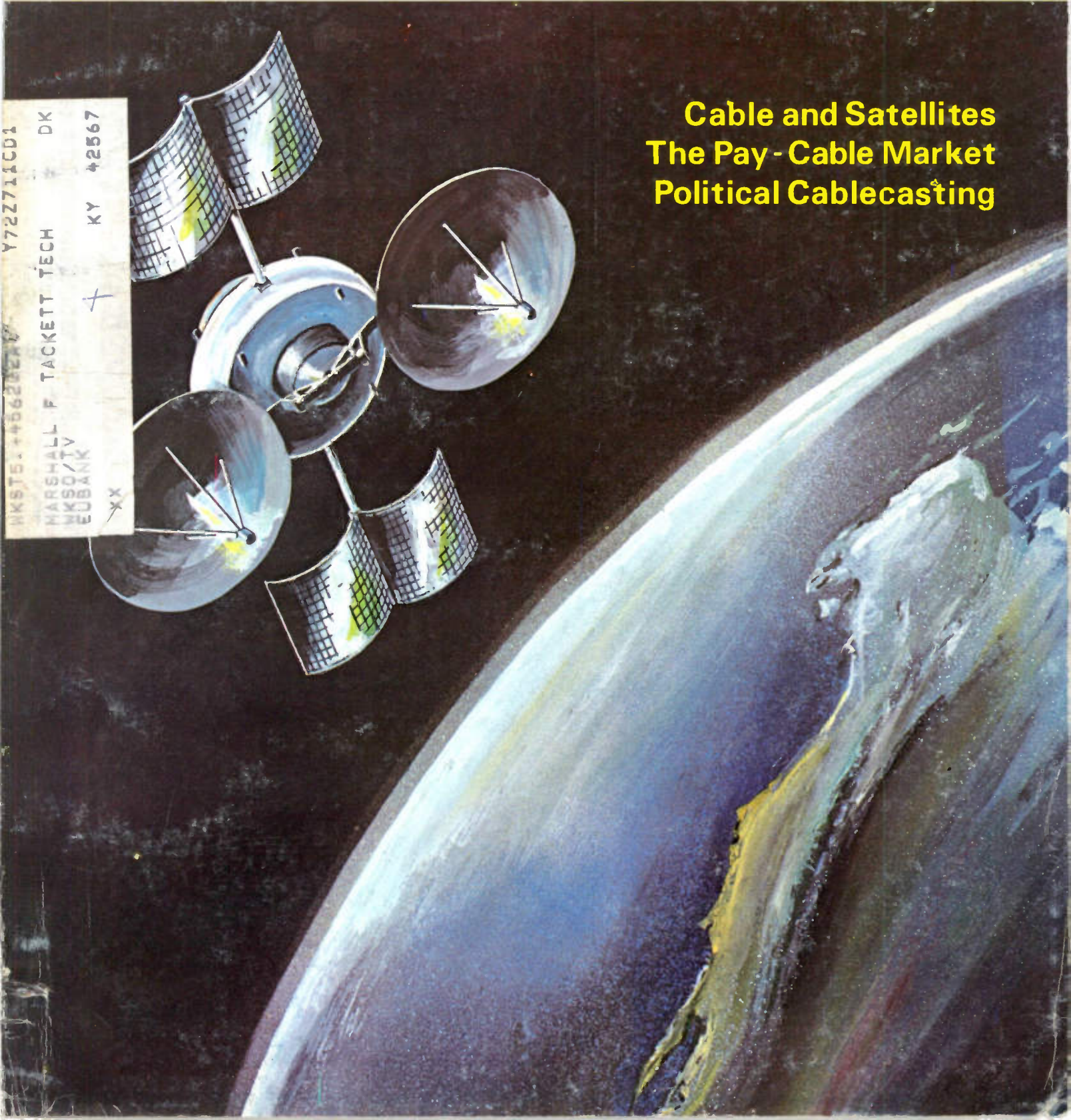


# *TV Communications*

The Professional Journal of Cable Television

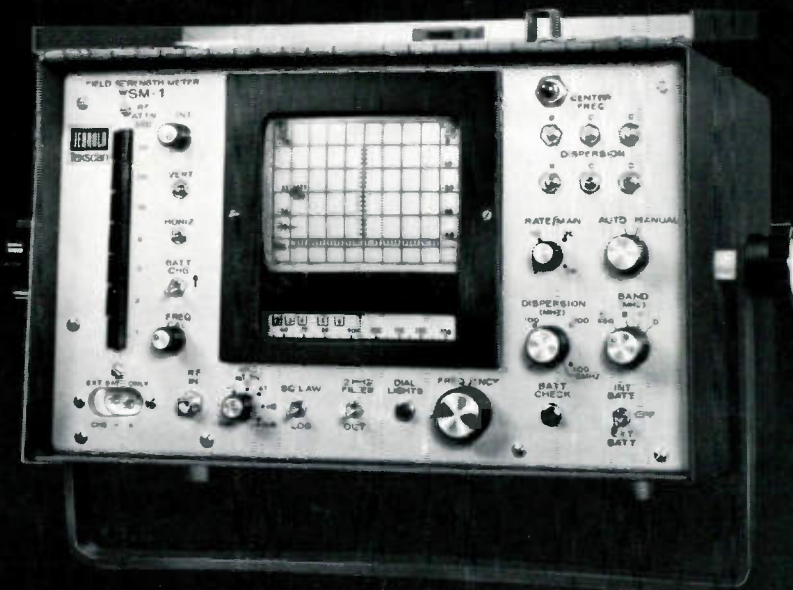
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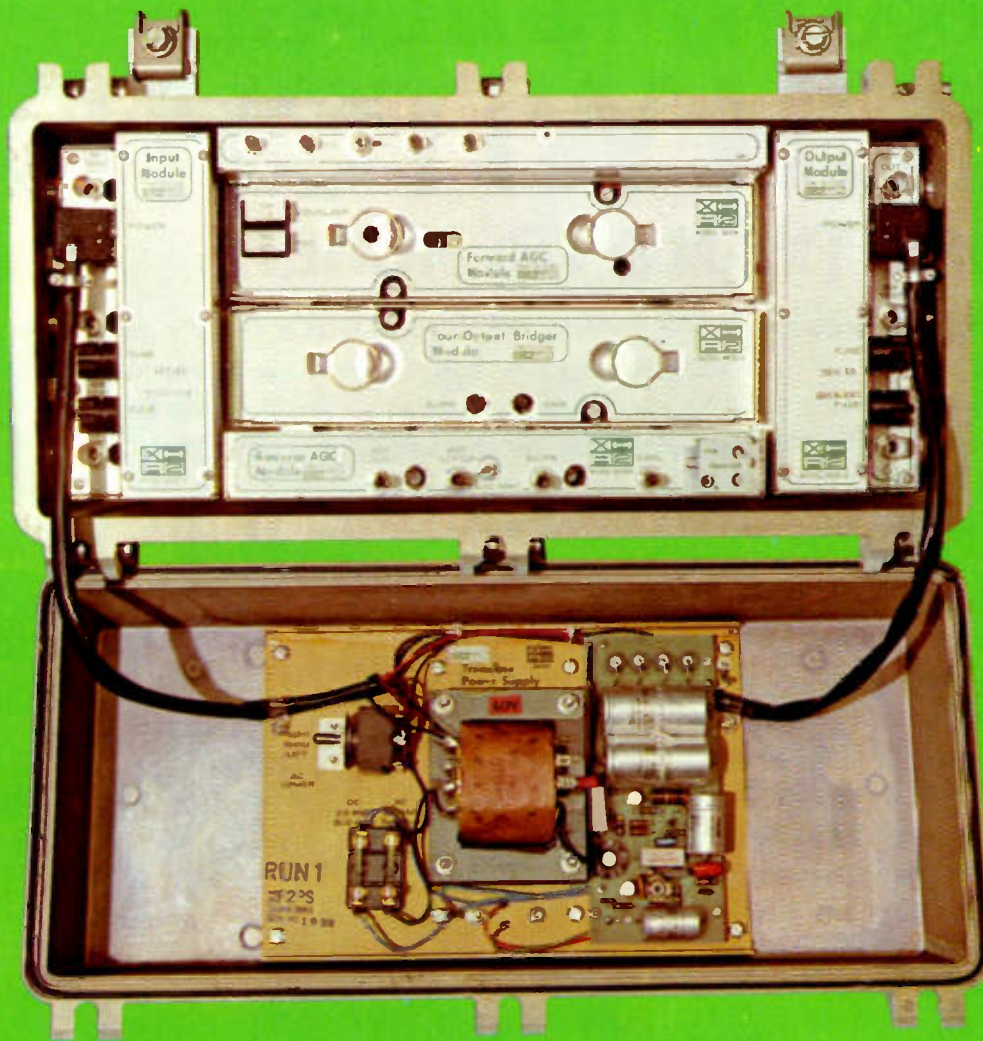
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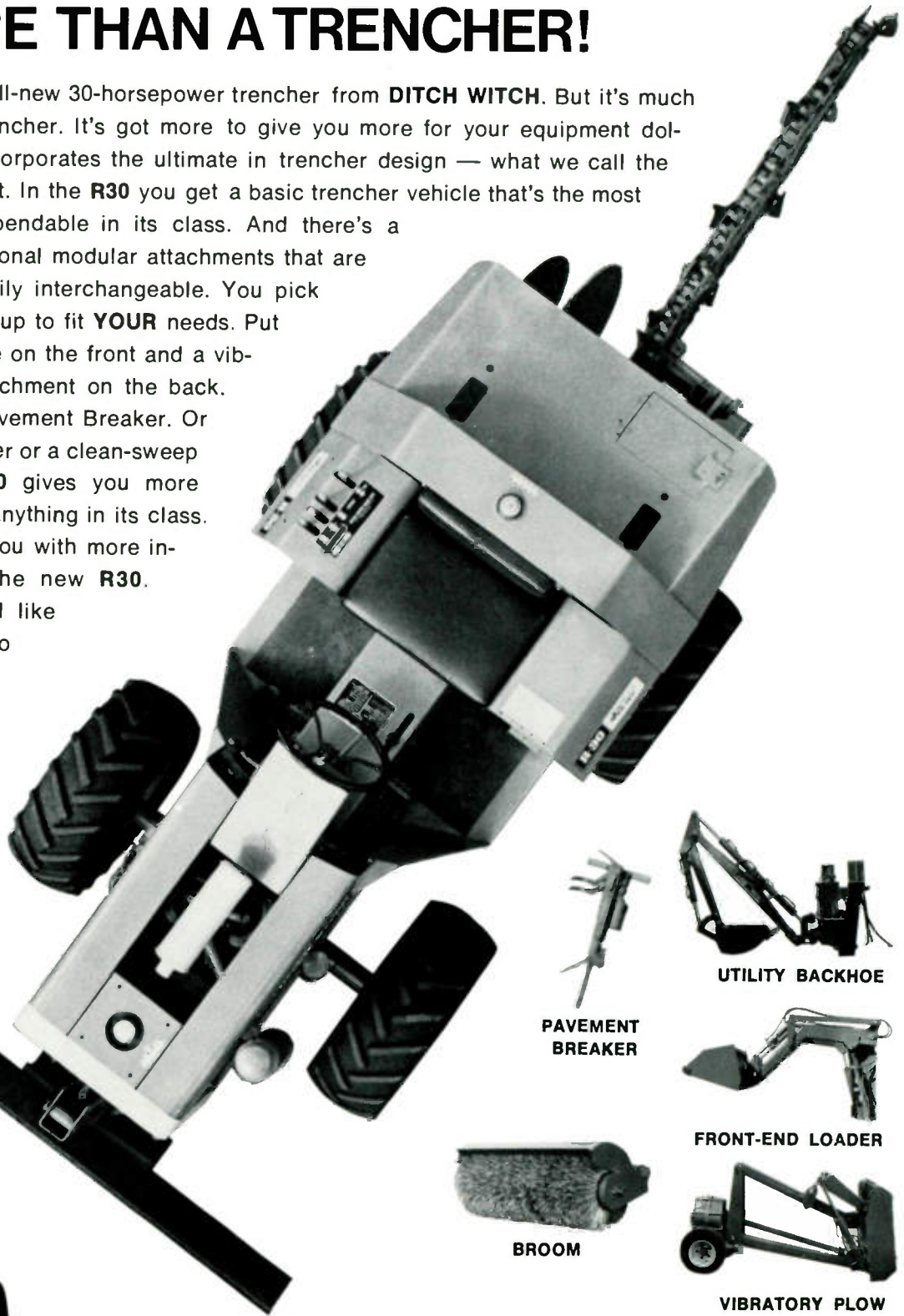
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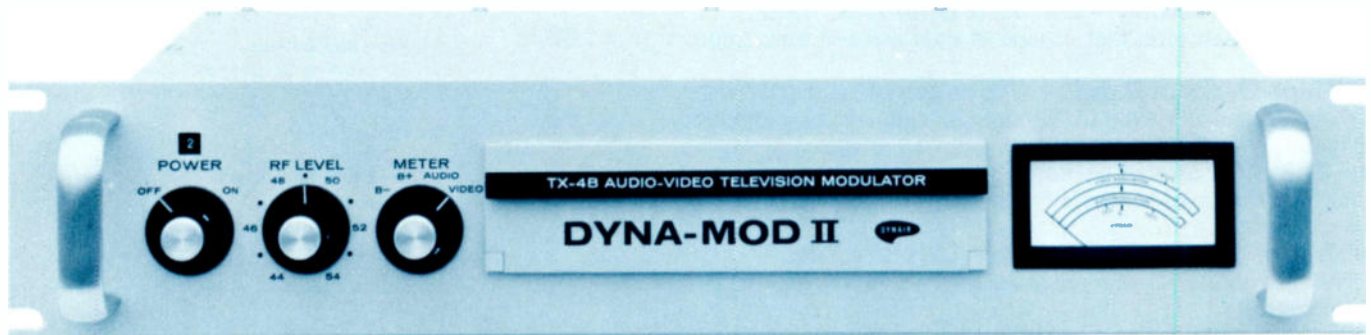
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November 1972, Volume 9, Number 11.



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## This Month's Cover...

Highlighting our lead article on the domestic satellite situation (see page 30), our cover is an artist's concept of the latest proposed design for the Western Tele-Communications, Inc. communications satellite. Picture courtesy of WTCl.

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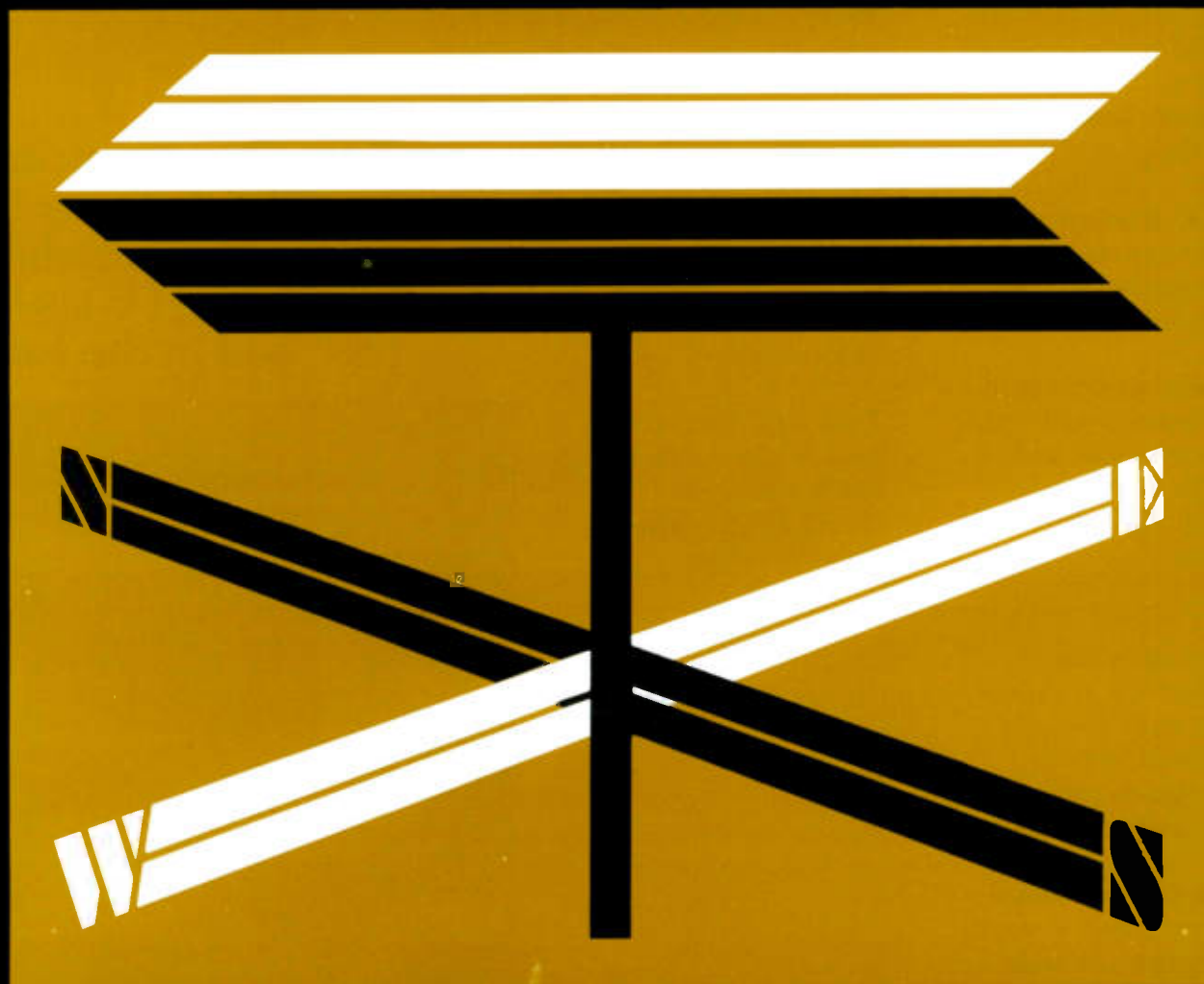
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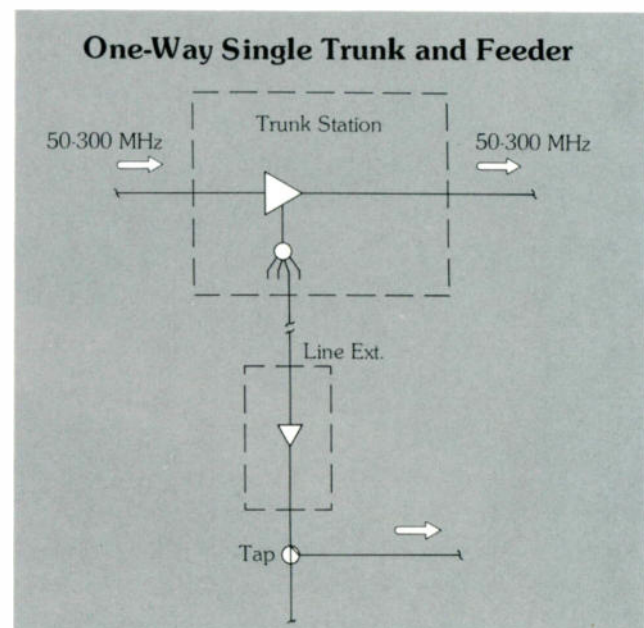
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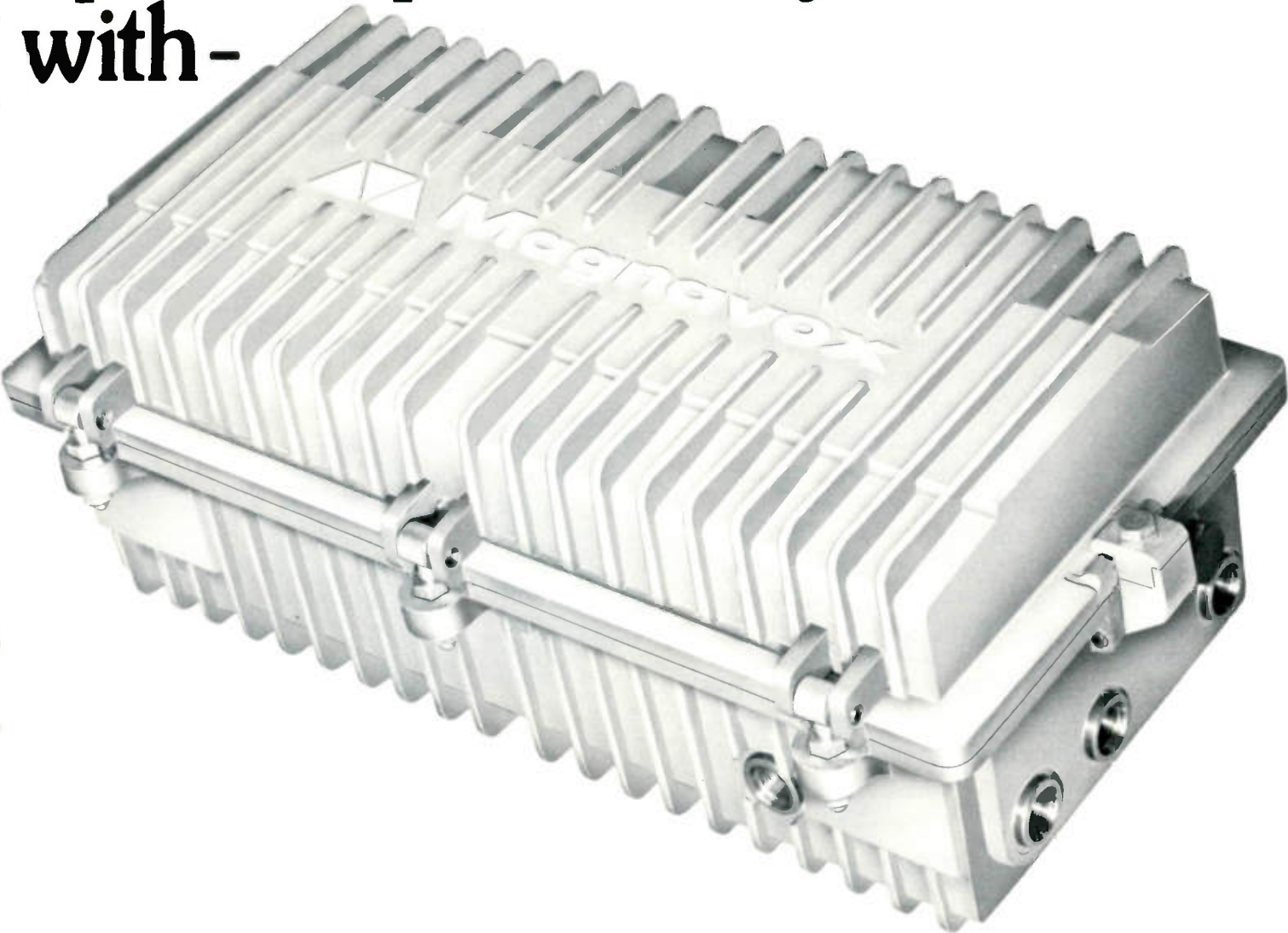
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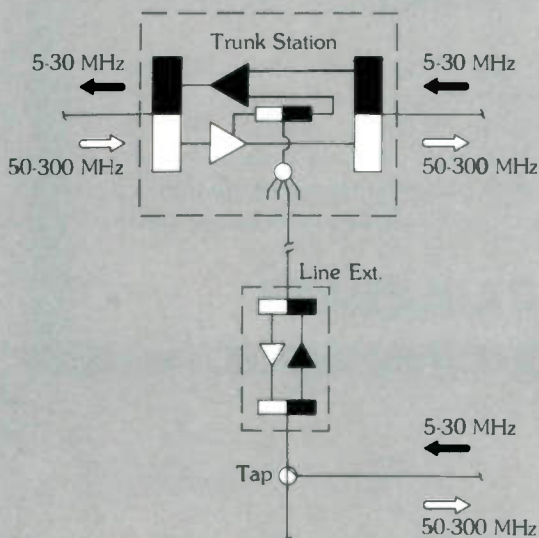
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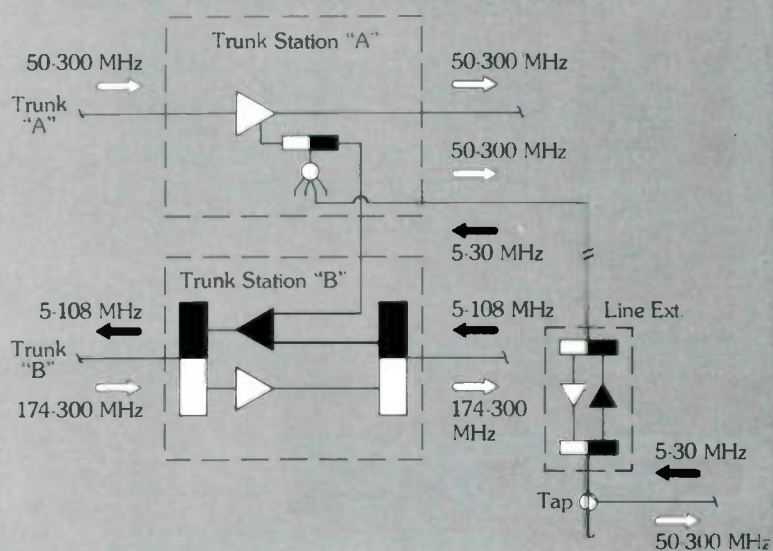
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# The TVC Viewpoint

EDITORIAL



Robert A. Searle  
Publisher

## The Seeds Have Been Planted

The National Cable Television Association's brave attempt to publicize cable communications by "Planting a Seed in the Vast Wasteland" has finally — and belatedly — begun to bear fruit.

Almost.

At least, seeds really have been planted in NCTA's and cable's struggle to gain realistic visibility and public relations impact with present and future members of Congress. But, NCTA is planting the seeds with the same efficiency and apparent ability as tenant farmers and serfs in the middle ages sowed their fields. The Association is just helter-skelter scattering the attempts at Congressional cablecasting... with obvious, uneven results. (See "Political Cablecasting — Just Wait Until Next Year," by Associate Editor Jack Burke on page 68 this edition.)

Nevertheless, as NCTA staffer John Paul Johnson told *TV Communications*, "It's not so much a late start as it is a beginning."

A beginning long overdue, the efforts have been understandably hampered by NCTA's late entry into the fray. The best results have been seen in Manhattan where both the TelePrompTer and Sterling Manhattan systems have characteristically plunged into political cablecasting. NCTA staffers promise to approach the next elections more efficiently and professionally.

We have long written in these pages that one of cable's more important — perhaps its most important — missions is the improving of its image with government officials. And, even though I agree with what Thomas Jefferson told his wife ("Politics is such a torment that I would advise every one I love not to mix with it."), I must congratulate the NCTA, David Foster, Rob Stengel and John

Paul Johnson on the beginning they have made this year.

And I expect them to do better in 1974... and to start now.

## "Apologists" Must Be Better

An apologist is one who argues the justification of a cause. Traditionally, an apologist was the best writer, debater and philosopher on a "side" in a debate. During the Renaissance, a brilliant man named Philip Melancthon served the reformer Martin Luther. In modern times, Presidents hire speech writers.

It is time for the cable communications industry to learn a lesson. Ostensibly, there exists a speaker's bureau within NCTA. If it really exists, it should start doing its job.

And that job should be more than just a source for cable speakers when some school, church or civic group thinks of cable television and its blue sky and then *asks* for someone to talk.

Like many others in the cable industry, I've attended a number of conferences and seminars on cable sponsored by groups outside the industry. Like many others, I've been appalled at the cable industry's representation at non-industry conferences. Often, the industry is not represented at all, and is usually outnumbered and "out-prepared" when it does participate.

The speaker's bureau needs to watch out for non-industry "cable" conferences and make certain that cable has proper representation on the program. The bureau must ensure that cable's apologists are of highest caliber — and more importantly — that they are on these programs.



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# Perspective

on the news



B. Milton Bryan  
Editor

Additional policy matters pending action at the FCC will probably be on the shelf for quite a while longer. Issues needing Commission attention include pay cable, sports carriage, multiple and cross ownership, state franchise moratoriums, federal/state/local relations, technical assistance to cities and even the definition of a CATV system.

Annual FCC cable policy meeting received only cursory attention at the Commission last month. Originally, the policy conference was scheduled for two days in mid-October, but the time given to it the first day was only about 30 minutes and the second day's meeting was cancelled altogether. FCC apparently feels it has earned a rest with regard to cable since so much attention had been focused on CATV last Winter in drafting new Report and Order.

Processing of uncontested Certificates of Compliance should speed up, however. It's the one cable activity the FCC has committed itself to for the time being. Jack Mayer, senior Cable Television Bureau staff member, was recently shifted from Advisory Committee work to certificate work and given a beefed-up staff to help move the processing forward.

Over 1200 applications have been posted to date, about 50 percent of which are uncontested, Mayer estimates. About half of those 600 or so uncontested requests have been processed to date. Around 70 have been returned to operators for completion or correction.

We mentioned last month in Perspective that the FCC may provide some relief with regard to the deadline for CATV technical performance testing. Rumbblings from both the industry and inside the Commission itself indicate such relief will be forthcoming.

Barring substantial objections, Commission will probably extend December 31 deadline to at least March 31, giving the industry a full year since the new rules went into effect. Smaller, independent operators will probably be given even further extensions, provided they can show cause.

Copyright negotiators almost decided to throw in the towel last month. Representatives of copyright interests had indicated they saw little hope for continued talks on subject of fee schedule. And at one time, cable representatives came close to agreeing with them. But when both groups met with FCC Chairman Burch, they agreed that negotiations should go on, so new date for new talks is being set now. Commission Chairman apparently feels strongly in favor of a negotiated settlement, even in the face of continuing evidence that the parties are "miles apart" with regard to the payment schedule question.

# EnDe - Code

## LOW COST SCRAMBLER & UNSCRAMBLER DEVELOPED

Athena Communications Corporation has developed a low-cost system to scramble and unscramble cable TV programs called EnDeCode. The system uses a decoder (top) which can be incorporated into a converter, atop a TV set in the home. The encoder, normally located at the system head end, is placed on the TV set (bottom) for photo purposes. This patented system and a special program package will be offered to subscribers on Athena's Cable TV systems and will be made available to other Cable TV operators as well.



The EnDe-Code system provides controlled access to any CATV channel.

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# LETTERS

Dear Bob:

Thought you and Phil would enjoy knowing *TVC* is well received here. Was pleased to see a late issue opened to our current ad on the desk of a top Taiwan communications official.

Keep up the good work.

Ching Ching.

R. Mike Daniel

Soladyne International

c/o Central Hotel

Taipei, Republic of China

*It appears we do get around. Thanks for letting us know about our acceptance in Taiwan. — Bob Titsch*

Dear Randy:

I wish to thank you for the cover picture on your September

1972 issue of *TV Communications* and the extra copies you sent along.

Sorry I missed you on your recent visit to Pueblo, but it sounds like you were in good hands.

Stop in when you get a chance, it's always good to see you.

Tom LaFourcade

General Manager

Pueblo Cablevision, Inc.

*Glad to be of service, Tom. I look forward to visiting with your people whenever I'm in the area. By the way, your Channel 3 news program is really looking professional these days. — Randy Lee*

Dear Mr. Maxwell:

*TVC's check sent as honorarium for my August article was a pleasant surprise. Thanks! We will be glad to direct you to any sources of new feature material that we can.*

You must be aware of the high regard held for *TVC* in our industry — especially by production

and managerial personnel. *TVC* is by far the most "asked-for" publication received by Mission Cable. In addition, many of the local university students use your articles as supplemental material to their texts.

Bona M. Molitor

Production Coordinator

Cable Two

Dear Mr. Maxwell:

Thank you for the extra copy of *TV Communications*. I am pleased that your magazine used the article I submitted.

Congratulations on having an excellent magazine. We enjoy the editorials, articles and professionalism that goes into each issue of *TV Communications*.

Victor R. Weals, Jr.

Production Manager

Community TV Systems, Inc.

Dear Milt,

Having authored a safety article in *TVC* some years back, it is gratifying to see continued and

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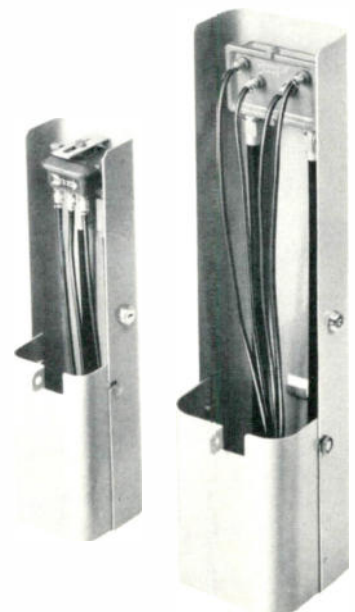
You want easy accessibility. The models TV4B4 and TV6B6 shown here have removable covers that allow access from three sides. You want security. Our pedestals are available with an optional cylinder key lock or a standard hasp that can be padlocked . . . plus a generous overlap on the cover for weather protection. Our new design is low-profile for unobtrusive installation . . . and all of our pedestals are made of 14 gage double mill galvanized steel, with a vinyl prime coat and baked on alkyd enamel finish. In short, we haven't spared a thing to make these the best CATV pedestals in the business. And, look at the prices . . . the TV4B4 is less than \$8 . . . and the TV6B6 is less than \$11. Surprising? Not really. Not when

you remember that our company has been the largest producer of telephone closures for the past 15 years . . . and we aim to do the same good job for CATV. Write for detailed information or call . . .



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updated safety articles in your fine publication.

With emphasis on September's issue dealing with General Telephone's "Classroom for Climbers," I also would confirm a marked reduction in accidents related to climbing when employees have been properly trained.

I hope the picture on the Technician section cover page doesn't distract the emphasis of this article. Although the picture cannot show motion, one must assume the men wearing "gaffs" walked to and from their position. If one would review climbing accidents, I'm sure it would prove alarming the accidents caused by dull "gaffs" (many times from stepping on rocks) or by gaff injuries caused by walking with unguarded "gaffs."

A simple but serious point often overlooked considering how inexpensive gaff guards are.

Our employees are our greatest asset; let's protect them.

Dennis L. Marmon, Manager  
Mission Cable TV  
San Diego, Calif. 92139

*Thanks for your continued support, Dennis, and for pointing out the gaff guard error for our readers. Our industry's professional men are indeed our greatest asset. If we don't take care of them the Occupational Safety and Health Administration will — and we may not appreciate the fines they levy to do the job.*

*Safety is a continuing concern of TVC, and we expect to have more on it in future editions. — Milt Bryan*

Dear Mr. Bryan:

In your September issue a Mr. Hawkins wrote in defense of municipal ownership of CATV, and its implementation through the use of "pure revenue bonds" at "no risk to the municipality." Would Mr. Hawkins care to state upon whom the risk initially and ultimately does fall? Or is he implying that there is no risk?

The \$386.00 market price he cites is based upon free market evaluation of a healthy, well run

operation and ignores the marginal systems, of which there are many which get sold quietly for a loss.

What happens if the municipally owned system is not well run, and does not come up to expectations? Are the rates arbitrarily raised? Is money borrowed from the Water Dept.? And, more importantly, would any city administration dare to admit failure and dispose of the operation, at a loss if necessary? Would not such a decision be based more on political than on business judgment?

The point is that the public is normally protected by virtue of the risk inherent in an investment. If the businessman does not plan well the project fails and someone more competent takes over. If the municipality plans badly this natural correction action (survival of the fittest) is precluded.

If my money or my job is on the line, either I do the thing right or I lose. And that is as it should be.

James B. Wright  
Rockford, Illinois

TVC

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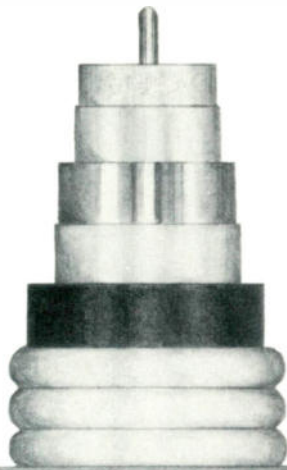


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db/100 Ft.—Ch. 13	
1/2" Superfoam—1.09	
1/2" Polyfoam—1.31	
Approx. Wt.—Lbs/mft	
1/2" Superfoam—88	
1/2" Polyfoam—104	

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# ESSEX SUPERFOAM CABLE



## Management Guidelines

Randall B. Lee  
Managing Editor



## Developing Your Idea Sources

No one knows a job better than the man or woman who works at it all day.

