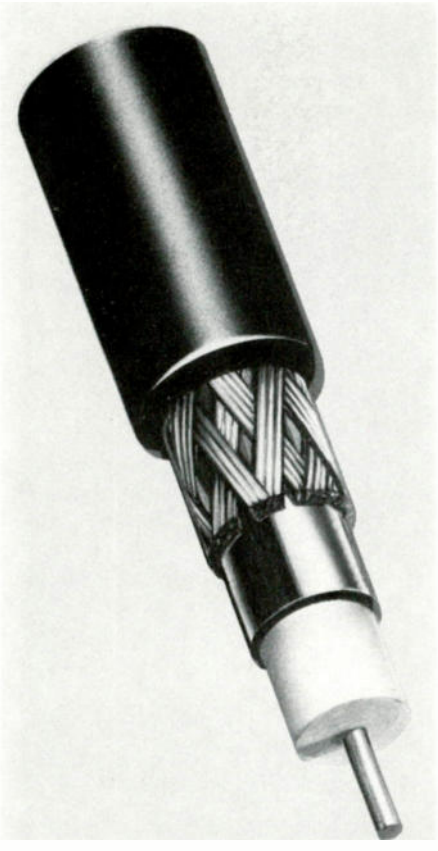

Cerro Polyshield

Jacket Characteristics

	Polyethylene	Polyvinylchloride
Common Name	Poly	Vinyl
Abbreviation	PE	PVC
Weather Resistance	Exc.	Good
Crack Resistance	Good	Poor
Abrasion Resistance	Exc.	Good
Flame Retardant	NO	YES
Direct Burial	YES	NO
Operating Temp.	-55°C to +80°C	-40°C to+80°C

polyvinylchloride (also known simply as vinyl or PVC). Polyethylene is tougher, more abrasion resistant, more flexible in very cold weather and it stands up better to sunlight, but it is flammable. This means that polyethylene should not be used indoors because it does not meet fire code restrictions. PVC is generally preferred except for underground applications.

Some drop cable jackets use self-sealing flooding compounds to keep out salt spray and industrial pollutants. Jackets with flooding compound must use messengers for aerial installations. Otherwise the jacket may shrink back on the cable during temperature variations.

While currently available drop cables are quite good, CATV cable manufacturers are constantly working to develop new, better types. For example, only .145" in diameter is currently being introduced. Mini-coax is not really a drop cable, but it is ideal for wiring apartment houses with direct subscriber access systems, since seven mini-coax cables fit into a single half inch conduit.

The industry is working diligently and constantly to develop better CATV drop cables.

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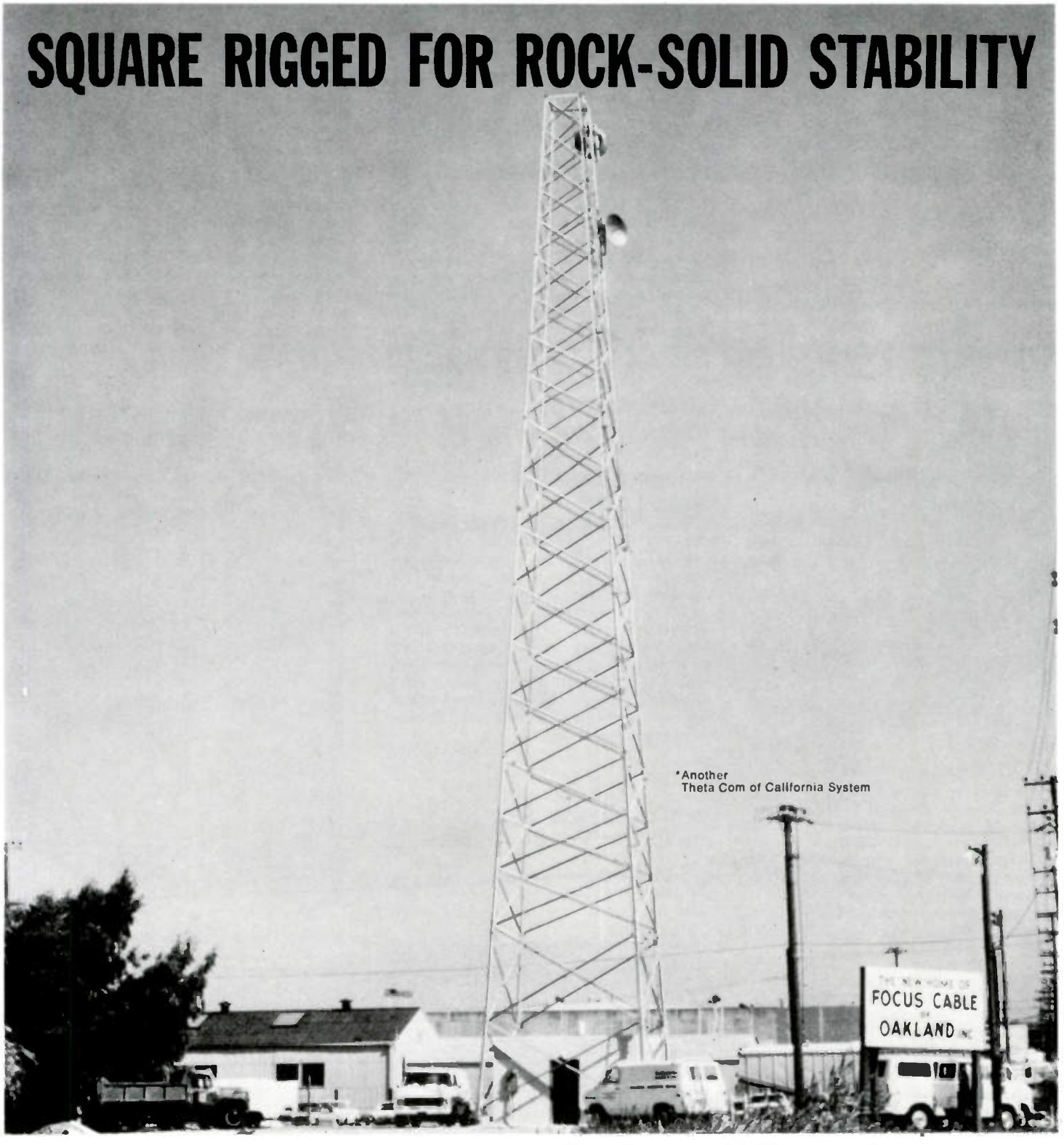

