



October 1968

TV Communications

The Professional Journal of Cable Television



In This Issue...

Cablecasting on Five Channels

Simplified Color Equipment for CATV

Equipment Specs and System Design

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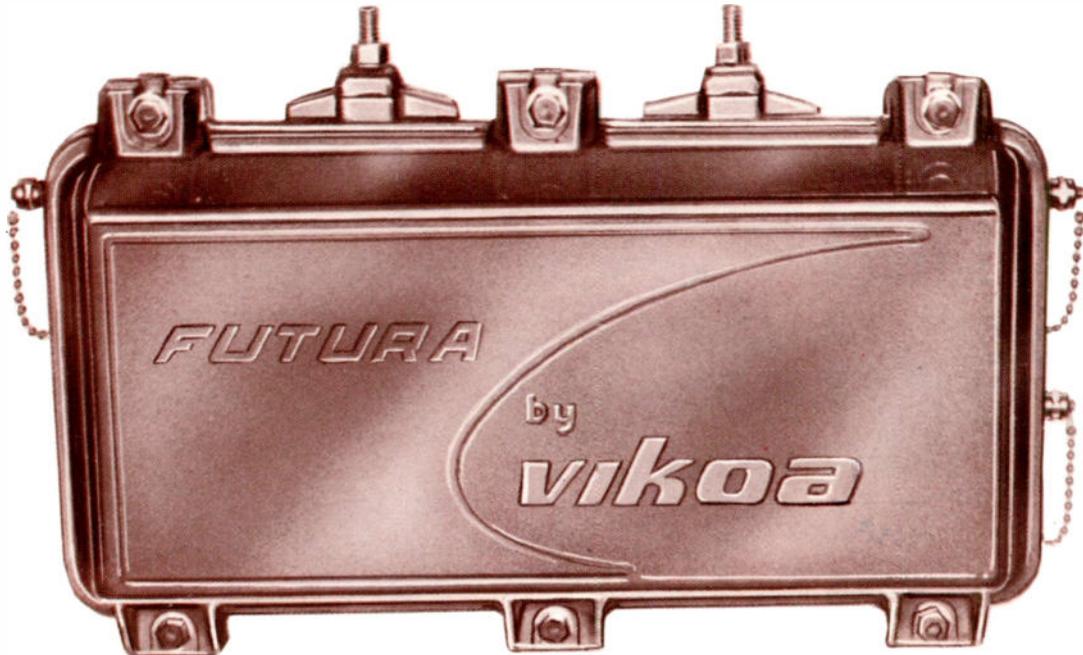
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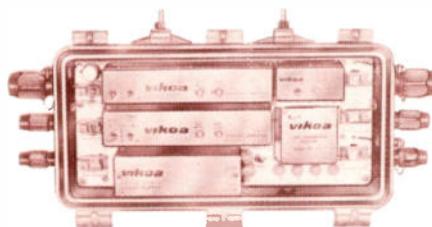
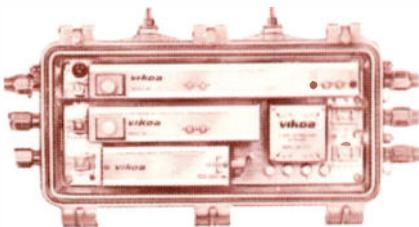
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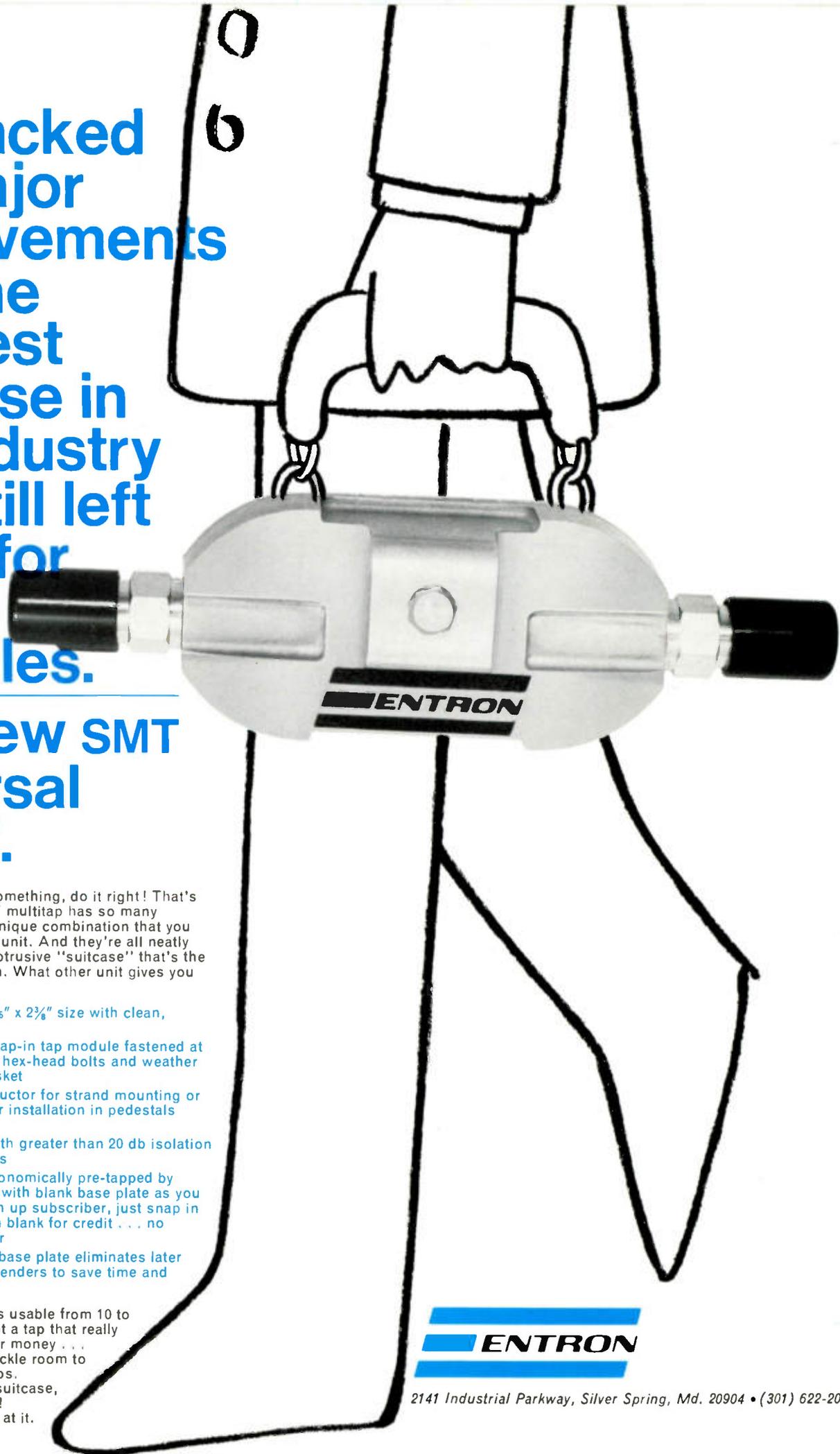
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IN THIS ISSUE

