

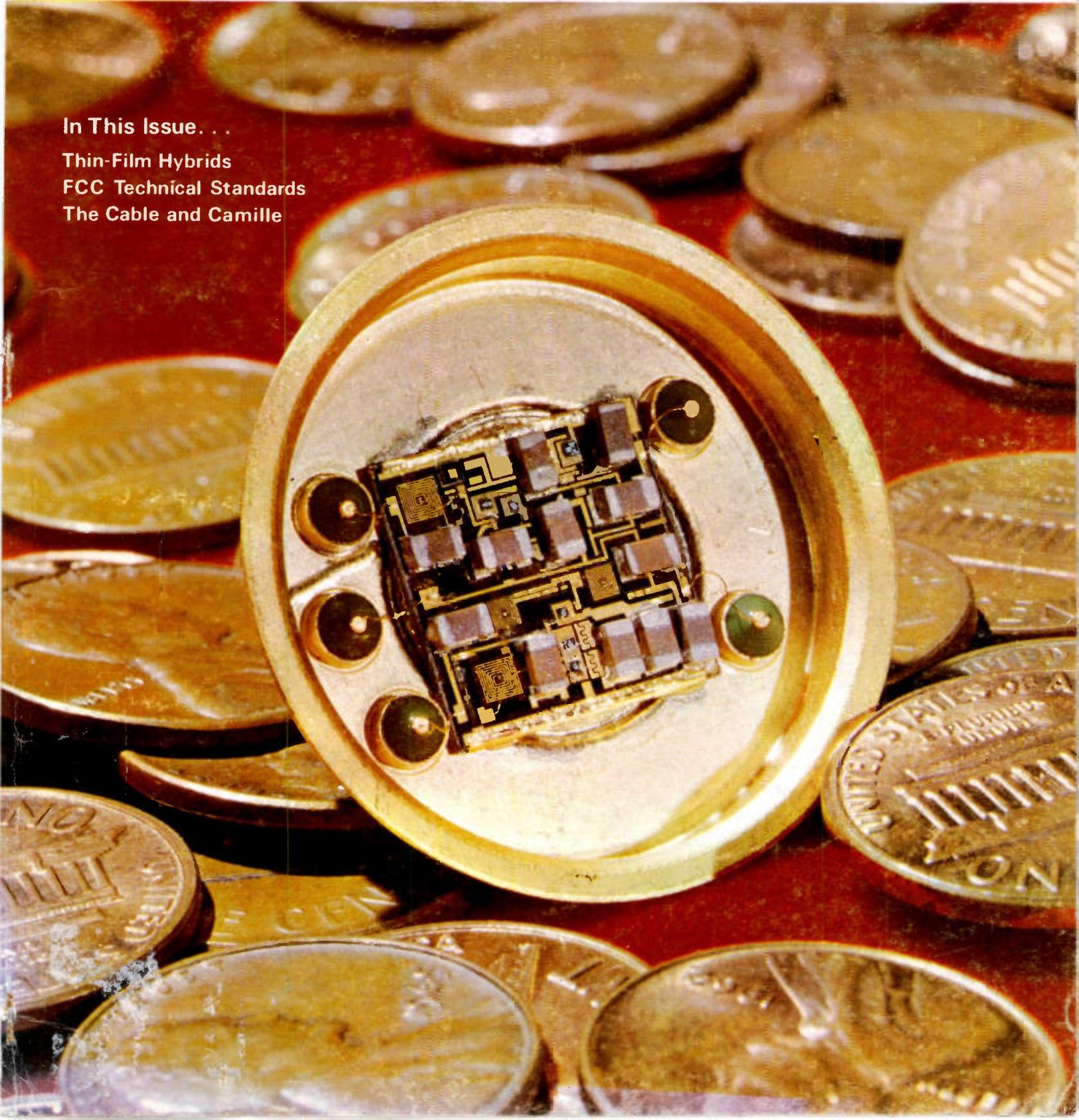
P-38

# *TV Communications*

The Professional Journal of Cable Television

P-24542

In This Issue . . .  
Thin-Film Hybrids  
FCC Technical Standards  
The Cable and Camille



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way yet  
to get a**



**channel FM head-end**

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a GENERAL INSTRUMENT company

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A 3 Bay Console housing studio control equipment.



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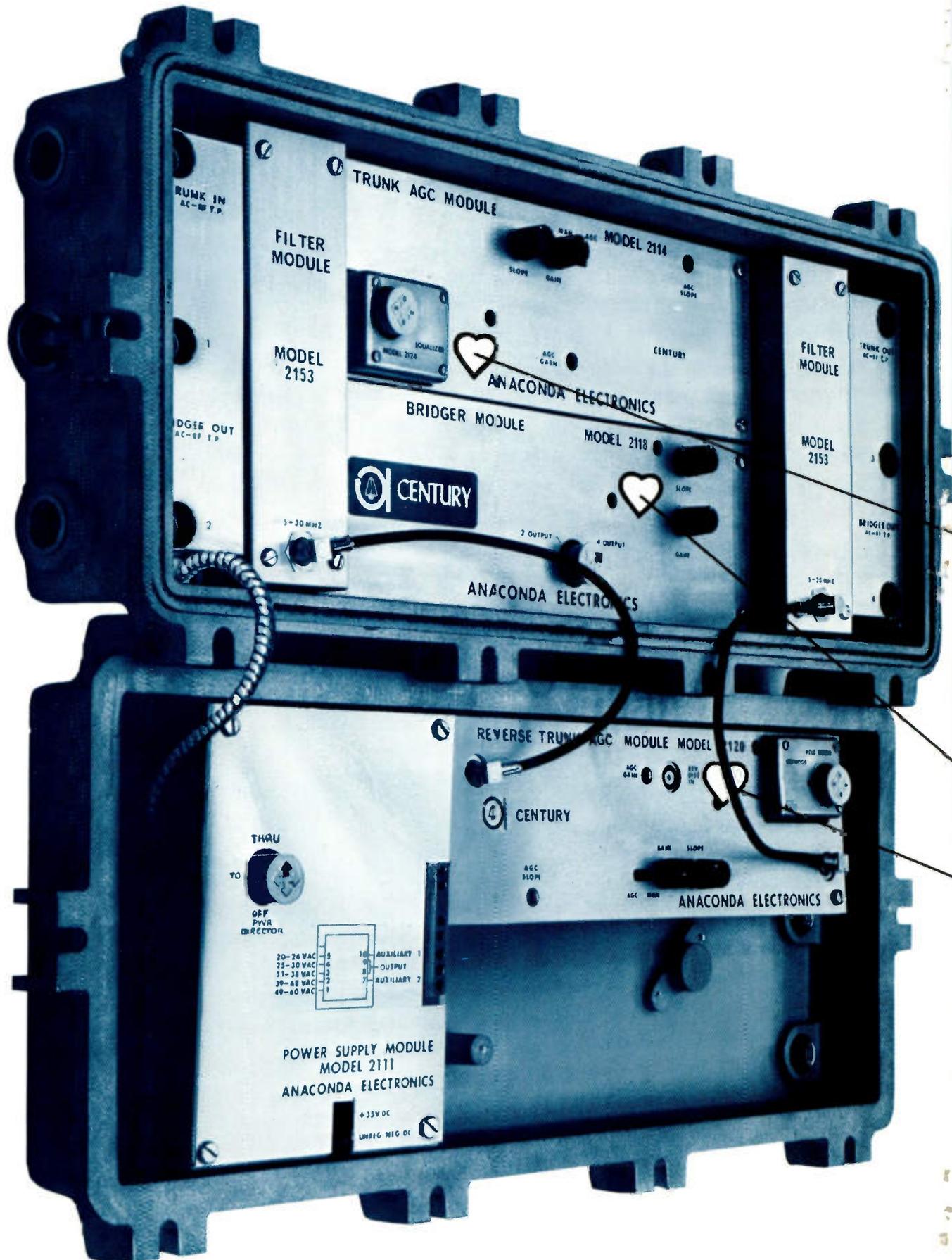
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# Anaconda contributes a

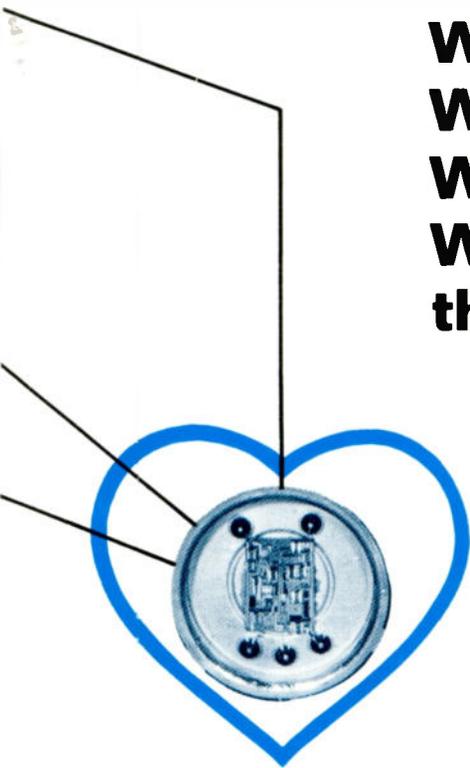


# new technology to CATV:

## MICROELECTRONICS!\*

**The industry's first hybrid thin-film integrated circuit, push-pull, plug-in modularized, 5-300 MHz, versatile, bidirectional, 43-channel, broadband cable communications amplifier.**

**We developed it.  
We field-tested it for a year.  
We designed a complete line.  
We introduced it at  
the 1970 NCTA Convention.**



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The New Technology from

 **ANACONDA electronics**

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And in Vancouver, in the Province of British Columbia

### "THE HEART OF THE MATTER"

\*The thin-film integrated circuit (shown actual size) is the heart of the new Century Series amplifier. By eliminating discrete components and reducing lead lengths, it sets a new standard for CATV amplifier performance, reliability, and stability under all conditions.

# TV Communications

The Professional Journal of Cable Television

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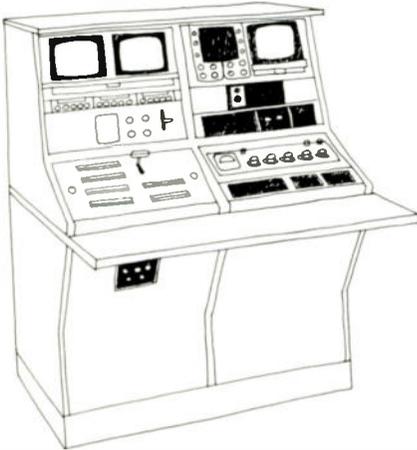
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# PRUZAN

# Cable

**Local origination is no longer a future possibility—it's a here-and-now necessity.**

**If you are about to invest in an origination system, look first to RCA.**

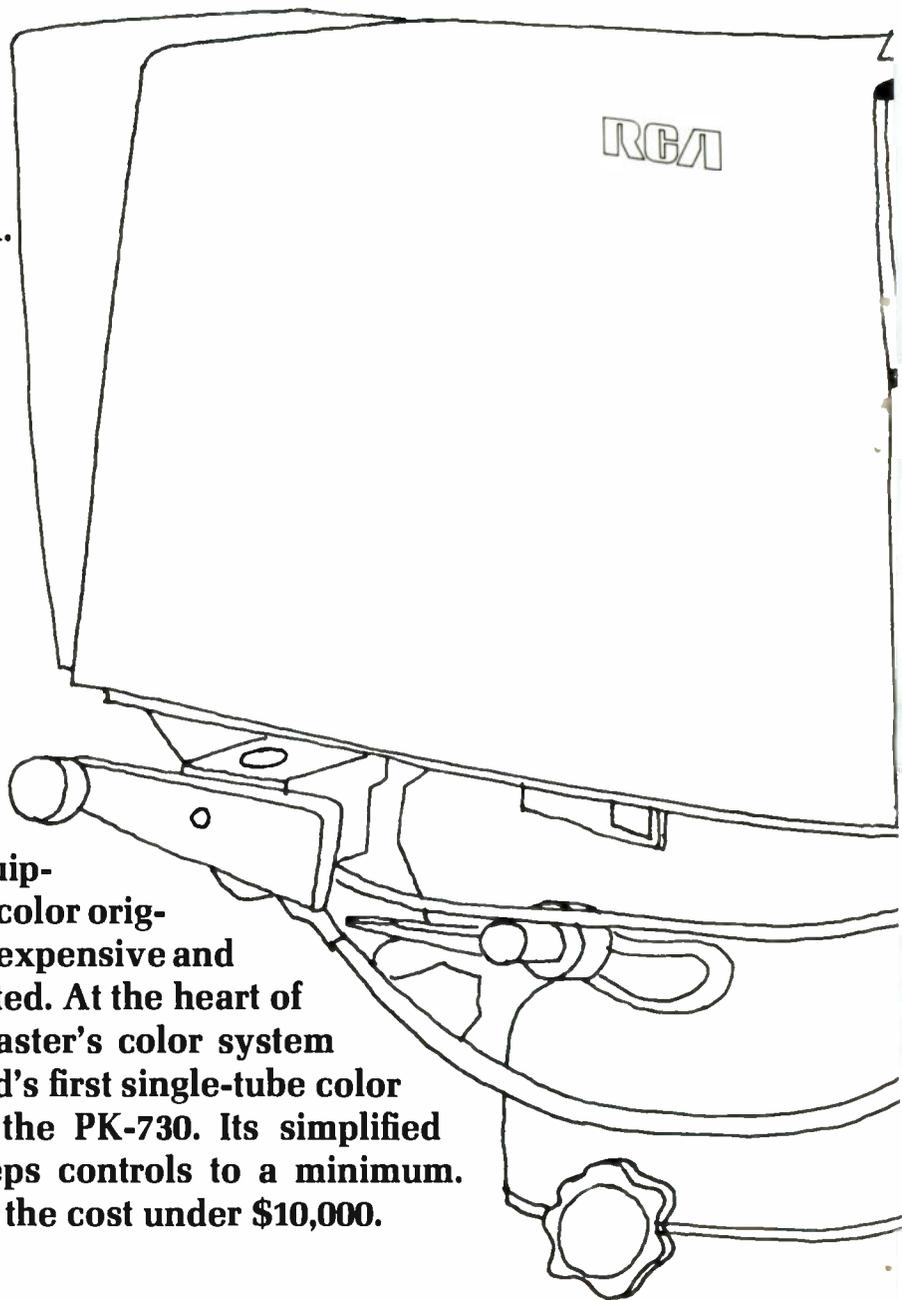


**We have a full complement of "cable mates" to meet your present and future needs—including**

**an exciting line of equip-**

**ment that makes color orig-**

**ination both inexpensive and uncomplicated. At the heart of our cablecaster's color system is the world's first single-tube color camera . . . the PK-730. Its simplified design keeps controls to a minimum. And keeps the cost under \$10,000.**



# Mates

And depending on how elaborate a system you need, or can afford at this time, you can mate your RCA color camera to other low-cost, easy-to-use origination equipment. Like a film system, video tape recorder, professional control center, monitors.

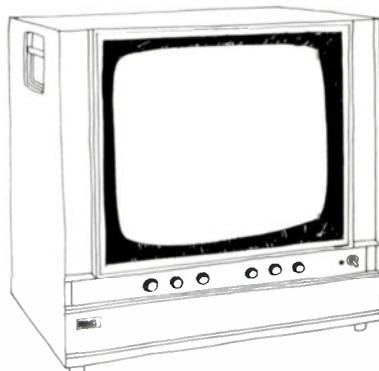
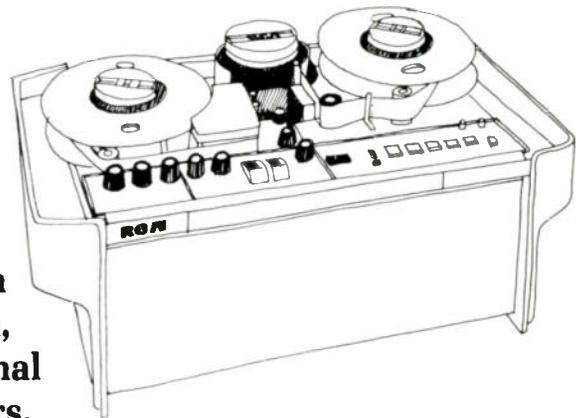
Or a new monochrome camera that can be converted to color at any time!

Each piece of equipment in the RCA color system assures you of quality color.

And you can add to your system without fear of obsoleting your original investment. Because every component is designed to match perfectly with every other one . . . electronically, mechanically and in styling.

For the full story on how to get started with RCA's cable mates, color or even-lower-cost monochrome, write RCA Cable Systems Department, Building 15-5, Camden, New Jersey 08102.

# RCA

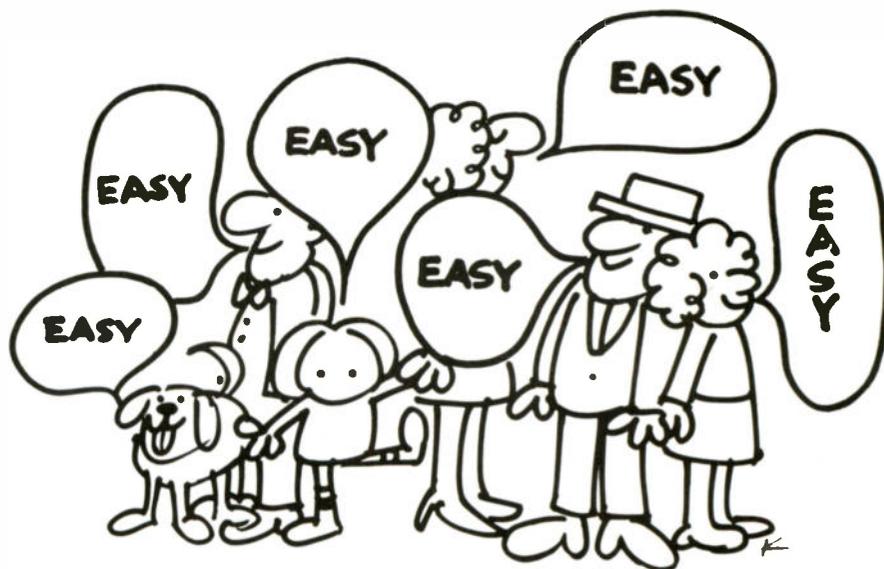


# Everyone in CATV talks about trouble-free operation, but only SKL makes system check-out easy.



The SKL/7224 12-channel oscillator offers a new method of system check-out. It generates signal *anywhere* in the system. The SKL/7224 accurately measures cross-modulation components to NCTA Standards, tests transmission and measures cumulative distortion. This 12-channel unit, each

with individual level control, provides a source for all VHF television picture carrier frequencies. Modules contain a crystal-controlled RF oscillator. Portable or can be rack-mounted. Price: \$5225 for full 12 channels and cabinet. For complete information, write: **SKL** Spencer-Kennedy Laboratories, Inc., 2 Lowell Ave., Winchester, Mass. 01890.



# The TVC Viewpoint

## EDITORIAL



**Robert A. Searle**  
Editor

## Facts About Impact—At Last!

More encouraging sounds from the direction of FCC — the research staff of the Broadcast Bureau has just released the results of a study of the impact of CATV on broadcasting. Findings were no surprise to anyone — except those who really believed cable would destroy “free” television.

The basic conclusion: CATV importing signals in a major market will probably dilute station profitability some, but of a magnitude so small that no one but borderline U’s will really be affected — and even that is not certain. UHF stations will be bolstered by the ability of CATV transmission to put them “on channel” and by the commercial insertion provision of the Public Dividend Plan — if enacted.

Audience fragmentation in San Diego (the city under study) is much less than many would expect. Local stations get 74% of the San Diego cable audience. Imported L.A. independents draw off only 26%. Using San Diego as a model, audience losses for V’s would range from 13%-20% in other cities calculated for. UHF audiences are predicted to *increase* as much as 50% as a direct result of CATV penetration in some cities.

The research staff estimates network revenues would only drop 4-5% by 1975 if the nation is 25% wired by then — hardly a drop in the bucket for an industry whose revenues in 1969 increased by nearly 13% with an increase in profit of more than 64%!

The staff concludes that the

problem of impact may completely disappear, assuming the commercial substitution proposal is practical — a conjecture which is disturbing to say the least to those who claim cable will destroy “free” TV.

The findings of the San Diego study are factual. They are rock-solid findings based on careful research and are by no means unsound. And they are largely representative of the situation as it exists across the nation. *And the FCC has given them due weight.* This is highly encouraging.

Those of us in this industry who shuddered to see the Commission reject the Philadelphia and Goshen impact studies can take considerable encouragement. Today’s FCC does not appear to be afraid of the facts — regardless of their effects on vested interests.

This is another reason why the CATV industry should work hard to be responsive and responsible before this Commission.

CATV’s responsibility is to keep the facts before the Commission and Congress. Now is the time to capitalize on the certainty that your voice will be heard. Now is the time to write the Commission and legislators about the issues which affect cable. Now is the time to stand behind the Political Action Committee for Cable Television and NCTA with your full support.

The time for bringing pressure and education to bear has never been better — *and it has never been more critical.*

The image features three metal pins of different designs, arranged vertically against a black background. The pin on the left has a threaded base. The middle pin has a smooth base. The pin on the right has a base with a single groove. The text 'AS MUCH AS 10% LOWER IN COST!' is overlaid in the center in a bold, orange font.

**AS MUCH AS 10%  
LOWER IN COST!**

# COMM/SCOPE TYPE CA COAXIAL CABLES WITH COPPER- CLAD ALUMINUM CENTER CONDUCTOR!

## IN STOCK FOR IMMEDIATE DELIVERY!

Order now! We can give you immediate delivery on all sizes (412, 500, 750) of Comm/Scope Type CA Coaxial Cables.

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They're available now in Comm/Scope's exclusive Alumagard® and Coppergard® constructions for aerial or direct burial installations.

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# Perspective

---

## on the news



*B. Milton Bryan  
Executive Editor*

Cable television is rapidly becoming a popular topic of business discussion. Increasing numbers of studies to determine the long-term implications of CATV are prophesying an extremely bright future. Beating the cable drum in unison with researchers are the popular and trade press. Everyone is expecting a lot.

However, don't be too quick to build your future on the specific conclusions developed through extensive research projects. Although all prognosticators agree that cable has a bright future, their specific conclusions regarding the size and nature of that future vary considerably.

Problem is, different researchers begin their research and consequently develop their conclusions on the basis of certain assumptions, which may or may not be true.

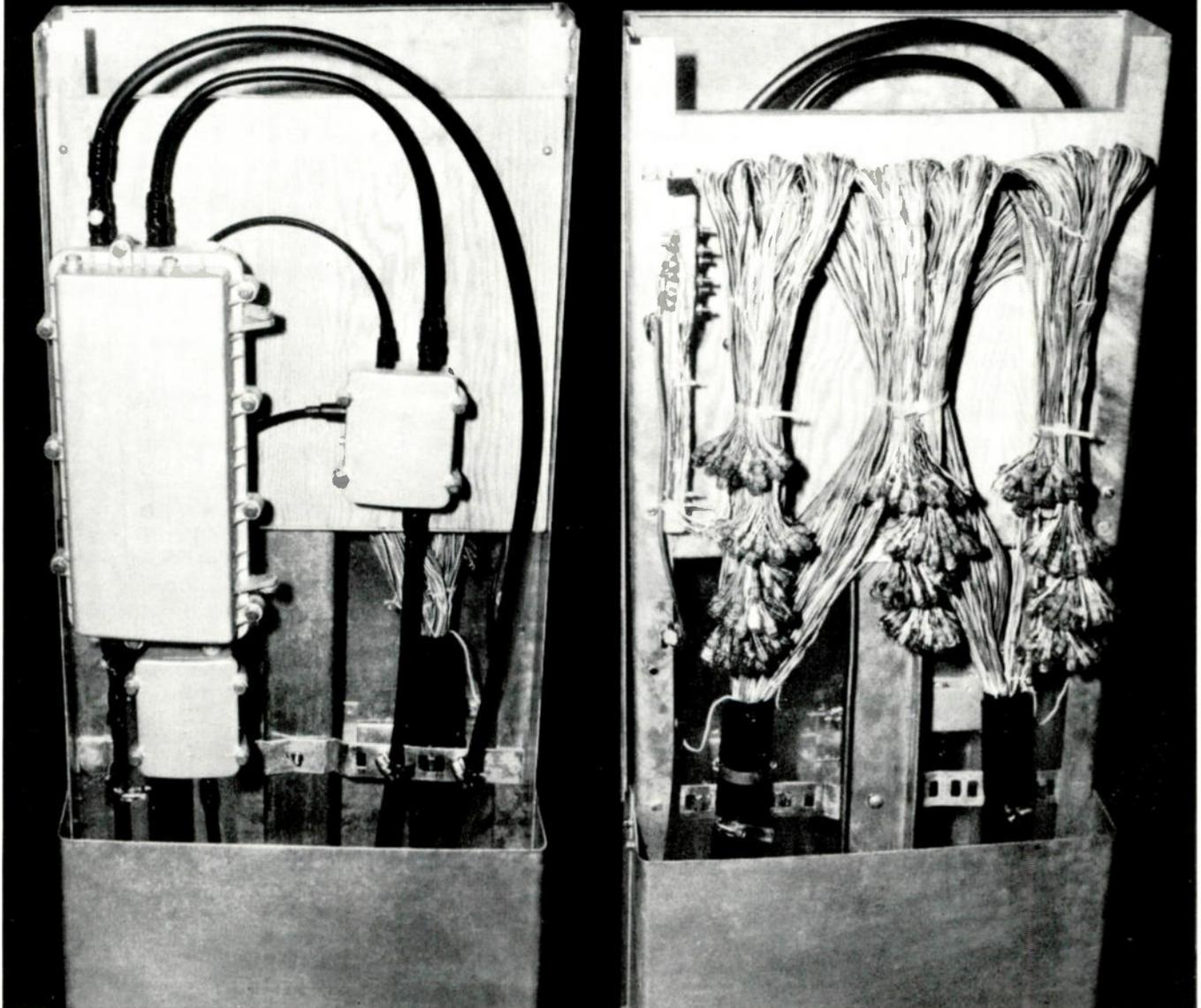
One of the most important assumptions is that CATV will be allowed a future in the top television markets, an opportunity which is not yet ours. Without liberty to develop a marketable service in the top-100, all CATV has is a promising technology with limited applications.

Nothing is certain, least of all the future of our industry in the hands of an agency which has done nothing but oppress it. Although there are some encouraging signs (numerous permits to import signals into top markets but outside the 35-mile limit is a good example) the FCC has yet to give the industry something solid to grow on.

All we have to date is talk. And there is frequently a great gap between political talk and legislative or regulatory performance. The Public Dividend Plan, which apparently hinges on Congressional approval of a new copyright bill, is probably dead until next session of Congress, along with the copyright bill itself.

There has been some talk of an "alternate plan" if the Public Dividend fails, but at this point, it is only more conversation. Nothing specific has come forth. Increasing pressure from the cable camp is seriously needed if the governmental restraints are to be significantly affected in the immediate future.

# Our "D" series terminal housing works both sides of the street.



Telephone cables! CATV components! Both at the same time!

Outside you have a compact, low-profile housing of sturdy, weatherproof construction. It is made of heavy 12 and 14 gauge steel, and is protected with a heavy zinc coating from the IS&W hot-dip galvanized-after-forming process.

Inside you have more space than you would think possible with so compact an exterior. A  $\frac{3}{4}$ " Marine-grade plywood internal separator finished with weatherproof polyurethane doubles as a surface for equipment mounting, and as a divider for the interior space between Cable TV and telephone

terminals.

Here is what you can put into our Series "D" housings:

**Model D-1** Up to 200 pairs of splicing\*; up to 75 pairs of loading and up to 18 pairs of termination. Plus CATV component space of 12" x 18".

**Model D-2** Up to 400 pairs of splicing\*; up to 100 pairs of loading and up to 18 pairs of termination. Plus CATV component space of 18" x 18".

**Model D-3** Up to 600 pairs of splicing\*; up to 150 pairs of loading and up to 18 pairs of termination. Plus CATV component space of 24" x 18".