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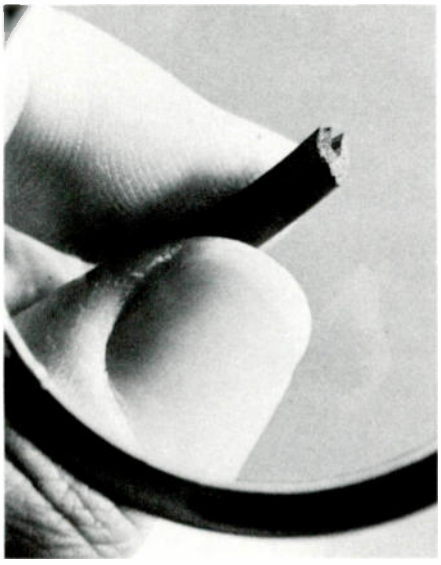
PRODUCT REVIEW

NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

ELASTOMER GASKET: CHOMERICS

Chomerics, Inc., 77 Dragon Court, Woburn, MA 01801, has announced the development of a new conductive elastomer gasket material



trade-named Shield-tite. The new gaskets consist of granular, micron-size, non-noble conductive particles dispersed in ethylene propylene dyene monomer (EPDM). They are intended for applications requiring moderate shielding effectiveness and continuous temperature exposure below 160° F. The physical shielding properties of Shield-tite make it ideal for CATV enclosures, characterized by frequent opening and closing of gasketed joints.

CHARACTER GENERATOR: LAIRD TELEMEDIA

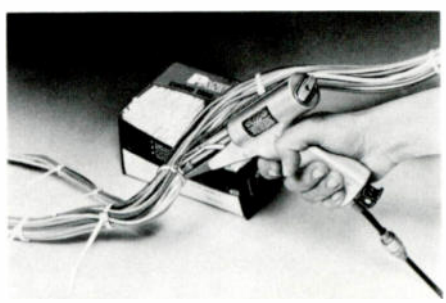
Laird Telemedia Inc. has introduced a new Video Character Generator system. A basic configuration of the equipment includes standard features such as program and preview outputs, 10 line by 25 character format, 250 character solid state memory, switchable video polarity, non-additive mix and horizontal edging. Standard keyboard control functions permit selective underline, overline, crawl, roll, box and flash, as well as a unique window format position feature. The 3600 Character Generator was designed with versatility, expandability and economy as prime considerations. Several separate solid state memories may be incorporated and unlimited access to both internal and external data sources is possible. A single Character Generator is capable of producing many simultaneous, but independent, video signals of identical or different information as well as combinations thereof. By this method, data sources such as fixed title, time/date and up/down counter may appear in various modes and screen positions on any or all output displays, with or without data composed from the keyboard. An audio cassette recorder and audio interface option are available as supplemental memory.

COLOR GENERATOR: VIDEO AIDS

Video Aids, 112 W. Fourth St., Loveland, CO 80537, announces the availability of a new NTSC/RS 170 Color Sync Generator. Incorporated into the design are all the features of a monochrome unit plus two additional outputs: burst flag and color subcarrier. The color burst reference 3.569545 is held to a plus and minus 10 hertz to a long term duration of 30 days. Short term is less than 1 hertz per second change with internal extal or phase lock. All output pulse widths are digitally controlled to eliminate drift from term temperature and aging.

INSTALLATION TOOL: PANDUIT

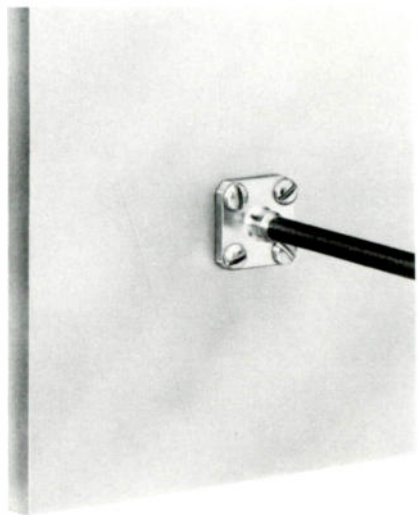
A new pneumatic, hand-operated cable tie installation tool has been announced by Panduit Corp., Tinley Park, IL 60477. The



lightweight, versatile tool installs 36 different Panduit cable ties and greatly reduces costly production time. According to Panduit, the new PPTS installation tool is specifically designed for production line, bench and harness board applications where high volumes of various size cable ties are used. The lightweight tool requires minimal trigger force. This means that, even during continued use, there will be minimum operator fatigue. Another advantage is the ease of operation which virtually eliminates operator training. The pneumatic tool installs all miniature, intermediate and standard cross-section Panduit cable ties, clamps, marker ties and pushmount ties on bundles up to four inch diameter. The new tool operates at any angle or position using standard 70 to 80 psi air, and provides uniform, controlled tensioning and flush cut-off of ties. Simply squeeze the trigger lightly and the tool automatically tightens to the preset tension and cuts the cable tie off flush. No sharp edges. No metal barbs. No twisting required. Tension adjustment is fast and easy using the conveniently located knob on the handle. The tension settings and adjustments are the same as for the widely used, manual GS2B Panduit installation tool. The tension can be locked at a pre-determined setting. All pinch points were avoided as operator safety was a major design consideration.

BULKHEAD TERMINATOR: CABLEWAVE SYSTEMS

A panel type termination from Cablewave Systems, 60 Dodge Ave., North Haven, CT 06473, represents a new method fo terminating .141 inch semi-rigid cable at a bulkhead or panel where a demountable junction is not required. Prior to the introduction of the new model, the alternative method of termination required drilling a hole and soldering the cable directly to the panel.



TRENCHERS: DAVIS MANUFACTURING

Two new medium size utility trenchers featuring total hydraulic control and one-hand operation have been introduced by Davis Manufacturing Division of J I Case, 1500 So. McLean Blvd., Wichita, Kansas 67213. The Fleetline 30+4 Super, a 30 hp rig, and the Fleetline 40+4 Super, a 37 hp unit, are the newest members of the Davis four-wheel drive rubber-tired articulated trencher line. Both can be equipped with attachments for trenching, backhoeing or direct-burial line-laying, backfilling and horizontal boring for exceptional versatility, and both power packages can be equipped with either a

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gasoline or diesel engine. Both trenchers feature the exclusive Davis Mono-Stick which puts total control of all movement of the machine in one hand. This single lever takes the place of the steering wheel, gear shift, accelerator pedal, clutch pedal, brake pedal and steering brakes. Hydra-Dynamic braking is applied by returning the Mono-Stick to neutral. A new fully hydraulic angle backfill blade is available on either machine. It angles 40 degrees either side and offsets 9½" to counter side thrust and permit backfilling while running parallel to the trench with the wheels back a safe distance. It can be used with any combination of attachments.