System operators who make the most profit are frequently those who carefully use the expertise of their staff. The people who maintain and operate your CATV equipment no doubt have valuable operational ideas, and day-to-day experiences can provide new ideas.

Here are some tips on how you, as a system manager, can get more good ideas:

- Establish goals. Progress is faster when all concerned know where you're trying to go. Goals need to be established for the next month, year and decade. Having concrete goals stimulates ideas which help attain those goals. It will help if the goals are specific: a 10 percent sales increase; a 25 percent reduction in maintenance costs; the new plant in service by next January, etc.
- Get your employees together. They'll do more and better brainstorming if the manager isn't present to cast doubt on what may appear to be wild ideas. An idea which the group agrees on is more likely to be a good one since the pros and cons will be carefully covered before it is recommended.
- Set a time for listening. Don't expect people to chase you with their ideas. If they fail to get your attention, or get only part of it, they will conclude that you really don't care about their thoughts. If the idea

presented hasn't been completely thought out, as may be the case with inexperienced people, provide definite instructions on how to proceed: "That sounds interesting. Think it over and jot down your *specific* proposal and recommendations. We'll get together next Tuesday at nine o'clock to discuss it further."

- Be a positive listener. You can stop the flow of ideas permanently by a continuous "yes, but . . ." lukewarm, discouraging response. The fact that they are trying to help is encouraging. Even part of a good idea is valuable. Perhaps together you can make something useful out of it.

If an idea is wrong or impractical, don't try to pretend otherwise. But it may be wrong because you didn't make the right facts available. With tact, you should encourage your employee to try again.

- Remember rewards. If an employee makes a real contribution to your profits he should be worth more to you. If he isn't rewarded, he will possibly look for a job where he is not overlooked. A pay increase or bonus, however, is no substitute for recognition. Making important contributions to the success of his employer's cable system can be a crucial source of satisfaction to an employee. Open, explicit, and gracious acknowledgment of such contributions by the manager can increase an employee's sense of self respect and gratification.

TVC



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# CATV News Briefs

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

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**Tiernan Bill changed before introduction.** Representative Robert Tiernan's bill to aid in the wiring of sparsely populated areas was reworded before its introduction on Oct. 13 to eliminate restrictions on the type of systems ownership eligible for financial assistance under the Tiernan plan. Bill will be referred to Harley Staggers' House Committee on Interstate and Foreign Commerce and handled by the Communications and Power Subcommittee. Hearings will be held on the bill early in the next session. As the bill reads now, all systems that can reasonably be expected to pass less than a system average of 60 potential consumers per linear mile would be eligible for loans. (CATV 10/16 p3)

**NCTA asks FCC for year's extension of test requirement** that all CATV systems be performance-tested by the end of 1972. Requirements were part of Second CATV Report and Order and necessitate that all Class I channels be tested at three widely separated points in the system. NCTA seeks grace period because rules did not become effective, this year, until March 31, and because of the scarcity of testing equipment and qualified personnel. (CATV 9/25 p3)

**California considering state regulation:** Ca. state senator Alquist, chairman of the California Senate Committee on Corporations and Public Utilities conducted public hearings throughout the state on the desirability and feasibility of PUC regulation of CATV. Opponents to state regulation heard at the three public hearings included California Community Television Association, the city and county of San Diego, and the California League of Cities, who said they favored local control over cable but would welcome state advice. (CATV 10/2 p3)

**Schildhouse at PNCCA Convention:** Cable Bureau chief tells Pacific Northwest Cable Communications Association to demand action on certificate of compliance if backlog continues, and challenge industry to improve dismal showing on minority employment. Also at PNCCA convention, David Foster promises better communications within the cable industry. (CATV 10/9 p3)

**NATO wins last-minute extension on pay-cable:** Two days before deadline for comments on pay-cable rules, National Association of Theatre Owners secured one-month extension until Nov. 1 for comments, Nov. 15 for reply comments. NATO had sought Dec. 15 deadline in order to complete comprehensive study. (CATV 10/2 p5)

**FSLAC to recommend "give-away" disclosure:** Members of FCC's Federal-State/Local Advisory Committee have agreed that Certificate of Compliance applications should list details on stock provided to "local investors" at a discount, dedicated portions of revenues or outright cash grants to local institutions or groups, commitments to provide service beyond the FCC requirements, and commitments for services for which the FCC has provided no minimums. (CATV 10/16 p3)

**FCC promises clarification:** Commission will act on petitions for interpretations of grandfathering and duplication rules. FCC has also listed those amended rules which will apply to certificate applications filed before July 14, 1972 and those which will not. (CATV 9/25 p3)

**Cypress, Warner win cross-ownership waiver:** Merger of Cypress Communications into Warner's Television Communications Corp. finalized on Sept. 30 (CATV 10/9 p8) graced by FCC cross-ownership waiver. Temporary waiver extends through August 10, 1973, or until ninety days after final Commission



# CATV News Briefs

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action on pending petitions for reconsideration of the rules. Facilities involved necessitating the waiver are in Cal., Ill., and Ind. (CATV 9/25 p5)

**Mass. Special Cable Commission seeks franchise delay:** Special state commission has sent 40-page packet to all operators and municipalities in Mass. asking for six month moratorium on franchise grants to allow for public hearings on proposed standardized franchise (included in packet). (CATV 10/2 p5)

**Albuquerque battle ends with compromise:** In a joint statement, released Sept. 25, GenCoE and the three Albuquerque TV stations announced an end to their long struggle over the cable company's right to operate in the city. Stations will withdraw their opposition to GenCoE's certificate application and will not support either the holding or passage of referendum on cable. GenCoE will withdraw antitrust suit it has filed against the three stations and petition it had filed with FCC calling for the revocation of stations' licenses. (CATV 10/9 p5)

**Foster urges end to sports blackouts:** In testimony before the Senate Communications Subcommittee, NCTA president said, "The cable communications industry most enthusiastically supports the direction that S.4007 would give the FCC — that is, the total abolition of the sports blackout exemption." Foster claimed that the antitrust exemption did not take into consideration CATV "with its unique ability to pinpoint audiences." (CATV 10/9 p3)

**Pay TV proposal draws protest from NAB, NATO:** Both the National Association of Broadcasters and the National Association of Theatre Owners have filed protests with the FCC contending that TheatreVisioN's proposed pay-TV via cable experiment in Sarasota, Fla. would violate both the letter and the spirit of the Commission's anti-siphoning rules. TVN had sought waiver of rules, maintaining that it was uncertain whether an attractive film package could be put together without films from two to ten years old, films which could be used only after obtaining a waiver of the anti-siphoning rules. (CATV 10/16 p3)

**TPT asks court review of border crossing case:** TelePrompTer Corporation has asked the U.S. Court of Appeals for the District of Columbia Circuit to review the FCC's dismissal of a complaint involving American Microwave and Communications' delivery of signals across the U.S.-Canada border at Sault Ste. Marie, Michigan, without special authorization. (CATV 10/9 p8)

**Cable Bureau dismisses broadcaster petitions:** At the request of the broadcasters themselves, the FCC's Cable Television Bureau has dismissed petitions filed by five Rocky Mountain TV stations for special non-duplication relief before the CATV Report and Order was reconsidered by the Commission. The systems against which the petitions had been filed were spread over four states. (CATV 10/9 p6)

**Hooks named "Backlogs Commissioner":** Benjamin Hooks has accepted Chairman Dean Burch's invitation to become the FCC's first backlogs commissioner, charged with setting out courses of action which "promise hard results," in situations demanding immediate attention. (CATV 9/25 p9)

**Conn. PUC chairman battling for cable TV:** State Public Utilities Commission chairman Howard E. Hausman has called attempts by two Connecticut broadcasters to delay hookup of cable television throughout the state — delaying tactics now taking the form of protests filings with the FCC — "frivolous" in substance and representative of little more than a "selfish attempt" to deprive citizens of television reception they cannot now enjoy. (CATV 10/2 p11)

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**Non-duplication protection granted to Penn. station:** FCC Administrative Law Judge Chester F. Naumowicz has decided in favor of Pittsburgh's WIIC-TV in its demand for non-duplication protection by Southwest Pennsylvania Cable TV's California, Pa. system. Southwest's contentions that the station has not sought protection from other systems in the area and that the station does not act as an outlet of local programming for California were recognized as factual by the judge, but not persuasive. (CATV 10/9 p5)

**CATV rationale may be applied to Telco/AM:** In ordering oral argument on an application for the transfer of a radio station license, the FCC has indicated its willingness to apply Cable/telephone rules to similar broadcast/telephone situations. Arguments will be heard on the issue of whether the public is served by a common carrier operating a broadcast facility within its own exchange area in the case of the application of the Court House Broadcasting Co. to assign its WCHI-AM, Chillicothe license to Chillicothe Telcom, Inc. (CATV 10/16 p4)

**Foster boosts priority of smaller systems:** NCTA president has formulated a four part plan to examine and aid the special problems of smaller systems: an NCTA survey questionnaire asking operators how the association could more effectively represent the smaller businesses' interests; special invitations to the operators of smaller systems to attend the October board meeting of NCTA; a study by the association's engineering department of technical problems that have a dollar impact on the small operator; and a series of informal "raps" between association people and operators throughout the country. (CATV 10/2 p6)

**Certificate Applications Granted:** During the latter part of September and the first half of October, the FCC granted 77 Certificates of Compliance. Listed by state, the certificates are:

Arizona: Cobra Valley Cablevision, Globe, Miami, and unincorporated areas of Gila County (CAC-149, 150, 151).

California: Theta Cable of California, El Sugundo (CAC-733); Redwood Cablevision, Inc., Fortuna and Rio Dell (CAC-361, 362); Storer Cable TV, Inc., City of Sonoma and adjacent parts of Sonoma County (CAC-495).

Florida: Pensacola Cablevision, Inc., Pensacola (CAC-608); Cocoa TV Cable, Cocoa, Rockledge, unincorporated areas of Brevard County and Merritt Island (CAC-560 through 563); Florida TV Cable Co., Melbourne, Indiatlantic, Indian Harbor Beach, West Melbourne, Patrick Air Force Base, unincorporated areas of Brevard County, Satellite Beach, Palm Shores, Palm Bay, Melbourne Village and Melbourne Beach (CAC-564 through 574); Sunrise Video Corp., Sunrise (CAC-518).

Indiana: Valley Cablevision Corp., Elkhart, Mishawaka, Goshen and Roseland (CAC-434, 435, 436); Plymouth CATV Services, Inc., Plymouth (CAC-442).

Louisiana: All Channels Cable TV, Inc., Lafayette (CAC-598); Continental CATV, Inc., Rayne (CAC-596).

Maine: State Cable TV, Inc., Augusta, Farmingdale, Gardiner, Hallowell and Randolph (CAC-446 through 450).

Michigan: National Cable Co., Inc., East Lansing (CAC-527).

Missouri: Missouri CATV Systems, INC., Osage Beach (CAC-510).

Mississippi: Mississippi Transmission Corp., Water Valley (CAC-522) and Pontotoc, Lambert, and Marks (CAC-506, 507, 508).

New Jersey: Vision Cable Television Co., Fort Lee and Edgewater (CAC-422, 423); Cablevision of New Jersey, Hoboken (CAC-772).

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# CATV News Briefs

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New York: American CATV, Inc., Salamanca and Great Valley (CAC-438, 439, 440).

Ohio: Southwest Cable Corp., West Union (CAC-830).

Oklahoma: Mooreland Television Co., Mooreland (CAC-385); Bartlesville Video, Inc., Dewey (CAC-73).

Pennsylvania: H. C. Ostertag Cable Television Co., Inc., Wrightsville (CAC--277); Telesystems Corp., Philadelphia (CAC-376); Cox Cablevision Corp. (dba Penwire Television Co.), Lewistown, Burnham, Juniata Terrace, Derry and Granville (CAC-700 through 704).

South Dakota: Missouri Valley TV Co., Inc., Chamberlain (CAC-715); Sioux Falls Cable Television, Inc., Sioux Falls (CAC-108.)

Vermont: St. Johnsbury Community TV Corp., St. Johnsbury, Concord, St. Johnsbury Center, Lyndon, Lyndonville, Passumpic, Waterford, Kirby and Barnett (CAC-705 through 713).

Virginia: Martinsville Cable Vision, Inc., Martinsville, Fieldale and Collinsville (CAC-363, 364, 365); Peninsula Cable Corp., Williamsburg and Hampton (CAC-391, 392); Reston Transmission Co., Reston (CAC-478).

Wisconsin: Total TV, Inc., Janesville and Milton (CAC-107 and 462); Regal Tele-Com, Inc. (CAC-424).

**Financial Developments:** TOCOM, Inc. has released earning report for the fiscal year ending June 30, 1972. The report shows \$.64 earnings per share after taxes on net income of \$218,302. In addition TOCOM has a backlog of \$1,800,000 as compared to the \$250,000 at this time last year. . . . Gene W. Schneider, president of LVO Cable, Inc., told stockholders' meeting that the company's consolidated revenues for the three month period ending August 31, increased 19 percent to \$1,750,000 from \$1,474,000 for the comparable period one year ago. . . . Nine-month report issued by Canadian Cable Systems Ltd. shows earnings for the period at \$2,109,674. Company reported an additional gain on investments of \$163,188. . . . Columbia Cable has announced net earnings for the first nine months of fiscal 1972 ending June 30, 1972 of \$436,000 or \$.42 per share compared to \$345,000 or \$.34 per share in fiscal 1971. . . . An 87 percent increase in earnings and a 61 percent increase in revenues for the three months ended July 31, has been announced by Burnup and Sims. Net income for the three months totaled \$750,500 or \$.10 per share on revenues of \$17,934,000. . . . (CATV Sept./Oct. Issues)

**Franchise Actions:** Patterson Twp., Pa. has awarded franchise to Tower Cable. . . . After 21 years of operation, Oil City Cable has sought and received a franchise agreement from Oil City, Pa. Franchise necessitated by new FCC rules. . . . Rising Star, Texas has granted franchise to Brownwood TV Cable Service. . . . P. Q. Gardiner Community Cable Vision Co. has won franchise from Monticello, Ark. Terms call for two percent payment of gross revenues and 25 year duration. . . . Thom-A-Lex Telecable granted 20-year franchise by Lexington, N. C. Agreement gives city option to buy system any time after tenth year of operation. . . . Pryor, Okla. has granted franchise to Green County TV. City had previously awarded franchise to LVO Cable. . . . Cambri TV Distribution Co. has won franchise from Loretto, Pa. . . . White Pigeon, Mich. has awarded franchise to Aero Electronics of Kalamazoo. . . . Daniels Properties, Inc. of Denver to provide cable for La Junta, Colo. . . . Hawkeye Cablevision, Inc. has been awarded franchises by both Windsor Heights and Red Oak, Iowa. Following recent franchise award to Air Capital Cablevision, Wichita Kan. is considering grant to Community Antenna Television of Wichita, Inc. (CATV Sept./Oct. issues)





Q.

## When does a cable system have no line extenders at all?

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**SECOND:** Maintenance on a modular amplifier is simplified to an exchange of modules, with the defective module being returned to the test bench for repairs. Exchanging a Unicom module should take less than 25 seconds, even under adverse field conditions, making it possible to change a troublesome unit during prime viewing time if necessary (all stations run advertising on the hour!). These small low cost modules also reduce the spares inventory problem.

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**THIRD:** Official rulings and your desire for the best possible system are making system capabilities become increasingly complex, which translates into obsolete CATV equipment. A fully modular amplifier will become obsolete just as any other type, but the modular unit can be updated with a minimum of time, effort or expense. Our stated policy is to make all new developments compatible with existing equipment, to guarantee that your system need not become suddenly incapable of meeting your requirements.

**FOURTH:** We do not think you should ever feel forced to purchase system capability which might not be required for a year or more. Unicom modularity gives you an option. Start simple using single ended TLC; add AGC as and when required by plugging in one more module; if two way becomes necessary, exchange two modules per station; converting to push pull we add a resistor to the DC Power Supply and exchange RF modules — those modules that end up spare being used in a less demanding system.

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# Captain Video May Blast Off Again — And This Time Spin Into Orbit as the New Captain Cable

It has been many years since Captain Video blasted off into the vast wasteland. Video may be headed toward space again . . . via domestic satellite. Instead of broadcast networks pushing the buttons, CATV may have a chance to be in control. **TVC** presents an in-depth report on the domsat picture.

*By Jacqueline B. Morse  
Associate Editor*

*Left: Artist's concept of an earlier version of Tele-Communications, Inc. satellite. Opposite page: The COMSAT earth station at Cayey, Puerto Rico is one of eight U.S. earth stations for satellite communications.*

November, 1972





The name of the domestic satellite game today is space-age roulette; a kind of industrial *Bob and Carol and Ted and Alice* with fortunes and futures riding on whether winning combinations can be put together in the executive suites.

In the nearly seven years since the Federal Communications Commission issued its first Notice of Inquiry, the domsat industry has gone through cataclysmic changes — on paper at least. Conceived as a monopoly, radicalized into open competition, finally emerging somewhere between the two. And all of this without a bird leaving the launch pad!

It would appear that the United States is at last on the verge of authorizing domestic satellite communications systems. The birds, they tell us, *will fly!* Yet the key questions remain to be answered: Who will build and own the domsats; who will use them; who will benefit most from them; and what will satellite technology mean to cable communications? These are questions behind the recent furious, curious courtship among the would-be satellite owners themselves and between them and prospective users.

Peeling back the layers of politics and rhetoric that have surrounded the domsat issue for more than half a dozen years, the core concern is whether there is enough business to support one domsat system — two? — more? (once you've decided private industry rather than government will operate the satellites). And if any number *can't* play, how do you decide who will be allowed?

A year after the FCC issued its Notice of Inquiry on March 2, 1966, the White House took over.

President Lyndon Johnson named former under secretary of state for political affairs Eugene Rostow to head a domsat study. At the tail end of 1968, the Rostow group urged an agreeable FCC to grant a single, exclusive authorization — to the Communications Satellite Corporation (Comsat), the international satellite company.

But again before the FCC acted, the White House stepped in. The new Nixon Administration wanted a chance to look at domsats and launched a new study in 1968, headed by then-assistant to the President, Clay T. (Tom) Whitehead.

Within months, Tom Whitehead was named President Nixon's director of the new Executive Office of Telecommunications Policy (OTP) — and when his study cast out altogether any idea of a domsat monopoly and called for "open skies," the FCC scrapped its plans and started again from scratch with applications.

From March 1970 until this summer, the would-be bird men anted up and drew opening cards — still without knowing precisely what the game would be. "Open skies," yes; but exactly how "open?"

A tentative answer was put on the table in March, 1972 for the eight full-system applicants and the five earth-station-only applicants. That was the FCC's Common Carrier Bureau's "Recommended Decision" which would have allowed more than one system to be authorized — but would have required applicants with similar technology to get together in a joint venture.

In May, the applicants, potential customers, and



curious observers packed the Commission's hearing room in Washington, D.C. for oral arguments on the Recommended Decision. Predictably, no one liked the decision in its entirety.

Also predictably, the Commission's June 16 Second Report and Order on domestic satellites came down between the staff recommendation and the White House open skies mandate.

Officially the policy is tagged "multiple entry." With some restrictions on certain firms, the FCC will allow as many applicants to be authorized as are financially and technically qualified.

The most stringent restrictions apply to AT&T and Comsat — the reasoning being that those two companies, because of their immense resources and favored monopoly positions outside domsat, could effectively stifle all other competition before birth. Proponents of the opposite view argue that the domsat business is risky enough — what sense does it make to handcuff the very companies who have the most chance of success?

## Unfinality of the Final Word

The supposedly "final" word is not yet final, however. As this goes to press, reconsideration of the Second Report and Order is on the FCC's agenda. The June vote was a close one — four to three; since then, Commissioner Robert Bartley, one of the slim majority, has retired; in addition, the weight of

Chairman Dean Burch is on the minority side. So no one is betting that the rules won't change again.

Domsat people hardly needed the FCC to tell them eight companies could not each successfully put up its own satellite system. When it comes to financial catastrophe, surely no Commissioner has a more vivid imagination than the executives who are committing the millions to a project.

And so, since June, this multi-party courtship has been going on — most dramatically to date in the new Comsat-MCI-Lockheed trial marriage. MCI and Lockheed had together filed an application. Comsat had applications of its own on file — one to serve AT&T, and one for a multi-purpose system to serve all customers. Under a new compact finalized less than two months ago, Comsat said it would buy a one-third interest in MCI Lockheed Satellite Corp. and the three together would ask for authority to build a multi-purpose satellite. *But*, if the Commission doesn't also grant Comsat authority to build a satellite for AT&T use, the deal is off.

A good many observers, at least in Washington, think the triumvirate will make it — that Comsat-MCI-Lockheed *has* put together a winning combination of money, marketing and moxie — and that this could be the first bird that flies. Others say Western Union will go up ("They've got no business left down here — they *have* to succeed in satellites.") or RCA. But no one knows for sure because the jockeying is still going on and it's too early to declare anyone out for sure.



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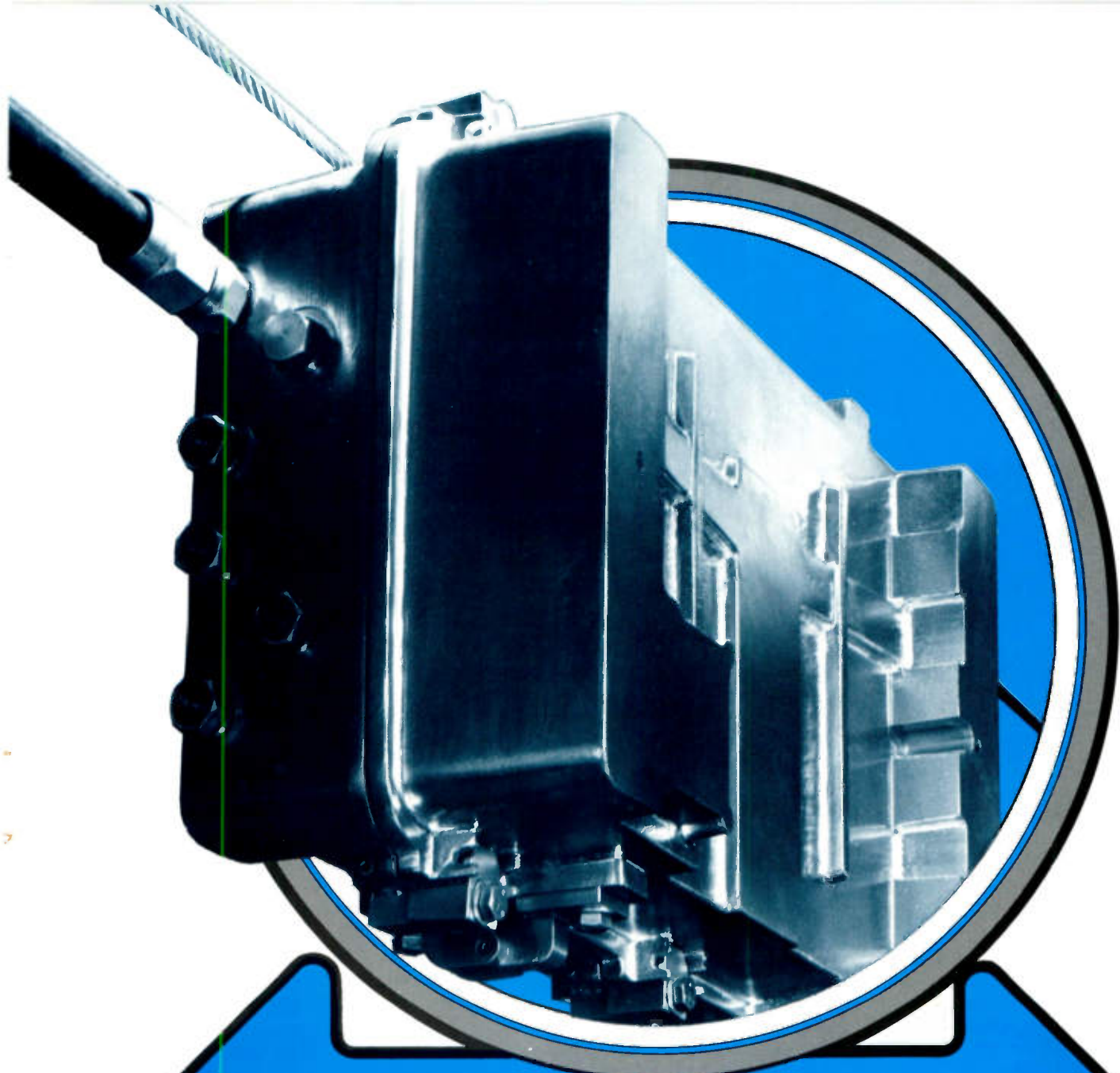
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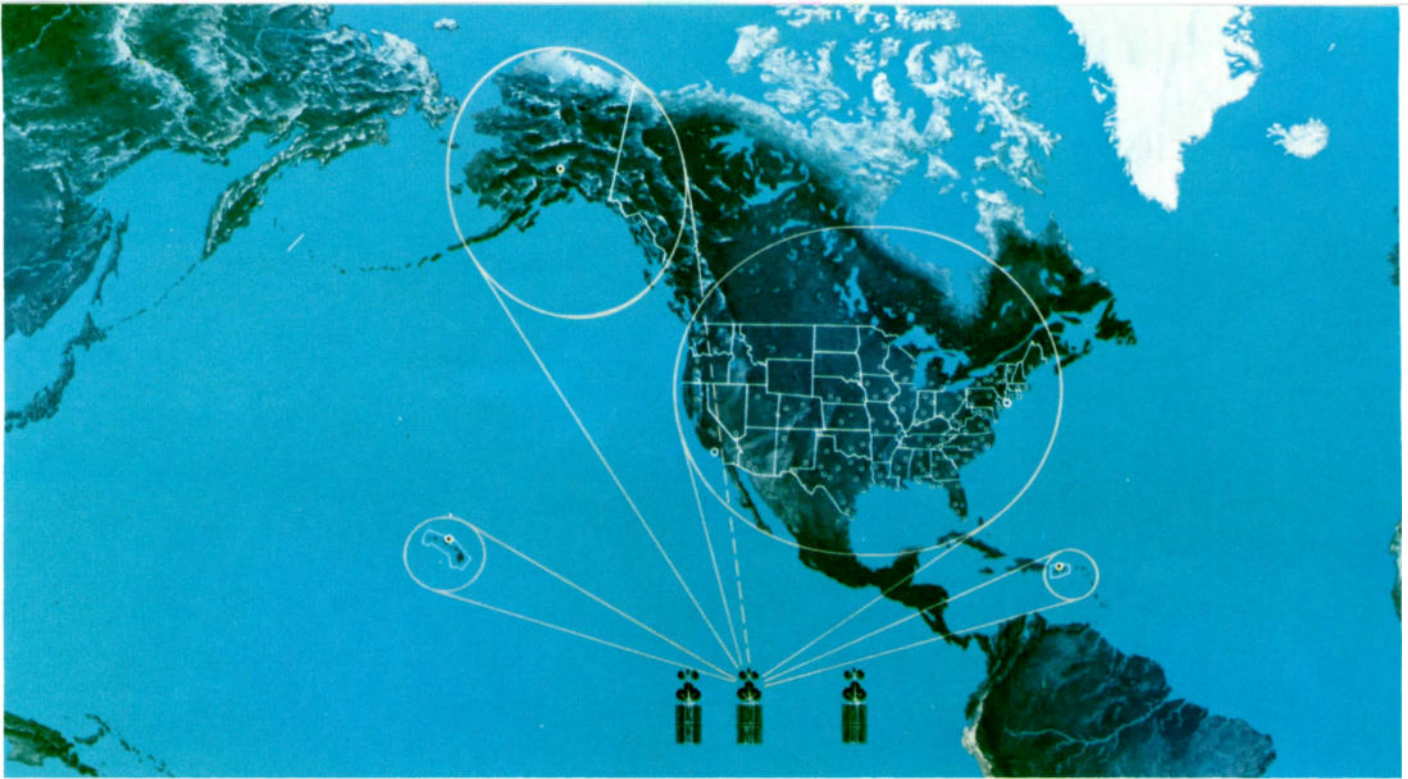
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What's at stake in the deals being made is Customers . . . the "biggies" that can be captured, and the many smaller ones that can be developed. Generally when satellite people talk about customers they mean AT&T, other telephone business, the networks — then all the rest including data users, private corporate communications and cable.

## As Reality Approaches

The closer domsat comes to reality, the more competitive the scramble for markets becomes, and the more coy the customers become.

Both AT&T and the broadcast networks, for example, at one time thought about owning their own birds for their own uses. Not only has that idea been discarded, but the networks now aren't even certain they want to use satellites at all.

Some of the early glamour of satellites has been dispelled by the cold light of economics. In fact, cableman Bruce Lovett, Washington D.C. vice president of American Television & Communications, has called economics "the single greatest misconception" about domestic satellites. "The early tendency," he says, "was to believe that anything that could be done via terrestrial distribution could be done better and cheaper via satellite. But of course that just isn't so."

Faced with a bill on the order of \$75 million from AT&T for lines, the networks were naturally attracted to the skies. Bell, however, has reconsidered and will lower its bill, and the nets have cooled on satellites.

What does it mean to other users — especially cable television — if the networks stay on the ground? Opinions on what the impact will be vary, but most agree there will be at least *some* impact.

Without the guarantee of network business, it is possible that fewer satellites will go up more slowly.

But even without the networks, it is estimated that two systems could be supported now ("now" meaning mid-'75 to mid-'76 if the Commission acts promptly) with another to follow five years later.

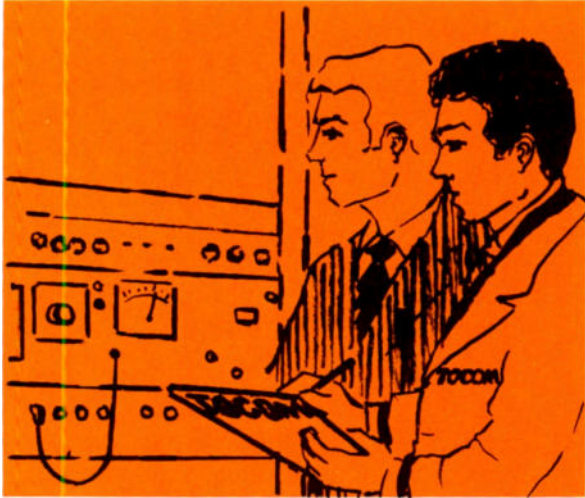
Cable people generally feel that without the networks, the satellite owners will be more anxious than ever to court the CATV market with attractive offers. In May, NCTA president David H. Foster said, "CATV might be the unique new market that will solve the economic question marks of satellite operations." Now that the networks have added another "economic question mark" Foster's comment becomes even more pointed.

Another advantage of the networks' dropping out could be significantly lowered costs. Satellite systems must be "gold-plated" to handle the broadcast business, the experts explain. The back-up, channel exclusivity, extraordinarily high-quality/high-dependability demanded by the nets simply aren't necessary for other users — including CATV.

Today's satellites have an expected life of about seven years. After about seven years, explains NCTA Director of Engineering Delmer Ports, the satellite runs out of the fuel that keeps it "on beam" and gradually drifts out in a wider and wider pattern. For at least that initial length of time, cable users can develop and expand markets with satellite technology considerably below that which the networks were demanding.

Another impact of the networks' decision pointed out by the cable experts is what Lovett calls "the configuration of the system." To handle peak loads, the networks were demanding 150 earth stations and some two dozen transponders (each transponder on the satellite handles one television channel or about 1,000 telephone circuits). Estimates vary on how many ground stations the cable industry would need to serve the country, but the range is only between six and twenty, drastically less than the broadcast needs.

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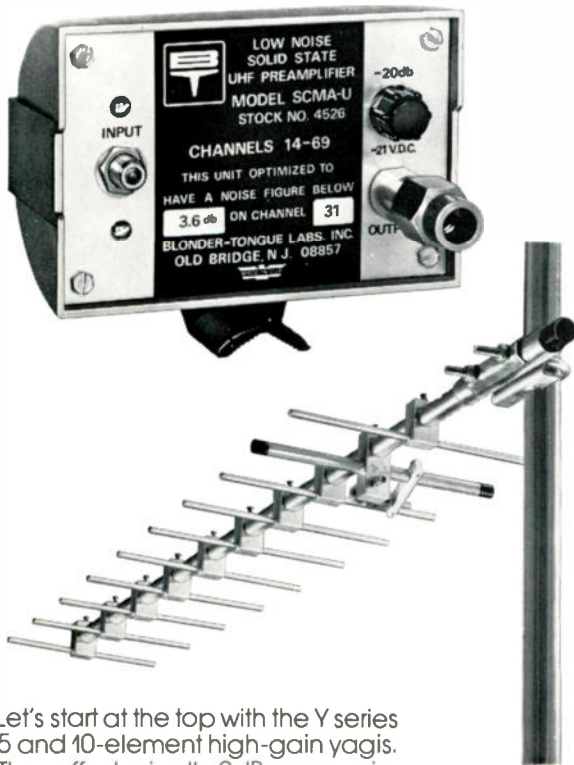
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A word about costs. Applicants' figures on launching a system run from about \$30-\$100 million, depending on the technology used. The booster represents a large chunk of that — \$7-\$8 million estimated for the Intelsat booster up to around \$30 million for the booster contemplated in the Lockheed plan. Insurance against a catastrophic launch represents another sizable slice — around 20 percent of the cost.

Most of the satellite systems proposed — RCA's for example — offer 12 channels and use the 6 GHz band to transmit up to the bird, 4 GHz to beam down to the earth station. The Lockheed 48-channel technology uses these bands as well, but also proposes to use the 12 GHz range.

Ground stations to receive in the lower range, where signal strength is limited internationally, cost in the neighborhood of \$100,000. Stations to receive in the higher range, such as proposed by Lockheed and Fairchild-Hiller, could be as low as \$10,000 as well as more transportable, more flexible and smaller.

One expert who is untroubled by the price tag of \$100,000 is TelePrompTer co-founder and executive Hubert J. Schlafly. He has pointed out that the equipment has a 10-year life and low maintenance. "It works out to less than \$1,000 per month," he said. "I have systems that pay more than that for terrestrial distribution."

## Satellites' Unique, New Market

Cable may offer satellites a "unique, new" market — but what do satellites offer CATV? And how might the two become partners?

Satellites appeal to cable as the quickest, best-available avenue to CATV interconnection. Simultaneously, and really as a part of the interconnection argument, cable people see satellites as a significant hope for the major urban markets.

The FCC's exclusivity rules for the major markets have largely eviscerated distant signal importation, especially of films; contemplated sports carriage restrictions threaten to complete the job. Perhaps in the distant days city managers' and some cable operators' dream of exotic services will pull in gold — but until then the only product the public has proved it will buy in quantity is entertainment. Major market systems would not be the only ones to benefit from exclusive cable programming — but their plight is undeniably more desperate than the smaller, grandfathered, saturated systems comfortably outside any 35-mile zone.

If the pressing need for alternative programming is in only 50 or 100 markets, then, why look to satellites? Two of the reasons are figures and the future. In order to have the buying power necessary to get good programming, it is estimated that the industry must offer two million subscribers. That in itself represents a lot of systems — and it's only a beginning.