Multi-Channel Cablecasting

The move of cable systems into program origination is clearly dramatized by the recent initiation of five advertising-supported cablecasting channels on Greensboro (N.C.) Cablevision. The commitment to program origination which Jefferson-Carolina Corp. has made in its Greensboro operation may well affect the thinking of many system operators across the nation—especially in view of its dependence on advertising sales for economic support. The complete story of this venture begins on page 44 of this issue. (Our cover this month was taken in the Greensboro Cablevision studios.)

Meanwhile, in Grand Junction . . .

A big programming project, and a professional approach by the system staff, paid off well for ComTronics'



Grand Junction, Colo. operation. Beginning on page 48, read about the live cablecasting of the National Junior College Baseball Championship—with three-camera coverage and play-by-play commentary of 15 games over a five-day period. Results: hundreds of cards, letters and calls from subscribers commenting on the programming effort.

More on Local Origination

Continuing the emphasis on CATV programming in this issue is attorney Morton Berfield's evaluation of "The Legal Facets of Cablecasting," beginning on page 54. Then Telesis president Richard Shively gets down to the hard facts of planning local origination, from the economic side, as opposed to the many generalizations floating around the industry currently. (See page 56). A description of new low-priced color equipment for CATV studio work will be found starting on page 62; and on page 79, a primer on care and handling of television cameras. And on a subject closely related to local origination, see Gay Rogeness' article about two-way transmission on cable systems, beginning on page 82.