VAN-MOUNTED LIFT: TIME MANUFACTURING

TIME Manufacturing Co., 7601 Imperial Drive, Waco, TX 76710, has announced the introduction of the VAN-TEL-24. The unit

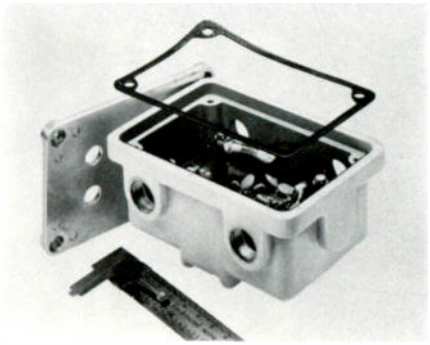
offers a working height of 30 feet, full 360° rotation and an elevation range of -6° to +84°. Rated bucket capacity is 300 pounds, and the VAN-TEL meets all OSHA standards without ballast, outriggers or stabilizers, even at full over-the-side boom extension. Bucket controls are simple electric toggle switches for elevation, rotation and extension, with a push button for truck engine remote start/stop. Complete over-ride controls are mounted on the pedestal inside the van. Hydraulic power is supplied by 12V D.C. pump or truck fan belt driven pump. A standard one-ton van with 8000-pound GVW is recommended for mounting the lift.

MINIATURE CABLE: CABLEWAVE

Cablewave Systems has announced the expansion of its series of miniature coaxial cables to include seven different diameters ranging from .035 inch to .325 inch in lengths up to 100 feet. Construction consists of a solid copper outer conductor, plain, or with various types of plating. Silver or tin plating is standard, however, any other electroplated finish can be furnished. While TFE Teflon dielectric with inner conductors of silver plated copperweld steel or silver plated copper are standard, other dielectrics and center conductors are available. The 50 ohm cables offer impedance tolerance as low as 1/2 ohm. Seamless outer conductor construction minimizes radiation and prevents crosstalk. The attenuation versus frequency curve is smooth and minimum VSWR is an important characteristic. In addition to light weight, another feature of the miniature cables is their ability to withstand repeated flexing. Installation is convenient due to ease of stripping, tinning or soldering.

CONDUCTIVE SHIELDS: TECHNICAL WIRE

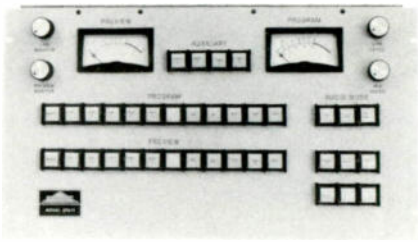
An electrically conductive silicone elastomer called Sc-Consil is available from Technical Wire Products Incorporated, 129 Dermody St., Cranford, N.J. 07016, to provide high to moderate conductivity for applications ranging from EMI shielding and mois-



ture sealing to static discharge wicks. Generally described as "semi-conductive", the standard compound has a nominal volume resistivity of 10.0 ohm-cm. By modifying the basic elastomer, Tecknit can tailor Sc-Consil parts to provide volume resistivity between 10 and 100,000 ohm-cm. Applications for Sc-Consil are based on the need to fulfill one or more requirements including: 1) Good electrically conductive at relatively low cost, 2) Consistant electrical properties, not affected by some mechanical working, 3) Charge or discharge of static electricity and 4) Compatible with all metals. Sc-Consil is available in sheets at various thicknesses for die cut gaskets; molded conductive parts; extruded shapes, tubing and cords; and custom Sc-Consil on metal parts.

MASTER SWITCHER: AMERICAN DATA CORP.

American Data Corporation, an Airpax Company, P.O. Box 5228, Huntsville, Alabama, has just announced the release of a



new master control switcher which is a companion to the 556 production system. The 570.11 is a two bus switcher which features audio-follow-video on both busses and four-auxiliary inputs. The audio mode may be selected between A-F-V, AUX or AUX into AFV mix. Ten watt monitor amplifiers are utilized to drive eight ohm speakers and have remote panel gain controls. The program line amplifier has a maximum output level of + 24 dbm into 600 ohms. Two large VU meters are incorporated into the control panel. Various methods of machine control may be included as options. A digital "one event" preset-take/cutbar-preroll system is one method, another is the use of dedicated start-stop switches for each machine. The control panel is only 10 1/2 inches high, 4 1/2 inches deep and mounts in a standard 19 inch equipment frame.

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TURNBACK TINGLER: COMM. TECHNOLOGY

A non-battery electronic circuit for buried cable location which is housed within their Turnback Wheel has been developed by Communications Technology Corporation, 2237 Colby Ave., Los Angeles, CA 90064. The wheel itself permits cable to be looped or turned back in such a way that cable shield or sheath will not be damaged. It offers a compact method for burying extra cable footage, and it places cable in the proper position for butt splicing. The new electronic circuit, called a tingler, is securely sealed within the Turnback Wheel and designed to utilize standard detector energy, amplify it, and produce an audible signal response similar to a large metal mass. Buried cable loops can be instantly located by the Tingler with standard cable locators. It requires no outside power source, as its energy is picked up from the cable locator. Or buried butt splices which utilize the Turnback and Tingler can be instantly located for repair, additions, etc.

MODULAR RELAYS: ITT JENNINGS

A series of modular coaxial relays has been introduced by ITT Jennings, a division of International Telephone and Telegraph Corporation, 970 McLaughlin Ave, San Jose, CA 95116. Designed for RF switching of CATV, CCTV, telemetry, and data distribution networks, the RC1100 series is available in several configurations that can be stacked to accomodate complex switching requirements. First in the series is the RC1103A, a 1X3 coaxial relay with a DC-to-300-MHz frequency capacility. The unit's sealed RF contacts provide a low and stable contact resistance with an extremely long life. It's designed for optimum VSWR and insertion-loss characteristics below 300 MHz with a minimum of RF leakage between input or output. Characteristic impedance is 50 ohms and the unit is equipped with BNC connectors. A 24-volt DC coil is standard. Typical applications include baseband and IF switching of microwave trunks and satellite communications networks, automatic switching of computer-controlled measuring systems, and CATV and CCTV distribution switching. The RC1103A is priced under $100 each in small quantities and delivery is 60 days after receipt of order.

TEST SETS: JERROLD TEXSCAN

A new deluxe CATV test set, model 9600, and a new basic CATV test set, model 9700, have been introduced by Jerrold/Texscan. 200 Witmer Rd., Horhsam, PA 19044. Model 9600 is a single package tracking sweeper analyzer for complete system analysis. It provides a unique tool for simultaneous sweep and analyzer measurements in the 1 to 350 MHz range. The model 9600 features frequency conversion from RF to IF, insuring high sensitivity, and greater than 100 dB of dynamic measurement range. Model 9700 is a new sweep system and spectrum analyzer. It is a complete CATV measurement tool in one package. The model 9700 features: a sweeper with sweep widths from 20 KHz to 350 MHz, continuously adjustable in two overlapping ranges with single-frequency (CW) positions, and a frequency range from 1 to 350 MHz; a spectrum analyzer with excellent specifications over the 4-350 MHz range, and slight reduced specs from 1 to 4 MHz.