Even if all of the systems now in need of alternative programming could be served by some distribution method other than satellite, at some

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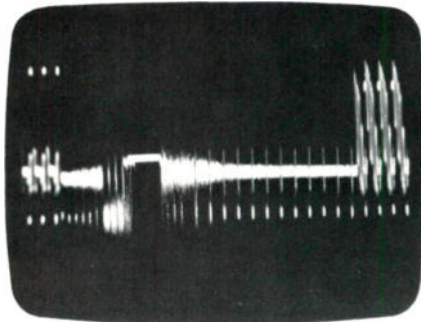
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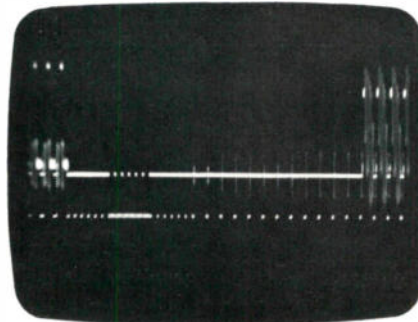
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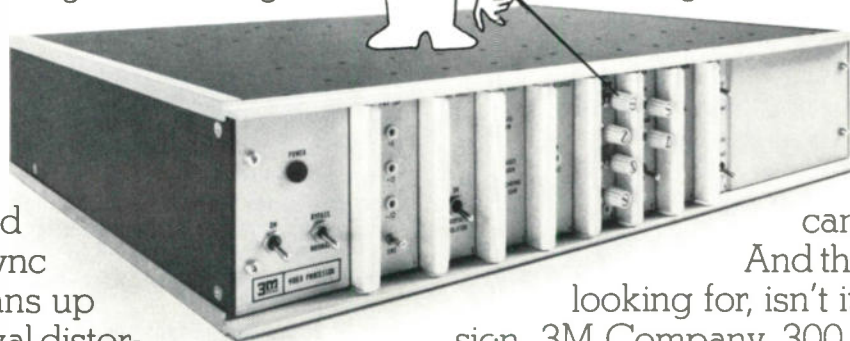
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point in growth, that method would become too cumbersome. Those who believe in satellites for cable, believe strongly in cable's future growth. If cable communications is to become a nationally effective medium, say the true believers, there *must* be interconnection.

## The New Rural Society

Dr. Peter Goldmark of Goldmark Communications envisions what he terms the "new rural society" where telecommunications can provide the business, cultural, entertainment and educational links which will make it possible for every American to choose a living place freely. Those who choose rural or suburban homes will not have to sacrifice the advantages of the cities and the increasing pressures on our bubbling urban areas can be relieved. Cable and satellites together, urges Dr. Goldmark, can make a decisive contribution.

Through the ups and downs of the domsat proceedings thus far, the CATV industry has managed to preserve a number of options for use of a domsat system. Through NCTA and through the participation of several cable-microwave firms (Western Telecommunications, Inc., LVO and TelePrompTer) the industry has asserted its own need for maximum flexibility.

At the outset, the satellite owners indicated an understandable preference for "portal-to-portal"

service. That is, the satellite owner himself would own and control the transmit ground stations and the receive ground stations.

The cable television industry, backed by the FCC, has demanded the right for users to own ground stations, particularly receive-only stations, and to have access to the transmit stations. Thus, a cable user can put together a "custom package" — he can lease the transmit station and the satellite transponders; lease the transponders only; or lease transmit and receive facilities.

Assuming the need for alternative programming, the desirability of satellites for distributing the programs, and the capability of the cable user to design his own combination of leased/owned facilities — the question remains as to how the "for-cable-only" programming is going to be put together.

## Individual MSO Can't Make It

The chances are obviously slight that an individual MSO, no matter how large, is going to ante up for exclusive programming and contract with a satellite owner for two transponders. (As Delmer Ports points out, there would almost have to be two for time zone reasons — unless, of course, the programmer were willing to ask East Coasters to stay up all night or West Coasters to come home early from work.)

The gap between the cable industry and the domsat owners is waiting to be filled by an organiza-

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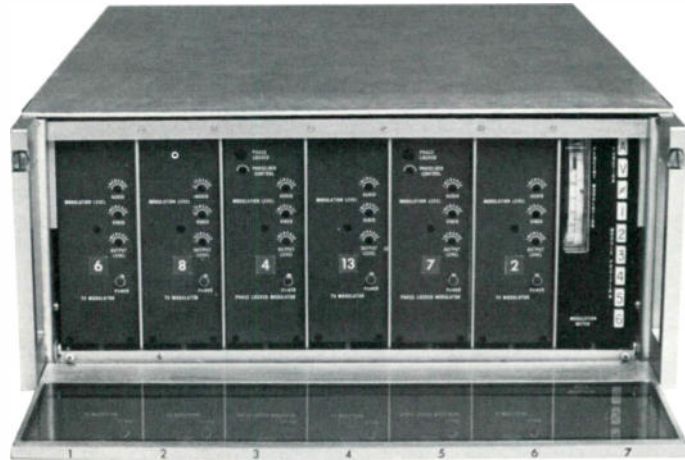
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**Model 7300 Heterodyne Processor VHF-VHF**

**Model 7310 Heterodyne Processor UHF-VHF**

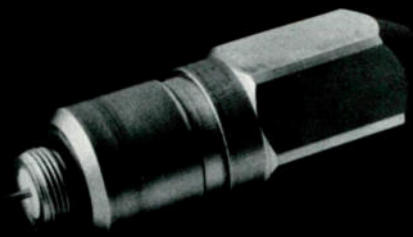
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tion or organizations which will secure the programming, negotiate with the satellite facility owner and market the programming to the cable systems.

That gap may be filled by entrepreneurs — or perhaps by a non-profit group of cable firms themselves. A precedent for the latter course exists in ARI (Aeronautical Radio, Inc.), a group of airline companies that owns and operates radio communications for airlines world-wide.

Such a non-profit group makes sense from the point of view that the market is largely unexplored and no one has the same incentive as a cable operator to explore it. But would it be workable?

As a beginning point, can industry executives who battle one another fiercely for franchises turn around outside the city councilroom and cooperate in such a venture? Some believe it would be possible; others are more skeptical.

Beyond that, decisions to be made by any such organization are very, very tough indeed. How, for example, would the service be priced? By number of subscribers, by plant mile, by homes passed, or a flat per-system price? Since it would cost the same (excluding terrestrial costs after the receiving station is reached) to give satellite programs to a small town in Nebraska or to New York City, perhaps a flat unit price should apply. But is the smaller system going to be willing to pay the same price to give programs (which perhaps are not needed anyway) to 1,000 subscribers as his big-city neighbor pays for 10,000 subscribers?

## Only the Beginning

These are just a few of the questions cable leaders are beginning to ask themselves and each other as domsat approaches reality. It may, in fact be possible to get some preliminary answers before the U.S. satellite flies.

This month, Canada is launching a domestic satellite system. It has been pointed out that there is still space available for lease at quite favorable terms and that actual experience would be invaluable before making a commitment in the U.S. program.

Ports acknowledges that NCTA, as the only national "voice" of U.S. cable, has had some discussions with Canada on the subject. He would like to see an experiment, he says; but he emphasizes that the machinery for securing the programming or the buyers of the programming is not in place.

Only a year ago, all of these considerations seemed as remote as — well, perhaps as the idea of "universe pollution" does now, the vision of eight-year-old, burned-out satellites endlessly orbiting the earth.

But now, suddenly, despite the still-possible bureaucratic delays, the time has come to choose partners for the opening dance. And the configuration of MCI, Lockheed, Fairchild, Western Union, et al on the one side with the telephone companies, cable industry, education, giant corporations, bank clearing houses et al on the other side is as fascinating to watch as will be the final configuration of earth-to-sky-to-earth links. TVC

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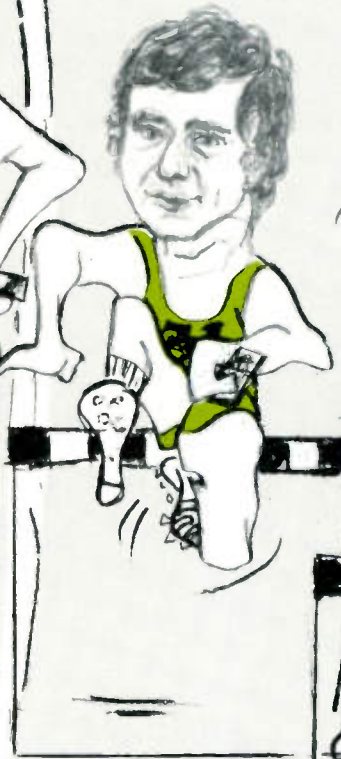
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# The Great Pay-Cable Race — Clearing the Final Hurdles



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DORE SHARY - TVN

The race is still on . . . and it won't be long before some results are known. With most of the hurdles behind them, executives of the four big pay-cable firms present their opinions and outlooks for the growing pay market.

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# TheatreVisioN

By Dore Schary  
TheatreVisioN, Inc.

The press, sensitive to change, has chronicled the activities of various companies that are entering the subscription TV field (subscription TV is a euphemism for Pay TV). Foregoing delicacy, we at TheatreVisioN identify our system as pay television. Our first area test in collaboration with Storer Cable Television in Sarasota, Florida will involve 1,000 cable subscriber homes, 300 hotel and motel rooms and an undetermined number of hospital rooms in that area.

The TheatreVisioN system is based upon a theatre ticket concept. Subscribers will purchase tickets which will be clearly identified with the name of the program they are to see plus the dates of the showings and the cost to the subscriber. These tickets will be inserted into the subscriber's decoder and the feature film, play, opera, interview, musical event or sports program summoned by the ticket will appear on the home screen.

It is no revelation in any field of communication that each competitor has his own reasons for believing in his system and device. We at TheatreVisioN believe that our system is a logical step for both the consumer and the film producer who are familiar with the conventional box-office sale of tickets. We argue that TheatreVisioN is the electronic counterpart of that service.

The decoder box is easily attached to the subscriber's television set and in no way interferes with the reception of regular cable channels.


The decoders which will be used in Sarasota will, in a short time, be followed by the second generation decoder which will feature a 26-channel cable converter along with the TheatreVisioN service.

Our entertainment program will contain seven items during a one-month period. Three films will be cablecast daily at 4, 6, 8 and 10 p.m. One program of three pictures will run on each odd day of the month and another program of three films will be available on even days of the month. The seventh item will be inserted on weekends or perhaps on special days in place of one of the films. The monthly subscription cost is \$15. However, after the first month, subscribers will be able to exchange tickets that they have not used, receiving credit on their next month's subscription.

Subscriptions will be available by mail and, in addition, individual tickets will be available at local retail stores or at the TheatreVisioN office or Storer offices in Sarasota.

Motion picture companies have been extremely cooperative in supplying us with important and exciting pictures and we are grateful to them for helping us to bring TheatreVisioN to our audiences. We will not show X-rated pictures at any time — a decision shared by the motion picture producers. As the popular song once said, "We have high hopes." These hopes are represented by the convictions of Chromalloy American Corporation which has made a heavy commitment to TheatreVisioN and by the Laser Link Corporation which has done the imaginative engineering.

Since I am convinced that TheatreVisioN has to be an alternative method presenting entertainment without interruptions and commercials, I truly hope that our competitors, along with us, find and satisfy audiences throughout the country. Sam Goldwyn once said referring to a picture, "I don't want to make any money on this — I just want everybody to see the movie."

Well, we would like everybody to see pay TV, but we are also interested in making the money and helping create a new and exciting branch of entertainment. 

---

# Home Theater

By Richard Lubic  
Home Theater Network

The American consumer is getting more and more particular these days. Even a bit demanding. . . .

He wants more out of his car, and his home, and his television.

Let's talk about television. For decades television has canned its product, then fed it to the public. We think that's fine.

But because of the audiences' growing demand for variety, we also think television should expand. . . . enough to become the home's complete entertainment center.

In addition to major sporting events and motion pictures, it must offer live concerts, Broadway plays, and fine symphonies, and even the opportunity to do

at-home shopping and to take college courses for credit while at home.

Such new television fare is what Home Theater Network is concerned with. We are a consumer-oriented program source, within the framework of the communications organization, which is about to provide the consumer with a more advanced and controlled communications system that will be nationwide.

You may be thinking, "Sure, television has to expand. But not through pay or subscription TV . . . it's been nothing but a failure."

Well, let's discuss a few pay systems of the past. Back in the early fifties, Colonel McDonald of Zenith spent millions of dollars for the development of that company's now famous Phone-a-Vision. Soon afterward, David Lowe, of the famous theater family, started the International Telemeter Corporation which came up with Telemeter for pay television. At about the same time Mathew Fox, utilizing a system known as Skiatron, started Subscription Television



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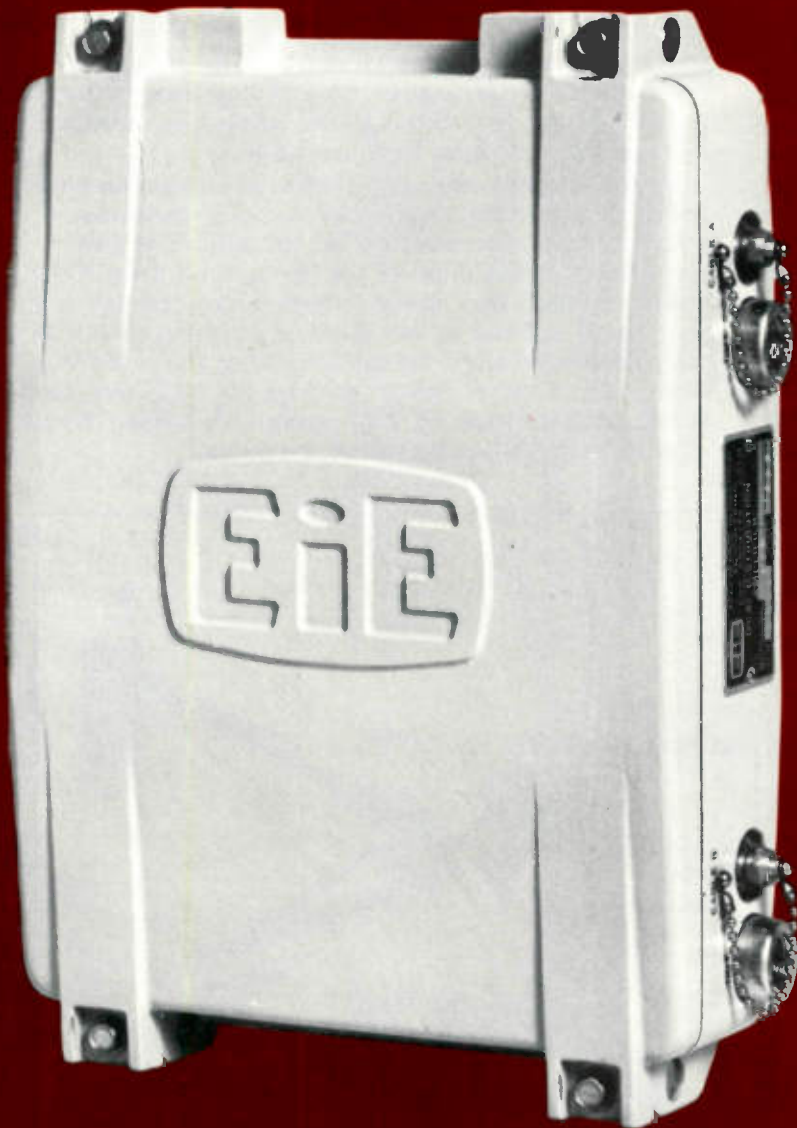


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Twenty-seven channel cross modulation performance is no worse than that encountered in conventional amplifiers for 12 channel operation.

The Series 50 Hybrid line is of course bidirectional. Series 50 Distribution Amplifiers can be optionally equipped with active or passive reverse channel capability. If you're considering a multi-channel (more than 12) single cable plant, look at Series 50.

Specialized equipment such as the Series 40/50 amplifiers combine the economy of the Series 40 Discrete line with the high performance of the Series 50 Hybrid line. Series 40/50 equipments include a bridge/trunk amplifier and an intermediate bridge amplifier, both of which are bidirectional. These equipments, which employ conventional solid state amplifiers in the trunk with hybrid amplifiers in the bridge leg are employed in layouts requiring a discrete trunk system and a hybrid feeder system.



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Corporation, STV. None of these systems was successful. The reasons for these failures are now history, but let's look at a few of them:

First, the opposition from certain motion picture exhibitors and from small segments of the public complained that the cost of the television sets that they purchased was high and nobody had told them that they would have to pay for this programming.

There were no UHF stations at that time and cable was just over the horizon.

Secretly, the Hollywood studios and the bright motion picture people were getting excited about the potential box office at home. They were thrilled for two reasons: the motion picture box office had peaked and was beginning to slide, and they wanted to get away from the domination of the exhibitor.

The main reason for this decline at the box office was the growth of television.

But viewers after many years became disenchanted with the standard fare, and wanted something better and more personal. Television like the motion picture business, found that it was experiencing a new problem. They needed better programming and the viewers were demanding it.

At the same time, the major motion picture companies were really feeling the obvious pinch brought about by the new "in-home" system of entertainment. So, when TV asked to buy their old motion pictures, the studios were eager to sell.

The studios reasoned, and reasoned badly, that their films represented quality entertainment that a

very great segment of the public had never seen.

"We'll see," the studios said, and they turned over priceless film to the television networks, who gladly paid the asking price . . . often a few thousand dollars for a picture that had cost a million dollars to produce.

These great blocks of backlog from the studios saved television at a very critical time. They were given the so-called quality programming they needed to hold the audience and fill up the time slots for sponsors.

Television now got a new wind, resulting in further depletion of the motion picture-going audience and that negative effect was, of course, badly felt in the studio financial statements. The studios began to fold.

The exhibitor who was fighting pay television in the early systems failed to see that he should have been stopping the studios from selling their pictures to free television. But by the time the exhibitor realized this, the horse had been stolen.

Another reason that pay television companies have failed is that they used over the air transmission, which became cumbersome for the FCC. The government took a dim view of taking air time from VHF channels, and this badly crippled pay television's chances of survival in any form. A crushing blow was yet to come, when in the middle sixties the exhibitors again struck with heavy propaganda and got the voters of California to vote against the newest form of entertainment, subscription television.

# ANNOUNCING

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Both units feature new and improved safety features: i.e., "positive lock" rotation system, strong "box" booms, electric controls or hydraulic "feathering" controls available for both models.

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"DEALERS INQUIRIES INVITED"

With the recent FCC rulings, Supreme Court reversals on the California vote, pay television is now becoming a new form, and rightfully so. But rather than attempting to scramble and unscramble pictures for over-the-air transmission and the enormous costs, plus uncertain FCC channel approvals, the logical and newest form for both today and the future is cable television.

This new form of communication does not threaten to take playing time from free television. It adds new channels. And, most importantly, it puts that long-sought box office in the home, which is HTN's goal.

Rather than chase the transitory market, HTN decided to go after the home market because of its long term potential. In addition to its entertainment capabilities (we will be able to simultaneously show a single motion picture to literally millions of homes throughout the country), it can also cover other critical areas. (As I said earlier, we plan to offer the viewer the chance to shop at home via our electronic catalogue, and to study: We are currently negotiating with the University of Southern California for a new form of study program.)

Of course, we at HTN are interested in succeeding and we've established a few basic requirements we feel we will have to meet.

An effective pay television consumer-oriented system must be able to stimulate consumer impulse buying. So, we've eliminated the need for the home viewer to purchase coded tickets outside his home.

Through our highly sophisticated and efficient new system, a person will be required only to make a phone call.

It works this way: By way of our microwave network, we will deliver signals to a receiving dish at the CATV's head-end. These signals will be modulated to a proper RF output and sent to the subscriber's home via two midband channels. On the back of the subscriber's set, a small down-converter will transform the midband frequencies to a low VHF frequency. The person at home will thus be able to activate his down-converter by dialing a number on his telephone and, using a small portable ordering device (PERK), send a coded message to a central computer which will acknowledge his request for a program. Seconds later, his requested viewing fare will appear on his screen.

There must be a small number of origination facilities to maximize efficiency and program quality during transmission. So, we're assembling a cross-country microwave network to allow U.S. coverage from three strategically located stations. This will also give us the ability to transmit live events.

There must be a system of accurate billing to insure honest percentages to producers and CATV operators, as well as to collect from the viewers. So, we've tailored our computerized billing service to not only insure that all concerned will receive accurate information, but also to allow for credit card billing.

When will HTN go into operation? We have already set up a "mini" pay TV system in Century City,

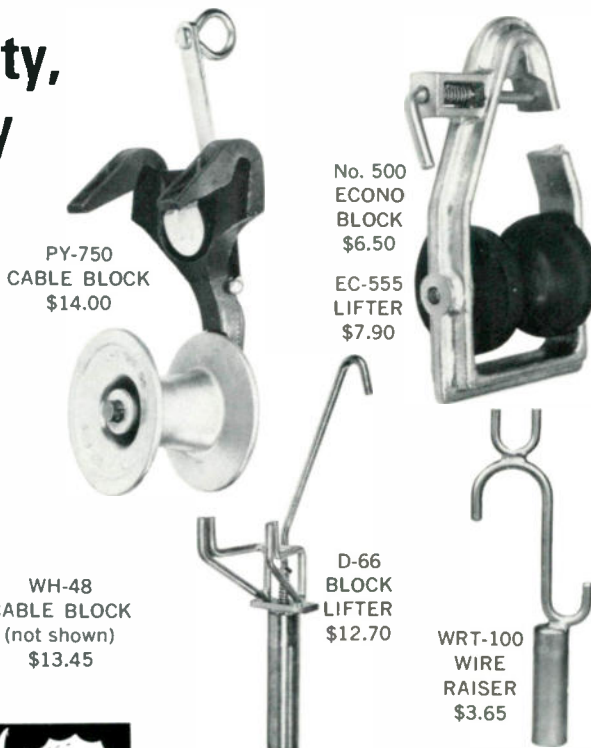
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Model PY-750, with locking cam, is for 3/16" or 1/4" messenger strand, has roller for maximum safety in stringing coaxial cable. Model WH-48 (not shown), with locking cam for 5/16" or 3/8" messenger, has roller for up to 2 3/4" cable, will not crease or disfigure cable jacket. No. 500 "Econo-Block" is an inexpensive block for coaxial cable and distribution lines, has spring-held locking pin, clears two lashed .750 trunks.

D-66 Lifter for placing PY-750 and WH-48 Blocks is alloy steel with precision-machined working parts, will also handle General Machine Products D cable blocks. "Econo-Block" uses an EC-555 Lifter. WRT-100 Wire Raiser is alloy steel, 25% stronger than cast metal, has two hooks for simultaneously raising messenger strand and telephone line. All affix to 1 1/4" diameter extension poles.

Write or call us for full information and prices.



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CABLE BLOCK  
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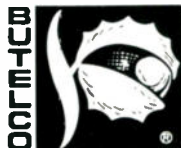
No. 500  
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EC-555  
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WH-48  
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An integral part of this system is the channel monitor unit. Through this unit it is possible to communicate with each individual receiver on a particular cable network. The channel monitor will make it possible to operate utility meter reading, burglar and fire alarm systems, remote disconnect, high speed opinion polling, plus a new and dramatic way of merchandising — the interactive commercial.

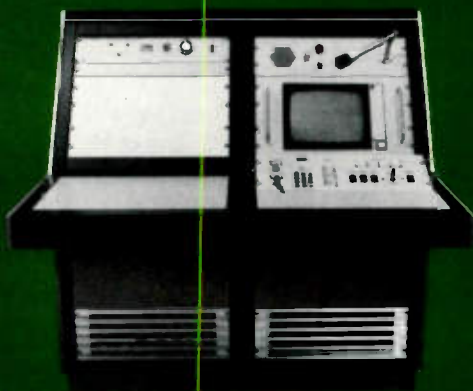
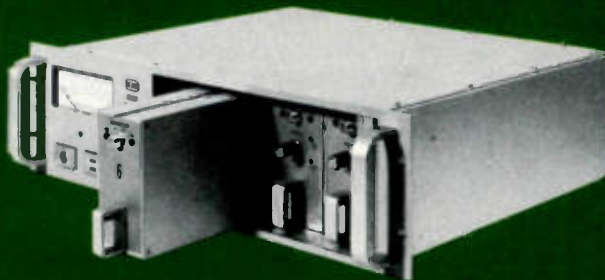
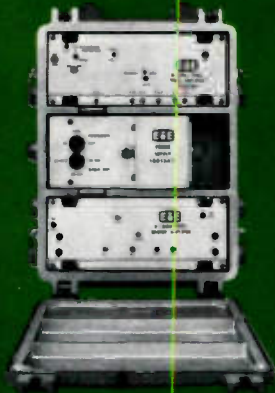
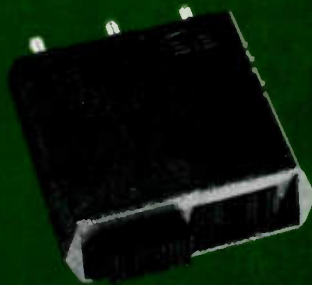
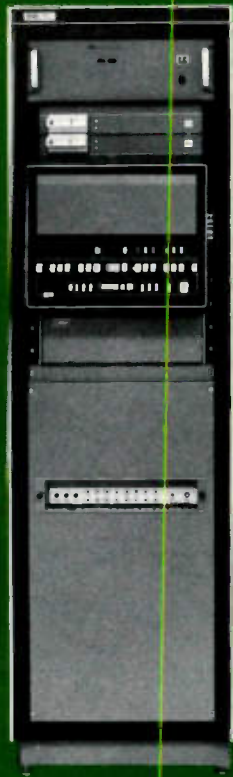
All of this and more is possible with the EiE total communication system. This highly versatile equipment is capable of operating: subscription TV, data transmission, remote control video surveillance, and many other profitable and rewarding communication services.



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The high quality of EiE components is reflected by its full line of cable television equipment. Flexibility and versatility are key words when describing EiE's color TV modulators, demodulators and A/B coaxial switches.

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complete with computer and ancillary equipment, to demonstrate our advanced programming concept.

We are currently conducting in-depth field research to develop specific marketing plans to enter our initial cable systems during the first quarter of 1973. Our following rapid national expansion will be dictated only by the volume of hardware produced by our suppliers.

We now have leasing agreements or options to provide service, upon successful test market perform-

ances, with Cablecom General, Liberty Communications, Continental CATV, Sammons Communications, and Communications Properties, Inc. These companies represent a total of 700,000 cable subscribers, and most importantly, 1,750,000 cabled homes. And we're currently negotiating with other major MSOs.

Indeed, the American public is increasingly seeking more out of television. Our technology will soon provide him the complete entertainment center. 

## Optical Systems

By Alan Greenstadt  
Optical Systems

Many of the questions surrounding subscription television will hopefully be answered in the next few months, as the 70,000 subscribers of Cox Cable's San Diego system (Mission Cable) will have the opportunity to see current movies, blacked out sports, and a myriad of other programs running the gamut from speed reading to opera. We call our system in San Diego, *Channel 100*.

For Optical Systems, *Channel 100* represents over two years of research, development and careful planning. Although the development and planning has by no means ended, we feel that we have overcome

many of the major hurdles in the development of an effective private channel television system.

Probably the most logical place to begin is with the delivery system. As soon as the leased channel concept was introduced in early 1970, a long search was started for the right delivery system which would contain all the necessary ingredients to make the concept a success. These ingredients were:

- 1) That the delivery system would work effectively on one-way systems.
- 2) That the equipment was able to work on unused frequencies on the cable system.
- 3) That the delivery system afforded a high degree of security.
- 4) And probably the most important of all, that the delivery system is highly flexible and capable of charging on a per program basis.

The next step was to establish a research and development facility, staffing it with talented engineers, many of whom had participated in the development of previous "pay television" devices. The first problem which we tackled was that of security. In late 1970, our proprietary scrambling method was perfected in tandem with a conversion system which did not generate spurious signals on other frequencies on the cable system.

The next and most obvious question related to the availability of frequencies on the cable system. It was determined that usable space existed not only in the mid-band, but also in the super-band. Further, through careful analysis it was determined that very often a usable channel exists in the sub-band. As a result of these studies, it was determined that there is a basic need for two types of terminal units, a 1-3 channel unit, and a multichannel unit which works in tandem with a set-top converter. The 1-3 channel unit is targeted for use on a 12 channel system with limited usable space.

In many instances, on non push-pull systems where all available standard VHF channels are being used, this unit can function very easily on the channel immediately below Channel 2 (sub-band). For those 12 channel systems with the capability to accept as many as three channels on non standard frequencies (probably the mid-band), the three channel version is ideal. The decoder portion of the multichannel unit has been designed to take the output of a standard set top converter. This, of course, obviates the need for making the investment of putting a decoder in the homes of subscribers who are not taking the special service. This multichannel unit can create a "private

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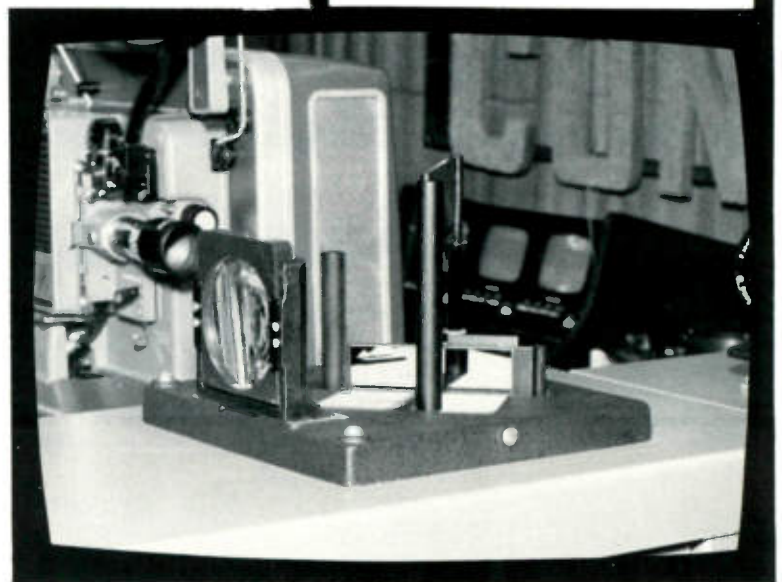
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channel" on any one of the 26 or 30 channels delivered by the converter.

The method of activation which we finally decided upon is called *collective enable*. In a collectively enabled system such as ours, the activation code changes quite often, and "cracking the code" is like trying to beat a roulette wheel, a purely random proposition.

Thorough analysis of card technology eliminated the use of magnetic or self-destroying tickets, as they proved to be expensive, and they did not yield enough flexibility to accommodate our marketing plan, nor did they yield enough code combinations. A system utilizing an array of punched holes in conjunction with a photo-optic card reader in the terminal unit has been adopted. This system yields 64,000 different program codes, as well as over 40,000 distinct terminal addresses.

The normal movie schedule at *Channel 100* in San Diego is four continuous showings a day. There are no commercial interruptions in the body of any program for which a customer is required to purchase a ticket. The cost of movie tickets varies with the amount of tickets purchased. For example, a customer can purchase a weekly movie ticket for \$2.25; or he can pay as little as \$1.50 a week by buying a season ticket to the movies. In this case, he receives a plastic card which entitles him to watch 26 movies during a 13-week period.

We also have do-it-yourself tickets called "Wild Cards" for the impulse buyer. These cards are unique in that all of the possible punch holes have been perforated and numbered. To request a particular program, the customer merely calls the *Channel 100* service office, and he is given a special code which corresponds to the numbers on the card. By punching out the proper numbers with a pencil or ball point pen, and then inserting the card into his terminal unit, he may view the program which he has requested. The "Wild Card" operates his decoder for only the particular program he has requested.

The programs being offered are current movies that have not been previously released to television. They include many of the same movies that are playing or have recently played in local movie theatres. We anticipate using films from Twentieth Century-Fox, United Artists, Universal, Warner Bros., Columbia, National General, and many other sources of production.

A customer can purchase his tickets in the mail, over the phone, or in person, in which case he can do so at any one of the conveniently placed *Channel 100* ticket offices. The customer also has the opportunity to pay for his purchases through the use of convenient bank charge cards.

The initial sale is made much in the same manner as conventional CATV is marketed. This is to say that we advocate the use of a strong outside marketing firm, conducting a carefully monitored door-to-door sales campaign. As is the case in San Diego, this campaign is heavily supported through the use of public relations, direct mail and other forms of advertising. The installation in the home takes only a minute or two. There is no minimum program

# LOCAL ORIGINATION PROBLEMS?



Are you trying to decide which weather scan or what studio equipment to invest in? While you are trying to decide, remember these three things:

1. R.H. Tyler Company is the originator of weather scan equipment for CATV.
2. R.H. Tyler Company can fill all your studio equipment needs whether they be black & white or full color.
3. The next time you have a question or a need for any origination equipment, **THINK R.H. Tyler Company!**

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purchase required. The customer pays only for those closed circuit programs which he has selected to view. He is required to post a \$20 security deposit which will be refunded to him immediately upon his request for termination. In addition he is required to purchase a service and maintenance contract which will cost him only \$1.00 per month for which he will receive full warranty and trouble call service at no additional charge.

Live programs such as sporting events are televised by *Channel 100* production crews. Many programs such as feature films, shows and plays, and educational material have been pre-recorded, and are

replayed and transmitted from *Channel 100's* origination facilities in San Diego.

Optical is also pursuing a vigorous licensing program both in the United States and in Canada (Canadian Optical Systems Ltd., a joint venture with Premier Cablevision). Licensees have available to them all of the software and hardware, as well as the various technologies necessary to run a system such as ours.

There is no doubt that we have much to learn about this new field. We feel that we have taken a flexible enough approach to survive the inevitability of mistakes and profit from them. TVC

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# Computer TV

By Paul Klein and Mark Schubin  
Computer Television Inc.

Anyone even remotely connected with CATV knows that "The Cable" can provide shop at home service, security and fire protection, picture-phone service, thousands of simultaneous programs, etc. Anyone who reads *TV Communications* or any other trade magazine knows that every manufacturer has two-way equipment just itching to attach itself to your system. Anyone who has attended any trade shows knows that the technology to do everything is here! Anyone doing anything?

No. (Naturally, experimentation is going on, but seven units here and five there of a difficult to proliferate (too expensive, too hard to build) system is not the same as *doing* something.)

Why not? Well, it's true that the technology exists — the we-put-man-on-the-moon argument is perfectly valid — but 3-D TV is pretty easy, too; and the home videotape recorder has been around for ages in the form of the \$200,000 quadruplex machine. Let's face it: Two-way blue-sky is expensive!

To an engineer, \$500 for a home terminal may seem cheap — to a 10,000 subscriber system it's *five million dollars*. And for what? Improved customer relations? What CATV system seriously believes that shop-at-home or security will significantly increase its number of subscribers? That's why Scientific-Atlanta, Tocom, Vicom, Theta-Com and others haven't yet scratched CATV's surface with their two-way gear.

How about getting the hardware *free*? What CATV system wouldn't love to offer all of the blue-sky functions *plus* extra channels of entertainment programming at no cost? That's what pay TV can do for a CATV operator. In pay TV, or unfree-TV (*Unfree* — *un* meaning not, and *free* meaning costless. Ergo, unfree-not costless. The only confusing facet of unfree-TV is that which is paid for not on a per-program basis, nor on a subscription basis, but by advertisers. This type of television, also known as *commercial* television, is sometimes called free-TV, thus the confusion.) as it is lovingly called, the *subscriber* pays for special programming, either on a per program basis, or by an added subscription, and

the pay TV company collects the money, installs the hardware, provides the programming and usually even sees fit to give the operator a hefty monthly channel rental or a piece of the action.

If the pay-TV company uses two-way equipment (as Computer Television and many others do), then the terminal in the home can also be used for training, opinion polling, shopping, security, or whatever. Which brings up the next point:

With 39 companies (by our modest count), in the pay-TV field, and at least one-third of them using two-way interactive communications, why isn't anyone doing anything? Where are the first million pay-TV homes?

As before, it's simply a money problem. Only now think of it in terms of a pay-TV entrepreneur who wants to serve a million homes and has managed to get his box (*Box* — container; in the pay-TV industry: a container full of all sorts of electronic whoosis and whoopees that converts, de-scrambles, monitors, emulsifies and/or does a garden variety of other things.) cost down to \$100. That's \$100,000,000 — a pretty piece of change. Got a box for \$10? That comes to \$10,000,000 — certainly less, but still imposing. Got a box for \$1? That's ridiculous!

How often must programming be changed? How much will it cost to operate the system? These, and other questions are still unanswered and serve to deter some large companies from making a huge commitment to the field. BUT . . .