There are four more good reasons for ordering the Model "D" from IS&W:

Single stake mounting for faster installation; locking facilities to prevent tampering; upper and lower covers are quickly and independently removable for easy access; a full 9 inches of space for pressurization equipment.

\*Based on 22 gauge cable for average ratings.

**INDIANA STEEL & WIRE COMPANY**  
Division of General Cable Corporation  
730 Third Ave., New York, N.Y. 10017.

200-25

**General  
Cable** 

**INDIANA STEEL & WIRE**  
DIVISION

# LETTERS

## Generator Left Out

● "Meet the Sync Generator: Heart of CATV Originations" by Jack Rickel, which appeared in your June issue, was undoubtedly of great interest to the many CATV operators striving to meet the January 1, 1971 deadline.

In a closing paragraph Mr. Rickel listed several sync generator manufacturers; regretfully he omitted Tektronix, Inc. of Beaverton, Oregon. Tektronix, the world's largest manufacturer of oscilloscopes, is also a prime supplier of television broadcast equipment, sync generator included. The type 140 NTSC signal generator provides: color bars, modulated staircase, convergence crosshatch and vertical interval test signals. It is also a

complete EIA Color Standard and Sync Generator with outputs of: subcarrier, composite sync and blanking, vertical and horizontal drive, and burst. Price \$1,800.

In August 1970 we will be announcing a new generator that is similar to the type 140 and designed specifically for CATV. One of the additional features it provides is a unique composite color test pattern.

Ron Wambolt  
Advertising Dept.  
Tektronix, Inc.  
Beaverton, Oregon

*The reader is invited to turn to page 25 for information on Tektronix's new generator.—Ed.*

## Getting Acquainted

● I am interested in finding out about the major cable television companies throughout the country and who some of their key personnel are. I would appreciate it if you could forward me what information you can, or a

directory with such information.

In recent months I have been reading about the great growth and potential of cable television. It strikes me as an area of communications that may well offer new and demanding opportunities to those of us already in the television industry.

Consequently, I would like to establish contact with various cable corporations and see how and where I can fit into CATV with my background—most of which has been in programming and production and has been acquired in network, educational, and local television.

William L. Cooper  
New York, New York

*We are always glad to welcome newcomers to CATV. You should find our two directories—The Systems Directory and Map Service and The Directory of Equipment, Services and Manufacturers—very helpful in getting acquainted.—Ed.*

● I find your magazine very helpful in keeping up with current trends in broadcasting since I am presently responsible for making recommendations for both closed-circuit and studio television equipment.

R. J. Pafford, III  
Production Manager  
KUSD-TV, Channel 2  
Vermillion, South Dakota

## Article Requested

● Please send a copy of George Green's article, "Preparation of a CATV Cash Flow Projection," that appeared in the January 1966 issue of TV Communications to my attention at the above address.

Michael T. Heigle  
Credit Manager  
Craftsman Electronic Products  
Manlius, New York

*A copy of the article is on its way. Photocopies and/or reprints of special articles are available from past issues of TVC. Communications Publishing also offers Cash Flow Projection books at a nominal cost.—Ed.*

TVC

**PRESTIGE CONNECTORS**  
**the REAL WINNER!**

Our new prestige line of seized-center-conductor connectors was designed to return profits to you through quality, reliability and ease of installation.

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# less is more

Less signal distortion, less interference, less noise and less maintenance result in a more profitable operation with Scientific-Atlanta equipment. Consider these examples:

Demodulators have phase-locked synchronous detectors. Quadrature distortion is eliminated. Differential gain and phase distortion are reduced to the lowest levels in the industry.

Solid state signal processors have crystal controlled converters with FET circuitry to minimize cross-modulation. Modular design reduces system down time.

Cavity-tuned VHF preamplifiers in weatherproof enclosures minimize adjacent channel interference, noise, and maintenance.

Rugged broadband antennas, designed for optimum electrical characteristics, have demonstrated less co-channel interference, less maintenance and maximum gain.

See what we mean.  
Your subscribers will.

For more on less, contact Dick Walters, Marketing Manager, Commercial Communications, Scientific-Atlanta, Inc. P.O. Box 13654, Atlanta, Georgia 30324. Phone 404-448-8499.

## Scientific-Atlanta

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We would drop  
300 of our clients  
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because we have

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THE TOP  
COMPANIES  
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## Management Guidelines

*D. Stuart MacPhail  
Managing Editor*



## Winning Employee Confidence

Directing people is the most important job of management; the highest man on the totem pole couldn't succeed without the support of those below him. People simply refuse to follow a man who doesn't fit their concept of a leader; they will work and do only what they have to, without enthusiasm, initiative or effort. Quantity and quality will suffer, and so will a company's profits. All the threats, promises, rewards, coercion and entreaties won't make employees follow an insincere, ineffectual manager.

From the manager's viewpoint, a "no confidence" vote from his subordinates will lessen his chances for promotion. He must secure their *willing* cooperation. Supervisory qualities are a flexible thing, depending upon the group and situation. For this reason, the intelligent leader must be flexible.

A supervisor is usually observed pretty closely. His words and his mood are subject to employee interpretation, or misinterpretation.

It is your job to instill confidence in your people. So you must be sure in your methods, decisive in order and confident in your actions. Employees can be hard judges. If you habitually vacillate; go forward then pull back, issue directions then countermand them, reveal by your actions that you are muddling through an assignment, you will lose the respect of those who report to you. The confidence they have

in themselves depends on their confidence in you, for they know that the success of the group effort is in your hands.

If you want loyalty of your people, you must be considerate of their feelings, their time and their ability. This means you must have sensitivity, because an unthinking, unfeeling person can be inconsiderate and never even realize it.

Your employees write a tough job description for a boss, much tougher than the one management writes. You must understand what they demand of your leadership and you must do your best to give it to them.

They expect you to keep them informed on the work of the department and its objectives. They expect you to tell each one how he is measuring up to his job. They expect you to go to bat for them in matters that affect the department or their interests. They expect you to give credit for jobs well done.

They expect constructive criticism, but they resent arbitrary, unfair or spur-of-the-moment comments on their performance. They expect you to show a sympathetic interest in their problems. They expect you to encourage them to greater efforts. They expect you to plan their time well, and to coordinate their activities.

Above all, they expect you to be a leader. Next month we will take a look at the subject of delegation of authority and responsibility. 

# WE'RE REBUILD & EXPANSION SPECIALISTS

Now is the prime time to begin construction on your new system, or to up-date or expand your present system. CATV technology continues to grow at a phenomenal pace, and more families than ever want the advantages of cable television.

Communication Systems Corporation offers 8 years' nationwide experience in CATV system design, construction, rebuild and expansion, both aerial and underground. We're specialists and we're experienced—we know your problems and what it takes to build maximum profitability into your system.

■ CSC utilizes its own professional engineering department to serve you better. Total integration of system design and construction, including complete head-end surveys, assures efficiency in building plus highest system performance.

■ CSC advanced rebuilding techniques keep system down-time to an absolute minimum. CSC completely overbuilds the existing operating system . . . makes the changeover quickly, only after the newly completed system has been finished and tested. Your bonus: Continuing good public relations.

■ CSC handles the entire system design and construction project for you. This includes all liaison with telephone and power companies to determine pole-line re-arrangements. Total CATV experience guarantees you superior service and workmanship in every phase of construction.

If you're planning to rebuild, expand, or build a new system, let CSC handle your project . . . we'll make your problems our problems.



**COMPLETE  
SYSTEM  
CAPABILITIES**

## COMMUNICATION SYSTEMS CORPORATION

140 EAST MAIN STREET • HUNTINGTON, NEW YORK 11743 • PHONE (516) 271-1262

# FINANCIAL REPORTS

Cypress Communications Corp. reports the results of its operations for the three months and nine months ending March 31, 1970. In the nine months ended March 31, 1970, Cypress' revenues increased to \$4,085,370 compared to \$3,398,838 in the corresponding period of the preceding year. Net earnings were \$48,395, or \$.03 per share, compared to a loss of \$27,951 or \$.02 per share, in 1969. In the three months ended March 31, Cypress reported revenues of \$1,387,098 and net earnings of \$86,450, or \$.05 per share.

Burnup & Sims, Inc. reports per share earnings of \$.90 for the year ending April 30, 1970. This compares with per share earnings

of \$.59 for the corresponding period of the preceding year. Earnings figures are based on net earnings of \$715,200 for 1970 and \$423,000 for 1969. Revenues were \$26,984,600 and \$17,090,100 for the two periods respectively.

Kaufman and Broad reports per share earnings of \$.24 for the quarter ending May 31, 1970. This compares with per share earnings of \$.17 for the corresponding period of the preceding year. Earnings figures are based on a net income of \$2,740,000 for 1970 and \$1,865,000 for 1969. Sales were \$30,764,000 and \$21,737,000 for the two periods respectively. Also reported were figures for the six-month period

ending May 31, 1970. Per share earnings for this period were \$.48 as compared with \$.34 for the same period the preceding year. Net incomes for the two periods were \$2,802,000 and \$1,898,000, based on sales of \$59,338,000 for 1970 and \$41,733,000 for 1969.

Tektronix, Inc. reports per share earnings of \$1.76 for the year ending May 31, 1970. This compares with per share earnings of \$1.75 for the corresponding period of the preceding year. Earnings figures are based on a net income of \$14,254,000 for 1970 and \$14,089,000 for 1969. Sales were \$165,205,000 and \$148,857,000 for the two periods respectively.

General Instrument Corp. reports per share earnings of \$.17 for the quarter ending May 31, 1970. This compares with per share earnings of \$.12 for the corresponding period of the preceding year. Earnings figures are based on a net income of \$1,462,698 for 1970 and \$1,100,689 for 1969. Sales were \$64,993,347 and \$60,105,609 for the two periods respectively.

Communications Satellite reports per share earnings of \$.40 for the quarter ending June 30, 1970. This compares with per share earnings of \$.20 for the corresponding period of the preceding year. Earnings figures are based on a net income of \$3,974,000 for 1970 and \$1,976,000 for 1969. Revenues were \$16,793,000 and \$11,546,000 for the two periods respectively. Also reported were figures for the six-month period ending June 30, 1970. Per share earnings for this period were \$.73 as compared with \$.35 for the same period the preceding year.

Fuqua Industries, Inc. reports per share earnings of \$.22 for the quarter ending March 31, 1970. This compares with per share earnings of \$.24 for the corresponding period of the preceding year. Earnings figures are based on a net income of \$1,484,000 for 1970 and \$1,569,000 for 1969. Sales were \$68,646,000 and \$75,640,000 for the two periods respectively. 

## Are you going to need announcers?

Write me.



**Miss Marijo Rison**  
Job Placement Department

Hundreds of CATV systems are soon going to need announcers. The best come from Columbia School of Broadcasting. We have nearly 500 announcers on the air in radio and TV. Simply write your requirements for a complete resume and photo. Free service to CATVs. We have students coast to coast — we'll select one from your part of the country.

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of Broadcasting  
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San Francisco 94118

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1. Q. **Why the sudden interest in Band Pass Filters?**  
A. Cost. They used to cost about \$75.00. This meant \$1800.00 to clean up a 12 Channel Head End. Now they are \$12.00 and it costs only \$288.00 to put them at input and output.
2. Q. **Where are they necessary?**  
A. Primarily at Head End Signal Processors, at both input and output.
3. Q. **Why at outputs?**  
A. To eliminate "leakage" of 45.75 IF and local channel oscillators.
4. Q. **How can 45.75 harm the pictures?**  
A. Because of loose "tolerances".
5. Q. **How does that affect the matter?**  
A. Plus or minus 100 KC means up to twelve different "45.75's", varying from 45.65 to 45.85.
6. Q. **So what?**  
A. They "beat".
7. Q. **Then what?**  
A. Their "beats" then modulate desired carriers".
8. Q. **Then what?**  
A. A TV Receiver detects them and they appear as "wormy pictures" or "busy backgrounds".....or just plain noise.  
Only \$144.00 per set of 12 channels, 2 thru 13. Less than 12 \$15.00 each.
9. Q. **Back to the Head End...how do they beat without a Detector?**  
A. They don't.
10. Q. **Where is the detector?**  
A. Every non-linearity from Head End "Mixing" to cascaded amplifier.
11. Q. **What's a typical example?**  
A. Signal Processor outputs. They have steep slopes at 45.75 to minimize leakage. When interconnected to other Processors they make near perfect "slope detectors" for 45.75 MC "beats".
12. Q. **What else?**  
A. Broad Band Amplifiers. They also have steep slopes at 45.75.
13. Q. **Why are the "wormy pictures" worse after cascading amplifiers?**  
A. Because you cascade "slope" detectors.
14. Q. **Will Hamlin B.P.F.'s at \$12.00 actually cure this?**  
A. Yes, unconditionally.
15. Q. **Have you sold many?**  
A. More than 8,000.
16. Q. **Is that a lot?**  
A. Probably more than sold by the whole Industry since 1949.
17. Q. **And what did you say the price is?**  
A. Only \$144.00 per set of 12 channels, 2 thru 13. Less than 12 \$15.00 each.

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## Texscan

# Late News

## FCC GIVES 5-2 APPROVAL TO H&B-TELEPROMPTER COMBINE

The Federal Communications Commission last month approved the merger of H&B Communications and TelePrompter Corporation by a vote of five to two. FCC approval was necessary because of the transfer of microwave licenses. However, the Commission was also concerned about the possible implications of the vast combine the merger makes possible.

As of February 1, 1970, TPT owned, wholly or in part, 29 systems with more than 151,000 subscribers. H&B presently operates approximately 100 systems in 23 states. The merger will result in the whole or part ownership by a single entity of approximately 130 systems serving 413,500 subscribers — or about 10% of the total number now receiving cable TV service.

The surviving company in the merger will be TelePrompter Corporation. Hank Symons, TPT Vice President in charge of CATV, will head the new combine. Little replacement of existing personnel, if any, is expected to take place.

At Late News closing, the merger awaited only routine Securities and Exchange Commission approval.

## TOPEKA, KANSAS FRANCHISE AWARDED TO CABLECOM GENERAL

In a four-to-one vote, the city commission of Topeka, Kansas awarded the city franchise to Cablecom of Topeka, a subsidiary of Cablecom General. Cablecom was selected from among the nine applicants vying for the franchise for the city, which has a population of 130,000 and an estimated potential of 40,000 subscribers.

The company's offer includes approximately 4½ percent of gross revenues (\$.20 per subscriber per month on a \$4.40 monthly subscriber charge) to the city, and 2% of gross revenues to the local city-owned Washburn University ETV station. The city is to receive \$150,000 immediately as advance payment in taxes. The ETV station gets \$50,000 immediately. Both fees are to be minimums, paid in advance every three years.

Subscribers will receive free connections, an extra hookup for \$1.00 per month and no charge for reconnects.

In all, the estimated total education contribution amounts to an immediate \$200,000 benefit.

Cablecom General, which has just relocated its offices in Denver, has 105,000 subscribers presently, and will soon be building systems in Amarillo and Corpus Christi, Texas.

## GORDON FUQUA RESIGNS TVC POST; SMITH NOW AT CABLE HELM

A desire to return to the Carolinas and reduce a heavy travel schedule have led Gordon Fuqua to resign from his position as executive vice president of TeleVision Communications Corp. and head of the company's cable division.

Fuqua will remain in CATV however, and plans to continue to be an active TVC stockholder. Company sources say his resignation was accepted with a great deal of reluctance.

# Late News (Continued)

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Replacing Fuqua is Joel P. Smith, whose title will be vice president in charge of the cable division. In this post, Smith will be responsible for the company's CATV operating systems and the acquisition and development of new CATV properties.

Assisting Smith will be newly appointed Edward J. DeMarco, who will come on board as director of CATV system development. DeMarco will be responsible for coordinating franchise applications and system acquisitions for TVC's cable division.

TeleVision Communications Corporation owns and operates 20 CATV systems serving approximately 80,000 subscribers in 12 states. The firm is currently building a system in Akron, Ohio, to serve a potential 150,000 subscribers.

## COMMUNICATIONS PROPERTIES, INC. PICKS UP 31st MARKET PERMIT

Communications Properties, Inc., has announced that final agreement has been reached to start engineering study for installing a CATV system in Columbus, Ohio, whose city council has granted a permit to CPI's wholly-owned subsidiary, Cable Services, Inc.

Terms of the 10-year permit, which goes into effect August 20, call for CPI to submit engineering and construction plans to the council by February, 1971. According to the franchise, construction is to start prior to August, 1971, and is dependent on Federal Communication Commission's approval to import distant TV signals.

The franchise is the third granted for the top-100 city of 540,000 population, and calls for a 6% payment of gross receipts to the city and a \$5 monthly subscriber fee.

The Columbus permit more than doubles the number of potential customers in areas franchised by CPI. Prior to the grant, CPI and Tower Communications had 150,000 potential subscribers in franchised areas. With the 165,000 homes in Columbus, there are 315,000 potential subscribers.

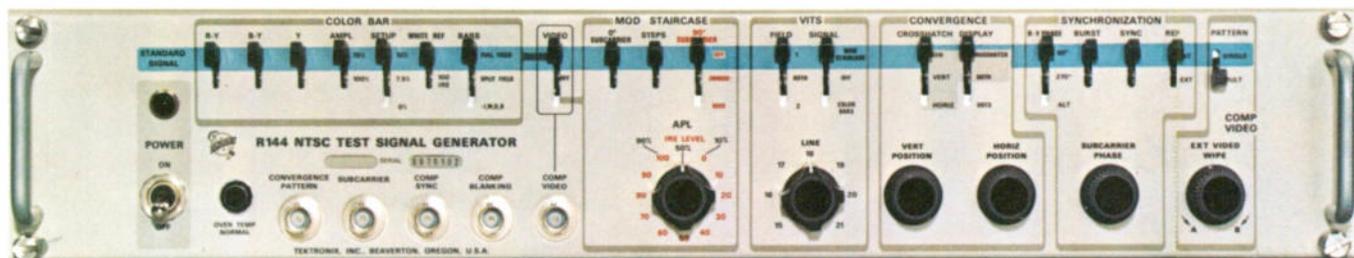
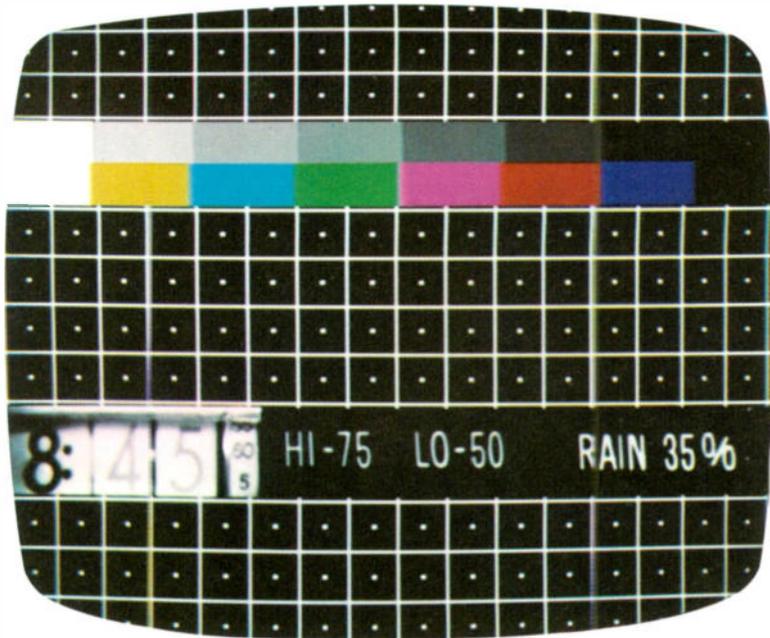
## ✓ SENATE COPYRIGHT REVISION BILL DEAD FOR THIS YEAR

The copyright revision bill was officially abandoned as a possibility this year when Sen. John L. McClellan (D-Ark.) introduced a joint resolution extending the life of expiring copyrights for another year.

McClellan, chairman of the Senate Copyright Subcommittee, noted the impasse over CATV regulation as being a significant factor in the inability to pass the badly needed and oft-delayed bill, but he cited the promises of FCC Chairman Dean Burch for new cable television rules by year's end.

McClellan also pointedly disagreed with the "CATV Public Dividend Plan" proposed by the Commission as part of its regulatory package. He indicated that he thinks that approach of the copyright bill, which relies more on exclusivity protection, is more practical. And of the proposal to have 5% of CATV systems' revenues set aside for the Corporation for Public Broadcasting, McClellan said: "It is not clear why cable television should be required to subsidize public broadcasting."

# New... TV Signal Generator Designed for CATV



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The TEKTRONIX 144 NTSC TEST SIGNAL GENERATOR is a source of high-quality television test signals for cable and broadcast TV systems. It provided the test signals for the composite test pattern pictured above. This unique pattern is of special interest to CATV operators. It contains up to five different signals in each field: CONVERGENCE (crosshatch lines and/or dots), COLOR BARS, GRAY SCALE (color bar luminance levels only) for checking gray-scale color balance and luminance/chrominance registration, and two EXTERNAL VIDEO inputs with manual horizontal wipe. By connecting TV cameras to either or both external video inputs, local programming such as time and weather may be inserted in the convergence pattern. The signals are displayed according to an inter-

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A choice of rackmount or cabinet configurations, compact size and low power consumption (40 watts) make the 144 ideal for CATV or standard broadcast in either control room, bench testing, or field operation.

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## Construction Reports

### Northeastern States

**Saco, Me.**, Coastal Cable & Antenna, Inc., strand mapping completed... **Leicester and Worcester, Mass.**, Parker Cablevision, \$100,000 studio complex nearing completion... **Pittsfield-Dalton, Mass.**, Pittsfield-Dalton Cable TV, adds Channel 22, Springfield, to 12-channel system.

**Hampton and Glen Gardner, N.J.**, Washington Cable Co., construction under way... **Amherst, N.Y.**, Amherst Cablevision Corp., turnkey contract for 200-mile system with Kaiser CATV signed.

**Owego, N.Y.**, TV Cable Co., installs new tower, extends service in the village... **Milford, Pa.**, D.J. Cable TV Co., construction under way... **Dale City, Va.**, C.D. Hylton Enterprises, rebuild planned.

### Midwestern States

**Aurora, Montgomery, North Aurora, and Oswego, Ill.**, Consolidated Cable Utilities, construction under way on 250-mile, 21-channel system... **Creston, Iowa**, True Vue Cable, construction under way.

**Browerville and Sauk Centre, Minn.**, Minnesota All-Channel Cablevision, new 250-foot tower installed... **North Platte, Neb.**, North Platte MultiVue TV System, Inc., new 500-foot tower installed... **Columbus, Ohio**, Canterbury Cablevision, Inc., construction under way.

### Southern States

**Athens, Ala.**, TV Cable Co., raises monthly subscriber rates from \$5 to \$6... **Guntersville, Ala.**, TV Cable Co., expansion now under way... **Davenport, Haines City and Lake Hamilton, Fla.**, TM Communications, tower construction under way.

**Tamarac, Fla.**, University Video, Inc., 250-foot tower installed... **Vero Beach and Ft. Pierce, Fla.**, Florida Cablevision, completes 160 miles of rebuild and 148 miles of new plant... **Quitman, Ga.**, Cable TV of Quitman, Inc., construction now under way.

**Phenix City, Ga.**, Phenix City CATV, expansion program planned; 40 miles of new plant to be installed by January... **Baird and Clyde, Tex.**, Callahan TV Cable Service, Inc., system now 90 percent complete.

**Sulphur Springs, Tex.**, Sulphur Springs Cable TV, construction continuing on rebuild of five-channel system... **Waco, Tex.**, TV Cable, Inc., monthly rate hike of \$1.25, to \$6.50 monthly, with franchise fee hike to \$900 monthly plus one percent of gross receipts, or four percent, whichever is greater... **Temple, Tex.**, TV Cable, Inc., monthly subscriber rate raised to \$6.50 monthly.

### Western and Mountain States

**Green Valley, Calif.**, Listronics, Inc., adds approximately four miles of new plant... **Lancaster, Calif.**, WGN Televents, Inc., hook-ups under way; 12 video channels plus FM offered.

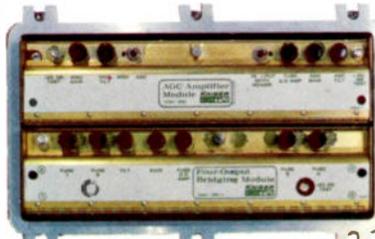
**Sunnyvale, Calif.**, Sunnyvale Cablevision, phase II, consisting of construction of 40 miles of plant, now under way... **Ruidoso, N.M.**, Sierra Cable Vision, construction continuing; over seven miles of underground plant already installed.

TVC



## Another distinction for Akron, TVC, and Kaiser CATV!

Long-famed as the world's rubber products capital, Akron, Ohio, will soon have another claim to fame . . . one of the world's largest and finest CATV systems □ TeleVision Communications Corporation (TVC), holder of the Akron franchise, chose Kaiser's new Phoenician XR (Extended Range) Series for this 1,300-mile dual-cable installation after careful evaluation. The "XR" Series incorporates the latest in push-pull



techniques, and is capable of carrying up to 32 TV channels plus FM on each cable. □ This is the largest CATV equipment order ever placed for a single location! Which backs up what we've been saying all along: From the smallest system to the largest, Kaiser CATV can provide "just right" equipment of latest design and highest reliability. □ If you're thinking small or thinking big, think first of Kaiser CATV.

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## **Nixon Assures Burch Majority; Tabs Unger as FCC Commissioner**

The strong direction of FCC Chairman Dean Burch will be strengthened even further upon the Congressional approval of Sherman Unger as new FCC commissioner. Nixon nominated Unger for the remaining 11 months of Commissioner Wells' term. Wells was appointed to the full seven-year term beginning July 1, 1970 when Ken Cox's term expired.

Unger's confirmation is near certain, although some flak can be expected from the black minority — which has been pushing for a Negro on the Commission.

With Unger on board, Burch will have a Republican majority on the Commission — the first in nine years. Although the Cincinnati attorney and present HUD general counsel is by no means a "yes man," he has been said to respect Chairman Burch and his ability. He can be expected to vote with the Chairman on most issues, but will probably have considerable effect on overall FCC direction.

Unger, 42, was born in Chicago on Oct. 9, 1927. After being schooled in the public school system of Harrison, Ohio, he received an A.B. in public administration from Miami University in Oxford, Ohio, in 1950, then attended the Cincinnati College of Law, from which he received a Juris Doctorate degree in 1953.

Before his appointment as general counsel of the Dept. of Housing and Urban Development shortly after President Nixon took office, Unger specialized in corporate trial law with the Cincinnati law firm of Frost & Jacobs. He joined that firm in 1956 and became a partner in 1963.

In Washington, of course, perhaps even more than his legal experience, a man's political experience counts. Unger came up through the Republican ranks, beginning as a precinct captain in Ohio. He was an advance man for Richard Nixon when he was campaigning for the Presidency in 1960, and, the Unger biography points out, "was the key coordinator in briefing the Republican Presidential and Vice Presidential candidates during the 1968 campaign." Also, in 1964 Unger was a special assistant to the Republican National Chairman — who happened to be one Dean Burch — said to be a personal friend.

### **Johnson Shuns "Activist" Image of Commission**

Controversial FCC Commissioner Nicholas Johnson recently said that the Commission's current image as an "activist" agency is over-blown. He criticized the Nixon Administration for applying pressures on Chairman Dean Burch to replace FCC general counsel Henry Geller and also said that Commissioner Kenneth A. Cox should be reappointed.

Testifying on consumer aid moves before Sen. Edward M. Kennedy (D-Mass.) and his Senate Subcommittee on Administrative Practice and Procedure, Johnson said that "I have done a little survey of the activities of the FCC in the last six to eight months. There has been some relatively uninformed talk recently about 'new activism' at the FCC. Some have even suggested that the agency has been moving so fast it

needs to cool down a little and turn inward.

"In fact," said Johnson, "many of the FCC's so-called 'bold actions' have been in the form of tentative proposals — put forward as *possible* actions for the *future* — which carry with them the strong possibility of long delay and substantive reversal."