TV Communications

The Professional Journal of Cable Television

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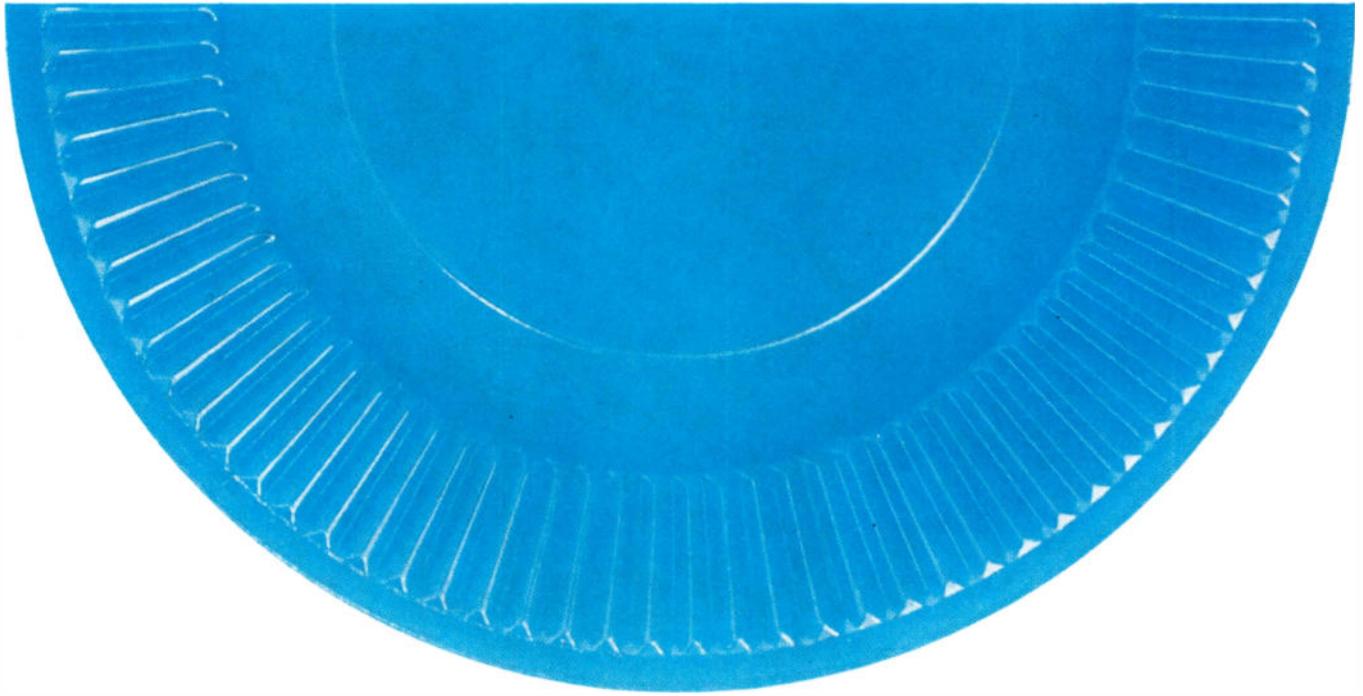
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The TVC Viewpoint

EDITORIAL



FCC Censorship Power

When the FCC refused to bar the Greensboro, N.C., cable system from originating local programs and paid advertising, a favorable precedent was established (see story, page 25). Pressure tactics bordering on intimidation were used by three broadcasters who asked the Commission to override the Greensboro city council's approval of CATV program origination and advertising plans. However, to the Commissioners' credit, they unanimously supported the decision of the local government.

We reiterate, the FCC ruling constitutes a helpful precedent.

But of far greater importance is the fact that the creation of programming and the carriage of advertising by the Greensboro cable system are *rights*—not *privileges* which may be granted by the FCC! The origination of programming, including commercial messages, is protected by the First Amendment to the Constitution of the United States. Every cable TV operator who wishes to provide such a service to his subscribers has the right to do so without the interference of any government body. The Greensboro decision, although favorable to the operator, is in itself a trespass—because any governmental agency exceeds its authority when it presumes to permit

or deny the exercise of a constitutional right.

From the manner in which the FCC quickly dispatched the Greensboro case, one might conclude that the Commissioners are wary of the constitutional question. On the other hand, the recent decision to prohibit advertising sales by a San Diego cable system suggests just the opposite—that the Commissioners include censorship of cablecasting content within their jurisdiction. (Perhaps they have forgotten the Congressional repudiation of FCC attempts to place frequency curbs on broadcast commercials.)

There are a number of constitutionally founded arguments against FCC controls on cablecasting program content; the First Amendment, free press-free speech, is only one. Space does not permit a detailed discussion of the various cases which can be made, if necessary, to contest such assumption of censorship powers by the Commission. But cable operators and broadcasters alike should be ready to wage these arguments in court.

Recent history does not suggest any room for complacency or blind faith in any situation where the Federal Communications Commission is tempted to reach out for broader powers.

Stan Searle

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Perspective

on the news



Robert A. Searle
Executive Editor

The federal government is coming to grips with its conspicuous backwardness in communications policy and regulatory implementation. As legislators become more painfully aware of FCC failure to solve pressing problems of spectrum allocation and utilization, the internal staff report of the President's Task Force on Telecommunications (see page 21) creates additional pressure on the Commission. An imaginative and forward-looking final Task Force report, along the lines of the staff paper, would underscore and sharply contrast the archaic philosophy and wholly inadequate processes of the FCC.

Particular heat would be placed on the FCC should the Task Force report include suggestions for expanded use of cable television... in view of the consistent efforts of Mr. Hyde's Commission to put CATV in an economic deep-freeze. If the Commission continues to let its mountain of CATV paper work pile higher and higher, while doggedly prohibiting 90% of the population from having cable TV available, the consequences may be drastic. Congress could abolish the Federal Communications Commission. The strong inclination to do so already has been voiced by prominent lawmakers--and FCC Commissioner Bartley has suggested that such a move might be prudent.