There is yet another aspect to pay TV invented in mid-1971 by Computer Cinema and currently fostering some sixteen companies.

It's called hotel-motel pay TV and it's unique in a number of aspects. First, virtually every hotel and motel has an inherently two-way master antenna (MATV) system, since there are no amplifiers after the head-end. Secondly, guests in a business hotel are a captive audience, away from home, away from friends, in a strange city, frequently bored, usually on expense account, and rarely in the hotel for more than a few days.

This last feature means that, in the course of a year, a thousand room hotel may represent an audience of 100,000 or more while a cable system with 1000 subscribers represents an audience of only 1000. Furthermore, with a minimum of programming, a hotel guest can see two different movies every night for his entire stay, and have fresh programs two

months or more later, when he returns. To do the same in the home would require a minimum of 700 movies per year.

A hotel has a built-in billing and collection system and has requirements for some standard two-way features such as message lights, wake-up buzzers, room and maid status, fire and TV theft alarms, etc. There are boxes available for this use — some two-way, some one-way; there are installations operating (as this is being written, the number of pay-TV terminals in hotels exceeds by some factors of magnitude the number in homes); and there is a need for CATV in this market.

Why a need for CATV? An excellent question. Many hotel/motel pay-TV operators are currently using inexpensive videocassettes for programming. In a test Computer Cinema conducted on Sterling's Manhattan Cable Television, Sony's Videocassette machine (\$1000) compared more than favorably with machines costing up to (\$30,000). Add an automation unit for a few hundred dollars and a video delivery system, ready to plug into an MATV system, costs \$6000 (five videocassette players for one three-hour and one two-hour movie, automation and cycling equipment, one monitor, and amplification equipment), a very "livable" figure.


However, assuming only 50 movies a year, at only two hours per movie, cassette and film transfer costs could exceed \$6000 per location per year. With maintenance and shipping costs added, the need for a low-cost method of video delivery, far less expensive

than the videocassette, becomes apparent. Such a method of delivery is CATV. Even a one-way system with only 12 channel capacity can serve a strip of hotels or motels of almost any size; without CATV, economic considerations would limit pay TV to hotels of about 300 rooms or more. Other MATV installations — apartment houses, hospitals, etc. — can also benefit from the two-way devices on a unidirectional CATV system. Security of signal may be maintained by scrambling, with only one unscrambler/converter necessary for each MATV system.

The net result is that everyone wins. The cable system leases unused channel space, provides its institutional subscribers with vast services (or gets institutional subscribers if it does not already have them), gets additional video delivery equipment and opens the field for two-way blue sky, providing some services immediately for apartment subscribers.

The pay TV company gets marketing and sales assistance from the cable company, reduces by a drastic percentage the amount of capital equipment and operating expenses it must provide, is assured of proper care and operation of its delivery equipment, and can expand with each CATV system as it grows.

The subscriber gets additional programming and services at his option and furthers the development of two-way interactive communications while paying only for those programs he desires to view.

In short, the future is here today, and you can join now by leasing channel space for hotel/motel pay TV on your system. 

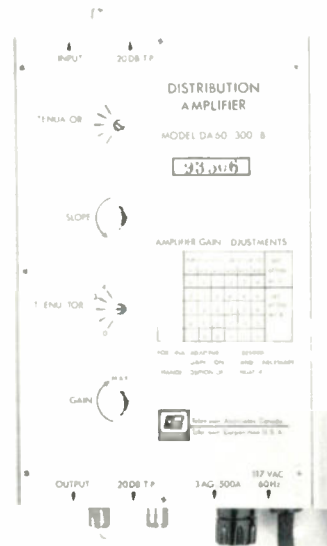
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Slope Adjustment:	0-16 dB	0-3.5 dB
Hum Modulation:	-60 dB	-60 dB
Input/Output Return Loss:	16 dB	16 dB
<b>Distortion Characteristics</b>		
For 20 Channel Operation		
Output Level	+48 dBmV	+48 dBmV
Cross Modulation	-57 dB	-57 dB
Spurious & Intermod Signals	-60 dB	not specified
<b>Power Requirements:</b>		
	117 VAC or 30 VAC (cable powered)	30 VAC (cable powered)



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Jacqueline Morse

# Three Might Get You Five — The Franchise Fee Gamble

For the health of the cable television industry and the good of the public, the FCC last February commanded an end to wild franchise fee bidding. There are limits, the FCC told local governments, to just how much money you can exact from operators for local regulation.

More cheers than boos greeted the mandate. It was thought then to be a giant step toward hacking out the jungle undergrowth of CATV franchising, and it has been. However, it has also become increasingly clear over the months that one giant step barely penetrates the jungle fringe, and that pushing back the undergrowth in one small area merely encourages it to grow more densely in another.

Some experts may believe there are more burning issues than money limits in the FCC's whole attempt to divvy up cable jurisdiction among Federal and non-Federal governments. But to the parties involved, there is no hotter issue than who gets how much money from the CATV operator.

As adept as the Commission may be in evading tough issues (and it has been quite consistently successful in ducking federal-state-local decisions), the cable fee question touches too many pocketbooks to be ignored.

Fortunately, the Federal-State-Local Advisory Committee (FSLAC) was created to give the Commission input on just such critical problems. And the FSLAC's Steering Committee put "franchise fees" right near the top of its "hot topics" list.

Beginning in August, the committee identified five major trouble spots demanding FCC attention:

- 1) Defining revenues. On what CATV revenues may a franchising authority base its percentage fee?
- 2) Limits. What is the maximum franchise fee allowed — three percent, five percent, or more?
- 3) Lump-sum payments. What lump-sum payments, if any, will the Commission allow, and under what conditions?
- 4) State regulatory fees. If the state imposes a CATV fee, must that be counted together with the local fee against the maximum percentage?
- 5) Other expenses and obligations incurred in franchise bidding. To what extent, if any, should stock discounts, out-of-pocket payments for extraordinary equipment, etc. count against the franchise fee ceiling?

The questions were obviously easier to ask than to answer. In fact, what began as a clear-cut question sometimes took on more the appearance of Silly Putty as it bounced from cableman to city representative to state spokesman to public interest delegate to consultant. The simplest statement could provoke near-shouting matches among the special-interest advocates; red herrings and endless rabbit trails were tracked and backtracked; agreements were reached at one meeting, only to fall apart in the opening minutes of the next.

If it sounds like chaos, it is not — quite. One must suspect that much the same goes on in any decision-making body; but some, like the FCC itself, are cloaked in privacy while the FSLAC must function under the critical eye of the public.

If all goes according to present plan, the committee will in fact wrap up its long discussion this month and present to the Commission a set of recommendations on each of the five troublesome questions.

## Definition of Revenues

Here, as in some other areas, the committee has had to "agree to disagree" and will set out alternatives for FCC consideration.

The question is whether the franchise fee may be levied by the franchisor only on CATV revenues from "traditional" subscriber service, or on *all* gross revenues, or on something in between.

City officials such as New York City's Morris Tarshis and San Diego's John Witt, already incensed over Federal limitations on the *percentage* of the fee, insist that it should at least apply to *all* system revenue. Tarshis argues vehemently that the future regulation of the "auxiliary" services (pay-cable, leased channels, etc.) is going to eat up far more of the city's budget than will regulation of traditional service. The ordinary subscriber, he contends, will wind up supporting the buyer of extraordinary services.

Cable people, however, point out that auxiliary services do not yet exist in most systems; and where they do, they are experimental and unprofitable. Since the development of these services is in the public interest, no franchise fee on these revenues

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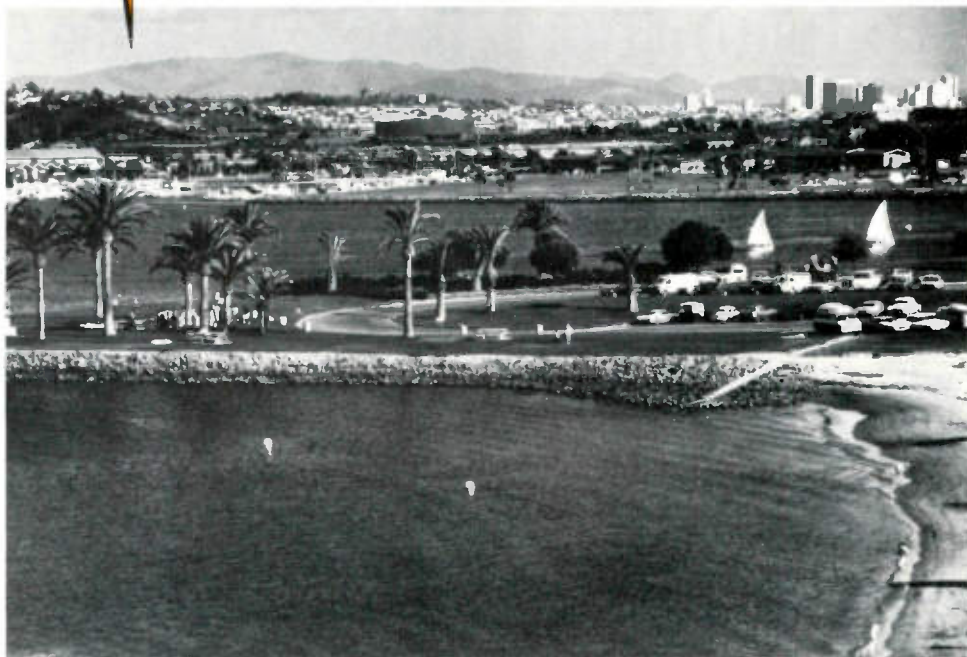
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should be allowed to burden that development.

In the midst of the committee's heated debate on the subject, a letter from Cable Television Bureau Chief Sol Schildhause to cableman Edward Allen answered the question — at least for the present.

Schildhause said categorically, "No," a franchise fee may not be based on auxiliary service income. "Subscriber revenues," he continued, "are considered to be those revenues derived from regular subscriber services — i.e., the carriage of broadcast signals and required non-broadcast services."

In looking to the future, the committee will outline alternative fee-bases for the FCC. If the base is restricted to exclude advertising, leasing, and pay-cable revenues, the committee will recommend that the FCC keep the question under advisement and reconsider it *no later than* five years from now.

### Percentage Limits

Section 76.31 (b) of the FCC rules reads: "The franchise fee shall be reasonable (e.g., in the range of 3-5 percent of the franchisee's gross subscriber revenues per year. . .)."

How firm is that three percent limit, or is it actually a five percent ceiling?

By consensus, the committee (excluding city representatives who do not concede either the propriety or authority of the FCC to set any limits) will likely recommend the following clarifications: (1) The

maximum franchise fee is three percent; (2) If, in the application for a certificate of compliance, it is demonstrated that there is "regulatory justification" and the cable operation would not be unduly burdened, a five percent fee may be approved; (3) Any fee above five percent would require a waiver with a much greater burden of proving its necessity.

In its rules, the Commission scarcely touched on lump-sum payments except to say in Section 76.31 (b) that the "reasonable" fee should include "all forms of consideration, such as initial lump sum payments."

As was brought out in committee discussion, there are two quite different classes of lump-sum payments. One, which most of the committee felt should be acceptable and should not be counted against the franchise fee, is a "filing fee"-type charge which all applicants must pay. That kind of fee, which would be paid before grant of a franchise and paid uniformly by all comers, could be used to pay the administrative costs of hearings, to underwrite an independent consulting service or for similar expensive undertakings.

The other type of lump-sum payment — the initial flat amount on grant of franchise of the commitment to pay a minimum amount monthly or annually regardless of system revenues — ought not to be permitted by the Commission, according to many committee members. Such payments are often the subject of competitive franchise bids. The prospect of immediate substantial revenue would tempt the city

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undoubtedly, but could well impair the chances of the system's success by draining away important dollars.

Should the state regulatory fee, if there is one, be counted along with the local fee against the three percent maximum? If New York State, for example, takes one percent of the system's gross, should New York City be cut back to two percent of gross so that the total does not exceed three percent?

Two of the committee's most outspoken and articulate members locked horns on this one. Amos (Bud) Hostetter of Continental Cablevision and Roland Homet, D.C. attorney working for the Illinois Commerce Commission in its attempt to regulate cable, battled to a draw and both sides will have equal time in the final document presented to the FCC.

The controversy boils down to the rationale behind the Commission's rules. Did the FCC limit franchise fees primarily to avoid burdening a young industry in interstate commerce; or was the limitation imposed primarily to cure abuses which have become evident in franchising at the local level?

Only the FCC can answer that. If the Commission determines that three to five percent is all the traffic will bear — together, of course, with the coming copyright fees and the FCC's own fees — then the states and local governments will just have to share.

If, on the other hand, the Commission agrees with the "Homet Position" that there is no record of state abuse of fees and that uniform fees imposed on all systems could never become the basis of competitive bidding, then state regulatory taxes will be imposed on top of the local-government ceiling.

## Other Expenses and Obligations

Once the franchise fee itself has been dealt with, the problems are hardly over. As Homet phrased it in committee, "There are a great many creative energies at work out there." Or, as Marc Nathanson of Cypress Communications put it, "You've closed the door on excessive franchise fees, so everyone is trying the side doors and back doors."

Where the rules have succeeded in making cities and cable firms focus competition on service rather than just on money, there is some sense that this is healthy. But even service commitments, if carried beyond the bounds of reason, can have the same undesirable effect on a system as an outrageous lump-sum payment or a franchise fee of 20 percent.

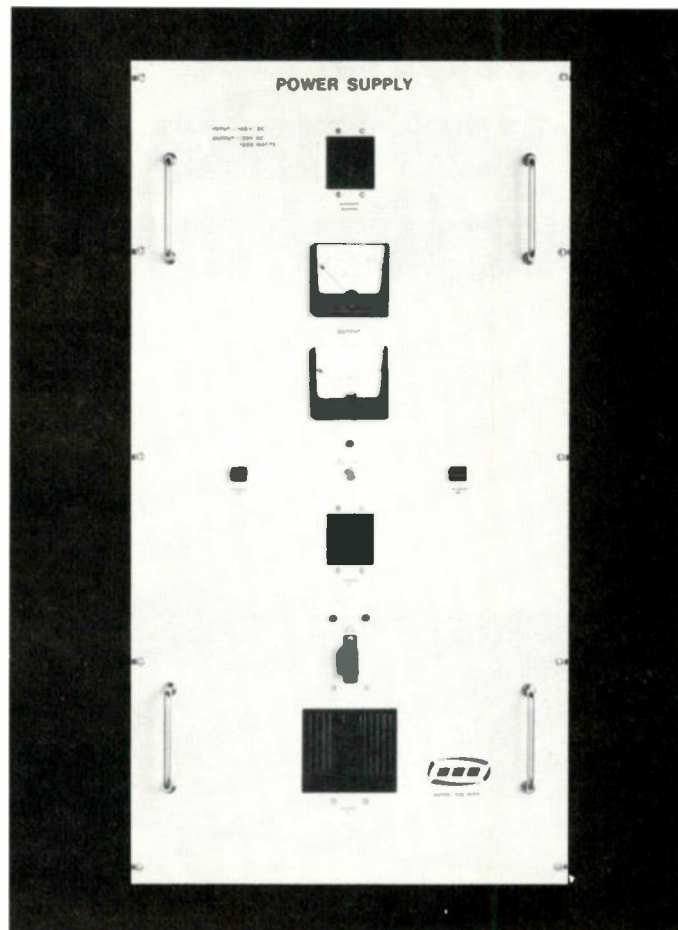
Homet, in a draft document prepared for the committee's consideration, said:

"The committee broke down 'other expenses and obligations' into four categories: equity contributions; grants to institutions; service commitments exceeding the FCC requirements; and service commitments where there are no FCC requirements."

"Equity contributions" refers to stock which is given to "local investors or sold to them at a discount without their assuming a proportionate risk of the investment. Homet, in a draft document prepared for

*(Continued on page 66)*

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Paul Maxwell

# Regulation and Responsibilities — Shadows on the Cave Walls

By Paul Maxwell  
Executive Editor

Cable is under pressure. As an industry coming of age, cable has the added responsibilities and problems inherent in approaching maturity in the glare of increasing social awareness — something cable adds to. Along with the growth of this new informational, educational and entertainment medium, other social movements are developing.

Social movements grounded in real and imagined abuses by business; social movements grounded in ageless youth rebellion; social movements grounded in centuries old racial abuses; social movements grounded in changing mores; and social movements grounded in simple awarenesses . . . all are directly and indirectly applying pressure to cable.

And most of these pressures will result in stricter regulation of the cable industry *unless* cable, as an industry, demonstrates that it does not need strict regulation forcing it to respond to legitimate pressures from society.

But that won't be easy.

And, it might be futile in today's climate.

Yet, it needs to be done.

Regulation by governmental bodies, no matter whether in response to legitimate abuses, to safeguard natural resources (like the electromagnetic spectrum), or to encourage the development of an industry, tends to ultimately stifle and restrict. Regulation tends not to regulate, but to hamper, hinder and harass.

And cable has enough problems without more restrictive regulation. The long freeze is example enough of the uncertainty of regulation.

Government administrators and regulators are in

much the same shape as the captives held in the cave in one of Plato's famous allegories. The captives were bound in chains and outfitted with blinders . . . and thus able to look in only one direction. Like bureaucrats.

They were forced to stare at a bland cave wall, and were unable to see their jailers. The jailers, just normal people like the captives, only allowed the captives to see the shadows of the jailers cast by the light of the fires onto the cave wall.

And the captives became very much afraid of their twelve-foot tall giant jailers. And resented them.

People in government, accustomed to doing things the bureaucrats' way, look at people in business much the same way. Yet, they often manage to secure power — power to control based on paperwork requirements. And then abuse that power because of real or imagined abuses by the "giants."

Cable doesn't need that. Cable must avoid it. And, the only way it can avoid it is by not deserving . . . and telling everybody convincingly. Cable must be a legitimate, viable *social and customer service*. As an industry, it must develop into the wise and good corporate man described by the American philosopher Ralph Waldo Emerson in his *Politics*:

"The less government we have the better — the fewer laws, and the less confided to power. The antidote to this abuse of formal government is the influence of private character, the growth of the individual; the appearance of the principal to supersede the proxy; the appearance of the wise man; of whom the existing government is, it must be owned, but a shabby imitation."

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## Franchise

(Continued from page 61)

the committee, estimated that if 20 percent of a system's equity is given to prominent citizens (presumably persons whose standing in the community will weigh heavily for the firm's franchise application), "that system will have to generate 25 percent greater profits to earn the same rate of return for the company."

Grants to institutions are similar to lump-sum payments discussed above except that the funds (or a portion of revenues) are promised not to the city itself but to a school, library, arts society or some other worthy institution. In some cases, the grant may be related to the cable operation, for example the funding of a public access programming group; but in many cases it appears more as a back-door lump-sum give-away.

Service commitments — whether it is a promise for a more sophisticated two-way service than the FCC demands or whether it is a promise for a quarter-million-dollar origination facility on which the FCC has set no maximum — can represent tremendous costs to the system operator.

What can, or should, the Commission do about these "other obligations?" Though they may be costly, they are goods or services which the operator and the city have apparently freely contracted for. In addition, it has been pointed out that a cable firm may be willing to lose money, in fact, in order to put in a particular system as an experimental ground or as a "showcase" operation.

There must be *some* "free ground" for competition among franchise applicants — how can the city make a choice among companies if there is no such freedom?

Since the line between reasonable regulation and unreasonable intrusion is such a delicate one and drawn along policy lines known only to the Commission itself, the committee has agreed to recommend "disclosure" as the cure to any lurking abuses.

The FCC will be urged to either require or encourage certificate applicants to provide data on stockholders, grants or funding, and services promised.

Those, then, are the outlines of the package which will probably be put before the Commission. It is not without its loose ends, and there are committee members who wish it had a greater number of firmly agreed-upon solutions to some of the problems posed.

If it does nothing else, however, it sets out for the Commissioners very thoroughly the areas and the dimensions of agreement and disagreement. The Commissioners can rest assured that every question has been explored from every special-interest viewpoint with no holds barred. Jack Mayer, the Cable Television Bureau senior staff member who was liaison to the advisory committee before being put in charge of handling contested certificate applications, commented: "In that (committee) room, there is just no way for anyone to con anyone else; there are too many sharp people to shoot down any balloon that goes up."

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# Political Cablecasting — Just Wait Until Next Year

... or the year after that. NCTA efforts to coordinate political cablecasting were handicapped by a late start, lack of interest and equipment compatibility. However, late efforts may omen greater participation in the future.

*By Jack Burke  
Associate Editor*

In late September, Richard W. Chapin, chairman of the board of directors of the National Association of Broadcasters, urged broadcasters to support the newly formed National Committee for the Support of Free Broadcasting — “a broadcasters’ political action fund to support such incumbents and candidates for either the House or Senate who will be predictably favorable to the continuation of the free enterprise system of broadcasting.” Imitation is the sincerest form of flattery.

The National Cable Television Association has long made similar appeals to its members for funds to be channeled into the campaign coffers of candidates who have demonstrated a particular fondness for CATV. And PACCT (Political Action Committee for Cable Television) has been an independent political arm since 1969.

Perhaps more importantly, the NCTA also undertook a program to involve its members and politicians in political cablecasting. The purpose of this program was two-fold. First, political cablecasting would, in this election year, provide the public with timely, important information about the candidates, and it would provide candidates with exposure on a local level.

Secondly, and perhaps more importantly, an appearance on cable television might provide a candidate, who may someday legislate on the subject, an opportunity to acquaint himself with the realities, and, in some cases, the mere existence, of cable television.

Another purpose of the NCTA program, in addi-

tion to providing cable subscribers with public service information and the candidate with exposure, is the improvement of relations between system operators and their elected representatives. “The main thrust of this fall’s campaign is acquainting candidates with the reality and mechanics of CATV,” according to Joel Ephrein, cablecasting coordinator for the Southeast. Ephrein feels that politicians, like a good deal of the public, have only heard the “blue sky” public relations spread by the industry to attract necessary investments: “They have to learn that this is a business, a tough business, if they are going to be dealing with it.”

It is not certain, at this point, whether or not the NAB felt a similar need to acquaint politicians with the existence of television (or radio).

## Divide To Conquer

The NCTA effort began in May shortly after the convention with the appointment of a political cablecasting coordinator for each of the states and for each of six regions. The primary responsibility of the state or regional cablecasting coordinator at this stage was the motivation of cable operators to participate in the program.

The NCTA next tackled the problem of aligning congressional districts with cable systems capable of local origination, a heady task made more difficult by recent re-apportionment.

Armed with information on what congressman would be running in the territory of what system, the



(Above left) Richard Heffner interviews Bella Abzug, Democratic candidate for the House of Representatives from New York's 20th Congressional district. (Above right) James M. Hancock, program director for the Humphrey taping, goes over taping format with Sen. Humphrey, Lorne Green and Chuck Connors as Jerry Gross, one of the Senator's media men, looks on, during last spring's California primary campaign.

NCTA then approached representatives and senators to advise them of the availability of exposure over their local systems and of the workings of cable in general. For this chore the NCTA contracted the services of D. J. Leary, an experienced consultant who has handled media for candidates of both parties in primaries and national elections, most notably, the 1968 and 1972 campaigns of Hubert Humphrey. The NCTA also drafted such distinguished CATVers as Bob Tarlton to help in the work of contacting congressmen. Those legislators who expressed an interest in cablecasting were then turned over to the state cablecasting coordinator, who was to arrange tapings and the subsequent bicycling of the tapes.

## Greatest Public Service Effort?

The NCTA Bulletin of Sept. 26 celebrated the initial efforts of the program thusly: "Cable is ready to put forth the greatest public effort in its history, to put its unique capabilities where they can do the most good to further the democratic process by creating new forums, new channels for exchanges between the electorate and those who seek elected office."

Unfortunately, the NCTA Bulletin was passing out kudos prematurely. As the campaign came to a close, systems in only three areas were, to any noteworthy degree, involved in political cablecasting — and these systems would have been involved with or without the NCTA program, as evidenced by their engagement in such programming long before the NCTA began its project.

The NCTA's effort suffered from some severe handicaps: that old nemesis equipment incompatibility which often precludes bicycling; lack of local origination capability; lack of interest on the part of both systems operators and politicians; and a late

entry into the field which resulted in a lack of organization.

The three areas where systems demonstrated a high degree of involvement with the political process were, as one might expect, Manhattan, Florida, and California. The success of political cablecasting in these regions was perhaps correctly attributed to coverage of local elections like "those the networks don't pay any attention to," as one of TelePrompter's New York programming operatives put it. Both TelePrompter's Manhattan system and Sterling Manhattan's have given considerable time to the coverage of candidates in local races.

## Where It's Really Working

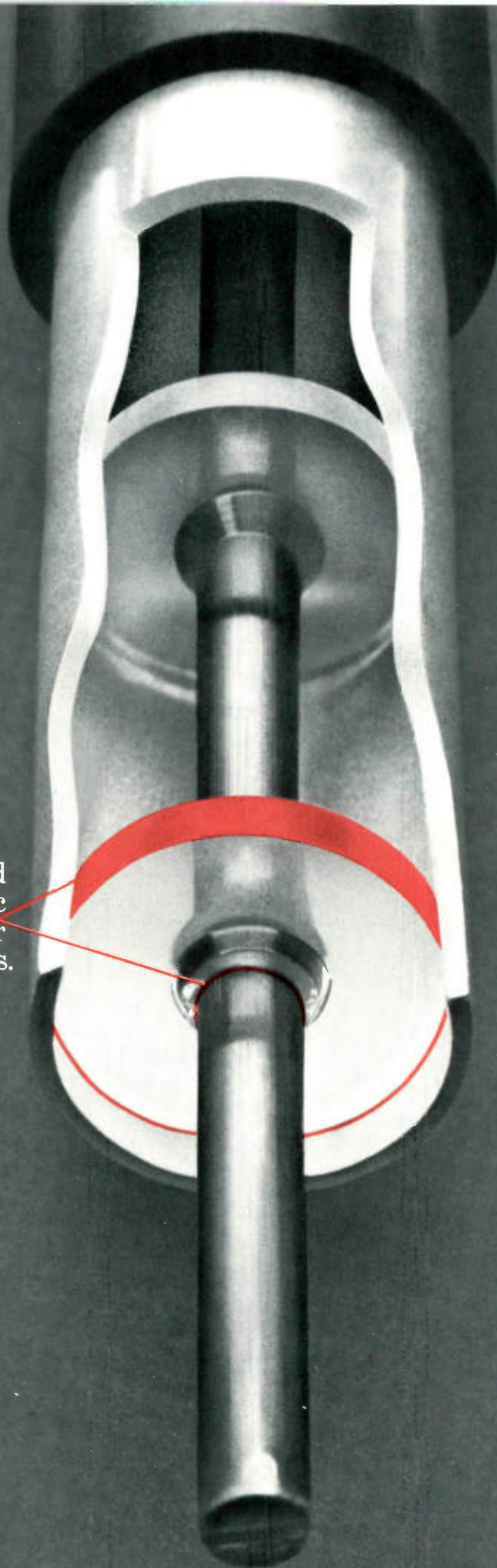
Sterling offered all legally qualified bona fide candidates one half hour of cable time during which he or she would be interviewed by Rutgers professor Richard Heffner. Those who have availed themselves of the opportunity to appear on Sterling's "Platform '72" program have included Congressional candidates Bella Abzug and Shirley Chisholm, and Louis Fischer, the Socialist Labor candidate for president.

During the Florida presidential primary, ATC's Orange Cablevision offered viewers a series of interviews with then presidential hopefuls, Edmund Muskie, Hubert Humphrey and John Lindsay. Others who have appeared on Orange Cablevision, and other systems around the state, include a candidate for the state public utilities office, a state senator who admitted to knowing almost nothing about a cable before his appearances, but came away with "some understanding of the nature of the business."

Twenty-six California systems participated in a bicycling network during the campaign for the presidential primary in that state last June. Efforts since that time have been less glamorous, but have included tapings of Senator John Tunney and



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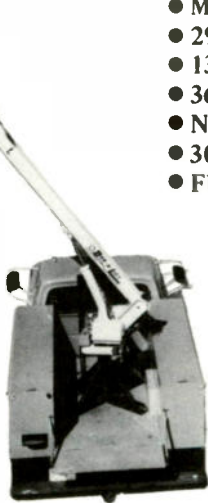
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congressman Buzz Johnson, bicycled to systems with interest in these candidates.

## In The Rest of America

Political cablecasting in the rest of the country has been, for the most part, limited to tapings of candidates campaigning in the area served by a system on a strictly local "news" basis.

The New Hampshire primary inspired system operators in that state to tape Democratic presidential contenders and bicycle the tapes around the state. At least one of the candidates appearing on cable, Senator Vance Hartke, a member of the Senate Communications Subcommittee, profited from his experience with cable, if not in votes, in the knowledge that "cable can give voters a voice in the election." Since the primary, however, New Hampshire has seen a minimal effort at political cablecasting.

A lack of origination has precluded cablecasting in some states, particularly those in the South. South Carolina, for example, has two systems with such capability, but the two systems are 250 miles apart.

Equipment incompatibility has all but negated the efforts of some regional and state coordinators, completely willing to drive tapes to systems in their areas. Some have overcome these problems by borrowing the necessary equipment and running tapes over the weather channels of willing systems.

Problems encountered in the political cablecasting program are themselves illustrative of some of the present difficulties in the cable industry. Although the plea, "We're only now starting on that," is frequently heard from cablecasting coordinators, some have little hope for even marginal success. Mississippi, where John Eastland, chairman of the Senate Judiciary Committee is seeking re-election, has only one system (Biloxi) with origination capacity. State cablecasting coordinator Daniel Boyd hopes to borrow VTR equipment for bicycling on weather channels, but has found little interest among other operators.

Two other southern state cablecasting coordinators grieved over the lack of origination in their respective states, but also chastised the state associations for lack of interest and organization. One laid the blame on the NCTA: "They just don't communicate. The NCTA didn't even ask anyone to participate."

## Focusing on Local Issues

Local interest is certainly preferable to none and may in some cases serve cable's needs. Candidates for state public utilities commission offices were taped and the tapes bicycled in both Florida and Tennessee.

Some states, through either devotion and hard work on the part of the state coordinator or through wide area systems' coverage and high technical capability are providing cable visibility to candidates and acquainting candidates with the operation of cable TV.



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Virginia is in the first class. Ron Roe of Danville Cablevision and state cablecasting coordinator has had all three candidates on his local news program and has made arrangements for taping half hour programs of each.

Mike Davis of Colony Communications in Providence, and the cablecasting coordinator for the Northeast, reports fantastic response from both systems and politicians in his region. Davis even expressed a willingness to drive necessary equipment to systems willing to do political cablecast of candidates.

## Enthusiasm Isn't Enough

Although state cablecasting coordinators have expressed enthusiasm for the NCTA program, many have said there is little they can do to overcome the lack of interest in such programming on the part of system operators in their states. Cablecasting coordinators throughout the country expressed a desire that the state association, in the words of one, "get off the can."

State political cablecasters are not without fault either. One Midwestern coordinator confessed, as late as mid-October, to hardly having started contacting other systems in his state. He also admitted to not knowing if there "were any state offices up for grabs this year." The station manager for the political cablecasting coordinator in a large eastern state wondered aloud, "if he knows that he is supposed to be doing that." The assistant to one regional coordi-

nator did not know that he would be assuming the responsibilities of the regional coordinator when the latter left for a month-long European vacation in October.

## After All, It's a Start

Although the NCTA's program is well-motivated, the national organization has suffered from a lack of organization. An NCTA memo sent to state and regional coordinators stressed the importance of accurate information to the success of the fall program but also apologized for including admittedly inaccurate information on congressional districts. One cablecasting coordinator in the Rocky Mountain district received a detailed list of the congressional districts and candidates for the state of Texas.

Problems encountered on the local level, with the possible exception of equipment incompatibility and the lack of origination capability, and disorganization on the state and national levels, can be blamed directly on the NCTA's late start in its attempts to coordinate political cablecasting. In the words of one staffer, still heavily involved in aligning congressional district with cable systems in early October, "We should have been doing this a long time ago." But even if the NCTA entered the field at a crippling late date this year, the effort may bear fruit in years to come. As John Paul Johnson has said, "It's not so much a late start as it is a beginning." TVC

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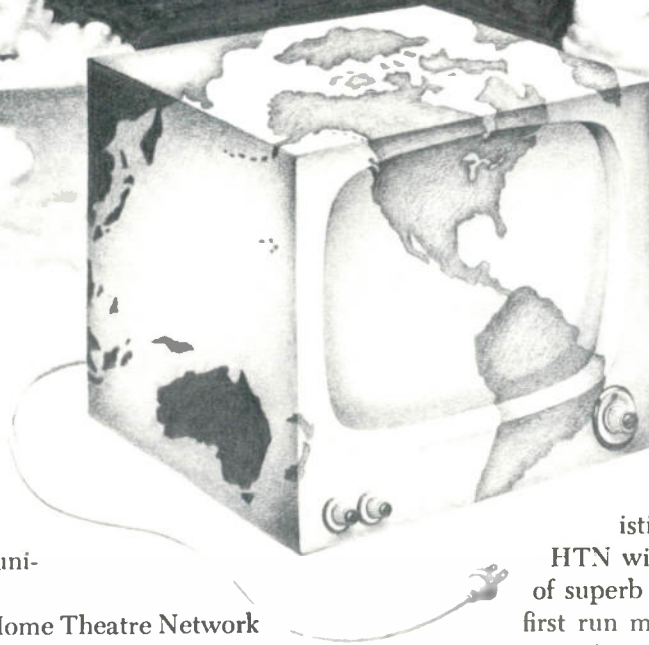
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We've even made *paying* for Pay TV easy. HTN computers automatically record charges the instant a customer orders his entertainment. Subscribers will be billed by mail, and can elect to pay through several major credit cards. Program producers will know within hours exactly how many people watched any given show.

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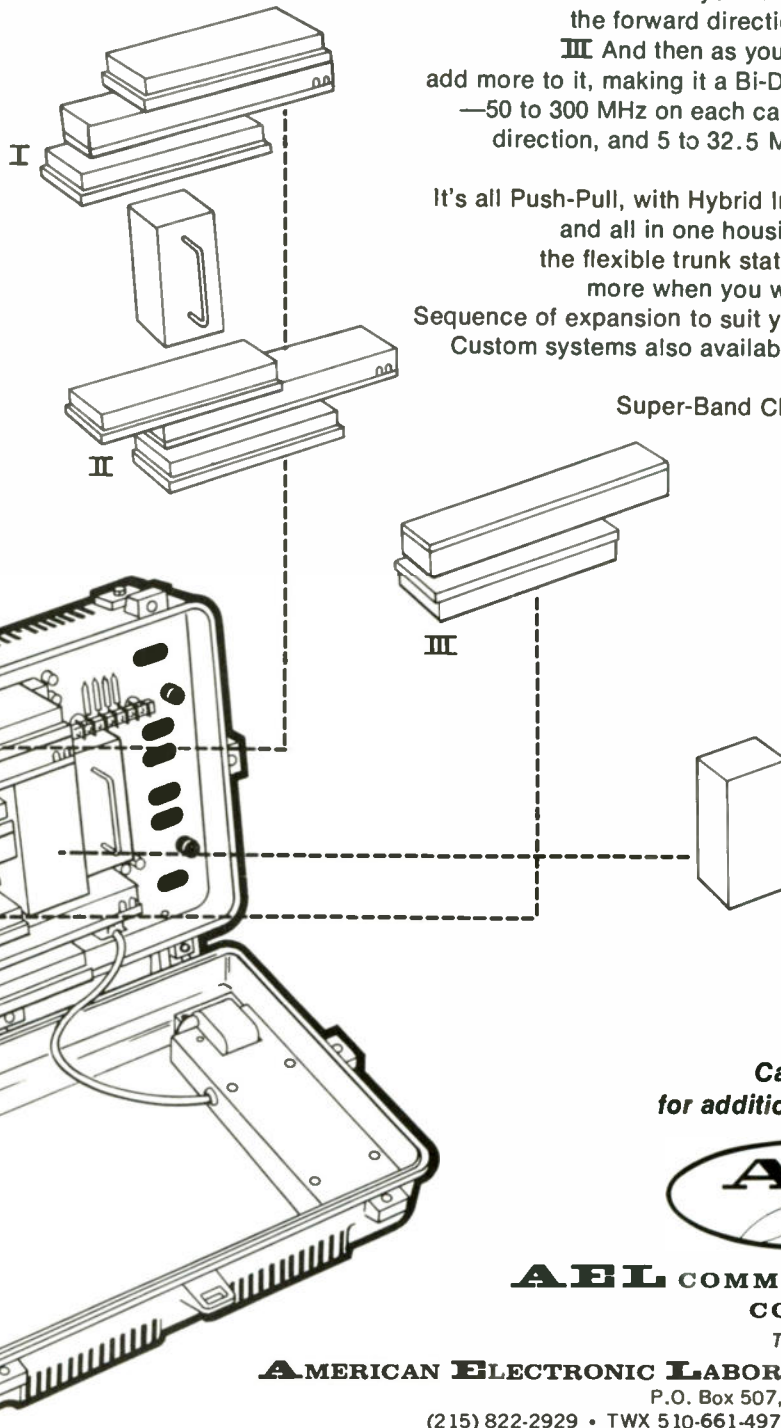
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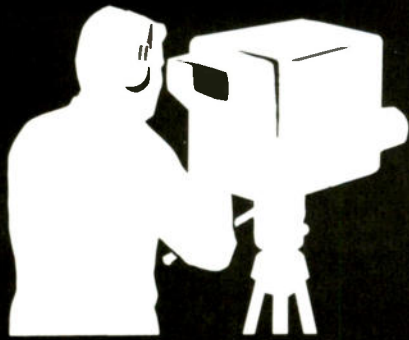
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# STUDIO

## Technology

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## OPINION

FROM THE INDUSTRY

# The Tape Decks of Babel — A Problem of Compatibility



Wally Briscoe

*By Wally Briscoe  
Senior Vice President  
National Cable Television Association*

In the early fifties some of the adventurous souls responsible for creation of community antenna television sought to emphasize the community nature of their service by initiating local program service on channels otherwise unused. They encountered a series of frustrations and after spending a lot of time and money most abandoned the effort.