### **Controversy Swirls Around Oakland Franchise**

For all intents and purposes, the Oakland, California, CATV franchise has been awarded to Focus Cable of Oakland, Inc. The firm was the low bidder (for subscriber fees) over other CATV firms: CableCom-General, Time Life, American Television Communications and TelePrompTer.

Focus won the franchise for the city which is the last major market left in California excepting Sacramento, with a controversial bid of \$1.70 per hook-up. "But the bid," said Harold Farrow (California attorney, officer and counsel for Focus), "is not the rate at which the subscriber will be charged."

Farrow said that after the first round of bidding for the franchise, contestants were informed by the city that "because the city didn't want to choose between the competing firms, the city council and city staff would draw up a new set of specifications for the franchise." The new franchise proposal was then released for bidding.

Farrow said that the council informed the contestants that charges for the rest of the channels and additional services would be subject to negotiation with the city.

"That's an asinine way to do it," said Farrow. "My opposition to this whole process is on record over at the council for the council and for the staff. I think it's a hassle, but these rules are their (city council and staff) game. The other bidders took a look at it and they said 'we're not going to put any faith in what we could negotiate for: so we're going to charge enough for the 12 channels to recover our whole cost—and we'll throw in the rest of it.'"

## Manhattan, TelePrompTer Snatch Twenty-Year New York Franchises

Under the terms of a new franchise contract with the city of New York, TelePrompTer and Manhattan Cable Television will be required to expand their 12-channel systems to 17-channel capacity by next July 1. The capacity is to be extended to 25 channels within three years. Five channels are to be set aside for public use.

The city is to receive 5 percent of gross revenues from the companies' CATV income, and 10 percent of gross for revenues from all other services. Minimum payment is \$75,000 a year.

The contract settlement was touch-and-go for a while when the board debated the recommendations of FCC hearing examiner David Kraushaar. Kraushaar suggested the city of New York was overstepping its bounds in the regulation of cable, and recommended the New York Telephone Co. be permitted to serve non-

franchised cable operators — namely Comtel, Inc.

Comtel is presently operating a Manhattan system by using the services of New York Telephone Channel Co. The cable company had tried and failed to get a court order to block the hearing.

A previous court ruling that allows Comtel to operate without a franchise was supported by Kraushaar, who referred to questions on the "proper division of responsibility and local authority in the matter of CATV regulation there, to say nothing again about the constitutional and legal authority of the New York City government to do everything it is trying to do . . . Essentially, the franchises issued by municipalities in the state appear by present New York law to be merely authorizations for the use of city streets."

The Board of Estimates hearing was delayed for an hour while the group went into executive session

to consider the hearing examiner's recommendation. The city decided to grant the franchises anyway, concluding "that the recommended FCC action was unsound and legally irrelevant to the board's decision on whether to approve the proposed franchise contracts."

Unless there is an appeal within 30 days, the hearing examiner's recommendations have the full effect of an FCC ruling. The matter goes to the FCC review board if appealed, and from there to the FCC for its consideration.

### Top-100 Leapfrogging Okayed in Oklahoma

Cablevision of Muskogee (Oklahoma) has won FCC permission to carry distant signals, even though they leapfrog closer television outlets not carried.

The cable system is within the predicted Grade A contour of KTUL-TV, and Tulsa is ranked as the 58th market, but Cablevision of Muskogee is more than 35 miles

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amount of heat, slitting with a knife and peeling away. Available in standard lengths from 2" to 12" and five expanded inside diameters of 0.4" to 2.0", each of which offers a shrinkage ratio of three to one; also in bulk 4' lengths (without sealant).

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*This complete color studio at Peninsula TV Power, Inc., Sunnyvale, California is typical of studio systems designed, and installed by IVC.*



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from any television station, and therefore will be allowed to import distant signals. Tulsa stations complained to the Commission that an Arkansas station would be leapfrogged, and that the CATV application should be held up pending resolution of the FCC rulemaking proceedings and Senate consideration of a new copyright bill.

The FCC, however, said that leapfrogging is permissible when the more distant signals are in-state and the leapfrogged signal is not. The Commission also noted that the proposed operation is consistent with its contemplated CATV rules, and that no purpose would be served by waiting until the Senate finishes consideration of the copyright bill.

## Cable Future Bright, Geller's Dim, Burch Reveals at Press Conference

Cable television was very much at stage center when FCC Chairman Dean Burch recently held his second press conference in the nine months he has held office. He said that CATV's future "is consistent with the aims of the Commission," and he commented that "I personally hope cable does realize some of the more esoteric services being talked about."

### Unspecified Slot

He also revealed that FCC General Counsel Henry Geller and Broadcast Bureau Chief George Smith would be replaced within a month. He refused to name their successors.

"I think that every Chairman is entitled to his own General Counsel," Burch said, but pulled out all the stops in praising Geller in these words: "I have not in my experience met with anyone with the intellectual capacity of Henry Geller."

General Counsel Geller has often been credited as the architect of the Commission's repressive policies toward cable in the past.

Although a wide range of Commission activity was discussed at the hour-long press conference, which was attended by about 20 trade and general reporters, CATV was the topic discussed in greatest detail. Early in the session, Burch was asked what the "most pressing" problem facing the FCC

## System Sales

Newly-formed **Burkesville Cablevision, Inc.** has announced the acquisition of **Burkesville Community Television**, a cable system which serves approximately 400 subscribers in Burkesville, Ky. Luther L. Sheperd and Kenneth Ballou were owners of Burkesville Community TV and John P. Blevens is head of Burkesville Cablevision.

**Community Cablevision of South Carolina**, a subsidiary of American Finance System, Inc., has announced the purchase of the Florence, Sumter, Marion and Darlington, S.C. cable systems from **Cosmos Cablevision Corp.**

**TV Cable Co.**, an affiliate of Thumb Video Co., has announced the acquisition of **Booth American Company's** underground cable system which serves a portion of Mt. Pleasant, Mich. Previously, both firms were serving subscribers in the area, and the move was reportedly made to eliminate much needless effort and expense.

**TM Communications**, a wholly owned subsidiary of the Times Mirror Co., has announced the purchase of **Hillsborough CATV, Inc.**, owners of a system serving Plant City, Fla. The purchase of the system is a link in establishing microwave relay stations across Florida, according to TM representatives. 



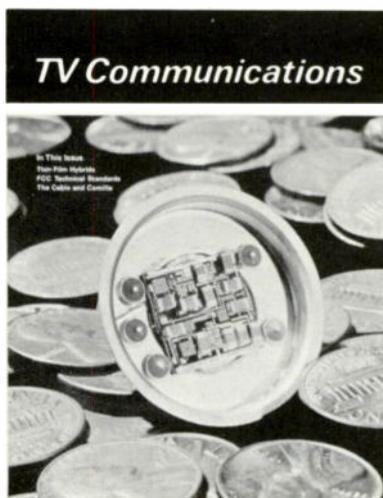
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### This Month's Cover...

Over a two-year period, Anaconda Electronics and Hewlett-Packard Company cooperated in the development of microelectronic circuit applications for cable television. The resulting thin-film hybrid amplifier is pictured on our cover. Read more about this tiny giant . . . and the implications of microelectronic circuit design for future cable communications . . . beginning on page 38. 



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BELDEN 8228	RG-59/U	Foam RG-59/U	Foam RG-11/U
2.5 lbs./100 ft.	3.5 lbs./100 ft.	3.4 lbs./100 ft.	8.2 lbs./100 ft.

Spiral wrapped drain wires provide more equal distribution stresses when flexed for longer service life, preservation of impedance values. Small diameter for space-saving installation in conduits (only 0.242" O.D.)

Easy to install Terminates with standard F-type connectors (Foam RG 6/U size connector with RG 59/U size crimp ring). Available in 100, 500 and 1000 ft. spools or 500 ft. Convert-a-pak (black, white or rose-gray colors). Call your Belden distributor about test sample orders, or send us your bulk quantity order: Belden Corporation, P.O. Box 5070-A, Chicago, Illinois 60680. Phone: (312) ES 8-1000.



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MC	Nom. Attenuation per 100 feet			
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50	1.5	2.4	2.1	1.0
100	2.1	3.4	2.9	1.5
200	3.1	4.9	4.1	2.2
300	3.8	6.1	5.1	2.8
400	4.5	7.1	5.8	3.3
500	5.0	7.9	6.5	3.7
600	5.5	8.9	7.1	4.1
700	6.0	9.6	7.7	4.5
800	6.5	10.3	8.2	4.9
900	6.9	11.1	8.7	5.2

is, and he replied that "one of the most important things we have" is cable television. His analysis of the Commission's past attitude toward CATV was that FCC has decided to carve out a role for CATV that is competitive with broadcasting rather than merely complementary.

#### No Effect in Big Markets

Although Cable TV might have an adverse economic impact on independent UHF television stations, he said, "My own feeling

is that cable in the big markets will have no effect on the network affiliates." And as for the UHF-TVs, he noted that the rules are designed to protect them.

#### FCC Okays Delay

#### In CARS Microwave Switch

In an unusual move, FCC has proposed a rule that would allow CATV microwave stations using Business Radio Service portions of the broadcast spectrum, in the

12200-12700 MHz band, an additional five years to switch over to the Community Antenna Relay Service (CARS) band, which occupies the 12700-12950 MHz band.

When the CARS service was first established in 1965, the Commission gave the CATV industry until Feb. 1, 1971, to switch over from the Business Radio Service. Four licensees of microwave systems in the BRS band asked the FCC for waivers allowing them to continue to operate on their old frequencies.

One of the prime arguments for the waivers advanced by Cox Cablevision Corp., Globe-Miami Cable TV Inc., Garden State Television Cable Corp. and Florida Antennavision Inc. was that the new equipment would be an extreme financial burden. Their old equipment would have to be changed at a substantial cost before its useful life had expired.

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## Calendar

**September 21-22.** The Mississippi CATV Association will hold its annual meeting at the Holiday Inn, Highway 80, Jackson, Miss. For further information contact Dan L. Boyd, General Electric Cablevision Corp., 504 Corine St., Box 1608, Hattiesburg, Miss. 39401 (601) 582-1981.

**September 28-29.** The Pacific Northwest Cable Television Association will hold its fall meeting at the Hanford House Convention Center, Richland, Wash.

**October 1-2.** The New York State Cable Television Association will hold its annual fall meeting. For further information contact W. Beardsley Van Etten, president.

**October 1-2.** The Tennessee CATV Association will meet at the Sheraton Hotel, Nashville, Tenn.

**October 7-9.** The Pennsylvania Community Antenna Television Association will hold its annual fall meeting at the LeChateau, White Haven, Pa.

**October 4-9.** The Society of Motion Picture and Television Engineers will hold a cable TV symposium at the New York Hilton Hotel, New York.

**October 28-30.** The Mid-America CATV Association will hold its fall meeting at the Glenwood Manor Motel, Overland Park, Kan. For further information contact Holland Meacham, Royse and Meacham, 119 South Jefferson, Elk City, Okla. 73644. 

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# FOCUS

## ... On People

### Systems

TelePrompter Corp. has recently made four new appointments. Ted Chanock has been named to the new position of Western regional manager. In his new position Chanock will supervise TelePrompter's 11 western systems. Bart Swift, formerly sales director of TPT's Group Communications Division, has been promoted to the position of district manager for TPT's seven systems which are to be built in Connecticut. Sherril Schroeder has been appointed manager of TelePrompter's CATV system in Liberal, Kan. J. Phil Franklin, formerly director of systems operation for Entron, has been

named manager of the new TelePrompter Island Cable TV system which serves Islip, R.I.

Clearfield TV Cable Co., a Television Communications Corp. subsidiary which serves Clearfield, Pa., has announced the appointment of James Armstrong as manager. He replaces Harvey Rennie who was transferred to Pittsfield, Mass.

Burt I. Harris, president of Cypress Communications Corp., has announced the appointment of Theodore J. Swanson as technical director. Formerly director of engineering of Harriscope Cable Corp., Swanson will now be responsible for technical supervision of Cypress' systems which

operate in approximately 80 communities throughout the U.S.

Alfred E. Anscombe, president of Amherst (N.Y.) CableVision, has announced the appointment of Charles C. Monde as manager, and Stewart Fraser as chief engineer. In their new positions, Monde will be in charge of operations and sales, and Fraser will supervise construction, for the system now being built.

### Suppliers

Alfred L. Ginty has been named general manager of Anaconda Electronics Co. Ginty was instrumental in the formation of Anaconda Electronics in 1966 and served as vice president, marketing and sales at that time.

Kaiser CATV has announced the appointment of Richard L. Rokes as administrative assistant to Robert W. Behringer, vice president of Kaiser Aerospace & Electronics Corp. and CATV Division manager. He was formerly vice president and general manager for Community Telecable of Seattle/Bellevue, Inc., a subsidiary of NBC. Kaiser CATV has also named Sidney A. Mills as manager, cable operations.

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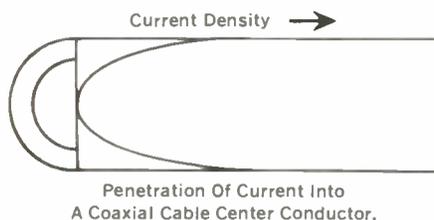
Robert Searle, President of Communications Publishing Corporation, has announced the appointment of Robert Titsch as Vice President-Sales for the firm. Titsch was most recently Sales Manager for National Cable Television Institute, coming there from the post of Executive Vice President for Travelers Motor Club. Prior to that, he was Sales Manager for CPC. In his new position, Titsch has responsibility for sales operations on all CPC products, including *TV Communications* and *CATV* magazines. R. Wayne Wilson, formerly Vice President-Marketing, has assumed the post of Vice President-Market Development for the firm. In his new post, Wilson has responsibility for market research and development for existing CPC publications as well as new products.

rvc

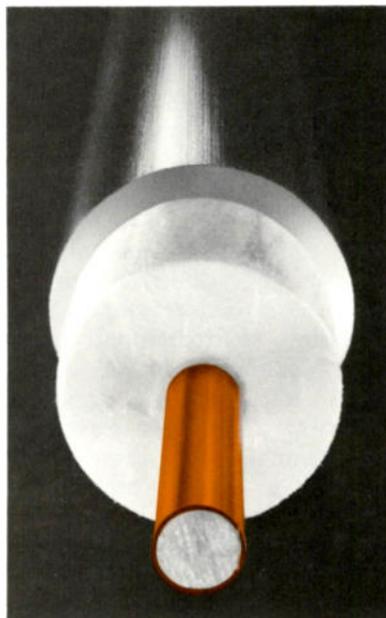
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# Beginning of a New Era: Microelectronics for CATV

Most cable people want their systems to grow into broader communications applications. Micro-circuitry will be the basis of such CATV growth. Not a pie-in-the-sky idea, thin-film hardware is available NOW.

*By Andy Fiamengo  
Anaconda Electronics*

An important development in cable television technology was achieved this year and unveiled at the 1970 NCTA convention in Chicago this past June. At that time, Anaconda Electronics of Anaheim, California, introduced the first push-pull broadband communications amplifier in the CATV industry, using hybrid thin-film integrated circuits as the heart of the amplifier.

This technological advancement signifies a new era in the state-of-the-art for cable system circuit design. It promises operational quality and reliability which was heretofore not applied to the CATV industry. The application of microelectronic circuit design implies the awakening of whole new areas of cable communications applications which will broaden the role of the CATV system, providing something more than television entertainment.

Anaconda Electronics, a division of Anaconda Wire and Cable

Company, is now in production and taking orders for their new amplifier line which employs the hybrid thin-film push-pull integrated circuits. The new line is named the "Century Series Amplifiers."

"The new line offers full capability for any application on the trunk or distribution lines, including bi-directional capability," according to Al Ginty, General Manager of Anaconda Electronics. "We have developed and brought to the CATV industry a new technology, advancing the state-of-the-art for cable communications systems — backed up with hardware... now!"

The entire Anaconda amplifier is so small that it has been enclosed in a shielded, hermetically sealed package. There is no way a system technician can inadvertently damage the unit by shorting it to ground with an alignment tool or meter probe. In

this manner, components of the r-f amplifier are also shielded from the environment. The small size of Anaconda's new amplifier means more communications functions are now possible in the same volume of space that is normally used exclusively for r-f amplification.

## Microelectronics Vs. Contemporary Semiconductor Designs

R-f circuit design in microelectronics more closely approximates a science rather than an art (as is the case to a large degree in discrete component amplifiers). With the design parameters well defined, a high degree of production consistency can be realized in microelectronic circuitry.

These design parameters can be well defined because of the miniature size of the amplifier components and because the

component values are highly repeatable. Also, test equipment developed in the past five years has made it possible to more accurately measure and characterize r-f components and circuits.

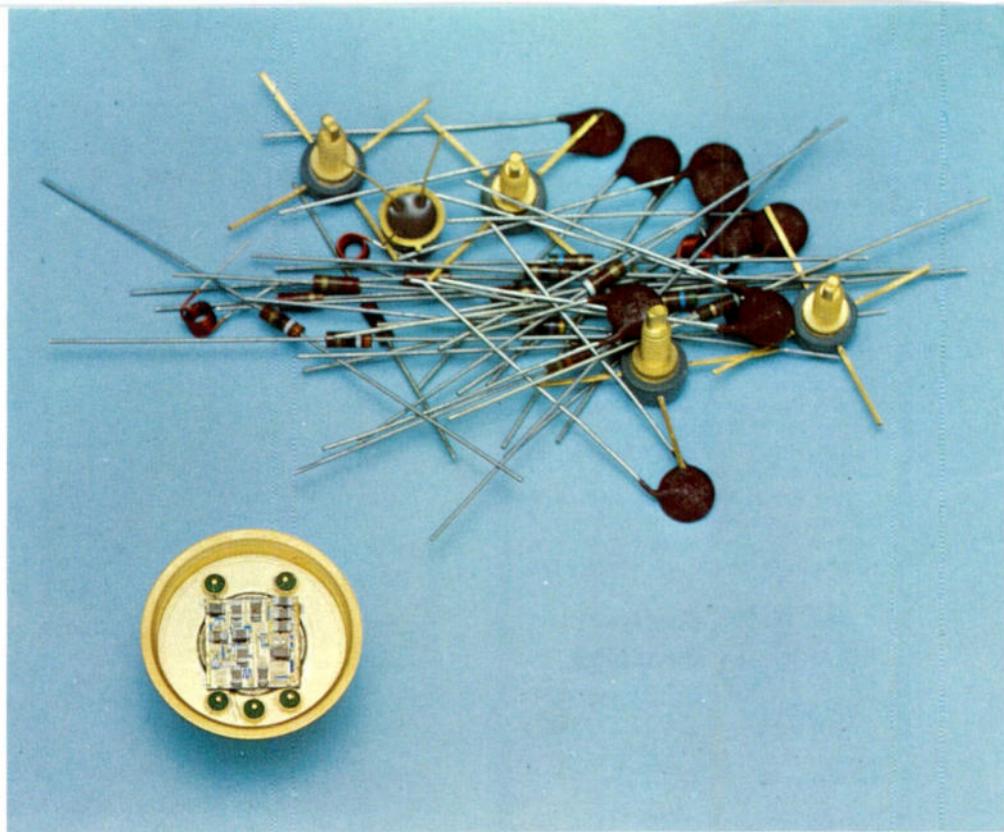
The benefits of hybrid thin-film push-pull IC amplifiers are not limited in application to the large metropolitan areas, but can easily be used in conventional, one-way, twelve-channel systems. A list of advantages offered by microelectronic CATV circuitry is as follows:

**Higher Performance — Quality** of the product is less dependent on assembly techniques. Hence, a better chance of sophisticated circuitry working and providing higher performance because of reduced solder connections and lead length variation. In addition, miniaturized circuits allow full utilization of transistor capabilities. The discrete component amplifier requires lead lengths (especially in the emitter circuit) which limit the high frequency and cross modulation performance. Therefore, a higher performance is obtained in the hybrid thin-film amplifier utilizing the same transistor chip as used in the discrete component package.

**Simplified Operation —** The number of discrete components in the finished product is reduced. Amplifier operation (controls and alignment) is simplified and, therefore, reliability is improved.

**Improved Consistency —** The hybrid thin-film amplifier lends itself to manufacture and testing by automated production equipment to provide more consistent product performance.

**Stability of Performance —** In the case of Anaconda's new products, the broadband, r-f amplifier consists of thin-film components on an approximately ½ inch square substrate. The temperature variation between components is minimized since these components are in such close proximity. Also, a unique feedback design insures stable performance over a wide temperature range. This means the operator would have fewer maintenance requirements comparing discrete versus hybrid in identical systems.



*The new hybrid thin-film amplifier (shown in housing, lower left), and the comparable, conventional discrete components needed to build the same circuit.*

## The Development Of Thin-Film Hybrids

Anaconda Electronics began work on microelectronic circuit design two years ago. At that time, Gaylord G. Rogeness, Director of Engineering at Anaconda, was involved with the development of bi-directional cable repeater amplifiers. Realizing that bi-directional capability, employing state-of-the-art of that time, would yield an amplifier whose housing would be unwieldy, Mr. Rogeness foresaw that the microelectronic circuit application was the ideal solution.

Anaconda Electronics has collaborated with Hewlett-Packard Company on the project since 1968. Two project engineers, Bill Nelson and Ralph Eschenbach, from Hewlett-Packard, worked closely with Rogeness to design and produce a working prototype of a miniature, broadband power amplifier. In December of 1968, this goal was accomplished. A complementary push-pull output stage was completed in the form of a hybrid thin-film amplifier.

The following six months, through extensive use of computer-aided circuit design, saw the

design, manufacture, and test of a four-stage r-f integrated circuit amplifier. In July of 1969, twenty engineering prototype hybrid thin-film amplifiers, each housed in a stud-mounted package, were completed. Exhaustive testing of these units has culminated into over 100,000 hours of hybrid thin-film amplifier operation in actual CATV systems.

## A Marriage Of Techniques

The term hybrid thin-film amplifier applies to the marriage of two microelectronic techniques. The resulting integrated circuit is therefore a combination of miniature discrete components bonded to thin-film circuits. Discrete components are usually chip coupling capacitors and chip transistors, while the thin-film circuit is made up of a number of layers of tantalum, gold, tantalum nitrate, and other elements applied on the substrate.

When appropriately patterned and etched, the thin-film layers result in the resistors, inductors, and conductor interconnections for the r-f circuit. The thin-film circuits are affixed to a synthetic sapphire substrate which has

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Gay Rogeness (r), Director of Engineering at Anaconda Electronics, and Vic Tarbutton (l), R & D Engineer were key men in Anaconda's development of microelectronic circuitry for CATV. They are shown here displaying the new hybrid thin-film IC amplifier as it is located in a module of the Century Trunk Amplifier.

excellent heat dissipating and optical flatness properties. This substrate is the counterpart of the conventional discrete component amplifier printed circuit board prior to etching. Because of its low thermal resistance, heat is quickly removed from the circuit, allowing it to operate at a temperature which ensures long life.

The hybrid thin-film push-pull integrated circuit amplifier, within its housing (which is slightly larger than a quarter of a dollar), represents a host of conventional discrete components and semi-conductors which would make up a comparable circuit ten times its size in area (a size comparison of the hybrid thin-film amplifier, a quarter, and a transistor of the type used in many CATV amplifier power supplies is illustrated in figure 1).

This means that new cable repeater amplifier capabilities can now be exploited since more circuits can be designed into a given housing. Specifically, at this point in time, it means that the bi-directional capability which Mr. Rogeness developed for Anaconda two years ago is finally realized within a state-of-the-art far in

advance of conventional techniques.

### Anaconda's Technical Specs

Typical performance specifications for Anaconda's hybrid thin-film amplifier used for trunkline application are listed below:

Gain	30 dB
Bandwidth (Operating)	40-270 MHz
Flatness	±0.3dB
Noise Figure	
Ch 2	6 dB
Ch 13	8 dB
Cross Modulation*	<-100 dB
Intermodulation	<-82 dB

\*Cross modulation measured using synchronous sync, 12 channels with no block tilt at output level of +32 dBmV.

The cross modulation characteristic of the amplifier follows a 2 for 1 derating curve within its linear region; that is, for each 1 dB the signal levels are changed, the cross modulation changes 2 dB.

The bandwidth of the repeater amplifier station is determined by discrete component equalizers and power supply decoupling networks. The hybrid thin-film amplifier has usable bandwidth beyond 300 MHz at the high end

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**Gene Iacopi**  
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Figure 1: The Small Hybrid Thin-Film Amplifier, Compared with a Quarter and a Transistor from a Conventional CATV Amplifier Power Supply.

and below 10 MHz at the low end. Therefore, the bandwidth of the repeater station is determined by discrete passive components external to the hybrid thin-film amplifier.

The hybrid thin-film amplifier is packaged in a hermetically sealed enclosure. Making any adjustments inside of the package after it is sealed is therefore not possible. The hybrid thin-film amplifier consists of a preamplifier with nominal gain of 14 dB and a complementary push-pull power amplifier with 16 dB gain. An external discrete component pre-equalizer and interstage gain control network convert the flat gain hybrid thin-film amplifier to a cable repeater amplifier. This approach is intended to provide the greatest flexibility for aligning the equalized repeater for various types and lengths of cable in the field. A block diagram of the cable repeater amplifier is shown in figure 2.

The variable gain and variable slope networks were designed to accept control currents which are derived from two pilot carrier levels. The dual-pilot AGC system then functions with the low-frequency pilot controlling slope and the high-frequency pilot controlling flat gain.

The Anaconda bridging or distribution amplifier is also a hybrid thin-film amplifier. Hence, all broadband amplification circuits in the system are accomplished by hybrid thin-film integrated circuit amplifiers. All broadband gain, slope, and equalizer circuits are realized by the use of discrete components external to the hermetically sealed hybrid thin-film amplifier.

## Microelectronics And Two-Way Transmission

New vistas of practical application are opened because of the bi-directional capability within one package brought about by the

The bi-directional transmission paths to carry these features to and from subscriber homes are now a reality. It remains for the peripheral systems to be developed, some of which are further down the road than imagined, to interface with the two-way cable communications system.

The age of microelectronics is here today. The advantages of this technology have now been applied to solve many of the cable repeater amplifier problems. The higher performance available from microelectronic circuits will provide the CATV system operator with broadband amplifiers which will improve and simplify the operation of this

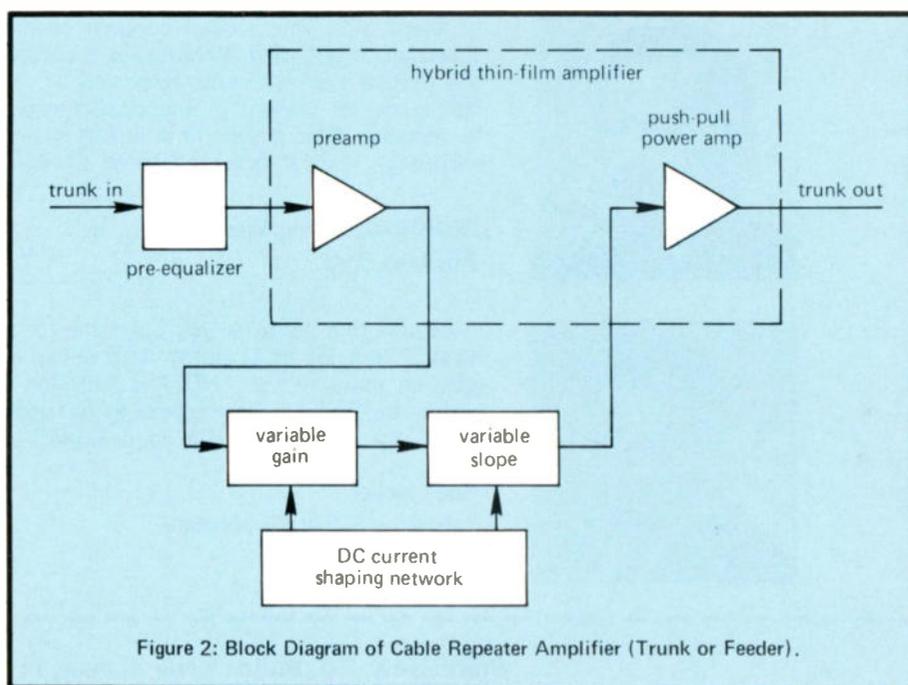


Figure 2: Block Diagram of Cable Repeater Amplifier (Trunk or Feeder).