AERIAL STRAND CLAMP: 3M COMPANY

A strand clamp for use in aerial cable splicing has been developed by 3M Company, P.O. Box 33600, St. Paul, MN 55133. Called the 3M Brand/MS^2 4035 Strand Clamp, it is designed for use with the MS^2 splicing head. The easy-to-set-up operation reduces a craftsman's splicing preparation time and the clamp requires a minimum of tools. For aerial cable splicing, the craftsman attaches the clamp to the strand, slides the splicing head into the clamp and is ready to begin splicing immediately. The clamp can be used on strands as small as 3/16th of an inch and for low pair count splicing applications. The strand clamp holds firmly with no slippage, and no-slack splices can be made without having to remove the clamp from the strand. The device is one piece and is constructed of nickel-plated steel. Aluminum knobs on the head clamp and strand vice are star-shaped for easier handling.

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● HAVE TRUE FIRE RESISTANT QUALITIES	ASBESTOS WALL PANEL OPTION
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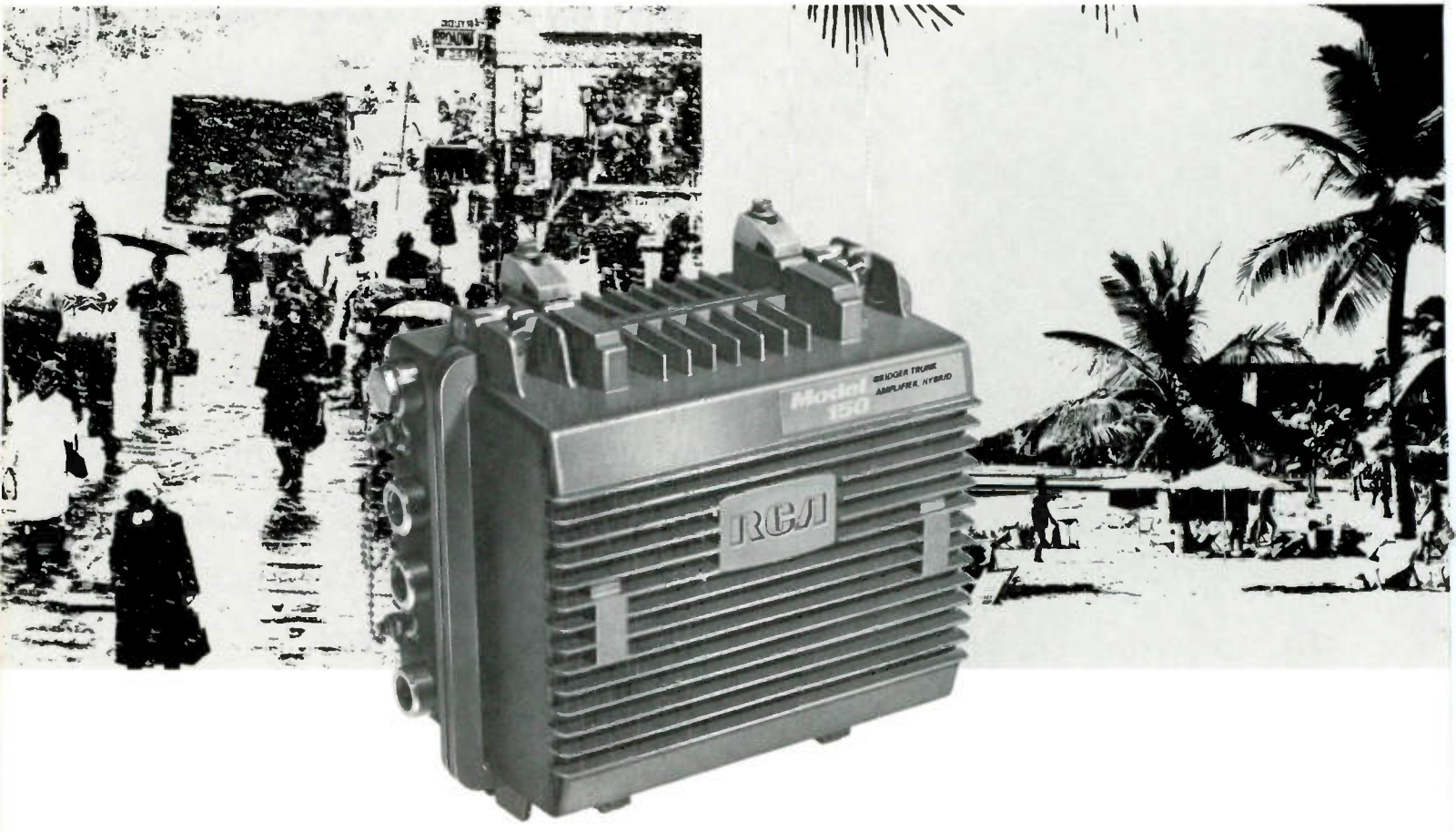

You can keep your CATV systems working with strong and clear signals even in the most severe weather with RCA's Model 150 amplifiers.

Here at RCA we've run some very rugged tests to prove this claim. For example, using a cascade of 20 amplifiers, we "tracked" a cable as it changed attenuation during simulated climatic changes. These changes, created in our environmental chamber, were extreme, with temperatures taken down to −40°F. and up to +140°F.

We used Automatic Gain Control and Automatic Slope Control (AGC/ASC) modules with the test amplifiers to sense the output level of the cable, and to automatically adjust the signal level of the amplifiers.

These temperature reliability tests proved our point: a flat response was maintained in each amplifier over the entire temperature range . . . from extreme cold to extreme heat!

Additional weather-proofing features include the provision for center seize connectors, rugged double gasket seals and a strong, compact, diecast aluminum housing.

Model 150 Amplifiers being set up for temperature reliability testing in the environmental chamber.

Simply translated, this means that your CATV system can function efficiently in any kind of weather. That is, if you're using RCA's Model 150 amplifiers.

For more information, contact RCA, Director of Marketing, 7355 Fulton Avenue, North Hollywood, CA 91605. (213) 764-2411.

Or, visit our Booth, No. 125, at the Western Cable Television Show in Las Vegas, Nevada, November 28 through December 1.