Local origination of programming is becoming "big business," as compared to early days of cablecasting. A consensus among system owners engaged in program origination is that costs for worthwhile material--other than automated services--require careful analysis and forecasting. Manpower expense usually outweighs cost of additional electronics and program materials.

Support from local merchants (who warmly welcome the new advertising outlet) is now accepted by many operators--as a means of meeting origination cost. Although CATV operators who sell advertising generally do not hope to profit directly, the additional channels of entertainment and information produce added subscriber revenues. Also important are the many public service programming functions which can be provided with the help of advertising income--with resulting enhancement of the cable systems' community relations.

Merger and acquisition trend continues. While newly formed American Television and Communications was lumping system interests of Narragansett Capital, Boston Capital and others to form a 75,000 subscriber MSO, the M & A efforts of a half-dozen big companies continued behind the scenes. Manufacturing, film production, broadcast networks and even food processing firms have been aggressively seeking entry and expansion in cable television. Look for more announcements of newly created and substantially enlarged MSO's.

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TURN PAGE 

Pictures

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LETTERS

● We have just added two of the new UHF stations on our Waco System. These channels are Ch. 39 and Ch. 21 in Dallas. There is another new UHF in Ft. Worth and we will be adding it into our system in the near future. These stations cannot be received in the Waco area without the cable. We have extended their viewing audience by 4,000 sets at the present time and will give them about 15,000 additional TV sets in the future. The UHF stations have expressed their thanks to TV Cable of Waco for the additional carriage the cable has given them.

Homer Harmon
TV Cable of Waco
Waco, Texas

● As you are already aware, Tele-Vue has enrolled several of our employees in the National Cable Television Institute correspondence courses. In the future, we will be requiring all supervisory technical personnel and prospective super-

visory personnel to enroll in home study courses.

Many years ago, Tele-Vue established the policy of furthering our company by elevating our technical and systems operating personnel. We feel it is in the best interest of our company to require an educational program. Therefore, it was with a great deal of interest that we watched you form the National Cable Television Institute and bring it to its currently successful status.

We, as a systems operating company, want to thank you and the staff of Communications Publishing Corporation for endeavoring to upgrade the educational level of the cable television industry. As the proficiency of a cable system's technical personnel is increased, the operating company will, without question, see an upward reflection in its cash flow. And that's the name of the game!

Homer A. Bergren, President
Tele-Vue Systems, Inc.
Seattle, Washington

● Things were so hectic and time so short at the Convention that I did not have a chance to express my deep appreciation for your cooperation on the *Convention Daily* and other matters in Boston.

I thought your coverage of our Convention—before, during and after—was outstanding.

I understand from John Druckenbrod that your people took advantage of our press room facilities and services, and I trust that the cooperation and assistance you received from John and Don Witheridge was everything you desired.

Again, Stan, I appreciate your help.

Frederick W. Ford
President, NCTA

Thank you, Fred. We appreciate the professional competence and cooperation displayed by the NCTA staff, especially by John Druckenbrod and Don Witheridge in connection with our Convention coverage efforts.

● I would greatly appreciate your sending me two copies of your brochure entitled "CATV System Cash-Flow Projection" as recently described in the *Journal of Commercial Banking*.

This information will be of considerable assistance to me and my associates. Thank you for your kind assistance.

E. James Houston
Assistant Cashier
and Credit Manager
Bank of the Commonwealth
Detroit, Michigan



It's time to turn your promotion dreams into reality . . . Build new subscribers with Hampton's media bingo! Cable Television Bingo, produced and copy-

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...the TMC-2100 Vidicon Camera



TMC-2100



TMC 2100 (rear view)

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- TMC-2100 non-viewfinder cameras feature all die-cast or extruded framework—rugged but good looking!
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- All circuit boards are made of high-quality glass epoxy materials and "plug-in" for easy field replacement.
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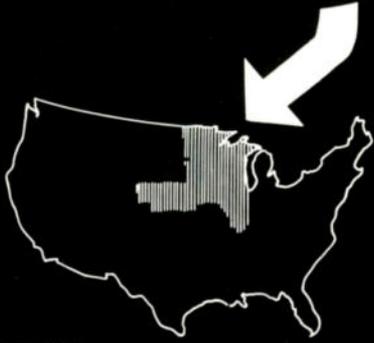


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Management Guidelines

Patrick T. Pogue



Overcoming Boredom In Your Job

When a manager takes over the operation of a system, he usually looks forward to his new tasks eagerly. He is anxious to try new ideas and his interest is exceeded only by his boundless energy. There are many things to do and learn and many improvements to be made. There aren't enough hours in a day to do all that has to be done. Unfortunately, however, this does not last forever.

Whether we like to admit it or not, it's human nature to grow jaded with the sameness of a job after a sustained period. But we can't change jobs every time we have overcome the obstacles, so we must stay at the *same* job and *change it*. We must be constantly uncovering new facets of the job and new approaches to old problems. An inquisitive mind with a sense of creativeness and dissatisfaction with the status-quo can always see new possibilities and challenges.