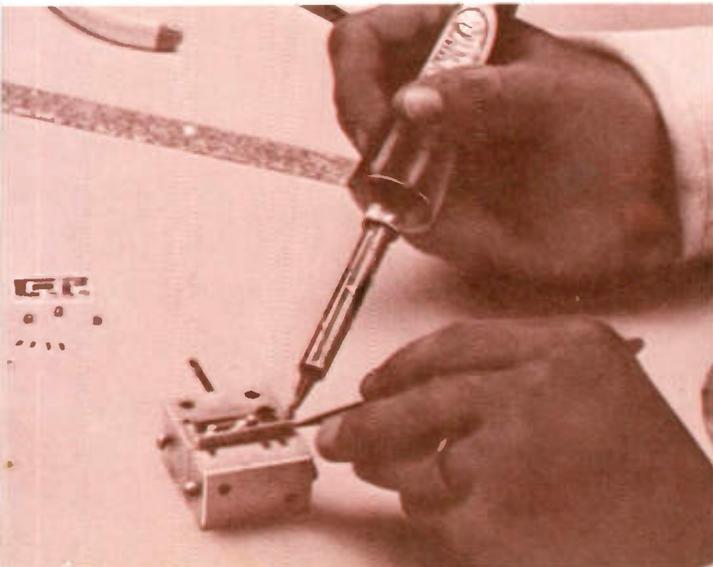
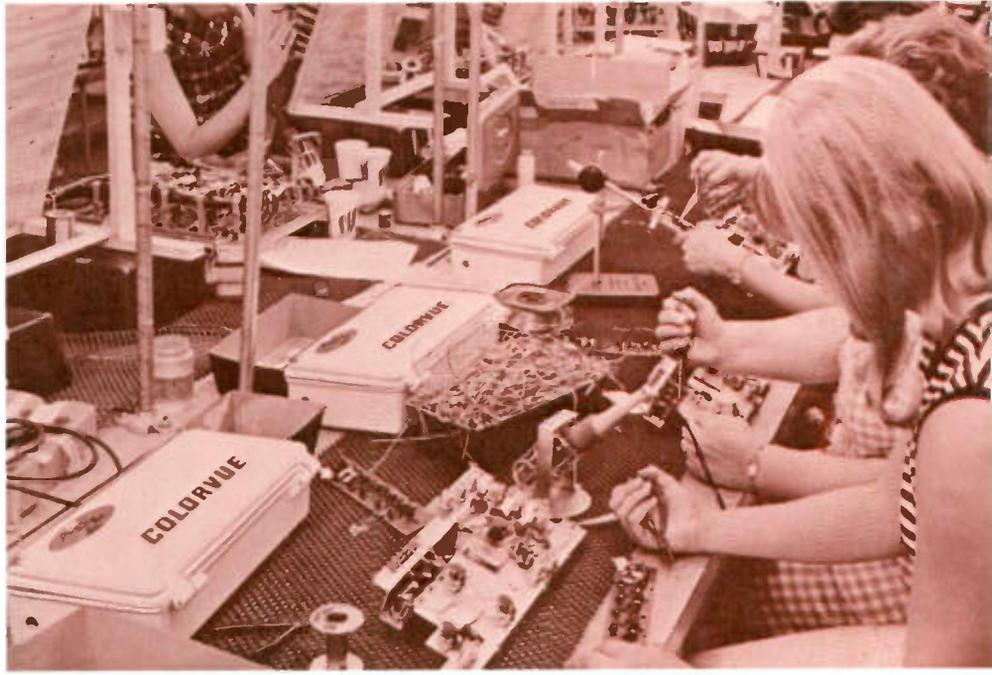
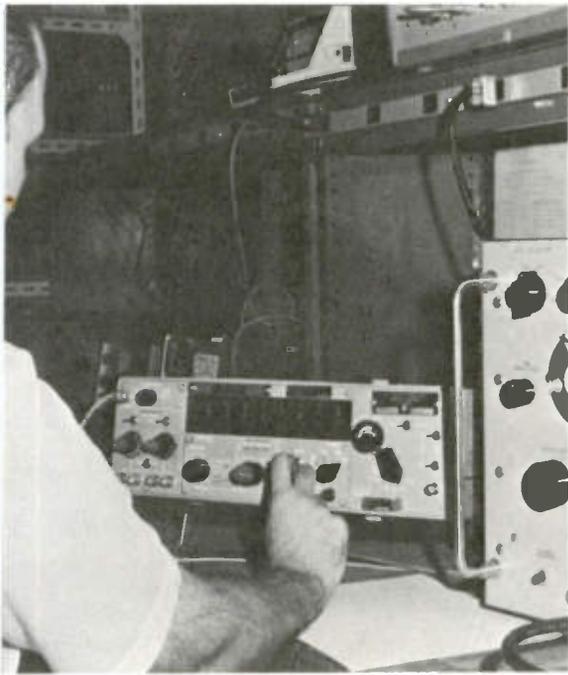
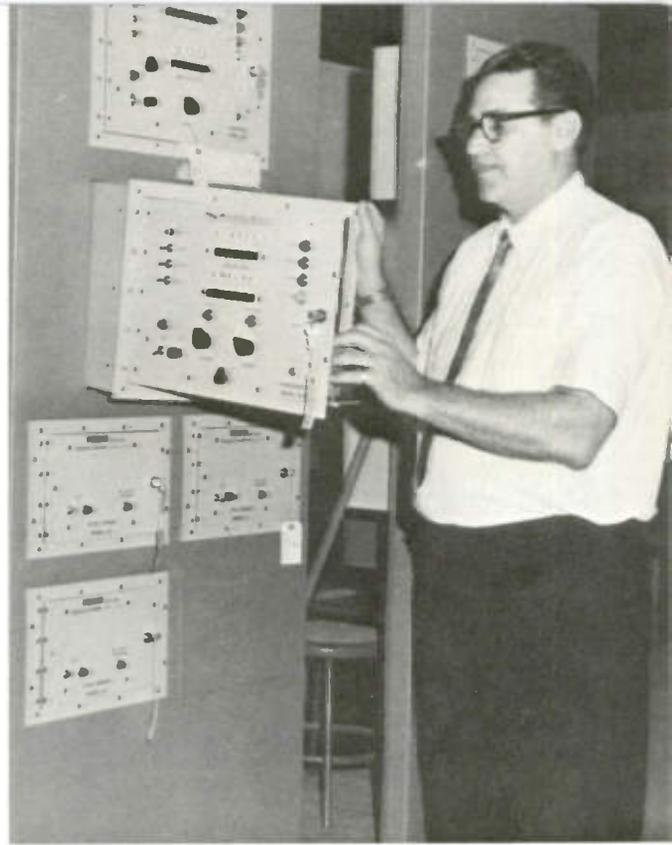
sophistication of microelectronics. A major application will initially be to allow distribution of remotely originated programs via reverse transmission paths of CATV systems.

Future glamour features for each home in the system would include: (1). Remote utility meter reading, (2). Preference polling (voting, shopping, program rating, etc.), (3). Subscriber fire alarm protection, (4). Subscriber burglar alarm protection, (5). Instructional programs, (6). Facsimile, and (7). Electronic mail delivery.

system. It will not be long before r-f microelectronic circuits will completely replace discrete component transistor amplifiers, just as the discrete component transistor amplifiers replaced vacuum tube amplifiers. TVC

Editor's Note: A six-page technical bulletin on the "Two-Way Repeater Station Utilizing a Hybrid Thin-Film Amplifier as a Building Block," is offered free by Anaconda Electronics. The bulletin is based on a paper presented at the NCTA Convention, June 9, 1970, by Gaylor Rogeness, Director of Engineering for Anaconda. Write to 305 North Muller Street, Anaheim, California 92803.

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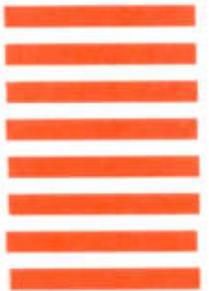
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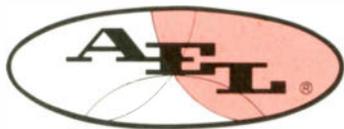
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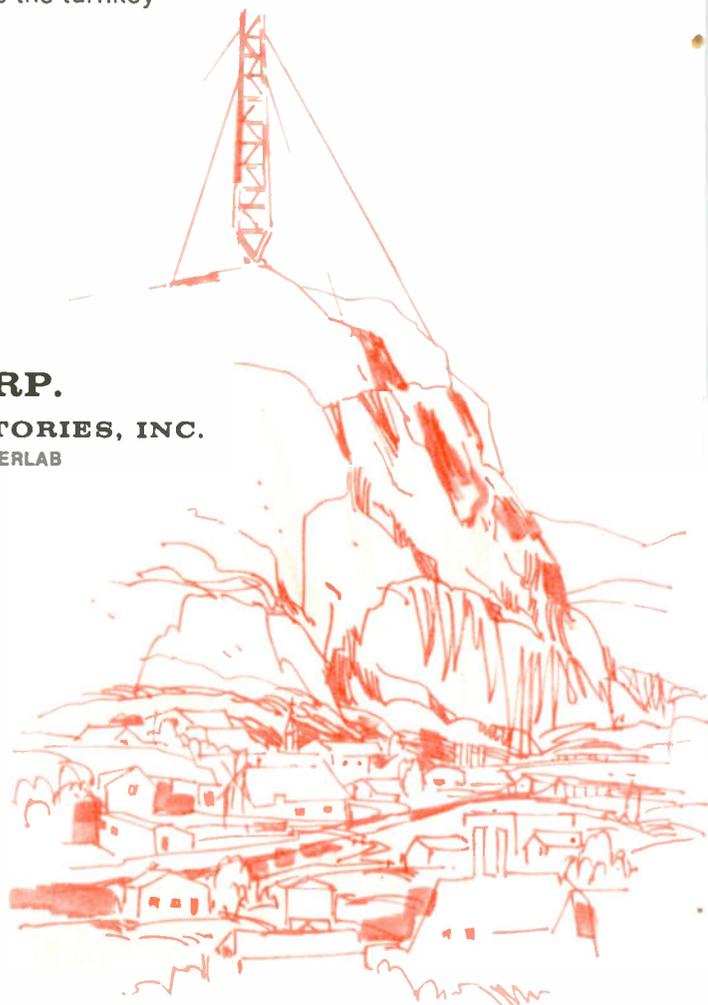
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# Cable System Offers Special Medical Channel

Communications services for non-mass audiences are sure to be part of cable's future. Here is a system that already has such a service under way.

*By Ed J. Prendergast  
Vice President and General Manager  
Louisiana Cable TV, Inc.*

The Louisiana Hospital Television Network, described as the most complete closed-circuit hospital TV system in the nation, now uses cable to extend its influence.

Recently, this special network was tied in to the facilities of Louisiana Cable TV, Inc. so that its programming can now be fed directly into the homes and offices of doctors and medical personnel of the Lake Charles, Louisiana area.

In order to view LHTN programs, it is necessary to have an "unscrambling" converter attached to a standard TV set. Thus, regular subscribers of Louisiana Cable TV are not able to receive the medical channel.

The LHTN transmissions are not new to Lake Charles, nor are the methods of converting the scrambled signal. What is new, however, is the concept of presenting the 9 hours of medical network telecasts in both the home and the offices of those in the medical profession.

Since 1967, LHTN has been

telecasting medical programs to 15 hospitals and medical schools throughout the state. The sending and receiving outlets are interconnected by South Central Bell microwave and land lines. Under this system, the doctors have to be at one of the receiving points to view the telecasts, which are presented daily from 8 a.m. to 5:00 p.m.

Because of professional demands on the doctors' time during this portion of the day, and because they had to be at a certain place to view the programs, many of the doctors found it impossible to see many of the LHTN programs.

Working with the Calcasieu Parish Medical Society's committee on continuing education, Louisiana Cable TV offered to present LHTN programs to the doctors of Lake Charles on a restricted channel, to their homes and/or offices. Cable lines were extended from Lake Charles Charity Hospital to the studios of Louisiana Cable TV and the new service was under way.

The telecasts are picked up on one of the nine mid-band channels between Channels 6 and 7. The unscrambler is necessary for this pickup. Local doctors and medical personnel will view the LHTN telecasts on Channel 6-G.

Louisiana Cable TV supplies the unscramblers to persons authorized by the Calcasieu Parish Medical Society to receive them. The converters may be purchased or leased.

LHTN operates studios at several hospitals and medical schools in the state: central control studios and Earl K. Long Hospital, both in Baton Rouge; the Louisiana State University Medical Center, Tulane University Medical School, Charity Hospital, and Ochsner Foundation, all in New Orleans; and Confederate Memorial Medical Center, Shreveport.

Actual surgical operations are shown, plus educational programs for nurses, administrative employees, and students, along with medical newscasts. The majority of the programs are live. Others are on film or video tape. 

# CATV Construction Contractors Directory

The firms listed here are currently engaged in cable system construction in North America. They should be contacted for details of specific construction capabilities and specialties omitted from this quick reference listing.

**A & M Construction;** 2009 Main Street, Sulphur Springs, Tex. 75482. Ph. (214) 885-4619; New or rebuild construction.

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

**Ameco, Inc.;** 2960 Grand Avenue, P.O. Box 13741, Phoenix, Arizona 85002. Ph. (602) 252-7731; Provides engineering planning and installation. Specializing in complete "turnkey" completions.

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

**J. C. Barnard & Assoc., Inc.;** 10121 Manchester Rd., St. Louis, Mo. 63112, Ph. (314) 966-2116; Construction and engineering

services, two way maintenance and restoration.

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

**Beaver Television Associates;** 287 Eddystone, Downsview, Ontario, Canada; Ph. (416) 635-0320; Turnkey construction of head-end signal survey, design, fabrication and installation of towers and antennas.

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

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

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

**Cable Communications Corp.;** 2326 N. 149th, Seattle, Washington 98133; Ph. (206) AT4-2288; All types of CATV construction work.

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

**Cable Constructors Inc.;** 203 Stephensen Avenue, Iron Mountain, Michigan; Ph. (906) 744-6621; Complete turnkey, engineering and construction supervision capabilities.

**Cable Services Corp.;** 321 South Second Street, Renton, Washington 98055; Specializes in CATV construction.

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

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

**Cablevision Construction Co.,** 528 Michigan Street, South Houston, Texas; Ph. (713) 941-1480; formerly known as Oklahoma Cable Const. Co., Inc.; Experienced in all phases of CATV construction.

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

**William B. Carr & Assoc.;** 4028 Daley, Walker Building, Fort Worth, Tex. 75118. Ph. (817) 284-9311; Provides engineering and construction services for CATV.

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

**Cascade Cable Constructors;** P.O. Box 604, Wenatchee, Washington 98801; Ph. (509) 884-7161; Complete turnkey capabilities for new systems or rebuilds.

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

**CATV Cable Construction Co.;** 2820 Auburn Blvd., Room 5, Sacramento, Calif. 95821; (916) 481-4888. Design engineering, construction and rebuild services.

**CATV Equipment Co.;** 1422 34th Avenue, Seattle, Washington 98122; Ph. (206) 325-6938. Specialists in all-band systems, providing complete construction services, layout equipment and installation.

**CATV Services Co.;** P.O. Box 574, Worland, Wyoming 82401; All kinds of cable system engineering and construction.

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

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

**Commco Construction Div.;** 802 Brown Building, Austin, Texas; Ph. (512) GR6-3531; Complete construction capabilities.

**Communications Construction Corp.;** 40 North Park Avenue, Lisbon, Ohio 44432; Ph. (216) 424-7055; Specializing in CATV plant construction; aerial or buried plant.

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

TV Communications

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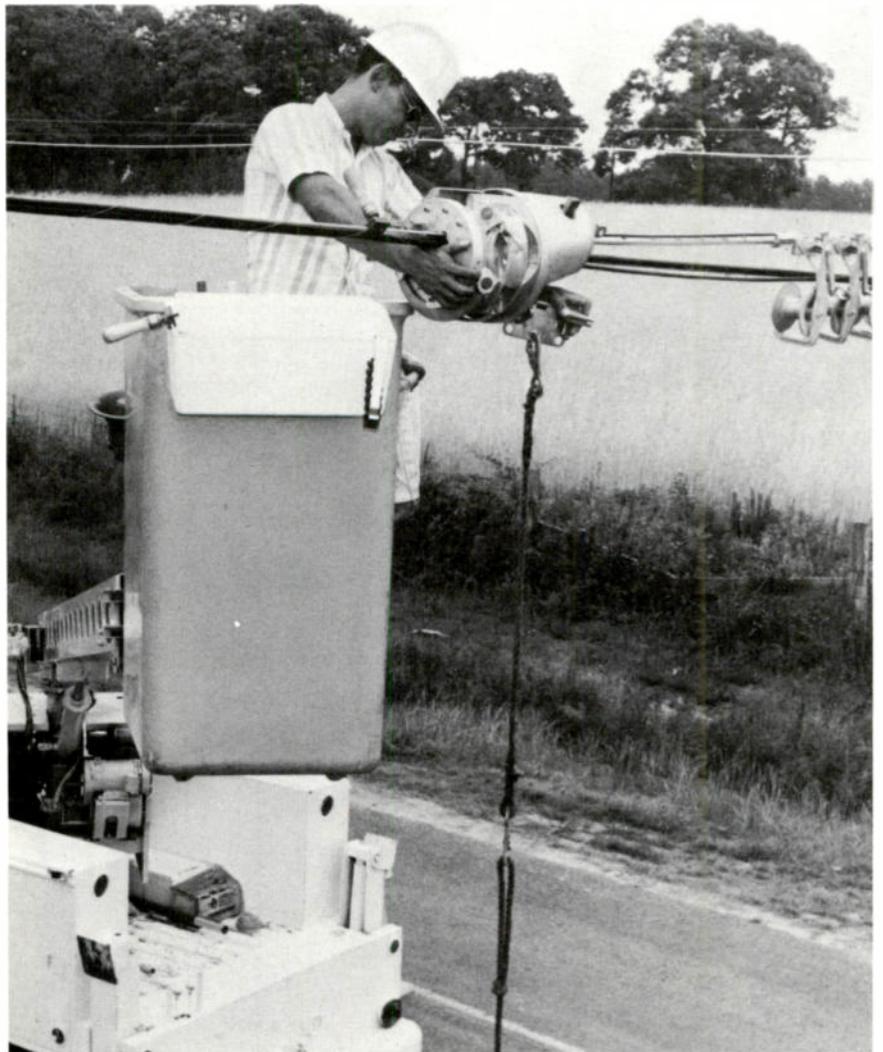
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Comm/Scope; (a division of Superior Cable Corp.) Hickory, North Carolina 28601; Turnkey construction including planning and engineering.

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

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

DAVCO Electronics Corp.; P. O. Box 861,

Batesville, Arkansas 72501; Ph. (501) 743-3816; Complete services include layout, equipment and installation.

Engineering Assoc., Inc.; 171 West Peachtree Place, N.W., Atlanta, Ga. 30313, Ph. (404) 523-5925; Complete engineering and turnkey construction services.

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

Foster Associates; 1101 17th Street, N.W., Washington, D.C. Consulting services including signal surveys, tower site location and head-end design.

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

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

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

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

Jackson Communication Corp.; 11 Market Street, Brookville, Ohio 45309; Complete engineering and construction.

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

Jerrold Electronics Corp.; 401 Walnut St., Philadelphia, Pa.; Ph. (215) 672-0800; Turnkey construction, engineering and surveys.

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

Kenmore Construction Co.; 700 Home Ave., Akron, Ohio 44310; Ph. (216) 762-9373; Underground work only.

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

K.M.T. Construction Corp.; P.O. Box 128, Nokomis, Florida 33555; Ph. (814) 488-7741; Complete construction services.

Lenkurt Electric Co., Inc.; 1105 County Road, San Carlos, Calif. 94070, Ph. (415) 591-8461; Complete "engineer, furnish, and install services." Also provides microwave equipment.

Artie M. Loftis Construction; Box 992, Athens, Texas 75751; Ph. (214) 675-4616; Complete CATV construction service.

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

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

Multi Media Engineering, Inc.; 2385 Lewis Ave., Rockville, Md., 20851; Ph. (301)

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726-1340; Cable television construction and engineering services.

**E. Harold Munn, Jr., Consulting Engineers;** Box 220, 57 Edison Court, Coldwater, Mich. 49036, Ph. (517) 278-6733; Provides engineering and consulting services and construction supervision.

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

**Pacific Pipeline Construction Co.;** 1632 S. Greenwood, Montebello, California; Complete CATV construction services.

**Power Line Construction Co.;** 2019 S.E. Hemlock, Portland, Oregon 97214; Full CATV construction service.

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

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

**Scientific-Atlanta, Inc.;** Box 13654, Atlanta, Georgia 30324; Ph. (404) 938-2930; Complete turnkey construction capability for CATV head-ends.

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

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

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

**Telecommunications Equipment & Services, Inc.;** 3769 Farm Hill Blvd., Redwood City, California 94061; Ph. (415) 365-2141 or (415) 365-1359; Complete construction services.

**TeleSystem Services Corp.;** 113 South Easton Road, Glenside, Pennsylvania; Ph. (215) 884-6636; Offers design, engineering and complete construction services for CATV systems. (Subsidiary of TeleSystems Corp.)

**Tel-Video Constructors, Inc.;** 1222 Mercantile Bank Building, Dallas, Texas 75201; Ph. (214) 747-1866; Complete CATV system construction services.

**Tico Group;** 641 Dekalb Industrial Way, Decatur, Georgia 30033; Ph. (404) 633-2682; Have complete construction capabilities.

**Tyee Construction Company;** P.O. Box E. 11805 N.E. 116th St., Kirkland, Wash.; Ph.

(206) VA2-8291; Complete CATV construction services.

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

**Underground Construction Co., Inc.;** 2600 Williams St., San Leandro, Calif. 94577, Ph. (415) 357-3520; Provides underground and aerial system construction.

**U.S. Cable Inc.;** P.O. Box 116, Appleton, Wisconsin 54911; Ph. (415) 733-3321; All types of construction except head-end work.

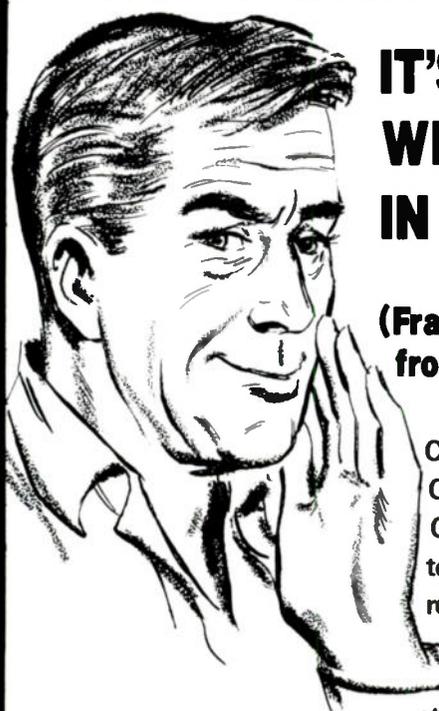
**Utilities Contracting Co.;** 1422 East Michigan,

Lansing, Michigan 48915; Ph. (517) 482-5248.

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

**Western Electronic Distributors, Inc.;** 1912 "S" Street, Sacramento, Calif. 95814; Ph. (916) 444-3474; Engineering and design for small systems.

**Williams Construction Co.;** Box 261, Glasgow, Kentucky; Ph. (502) 651-5480; Specializing in CATV construction and installation. 



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# Cable Operators Unite After Hurricane Camille



The winds came and five cable systems were battered along with everything else in sight. Cablemen and suppliers cooperated for fast, growth-producing rebuilds.

*By Gene G. Cook  
Sales Promotion Manager  
General Electric Cablevision*

**I**t was almost a year ago, on the night of Sunday, August 17, 1969. The most destructive hurricane in the history of the United States slammed into the Gulf Coast of Mississippi.

Hurricane "Camille" was no lady . . . her winds exceeded 200 miles per hour and tide level was over 20 feet. By the next morning hundreds of people were dead or missing, thousands of homes heavily damaged or in many cases totally destroyed. Cable systems in Long Beach, Pass Christian, Gulfport, Biloxi and Ocean Springs faced the gargantuan task of extensive system repair; or in the case of Biloxi and Ocean Springs, complete teardown and rebuild.

The official motto of this national disaster area quickly became "Together We Build." That same phrase depicts the cooperation and attitude of the entire CATV industry in helping to rebuild the cable systems on the Gulf Coast.

John Humphries, General Electric Cablevision manager in Biloxi and Ocean Springs, had been through hurricanes before. He knew there would be some damage to the system. In preparation all trucks were fully gassed and stocked with essential equipment and tools. Henry Swindle, Chief Tech, grabbed every available gas can he could find.

By 10 o'clock Sunday night Humphries, whose

home is only a few blocks from the beach, decided that "Camille" was no ordinary hurricane, and he prepared to evacuate his family . . . "When I opened the door, I knew it was useless. The tide was up, water was rushing down the street, and debris was flying everywhere. We just had to wait it out. By dawn it was over, and we got out to look around — I wasn't prepared for what I saw. Trees down everywhere, across houses, on cars, blocking streets. Utility lines and our cable down everywhere I looked. People were in a daze; no one could believe that a storm could do so much horrible damage."

With winds clocked at over 200 mph, his greatest concern was the tower . . . "I really thought the tower would be gone." Ironically, that was the one thing left standing. Travis Garrett, National TV Cable's manager in nearby Long Beach and Pass Christian, was not so lucky . . . "It was an awful sight. The tower lay on the ground, all twisted up as if some giant had twisted it with his hands. It was a 400-foot tower, and the top of the tower was no more than 75 feet from the base. We use pre-fab type head-end buildings. The building had been lifted up and set on its side against the base of the tower. One of the large guy wires had been torn loose and blown completely over a power line about 350 feet from the tower."

Fortunately, no cable personnel in any of the systems were seriously injured. Many, however, reported harrowing experiences. Joe Woodward, an installer for National TV Cable, had his house blown down around him. He spent the rest of the night under a tree that had blown down in his back yard. Luckily none of his family was home with him; they had previously gone to a shelter.

Bill Jones of Kaiser CATV was living in North Biloxi. He was in charge of turnkey construction in Ocean Springs, soon to be turned over to General Electric Cablevision. Because of high water, Bill and his family were forced to push their color TV set into the hallway and stand on that to reach the attic. Later he began tearing a hole in the roof so his family could climb out. Luckily the rising water stopped less than one foot from the ceiling.

In Long Beach and Pass Christian the trunk lines and poles were down, and amplifiers were lying out in the mud and water. Travis Garrett estimates 85% of his drops were torn out. The only thing they could find at their office was a new seemingly undamaged, "12 Channel Cable TV" electric sign. The sign was sitting on a steel beam, but the rest of the building had been completely demolished. In Biloxi and Ocean Springs the entire system was wrecked. Lines down, amplifier housings ripped off, over 60% of the drops out and another 25% badly damaged.

Cable crews in all systems turned to the task of helping their cities dig out from under. In Biloxi, G.E. Cablevision crews assisted Civil Defense by using power saws to clear debris from the streets. Their trucks also hauled food, clothing and fresh water across the Ocean Springs bridge. Heavy trucks could not use the bridge because of its weakened condition. A desperate need soon arose for immediate public communication. Donald E. Perry, G.E. Consumer Electronics Division Vice President, had 1,500 transistor radios flown in and distributed to families hardest hit.

After a thorough inspection, the Biloxi and Ocean Springs systems were deemed beyond repair. 130 miles of plant in Biloxi and 70 miles of plant in Ocean Springs had to be torn out and completely



rebuilt. Personnel worked 14 to 16 hours per day preparing new strand maps and tearing out the old and damaged system. In October Merl L. Galusha, G.E. Cablevision General Manager, signed a turnkey construction contract with Kaiser CATV.