In the first place, the equipment available for local program origination on community antenna systems was either broadcast equipment which was entirely too expensive or closed-circuit equipment, which at that time was considerably less reliable than it is today. In addition, even the closed-circuit equipment was expensive. Of course that was

before video tape recorders (even for broadcast television) so everything had to be done live. That required a level of expertise in production that was not yet a standard talent of CATV system personnel — something that has not changed much over the years.

Other reasons stated by the early pioneers in cablecasting for giving up included exasperation over lack of community interest in what they were doing. But, interestingly, there were many reasons for this — not the least of which was the practice by television dealers of aligning only those channels on the receiver which they knew would be used for over-the-air reception. This accounted for some very poor reception and hence very little

viewer interest in local programs. Early set design did not always assure that locally originated pictures would lock in. And the studio equipment in use usually did not include enough technical monitoring equipment to assure the best possible picture.

System owners and managers were typically the people directly involved in operation of the early cablecasting facilities and the time spent on program preparation and production was time taken from their normal efforts to increase their saturation, plan and design system extensions, oversee maintenance of the system and the countless other things involved in CATV system management.

All these things combined to persuade most of the early cable-



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casters that it really wasn't worth the effort. They saw the need and the potential but the time was not quite right.

Then in about 1960 the CATV industry became involved in a new battle. The Clarksburg and Fairmont, West Virginia, systems were sued by United Artists for copyright infringement based on their reception of broadcast signals containing motion pictures, the rights to which were owned by United Artists. This suit, which was to become a landmark case in copyright, produced some very quick reaction.

First, the CATV industry recognized this suit as a fundamental challenge to its right to serve the public with better reception and more pictures from broadcast television stations. It was then decided that the best defense in the suit was the completely realistic position that a community antenna television system is simply a master antenna providing for an entire community at a small fee what any individual householder could provide for himself but at great cost. The issue was joined essentially on that basis alone. The industry was counselled strongly to avoid anything that might interfere with the master antenna defense in the *United Artists v. Fortnightly* case.

Notwithstanding this advice, in the years following 1960 the weather channel became a standard service of many CATV systems. In addition to using the weather channel for its designed purpose, several innovative people discovered the cameras could be turned around and used to do other things. Some did live programs. Some showed movies picked up with the camera from a projection screen. A few others began buying the cameras then available to do simple studio productions.

In 1965 the news channel was introduced, followed a couple of years later by the stock service.

In preparation for the 1965 convention, I recommended to the Executive Committee inclusion of convention sessions covering program origination on cable systems, and narrowly escaped being thrown bodily from the 8th

floor of the Madison Hotel. Obviously the time was not quite right.

Then a succession of things happened. The Federal Communications Commission sent to the Commerce Committees of the House and Senate a Bill designed to regulate community antenna television, containing an outright prohibition against origination of any kind on CATV.

This was appalling.

Simultaneously, a copyright bill was presented to the Judiciary Committees of the House and Senate, including, for the first time, a section dealing with copyright for CATV systems. Included in Section 111 of that early copyright bill, was a very sharp limitation on what CATV systems should be allowed to originate in the way of local programs and information.

CATV, under the proposal in the copyright bill, would be limited to those things which broadcast stations had found over the years to be totally uninteresting — hence unsaleable — programming. So now, in addition to the problems introduced by the motion picture industry with respect to copyright, for the first time the cards were really on the table in two bills containing sections to protect the programming areas profitable to broadcasting. Naturally, we opposed these sections of the regulatory and copyright bill as well as most of the other protectionist provisions.

## Complex Copyright Case

During all these years the *United Artists* case had been proceeding slowly and had by now been joined by a second suit, more specifically setting forth the separate issues — *CBS v. TelePrompTer*. For the first time, the *CBS* suit specifically singled out as a type of operation raising questions about liability, the program originating CATV system. Both suits had broad industry support from program producers and distributors.

In the late Spring of 1966, the NCTA Board was in session near Chicago when it learned of the

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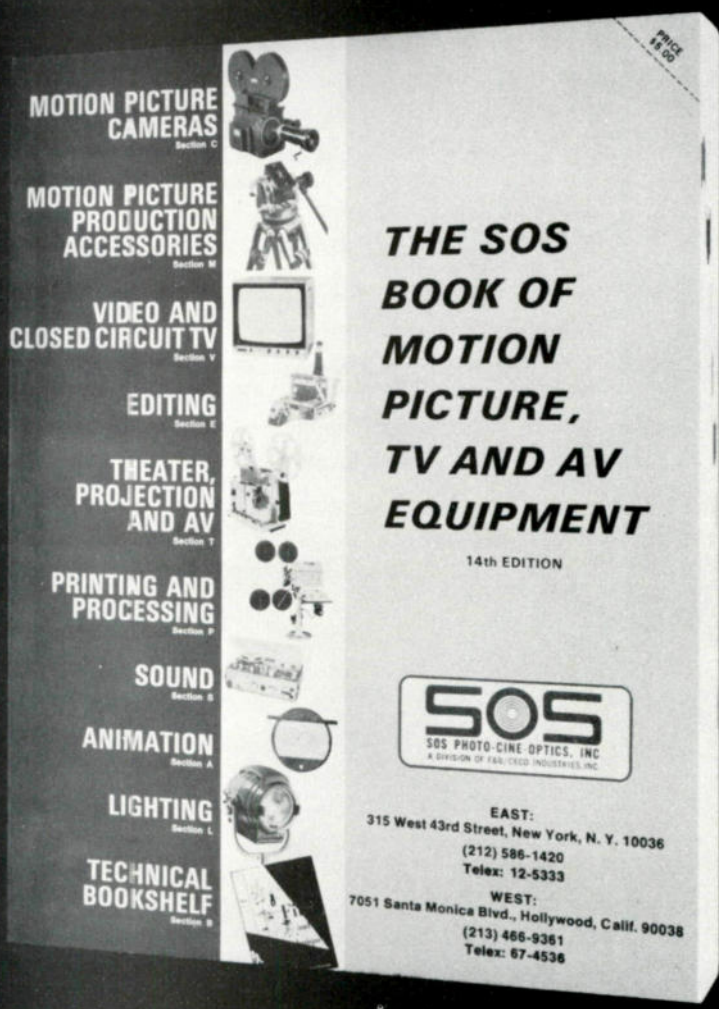
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loss in the Southern District Court of New York of the United Artists v. Fortnightly case. This not only threatened the Clarksburg and Fairmont systems, but had great significance for the entire industry.

### From Where?

Now, where would the programming come from to sustain the CATV systems in existence? I dusted off my 1965 recommendation for inclusion of program origination material in the convention and re-introduced it for the 1966 convention scheduled for Miami in July. The Board unanimously approved it this time, and Frederick W. Ford, then President of NCTA, adapted the recommendation for his major address at the Miami convention.

By that time, video tape recorders were available in a price range that sounded attractive for CATV. Some were known to be in use; and we began studying their capabilities. The equipment was developed primarily for instructional use in schools, but seemed to adapt reasonably to distribution on CATV systems. Then we discovered, for the first time, the extent of the compatibility problem between helical-scan videotape recorders. In addition to a relatively low level of reliability, the inability to exchange programs, even between recorders of the same make, was a frustrating discovery — not destined to improve significantly for several years.

In 1966 we identified nearly twenty different models of helical-scan recorders currently being offered to the educational and CATV markets.

### Too Many Kinds

Recognizing the problem and being able to cope with it proved to be poles apart. Each manufacturer had large sums devoted to R&D in development of their transport system. None was about to pay a royalty to another for use of a transport system until theirs was amortized — if then.

And new systems were coming into the market at an alarming rate.

The development compares interestingly to the dictaphone market, in which compatibility seems to be contra-indicated, since one of the apparent goals of that industry is to use hardware to sell software. The polaroid camera is another good example.

But in video tape recorders, in the hands of people producing programs that should be interchangeable with other systems and other schools, the basis for concern is much broader.

### Standard Needed

Obviously a standard was needed.

But setting a standard is a terribly complex undertaking.

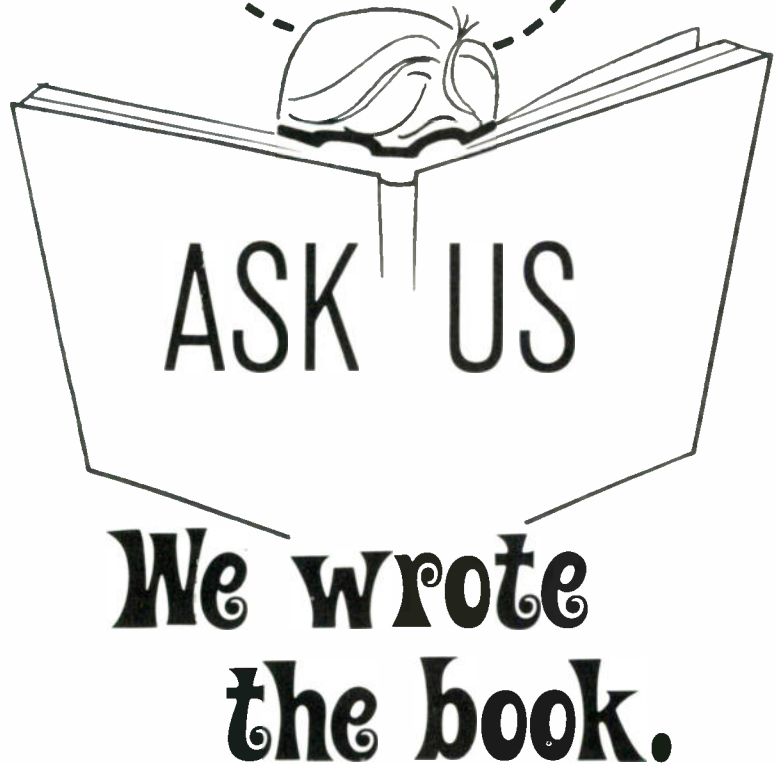
After encountering the basic reluctance of the engineering fraternity to lock in a standard during the developmental phase of a generation of equipment, the next hurdle was the anti-trust laws. If one piece of equipment were to be selected as the standard, every other manufacturer of similar equipment could logically be expected to file a suit charging restraint of trade.

Trade associations are as vulnerable to this sort of challenge as are businesses. Hence, our standards committee at NCTA was unable to take firm action. And the manufacturing industry was unwilling to. The standard-making organizations — EIA, IEEE and SMPTE — have not yet been helpful, although they are watching with interest.

In 1967, an effort was made to have VTR equipment installed in Congress for the use of congressmen and senators that would enable them to make programs for distribution to cable systems. It was hoped that the availability of tapes made on a specific machine, would encourage the informal standardization by the system operators on a particular model. We didn't care which one was selected, preferring to leave that choice to the operators of the recording studio facilities on Capitol Hill. However, they were

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not persuaded that there was a real need for the additional equipment, particularly since it would inevitably involve a need for additional space and personnel to operate it. So that effort was unsuccessful.

## More and More

In the ensuing years there has been a greater proliferation of models and even tape sizes. The next entry was the one-half inch video tape recorder. As the result of recognition in Japan of the compatibility problem and the desirability of a universally used format, there evolved the first video tape standard — EIAJ-1 — a standard for one-half inch monochrome video tape recorders.

That still is the only standard. It is the only reference available for those who seek equipment that will produce tapes that may be interchangeable. An additional standard is under consideration for half-inch color, but has not been announced.

But all one-half inch VTR's are not built to the EIAJ-1 standard.

More recently there has been great interest in the development of a new tape size — 3/4-inch — which seems to promise greater stability as well as greatly simplified operation as a result of enclosing it in a cassette. The ease of handling is impressive.

The first announcement of this approach came from Japan and indicated a preliminary agreement among manufacturers in Japan to produce compatible systems. From the outset, it appeared that the hope for compatibility in 3/4-inch equipment was real since no one else had yet entered the field. This hope was short lived. Even before the first 3/4-inch machines were demonstrated, RCA announced its intention to introduce a 3/4-inch system that would not be compatible with others.

There ensued a succession of announcements by various American companies expressing interest in or commitment to the RCA system. As observers, we have speculated that this could be a domestic effort to thwart foreign competition and stem the flow of electronic technology from the far east in competition with American products. On the other hand, it could simply be the result of a completely independent R&D program that happened to coincide with the Japanese announcement.

Whatever the origin, it produced another frustration for those of us who devoutly seek a standard for program exchange in CATV and educational circles.

We cannot quarrel with the record. Competition continues to produce better products. But we certainly chafe at the inability to channel the competition within the confines of a single interchangeable helical-scan format.

## Company Standards

Within the CATV industry, some MSOs have adopted company-wide standards — purchasing identical equipment to be used in exchanging programs among their systems. Even this


effort is frustrated by the counter-effects of mergers and acquisitions. Newly acquired systems may or may not be equipped with the same compatible video tape recorders.

Apparently no one in a position to create and implement a standard for the CATV industry is yet convinced that the available equipment is good enough to stop and say, "this is it." But, while we wait, millions of dollars have been spent transferring programs to tape formats that may never be used. Some of this has been done by people who should have known better because they were alerted to the problem. But they did it.

## Film Chains

During all of these years, we at NCTA have been counselling use of 16 mm. film chains as the only truly compatible piece of equipment for program exchange. Surprisingly, fewer systems have film chains than VTR's. The reason may be the fascination of the recording and instantaneous playback capabilities of VTR's compared to the pedestrian but reliable performance of the old workhorse, the film chain. We still urge the inclusion of a film chain in every local origination package.

Even that is more complicated than it should be — with several formats available in motion pictures. Eight millimeter film has always been available to the hobbyist and to some serious users. The recent popularization of the Super 8 format has injected another potential problem in program interchange. But the cost of film chains suitable for CATV is not prohibitive. In addition, the investment is probably more durable than any that could be made today in video tape equipment. At least 16 mm and Super 8 projection equipment are respectively compatible.

At some point, someone, in CATV, in government, or in one of the standard-making groups, will say "enough — let's stop here." If this industry is serious about developing program exchange capabilities, the time is here to take action. 



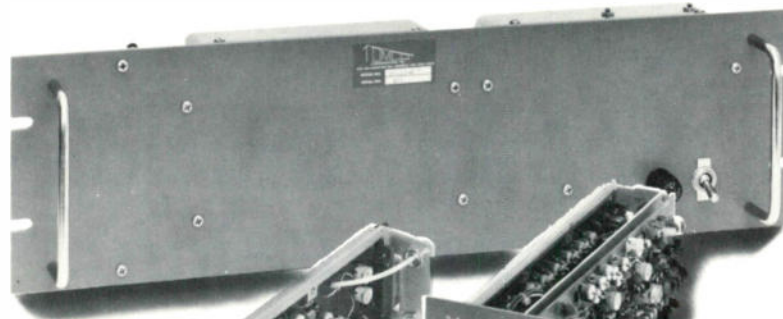
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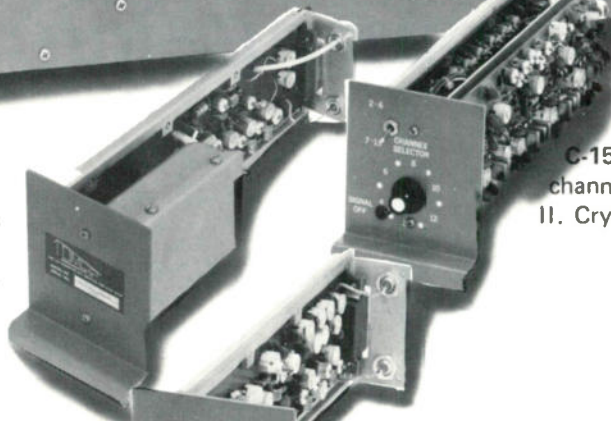
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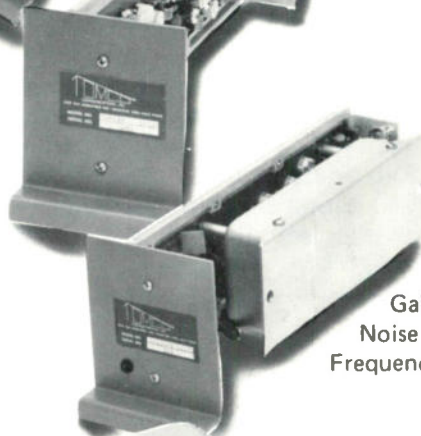
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# The Color TV Cable Studio — Planning and Construction

Continuing his series on the low-cost color studio, Oliver Berliner discusses the planning and construction of the studio. Special attention is given to the setup of a well-designed patchbay.

By Oliver Berliner  
Telaudio Centre

**E**laborate teleproduction plants may call for the services of an architect or building designer, but whether or not you intend to make use of these specialized skills, the advice of an acoustical

consultant may be the most worthwhile investment you can make.

Recording studios present the most serious acoustic problems — very high sound levels that must

not penetrate into adjacent studios, so-called *standing waves* of sound, street and other noises that must not be permitted to enter, air conditioning rumble and “whoosh,” RF interference from radio stations, power lines and lighting fixtures, plus the need for decorative interior design.



Figure 1: A monitor which selects up to 3 surveillance cameras covering the soundstage as an aid to the director and switcher operator. Photo courtesy of Panasonic.

## Consideration Lessened

These considerations are lessened in the case of soundstages. Here we are working mostly with voice rather than music — although we must be very careful of other noises of all kinds since the voice is not intense enough to drown out radiation interference, street noises and air conditioning sounds.

More powerful air conditioning will be required in the color cable-casting studio because of the considerable heat from the lights and the occasionally large number of people that may be on stage, to say nothing of the considerable audio and video equipment in use. Soundstages normally do not

Figure 2A: Patchbay dedication for Master Control

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- CVDA—Composite-Video Distribution Amplifier
- PDA—Pulse Distribution Amplifier
- M—"Mult" Bridging Output
- B—Bridging Input

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STU-A MON-2	STUDIO-A OUT	STUDIO-B NON-SYNC IN 1	CONTROL ROOM-B IN-1	CAMERA NO 1
STU-A MON-3	STUDIO-A OUT	STUDIO-A NON-SYNC IN 2	CONTROL ROOM-A IN-2	CAMERA NO 2
STU-A MON-4	STUDIO-B OUT	STUDIO-B NON-SYNC IN 2	CONTROL ROOM-B IN-2	CAMERA NO 2
STU-A MON-5	STUDIO-B OUT	STUDIO-A NON-SYNC IN 3	CONTROL ROOM-A IN-3	CAMERA NO 3
STU-A MON-6	STUDIO-B OUT	STUDIO-B NON-SYNC IN 3	CONTROL ROOM-B IN-3	CAMERA NO 3
SPARE	MIXED SYNC	STUDIO-A NON-SYNC IN 4	CONTROL ROOM-A IN-4	CAMERA NO 4
SPARE	MIXED SYNC	STUDIO-B NON-SYNC IN 4	CONTROL ROOM-B IN-4	CAMERA NO 4
STU-B MON-1	MXD BLNK'G	STUDIO-A NON-SYNC IN 5	CONTROL ROOM-A IN-5	FILM CAM 1
STU-B MON-2	BURST FLAG	STUDIO-B NON-SYNC IN 5	CONTROL ROOM-B IN-5	FILM CAM 1
STU-B MON-3	BLACK BURST	TITLES GEN. OUT	VTR CVDA-1 IN	FILM CAM 2
STU-B MON-4	COLOR BURST	TITLES GEN. OUT	VTR CVDA-2 IN	FILM CAM 2
STU-B MON-5	MULTIBURST	IMAGE ENHANCER IN	VTR-1 PROC OUT	VTR CVDA-1 OUTPUT
STU-B MON-6	MULTIBURST	IMAGE ENHANCER OUT	VTR-2 PROC OUT	VTR CVDA-1 OUTPUT
CAM-1 OUT	STAIRCASE	STUDIO-A PREVIEW OUT	VTR-3 PROC OUT	VTR CVDA-2 OUTPUT
CAM-1 OUT	STAIRCASE	STUDIO-B PREVIEW OUT	VTR-4 PROC OUT	VTR CVDA-2 OUTPUT
CAM-2 OUT	UTILITY WFM & PCM	DRESSING ROOMS	MAINTENANCE-1	TC/VTR-1
CAM-2 OUT	UTIL. COLOR MON. & V-SCOPE	STUDIO-A AUDIENCE MON.	MAINTENANCE-2	TC/VTR-2
CAM-3 OUT	COLOR MON. A	PROCAMP (UTILITY) IN	DEMODULATOR	TC/VTR-3
CAM-3 OUT	COLOR MON.	PROCAMP OUT	DEMODULATOR	BUILDING MODULATOR
CAM-4 OUT	NETWORK OR MICROWAVE	PROCAMP OUT	CHIEF ENGR.	HORIZONTAL DRIVE
CAM-4 OUT	STRAP-4	CATV HEADEND IN	GEN'L MGR.	VERTICAL DRIVE
CAM-5 OUT	STRAP-4	CAMERA-1 VIEWFINDER IN	CLIENT'S BOOTH	GENLOCK IN
CAM-5 OUT	STRAP-4	CAMERA-2 VIEWFINDER IN	STRAP-2	STRAP-1
CAM-6 OUT	STRAP-4	CAMERA-3 VIEWFINDER IN	STRAP-2	STRAP-1
CAM-6 OUT	STRAP-4	CAMERA-4 VIEWFINDER IN	STRAP-2	STRAP-1



Figure 2B: TeleCine/ Video Tape Recording Patchbay Dedication		NT M NT M NT M MT M T T T T T T T T T T T T S S S S																																				
		101				104				107				110				113				116				119				122				125				
ROW 1	VTR-1 OUT	VTR-1 MULT	VTR-2 OUT	VTR-2 MULT	VTR-3 OUT	VTR-3 MULT	VTR-4 OUT	VTR-4 MULT	PROC/DOC-1 OUT	PROC/DOC-2 OUT	PROC/DOC-3 OUT	PROC/DOC-4 OUT	FILM-1 OUT	FILM-2 OUT	STUDIO-A OUT	STUDIO-A OUT	STUDIO-A OUT	STUDIO-B OUT	STUDIO-B OUT	STUDIO-B OUT	CVDA-2 UTILITY OUT	CVDA-2 UTILITY OUT	STRAP-1	STRAP-1	STRAP-1	STRAP-1												
	PROC/DOC-1 IN	VTR-1 IN	PROC/DOC-2 IN	VTR-2 IN	PROC/DOC-3 IN	VTR-3 IN	PROC/DOC-4 IN	VTR-4 IN	STAIRCASE	MULTIBURST NETWORK OR MICROWAVE	DEMODULATOR	MASTER CONTROL 1	MASTER CONTROL 2	MASTER CONTROL 3	MAINTENANCE 3	STUDIO-A MULT	STUDIO-B MULT	MIXED SYNC	TITLES GEN	UTILITY CVDA-1 OUT	UTILITY CVDA-1 OUT	STRAP-2	STRAP-2	STRAP-2	STRAP-2													
	STAIRCASE	MULTIBURST	BLACKBURST	COLOR BURST	BURST FLAG	MIXED SYNC	BLANKING	HORIZ. DRIVE	VERT. DRIVE	MASTER CONT.—1	MASTER CONT.—2	WFM & PCM	COLOR MON. & VECTORSCOPE	STUDIO-A OUT	STUDIO-B OUT	CAMERA-1	CAMERA-2	CAMERA-3	CAMERA-4	FILM-1	FILM-2	TC/VTR-3	DEMODULATOR NETWORK OR MICROWAVE	TITLES	SPARE													
	1	4	7	10	13	16	19	22	25																													
	Figure 2C: Maintenance Dept. Patchbay Dedication		T T T T T T T T T F F I I T T T T T T F T T T X																																			
			1				4				7				10				13				16				19				22				25			

devote any attention to decorative walls because they will be covered with drapes and backdrops and settings for the scenes to be cablecast.

### Expert Helpful

An acoustics expert can detail the construction procedures and materials required to give you the needed soundproofing in only a few hours. This may include construction of walls and ceiling so that no opposite surfaces are parallel. Furthermore, he will more than likely design a "room within a room" with the interior walls completely separate from the exterior walls — an extremely efficient method for sound isolation. He will also specify the methods and special parts required to minimize air conditioner motor noise and the sound of swirling air.

One of the methods of reducing the cost of soundproofing is the elimination of windows between the studio and the control room.

In active cablecasting studios, the windows would normally become useless because of the sets, drapes, personnel, props and equipment which find their way to this location.

Several manufacturers have introduced ultra-compact closed circuit television surveillance systems of extremely low cost, made possible because up to three cameras may be powered from a single source, and a monitor and camera-switching facility is incorporated into one compact cabinet. Not only do these systems cost less than soundproofed windows, but they overcome the problem that occurs when the windows are rendered useless anyway.

### No Fluorescent

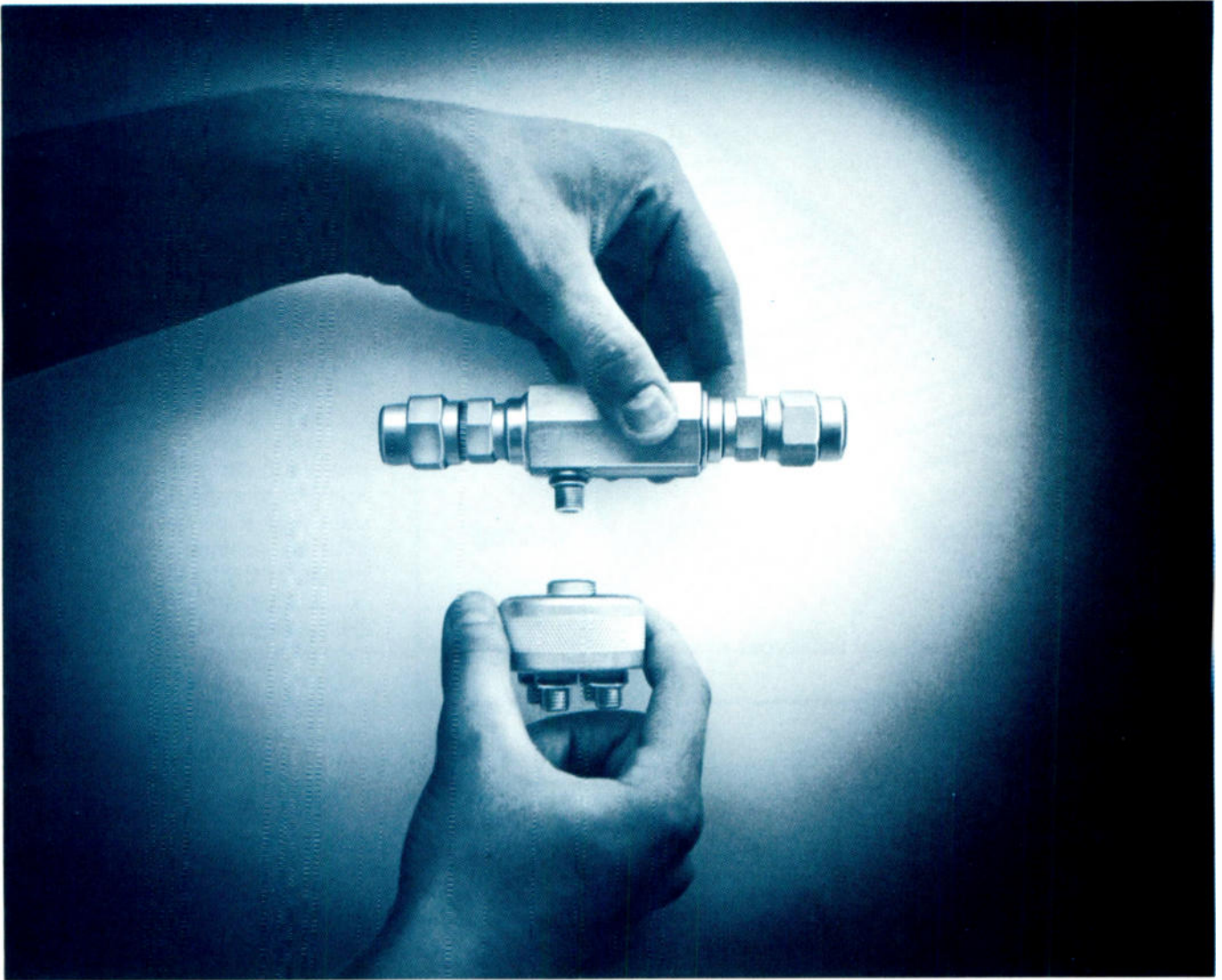
In television's early days fluorescent lights were a common occurrence in studios because of their efficiency, minimal heat radiation and "even" light distribution. Today they should be used only as efficient work lights.

So-called down lights, imbedded in the ceiling or suspended from it, should be used in the control room. They should be controlled by an inexpensive dimmer and should be augmented by ample work lights for when the control room equipment is in need of inspection or maintenance.

### Visitor's' Window

A window placed between the control room and the hallway is highly recommended. Visitors may then watch the always interesting control room activity without entering the room (you could use curtains or venetian blinds to prevent this when desired) and staff members in search of someone could see whether or not that person is in the control room without having to enter and disturb its occupants.

In an elaborate plant desiring the utmost in versatility and flexibility at the lowest possible cost, all important areas should be interconnected via appropriate



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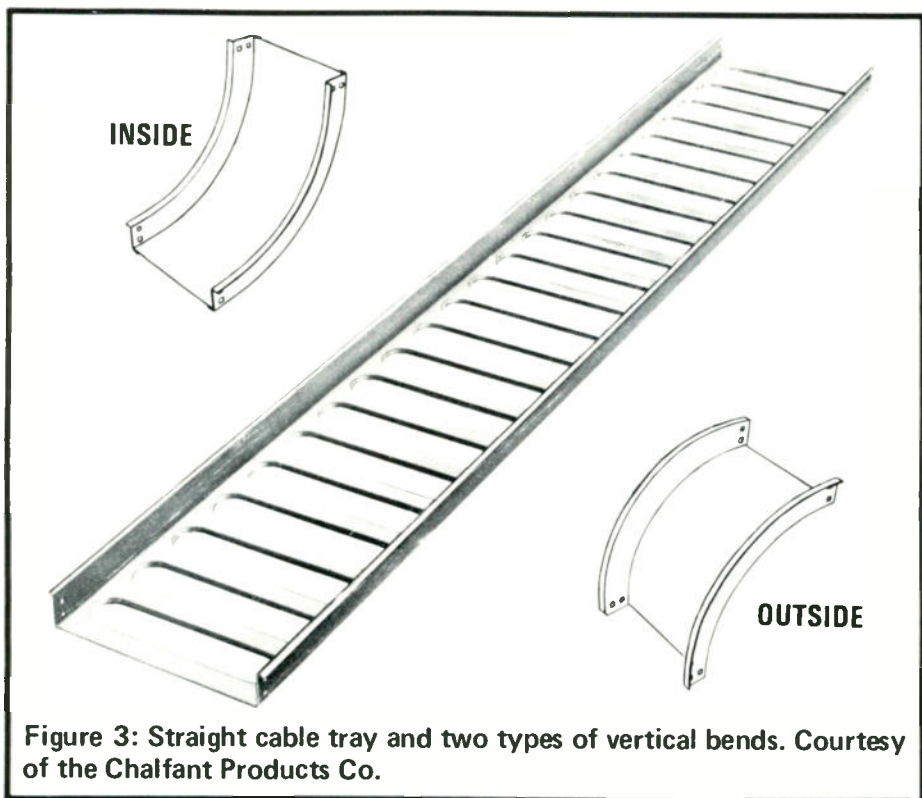


Figure 3: Straight cable tray and two types of vertical bends. Courtesy of the Chalfant Products Co.

patchbays, both audio and video. These would include at least two or three "open loops" from location to location — such as Master Control to each studio Control Room, Master Control to Telecine/VTR, Master Control to Maintenance, and Telecine/VTR to Maintenance. These lines ter-

minate in jacks so that "information" may be sent in either direction. The ultimate convenience and "fail-safe" aspects of these provisions more than justify their relatively modest cost.

Figure 2 details an extensive patchbay intended originally for use in the sophisticated two studio setup described in an earlier chapter (*TV Communications*, July, 1972). As has been pointed out before, the physical placement of video jacks is far more critical than is the case with audio jacks. This results from "looping and loading" conditions inherent to video which require certain jacks to be adjacent (usually vertically).

Careful study of the patchbays will reveal that concerted attention has been given to obtaining a logical, efficient and functional placement of all video jacks. The bays shown here make use of specially designed video jacks, not found (nor necessary) in audio. The many multiple outputs used for certain circuits are necessary to feed some of the outputs to various points simultaneously. Various jack numbers are shown for convenience in locating them on a video block diagram.

It is customary in cablecasting studios to minimize construction

costs by running cables overhead and more or less exposed, as opposed to the concealed wiring common in radio stations and recording studios. Entry to the equipment racks is made at the top, rather than through conduit or ducting installed at the base of the racks. While video cable runs are not very attractive, their utility and cost savings should be a prime consideration.

Multiconductor camera cables, control wires, video lines, audio lines, and in certain instances, lighting cables, may be supported by *cable strays* which are suspended from the walls or ceiling. Special sections for all sorts of sizes and styles of trays are available to provide sharp or gentle bends in the cable being supported, inside or outside slopes... *everything* necessary to direct the cables properly with a minimum of strain plus the all-important accessibility and the ability to remove or add wires easily. Figure 3 depicts these cable-carrying units.

While video cables generally carry about equal voltages, this is not the case with audio. Care should be taken to keep microphone cables (usually at -56 dB level) away from program lines which are at +4 or +8 dB. Failure to do so could mean pickup of program material in the microphone lines. Of course, *everything* should be kept away from AC power cables and lighting wiring. Separate entrances to the racks for each type of "service" should be provided.

There is a great danger of leakage and interference when wires parallel each other for any appreciable distance. While your AC power to the racks will probably have to be encased in approved conduit, it is sometimes possible to run wiring to your stage set lights without having to use conduit. Usually, the way to do so is to have all such wires utilize plugs at the "cold" end and use cable that is rubber-covered and not fastened anywhere... so that it is legally "portable" according to the electrical code definition. Your cable trays help make this possible, and the cost saving is fantastic.