The system operator with such a mind will see how his job fits in with and affects those around him. He will see if he can be of *personal assistance* to other system personnel. A manager who sees his job as part of a larger scheme of things finds it hard to become bored.

Another area needing constant attention and offering a great deal of challenge is the area of *personnel improvement*. How can you increase your employees' productivity by making their jobs more challenging? In what ways can they do old jobs differently and better? Ask yourself, "What impact do I have on their lives?"—not just in determining their income, but encouraging them to improve themselves, in setting them straight when they are going wrong, in helping them utilize their minds

and abilities beyond what they thought possible. Trying to find ways of giving them a lift will also greatly enhance your own interest.

A big part of the system manager's job is to *revive the others*. To do this, he must find out what's causing their letdown or disinterest.

A good system manager must be community-oriented and locally involved. Can you be of help or provide better service to your subscribers and their community? Can you help with community problems by taking positive action or making constructive suggestions? What about the many people in the community with whom you come into contact? How many of them rely on your judgment for decisions that are crucial to them? How many other people and operations that they control are influenced by your opinions?

It's a rather curious phenomena, but staleness, if it is prevalent in the system manager, usually runs through the entire firm and may even extend to those you contact outside. *Staleness is like an epidemic*. If the system manager suffers from disinterest or a lack of challenge, the chances are that most of the others in the system do too. All programs from system maintenance to advertising and promotion can be adversely affected.

There is no ready answer for staleness. But there are answers to be explored to help alleviate the condition. If too many people become bored, then there is probably something wrong with the aggressiveness of the system manager. And if your people cannot use their initiative, they will be looking for other opportunities.

(FVC)

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FINANCIAL REPORTS

Hewlett-Packard Co. reports per share earnings of \$.45 for the quarter ending July 31, 1968. This compares with per share earnings of \$.44 for the same period last year. Earnings figures are based on net incomes of \$5,626,000 and \$5,430,252 for the two periods respectively. Sales were \$68,600,000 for 1968 and \$61,119,395 for 1967. Also reported were figures for the 9 month period ending July 31, 1968. Per share earnings for this period were given as \$1.16 as compared with \$1.24 for the same period last year. Net incomes for the two periods respectively were \$14,529,000 and \$15,353,600 with sales at \$196,114,000 and \$180,174,000.

Copperweld Steel Co. reports per share earnings of \$.73 for the quarter ending June 30, 1968. This compares with per share earnings of \$.34 for the same period last year. Earnings figures are based on net incomes of \$1,772,254 and \$813,781 for the two periods respectively.

Sales were \$38,702,230 for 1968 and \$32,392,939 for 1967. Also reported were figures for the 6 month period ending June 30, 1968. Per share earnings for this period were given as \$1.46 as compared with \$.90 for the same period last year. Net incomes for the two periods respectively were \$3,540,751 and \$2,177,012 with sales at \$75,864,958 and \$68,089,404.

TelePrompTer Corp. reports per share earnings of \$.84 for the 6 month period ending June 30, 1968. This compares with per share earnings of \$.77 for the same period last year. Earnings figures are based on net incomes of \$833,561 and \$652,033 for the two periods respectively. Gross revenues were given as \$3,655,618 and \$3,455,555 for the two periods.

Cohu Electronics Corp. reports per share earnings of \$.07 for the 6 month period ending June 30, 1968. This compares with per share earnings of \$.11 for the same period last year. Earnings were given as \$89,256 and \$141,626 for the two

periods respectively. Sales were \$4,449 for 1968 and \$3,842,048 for 1967.

Reeves Broadcasting Corp. reports per share earnings of \$.17 for the 6 month period ending June 30, 1968. This compares with per share earnings of \$.20 for the same period last year. Earnings figures are based on net incomes of \$332,200 and \$408,100 for the two periods respectively. Operating revenues were given as \$6,377,200 and \$5,054,900 for the two periods.

Ampex Corp. reports per share earnings of \$.26 for the quarter ending July 27, 1968. This compares with per share earnings of \$.20 for the same period last year. Earnings figures are based on net incomes of \$2,485,000 and \$2,072,000 for the two periods respectively. Sales were \$58,976,000 for 1968 and \$52,749,000 for 1967.

Fuqua Industries, Inc. shareholders have voted approval of acquisition of Interstate Motor Freight System. Under terms of the acquisition, which is expected to be consummated this month, Interstate common stockholders would receive a "package" of Fuqua securities. The transaction will result in Fuqua's issuing about 526,000 shares of common stock, 316,000 warrants, and \$15,800,000 of debentures. 1967 sales for Fuqua totaled \$60.2 million and net income was \$4,686,000.

North American Communications Corp. reports per share earnings of \$.29 for the 6 month period ending June 30, 1968. This compares with per share earnings of \$.23 for the same period last year.