When Richard Hood, Chief Construction Engineer for Kaiser CATV, arrived in Biloxi, he learned that falling poles, tree limbs and debris had crashed into electronic gear with such force that many cast aluminum housings had been cracked like egg shells. Cables had been ripped from the amplifier housings in others and the electronic circuitry ruined by salt water. Cable and strand were snapped off by the force of the hurricane borne objects and carried miles away. One piece of cable with a line extender in place was found 7 miles from any part of the system.

General Electric Cablevision personnel, having spent the first days after the impact of "Camille" in rescue and emergency work, turned to the task of making ready for the almost total rebuild of their system (only 5 strand miles of the 130 miles of system were usable). They did such a remarkable job that when Kaiser CATV field engineers and sub-contractors arrived, they were able to start construction immediately.

In the meantime, Hood had set up a warehouse facility, planned schedules of equipment to be shipped from the Kaiser CATV factory, and projected the work plan to have the system operational within four months.

The supervisory load was divided between the Kaiser CATV Field Engineers, who stayed with the job until their assignment was finished. Gary Smith was in charge of pre-sweeping all cable prior to installation and balancing segments as they were finished so that subscriber hook-ups could begin in the fastest possible time. John Roeder correlated the theoretical electronic layout and strand maps with the actual call out of equipment. Bill Reynolds was



*This is how Garrett found his tower. Head-end building had been lying on its side, against the base of the tower.*



Boats ended up ashore and utility poles sagged after the storm.

liaison with sub-contractors, while Dick Hood acted as overall coordinator and liaison with the Kaiser CATV factory.

Everything was going like clockwork, and the first segment was nearly completed. The crews were making bets on how many days ahead of schedule they could deliver it when it was discovered that a 1,000-foot piece of air dielectric cable under the river was defective. Henry Swindle of General Electric made himself a hero by replacing it so fast that the first segment was still delivered four days ahead of schedule.

The spirit of "Together we build" took hold of everyone. For example, Constable Roy Tootle of Ocean Springs, who was warehouse supervisor for

Kaiser CATV, was also truck driver, general handyman, carpenter, bookkeeper, pole-walker, etc., pitching in wherever an extra hand was needed.

The sub-contractor, Cablevision Construction Company, provided crews in sufficient number to often exceed 20,000 feet of system build per day . . . a remarkable record despite the added difficulties encountered because of hurricane damage to streets, poles and general environment. Over 3,000 customer taps were installed in sequence as the system was built . . . another plus factor in getting service restored quickly.

Travis Garrett was able to get his systems back in operation in a short time due to the prompt service and assistance of such suppliers as Superior Continental, Scientific-Atlanta, Inc., Utility Tower, Southern Telephone Supply and Davco Electronics Corporation.

Mississippi Electric Company and Southern Bell Telephone were always ready to resolve any problems speedily and courteously, even with their own tremendous work load.

Kaiser CATV coordinated the building of 130 miles of system in 121 calendar days, a rate greater than one mile per day. Dick Hood noted, "Due credit should be given for the excellent performance and coordination provided by Cliff Gardner of Cablevision Construction who supplied the work crews; Ross Embery, who did the splicing work; Emery MacNeil of Mississippi Power Company; Jack Taylor and Jim Baker of Southern Bell; and especially John

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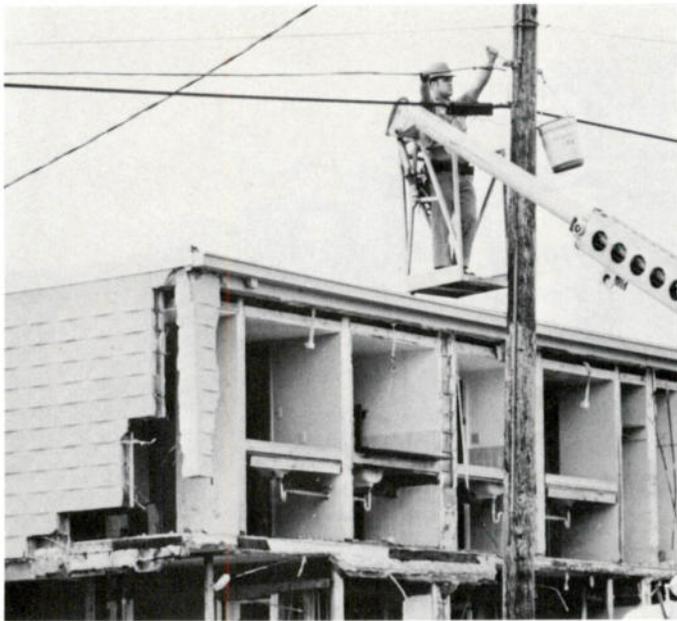


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*With devastation as a backdrop, a General Electric Cablevision technician starts the rebuild project.*

Humphries and Henry Swindle of General Electric.”

The first 25 miles of new plant was delivered to General Electric on December 20th. Hook-ups started immediately. Original subscribers were automatically hooked up. Simultaneously a door hanger campaign was started offering free installation. The door hangers were distributed by members of the Boys Club of Biloxi. G.E. Cablevision had made a donation to the Club for a new building . . . their old one had been destroyed in the storm.

Now, a year after the almost complete destruction of Biloxi, Mississippi, G.E. Cablevision is not only back in operation, but has over 1,300 more subscribers than they had before the hurricane struck. In Long Beach, since everyone had lost their rooftop antennas, the cable subscriptions jumped from 50% saturation to over 80% in the few months immediately following the storm.

The way G.E. Cablevision conducted themselves in this community tragedy turned out to be the finest public relations job that a system could perform . . . and the same can be said of National TV Cable, Inc., in Long Beach and Pass Christian, and Cable Com General in Gulfport. CATV equipment manufacturers and suppliers throughout the country gave their full assistance and cooperation to get all of these systems back in operation. Today on the Gulf Coast of Mississippi cable is back — bigger and better than ever. rvc

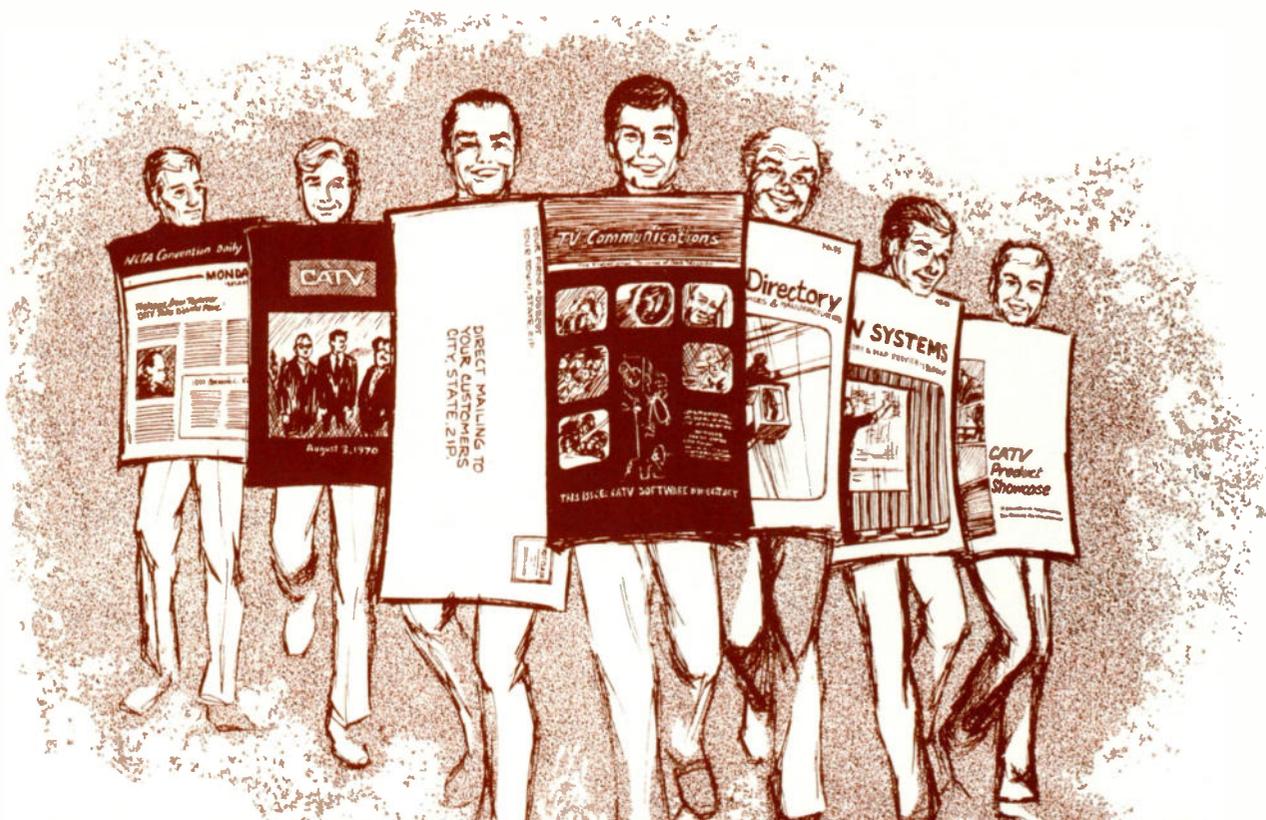
Hurricane Celia blew through the Corpus Christi, Texas, area early last month with winds over 150 mph. Jim Polk, manager of the cable system at Alice, Texas, (about 35 miles west of Corpus Christi) reported that about 40% of his drops were damaged by the storm. Within a week, 90% to 95% of the system was back in service. As an interesting sidelight, Polk had to use an ice cream truck to power his head-end while power was out.

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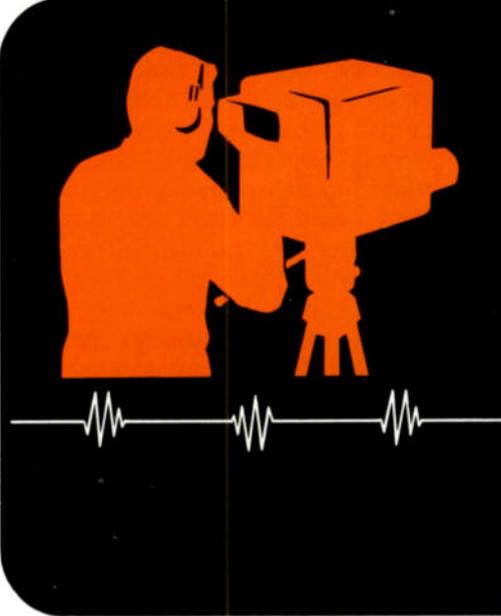
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# STUDIO

## Technology

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

## Video Recording Equipment: What's Best for Your System?

This is the beginning of a multiple-part article reviewing the various types of VTRs, their general characteristics, limitations, advantages and costs.

*By Jack A. Rickel*

**T**he most controversial subject in the entire field of origination these days is that of video tape recorders. The wide variety of tape widths, tape speeds, writing speeds, playing time and special features have created disagreement even among experts as to what's the best choice in VTR's.

We won't attempt to try to solve the argument, but in the next few articles on video tape recorders we hope to give you enough information that you can form your own opinions.

To the best of our knowledge

the first video tape recorder was built by Bing Crosby Enterprises, Inc. in 1953. It now reposes in the shop of a friend of ours in Pennsylvania. This huge monster was mounted in several racks and utilized several hundred vacuum tubes. It had four stationary heads over which the tape ran at the unbelievable rate of 240 inches per second. This meant that a 14" reel of tape lasted 3 3/4 minutes total playing time. In spite of its inefficiencies the recorder did work and would produce a video bandwidth of 2 MHz with a signal-

to-noise ratio of 30 dB. In the few short intervening years, we have come to battery operated, broadcast-quality recorders which can be carried by one man.

Video tape recorders fall into three major categories designated by the size recording tape employed. There are 2" recorders, 1" recorders and 1/2" recorders. The two-inch types may be either quadruplex or helical scan types; the 1" and 1/2" are only available in helical scan format.

Prior to the development of the video tape recorder all programs

were produced and transmitted live or were produced on film which was played back on a film chain. It was possible to save programs by simultaneously recording it on film by means of a kinescope recorder at the same time it was being transmitted, but the quality of kinescope recordings was poor. The first video tape recorders developed were for broadcast television use. These were two-inch quadruplex machines.

Because they were the first developed and still considered the standard of the industry we'll discuss the quadruplex video tape recorder in this article.

### The Quadruplex VTR

Ampex devised the basic principal of the rotating head and FM modulation which is the heart of almost all present day recorders. Their unit was developed in 1956.

Early quadruplex recorders were tube type and were large and difficult to keep properly maintained. They recorded and played

back only monochrome video tape and lacked a lot of features of present day machines.

Today's quadruplex video tape recorders are all solid-state and produce high quality high-band color video that is hard to differentiate from the live video out of the camera.

What is a quadruplex video tape recorder? It is a large electro-mechanical machine that accepts video signals, sync signals and audio signals which it records on magnetic tape where they remain until the tape is played back at a later time or erased. It is called quadruplex because it has four rotary recording heads which are rapidly switched in and out of the recording circuit, one after another. As the two inch wide tape is driven from one reel on the machine to the other it passes over the recording heads. The four recording heads rotate in a circle at right angles to the tape, with each one laying down a vertically recorded track 5 or 10 mils wide, depending on the recording head used.

As the head wheel (the rotating drum holding the recording heads) rotates, the head making contact with the tape is switched into the active position whether it be record or playback. A separate longitudinal track along the top and bottom edge of the tape contains the audio information and cue information which is placed there by stationary heads. Erase heads positioned ahead of the record heads remove previously recorded information from the tape before it reaches the record heads in the record position. These heads rotate at 14,400 rpm. At that speed there would be considerable friction between the tape and the heads which would cause excessive wear of both the heads and tape. To reduce friction, "air-bearing" headwheels were developed using a stream of air to act as a bearing surface.

### The VTR Records Modulated FM Signals

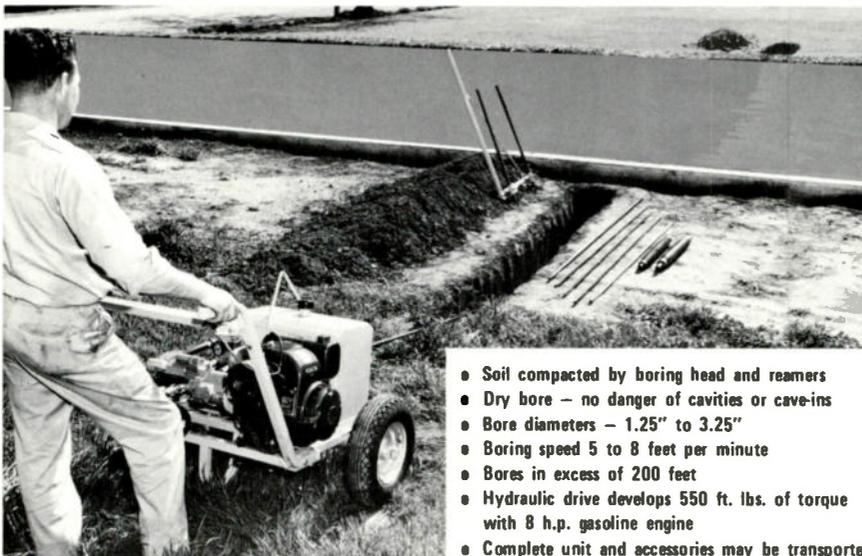
It would be almost impossible to record video information directly onto the tape and play it back without distortions. For this reason, all recorders use the video signal to modulate an FM carrier and the FM signal is what is recorded on the tape and recovered. This is single-sideband FM. This FM signal is in the range of 4.28 MHz to 6.5 MHz for low-band recorders, and 7.06 MHz to 7.9 MHz for high-band recorders. High-band recorders offer better deviation and therefore better video response, but are more expensive.

At 15 inches per second, a 14" reel of tape has a total playing time of 92 minutes, or a little over an hour and a half on a quadruplex recorder. At 7½ ips total playing time is 192 minutes or a little over three hours.

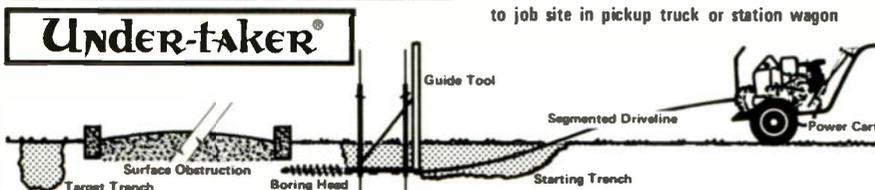
The electronic signal response of a quadruplex recorder is very good. On a high-band machine, video response is flat to 4.1 MHz with a signal-to-noise ratio of 46 dB. Audio response is plus or minus 2 dB from 50 Hz to 15 KHz at 15 ips. For color differential, phase is less than 4 degrees and differential gain is less than 4%.

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With proper accessory equipment, electronic editing is easy and precise on the quadruplex recorder. So much so that a single video frame can be removed or inserted without disturbing the rest of the tape.

Quadruplex recorders are usually equipped with a video monitor, a waveform monitor, and an audio monitor so the program being taped can be accurately monitored both during recording and playback.

One nice feature of quadruplex recorders is the complete interchangeability of tape. Any tape made on a quad machine can be played back on any other quad machine in the world, providing the power line standards are the same. This makes it a great boon to broadcasters who wish to purchase tapes from each other, the networks or tape libraries. Actually, at this time, there are only two major manufacturers of quad tape machines in the world: RCA and Ampex. Let's look at some of the

models available from these two companies.

### Quads Are Big Investment

The basic Ampex quad machine is the model VR-1200B, available in either monochrome or color with a number of options. The lowest black and white version is \$50,750 and the highest-priced color version is \$71,750. An up-graded version of the model VR-1200C ranges in price from \$70,300 to \$89,500. The VR-1200B is a color production unit that runs from \$73,300 to \$92,500. The new AVR-1 machine is automated. Its prices range from \$103,000 to \$111,895. Ampex also has a portable back-pack unit which can operate from either batteries or AC power and will record 20 minutes of either black and white or color. It sells for \$50,000.

RCA has three basic models. The TR-60 for either black and white or color at \$72,500, the

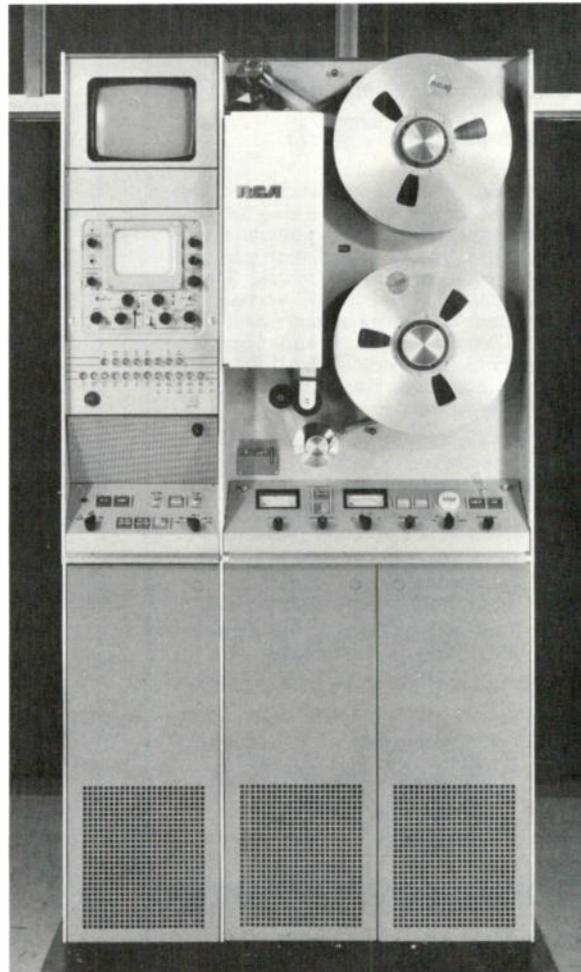
TR70B high-band color machine for \$87,500, and the TR70C full production unit for \$93,500. RCA also has a cartridge quadruplex tape machine for \$89,500 which will play up to 22 three minute cartridges for spot announcements and commercials.

As can be seen from the prices of these quadruplex recorders, they are out of reach for most CATV system operators except for the very few large systems with full production facilities. Nor is the purchase price of the machine the only major expense. An hour reel of 2" video tape costs over \$200. Recording heads may last anywhere from 200 hours to 1000 hours depending on use. New video head assemblies cost from \$200 to over \$3,000. You can see that it costs over \$300 per hour to operate a quad machine.

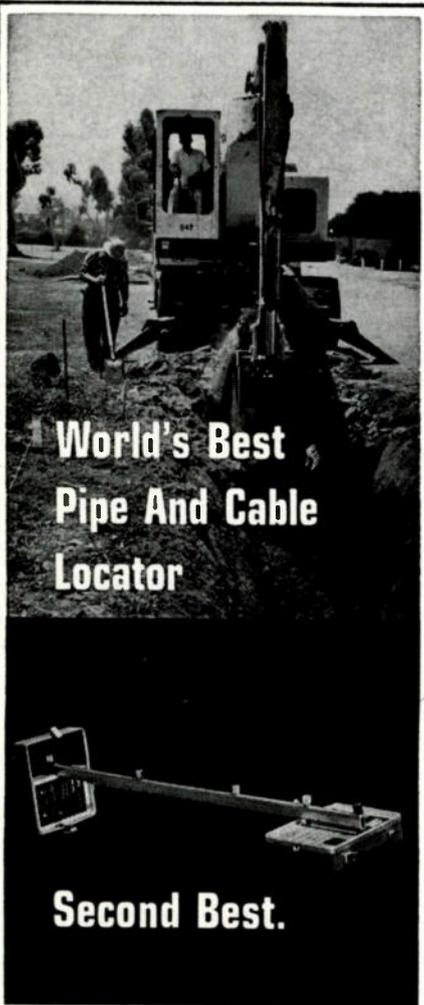
Next month we'll discuss helical scan video tape recorders, which are the most likely recorders to be used by CATV originators. 



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## Studio Notebook

answers to program problems



By Ken Lawson

**QUESTION:** (From Dick Cox, Manager, Montana Video, Inc.) *What are some helpful but inexpensive techniques for the cable newscaster?*

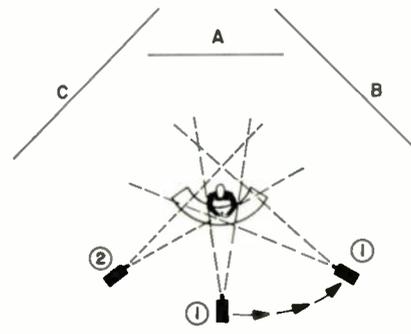
**ANSWER:** This will be the first of three columns answering this question about one of the key programs for the cablecaster. This month we will cover "staging." The next two columns will provide hints on "delivery" (performance), and "program content."

A news program should convey a specific mood. First, it should be formal. Sets should not be elaborate. Network shows are good examples of this. Second, the type of audience will tell you other things about your choice of stage articles. An afternoon news show, accentuating women's news, and delivered by a woman, should produce a soft, beautiful, feminine mood. It can be a little less formal and contain some props for effect. The evening news should be masculine, more formal, with a squarer pattern to the set.

You will probably want to put the news set on a riser to keep the camera at eye level and fairly close (waist high picture or closer). If the newscaster looks up to the camera he will lose "authority" in his appear-

ance. On the other hand, if he looks down at the camera (and audience) he will appear haughty.

A good technique for a one-man show with two cameras is shown below. This multiple angle arrangement provides a different set for news (A), weather (B), and sports (C) without moving anything but the cameras and the direction the announcer faces. Each set is



ONE-MAN NEWS

separate from the other and can be any one of a number of backgrounds: graphics, logos, or colors.

If commercial breaks are inserted between set changes, only one camera is necessary. **TVG**

A \$10 check is yours when your question regarding cablecasting is used in this column. Send questions to: Studio Technology Editor, TV Communications, 1900 West Yale, Englewood, Colorado 80110.



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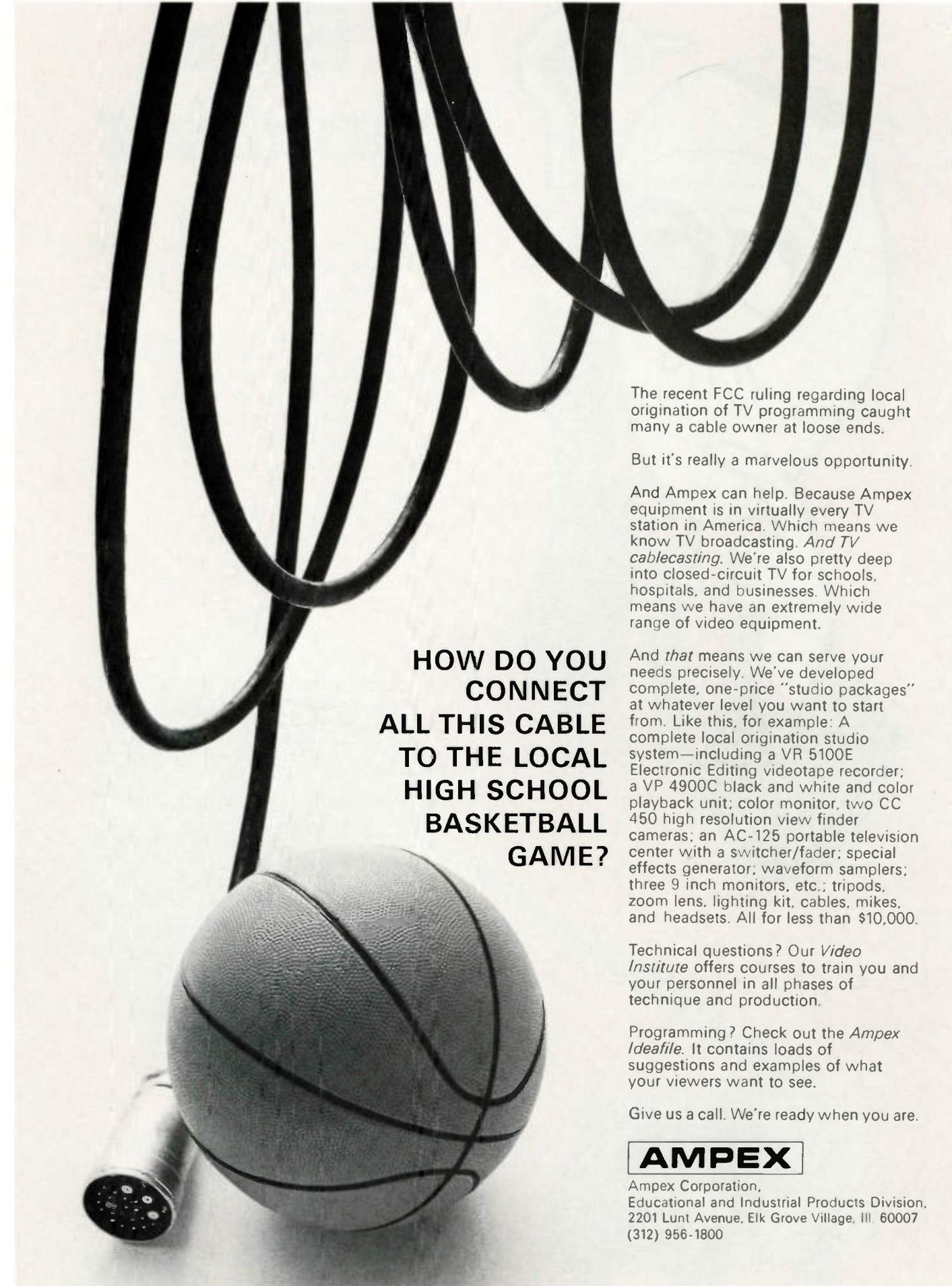
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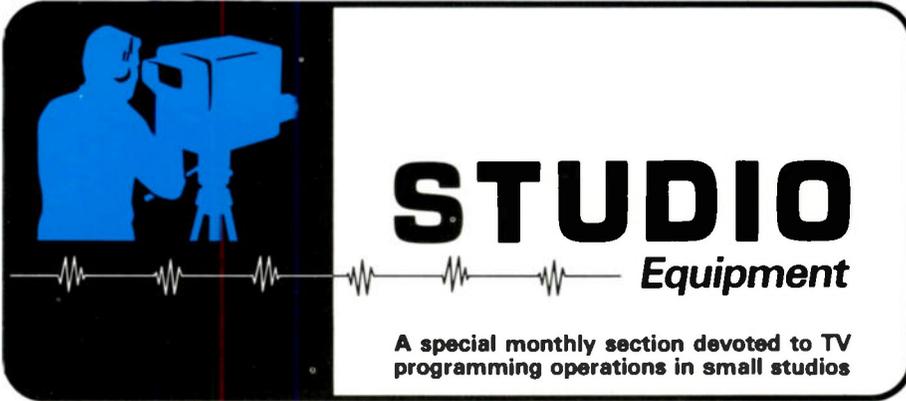
Technical questions? Our *Video Institute* offers courses to train you and your personnel in all phases of technique and production.