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Title _____

Company _____

Company Address _____

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PLEASE CHECK TYPE OF BUSINESS

☐ CATV System Operations
☐ CATV Contractors Consultants
☐ CATV Investors
☐ CATV Components Mfgs . Dealers and Distributors
☐ Microwave and Telephone Companies
☐ TV. AM. FM Broadcasters
☐ Educational TV Stations Schools and L braries
☐ Closed Circuit TV Users
☐ Financial Institutions, Brokers, Attorneys and Governmental Agencies
☐ Program Producers, Program Distributors and Advertising Agencies

TVC

I would like to begin receiving *TV Communications* every month for the term checked.

☐ $23 00 for 3 Years
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☐ $17 00 for 2 Years

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Company Address _____

City _____ State _____ Zip _____

PLEASE CHECK TYPE OF BUSINESS

☐ CATV System Operations
☐ CATV Contractors/Consultants
☐ CATV Investors
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☐ TV. AM. FM Broadcasters
☐ Educational TV Stations. Schools and Libraries
☐ Closed Circuit TV Users
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CATV DIRECTORIES

I would like to receive the annual *CATV Directory of Equipment and Services* and the *CATV Systems Directory, Map Service and Handbook.*

Buy Them Together or Buy Them Separately

☐ only $13.90 for both Directories! Special combined offer provides *a savings of $4.00!*

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☐ $8 95 for CATV Systems Directory, Map Service and Handbook

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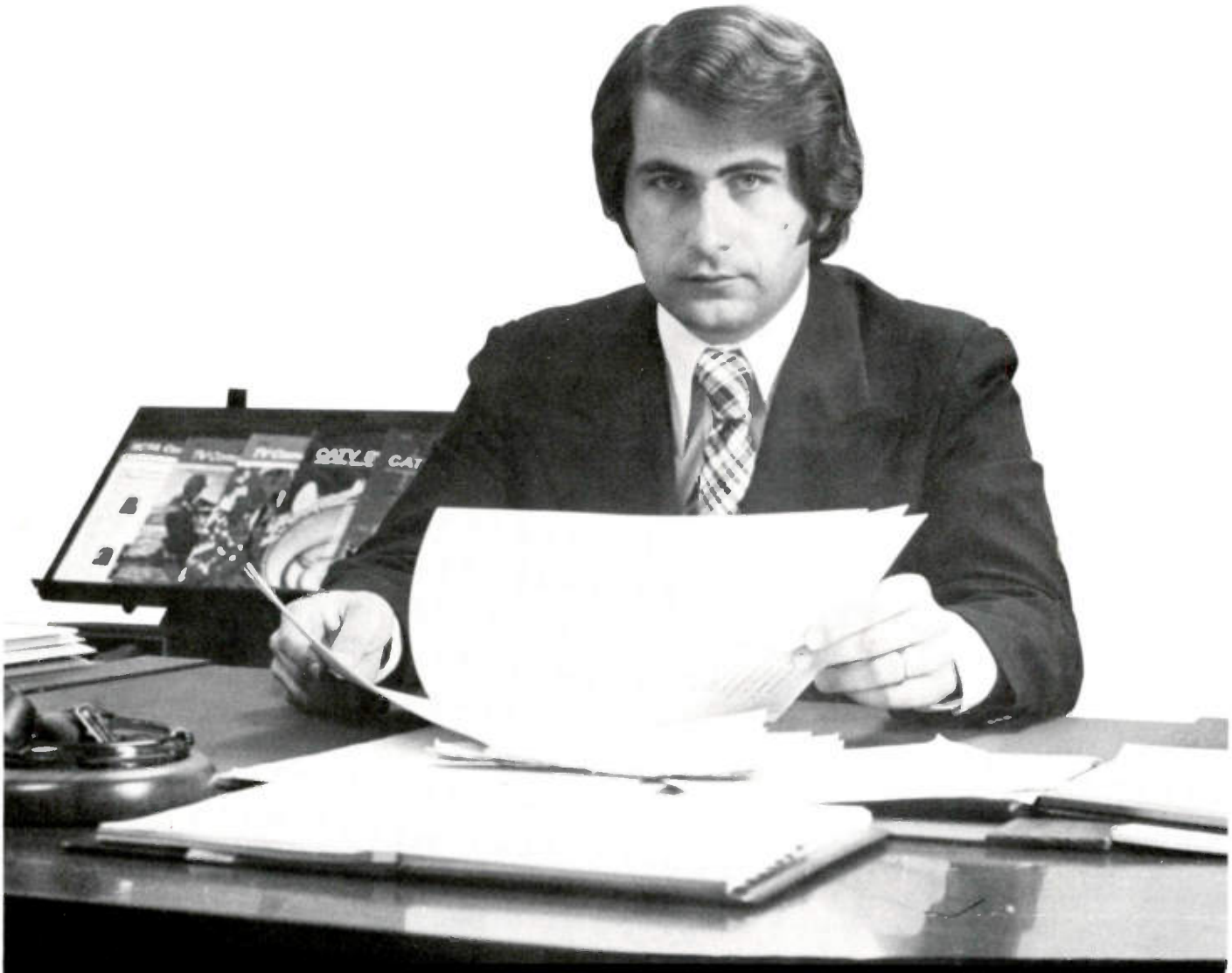