Richmond Newspapers Inc. reports per share earnings of \$.76 for the 6 month period ending June 30, 1968. This compares with per share earnings of \$.70 for the same period last year. Profits were \$1,000,900 for 1968 and \$1,000,100 for 1967. Gross revenues were given as \$21,400,000 and \$20,000,500 for the two periods. 



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- Bulletin TV-10 on Trunk and Distribution Cable
- Bulletin on Copper Clad Aluminum Wire for CATV Cable

Late News

SENATE CONFIRMS H. REX LEE FOR FCC

President Johnson delayed long enough in naming a new Commissioner for the FCC's vacant seventh seat--but once named, H. Rex Lee has been confirmed by the Senate in an uncharacteristic rush. A little-known Washington administrator, Lee was with the State Department's Agency for International Development at the time he was appointed to the Commission. He is a former governor of American Samoa where he was responsible for extensive use of ETV in the school system.

According to Lee's own statement, he is "not a communications expert" and he has refused to commit himself on any of the issues facing the FCC before having the opportunity to study them. Lee's name, along with several others, was submitted to the President by the Chairman of the Civil Service Commission some time ago.

FCC UPHOLDS ADS ON GREENSBORO CABLE

Cable system local origination--and carriage of advertising to support that origination--have been upheld by the FCC in the face of high-pressure opposition by North Carolina broadcasters. When Jefferson Carolina's Greensboro, N. C., system won unanimous approval of the city council for a franchise revision allowing origination and advertising, three broadcasters filed urgent requests with the FCC for immediate ex parte relief.

Without waiting for the Commission to rule--or even for the cable system's reply comments--Piedmont Triad TV followed up with a filing in the Federal court asking "the Commission to cease its unreasonable delay."

Under circumstances which suggest some resentment on the part of the Commission toward the tactics of the broadcasters, the matter was considered and a decision--in favor of the CATV'er--was rendered more than a week prior to the deadline for filing of reply comments.

The FCC claimed there had been no showing of probable immediate impact upon broadcast resulting from carriage of advertising on the local origination channel. The decision went on to observe that the questions raised must be settled by rule-making, and such rule-making was promised "shortly."

TASK FORCE REPORTS LAUD CATV

Two important Telecommunications Task Force Reports have been made public recently--both very encouraging to cable television forces. The latest is from the New York City Mayor's Advisory Task Force on CATV and Telecommunications, headed by Fred W. Friendly, former CBS New Division Head. The report recommends franchising 10 systems in NYC's five boroughs, making CATV available to all city-dwellers within the next few years. It also proposed a pay-TV experiment.

Late News (Continued)

Preceding the NYC document was a lengthy, 155-page staff report to the national President's Task Force on Telecommunications. The internal draft report recommended a substantial role for CATV in the national communications scheme. Over-the-air broadcasting, according to the report, would continue to be the basic medium, but CATV would be used to further the aims of diversity of programming, local expression, and service to as wide an audience as possible.

Approximately one-quarter of the entire document was devoted to the subject of cable television, and the authors summed up their position in the statement, "The thrust of our analysis... (is that) cable television offers great promise in terms of the goals of a national policy for broadcasting."

"FAIRNESS" RULES VIOLATE 1st AMENDMENT

The Seventh Circuit Court of Appeals, in what has been hailed as a "benchmark" case, has held that some of the rules promulgated by the FCC under the Fairness Doctrine violate the free speech/free press guarantees of the First Amendment.

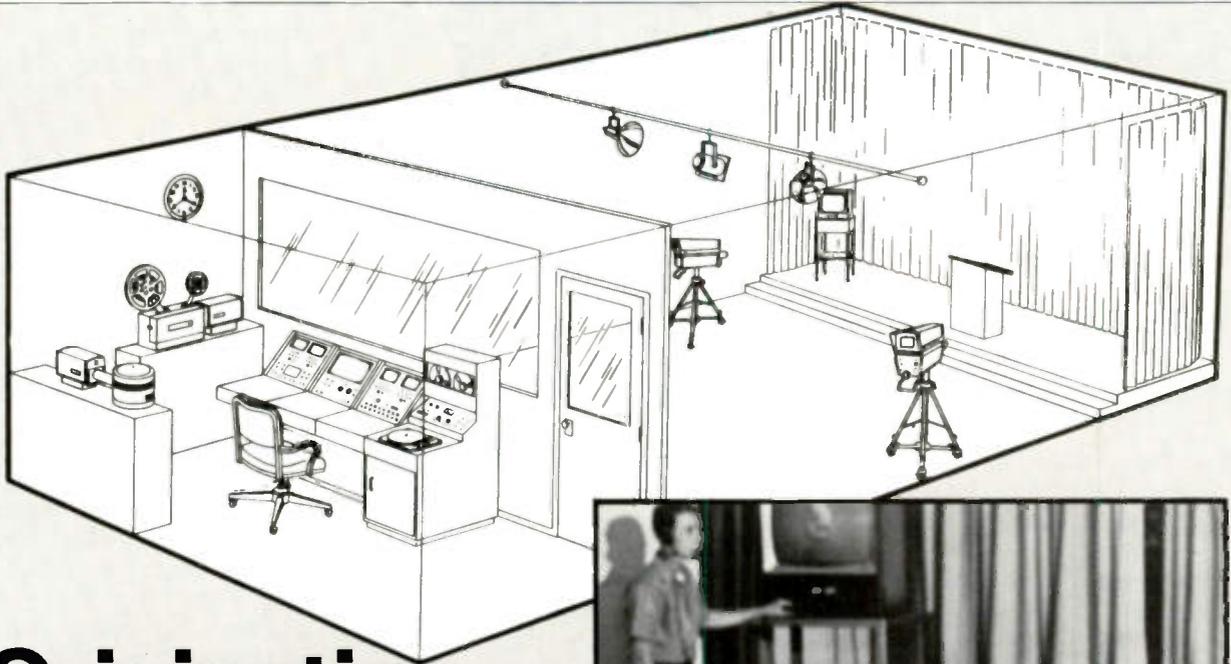
In upholding the Radio-Television News Directors Association and eight broadcasters, the court rejected FCC arguments that the scarcity of spectrum space creates a meaningful distinction between the press and broadcasting insofar as freedom of speech is concerned. The court said it feared FCC censorship and pointed out that, "The rules pose a substantial likelihood of inhibiting a broadcast licensee's dissemination of views on... controversial issues."