Programming? Check out the *Ampex Ideafile*. It contains loads of suggestions and examples of what your viewers want to see.

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# STUDIO

Equipment

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

## Techno Modified Camera For Wider Lighting Ranges

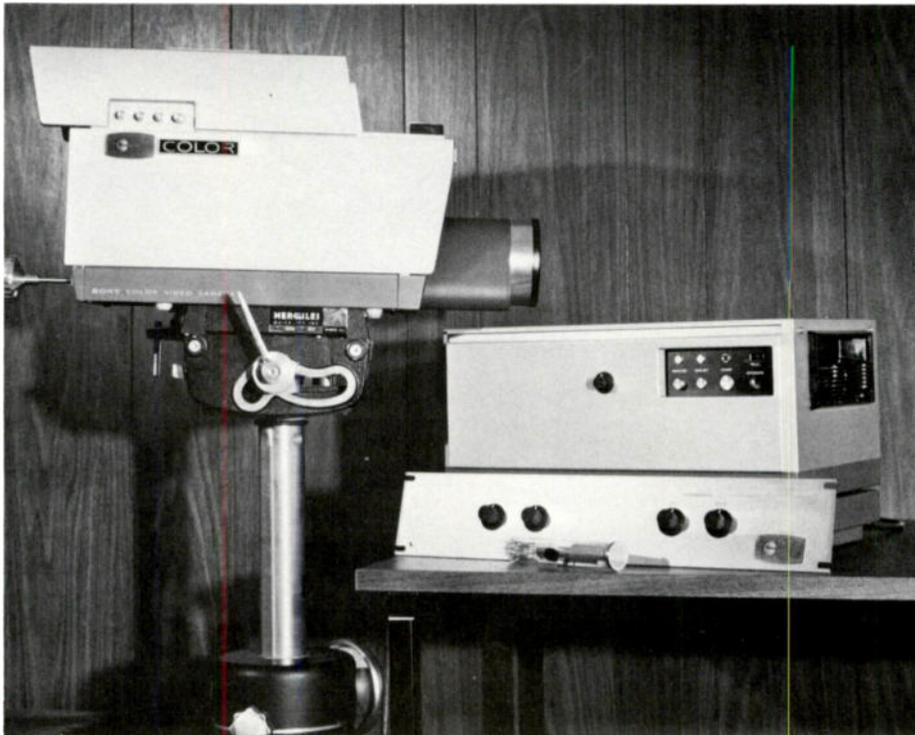
Techno Products Company has announced the availability of a modified version of the Sony DXC-5000 two-tube color camera. Techno's modified edition comes with a Plumbicon in the luminance channel. Originally using a Vidicon, the altered camera has reduced lag and improved low light level capability, while maintaining ease of operation and stability.

It is possible to get low lag color pictures with a light level of only 50 foot candles using this

compact 28 pound camera. With built in color bar generator, it is priced at \$11,500.

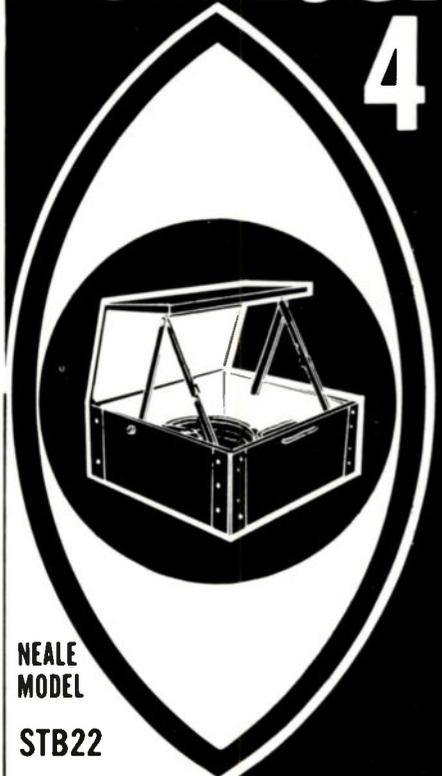
Additional accessories are available. They include: remote video controls, adaptor for the use of any C mounted lens, and a rack mount for the camera control unit.

After modification, the camera is designated TPV-16P. For more details about the TPV-16P color camera, contact Techno Products at 7405 Greenbush Avenue, North Hollywood, California 91605. TVC



TV Communications

# Eye opener number 4



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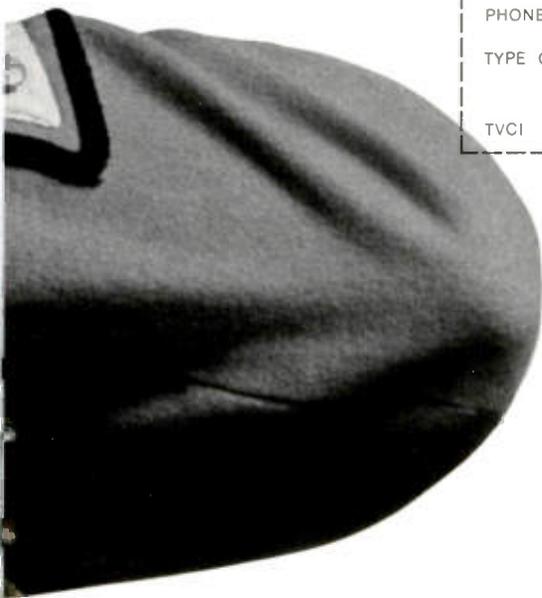
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TYPE OF VTR EQUIPMENT \_\_\_\_\_

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Very shortly, many Cable operators will begin originating their own programs. When they do, they will face the problem of trying to make their programs look as good visually as those broadcast by the commercial stations. An ideal solution to the problem is to use pre-fabricated scenery, a material already widely employed throughout the television industry. Basically this material is a series of vacuum formed, three dimensional scenic units which are hand painted and come ready to use. They realistically simulate a wide range of exterior and interior wall surfaces yet are relatively low in cost and can be set up easily by one man. They enable production men to create attractive, impressive looking program settings quickly, inexpensively and with a minimum crew. The set illustrated above is just one example of what can be done with these pre-fab scenic units. For a catalog and more information on this material, write

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## CATV Programming

software news and tips

Program origination is fast becoming a major interest of cable people throughout the country. Some 250 systems already do some local origination. Surprisingly, most of these systems are smaller than the 3,500 subscriber group which the FCC says must begin originating by April 1 of next year. The FCC requirement will bring another 250 or more systems into cablecasting.

This new column will bring *TV Communications* readers a monthly up-dating of developments in the software business... as it relates to the cable industry. This is where you will find news, tips and suggestions to aid in programming your origination channel(s) effectively.

Viacom International, Inc. is a new name in the CATV software business. Viacom is the new public corporation into which CBS plans to spin-off its CATV and television program operations (previously known as CBS Enterprises, Inc.). The firm provides programming only... no hardware is included. They supply "everything an operator needs to put (15 hours per week) on the air from his studio, with his camera, using local hosts and participants." For example, they provide such things as scripts, graphics, audio tapes, film clips, props, set designs, light plots and camera instructions. Cablemen can reach Viacom through the CBS offices at 51 West 52nd Street, New York, New York 10019, (212) 765-4321.

Satori Productions, Inc. is a program distributor that was not included in the August, 1970, *TV*

*Communications* Directory of Software Suppliers. Satori currently distributes four series to cable systems. PRIVATE SCREENING is a series of "experimental and underground films," with a host. MOONDREAM is a series of children's programs. THE CINEMA consists of movie reviews and movie clips. SATORI is the name of a fourth series described as "music and comedy... fast new format." Pricing information was not given in Satori's release. Contact Satori Productions directly for further information at Post Office Box 688, Radio City Station, New York, New York 10019.

Another firm that was not included in the Software Directory is Thomas J. Valentino, Inc., supplier of special sound effects and mood music. Their music library consists of over 70 hours of music in a set of 110 records. Music ranges from openings and closings to bridges, fanfares, etc. Their sound effect library has over 500 selections from thunder and wind to rodeo sounds and flushing toilets. Certainly each of these sounds will be useful in the preparation of unique CATV productions. For further information on these two libraries write 150 West 46th Street, New York, New York 10036.

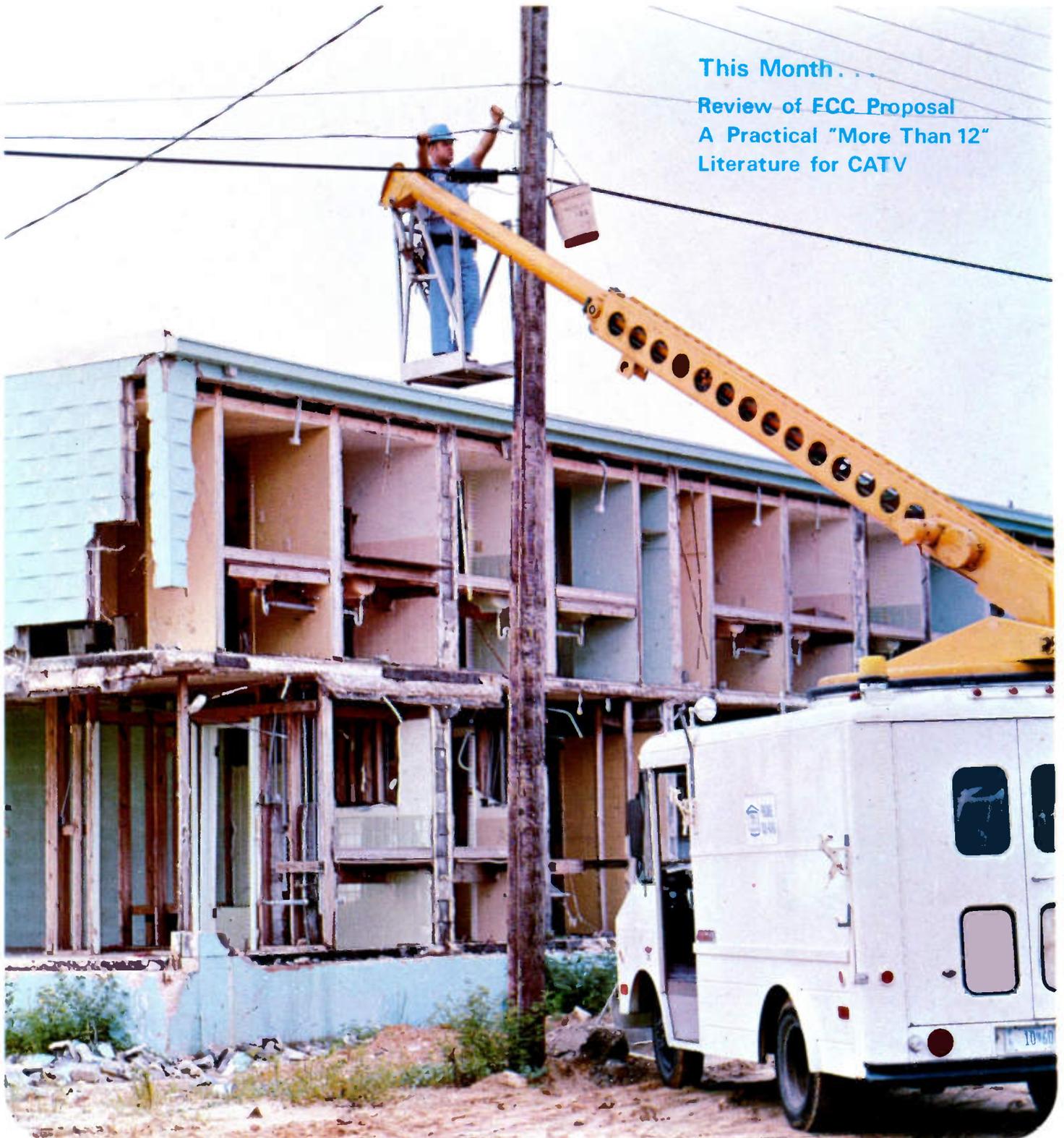
A special cablecasting session will be part of the October 4-9 Conference of the Society of Motion Picture and Television Engineers at New York's Hilton Hotel. The session will cover automated programming, closed-circuit standards, super-eight and other film techniques. TVC

September 1970

*TV Communications*

# *CATV Technician*

This Month . . .  
Review of FCC Proposal  
A Practical "More Than 12"  
Literature for CATV

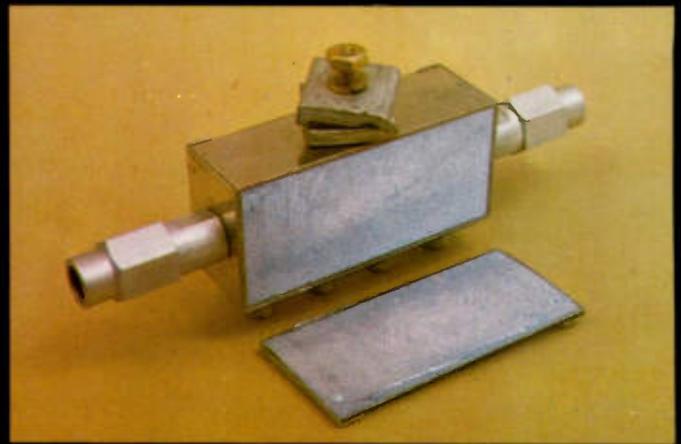


A General Electric Cobllevision technician tears out the battered sections of one of the Gulf Coast CATV systems . . . and rebuilds after the 200 mile per-hour winds of Hurricane Comille. See page 50.



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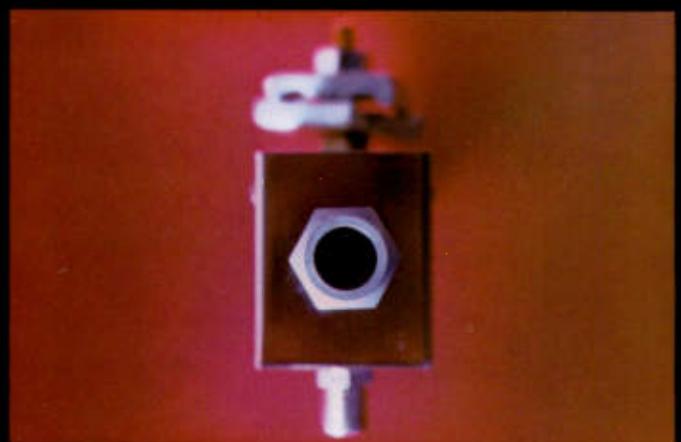
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# CATV Technical Standards: A Review of FCC Proposals

Comments on the proposed CATV technical standards are due October 7th. This review will provide the background. Form your opinions and speak out to the FCC.

*By G. Norman Penwell  
Director of Engineering  
National Cable Television Association*

**I**t should not go unnoticed that of the seven CATV documents released by the FCC on July 1, 1970, the Notice of Proposed Rules for Technical Standards, Docket No. 18894, was the only one adopted without a single dissenting opinion. Either this subject is spectacularly uncontroversial or the Commissioners have developed a unanimously dim view of the technical performance of the CATV industry.

The December 1968 Docket 18397 informed the industry that the Commission intended to issue a

further notice to consider technical standards. This has now been done in the manner of responding affirmatively to the petition of Hammett and Edison, consulting engineers, asking that rulemaking be initiated to establish technical standards. All technical matters referred to in Docket 18397 have now been transferred to the new Docket 18894 "so they may be given separate and early consideration." Comments on the proposed rules are due by October 7, 1970, and replies to comments by October 28, 1970.

While the Notice includes the proposed rules as appendix A, the seven pages of introductory remarks address themselves mainly to three issues that are not strictly "technical standards." To this extent, the Notice is somewhat in the nature of an inquiry into the pro's and con's of requirements for: (1) minimum channel capacity, (2) limited two-way communications for every subscriber, and (3) studio and distribution facilities for each community within a franchised area. The implications of these introductory remarks will be considered first.

## Minimum Channel Capacity

The Commission is now on record as acknowledging the argument the cable industry has long been making, "Our present over-the-air television system operates as an economy of scarcity . . . whereas . . . cable television offers the technological and economic potential of an economy of abundance."

The Commission is particularly interested in seeing large metropolitan markets built with sufficient

### ABOUT THE AUTHOR



G. Norman Penwell is Director of Engineering for the NCTA. During the two years he has been with NCTA, he has been responsible for coordination of engineering activities between the cable industry and industries represented by such groups as NAB, IEEE, EIA, NAEB and SMPTE. He serves as the NCTA

liaison with the engineering office of the FCC. Penwell got started in cable television in 1953. He started systems in Bozeman and Livingston, Montana, and has operated radio and television stations in Montana. Penwell speaks frequently before state and regional CATV groups and professional engineering groups.

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capacity to meet the foreseeable demand. It notes that many such systems are being constructed with 20 channel capacity and it has been advised (by whom?) that 40 channel systems can be built "without too great an incremental cost over a 20 channel system." The industry is requested to comment upon what the minimum capacity should be, what lesser capacity should be required for smaller markets, and what the basis should be for categorizing market size for these purposes. For example, the top 25 SMSA's (standard metropolitan statistical area) might have a requirement for at least 25 channels, all other SMSA's at least 12 channels, and markets outside SMSA's at least 5 channel capacity (many small and remote markets strain to receive three off-the-air signals and a requirement to distribute more than the low-band VHF channels would represent an unnecessary burden that would serve no useful purpose).

The important thing to note is that on the basis of the industry's comments, the Commission is going to specify some minimum channel requirement, and all systems will be required to comply within some conversion period. It behooves this industry to respond carefully and thoughtfully to this issue with detailed economic and engineering data to defend the minimum's we suggest, and the best classification of market or system size to which the minimums would apply.

The definition of channel capacity also needs some further clarification. For example, would a channel maintained on the entire system but delivered only to doctors (medical information channel) be included in the count towards minimum channel capacity? Also, would a full video channel in the reverse direction qualify as one of the minimum channel requirements?

Another problem, most serious, is that the Commission has apparently given little thought to the receiver-CATV interface once we go beyond the 12 VHF channel system. The receiver compatibility problem is severe enough with the 12 channel system since receivers are designed around the Commission's Sixth Report and Order regarding broadcast television which did not allocate adjacent channels to a single market. CATV systems have been able to distribute adjacent channels only by careful adjustment and maintenance of adjacent channel signal levels and not by virtue of any receiver design optimized for CATV use. Except for the dual-cable systems (and the use of an A-B switch) more-than-12-channel systems are a step backward to the days prior to the All-Channel Receiver law in that they must use an additional converter to get the signal from the cable to the set.

A cable television receiver is sorely needed to solve this and other cable/CATV interface problems. However, this implies that all systems use a standard allocation of cable spectrum for channels other than the usual 12 VHF broadcast assignments. The CATV industry has just not come to grips with the problem of how to best use the cable spectrum for more-than-12-channels. There have been about as many different proposals as there are manufacturers; perhaps this proceeding before the FCC is the instrument that will

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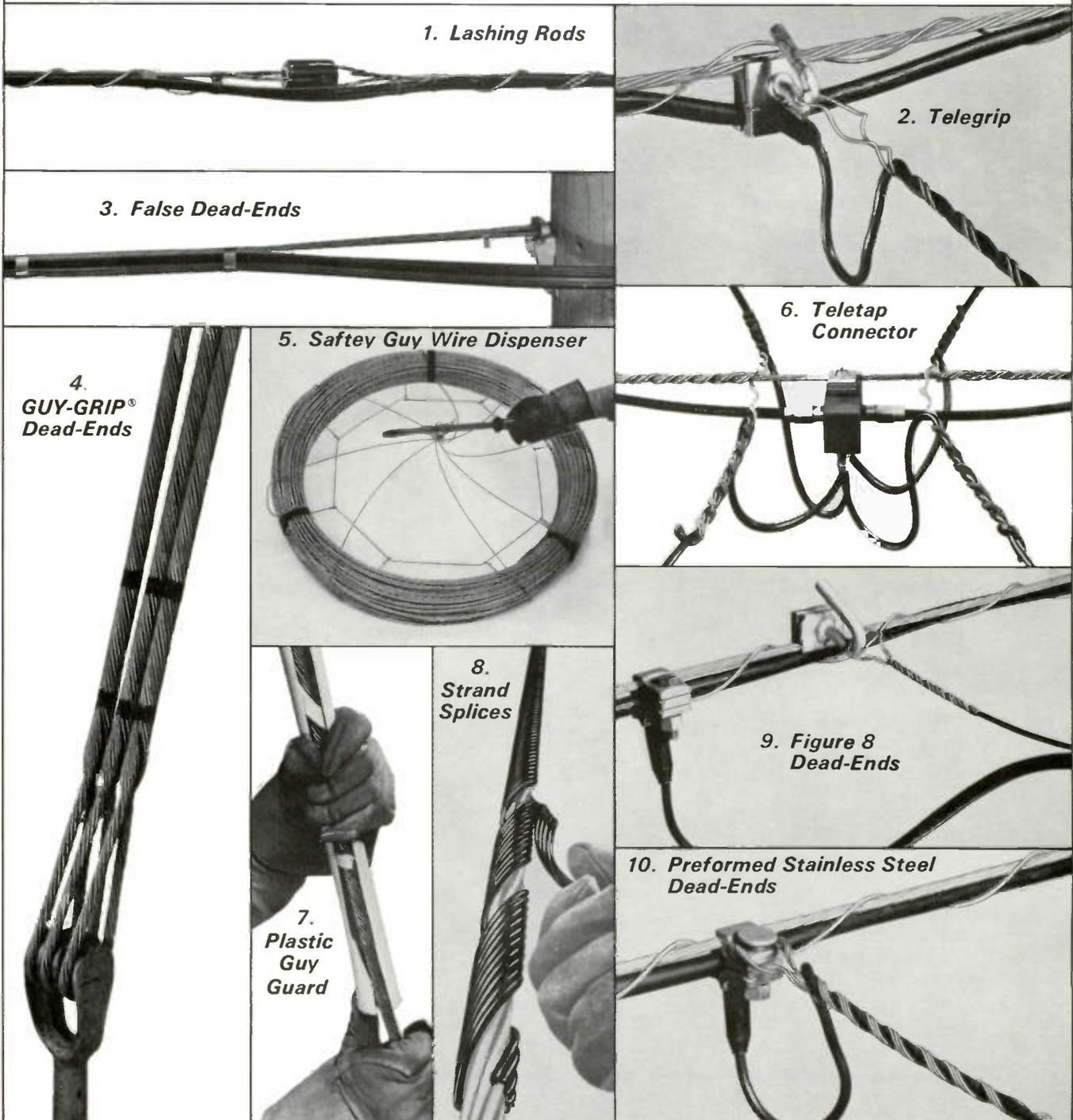
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prod the industry into a competent in-depth analysis on the use of the cable spectrum that will then provide the basis for the development of a truly cable-compatible television receiver. Then we will know the maximum number of video channels that can realistically be distributed by the single coaxial cable. Certainly there is no technical magic about the numbers "20" or "40." These numbers have simply been "picked out of thin air" with little, if any, engineering reason for their being suggested.

## Two-Way Cable Communication

A requirement for 2-way communication from each subscriber (if desired) is also under consideration for future systems. The Notice speaks of a 4 KHz message channel that could be shared by a limited number of other subscribers (such that queuing would not be a problem). The intent is not clear as to whether a 4 KHz information rate (or data rate) should be available for a limited time for each subscriber or whether a time-shared 4 KHz party-line for binary responses would be satisfactory. In the latter event several hundred or maybe thousands of subscribers could share a 4 KHz channel without significant queuing, with subscriber responses being of the "yes-no" type.

Future systems could consider installing a separate twisted-pair (as distinguished from using the coaxial cable) for this purpose, although this approach runs contrary to the wide-band data potential of the cable. System designers might actually find it just as easy to install several hundred kilohertz of reverse communications capability—and indeed this would make more sense in many respects. (Editorial Note: For an in-depth review of state-of-the-art CATV technology as it relates to more-than-12-channel capacity and two-way cable communications, the reader is invited to see the four-part series "Expanding Cable Capability" by TVC Technical Editor, I. Switzer. That series began in June, 1970 and concludes in the October issue.)

## Local Origination Centers

Separate origination centers is the third issue raised in the introductory remarks of this Notice. Since the cable can be uniquely local in its distribution, the Commission feels this attribute of cable systems should be developed to the extent that every community within the franchise area should have available a separate channel for (on a when desired basis) community expression.

The suggestion is that studio and production facilities be available on a community basis. This implies, then, that the distribution system must recognize distinguishable communities, and the system distribution must be designed accordingly. That is, each community must, in effect, have its own head-end. System distribution will have to be laid out carefully so that parts of a "community" are not delivered signals from the feeder lines of another "community" within the franchise area.

The details of what constitutes a "community" are

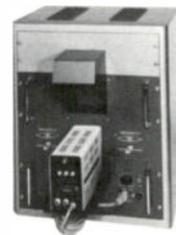
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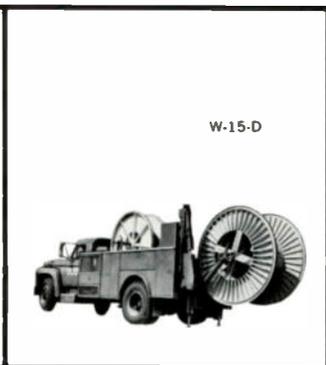
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to be left in the hands of the local franchising authorities, but the Commission is seeking comments on what the appropriate guidelines should be. For example, should 25,000-50,000 households be considered generally as a "community."

Some thought should be given to the possibility of time-sharing a single local community channel. For example, if the communities are small, it is doubtful that a single small community could or would even want to originate a consistent and extensive program schedule. Therefore, small-community needs might fairly be served by time-sharing a single channel dedicated to local service. The Commission will want the industry's comments on this issue, also.

**The Conversion Period**

Three years is proposed as the period during which time all systems are expected to bring their technical performance into compliance with the new rules. For some of the requirements proposed, the three-year period seems unduly short and will no doubt represent considerable hardship on some systems. If VHF broadcasters were required to move to UHF assignments, it is doubtful the FCC would require that they complete the conversion in three years. The three-year requirement is just too short in several instances and does not allow a CATV operator sufficient time to amortize an investment made in good faith and which, at the time, may have represented the state-of-the-art. A ten-year conversion period might be more appropriate.

Certification of compliance with the technical standards must be filed annually following the initial conversion period and will consist of performance data submitted as measured at three widely separated subscriber terminals, one of which must represent the longest cable distance from system input. This procedure differs from that allowed the broadcaster who does not file an annual certification with the FCC. The Commission inquires of the broadcaster, only at the time of license renewal, "When did you make your last proof-of-performance?"

It is important to note that the requirement is for data to be taken at the subscribers' terminal. We have a basic problem right here. The subscribers' terminal is a 300 ohm balanced input; but CATV test instrumentation is commonly made for 75 ohm unbalanced measurements. To make the measurement at the 300 ohm terminal, we would have to put two BALUN's back-to-back, and incur the additional loss and cumbersomeness of this method. It is hoped that the Commission could be persuaded to accept 75 ohm measurements, perhaps on the condition that the operator certify that BALUN loss is no more than 1 dB.

There is the further problem of gaining access to the three subscriber terminals. All the required performance data could just as well, and with considerably more ease, be obtained by measuring from a test output of the last amplifier (line-extender) prior to the subscribers' terminals. For example, to measure S/N at the subscriber terminal will require the insertion of an amplifier of known

noise-figure ahead of the signal level meter.