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# The Cable May Just Tie This Country Together Yet

"Bring us together" was a popular slogan in the last Presidential election. In their own way, many cable operators are doing just that. How? By joining with others in the networking of programming material.

By Peter M. Shapiro, Ph.D.  
Stanford University

When CATV people hear the word *cablecasting*, most quite rightly think *local service*. But another side of cablecasting, the formation of cablecast networks, also deserves attention. In fact, cablecast networks may someday provide the largest portion of CATV revenue and be the service that classifies CATV as a truly new medium.

## Three Variations

The CATV future may hold at least three distinct networking variations. One is the network operated by the cable MSO, which produces or acquires, and then distributes programming to owned and non-owned systems. Another is the independent network that leases CATV channels and distributes such general-interest software as movies and sports. And a third variation is the independent network that leases channels, but distributes special-interest programming that appeals to members of ethnic, political, or other minorities. Other kinds of networks are clearly possible, but

these three are the most likely types.

To help project future network patterns, we examined current interchange of cablecast programming. Last Fall we surveyed CATV program directors and during the year we held interviews and correspondence with MSO and software spokesmen. We were interested in the kind of programming that is interchanged, in the sources of programming, in the method of transferring the cablecasts from source to CATV outlet, and in the way the software is paid for.

## 950 Hours Per Week

In Fall 1971, according to the survey, there were about 950 hours per week of non-locally produced cablecasts exhibited on some 116 CATV systems. There were 206 software supply arrangements, which we call linkages, between program suppliers and CATV systems. Those program suppliers who were involved in more linkages with CATV systems generally also distributed more

hours per week of programming. This was not true, however, in comparing suppliers of free films with those of old feature movies — feature movie suppliers distributed many more hours of software through many fewer linkages than free film sources. Taken together, suppliers of free films and of feature movies dominated both in linkages and in hours per week of interchanged cablecasting.

## Free Film Suppliers

The major free film supplier is Modern Talking Picture Service (New York). Eugene Dodge of Modern said that by March 1972, Modern's seven libraries around the country were supplying 300 CATV systems with their product. Modern gets \$7.50 per CATV system play from the sponsors of the films as compared to \$20 per broadcast station play. CATV operators pay return postage.

Typical of free films are United Air Lines' 28-minute ski film on the Colorado ski areas and 28-minute film on Hawaii; Hershey Food's 27-minute film on the his-



tory and manufacture of chocolate; and the American Medical Association's 28-minute film on careers in medicine and allied fields.

Other active suppliers of free films to CATV are the Canadian Travel Film Library (the San Francisco office distributes to 25-30 systems in the West), Association-Sterling (New York), HEW-Social Security, the Army, the Navy, and various religious organizations.

## Feature Movies on Cable

One of the prominent suppliers of feature movies and old TV shows is Cable Network Television, a subsidiary of National Telefilm Associates (Los Angeles). Arnold Moser of CNT said the company was offering to CATV some 2000 domestic features produced between 1933-1968, but for exhibition only where they were not already under license to a broadcast station with Grade A coverage over the CATV community. CNT's prices vary with the size of the order: a recent price sheet shows that 26 features, one per week each exhibited six times, would cost \$2800 (\$18/exhibition), while 260 features, 10 per week each shown six times, would cost \$15,600 (\$10/exhibition).

Modern Media Services, a subsidiary of Modern Talking Pictures, also varies its prices depending on the size of the buy. For two plays of one of its 1940s-1950s features, MMS asks between \$35-\$50. Eugene Dodge said 11 CATV systems were exhibiting the MMS software.

Another movie and TV shows supplier, Official Films (New York), distributes its pre-1965 monochrome features to about 35 CATV systems, according to Official's Bob Marcella. Marcella said rates were based on evaluation of the system's market — for example, large market systems would pay as much as \$33/episode for 114 episodes of Peter Gunn, while smaller market systems might pay only \$17/episode.

At least 42 CATV systems are represented in New York by

TeleMation Program Services, a buying service that contacts features distributors to determine which films are available to a cable television system in a given market, decides on the programming that meets the system's needs, and negotiates the price for the software package. For this, TPS receives a flat fee from its client CATV systems. It is the opinion of Bob Weisberg, president of TPS, that the future of cablecast networking will be determined by the major film companies such as NTA, MGM, and Warner Bros.

## System-to-System

Many program directors who responded to the survey shared the sentiment that "it is beneficial to work together to provide more varied and interesting programming." But program exchanges between CATV systems are surprisingly rare. Most occur between commonly owned systems; for example, interchange is found between systems owned by Communications Properties Inc. in Ohio, between American Television & Communications systems in Orlando and Melbourne (both Fla.) and Beloit (Wisc.), between Cablecom-General systems in Modesto and Santa Rosa (both Calif.) and Colorado Springs (Colo.).

## Third Party Organizations

Program sharing between variously owned CATV systems tends to be organized by "third-party" organizations. For example, in New England, Bill Kenny of the Northeast Cable Television Association organizes interchange and distribution of cablecasts among 17 participating systems. A more temporary but more extensive sharing network was organized for the California Democratic primary by the California Cable Television Association and NCTA — 32 systems serving 500,000+ subscribers participated. (The NCTA also has been active in organizing political cablecasting cooperative ventures — see CATV Magazine, October 25, 1972.)

Also still quite rare is MSO acquisition or production, and subsequent distribution, of cablecasts. Examples of current efforts include networks organized by TelePrompter and Tele-Communications Inc.

## MSO-to-System

TelePrompter distributed its coverage of the March 1972 National Black Political Convention in Gary, Indiana and has tested its ability to schedule a nationwide videotaped cablecast: John Barrington of TPT said a tuberculosis association program was sent to 20 regional offices, where it was dubbed to produce enough copies for all 73 TPT cablecaster systems — the program was then played, one evening at 7:30 p.m., on all 73 systems.

Tele-Communications Inc. microwaved its coverage of the February 1972 Montana Constitutional Convention to 28 CATV systems and sent videotape copies to systems not interconnected by TCI microwave. TCI has also been involved in the Daniels & Associates microwaved cablecasts of Utah Stars basketball matches and other events.

## Barter and Sports

Barter program distribution has increased since the survey was completed. Since that time, hundreds of systems have played programs distributed by Videomation (New York), Perceptive Program Service (Chicago), Tandar Four (New York), and Time-Life Books (New York). The barter shows tend to be of the "how-to" variety or to involve interviews with guests. Common topics are cooking, movies, and books. Pre-inserted sponsorship pays for the programming, thus permitting "free" usage by CATV systems (apart from shipping costs).

The most sophisticated cablecast distribution from a technological standpoint has involved sports events.

Events promoted by Daniels & Associates (Denver) have been cablecast to CATV systems



throughout the Rocky Mountain states over Western Tele-Communications Inc. (WCTI) microwave. The March 1972 network cablecast to 24 systems on the Denver microwave chain included several boxing matches promoted by D & A, a tape of a Muhammad Ali boxing match the rights for which TCI had acquired, and Perceptive Program Service's NOW EXPLOSION, for a total of 5.5 hours of programming. For this, CATV operators paid Daniels \$0.04/subscriber.

## Garden Sports

Another distributor of sports cablecasts is Madison Square Garden (New York). MSG's major league hockey and basketball events are transmitted to the two Manhattan CATV systems, to several Long Island systems plus some others in New York State, and to five New Jersey systems. MSG delivers the television signal to the roof of the Garden, and CATV operators hire facilities to transmit it to their headends. Jack Price of MSG said the operators pay \$25,000/year or \$5/subscriber home, whichever is greater. MSG is considering expanding its cable coverage to other systems within a 50-75 mile radius of New York City. Price said the cablecasting of the events to the approximately 100,000 subscribers does not affect attendance at the Garden.

## Leased-Channel Network

We found but one instance of a leased-channel network: Community Medical Cablecasting (New York) leases channels on eight CATV systems and is planning expansion to five additional systems. CMC programming reaches some 1600 medical doctors who subscribe to these systems. On five of the CATV outlets, the software is transmitted on a midband channel with reception possible only through the use of decoder devices in the doctors' homes.

On the other systems, the CMC programs are transmitted on open, but normally unused, channels and are promoted only to doctors.

Arthur Cornfeld of CMC said three programs totalling one hour in duration are shown on each participating system each night, Sunday through Thursday, for two weeks, and then the tapes are changed. The software has been exhibited in a network of 600 hospitals prior to its CATV showing, and is supported by three minutes per hour of pharmaceutical advertising. CMC pays the systems about \$100/month, and covers the cost of converters, of their installation, and of the modulator needed by the cable system to transmit on the mid-band channel, and also sends doctors a TV guide every two weeks about coming programs.

## Pay-Cable

Pay-cable was big news at the 1972 NCTA Convention and many tests are now underway or about to start. Optical Systems (Los Angeles) is beginning to sell movies to Cox subscribers in San Diego and to subscribers of the large Vancouver, Canada system. TheatreVisioN (New York) is marketing movies and other programming to subscribers of the Storer system in Sarasota, Florida. Trans-World Communications (New York) has announced plans to test its system on 10 CATV outlets. Gridtronics (New York) plans to begin selling movies in Fall 1972 to subscribers of nine TeleVision Communications systems. And recent publicity has been given an arrangement whereby Home Theatre Network (Los Angeles) will sell its software to Cablecom-General subscribers.

All of these pay-cable ventures operate with one-way CATV systems. Interactive two-way systems that will prominently include pay-cable are still being debugged technologically (see *TV Communications*, June 1972).

## Networking Technology

Most programming that is produced specifically for cablecast exhibition is produced and distributed on videotape. The rest, except for the microwaved sports

cablecasts, is distributed on film.

Many program directors commented in the survey that videotape machine non-standardization was a major obstacle to interchange of programming. Some software suppliers also remarked on the difficulties produced by the existence of incompatible VTRs in different CATV systems. This problem is gradually being overcome as the profusion of brands diminishes in one-inch VTRs — several CATV companies have decided, for example, to make IVC color machines their standard in one-inch equipment. The Sony ¾" videocassette player has also made inroads among software suppliers and cable companies and shows signs of becoming a standard. (See Wally Biscoe's opinion on page 77, this issue)

The barriers to electronic distribution of cablecasts are also lowering. Microwave facilities owned by CATV operators, which can be used for cablecast transmission, are covering ever more territory. Regional interconnection of CATV systems is also increasingly feasible with the advent of the short-haul, multi-channel microwave systems. And the creation of domestic satellite facilities in the next few years will bring within reach national electronic distribution of cablecasts.

Thus technology for the interchange of cablecasting is changing from a limiting to an enabling factor.

## Relevant Regulations

In general, FCC rules favor the development of cablecast networks. The requirement that CATV systems originate programming will provide the basis for MSO-networks and for distribution of independent programming on the origination channels. MSOs will be able to use cablecast networking both to directly generate revenue and also to attract new subscribers in the major markets.

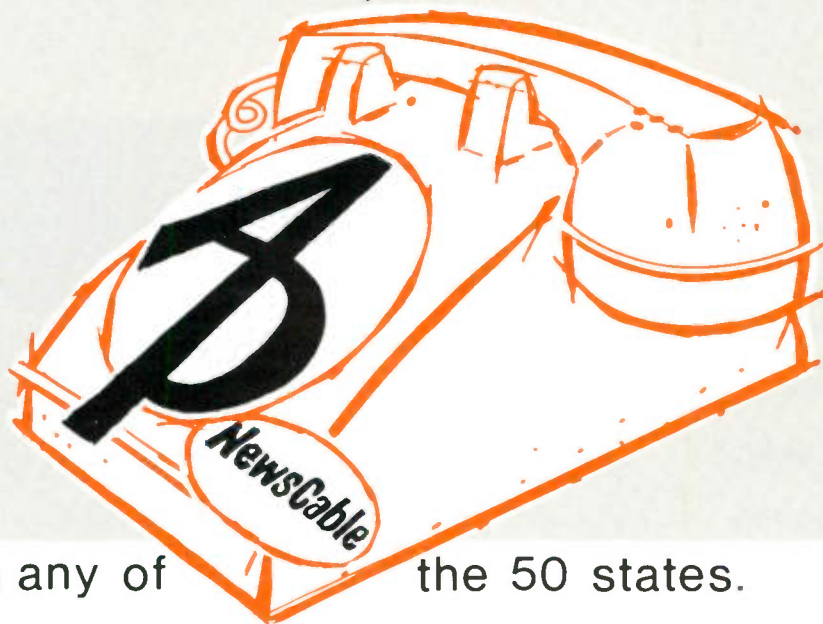
The channel leasing rules support the development of independent cablecast networks. Entrepreneurs would be encouraged to produce new cablecast software

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The logo for the National Cable Television Institute (NCTI). It features the letters 'ncti' in a stylized, lowercase, blue font. The 'n' and 'c' are connected, and the 't' and 'i' are also connected. The letters are bold and modern.

by the knowledge that they can gain access to the CATV outlets of their choice.

Rules permitting cablecast transmission in the microwave CAR-band will facilitate regional networking and the establishment of regional modules of systems for reception of cablecasts distributed by satellite. And the FCC's likely approval of CATV ownership of receive-only earth stations will make cablecast networking via satellite more economical.

## Exclusivity

On the other hand, the Commission's tough exclusivity protection for syndicated broadcast programming in the top 50 markets will discourage CATV penetration of these viewer-rich areas, despite newly gained rights to import distant signals. Also, restrictions on the cablecasting of sports events can only delay network development.

The Commission is indulgent regarding the prospect of CATV networks partly because of its historical mission to increase diversity in the marketplace of images and ideas, and partly because it is skeptical that cablecast networks are imminent. It is hard to foresee what the FCC will do once the cablecast networks are indeed functioning to increase diversity but are also drawing financial and programming resources from the hitherto protected broadcasting industry.

## Trends for the Future

Despite the currently primitive stage of cablecast interchange, some trends are apparent.

It is likely that the first cablecast networks of major scope will be operated by MSOs. This is evident in the resources that have been accumulated by some of the MSOs, in their present cablecast practices, and in their stated plans.

The large CATV operators are accumulating necessary CATV system coverage that will make networking feasible. The pace of mergers and concentration of system ownership has not slack-

ened and the largest CATV operations are also the fastest growing ones. The recent announcements on mergers between TVC and Cypress, and between Cox and ATC, attest to this.

Some of the MSOs also possess impressive software resources. TelePrompter has developed production capacity and owns Filmation, an established software producer. Tele-Communications Inc. owns National Telefilm Associates. TeleVision Communications is owned by Warner Communications, which also owns Warner Bros. Time-Life Cable is part of a large software concern. Viacom International is a combination CATV and television software company.

## Extensive Resources

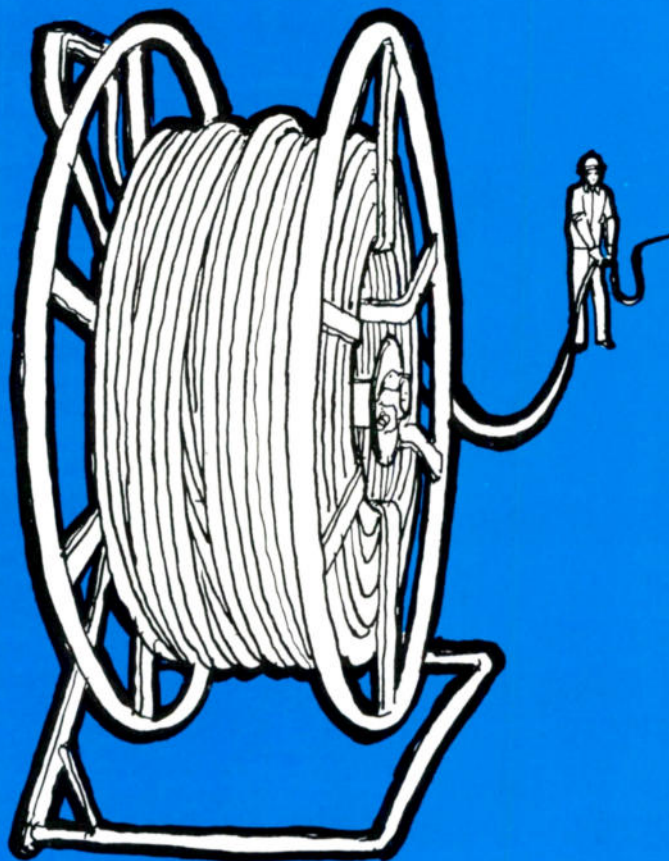
Transmission and technical resources are extensive in several MSOs: in TCI, with its 13,000 route miles of microwave and proposed domestic satellite system; in TelePrompter, with its Hughes Aircraft association, recent acquisition of an equipment manufacturing company, and proposal to construct receive-only earth stations; in Communications Properties Inc. with its Texas microwave facilities; and in LVO Cable Inc. with its midwest microwave holdings and proposal to build satellite earth stations.

Among the large MSOs, TelePrompter and TCI have been most explicit in their networking aims.

TelePrompter's plan to distribute programming to CATV systems by satellite, has been well publicized and TPT's creation of software capacity and experimentation with networking is consistent with the achievement of this plan. TelePrompter is equipping its systems with compatible videotape machines so that networking can begin even prior to the operation of domestic satellites. John Barrington of TPT commented that syndication of TPT software would produce clear profits after the programming had been amortized by exhibition on the company's many cablecasting systems.

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Similarly, TCI has advertised the coming of "interconnected network cablecasting on a regular basis." The company already has accumulated experience with microwaved cablecasting. Graham Moore said a studio was being constructed in corporate headquarters to produce programming for live distribution to CATV systems.

Another of the 12 largest MSOs, Time-Life Cable, also appears likely to establish a cablecast network. A Time-Life report to the FCC pointed out that satellite transmission "is critically important both as a means of delivering programs produced by others to Time-Life's CATV systems and as a means of distributing programs produced by Time-Life to its own and possibly other CATV systems." John Berentson of Time-Life said the corporation indeed was anticipating entering the business of supplying cablecast software to owned and non-owned systems.

However, not all the large CATV MSOs are inclined towards creating their own cablecast networks. TeleVision Communications Corp., which certainly has the resources needed for this activity, is more interested in locally-oriented service in those systems where cablecasting is required, according to TVC's Ed DeMarco. The same sentiment was expressed by Doug Dittrick of American Television & Communications. Hal Oyler of Cablecom-General said "fiduciary responsibility" prevented rapid development of a Cablecom network but that such was gradually being approached in the sharing of programming between the company's systems.

### Questions in the Future

Besides MSO-networking, it is likely that independent cablecast networks will develop that utilize CATV channels. Indications now are that, initially at least, the programming distributed by these networks will be general-interest in kind, such as sports and movies. Movies especially are the staple diet of the current pay-cable en-

terprises and it is clear that the motion picture producers and other contemporary software powers intend to play a large role in CATV programming.

Further off in the future are the multiple special-interest networks that have often been predicted for CATV. Prerequisites for such networks include significant penetration of CATV into the major markets and the installation of pay-cable devices in millions of subscriber homes so that minority audiences can support narrowly-oriented programming. These conditions may be met by 1981 or so. There will also have to be guarantees that independent pay-cable entrepreneurs can utilize the installed charging devices as part of their access to leased channels. And the spirit of the FCC rules requiring non-discriminatory access to leased channels will have to prevail. Otherwise, the Commission may be inclined to reclassify CATV as a common carrier, removing the industry's potentially lucrative option of creating CATV-operated cablecast networks.

The kinds of networks that develop will help to define the role of CATV in the communications system.

Will CATV networks be broadcast-type structures operated by MSOs? Will CATV systems primarily become additional outlets for movies and sports now exhibited through other media? Will CATV provide the basis for a myriad of special-interest networks in the same way as magazines and journals provide outlets for narrowly defined concerns?

These are important questions that should concern all people involved in CATV...including those active in the industry as well as visionaries commonly found outside it. TVC

*Editor's Note: A copy of Mr. Shapiro's complete dissertation (275 pages) on network-ing is available for \$35. Send requests to Mr. Peter D. Shapiro, 3 Nipmuc Terrace, Framingham, Mass. 01701.*



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# STUDIO Equipment

A special monthly section devoted to TV programming equipment for small studios

## TeleMation Offers T-MATIC

TeleMation, Inc., P.O. Box 15068, Salt Lake City, Utah 84114, recently began production and delivery of its new T-MATIC program automation system.

The system is designed to provide automatic programming of multiple cassette tape players.

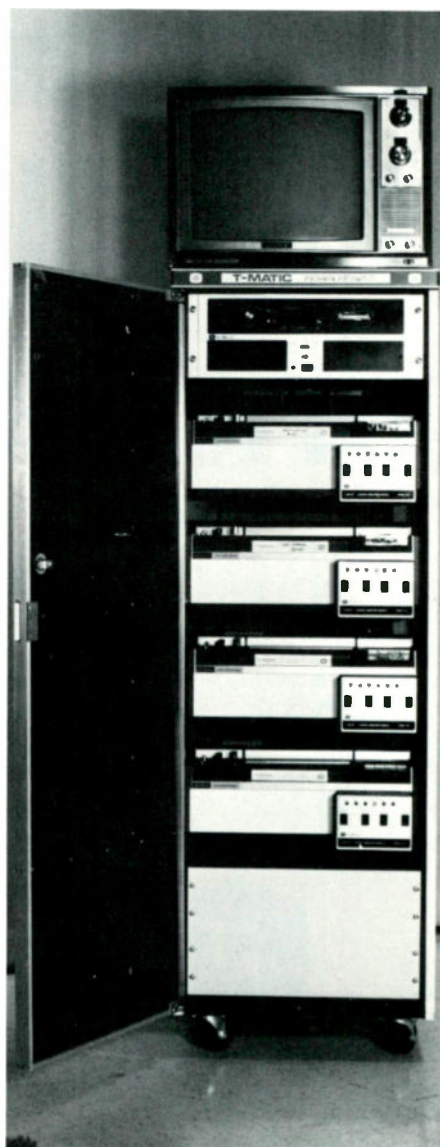
Each console combines Sony U-Matic Videocassette players with TeleMation-manufactured control equipment. Up to six machines can be sequenced by one control chassis.

The advantage of the system to cable operators or hotel managers, for example, is its ability to run for hours unattended. According to TeleMation President Lyle O. Keys, a person with no technical training can handle any operation requirement. All that is needed to start several hours of programming is the loading of the cassettes and starting the system in operation. The system switches automatically from one machine to another. As one program ends, another machine is switched on the program channel. Commercial announcements which are loaded onto a separate cassette can be inserted into program material, followed by an automatic return to the original programming.

Commenting on the system, Mr. Keys said, "Unusual flexibility has been incorporated in T-MATIC to meet many different programming requirements. A single T-MATIC console may operate as a one channel system with six videocassette players, or as a two channel system with three machines per channel. Two T-MATIC consoles may operate together as a single channel system with 12 players.

Price of the basic system with two players is \$5,340.

TVC





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The **P9030A** plugs into the same main frame for measurement of gain, loss and return loss of active and passive devices. It includes precision .25 db attenuators, an electronic switcher, repeatable bridge and RF detector.

The **P9040A** is a low-cost spectrum analyzer plug-in, covering the range from 500 KHz-300MHz. It offers a 70 db dynamic range, digital IF attenuator, digital center frequency readout and built-in frequency and level calibration.

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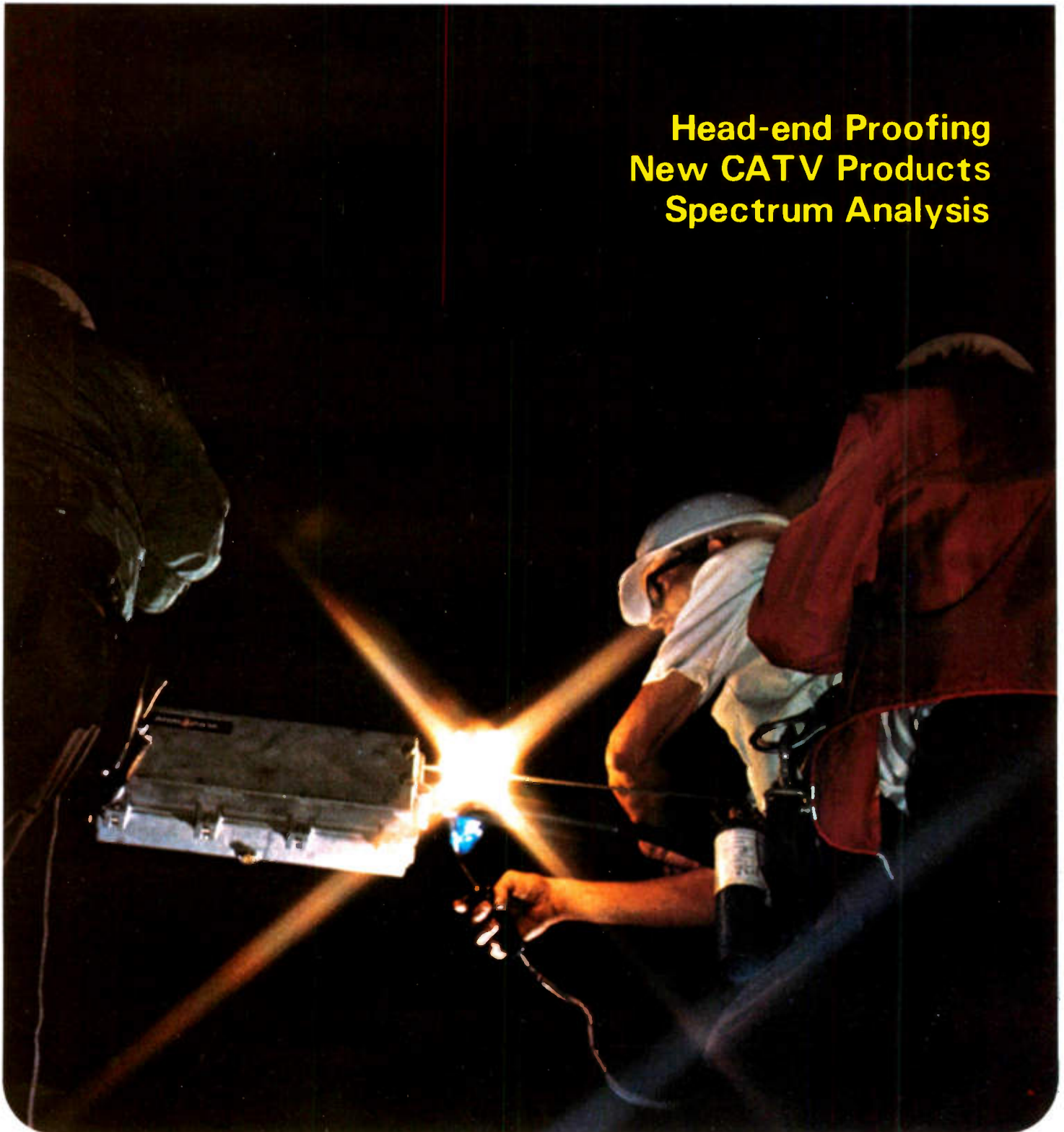


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# One Hundred Proof And a Good Head (end)

Many of the technical requirements in the FCC's CATV Report and Order are wholly or partially dependent on the head-end. Testing may only be required in the system, but a complete proof should be run on the head-end first.

*By Alex B. Best, Senior Engineer  
Cable Communications Division  
Scientific-Atlanta, Inc.*

Now that the FCC's new rules and regulations are a reality, system operators are faced with the problem of making proof of performance measurements by December 31 of this year, unless the NCTA is successful in its attempt to postpone that date. Systems in operation prior to March 31, 1972 have five years to comply with the rules. New systems must be in compliance now.

At present, the rules apply only to Class I signals, that is, those channels that are delivering standard broadcast television signals either picked up off the air or delivered to the CATV head-end by microwave or provided by direct connection to a broadcast station. Although the FCC is requiring that the measurements be made at three widely separate subscriber terminals, it is obvious that some of the specifications are determined entirely by the head-end, some are determined entirely by the distribution system, and some are affected by both.

The table lists the FCC's technical specification and then indicates which portion of the system affects each. The results of this table point out that before

measurements are made in the distribution system a proof should be run at the output of the head-end on those technical specifications that are determined wholly or in part by the head-end.

By knowing the operating characteristics of the head-end, the CATV operator making the measurements in the distribution system will be in a much better position technically to correct any violations which may still exist.

From the table it can be seen that all but one of the FCC specifications are determined all or in part by the operating characteristics of the head-end. Therefore it is recommended that the performance measurements to prove compliance with the technical specifications should be made at *four* widely separated points within the system, the fourth point, which should be measured first, being the output of the head-end.

In fact, concerning the specifications that are determined entirely by the head-end, there is no reason to measure them at any point other than the head-end. With the test equipment the cable system operator now has available

to him, certain of the specifications such as frequency accuracy of each channel can more easily be made at the head-end.

The FCC has given considerable latitude in which method is used to make the measurements. Where applicable, the NCTA standards may be employed. As far as head-end measurements are concerned, the only applicable NCTA measuring technique is one describing methods of measuring noise levels in cable systems, NCTA Standard 005-0669. Otherwise, any measurement technique which is based on good engineering practices will be accepted.

The remainder of this article lists each of the specifications that are determined in part by the head-end and at least one measuring technique which we feel would be acceptable to proof a head-end. Also listed is the equipment necessary for each method.

- 1) Frequency of visual carrier shall be 1.25 MHz  $\pm$ 25 KHz above channel boundary.

Discussion: Due to the complex nature of waveform of the amplitude modulated visual carrier,




most counters on the market today will not accurately count television type signals. Although it is possible to go into the various pieces of equipment and count the

local oscillators that are used to generate or convert the television signals, this technique is not desirable because the measuring device may change the frequency we are

trying to measure due to loading effects.

Also, in the case of heterodyne processors and UHF/VHF converters, this method does not account

Technical Specifications	Head-end	Distribution System
1) Frequency of visual carrier shall be 1.25 MHz $\pm$ 25 KHz above channel boundary	Affected by UHF-VHF converters, processor off channel conversions, TV modulators	Has no effect
2) Frequency of aural carrier shall be 4.5 MHz $\pm$ 1 KHz above visual carrier of same channel	Affected only by TV modulators which are fed an audio sound signal	Has no effect
3) Frequency of visual carrier at output of set-top converter shall be 1.25 MHz $\pm$ 250 KHz above the lower frequency boundary of cable television channel	Indirectly affects	Has no effect
4) Minimum visual signal level at subscriber terminals shall be 0 dBmV	Directly affects, most likely on an individual channel basis	Directly affects, but most likely will affect multiple channels
5) Maximum visual signal level at subscriber terminals shall be below threshold of degradation due to overload in subscriber's TV set	Directly affects, most likely on an individual channel basis	Directly affects, but most likely will affect multiple channels
6) 3 dB maximum visual signal level variation between any two adjacent channels where the visual carriers are 6 MHz apart	Directly affects. Primarily determined by head-end	Should have very little effect unless some system component has an amplitude variation which is repetitive throughout the system
7) 12 dB maximum signal level variation between any two visual carriers on the cable system	Directly affects	Directly affects
8) The aural signal level shall be maintained between 13 and 17 dB below the associated visual signal level	Directly affects; primarily determined by head-end	Should have very little effect unless some system component has an amplitude variation which is repetitive throughout the system
9) Maximum long term signal variation on any channel on the cable system shall be no greater than 12 dB	Directly affects, most likely on an individual channel basis	Directly affects, most likely will affect multiple channels
10) The channel frequency response shall be $\pm$ 2 dB for all frequencies within -1 MHz and +4 MHz of the visual carrier frequency	Directly affects; primarily determined by alignment of preamps UHF to VHF converters, processors, modulators, and filters	Should have very little effect unless some system component has an amplitude variation which is repetitive throughout the system
11) The maximum peak-to-peak variation in visual signal level caused by hum, inadequate low frequency response or other repetitive transients shall be 5%	Directly affects. Poor low frequency response would entirely be determined by head-end	Directly affects. Has no effect on poor low frequency response.
12) The minimum signal to noise or signal to properly offset co-channel signal ratio for all signals picked up or delivered within its Grade B contour shall be 36 dB	Directly affects	Directly affects
13) The minimum signal to intermodulation or other non-offset carrier ratio shall be 46 dB	Directly affects	Directly affects
14) The radiation from a cable system shall be limited as follows: a) Up to and including 54 MHz b) Over 54 MHz up to and including 216 MHz c) Over 216 MHz	Directly affects 15 $\mu$ V/M at 100' 20 $\mu$ V/M at 10' 15 $\mu$ V/M at 100'	Directly affects
15) The subscriber terminal isolation shall be a minimum of 18 dB, but in any event shall be sufficient to prevent any visual picture impairments at any other subscriber terminal	Has no effect	Directly affects; entirely determined by distribution system



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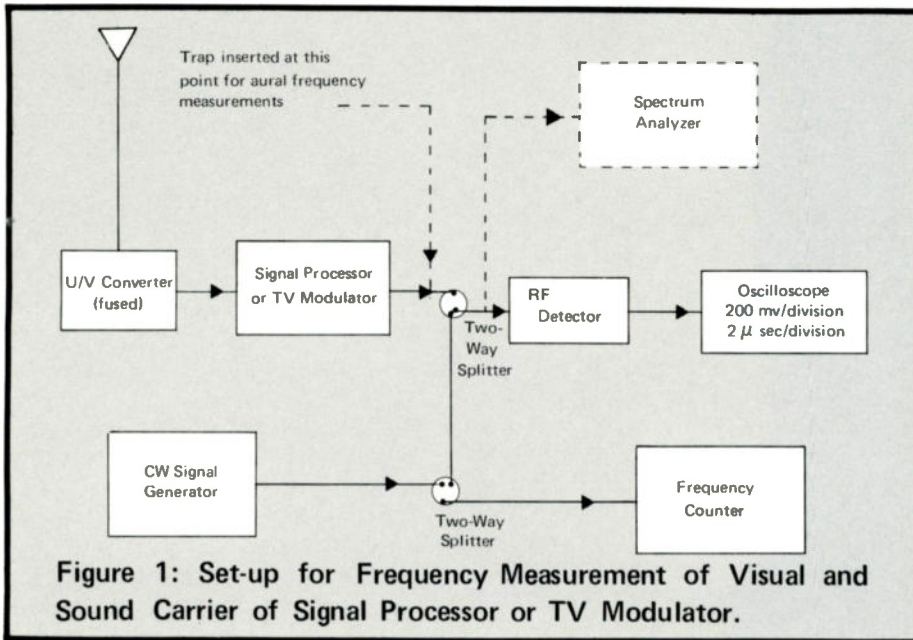
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for any frequency error which may exist in the off-air signal. Another technique, presented at the 20th Annual NCTA Convention<sup>1</sup>, performs very satisfactorily but requires some engineering effort on the part of the system operator to build the required piece of equipment.

The solution to measuring the frequency of visual carriers consists of generating a carrier which is equal to or very close ( $\pm 100$  cycles) to the desired visual carrier that will properly operate a counter. A technique for obtaining this carrier is described below.

**Equipment needed:** Frequency counter, 50 MHz to 300 MHz with time base accuracy of at least 1 part in  $10^6$ , CW signal or RCA Marker Generator (Model WR-99A), RF detector and oscilloscope or spectrum analyzer with incidental FM of less than  $\pm 300$  cycles.

**Measuring Technique:** Set up the equipment as shown in Figure 1. Adjust the frequency of CW signal generator as close as possible to the desired visual carrier using the dial accuracy to begin with, and then carefully tune the generator to give a zero beat with the visual carrier. If an oscilloscope and RF detector are used, this beat can be observed on the scope as a low frequency signal which varies in accordance with the frequency

difference between the two signals.

When zero beat is achieved, the presentation on the scope will become a straight line. If a spectrum analyzer is used to indicate zero beat conditions, the scan width and IF bandwidth of the analyzer should be continuously decreased while the generator is being adjusted until the generator frequency is as close as can be set to desired visual carrier.

Using the detector and scope method, a minimum visual carrier level of approximately +40 dBmV is required because of the low sensitivity of the detector. Also, only one channel at a time should be present at the input to the detector when using this method. The counter readout should be recorded immediately after zero beat is obtained. This readout is of course equal to the visual carrier frequency.