Although the court spoke only on the specific rules governing "personal attack" and declined to rule on the remainder of the Fairness Doctrine, it is expected that the case will reach the Supreme Court, perhaps in conjunction with the Red Lion case on the same subject which was decided in favor of the FCC in the lower court.

ATTORNEYS DEBATE FUTURE AT NCTA SEMINAR

Distinguished panelists speaking in half a dozen sessions at the NCTA Legal Seminar disagreed among themselves on many points, but reached agreement on one: that the Second Report and Order is in its death throes. Communications attorneys and government representatives glanced briefly at the past and present, but focused primarily on the future of CATV during the two-day seminar.

Some 150 persons were on hand in Washington, D. C. for discussions ranging from FCC regulation to public utility control, 214, copyright, and future communications laws. One of the liveliest sessions was sparked by Tom Dowd, of Pierson, Ball and Dowd, who suggested that a public utility future for CATV might not be as bad a fate as many think. In his hypothetical situation, the hardware and software of CATV would be separated by law with most channels offered to users on a common carrier basis.



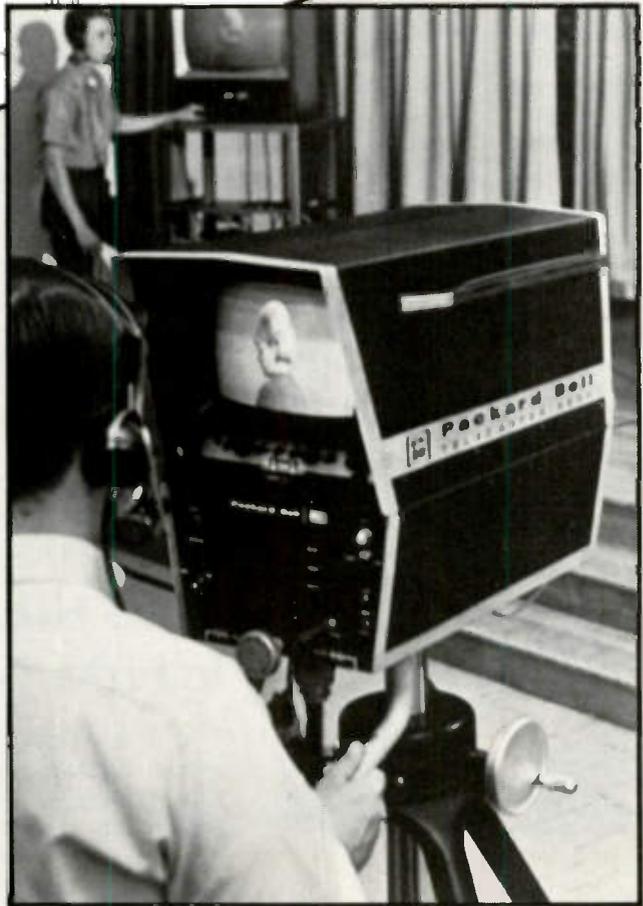
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PB-9200 Viewfinder Camera is the heart of Packard Bell's pre-packaged CATV systems.

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Bell Modifies Pole Attachment; Construction Crews Return To Work

After a seven-week construction shut-down Jim Davidson, president of Cable Services, Inc., of Helena/West Helena, Ark. reports that work has resumed and cable television service will soon be available to the residents of the two communities.

Southwestern Bell officials have ended a three-month deadlock on a



Mr. Davidson

pole attachment agreement for the Arkansas communities. Davidson had balked at restrictive wording with respect to locally originated programming, as expressed in the standard Bell pole attachment agreement.