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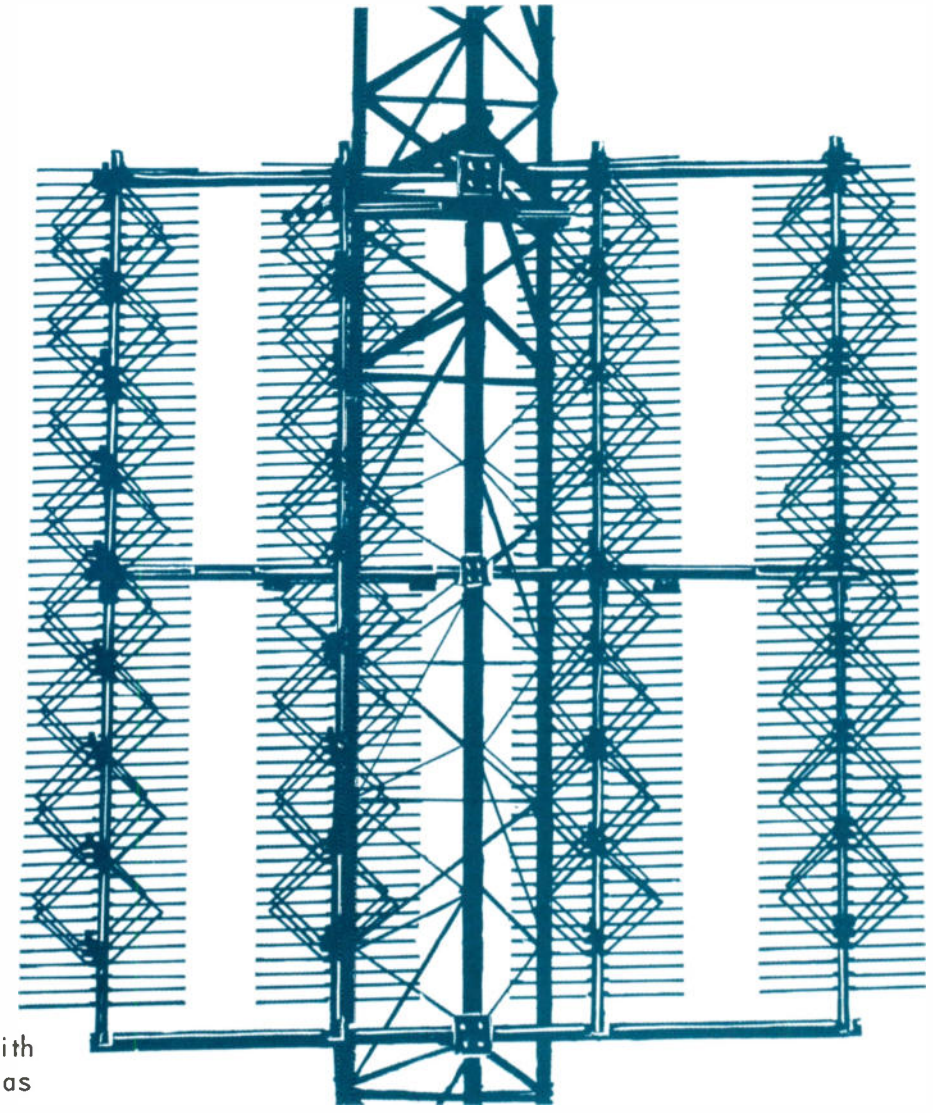
INDEX OF DISPLAY ADVERTISERS

Get the ultimate in UHF and VHF reception with Lindsay's Revolutionary New ZIG ZAG antennas

ZIG*ZAG SERIES



UHF Model		Gain in dBi
4-SZZ	QUAD	25.2
2-SZZ	2-BAY	22.6
1-SZZ	SINGLE	20.0

SHOWN
Quad of UHF Super ZIG ZAGS
Model 4–SZZ-19 (Channel 19)

Solve reception problems with Lindsay ZIG ZAG Antennas

The new Lindsay ZIG ZAG antenna series is the most advanced antenna design yet developed. It provides more gain and reliability than any other antenna for a given size, with substantially reduced wind resistance due to its unique design.

Actual tests show gains in excess of quad stacked eight foot parabolic dishes.

The Zig Zag antenna's closely controlled impedance permits full realization of the noise figure benefits provided by the best "Low Noise" preamplifiers available today. (Some antennas throw away this benefit).

Side and rear lobes are kept to a minimum to assure maximum rejection of interfering signals.
The extra high gain, low VSWR and flat response will give the utmost performance in UHF and VHF reception. (VHF – highband only.)

A compensated phasing system maintains maximum performance and keeps antenna on frequency even under ice loading conditions.
The narrow spaced grid type reflector screen provides solid performance and prevents distortion of the antenna's radiation pattern due to the mounting structure.

The vertical plane design permits direct mounting onto a tower leg and makes fine adjustments easy.
Another advantage of the tower hugging feature is the provision of faster and safer installations.

The Lindsay ZIG ZAG antenna series is constructed of special high strength aluminum alloy. The mounting clamps are heavily plated and generously massive in size and have non-slip teeth to keep the antenna "on target". The U-bolts take up to 3"OD masting (larger diameter upon request). Supplied with 'F' connectors.

Before shipment, all ZIG ZAG antennas are carefully tuned on our antenna test range for maximum performance. They are available in arrays of 4-stack (quad), 2-stack and single antennas. For further information and specifications,

write or call.....

Lindsay

418 Caredean Drive, Horsham Pa 19044
USA. Telephone (215) 674–5510

In Canada...
LINDSAY SPECIALTY PRODUCTS LTD.
50 Mary St W, Lindsay, Ont. (705) 324-2196

Picking your cable is easy. Getting it often isn't.

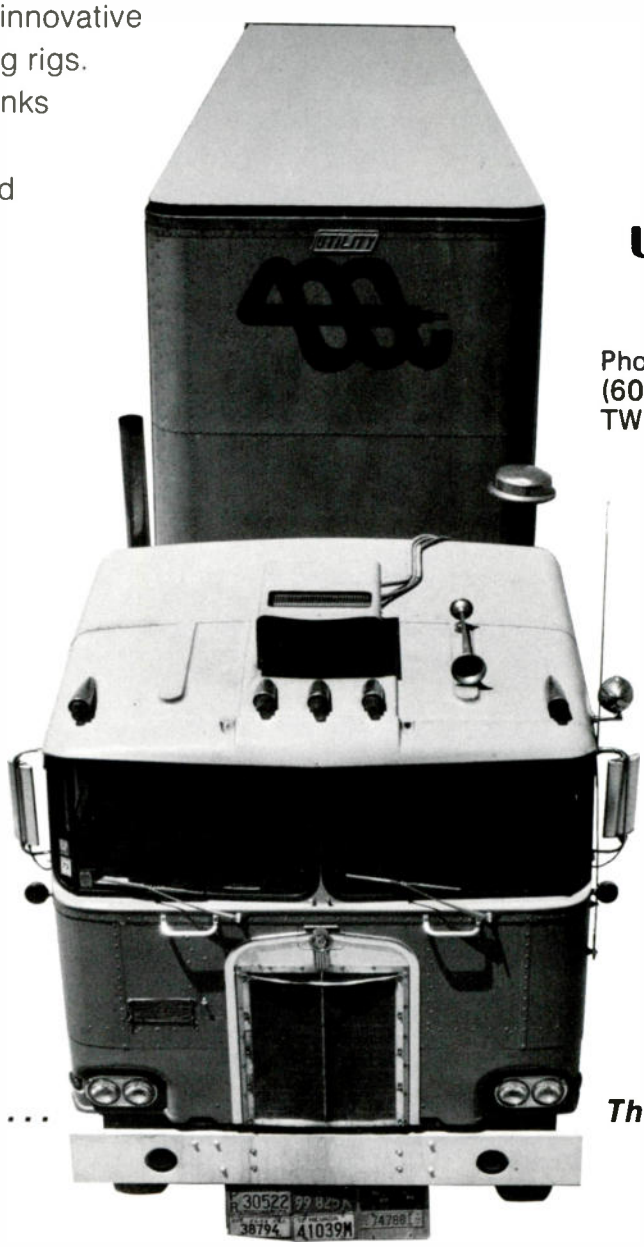
In reasonable time, that is. Not to mention when promised. Around order time it's all honeymoon. Any delivery promise goes. Later, it's often all delays. Always the unavoidable kind. Always someone else's fault.