The certification procedure also requires an operator to file a statement of system channel capacity, listing the cable television channels (only off-the-air channels) delivered to subscribers, the stations whose signals are delivered to subscribers on those channels, and the minimum visual signal level that is maintained on each channel under normal operating conditions (presumably signal level at the subscriber terminal is what is desired here). Only the above cable television channels are involved in the measurement data to be submitted and certified.

Seven new definitions are being added to the rules, paragraphs (1) through (r). Note that a cable television channel is defined as a "standard television broadcast channel." This seems to exempt any signal that is not first picked up off-the-air. System noise is defined as that noise in the central 4 MHz of the 6 MHz channel (4 MHz being the approximate noise bandwidth of the typical television receiver).

### Frequency Boundaries

The frequency boundaries, as they appear to the receiver, are to be maintained in accordance with the Table of Allocations, para 73.603(a) of the rules with the visual carrier to be maintained  $1.25 \text{ MHz} \pm 25 \text{ KHz}$  above the lower boundary of the channel and the aural carrier to be  $4.5 \text{ MHz} \pm 1 \text{ KHz}$  above the visual carrier.

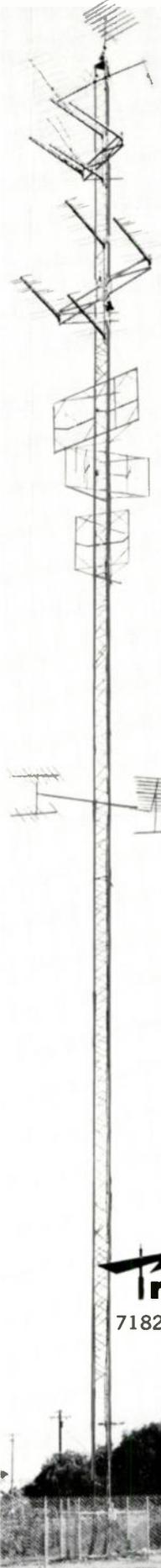
On the visual carriers this tolerance amounts to:

Channel	Visual Frequency	% Tolerance Allowed
2	55.25 MHz	.04525 %
13	211.25	.01185
14	471.25	.00525
83	885.25	.00282

For heterodyne front-end units that come back on-channel after conversion to i-f (using the same LO for both up and down conversion) the tolerance maintained will be that of the broadcast station and there should be no problem since the broadcast tolerance is tighter than the proposed rules. For other conversions, the tolerance could become a problem. Most heterodyne units on the market today advertise a crystal stability of .005%. However, this specification is usually the tolerance to which the crystal was originally ground; it is not necessarily the tolerance of the crystal after it is placed in the holder, nor of the oscillator circuit after packaging in the heterodyne unit.

We are clearly in trouble in the case of UHF-to-VHF conversions. We will have the conversion period (whatever that turns out to be) to retrofit with tighter tolerance crystals, or in the case of UHF perhaps crystal ovens will have to be used to maintain stability. To my knowledge, no manufacturer for the CATV industry is currently offering a UHF converter that would meet the specification — not that it can't be done, it will just cost more.

The same comments apply to systems that have microwave feeds wherein the signal must be re-modulated on channel. Most modulators are also spec'd at a crystal tolerance of .005%. However, in those few instances when a microwave feed does not transmit



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the aural carrier in the diplexed mode as originally broadcast (i.e. 4.5 MHz above the visual carrier) the reconstitution of the aural carrier to the 1 KHz tolerance is going to require special effort (and dollars).

Moreover, the proposed tolerance does not seem properly addressed to the problem. The governing situation, which must be controlled, is the nearness of the lower adjacent sound-carrier to the desired visual-carrier which causes sound interference in the picture the nearer it gets. The upper adjacent channel (and its visual-carrier) can deviate further downward into the desired channel. So, the controlling tolerance must be applied to the lower adjacent carrier and it should probably be the same as the broadcast tolerance.

The broadcast tolerance would allow: (1) two 10 KHz offsets, (2) the desired visual channel could deviate downward 1 KHz, (3) the lower adjacent channel visual-carrier (carrying along its aural carrier) could deviate upward 1 KHz, and (4) the aural carrier of the lower adjacent channel could also independently deviate upward 1 KHz. These allowable (within broadcast tolerance) deviations add up to 23 KHz or a separation of no less than 5.977 MHz between visual-carriers of the desired and lower adjacent channel that should not be compromised.

There is no need for such a tight tolerance in the other direction, however, and 70 or 80 KHz might prove to be very satisfactory. The total tolerance then required of CATV could be on the order of 100 KHz (rather than the 50 KHz proposed) and no technical

compromise of performance at the subscriber terminals would have been effected. Thus system operators could order .005% crystals for the center of their individual tolerance requirement depending upon whether they used the lower adjacent channel.

## Visual Signal Level

The visual signal level at the subscribers' terminals is to be no less than 0 dBmV. This is a well accepted minimum design goal for modern systems and seems to be well founded in theory. (Editorial Note: For greater background on this subject, the reader is referred to figure 3 of "CATV Systems, Design Philosophy and Performance Criteria . . .," J. R. Palmer, IEEE Transaction on Broadcasting, Vol., BC-13, No. 2, April 1967. That article indicates that for subscriber levels of 0 dBmV or better, observer ratings of picture quality tend to become independent of receiver noise figure.) Many older systems were not designed to this goal, however, and it will be costly for such systems to be brought into compliance. In fact, many systems with an intended goal of delivering 0 dBmV to subscribers may be surprised to find that 25% to 30% of their subscriber drops are not meeting their intended goals. The proposed rules will mean closer attention to installation practices.

The further requirement that this level be maintained within 6 dB of its minimum value (the value the operator listed with the Commission in the certification) would appear to serve no useful purpose. The governing concern, as mentioned previously, is the adjacent channel level and the proposed requirement that these be within 6 dB of the desired channel is probably none too tight a specification. If adjacent channel levels are sufficiently controlled, there should be no reason for other level criteria. Receiver action must work in the off-the-air signal environment of 100 microvolts to several hundred millivolts — and surely no CATV system is going to exceed those limits.

The suppression of the aural-carrier to between 13 and 17 dB below the visual-carrier is certainly appropriate for systems carrying adjacent channels, but the specification is not necessary for some of the smaller systems that may not be using adjacent channels. This provision, hopefully, will be changed since the introduction of additional head-end equipment for the purpose of gaining this separate aural-carrier control would serve no useful purpose.

## Signal-to-Noise Ratio

The signal-to-noise ratio at the subscriber terminals is to be maintained at no less than 36 dB for signals that serve the CATV system community with Grade B or better or are first picked up within a Grade B contour for microwave relay to the system head-end. This requirement may prove more difficult to meet than appears at first blush since most system specifications refer to trunk line characteristics whereas the FCC proposal specifies S/N at the subscriber terminal. Again, new systems should find this requirement within their grasp, but older systems may have to

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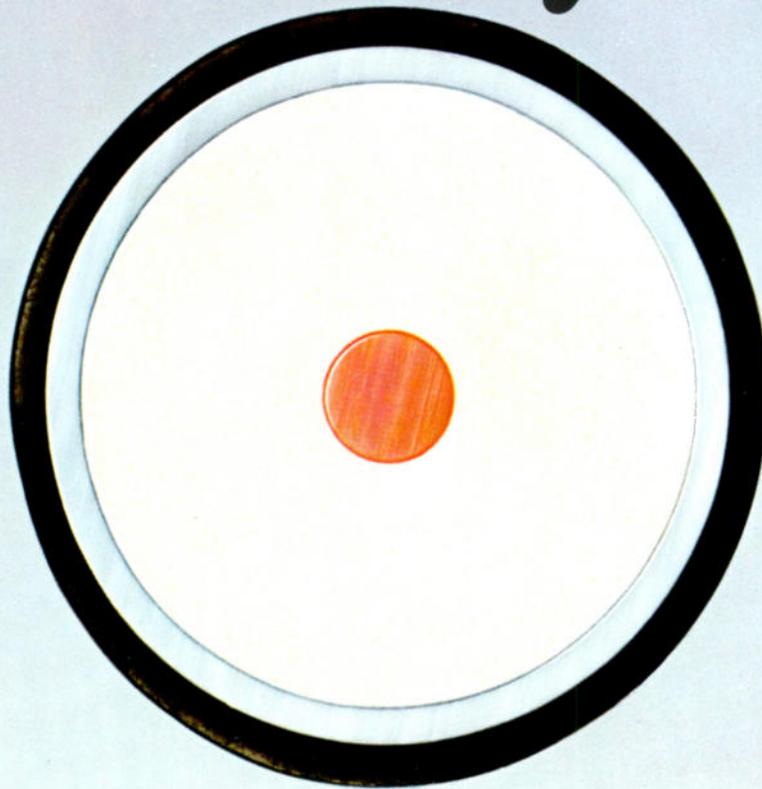


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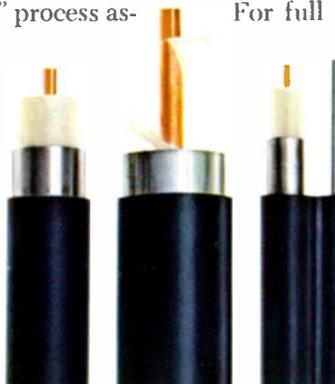
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redesign to comply with the new rules.

S/N requirement pertains only to Grade B or better signals, but it is also meant to include any CARS band equipment between the head-end and the antenna pickup. Moreover, since the measurement method suggested by the FCC says that the antenna may be disconnected and replaced with a terminating resistor, there is the clear implication that any microwave equipment between antenna and subscriber must be included in this measurement. This section of the proposed rules may have to be rewritten since this measurement scheme obviously won't work where a baseband microwave feed is re-modulated on channel. In these cases, terminating a remote antenna input is not going to turn off the carriers of the modulator which precludes the accurate measurement of noise in the channel.

The specification on hum and other undesirable low-frequency components in the visual signal (para 74.1153 (a) (7)) is apparently the only case in which the video waveform must be examined. The requirement to keep these components below 5 percent of the visual signal level is probably not really satisfactory, but it is apparent where this specification originated. It is quite similar to para 73.682(a) (16) of the rules on transmission standards for television broadcasters, however, the paragraph in the broadcast rules goes on to say: "This provision is subject to change but is considered the best practice under the present state-of-the-art. It will not be enforced pending a further determination thereof."

Proposed rule para 74.1153(a) (10) requires coherent interference disturbances including intermodulation and co-channel to be suppressed 46 dB below the desired visual-signal level. The disturbing part of this specification is that it includes co-channel. A CATV operator has little, if any, control over co-channel picked up via the antenna. During the seasons favorable for "skip" (bounce from Sporadic E layers), co-channel becomes severe in Grade A and even within some City Grade contours. The co-channel requirement should pertain only to system-generated co-channel or co-channel induced in the system exclusive of the antenna pickup.

## Isolation Requirements

The terminal isolation requirement of 30 dB between subscribers is going to prove difficult for older systems. It is only recently that the industry has had available directional couplers and passive tap devices of 30 dB isolation between spigots. The combination of the 0 dBmV minimum level requirement and the subscriber terminal isolation of 30 dB can mean, in many instances, respacing of amplifiers, addition of amplifiers, and addition of modern customer tap devices. As mentioned previously, the three-year conversion period seems unduly short

unless the Commission adopts a more liberal attitude toward the granting of hardship waivers.

## Radiation Limitations

The radiation limitations, formerly in para 15, Subpart D, para's 15.161-15.165, have been incorporated in the proposed rules with some changes. The more lenient radiation limits for sparsely settled areas have been deleted; and the high VHF band limitation of 50 uV/m (132 MHz-216 MHz) has now been reduced to the 20 uV/m requirement of the low-band (54 MHz-132 MHz). A further subtlety appears in the reference to the measuring equipment to be used. The former wording was "A field strength meter using a horizontal dipole antenna shall be employed." The proposed rule in para 74.1155(h) (1) reads: "A field strength meter of adequate accuracy using a horizontal dipole antenna shall be employed." It may be that meters such as the Jerrold 704-B cannot be used for radiation measurements unless the calibration can be proven.

The aggregate effect of the rules, as proposed, means that many systems may be faced with a considerable investment in newer equipment and system layout changes in order to fully comply with the specifications. The cost of test equipment alone, to fully implement these measurements, can be on the order of \$15,000 (a bare and marginal minimum) to \$25,000.

Let us hope that the Commission does not lose sight of the fact that any specification proposed should serve a useful and desired purpose. This concept is summed up best in the words of Donald G. Fink, former editor of the Proceedings of the IEEE and vice-chairman of the National Television System Committee, in his article in the Color Television issue of the Proceedings (October, 1951): "... a television system should never be called upon to reproduce an image that is 'more than pleasing'. This seemingly trivial limit on the required excellence of a television system has profound influence on the cost of rendering the service and the amount of radio spectrum space required. It implies that the system should not have capabilities beyond the reproduction of a satisfactory (pleasing) image, since such capabilities cost dear, in money and in spectrum resources." TVC

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# Expanding to 17 Channels: How They Do It in Seattle

Technical Editor Switzer concludes his series on "Expanded Cable Capability" by drawing attention to this practical approach to increased channels.

*By James A. Hirshfield, Jr., President  
and Jerry A. Laufer, Vice President  
Crystal Cablevision, Inc.  
Seattle, Washington*

Crystal Cablevision, Inc. has developed a new method of CATV signal distribution for apartment house areas. This method: Expands deliverable channels from 12 to 17... minimizes customer orientation and operation problems... is technically uncomplicated, easy to install, and built with "off the shelf" equipment... and costs \$9.00 or less per customer in additional expenses to install.

The bright future projected for cable television is based on the elimination of a monopoly of nature — the frequency spectrum. Cable TV provides more television channels than can be delivered through the air. Technologically, any number of channels can be delivered. Economically, cable systems generally have been halted at the twelve channel level.

There are several practical reasons for this limitation. Dual systems, while effective, encompass a large investment in facilities. They provide an external switch at the customer's TV set which he must learn to use. Con-

verters also involve a large investment, and to date have proven to have some technical problems. They also cause substantial customer orientation problems. UHF converters again involve a substantial investment.

Thus, attempts to expand channel capacity beyond 12 have not met with satisfactory solutions to date.

Crystal Cablevision constructed a Starline 20 plant in the apartment area of Seattle two years ago. Originally, this system was structured to deliver 17 channels through use of standard converters. Technical and customer orientation problems caused the system to go to a 12 channel operation, similar to most of the 20 channel systems constructed to date. The area originally cabled by Crystal contained 840 home and apartment units per mile, sitting one to three miles from the three network transmitters. These strong local signals were placed off-channel in the 12 channel operation. Our problem, then, was to find a method of delivering

more than 12 channels which was acceptable from the standpoint of customer orientation, technical performance, and cost.

## Block Conversion To UHF

All TV sets sold since 1965 have contained UHF tuners. This comprises somewhat over half the TV sets presently in use. The customer, while not usually trained to utilize the UHF dial correctly, is nevertheless more familiar with this tuner than most external devices we might attach to his set. We felt that use of this dial to deliver extra channels would substantially reduce the customer orientation problem.

Most of Crystal's customers live in apartment buildings and are fed from a distribution box on the building. These buildings average 25 units each. The runs within the building vary from 50 feet to 150 feet. The calculations below are based on 100 foot runs. The aluminum foil, solid dielectric "59" size cable loss at channel 13 is about 5 dB. The loss at channel

22 (the highest channel used) is about 8 dB.

If we could technically convert additional channels to UHF at each distribution box, we would substantially solve the problem of cost by using a normal 12 channel existing plant, at all points except the distribution box, to deliver our signals.

A 20-unit building was chosen for installation on a pilot project basis. A bench test was made of the system, which checked out favorably. We went ahead with installation of the pilot project.

### Pilot Project Installation

Figure 1 is a block diagram of the delivery system. Five mid-band channels are converted to five of the nine UHF positions available on the Vikoa converter. This enables us to use every other UHF position and avoid potential adjacent channel tuning problems for the customer, while limiting the harmonic problems occasioned in 20-channel operation by carriage of signals in the mid-band and the low-band. Table 1 shows the mid-band channels and the UHF frequencies to which they

are converted.

The system head-end equipment consists of conventional heterodyne converters with band-pass filters and a directional coupler output system. No changes are made in the head-end.

In the distribution box at the apartment house (see figure 1), the VHF is tapped off the incoming drop through a 20 dB directional coupler. This was necessary because this particular building had an amplifier located on the strand, and the Vikoa converter is designed for low level operation. The converter used has about 3 dB of loss for an output of plus 12 dBmV. This output is amplified to +40 dBmV with a Blonder-Tongue CUB-29P amplifier. The UHF is then mixed with the VHF through a Jerrold FCO-320 UHF-VHF splitter-mixer. The combined UHF-VHF is split with a network of splitters to feed each apartment. The Jerrold 1596 and 1597 splitters have a pass-band of 20-890 MHz. The loss and isolation of these splitters are not as good as VHF splitters. Loss is typically 3.5 dB VHF and 4.5 dB UHF. Isolation is 18-20 dB VHF and 12-15 dB UHF. With these losses, typical levels are as follows:

VHF in		UHF out	
channel	frequency (MHz)	channel	frequency (MHz)
* A	120-126	14	470-476
B	126-132	15	476-482
* C	132-138	16	482-488
D	138-144	17	488-494
* E	144-150	18	494-500
F	150-156	19	500-506
* G	156-162	20	506-512
H	162-168	21	512-518
* I	168-174	22	518-524

\* Channels used for final system to avoid adjacent channel problems.

	VHF	UHF
8 low level runs - out	+18	+17
50' coax-loss	-3	-4
TV set level	+15dBmV	+13dBmV
12 high level runs - out	+22	+22
100' coax loss	-5	-8
TV set level	+17dBmV	+14dBmV

The transformer used at the TV set is a Jerrold FSX-1314. We have also tested a Vikoa 106. Both of these units match 75 ohms to 300 ohms and split UHF and VHF into two separate "twin leads." These leads are attached directly to the respective UHF and VHF terminals of the TV set.

Tuning on the mid-band channels is accomplished by simply selecting the UHF position and adjusting the UHF tuner to the desired channel. VHF channels are tuned normally.

Channel identification is a problem on most UHF tuners. This has been decreased by providing non-adjacent channels and placing the weather channel in the middle (channel 18) to provide a constant picture for reference.

The two transformers do not reject direct pick-up as well as the good shielded and balanced VHF transformers normally used (this is only a problem on VHF).

Another problem is the low level operation required of the Vikoa converter to avoid cross-mod. This is solved by using the

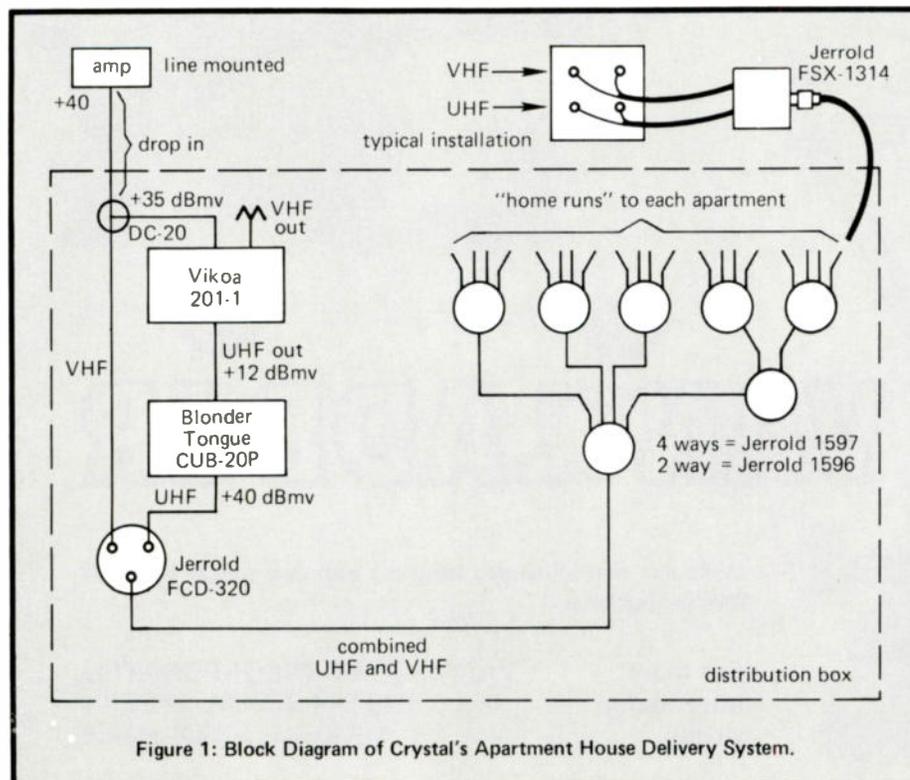


Figure 1: Block Diagram of Crystal's Apartment House Delivery System.

UHF post amplifier.

The over all performance of the above system is good considering the use of "off the shelf" items. The UHF tuners in the TV sets perform better than we had expected.

### Economic Considerations

Table II lists the additional items required to convert the standard delivery system to the above described system. Fixed material costs per building are \$138.30. Additional labor required should not exceed one hour. Per unit costs were \$3.50 in the pilot project, which is at the high end of the expected cost per unit range.

Thus a 25-unit building can be set up to deliver UHF for \$5.53 per unit, and customers connected for an additional \$3.60 per unit.

The need to deliver more than 12 channels is apparent to all of us. Crystal has solved the first step in this problem by delivering five additional channels to the customer's UHF dial. Customer

Per Building	Description	Quantity	Additional Cost
Vikoa	201-1 converter	1	\$ 30.00
Blonder-Tongue	CUB-29P UHF amplifier	1	86.30
Jerrold	FCO-320 UHF-VHF filter	1	15.00
Delta	DMT-20 directional coupler	1	7.00
			\$138.30
Per Unit			
Jerrold	1596 splitter	1/20	.10*
Jerrold	1597 splitter	3/10	1.00*
Jerrold	FSX-1314 transformer	1	2.40*
			\$ 3.50

\* This number represents the cost of the item in excess of the standard UHF item, divided by the number of units each item can serve.

orientation problems are minimized, with this system, through use of the customer's own UHF tuner. The system is technically quite simple . . . can be built with "off the shelf" items . . . and can be built quite economically — at approximately \$9.00 per subscriber for a 25 unit building.

Larger buildings, of course, are more economical.

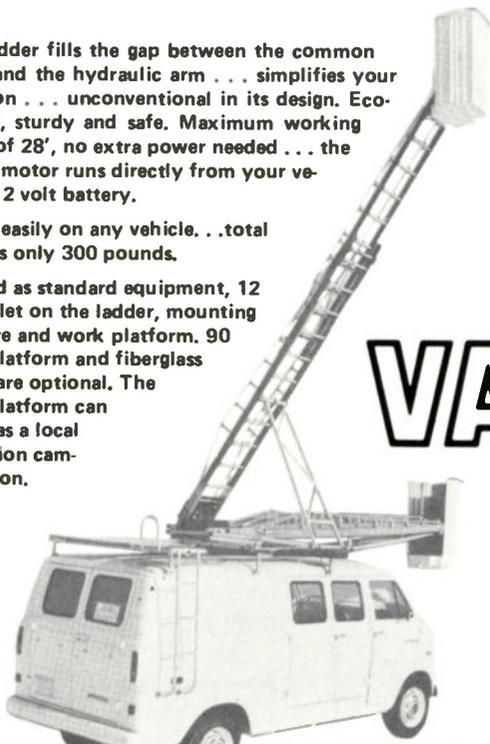
The basic limitation of the system is that it "only" delivers five more channels. But, we feel that this "only" is a vast step forward in solving the problem of product distribution in major metropolitan areas. rvc

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Van Ladder fills the gap between the common ladder and the hydraulic arm . . . simplifies your operation . . . unconventional in its design. Economical, sturdy and safe. Maximum working height of 28', no extra power needed . . . the electric motor runs directly from your vehicle's 12 volt battery.

Mounts easily on any vehicle. . . total weight is only 300 pounds.

Included as standard equipment, 12 volt outlet on the ladder, mounting hardware and work platform. 90 swivel platform and fiberglass bucket are optional. The swivel platform can double as a local origination camera station.



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42-61 24TH ST., LONG ISLAND CITY, N.Y. 11101

## ALL ALUMINUM SHEATHED CABLES AVAILABLE WITH INTEGRATED MESSENGER

TYPE	O.D. (NOM.) CONDUCTOR	O.D. (NOM.) DIELECTRIC	OVERALL O.D. (NOM.)		NET WEIGHT LB. PER M FT.
			UNJACKETED	JACKETED	
TA-4	.0752	.362	.412	---	78
TA-4J*	.0752	.362	.412	.480	100
TA-5	.098	.450	.500	---	102
TA-5J*	.098	.450	.500	.575	132
TA-8	.146	.690	.750	---	218
TA-8J*	.146	.690	.750	.850	274

## ATTENUATION IN DECIBELS PER 100 FEET

CHANNEL	2	3	4	5	6	7	8	9	10	11	12	13
TA-4, TA-4J	.77	.82	.86	.93	.96	1.46	1.49	1.51	1.54	1.56	1.59	1.61
TA-5, TA-5J	.63	.68	.71	.74	.79	1.12	1.15	1.17	1.20	1.22	1.24	1.26
TA-8, TA-8J	.42	.44	.47	.51	.53	.80	.81	.82	.84	.85	.87	.89

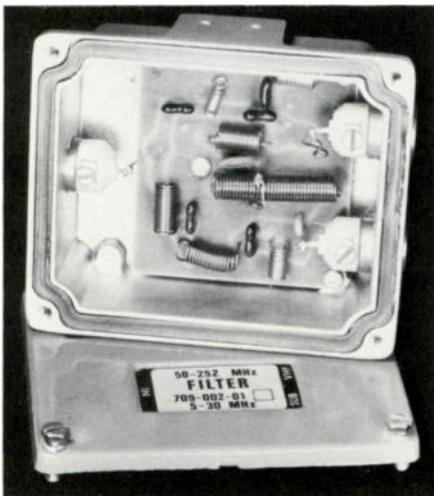
\*"Also available for direct burial with high molecular weight poly jacket, self-sealant flooding compound, and rodent repellent jacketing."

# PRODUCT REVIEW

NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

## TWO-WAY FILTER OFFERED BY CASCADE

Operating over the frequency range of 5-252 MHz, a new two-way filter by Cascade is designed to separate or combine VHF (50-252 MHz) and sub VHF (5-30 MHz) signals. This filter is designed to offer the capability of adding sub VHF services (such as two-way services) to an existing system with a minimum changeout of equipment. It



is compatible with all CATV distribution equipment. The cast aluminum housing measures 4 3/4" x 3 7/8" x 2", has center conductor seizing and uses 5/8-24 connectors.

For further information on this new product contact Cascade Electronics Ltd., Port Moody, British Columbia or 1111 C Street, Bellingham, Washington.

## MICROWAVE SYSTEM FROM SCIENTIFIC-ATLANTA

A completely solid-state, low cost microwave system has been developed by Scientific-Atlanta for operation in the 12.2 to 12.7 GHz general business band and in the 12.7 to 12.95 GHz CATV CARS band. Both color and monochrome television signals may be transmitted with this system in single-or-multiple hops over distances up to 25 miles, in full compliance with FCC standards. The oscillators for both the transmitter and the receiver are housed in weather-proof enclosures behind the antennas so that coaxial cabling may be used rather than waveguide. The system electronics are housed in 5 1/4" cabinets. Gunn-effect and Impatt oscillators are utilized. The transmitter power output



is 10 MW (+10 dBm). System's reliability is rated in excess of 99.9%.

For further information on this new product contact Scientific-Atlanta, Inc., Post Office Box 13654, Atlanta, Georgia 30324.

## TWO-WAY EXTENDER NEW FROM JERROLD

A new two-way line extender, model SDV-30/60, offered by Jerrold Electronics Corporation for two-way CATV systems, is a push-pull amplifier for high and lo-sub bands with high and low-pass filters included. Plug-in equalizers are used in the high-band portion of the amplifier and return leg-equalization is included in the return module circuitry.

For further information on this new product contact Jerrold Electronics Corporation, CATV Systems Division, 401 Walnut Street, Philadelphia, Pa.