**2) Frequency of aural carrier shall be 4.5 MHz  $\pm 1$  KHz above visual carrier of same channel.**

**Discussion:** Heterodyne processors of the type used in CATV today do not alter the intercarrier frequency transmitted by the broadcast station. Modulators, however, which use audio rather than 4.5 MHz FM as a sound source, generate their own intercarrier frequency and are subject to error. The aural carrier associated with

each television signal is of course frequency modulated with a maximum deviation of 25 KHz.

Although most counters will accurately count an FM signal if a sufficiently long gate time is used (at least one second is required for  $\pm 25$  KHz deviation to give accurate results), there are many instances when the intercarrier signal is not readily available for counting.

When this is the case, the aural carrier can be counted directly by using the same technique described for the visual carrier, with one modification. When the RF detector method is used to obtain a zero beat, the visual carrier should be "notched" out with a trap so that it doesn't obscure the scope display. Also, it is much easier to obtain zero beat conditions during a "quiet" period on the signal to be counted.

**Measuring Technique:** The technique for measuring the aural carrier is the same as that for measuring the visual carrier. Figure 1 shows the proper equipment set up and indicates the location of the visual carrier trap.

**3) The frequency at the output of set-top converters is only indirectly related to the head-end and obviously cannot be measured at the head-end. (Also specifications 4 through 9.)**

**Discussion:** All of these technical specifications are related to amplitude measurements of either the visual carrier or sound carrier. Although the absolute magnitude of the carriers at the output of the head-end are not necessarily indicative of the levels present at the subscriber terminals, correct levels at this point are essential to the proper operation of the system.

#### Method 1

**Equipment Needed:** A good quality field strength meter which has been recently calibrated.

Obviously a field strength meter would be the simplest and probably the most accurate method of setting the proper levels at the output of the head-end.



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## Method 2

Equipment needed: Spectrum analyzer.

A spectrum analyzer which has the feature of absolute calibration can also be used to measure levels in a CATV system. However, great care must be exercised to achieve accurate results in that most analyzers on the market today are calibrated in terms of dBm (0 dBm = 1 mw into 50Ω), have an input impedance of 50Ω, and their peak indication of the visual carrier on the display is dependent on the IF bandwidth selected by the user.

As far as amplitude measurements are concerned, spectrum analyzers are more useful for spotting gross misadjustments of output levels at the head-end output rather than accurate level setting of individual channels.

10) The channel frequency response shall be  $\pm 2$  dB for all frequencies within -1 MHz and +4 MHz of the visual carrier frequency.

Discussion: The frequency response of each channel from the antenna terminals to the trunk line input is the product of the responses of all the components that the signal passes through. Although we might be tempted to sweep each device by itself to see if it meets the FCC specification, this will not insure that when they are connected together the overall response will be within the specification.

It would be difficult to determine how the individual component amplitude variations might add or how a component with a high VSWR might affect the overall response. To determine the overall system response we must therefore measure it with all of the components connected together and with the gain of the components at their normal operating condition. This means we must get our test signal at the antenna input terminals and clamp the AGC voltages of processors, etc., at that level which they normally operate.

## Method 1: Sweep Method

Equipment needed: Sweep generator, oscilloscope, detector, and marker generator.

Measuring Technique: This obviously is the standard sweep frequency method of determining amplitude response. If we sweep the overall system from antenna input to head-end output, we must turn off all other active devices in the head-end which would give an output signal into our detector.

## Method 2: Point-by-Point Method

Equipment needed: Manually variable signal generator, field strength meter.

Measuring Technique: The output of the signal generator is fed into the download and as the generator is moved in discrete steps across the passband the level out of the head-end is recorded using a FSM. Care must be taken to insure that the output level of the signal generator remains constant as it is tuned across the channel of interest. Even an RCA marker generator, Model WR-99A, would suffice for the signal generator if a 75Ω 10 dB pad is placed in the output to insure that its output VSWR is low.

## Method 3: Multiburst Method

Equipment needed: Multiburst test signal generator, waveform monitor, modulator, and demodulator.

Measuring Technique: This method is obviously more useful to measure the overall response of a microwave system. We can, however, with the use of the modulator and demodulator, determine the response of RF to RF devices. Interpreting the resulting multiburst signal to determine the actual response at -1 MHz and +4 MHz may be more difficult than using the preceding techniques. Also, it would be necessary to know very accurately the response of the test demodulator or modulator, if they are not used as a pair.

11) The maximum peak to peak variation in visual signal level caused by hum, inadequate low frequency response, or other repetitive transients shall be 5%.

Discussion: As far as head-end equipment is concerned, inadequate low frequency response can only be caused by modulators, demodulators, or video processing devices. Hum and repetitive transients, however, may be introduced by any active device in the head-end. The classical method of measuring hum by feeding a CW signal through a processor and then determining the amount of ripple on it by using a FSM does not insure that the other portions of the specifications are also being met. A technique for measuring all three at one time is described below.

Equipment needed: Good quality field strength meter with video output port. Oscilloscope with a bandwidth of at least 1 MHz capable of being DC coupled.

Measuring technique: The field strength meter is connected to the output of the head-end either directly or through a directional coupler. The video output of the FSM is connected into the vertical input amplifier of the oscilloscope and its time base set for line sync. With the head-end operating under normal off-air signal conditions, the FSM is tuned to the visual carrier of the channel to be tested. The video signal into the scope is then adjusted to have a sync tip level of 1 volt.

This can be accomplished by DC coupling the scope and adjusting the peak video output signal of FSM by use of the slide switch attenuator settings and calibrator control set to the manual position. The scope should then be AC coupled and the sensitivity increased so that the variation in sync tip level across one field can be measured. The peak-to-peak variation in sync tip level in volts multiplied by 100 gives us the answer in percent. For example: .05 volts (50 mv) of peak-to-peak

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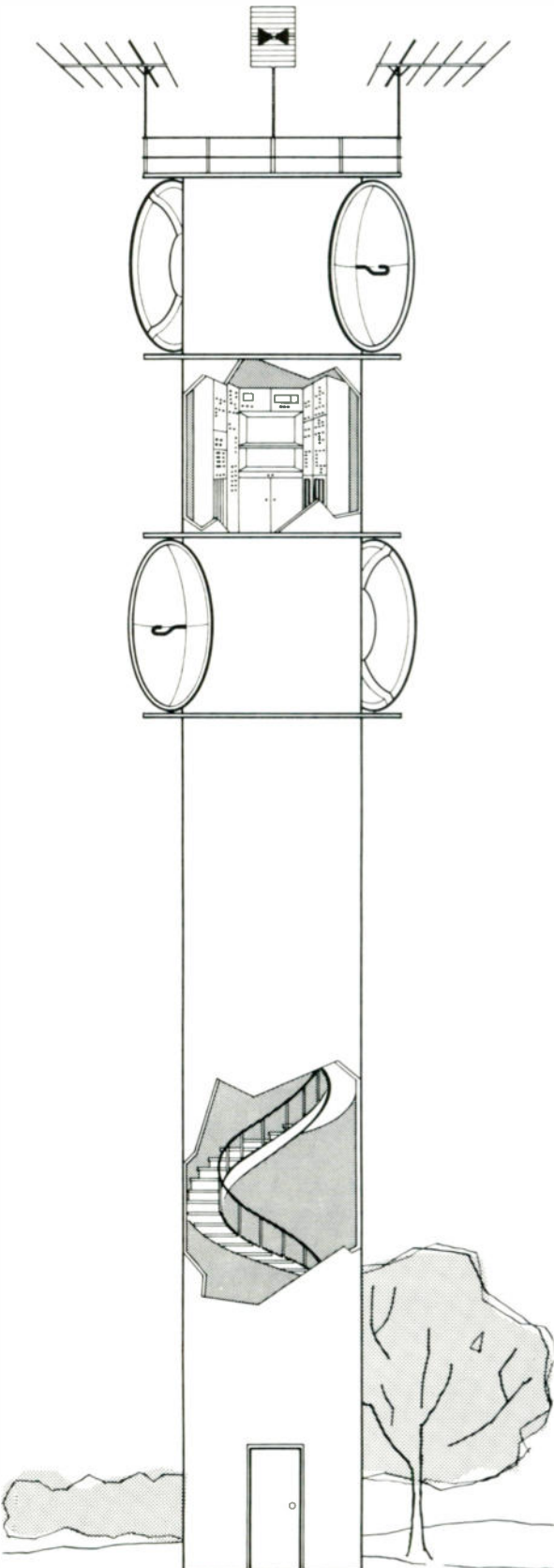
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ripple on the sync gives us a variation of  $.05 \times 100 = 5$  percent.

- 12) The minimum signal to noise or properly offset co-channel ratio shall be 36 dB for signals picked up or delivered within its Grade B contour.

**Discussion:** The measurement of co-channel is in no way related to the measurement of noise. Although it is highly unlikely that co-channel only 36 dB down would be received within the Grade B contour of a channel, its measurement can most easily be made using a spectrum analyzer. By examining the sideband structure between the first and second 15,750 KHz sidebands, we should not only be able to determine its magnitude, but also to determine if it is 10 KHz or 20 KHz co-channel.

Measuring signal-to-noise ratios are more involved and can most easily be made at the output of processors where the noise levels are relatively high as compared to the output of the combiner network where accurate noise levels are difficult to make due to their low level and the possible presence of adjacent channels. Fortunately, however, signal-to-noise ratios measured at the processor output have essentially the same values they would have at the combiner output, assuming that the combiner network has no more than 30 dB loss.

Measuring the signal-to-noise ratio at the output of a modulator is more difficult than at the output of a processor but is essentially equal to the video-to-noise ratio of its input signal. The two measuring techniques described below apply only to processor output signals.

#### Method 1

**Equipment required:** Field strength meter, variable DC power supply (if required).

#### Measuring Technique:

1) With processor operating under normal off-air conditions, measure and record the visual carrier level.

2) Switch the processor to manual AGC and adjust for the same output level recorded in Step 1. If no manual gain control is available measure thy AGC voltages and clamp them to this level using an external DC power supply.

3) Remove the antenna lead and terminate the antenna input connector with a  $75\Omega$  resistor. If a pre-amp, a UHF/VHF converter, or a combination of both are used, they should be included in this measurement by removing the antenna lead from the unit to which it is connected and terminate this input with a  $75\Omega$  resistor.

4) Measure the noise level by removing attenuation from the FSM until an on-scale reading is obtained on noise. The noise level should be measured at 0.5 MHz increments across the TV channel to insure that the noise remains fairly constant. Signal processors may exhibit a noise peak at the sound carrier frequency with no sound carrier present. This is due to the high gain of the sound IF amplifier and the fact that its gain may not be reduced when the AGC is clamped or placed in the manual gain position. If the noise peak goes away when the sound IF is removed, this effect may be considered normal and the noise measurement made with the sound IF temporarily removed.

There is also the possibility of spurious signals falling within the channel which could cause erroneous noise measurements. Before any noise measurements are made these signals should be eliminated. After you are sure that the noise level you measured is accurate, its value must be corrected due to the bandwidth difference between the FSM and the TV channel.

Also, the FSM detector responds more to the noise signal peaks than its true rms value. These two sources of error tend to cancel each other. The amount of correction in dB which must be added to the measured noise level is generally given in the FSM instruction manual.

5) The output signal to noise ratio is then equal to the difference between the visual carrier

level recorded in Step 1 and the corrected noise level determined in Step 4.

#### Method 2

**Equipment Required:** Spectrum analyzer, CW signal generator.

#### Measuring Technique:

1) Set the output of the signal generator to the same level and approximately the same frequency as the visual carrier of the channel to be measured. The set level should be that recorded at the input to the first active device.

2) Remove the antenna lead from this device and substitute for it the output of the CW generator.

3) The spectrum analyzer should now be connected to the output of the processor for the channel being measured and the signal-to-noise ratio read directly off the display graticule. Depending on the analyzer bandwidth used for the noise measurement, a correction factor must be added to the noise level recorded off the graticule. For a bandwidth of 300 KHz, this correction factor is 11 dB. There is an addition correction factor of 2 dB which also must be added to the noise level due to the characteristics of logarithmic displays reading low on noise measurements.

4) The difference between the visual carrier and the corrected noise level is the output signal-to-noise ratio. Test conducted with a spectrum analyzer for signal-to-noise ratios higher than 50 dB tend to indicate a poorer signal-to-noise ratio than is actually the case. This is due to the relatively high noise floor of the analyzer. High signal-to-noise ratios can be more accurately measured using the FSM method.

- 13) The minimum signal to intermodulation or non-offset carrier ratio shall be 46 dB.

**Discussion:** With respect to head-ends, there are three primary methods of generating spurious signals which may fall within the passband of desired channels. These are: (1) Intermodulation products, local oscillator, or other

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spurious signals out of processors, modulators, pilot carrier generators, etc., falling in other channels when combined together, (2) Cross-coupling of signals from one device to another, and (3) Intermodulation at the input of a processor due to strong adjacent channels which can fall within the passband of the desired channel. Only (1) and (2) can be measured with a field strength meter whereas all three can readily be determined with a spectrum analyzer.

**Method 1: Field strength meter method to measure type (1) and (2) spurious signals.**

**Equipment needed:** Good quality field strength meter.

**Measuring Technique:** To measure spurious signals of the type (1) described above, connect the FSM directly to the output of the head-end after the combining network where the desired visual levels are relatively high (+30 dBmV to +40 dBmV). Tune the FSM to the visual carrier of the channel to be tested and record its levels. This channel is now removed from the combined head-end output and the sensitivity of the FSM increased while tuning the FSM across passband of the removed channel.

If a spurious signal is located it should first be determined if it is generated in the input of the FSM. This can be accomplished by removing 10 dB from the input attenuator of the FSM to see if the indication on the meter increases 10 dB. If it increases more than 10 dB, it is generated in the FSM. If it does not, compare its level with that of the previously recorded visual carrier level.

To measure spurious signals of type (2), tune the FSM to the visual carrier of the channel to be tested and record its level. Measure and clamp the AGC voltage of processor of this channel to the value it has under normal off-air conditions. Remove its input signal and terminate with a 75Ω load. Now increase the sensitivity of the FSM and tune across the passband of the desired channel using the test described above if a spurious signal is located.

**Method 2: Spectrum analyzer method.**

**Equipment needed:** Good quality spectrum analyzer.

**Measuring Technique:** Connect the output of the head-end to the input of the spectrum analyzer and examine carefully each channel to determine if any spurious signals are hiding in the sideband energy or close to the visual, sound, or color carriers of each channel. If a spurious signal is found, remove some attenuation from the input of the analyzer to see if the level of the spurious signal on the display follows a one-to-one relationship with attenuation removed. If it does not follow this relationship, it is generated in the analyzer and should be disregarded. If it is a genuine spurious signal, compare its level with that of the desired visual carrier.

- 14) The radiation from a cable system shall be limited as follows: (a) up to and including 54 MHz 15 uv/M at 100', (b) over 54 up to and including 216 MHz 20 uv/M at 10' (c) over 126 MHz 15 uv/M at 100'.**

**Discussion:** Although this specification was probably written more with the distribution system in mind, the head-end cannot be disregarded as a possible source of radiation, especially considering the many sources of relatively large levels of local oscillators that exist in many pieces of head-end equipment. There is a question as to whether radiation from certain pieces of equipment, such as signal processors, would fall under the limits written for CATV systems or paragraph 15.63, part 15, of the FCC Rules and Regulations concerning radiation from all radio receivers that operate (tune) in the range 30 to 890. MHz. Of the two, technical specification 14 listed above which applies to the cable system is by far the more stringent and if the head-end meets the CATV requirements, it will also meet the requirements given for radio receivers.

**Equipment needed:** Resonant dipole antenna at each measuring frequency or antenna with known gain at each measuring frequency. Field strength meter.

**Measuring technique:** Due to the obvious problem of size in constructing a resonant dipole at very low frequencies or of obtaining any other type of antenna with known gain at low frequencies, the technique mentioned under part 15 for radio receivers might apply. This method reads: "for frequencies up to 25 MHz, the interference capability can be determined by the measurement of radio frequency voltage between each power line and ground at the power terminals of the receiver." For television broadcast receivers this cannot exceed 100 uv. It would be difficult to compare this limit, however, with that given for cable systems, that is 15 u v/M at 100 ft.

For frequencies above 25 MHz a dipole or other suitable antenna with known gain can be used along with an FSM to obtain readings of the radiation levels in dBmV at the distances required by the FCC. These readings can then be converted to microvolts/meter using the formula

$$E = .021 fV \text{ if a resonant dipole is used}$$

$$\text{or } E = \frac{.021 fV}{G} \text{ if another type antenna is used where}$$

G = gain of the antenna,  
 f = signal frequency in MHz  
 V = field strength reading is uV  
 E = field strength in uV/meter

The FCC, by requiring that the technical specifications be met at three widely separated points in the system, realizes that this does not insure that all subscribers on the system will receive perfect pictures. It does mean, however, that the system is capable of producing good quality signals at each home. The one link in the signal path from origination point to home that all subscribers have in common is the head-end. Unless the head-end is capable of conforming to the FCC specifications, there is no point in making measurements in the field.

# Measure Video and Aural Separation DIRECTLY!



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# Part II

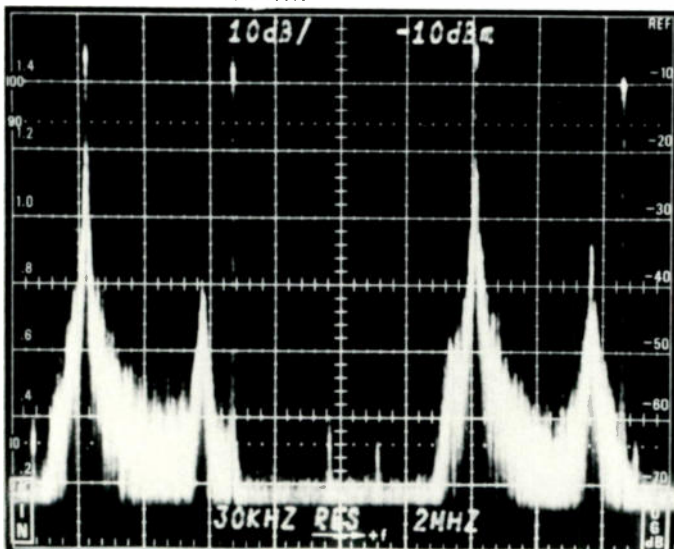
## Spectrum Analysis and Key FCC Measurements

The spectrum analyzer is an expensive piece of test equipment, but a very valuable one. Linley Gumm explains its applications in performing intermodulation, noise, co-channel and hum measurements for the FCC.

By Linley Gumm  
Project Engineer  
Tektronix, Inc.

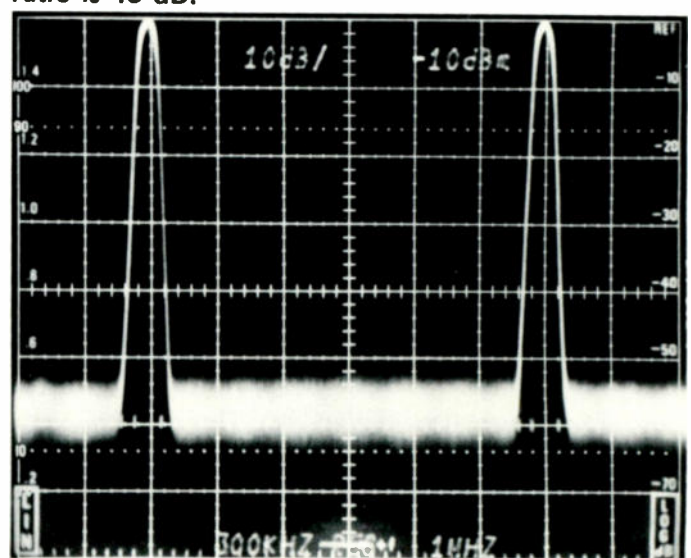
**I**ntermodulation: Intermodulation occurs when two signals applied to an amplifier produce more than two signals at the amplifier output because of nonlinearity. Figure 12 shows a typical measurement. Channel 8 is on the left and Channel 10 on the right. Between them are two low level signals that are the result of the third order curvature of the amplifier. The visual and aural carriers of Channel 8, which are 4.5 MHz apart, combine to form an intermodulation spurious product 4.5 MHz above and below aural and visual carriers, respectively. The small signal just below Channel 10's visual carrier is one of the intermodulation products produced by Channel 8. Similarly, the small signal just above Channel 8's aural carrier is one of the intermodulation products produced by Channel 10. In this case they are about 57 dB below the visual carriers.

Figure 12: Intermodulation measurement. Intermodulation is 57 dB down.



**N**oise: A spectrum analyzer can easily measure a signal-to-noise ratio. In the case of a CATV system, the measurement can be made directly without any special techniques if the S/N ratio is 50 dB or less. Figure 13 shows this measurement. The system is operating in its normal mode, except substitution carriers have replaced all of the signals. The noise is at a uniform level between the two carriers at -58 dB down from full screen. The 7L12 spectrum analyzer's bandwidth is 300 kHz so this number must be modified to allow at the 4 MHz S/N ratio used in CATV measurements. The amplitude difference between 4 MHz and 300 kHz noise bandwidths is 11 dB. However, logarithmic displays read about 2 dB low in noise measurements. Therefore, the 4 MHz S/N measurement of this system is:  $58 - 11 - 2 = 45$  dB.

Figure 13: Noise measurement. The signal-to-noise ratio is 45 dB.



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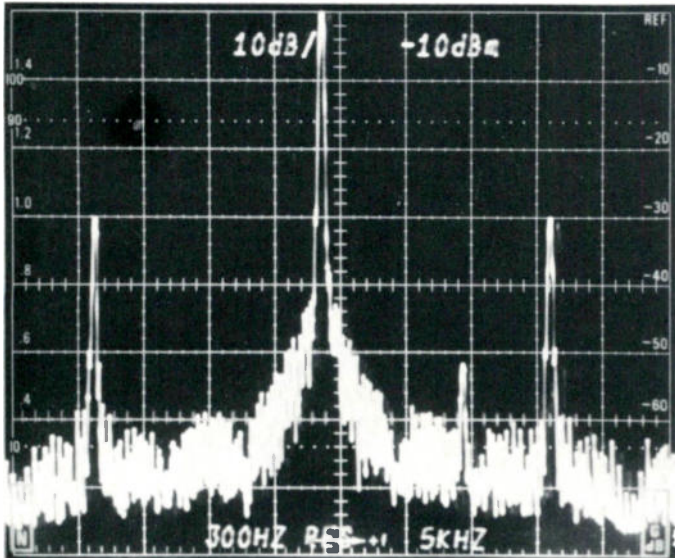


Figure 14: Co-channel interference. The co-channel signal is 51 dB down.

**Co-Channel Interference:** Only the more elaborate analyzers can make this measurement. Figure 14 shows the carrier and the first two 15.75-kHz sidebands of a TV signal. 10 kHz above the carrier is another signal that is another TV carrier assigned to the same channel but offset by 10 kHz in frequency.

**Interfering Signals:** We've already discussed stray and interfering signals away from the TV signals. But what about interfering signals within a TV channel? To explore this point, some tests were run in the lab deliberately adding a CW signal to a TV signal and observing the result. Figure 15 is a normal TV signal. Figure 16 shows the same signal with a 40 dB down interfering signal 2 MHz above the visual carrier. Figure 17 shows the resultant herringbone on the TV picture. Figure 18 shows the same interfering signal, but it is now 50 dB down.

The resulting herringbone shown in Figure 19 is

Figure 15: Typical TV signal.

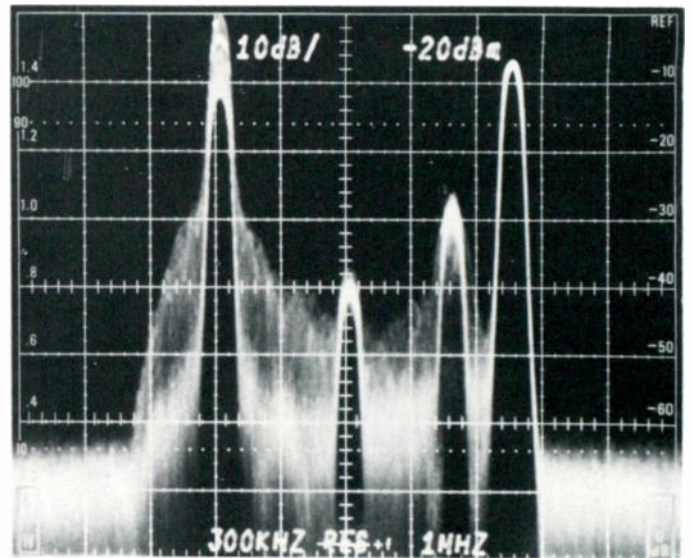
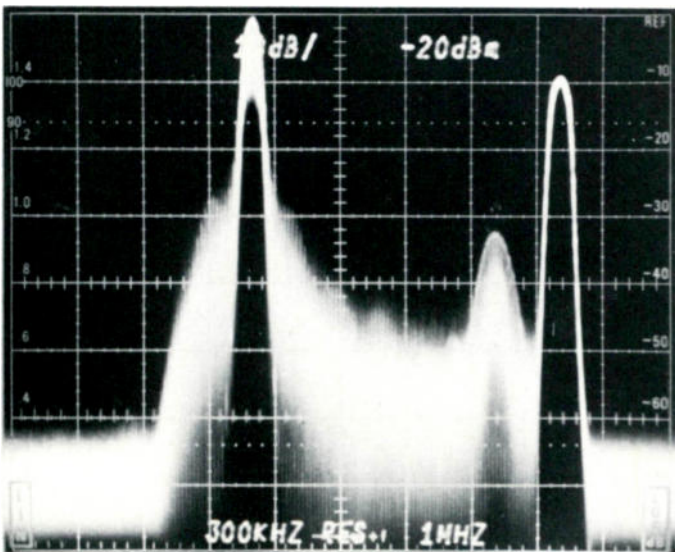


Figure 16: TV signal with 40 dB down interfering signal.

just perceptible, lowering the interfering signal's amplitude by another 10 dB to -60 dB below sync tip results in a still visible signal in the spectrum analyzer display in Figure 20, but results in no visible picture degradation. When there is doubt about whether or not some feature within the spectrum analyzer display at a TV signal is an interfering signal, the problem can be resolved by looking at the display over a period of time as the picture content changes. Any fixed low-level feature, with the exception of the chroma signal, is probably an interfering signal.

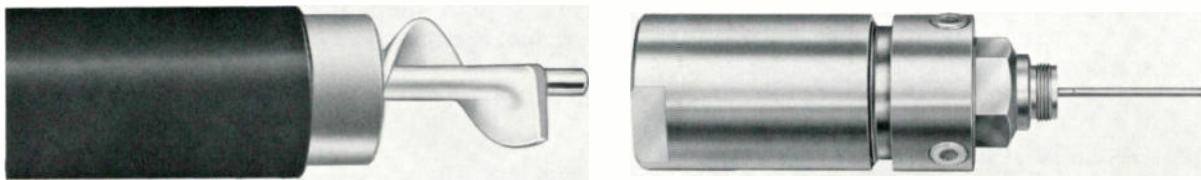
**Hum:** Hum can be measured by using the spectrum analyzer as a wideband receiver and viewing the resulting video with respect to time. Figure 21 shows the spectrum analyzer being used as a 3-MHz bandwidth receiver to look at a TV transmitter. When the frequency span control of the unit is set to zero, the

Figure 17: TV picture with 40 dB down interfering signal.



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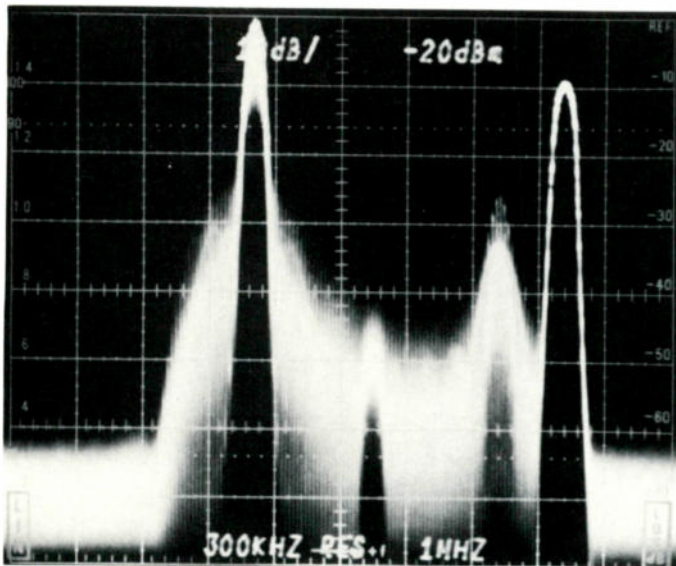


Figure 18: TV signal with 50 dB down interfering signal.

CRT readout display reads the time per division of the sweep instead of frequency per division. The linear scale is used for maximum sensitivity. The line across the top of the screen is the sync tip level. The sync tip level is varying .2 divisions with a full scale deflection. Therefore, the hum is  $.2 \div 8 = 2.5\%$ .

**Radiation:** Radiation is measured by using a calibrated antenna and measuring the amplitude of the signals by it. Reference must be made to a correction chart provided by the antenna manufacturer before the actual field strength may be determined.

Testing for signals leaking from CATV systems may be a frustrating experience. It will be difficult to separate the signal picked up directly from the signal that is leaking from the cable. Only when signals on the cable are at a different frequency will it be

Figure 19: TV picture with 50 dB down interfering signal.

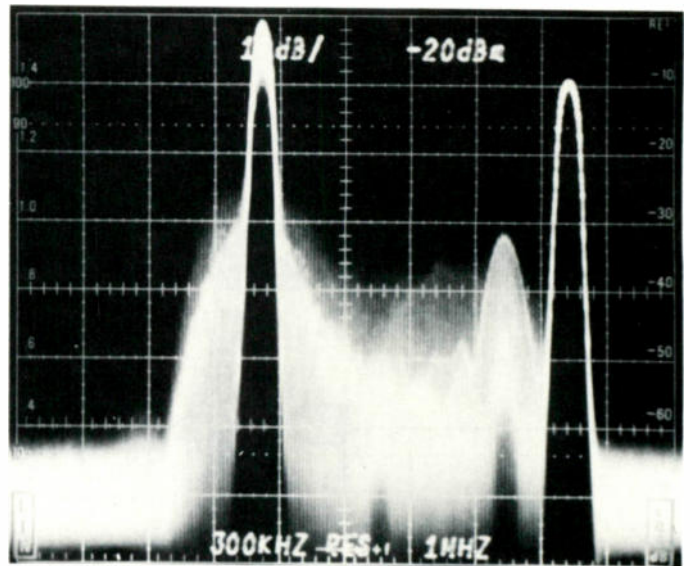


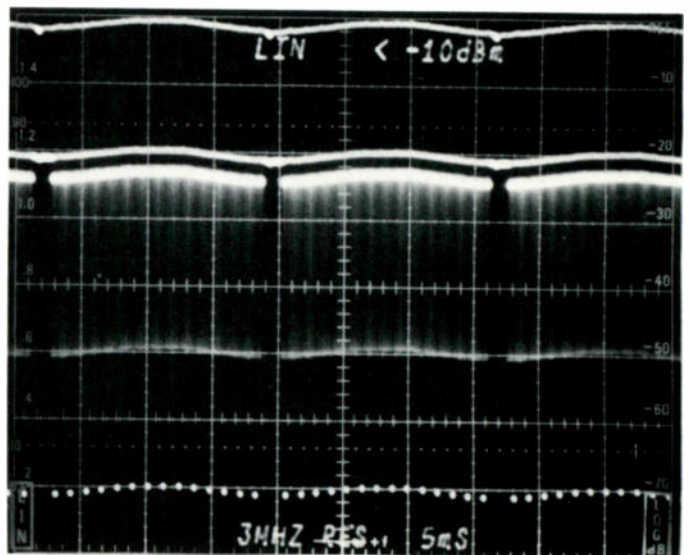
Figure 20: TV signal with 60 dB down interfering signal.

possible to get an unambiguous reading. Adding CW signals at some unused frequencies to the CATV system's normal load and at the same level as the visual signals may aid in measuring radiation levels with less confusion.

## Conclusion

The author has attempted to show how, with the aid of a spectrum analyzer, a great many of the difficult, time consuming CATV measurements can be made conveniently. A spectrum analyzer is not the only measuring instrument a CATV operator needs. But, it is a basic instrument that makes many measurements by itself, and enhances the measurement capability of many other pieces of test equipment. rvc

Figure 21: Hum measurement. Hum is 2.5% P-P of sync tip amplitude.



# Ohio cable operator builds long life and good looks into TV cable systems

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Much of the responsibility of building and maintaining the company's wide network of cables rests with Glenn Lorenz,



Glenn Lorenz, Supervisor, is in charge of cable systems construction for the four-state area served by Tower Communications, Inc.

Supervisor in charge of cable systems construction. He's a nineteen-year veteran with the company.

We talked to him about his work, and particularly about the predominance of Preformed cable support products used in their cable systems — Telegrips, Teletaps, False Dead-Ends, Splices, and GUY-GRIP® dead-ends.

He emphasized the importance of neat, clean-looking lines and recognized that Preformed products have a slim silhouette — they blend into the line, have no bulky clamping mechanism, no nuts or bolts.

Economy is another big point. In laying out a new system, Tower Communications makes cost estimates as accurate as possible; they like costs to match estimates, which means avoiding lost time on the job. Preformed products twist on in a jiffy without tools. Contractors like them too, he pointed out, because of the ease of application.

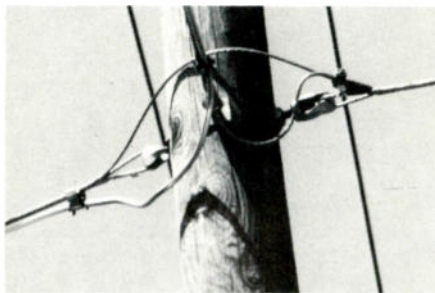
Furthermore, the helical wire construction typical of Preformed CATV products cradles the cable, preventing cable distortion and excessive wear and tear. Preformed strand products promise long life to the cable system.

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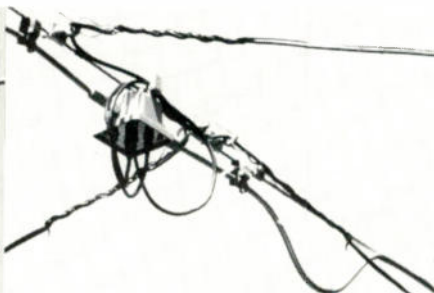
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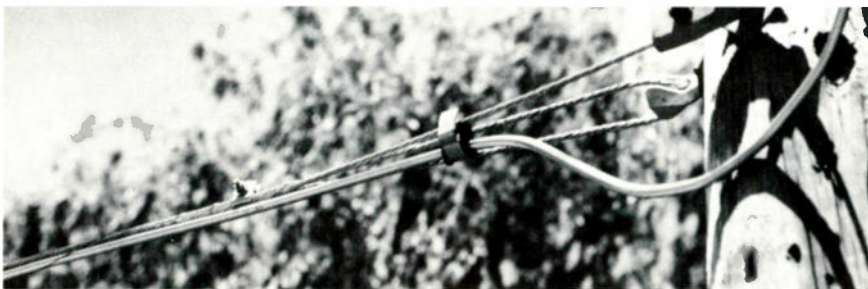
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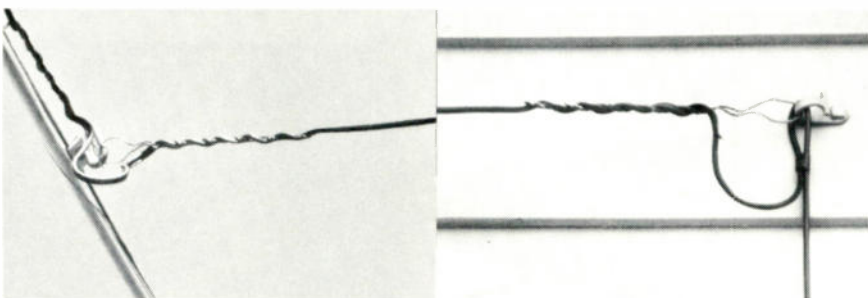
Corner pole construction showing use of three GUY-GRIP dead-ends to support messenger strand. Note that cable system is bonded throughout.