With us, there isn't someone else. We do it ourselves. With our own special trucks. With our own innovative loading and unloading rigs.

A side benefit: thanks to this special equipment, we've eliminated just about every possible cause of in-transit cable damage. The way it leaves is the way it arrives.

Next time you need cable, think hard about *how* you need it. Fast, on time, in factory-fresh condition would be our suggestion.

And promise.



SYSTEMS WIRE & CABLE INC.

Phoenix, Arizona
(602) 268-8744
TWX 910-951-1533

Rome, N.Y.
(315) 337-7080

PLEASE MAKE NOTE OF OUR NEW PHONE & TWX NUMBER

All we make is cable . . .

That's why we make it better.

THE CATV CLASSIFIEDS

HELP WANTED

FIELD TECHNICIANS

Qualified field technicians needed to maintain large complex in beautiful mountains of East Tenn. Must have experience in trunk balancing and maintenance of Starline – 1/Starline – 20 equipment plus broad knowledge of CATV electronics. Good starting salary . . . . fringes galore. REPLY TO BOX #W-1112-2.

TECHNICIANS
INSTALLERS – TECHNICIANS

Openings now for qualified individuals to do plant maintenance and customer service calls. Excellent opportunity for individual looking for advancement and responsibility.

JACKSON COUNTY CABLE SYSTEM
1600 South Nolan Road
Independence, MO. 64055
(816) 836-8800

CHIEF TECHNICIAN/ENGINEER

Opportunity to join developing cable company in the metropolitan Kansas City area. First 100 miles of 400 mile system now complete with remainder under construction. Applicant must have chief technician experience and be ready to step in and take over full responsibility for plant construction and maintenance.

JACKSON COUNTY CABLE SYSTEM
1600 South Nolan Road
Independence, MO. 64055
(816) 836-8800

WANTED
ELECTRONIC TECHNICIAN

Major CATV system has openings for qualified Technician to perform system maintenance and turn-on for a 704 mile dual cable system with Jerrold Headend equipment and 21 miles of AML microwave. Applicant must be familiar with the operation of THETACOM XR2 Electronics. Send resume or call Jim Anderson (415) 534-4175. P.O. Box 23763, Oakland, California 94623.

EXPERIENCED
SYSTEM TECHNICIANS

NEEDED IMMEDIATELY FOR 500 MILE PLANT PRESENTLY OPERATING AND UNDER CONSTRUCTION. CONSTRUCTION AND SYSTEM MAINTENANCE EXPERIENCE NECESSARY. EXCELLENT OPPORTUNITY FOR ADVANCEMENT. ALL INQUIRIES CONFIDENTIAL. CONTACT: WAYNE MANGUM, COMPLETE CHANNEL TV, 5723 TOKAY BLVD., MADISON, WI 53711 AC 608/274-3511.

HERITAGE COMMUNICATIONS, INC.

TECHNICIANS, ENGINEERS

Strong Technical personnel needed to aid in our growth. Send resume and career objectives to

Arthur C. Hutzler
Heritage Communications, Inc.
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Des Moines, Iowa 50309

CATV Technician

- Experience required in the measurement and qualification of CATV system equipment. Opportunity exists with a progressive, fast growing CATV equipment manufacturer.
- Excellent Opportunity for Advancement for the Right Man.
- Generous Company Paid Benefits. Send Resume in Complete Confidence to:

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Equal Opportunity Employer m/f

wanted
wanted
wanted

Chief Engineer-CATV medium size MSO company West Coast. Require both CATV and Broadcast administrative experience. Top salary plus generous fringe benefits. Opportunity with a growing company in a pleasant year-round climate. All replies confidential. An Equal Opportunity Employer. Send resume and salary requirements to: W-1119-1.

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Think about a new idea from MAGSON.
Imagine a sales tool that increases the calls your men make daily and improves morale.
No investment — Lease perma press uniforms without the cleaning.
Distinctive colors — custom emblems — free replacements.
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MAGSON UNIFORM
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(203) 225-8651

LEGAL NOTICE

PLEASE TAKE NOTICE

Please take notice, that the incorporated City of Camarillo, Ventura County, California, hereby invites interested perons to apply for a franchise to provide cable television service to the residents of the City. Camarillo, California, is a community of 23,500 persons with an area of approximately 17 square miles, located approximately midway between downtown Los Angeles and the City of Santa Barbara, California. A copy of the City's enabling ordinance, which includes technical specifications and application procedures, may be obtained by writing to the City Manager, City of Camarillo, P.O. Box 248, Camarillo, CA 93010.

BUSINESS OPPORTUNITY

PURCHASE SYSTEMS AND FRANCHISES

MSO is interested in purchasing CATV franchises and systems. Have very substantial funds available. Can respond quickly in confidence to your inquiry. Reply to President, Pioneer Cablevision Corp., 19 West Elm Street, Greenwich, Connecticut 06830. (203) 661-1166.

EVER HAD THE URGE

. . . To Try Selling?
. . . To Be in Business for Yourself?

If you have common sense and are a hard worker, Van Ladder has a new and unique program available for you. Minimum investment required. Excellent proven profits. Write for info on our totally new line. Sales to all major telephone and CATV Systems now. Call (712) 262-5810 or write

VAN LADDER
Box 709
Spencer, Iowa 51301

POSITION WANTED

POSITION WANTED

Energetic, creative, young man with Production and Supervisory experience in Broadcasting and Cable desires to manage a local origination department for a progressive Cable Co. I am currently working in So. Fla., but would relocate. Send inquiries to TV Communications P.O. Box #T-1273-1.

EQUIPMENT FOR SALE

USED SYSTEM EQUIPMENT

"78 ea. SKL 222A Trunk Amplifiers; 71 ea. SKL 209A Line Extenders. Also Jerrold (51 ea. BDA213 and 18 ea. SCA 213) and Entron (25 ea. ABX 640 and 46 ea. LHB254R) and other miscellaneous equipment. Will take best offer for all or part. Video International, Inc. (904) 575-1398; P O Box 5197, Tallahassee, Fla. 32301."

EQUIPMENT FOR SALE

FOR SALE: Anaconda FM Repeaters, Model 8710's Following Frequency: 95.9, 91.7, 102.9, 107.5, 106.7, 88.7, 95.5, 96.3, 99.5, 100.3, 101.1, 104.3, 105.1, 99.9, 92.5, 94.7, 99.1, 101.5, 104.7, 93.5, 98.7, 105.5
Selling price: $115 each or all 22 for $2,000.00. Contact Frank Nagle, Buckeye Cablevision (419) 531-5121.