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# FULLY INTEGRATED POWER SUPPLIES . . . a package deal

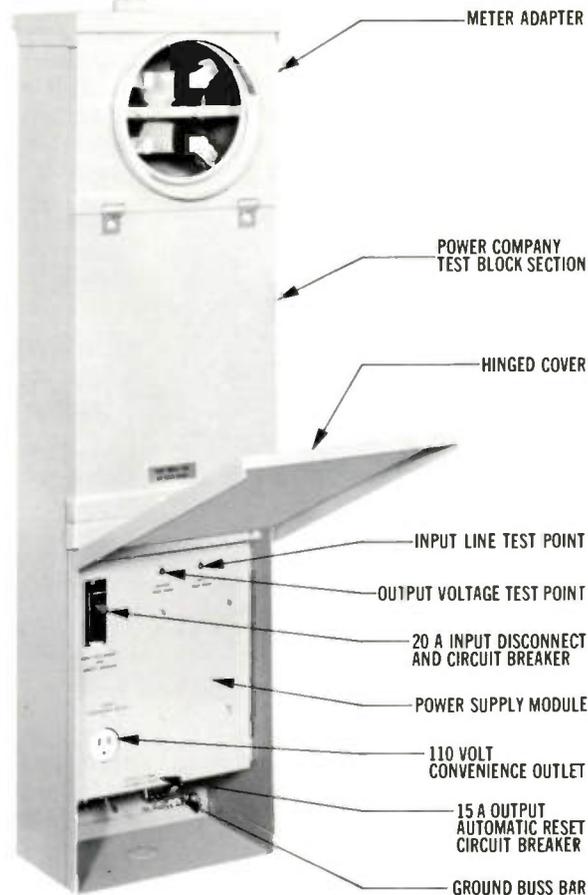
- Effectively cuts maintenance time by 75%
- Eliminates unnecessary fittings — cuts costs by 20%
- Enhances pole appearance — pleases subscribers
- Eliminates unsightly pole clutter — appeases utility company
- Eliminates hazardous pole climbing
- Four models . . . regulated and unregulated . . . with and without meter adapter
- Quick drop-in field replacement of module

Somebody had to do it! By integrating elements into one weatherproof utility box, your installer can now do the job in less than one-half hour. With the GLETRONICS package CATV units, there is less wiring, fewer fittings for reduced plumbing costs, better appearance, safer poles, and better relationships between you, your subscribers, and the utility company.

GLETRONICS' fully integrated power supplies feature a 110-volt convenience outlet, input/output test points, and other standard features . . . all within easy access under a single hinged cover. UL approved utility box.

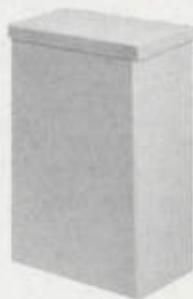
Another plus feature! In emergencies, the convenience outlet may be used as an input merely by placing the disconnect in the "off" position. Power may then be supplied by a portable generator or similar source.

Drop-in power supply replacement is easily accomplished in five minutes by removal of four quarter-turn fasteners. For new economy in CATV operation, specify GLETRONICS' fully integrated power supplies. Fully tested and thoroughly field proven.

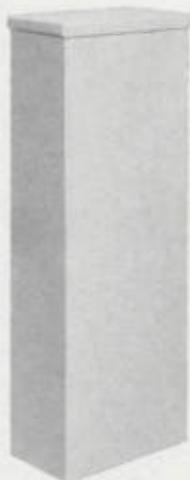


## STANDBY CATV POWER SYSTEM

The Type II Battery Pack delivers twice the capacity of the Type I at only 20% additional cost. Although GLETRONICS recommends two battery pack types (I and II), any capacity can be supplied. Your size and weight requirements are the only limitation.



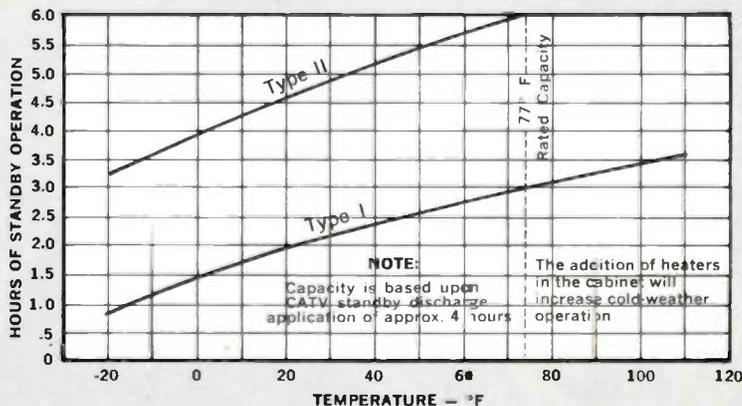
Type I  
24" H x 13" W x 8-1/2" D



Type II  
40" H x 16" W x 8" D

GLETRONICS' standby CATV power systems . . . either pole-mounted or underground, are designed to eliminate the type of system failure over which the CATV operator has no control. The complete standby emergency system is housed in two cabinets — a battery pack, and a pole-mounted unit connected to the 115-volt line and the TV cable.

The GLETRONICS standby system features . . . Highly reliable SCR-type inverter • automatic switching (less than 10 msec in either mode) • automatic inverter shutoff at 28-volt battery level • automatic battery recharging • communications-type calcium-lead or lead-antimony batteries • low maintenance • up to 25-year life



*Glentronics, Inc.*

CATV DIVISION, P.O. BOX 66  
748 EAST ALOSTA AVE.  
GLEN DORA, CALIF. 91740  
PHONE (213) 963-1676

## TELSTA INTRODUCES SPLICER'S AERIAL BASKET

Telsta Company, a division of General Cable Corporation, has developed a new splicer's basket that is claimed to improve the technician's efficiency. The basket rotates a full 180 degrees about its own vertical axis, so

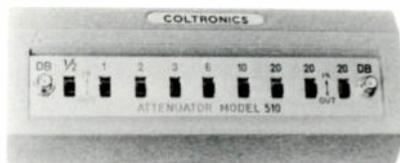


that the operator always works square to the cable. The rotation feature means the basket is smaller, yet more elbow room is provided for increased production and proper use of modern tools. A complete aerial workshop, the basket includes power, air, heat, and weather protection, yet it is compact and stows well up in the travel position, in no way impeding the driver's view.

For further information on this new product contact Telsta Company, 1700 Industrial Road, San Carlos, California 94070.

## COLTRONICS INTRODUCES HIGH PRECISION ATTENUATOR

A new high precision attenuator, the Coltronics type 510, is designed to



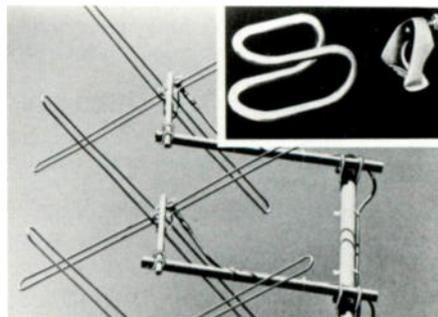
provide a maximum of 82.5 decibels attenuation in a direct current band up to 900 MHz with outstanding accuracy and very low return loss. The Coltronics type 510 is encased in double-shielded die-cast housing. Slide switches are

designed for rugged construction. They feature coil silver-plated, self-wiping contacts. Connectors are of the F type, and contain gold-plated contact springs.

For further information on this new product contact Coltronics Limited, 250 Marcus Boulevard, Hauppauge, L.I., New York 11787.

## NEW LOCKING DEVICE FOR ANTENNA MOUNTS

Antenna mounts for cable television reception are now being manufactured by Up-Right Scaffolds. They offer a unique device which locks standard pipe at right angles, and specially aligns antennas to receive television signals at maximum strength. The flexible new lock consists of a loop and saddle. Its open loop wraps around the pipe at any point desired without taking it over the



## THANK YOU, MR. MOON . . .

This letter from Community Cablevision of Newport Beach is indicative of the established reputation of American Technology Company as one of the leading producers of quality CATV Directional Taps.

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Newport Beach, California 92660  
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November 12, 1969

Mr. E. A. Munson, General Mgr.  
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3630 West Clarendon  
Phoenix, Arizona 85019

Dear Gene:

I felt I should take time to let you know of the excellence of your directional tap.

As you know we have several hundred of them in service in our all underground CATV system on The Irvine Ranch in Southern California.

To date we have not replaced, repaired, or had to check a single directional tap that has been put into service. This I believe is living proof of the tremendous effort you put into producing and delivering a high quality product.

By utilizing your tap (mini-tap in comparison to others) we have been successful in reducing costs in our sub level construction.

I would recommend, and do often, your directional taps to anyone who is considering building a top quality CATV system.

We are looking forward to your next visit to our system.

Yours truly,  
*Eugene R. Moon*  
Eugene R. Moon  
General Manager

ERM



# Sometimes you need a new twist.

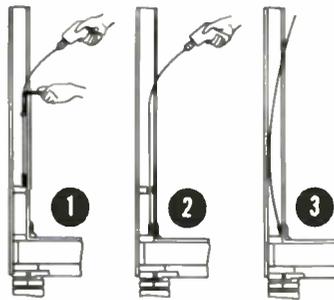
Rigid bits are fine for drilling in a straight line. But when you need to bend a little, there's D'versiBIT.

Introducing the new drill tool that gives you expert control over a flexible spring steel shaft of five, six and ten foot lengths. It's a fast efficient technique that also allows line recovery capabilities for in-wall installation.

For illustration, let's consider the installation of a thermostat in an existing wall. The line is to be run from the basement. First a small hole is made at the desired location of the thermostat. A one inch hole is sufficient.

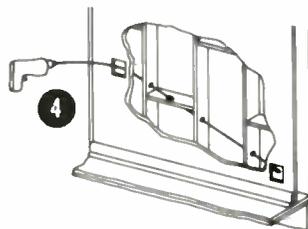
Now with the aid of D'versiBIT's handy position tool **8**, you insert D'versiBIT into the hole and slide the shaft down to the purlin or firestop. **1** D'versiBIT is held against the inside wall. Now by drilling through the purlin or firestop, you have a guide for the shaft. By sliding D'versiBIT down, you will make contact with the flooring at the exact location to drill through to the basement. **2**

With completion of this operation, you are ready for recovery. Your line is attached to a specially designed recovery grip. **7** The grip is then attached to a hole in the D'versiBIT tip. D'versiBIT is



then pulled back with the line attached for recovery.

In the absence of a midway purlin, D'versiBIT is held against the inside wall and dropped down to the floor. It is then allowed to bow against the back wall. **3** This technique again positions D'versiBIT exactly where you desire to drill. A tiny hole is also located in the chuck end of the shaft to give you the option of pulling the line from this direction.



D'versiBIT can be controlled in drilling both to the basement or attic. It can drill sideways or diagonally across the wall from a wall switch to a wall socket. **4** Even heavy conduit lines offer no problem for D'versiBIT. And you have the option of Auger **5** or Carbon **6** drill tip to meet individual job specifications. D'versiBIT comes in bit sizes of 3/8", 1/2", 3/4", 1", 1 1/2" and 2" with appropriate grips for recovery. Termite shields and wall insulation offer no restriction for D'versiBIT. It's a new twist to save you time and frustration. D'versiBIT. It's the better way.



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## D'versiBIT.

end of the pipe. The lock is installed in seconds by tightening a single screw. Any adjustments are made by loosening the screw. The lock produces 8,000 lbs. of grip to form a strong, rigid mount. It is known as the Rota-Lock.

For further information on this new product contact Up-Right Scaffolds, 1013 Pardee Street, Berkeley, California.

### PRUZAN MARKETS NEW "Q" SPAN CLAMP

A new type Q span clamp that installs quickly for use with any drop grip is now available from Pruzan. Featuring a bridle ring design, it is designed to absolutely prevent the drop grip from coming off, but allows instant, one-hand removal, when desired. The entire clamp is galvanized. They are available for \$32/100 in quantities under 1,000, and \$30/100 for quantities over 1,000.

For further information on this product contact Pruzan, 1963 First Avenue South, Seattle, Washington 98134.

### 62" DEEP LINES PLANTED BY KEN/TEL PLOW

The Midwest Mainline 7 ton trailed plow is designed to bury all types of CATV distribution cables underground



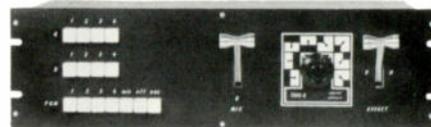
without cleanup or backfill, at speeds averaging 1 to 2 miles per hour plowing time. The Mainline, with full hydraulic controls and adjustable plow tooth is capable of statically planting up to 4.8" O.D. material, to 62" depths. The plow blade inserts or raises independently of wheels or other functions. According to the manufacturer, KEN/TEL, Mainline's completely self-contained hydraulic system controls plow share, sod colter, folding tongue, individual wheel height and self-loading reel rack of 24,000 lbs. capacity. The unit can be trailed by a truck between jobs at highway speed.

For further information on this new product contact KEN/TEL Equipment Company, P.O. Box 446, Candler, North Carolina 28715.

### CATV SWITCHING UNIT FEATURES LOW COST

An all new vertical interval switcher/fader, special effects unit is being

marketed by Kapco Enterprises, Inc. It is billed as a way "to fill the need for a reliable program switcher at a reasonable price." The \$975 unit, designated TSFE-4, features all electronic switching, with a vertical interval program bus for a glitch free signal. Silent, illuminated switch buttons show camera set ups at a glance. The fader section provides facilities for dissolves from one video signal to another, superimposition, fade to black, or any combination of these effects. Special effects include horizontal and vertical wipes as well as

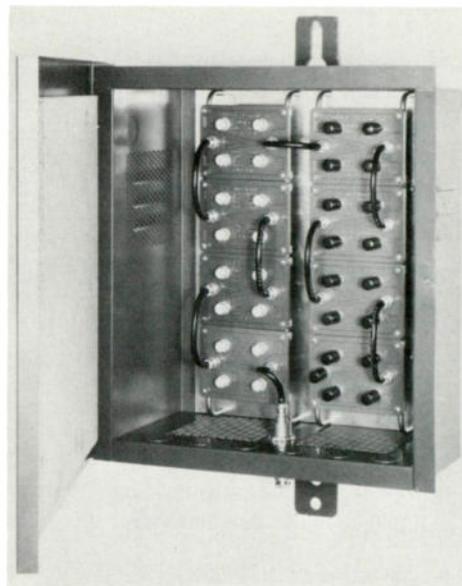


corner inserts from any of the four corners. Split screens and corner inserts can be preset on a preview monitor, then switched directly into the program line. Individual control bars adjust horizontal and vertical components of the corner inserts. The unit was designed for standard rack mounting, is fully transistorized, and has its own built in power supply.

For further information on this new product contact Kapco Enterprises, Inc., 947 Janesville Ave., Fort Atkinson, Wisconsin 53538. 

## DELTA INTRODUCED THE "AHDS" CATV APARTMENT HOUSE DISTRIBUTION SYSTEM

- INDIVIDUAL CONTROL OVER EVERY APARTMENT
- ECONOMICAL DISTRIBUTION, WITH MULTI-TAP FLEXIBILITY
- AVAILABLE WITH A BROADBAND, 40dB AMPLIFIER
- .412 CABLE INPUT AND OUTPUT
- SUPPLIED COMPLETE WITH INTERCONNECTING JUMPER CABLES



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## Literature For CATV

Tab Books has recently published two books that will be of interest to CATV technical people. Solid-State Circuit Design & Operation is a \$9.95 book written by Stanton Rust Prentiss. It is 288 pages and has over 140 illustrations as a guide to semiconductor circuit analysis and design. CATV System Engineering, New Third Edition is a \$12.95 expanded and revised version of William A. Rheinfelder's original book of the same title. Its 256 pages deal with planning, designing and operating a CATV plant. Tab Books is located at Blue Ridge Summit, Pa. 17214.

A condensed catalog covering their entire line has been issued by GBC Closed Circuit TV Corp. The free catalog includes a wide selection of video equipment for CATV, MATV and industrial TV applications. Write to GBC at 74 Fifth Avenue, New York, New York.



RCA has just issued a 12-page brochure and series of catalog sheets detailing their complete complement of color television equipment. They provide an overview of RCA color cameras priced under \$10,000, color film systems and video tape recorders. For copies, write RCA Professional Electronic Systems, Building 15-5, Camden, New Jersey 08102. Request Form 3J5558.

The first edition of Pruzan's 124-page, pocket-size catalog contains hundreds of items of tools and equipment handled by the company. Write to 1963 First Avenue South, Seattle, Washington 98134, and ask for the "1970 Tool and Equipment Catalog."



Hunt-Pierce Corporation has released a new 24-page catalog showing their complete line of Servi-Lift aerial platforms. For a copy, write to Hunt-Pierce, 230 Old Gate Lane, Milford, Conn.



Vikoa is offering a new 63-page catalog featuring wire, cable and electronic products for internal distribution systems. A free copy of the IDS/MATV catalog may be received by writing to Vikoa, Inc., 400 Ninth Street, Hoboken, N.J. 07030.



"The Key to Easy Maintenance... Passives with a Test Point" is a new brochure. It describes Entron's new CATV line with input and output test points that enable signal levels to be monitored throughout a cable system. Also available from Entron is their complete catalog of equipment offered for CATV. Write Sales Service Dept., Entron, Inc., 2141 Industrial Parkway, Silver Spring, Md. 20904.

A 44-page, full-color catalog is available from Trompeter Electronics. It features their complete line of coax, twinax, triax and quadax connectors, patch panels, plugs, jacks, patch cords and accessories. Write to Trompeter at 8936 Comanche Avenue, Chatsworth, California 91311.



TeleMation, Inc. has recently released four publications of interest to cable operators. A heavily-illustrated, 24-page booklet outlines System Expansion from basic equipment to a full-color production system. It is an equipment selection guide to help avoid obsolescence of original, small-studio equipment. Information sheets have been published on TeleMation's TCG-1440 Character Generator, TSE-100 Series Screen Splitters and TSG-3000 Broadcast Color Synchroni Generators. This literature may be ordered from TeleMation by writing Betty Harris, 2275 S.W. Temple, Salt Lake City, Utah 84115.

A new Pioneer Industries brochure describes Pio-Sonic sound-insulating doors, Pio-Seal acoustical seals and automatic drop seal "100." Write to Pioneer Industries, 401 Washington Avenue, Carlstadt, N.J. 07072.



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## TV Communications ADVERTISING STAFF

1900 WEST YALE ENGLEWOOD, COLORADO 80110 AREA CODE /303-761-3770

TV Communications is published by Communications Publishing Corp., publishers of CATV Weekly, the CATV Directory of Equipment, Services & Manufacturers, the CATV Systems Directory Map Service, the NCTA Convention Daily, and CATV Product Showcase.

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Contact Robert Titsch, Don Steele or Wayne Wilson. They will assist you with specialized market and media information.

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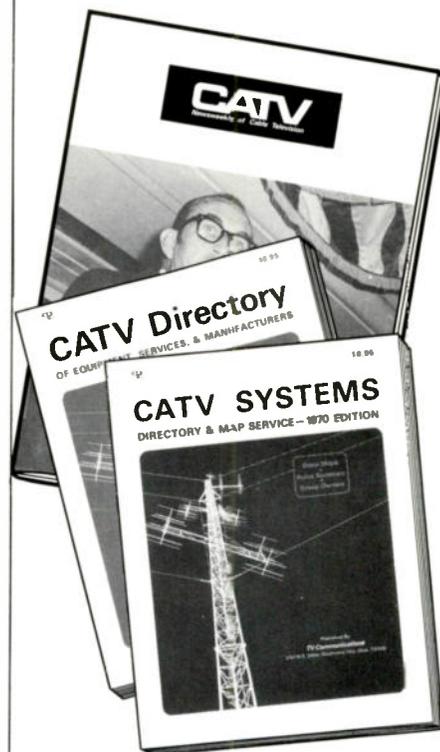
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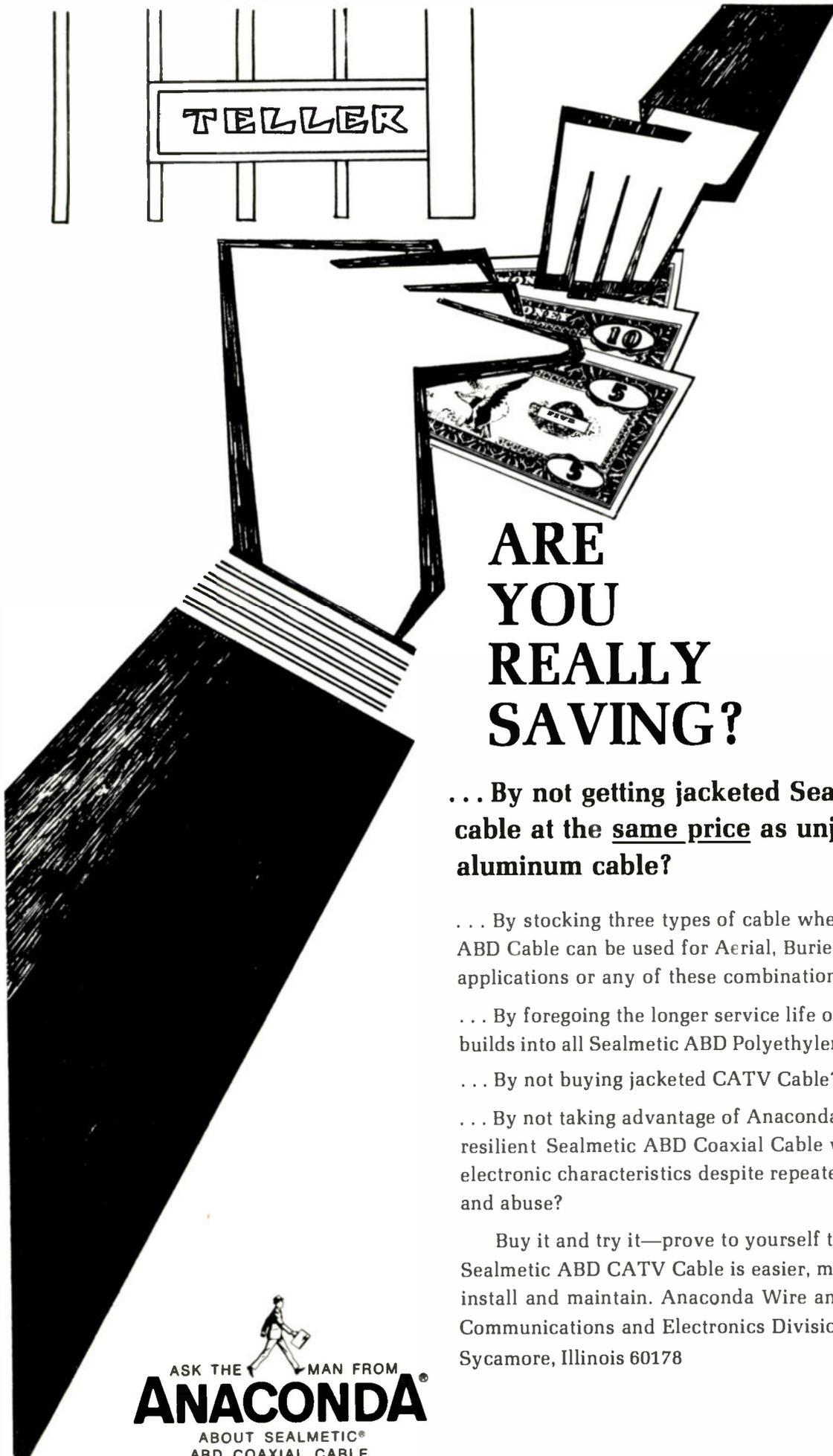
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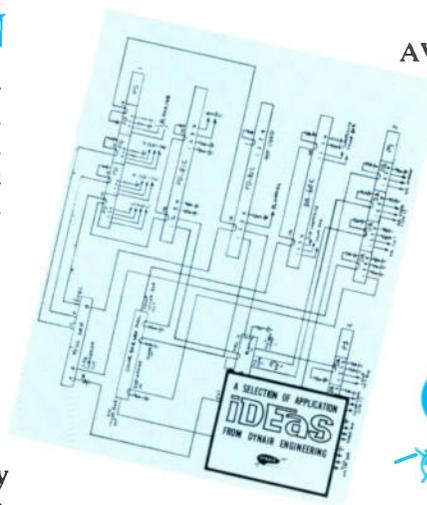
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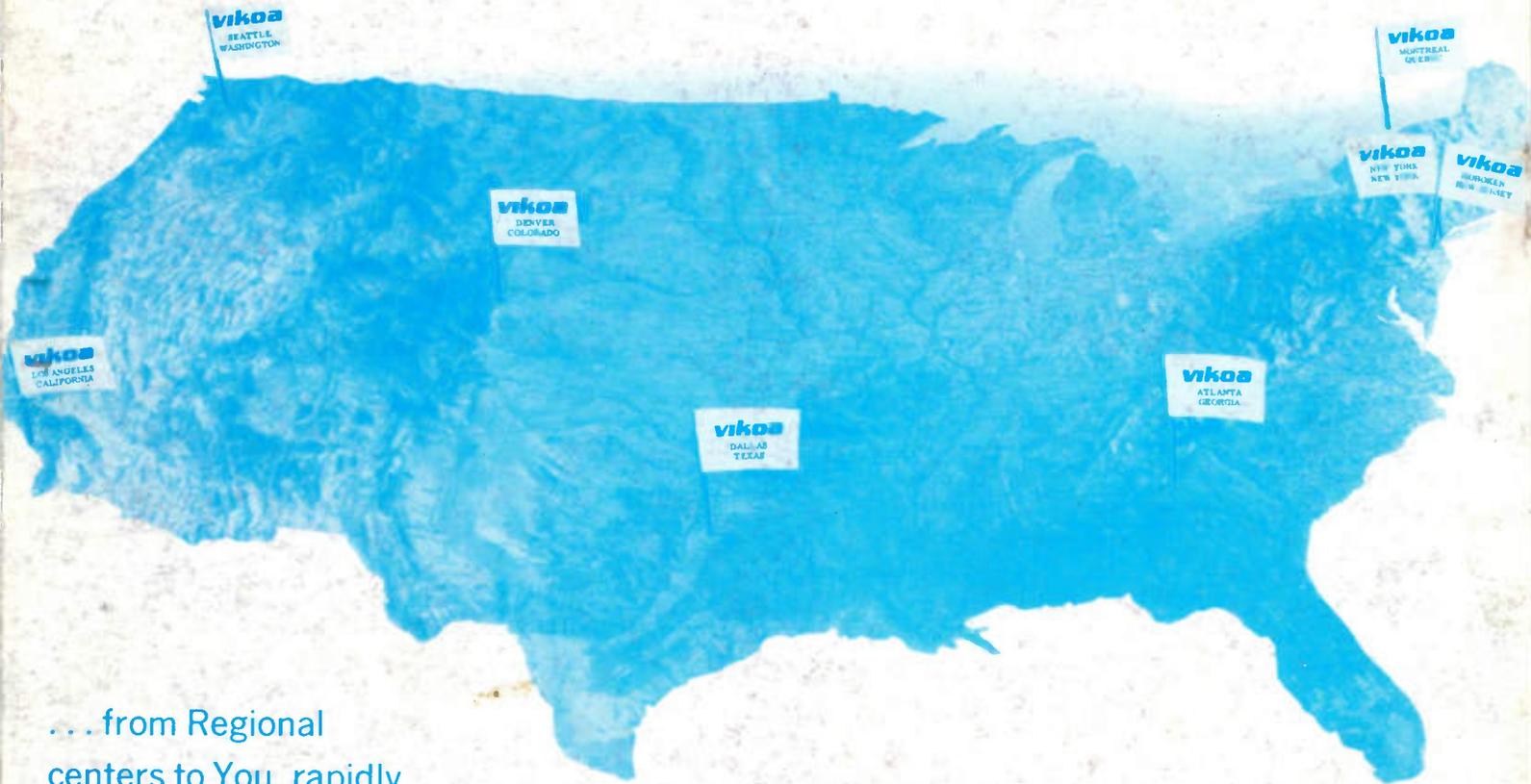
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