Three-way tap-off is made with Telegrips, which are connected to span clamps and carry the wire to the house.



Preformed False Dead-End is used at guyed pole. Permits straight-through continuation of cable and messenger. Often used when a slack span is needed.



In some cases it is preferable to bring the service wire off the tap to a point somewhere in midspan where a neat connection is made with two Telegrips.

Telegrip is neatest way to bring service wire to the house entrance. It prevents kinks in the wire and helps give distortion-free picture.



# PRODUCT REVIEW

NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

## DISTRIBUTION AMPLIFIERS: SCIENTIFIC-ATLANTA

Scientific-Atlanta, P.O. Box 13654, Atlanta, Ga. 30340, has introduced a complete line of two-way distribution amplifiers. The series 6500 amplifier line employs hybrid integrated circuits in all units. Downstream signals are transmitted in the 54-300 MHz band while upstream signals are transmitted between 5-108 MHz.

A single housing contains all circuit modules including forward and return amplifiers, bridging amplifier, dual-pilot AGC, and power supply. Unique packaging techniques enable the amplifier housings to be opened in either direction with respect to signal flow. Output connectors may be located in a manner to eliminate cable loops for pedestal mountings.

## AM/FM TUNER: JERROLD ELECTRONICS

A new professional quality solid state high fidelity AM/FM tuner designed specifically for MATV and CATV head-ends has been announced by Jerrold Electronics Corp., 401 Walnut St., Philadelphia, Pa. 19105.

Designated AFT-2002, the new unit's features include an FET front-end, micro-circuitry and FM interchannel hush. The unit

also has a front panel meter which indicates either zero center (to simplify tuning) or signal strength peak, depending on the position of the meter switch.



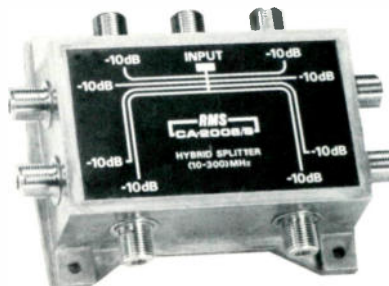
Other front panel controls include tuning, on-off, audio level control, AM-FM selection and interchannel hush defeat switch.

The output of the new AM/FM tuner is 1.2 volts, audio.

The unit takes up 3½" on a standard 19" rack. The finish is gray hammertone steel. Price is \$468.75.

## EIGHT-WAY SPLITTER: RMS ELECTRONICS, INC.

The CATV division of RMS Electronics, Inc., 50 Antin Place, Bronx, N.Y. 10462, has announced the production of a new eight-way splitter, model CA-2008/S, one of a series of three types produced by the division. The



unit is available in a quarter-inch thick aluminum die cast housing, with a stainless steel bottom plate. The unit is completely weather-proof. The frequency range is 5-300 MHz. Maximum insertion loss: 10 dB. Isolation is 25 dB minimum. The return loss is 20 dB minimum. The network is solid state.

## VIDEO MONITOR: ASACA CORPORATION

Asaca Corp. of America, 1289 Rand Road, Des Plaines, Ill. 60016, has introduced a new 9" solid state video monitor, model AVM-090U. Utilizing a Uni-Potential CRT, this

monitor is said to deliver resolution of 600 lines and excellent vertical and horizontal linearity to produce a sharp picture. Standard 19" dual rack mount type is also available.



Specifications include: input signal — VS 0.5v p-p — 2.0v p-p; input impedance — 75 ohms — high impedance switchable. Looping input; resolution — horizontal more than 600 lines, vertical more than 300 lines; video amp. gain — 34 dB or more; and signal to noise ratio — 40 dB or more.

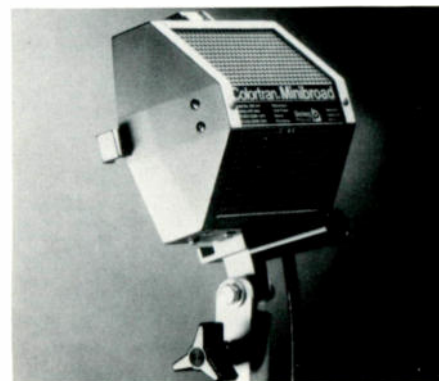
## POWER SUPPLY: GLENTRONICS

A dual 60 volt, 12 ampere stand-by power supply has been introduced by the Glen-tronics Division of Sawyer Industries, 748 E. Alosta Ave., Glendora, Ca. 91740.

The new stand-by unit, designated model CTS-1002, features completely modular construction. Transformer, control and inverter sections are contained in plug-in modules, to minimize downtime during equipment replacement. Emergency power is supplied by a bank of six 6-volt batteries enclosed in an integral cabinet. The system provides line regulation of ±1%. A 30-volt version is available in addition to the 60-volt unit. Single channel units are also offered.

## FILL LIGHT: BERKEY COLORTAN

Berkey Colortan, Inc., a division of Berkey Photo, Inc., 1015 Chestnut St., Burbank, Ca. 91502, has announced the new Minibroad — a strong fill light in a compact package. The unit utilizes the latest technology for power-



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The TEKTRONIX 144 Generator is a good buy. First it provides full EIA sync with the drive and blanking necessary for basic studio operation. And in addition, at no extra cost, the 144 provides color bars, convergence crosshatch, modulated staircase and modulated pedestal for studio setup and evaluation.

And more . . . A special mode of the 144 places your choice of video in an insert area of a composite pattern of convergence crosshatch and color bars. This insert area can be used for a commercial . . . a message from a TV service company would be very appropriate . . . or automatic time/weather data.

And special effects . . . The TEKTRONIX 144 comes with provisions for a simple wipe between two external video sources. All that is necessary is a simple change that is fully described in the 144 instruction manual.

**No costly add-ons needed:** The TEKTRONIX 144 is a complete generator with performance to match your needs today and the demands of the coming years, and it only costs \$2500. You can learn more about the 144 and other TEKTRONIX products for CATV by using the new Television Products Catalog. If you haven't received one—you are not on our CATV Mail List and are also missing the information contained in our Television Application Notes.



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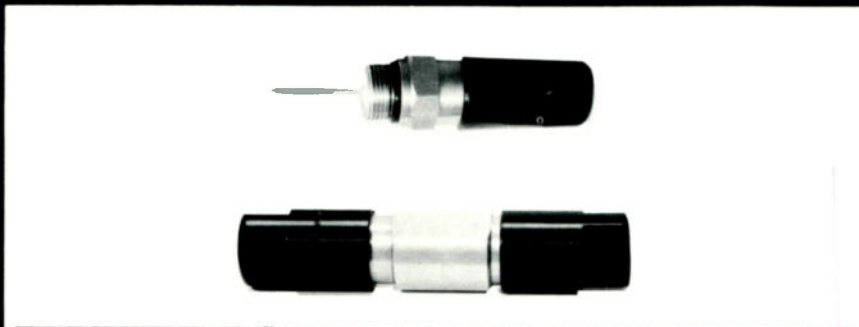
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ful and efficient light output. Its 650 watt "quartz" lamp is designed to deliver a maximum amount of light with a minimum amount of heat. The light weighs 20 ounces.

The light features a quick pan and tilt handle for fast, convenient adjustment. Full 180-degree vertical tilt. Each light has 12 feet of cord with an in-line switch. A full line of completely detachable accessories is also available.

### STEREO FM MODULATOR: FUNG ENGINEERING

Fung Engineering Co., 111 Glenn Way, Belmont, Ca. 94002, has introduced the new model FMSM-9172 automated stereo FM modulator to provide stereo FM signal to CATV systems.

The unit features automatic modulation controls on both left and right channels, phase locked VCO, and crystal controlled up converter. This unit, with power supply and modulation meter, is priced at \$525.00.

### AERIAL LIFTS: LIFT-OFF MFG.

Lift-Off Manufacturing Corp., 55-59 S. Main St., Oneonta, N.Y. 13820, has announced the availability of two new aerial bucket lifts.

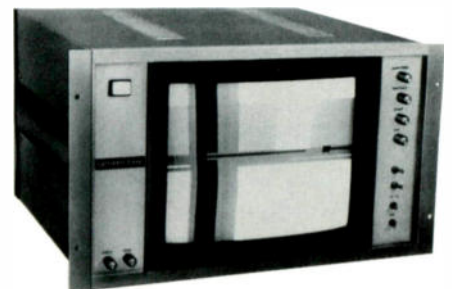
The two new models are the LO-24B and the LO-28B. The LO-24B has a working height of 29'. It will be a revised version of their present LO-24 unit. The LO-28B features a fiberglass upper boom and has a working height of 33'.

Both units are said to feature improved design and new safety features.

Lift-Off Mfg. Corp. has been marketing the LO-24 lift unit previously built by Apollo Mfg. Co. Apollo Mfg. Co. was acquired by Lift-Off Mfg. Corp. over one year ago.

### COLOR MONITOR: UNIMEDIA CORP.

Available from Universal Media Corp., 29115 Mission Blvd., Hayward, Ca. 94544, is the new SMT Series color studio monitors, which employ the Sony Trinitron single gun

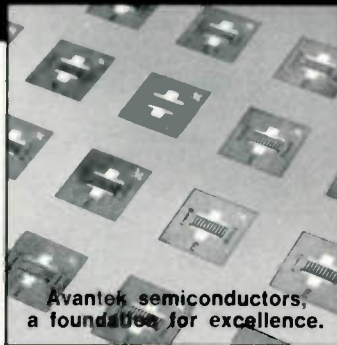


system. This system is designed to offer inherent sharp focus and greater brightness without recurring convergence problems. The series includes 9", 12", 15", 17" and dual 9" rack mount models.

A single 9" model with a Tektronix Type

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minutes or less to portray your entire cable system for spectrum analysis, signal level and frequency measurements, noninterfering system sweep, spurious radiation field strength, return loss, isolation and signal-to-noise ratio measurement. With Avantek's rugged, portable Remote Automatic Sweep System, it's simple and quick.



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The lightweight, weatherproof CR-1000 affords simple, one-man measurement of swept frequency response or spectrum analysis at any time and at any point in your cable system.

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528 Waveform Monitor is also available. An option package, available on all units, provides front panel switch control of two separate inputs and Pulse-Cross. The Pulse-Cross mode permits shifting the picture either horizontally or vertically, or both together, to display Sync, Burst, Blanking, Vertical Interval Test and Reference signals.

## COLOR MONITOR: MIRATEL

The Miratel Division of Ball Brothers Research Corporation, 1633 Terrace Drive, St. Paul, Minn. 55113, has introduced a new color monitor, the TCB-19. This series is also available in a cabinet-mounted 25-inch version. This monitor is available either with cabinet enclosure or in rack mount configuration. Stability and reliability are said to be insured with temperature compensation, power supply regulation and low-drift chroma demodulation.

Features include switchable long or short time-constant AFC (automatically returns to short time-constant when sync is lost, for wide capture range); all solid state circuitry; and controlled phosphor picture tube. A black matrix Hi-Light picture tube is optionally available.

## CHROMA KEYS: CENTRAL DYNAMICS CORP.

Available from Central Dynamics Corporation, P.O. Box 116, 230 Livingston St., Northvale, N. J. 07647, is the model VK 2140 encoded chroma keyer. It operates in conjunction with a professional quality special effects generator to provide keying effects based on hue from an encoded composite color signal. An integral input selector and multiple outputs each with independent internal delay adjustments enable the unit to be incorporated into a production switcher with multiple effects systems without external key signal delays.

A demodulation and hue enhancement technique is said to assure low noise, high resolution and freedom from spurious luminance transient effects. Video delay modules are designed to facilitate convenient installation of the encoded chroma keyer into an existing video production switcher.

A kit of remote control components is provided for user installation. The keyer is available for either the NTSC or PAL color standards.

## FRAME LOCATOR: VIDEO ELECTRONICS

Any part of a videotape recording can be located to within a tenth of a second of running time with a digital information system which can be added to the normal video signal without modification to the recorder. TapeCode, which is manufactured by Video Electronics, Ltd. of Manchester, England, is being marketed by Denlen Electronics Corp., 23 Guardsman Rd., Thornhill, Ontario, Canada.

The system records individual numerical

information on every frame of a tape without interfering with the picture content, and a solid-state display panel exhibits the data during both record and playback modes. Recordings can be made on any videotape machine and replayed on any other compatible unit, while retaining absolute correlation between numerical and picture information.

Numerals may be elapsed time, 24-hour clock time, digital counts up to 99,999,999 or binary coded output from a computer, tele-tape or digital instrument. Without altering the recorder, the system can be extended with a Cuecode unit to operate mechanical or electronic switches automatically at presettable points of the tape to initiate external sequences, such as machine start or projector changeover.

Of use for simplifying editing and cueing procedures, TapeCode has applications in all fields where videotape recording is used.

Price of the basic system is about \$800 Canadian, FOB Toronto.

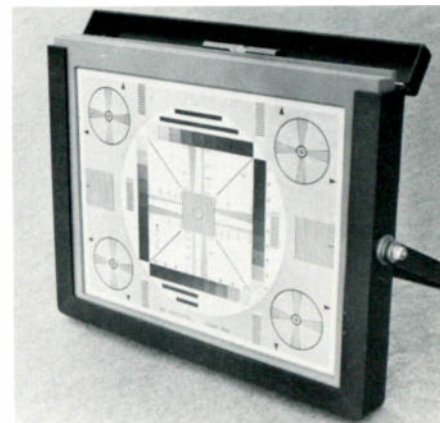
## DIGITAL MUSIC: AUDIO/VIDEO PRODUCTS

Digitone from Audio/Video Products, 9336 Fostoria Street, Downey, California 90241, is a digital music maker which can be used to produce jingles, station ID's, news tags, and more. A 16 tone sequence in continuously variable for a numerous variety of melodies.

The unit is built around reliable integrated circuitry and is completely portable. An internal speaker allows monitoring, and a 600-ohm balanced line output is available for feeding your board for on-air operation and production. Price is \$69.00.

## TEST SCREEN: GRENIER BROTHERS

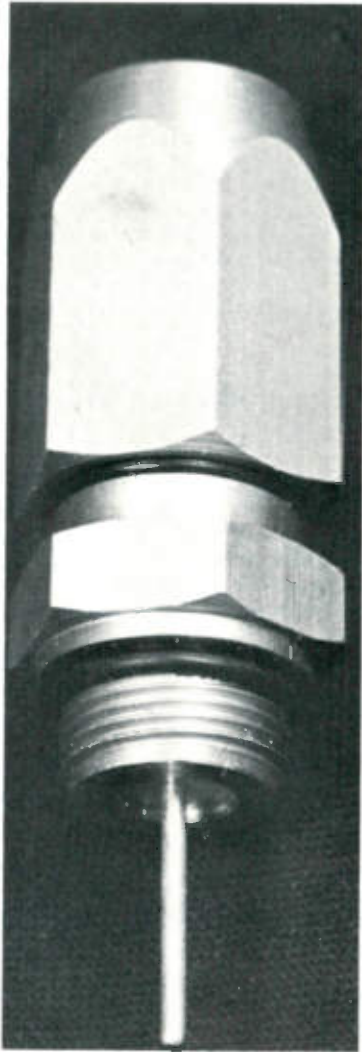
Grenier Brothers, Incorporated, 1224 N. Vine St., Hollywood, Ca. 90038, has announced their new product, "Porta-Pattern" test chart set. The set consists of an extruded aluminum frame with a spring loaded handle.



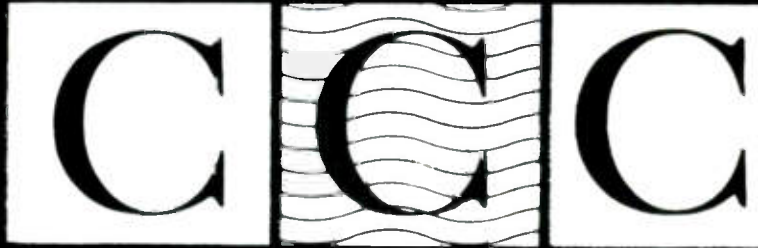
The set consists of an extruded aluminum frame containing one each resolution, linearity, registration and logarithmic reflectance chart. The charts are each recessed in individual neutral gray frames to assure water and abrasion resistance.

The four charts are placed in the frame in

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A real CATV Meter.  
Reads Adjacent Channels.  
Covers 2 to 13 in one continuous range.  
Plus or minus 2 dB or better.  
Indicates average signal level.  
UHF tuner or low frequency adaptor  
can be added later when required.

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the order of usage, and after use the front chart is reversed, providing complete protection of the charts when not in use.

The frame has a spirit level built in to assure alignment accuracy when the charts are in use. The unit is designed for self-standing or mounting on a standard microphone stand. The entire unit measures 11" x 14" and weighs less than five pounds.

**AEROSOL SPRAYS:  
AMECO, INC.**

Ameco, Inc., Box 13741, Phoenix, Ariz. 85002, has introduced two products which are designed to help prevent deterioration of cable TV equipment. The firm is marketing an anti-corrosive material, LPS 3 and Instant Cold Galvanize, also under the brand name LPS.

LPS 3, which comes in aerosol spray or bulk, is an inhibitor against moisture, salt, acid and chemical atmospheric and soil conditions. One application is said to stop rust two years or more and protect all metals against deterioration. LPS 3 also penetrates and lubricates metal parts without harming non-metallic components.

The Instant Cold Galvanize is said to equal hot galvanizing at one-half the cost. Available in a ready-to-use aerosol spray, the compound contains 95% zinc and has withstood over 3000 hours in salt spray tests. It also rust-proofs metals for three years or more. Electrochemical action fuses the zinc to the metal,

and if the coating is penetrated the galvanize will sacrifice itself to protect the exposed base metal.

**PARABOLIC ANTENNAS:  
RF SYSTEMS, INC.**

A new series of six high performance parabolic antennas with guaranteed radiation pattern envelopes is being produced by RF Systems, Inc., 155 King St., Cohasset, Mass. 02025.

The antennas are available in diameters of 15, 30 and 45 feet, with a broadband feed. The 15-foot model for channels VHF 7-13 and/or UHF 14-83 has a guaranteed front-to-back ratio of 40 dB for high band VHF and 45 dB for UHF. The 30-foot model for VHF 7-13 has a guaranteed ratio of 45 dB with solid surface and 40 dB with mesh surface. The 45-footer with mesh for VHF 2-6 and VHF 7-13 is guaranteed at 35 dB for low band and 43 dB for high band.

**TIME RECEIVER:  
CATEL**

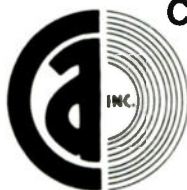
The new FMT-2000 Timemod, available from CATEL, Division of United Scientific Corporation, 1030 W. Evelyn, Sunnyvale, Ca. 94086, combines a high performance crystal controlled receiver and an FM modulator to add National Bureau of Standards frequency

**\$650,000**

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Educational TV Stations, Schools  
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Closed Circuit TV Users

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The unit makes it possible for any CATV system to carry the 24 hour a day precise time announcements as an additional FM broadcast service in the FM band or on the aural frequency of any VHF television channel. It will also permit simultaneous transmission of time broadcasts on television information or weather channels.

In addition to the continuous precise time announcements, the National Bureau of Standards service provides transmissions of standard audio frequencies, radio propagation forecasts, geophysical alerts, storm and hurricane warnings.

## STYRAFOAM CABLE: CERRO WIRE AND CABLE

A new ultra-low-loss aluminum sheathed CATV cable has been introduced by Cerro Wire & Cable, Halls Mill Rd., Freehold, N. J. 07728. Called Styrafoam, the new Cerro cable uses expanded polystyrene dielectric.

The cable is said to be light, easy to handle and causes considerably less attenuation than conventional aluminum sheathed coaxial cables. With this cable, the manufacturer claims trunk line amplifiers can be spaced 20% further apart.

The cable is made by a computer controlled manufacturing process. A full logic automated analog/digital computer system provides continuous monitoring of all key cable parameters, including diameter of core, center conductor spacing, capacitance and impedance. The computer system automatically adjusts line speed, extruder speed and extruder temperature, continuously correcting minor deviations and assuring uniform quality reel after reel.

Built-in recording facilities compare the physical and electrical properties of each length of cable with the conditions under which it was produced. This facilitates in-process quality assurance.

The new cable utilizes copper clad aluminum center conductors and is available in all popular sizes. It can be ordered with a polyethylene jacket, jacketed with .109 galvanized steel messenger, or unjacketed.

## SPLICER BUCKET: STELCO INC.

Stelco, Inc., 7700 Wedd, Overland Park, Kansas 66204, has announced the introduction of its high production splicer bucket for the Stelco Stel/Lift and Stelco Stel/Scope aerial devices.

The splicer bucket, which conforms to industry standards, measures 24" x 30" x 42" and is constructed of steel framing with expanded metal walls, affording the splicer maximum ventilation. Optional snap-on side covers and a splicer's tent protect the splicer during inclement weather.

Other accessories for the splicer bucket include a removable folding seat that can be used on both sides and the back of the bucket, bottle compartment, a curbside door with built-in shelving and power tool compartment, a support and tray, and a folding tool tray. The new splicer bucket also features, as optional equipment, a heater and power outlets for tools.

## MOBILE STUDIOS: CAM MFG., INC.

CAM Manufacturing, Inc., of Chapel Hill, North Carolina, has announced two additions to its line of mobile TV studios.

CAM is now introducing both a stepvan and a trailer model in order to service cable television operators of various sizes.

Studio B is an 8' x 14' trailer equipped with either black-and-white or color capability, pan and tilt tripod, monitor, multi-microphone audio recording, van-mounted VTR

and audio mixer. The trailer, which serves as a television studio, is sound insulated and carpeted, with appropriate backdrops, lighting and furnishings. Options include a lo-light level camera, more elaborate lighting and backdrops, and air conditioning and heating.

Studio C is an 8' x 14' stepvan equipped in a similar fashion and with the same options available. Air conditioning is standard equipment.

CAM will lease or sell all models with either black-and-white or color cameras and promises delivery within 30 days.

## TIME INTERVAL COUNTER: TEKTRONIX, INC.

According to Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97005, more solutions and digital accuracy come to oscilloscope timing measurements with its newest digital plug-in for its 7000-Series oscilloscopes: the 7D15 universal counter/timer. Because this unit is a scope plug-in, it is said to provide more convenient counting and timing measurements with greater accuracy and confidence at a lower cost per measurement.

Signals from the scope can be used to arm and control the counter/timer. The measured signal can be seen on the CRT, along with the measurement interval and the counter Schmitt trigger signal. Through various scope plug-ins, signals can be preconditioned.

There are eight modes for this DC-to-225 MHz counter/timer: Time Interval, Time Interval Averaging, Period, Multi-period, Frequency, Frequency Ratio, Totalize and Manual Stop Watch.

Resolution is 10 nanoseconds in single-shot time measurements, and is 100 picoseconds in time

Resolution is 10 nanoseconds in single-shot time measurements, and is 100 picoseconds in time interval averaging. The CRT readout displays a full eight digits. Price is \$1,475.



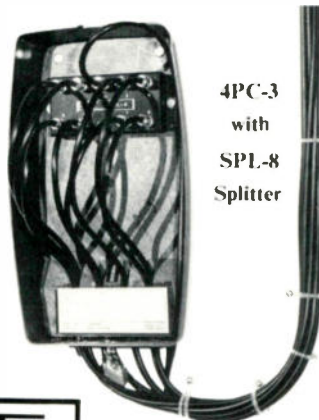
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## IN-FIELD INVENTORY CONTROL



4PC-3  
with  
SPL-8  
Splitter

### Cable Split Apartment House Terminal Boxes

- 4PC-3 Up to 4 apartments  
4 outlets per apartment
- 8PC-3 Up to 8 apartments  
4 outlets per apartment
- 12LT-1 Up to 12 apartments  
1 outlet per apartment
- 24LT-1 Up to 24 apartments  
1 outlet per apartment

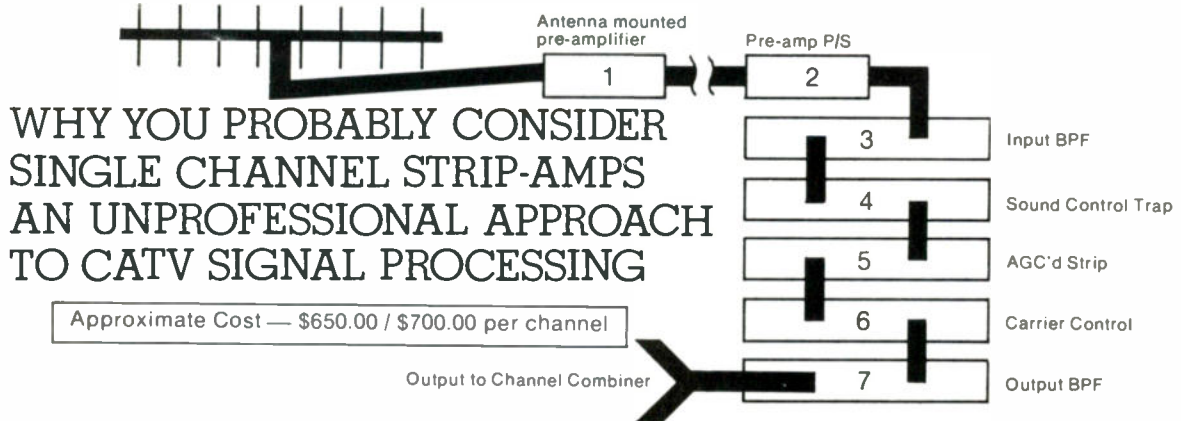


Patent No. 3,610,810

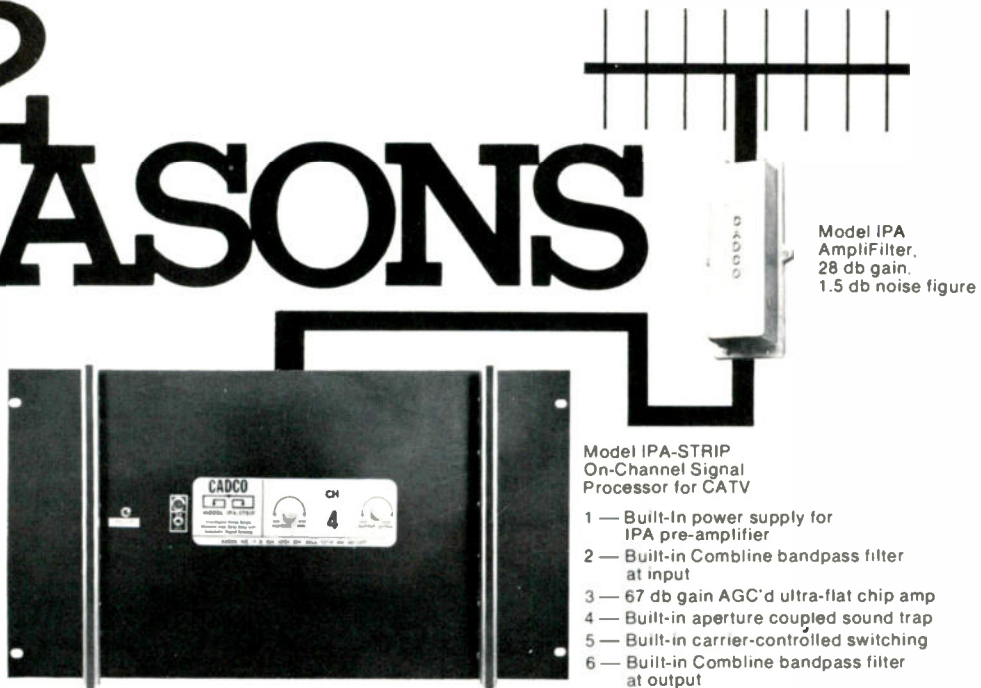
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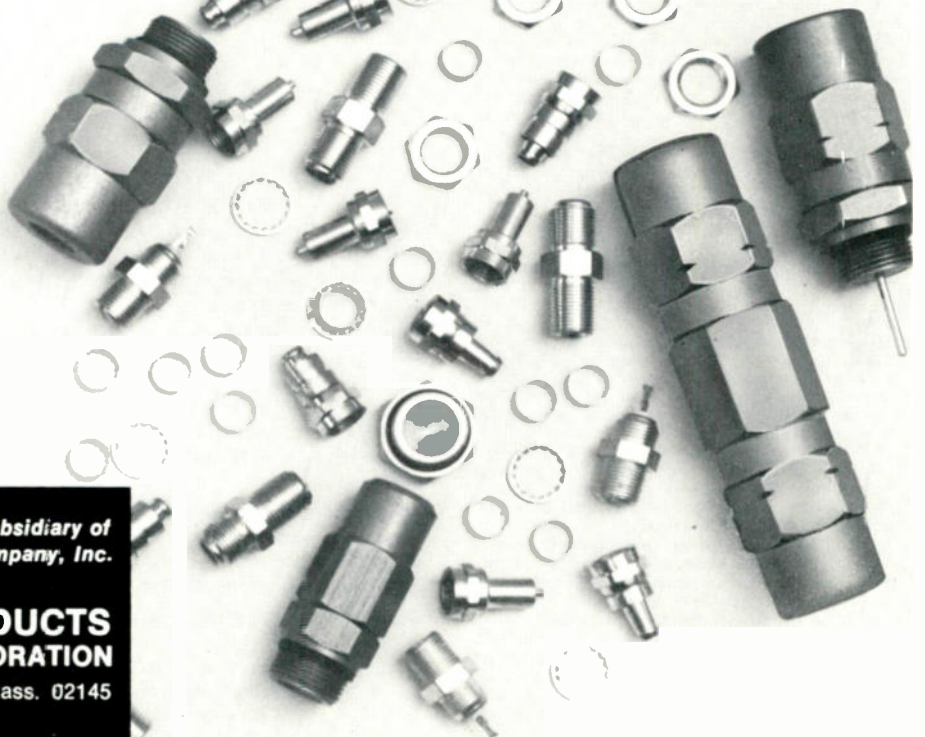
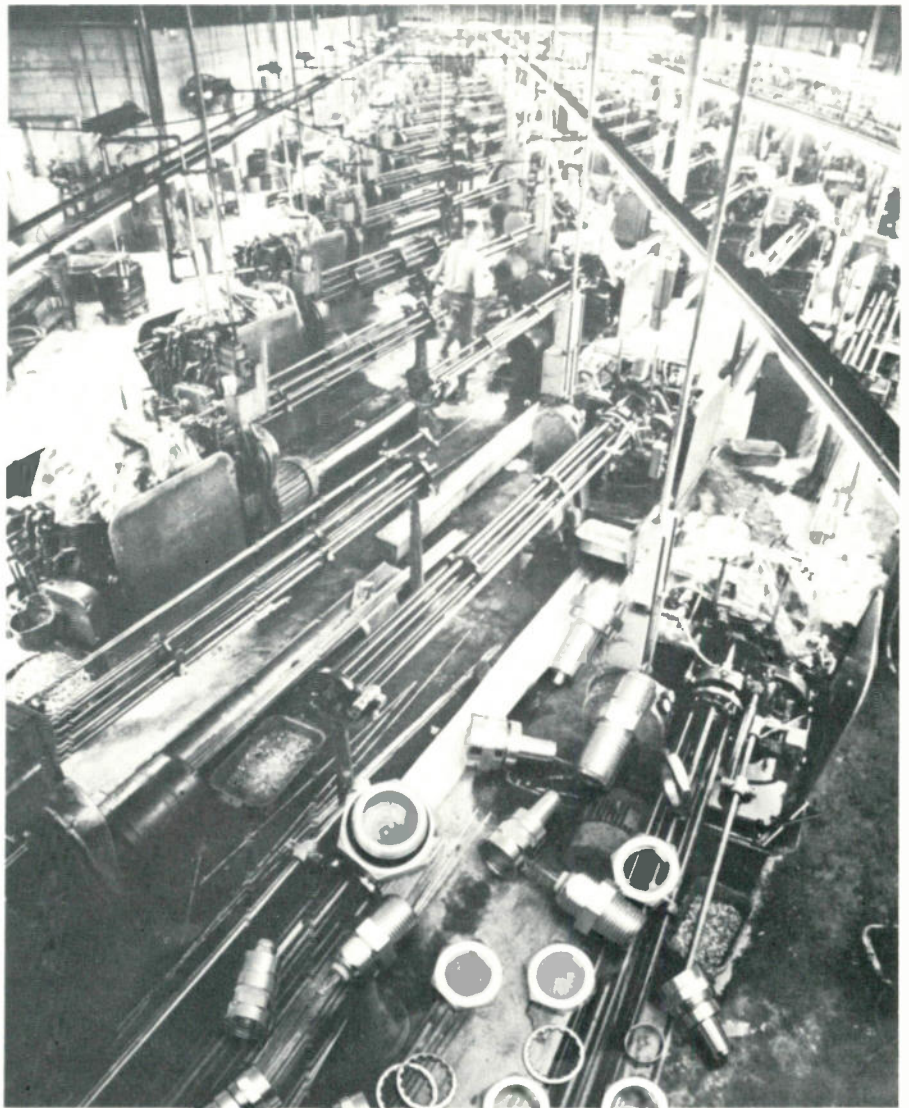
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2. Title of publication: TV Communications.
3. Frequency of issue: Monthly.
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9. For completion by nonprofit organizations authorized to mail at special rates (Section 132.122, Postal Manual): Not applicable.
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## THE CATV

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**17 Iowa Cable Television Association** will meet at the Holiday Inn, The Amanas. For further information contact James Hoak, Hawkeye Cablevision, 704 Insurance Exchange Bldg., Des Moines, 50309.

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**How To Interpret TV Waveforms** by Forest H. Belt is available from Tab Books, Blue Ridge Summit, Pa. 17214. The 256-page book features over 250 waveform photos and 20 schematic diagrams. Photos display normal waveforms and key waveforms under various component fault conditions. This book should be helpful to the technician who must service monitors. Price is \$7.95 hardbound and \$4.95 for paperback.

Available from Ken Knight, Laser Link Corporation, 303 Crossways Park Drive, Woodbury, New York 11797 is the **How To Lay Out an Airlink CATV System** book. The 12-page book includes everything from installation to selection of transmitting and receiving sites. The book is free upon request.

Just published by Hastings House, 10 East 40th Street, New York, New York 10016 is **The Technique of Lighting for Television and Motion Pictures** by Gerald Millerson. The 366-page book covers everything from the nature of light to picture control. The book is a comprehensive study of the art of creative lighting and analyzes techniques and processes of lighting. Price is \$17.95. 

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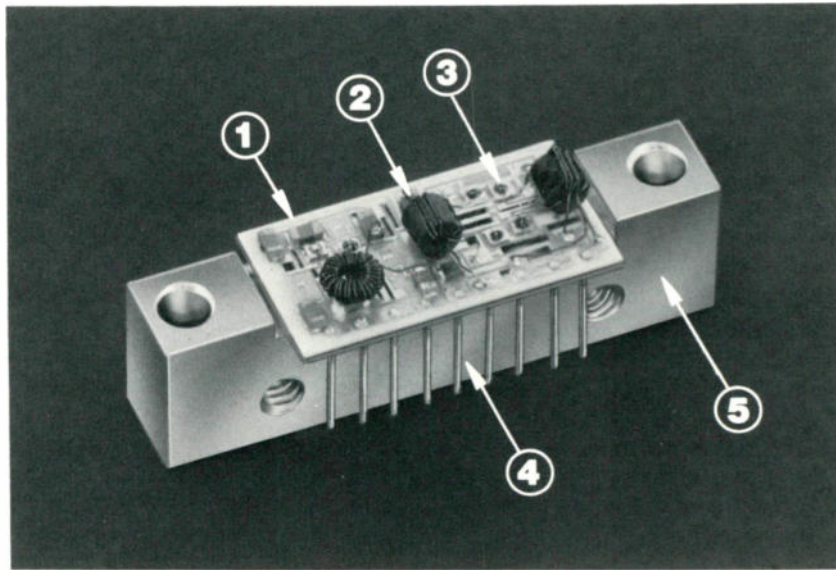
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