BUSINESS DIRECTORY

Ground Clamps

Type #242
PAT

WESTAY COMPANY
P. O. Box 573 - Cupertino, Calif. 95014

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Manufacturers of coaxial connectors for the CATV Industry.

has changed their name to:

TIDAL COMMUNICATIONS CORPORATION

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Cable Television Management and Engineering Consultants
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20036
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Atlantic Research Corporation

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DO IT WITH CLASSIFIEDS
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Write: *CATV Magazine*
Classified Department
1900 West Yale
Englewood, Colorado 80110

LEGAL NOTICE

TOWN OF FAIRHAVEN, MASSACHUSETTS SOLICITATION FOR CABLE TV APPLICATIONS

In accordance with the provisions of Massachusetts General Laws Chapter 166A and Sec. 1 - 3 (b) (2) of the Procedural Regulations of the Cable Television Commission of the Commonwealth of Massachusetts, notice is hereby given that applications for a cable television license or licenses will be received by the Town of Fairhaven until March 1, 1974. Application must be made on forms prescribed by the Commonwealth of Massachusetts CATV Commission, available upon request from such Commission. A fee of $100.00 payable to the Town of Fairhaven must accompany each application. Applications and fees should be forwarded to the Board of Selectmen, Town Hall, Fairhaven, Massachusetts, to be received by such Board on or before March 1, 1974.

TOWN OF FAIRHAVEN
BY: Board of Selectmen
William H. Perry, Chairman
Kenneth M. Wood
Walter Silveira
Issuing Authority

Literature

Wavetek, 9045 Balboa Avenue, San Diego, CA 92123, has published a 15 page booklet on function generators, written for both the interested and experienced users. The basic generator with VCG (voltage control of the generator frequency) is described, and nine function generator applications are given that use VCG and the basic sine, square and triangle waveforms. A glossary describing the terms used and a matrix of 21 Wavetek function generators and their features included.

Tab Books, Blue Ridge Summit, Pa., has published a **CATV Operator's Handbook** covering every aspect of CATV system management from the basics of planning and design to program origination and two-way cable operation. The first several chapters explain how experts go about starting a system, getting involved in the community, conducting surveys, obtaining franchises, installing the plant, and determining cash requirements. Two chapters deal with antenna system planning, including tips on locating headend sites. Proved methods of cable service promotion are described. Case history discussions reveals what is being done with regard to local origination in various size markets. Also, covered are two-way systems, describing what is being done, the problems encountered, and the future of two-way communication. TVC

Calendar

NOVEMBER

26-27 NCTA Board of Directors meeting, Las Vegas Hilton, Las Vegas, Nev. Contact: Rochelle Nezin, NCTA.

28 Public Relations Committee Meeting, Las Vegas, Nev. Contact: Judy Jones, NCTA.

DECEMBER

28-Dec. 1 California Community Television Assn. convention, Las Vegas Hilton, Las Vegas, Nev. Contact: CCTA, Walsh Center Building, 3137 Castro Valley Blvd., Castro Valley, Cal. 94546.

JANUARY

9 New England CATV Assn. winter meeting, Marriott Hotel, Newton, Mass. Contact: Bill Kenny, Box 321, Tilden, N.H.

15-18 Rocky Mountain CATV Assn. meeting, Scottsdale, Ariz. Contact: Tom Worster, Comtronics Cable TV, 725 Rood Ave., Grand Junction, Colo. 81501. 301/422-8615.

20-22 NCTA Regional Legislative Conference, Quality Inn, Washington, D.C. Contact: Brenda Gore, NCTA. TVC

Deal Your Viewers This Winning Hand...

—AT LAS VEGAS, STOP
BY OUR DISPLAY BOOTHS
#177, 178, 179

NewsCable

Cable Television's Primary News Programming Force

Mr. Bob Sundy
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New York, New York 10020

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Please have your AP representative in my state contact me about **AP NewsCable** service ..... ☐

NAME _____

TITLE _____

CATV SYSTEM _____

ADDRESS _____

CITY _____ STATE _____

ZIP CODE _____ TEL. NO. (____) _____

Model 2-3400
Mainline Manual Amplifier Module

4 PUSH-PULL STUD TRANSISTOR STAGES

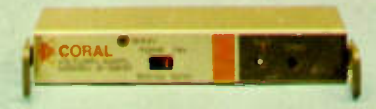
Model 2-3410
Mainline/AGC Amplifier Module

CONVERTIBLE PIGGY-BACK DUAL PILOT AGC

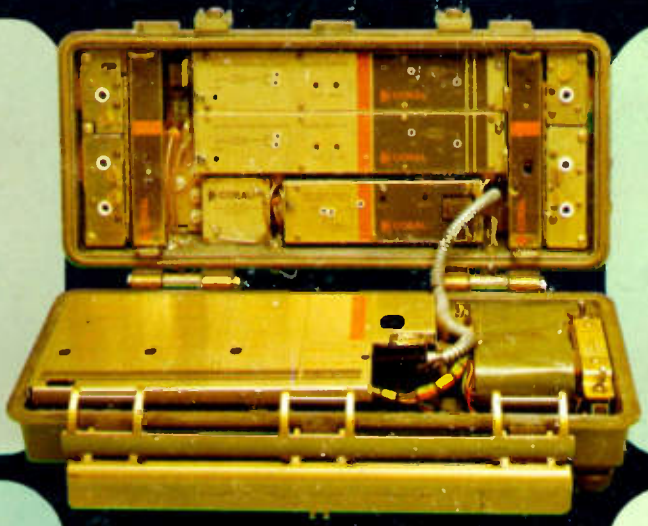
Model 2-3600
Bridger Amplifier Module

DUAL PUSH-PULL STUD TRANSISTOR AMPLIFIER FOR HIGHER OUTPUT

Model 2-3800
Return Amplifier Module



5-24 MHz RETURN PATH AND STATUS MONITOR UNIT



Model 2-3700
Sensor Amplifier Module

SENSES GAIN CHANGE TO SWITCH IN THE BACK-UP TRUNK AMPLIFIER

Model 2-3601
Distribution Selector Module

ONE, TWO, THREE OR FOUR OUTPUTS ARE OPTIONAL

2300

Model 2-3500
DC Power Supply Module

EXTRA HEAVY DUTY 100 WATT REGULATOR WITH SHORT CIRCUIT PROTECTION

THE TOTAL PACKAGE

1st WITH REDUNDANT "FAIL-SAFE" TRUNK AMPLIFIER
1st WITH 3-WAY REDUNDANT POWER SUPPLY
MODULAR BI-DIRECTIONAL SYSTEM WITH "STATUS MONITORING."

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