Earlier, Robert F. Farrell, Right of Way Supervisor for Southwestern Bell, supplied Davidson with a new, modified pole attachment agreement. The new document states that it applies only to "the distribution of broadcast programs obtained off-the-air by Licensee's antenna as presently located . . . or by means of an antenna or towers

at distant locations and from which such broadcast program is transmitted . . . by relay facilities . . ."

However, the following language was *deleted* from the new agreement: "Such service may also include as an incidental part of the Community Antenna Television service furnished all subscribers without additional charges therefor: Music received off-the-air, 'fill-in' music originating in Licensee's control house, news and weather announcements, occasional local television programs, and occasional closed circuit television programs. This agreement does not cover space on Licensor's poles for the attachment of equipment for pay

MSO Hits Top-Five Category In First Two Months' Operations

Making his first public announcement, American Television and Communications president, Monroe Rifkin has revealed that his new company has acquired 75,000 subscribers in 13 states—acquisitions which place ATC in the top five MSO's in subscriber count.

"Within the last two months," Rifkin said, "ATC has acquired through purchase or an exchange of stock, CATV systems with a gross market value of \$25 million, including systems in Arvin, Tehachapi, Lamont, Saugus and Lafayette, Calif., plus three systems in Los Angeles County; Chanute, Independence, Neodesha, Parsons and Emporia, Kan.; Perry and Madison, Fla.; Fort Madison, Ia.; Monroe and West Monroe, La.; Mankato, Minn.; Eau Claire, Wis.; Oscoda and Tawas, Mich.; Wood-

television, wired music, or other communications which are not broadcast programs obtained off-the-air, or incidental thereto as aforesaid."

Davidson told *CATV Weekly*, that, following the pole contract modification by SWBT, his company's relationship has been greatly improved and that both his staff and telco people "have been working hard at improving relations."

At the time construction crews were pulled out of Helena and West Helena more than 80% of the cable plant had already been constructed, with only a few miles remaining to be constructed. The additional plant consisted mainly of trunk run connecting the two systems with a common head-end located between the towns. When the systems are activated, the 24,000 residents of Helena and West Helena will receive television signals from an Arkansas station for the first time.

The cable service will include ten TV channels, five off-the-air FM channels, weather display and two channels of taped music. According to Davidson, several hundred home owners have already expressed their desire for cable service.

ward, Blackwell and Tonkawa, Okla.; Fallon and Yerington, Nev.; and Baker, Union and LaGrande, Ore.

The company had previously purchased United Video of Kansas City, Kan., with systems in Columbus and Falls City, Neb.; Booneville, Chillicothe, Marshall, and Maryville, Mo. The brokerage division of Daniels and Associates assisted in the negotiations leading to the acquisitions and merger.

The directors of ATC are Royal Little, founder of the Textron Corporation and chairman of the Board of the Narragansett Capital Corporation; Harvey Sarles, president and treasurer of the Narragansett Capital Corporation and president of the Business Development Company of Rhode Island. Other directors include Commander Charles



ATC president Monroe Rifkin (l.) points out graphic representation of the company's success to vice president Doug Dittrick.

"Pete" Conrad, Jr., NASA astronaut and R. Courtney Whitin, a vice president of Boston Capital Corp.

Principal executives of ATC are Rifkin, president, and Douglas Dittrick, vice president. Rifkin, who has been associated with cable television since 1956, was formerly vice president-finance of Tele-Prompter Corporation. He came to Denver in 1963 and joined Daniels & Associates as president of Daniels Management Company. Rifkin, a CPA, has also been active in consulting work and franchise development for Daniels. He has been a director of National Cable Television Association since 1966 and is currently treasurer.

Dittrick was instrumental in the formation of General Electric Cablevision, a wholly-owned subsidiary of General Electric Company. As General Manager of GE's Cable TV operation, he was responsible for system acquisition, construction, and operation.

FCC Upholds Cable Right To Originate, Carry Advertising

Responding to an urgent request for immediate *ex parte* relief by Greensboro, N. C., broadcasters, the FCC has upheld the right of the Greensboro cable system to originate programming—including paid advertising.

While the Greensboro system is the subject of the Commission's decision, the ruling is important to many system operators across the country who are considering—or are in fact already—originating programming with advertising.

The important decision came just 22 days after Greensboro UHF station, WUBC-TV, supported by two other broadcasters, filed its "Request for Immediate Ex Parte Temporary Relief and for Further Proceedings."

The appeal to the Commission was made on August 6, the day after the Greensboro council had voted unanimously to open the door to advertising-sponsored local origination on the system. The original CATV franchise had forbidden all origination, but both the

mayor and the city council were persuaded to amend the terms by the arguments of George Green, Jefferson-Carolina vice president.

Rights of the cable system were challenged before the FCC by WGHP-TV with a petition for "Order Prohibiting Origination of Programs and Commercial Advertisement" and by WFMY with a "Petition in Support of Request for Relief."

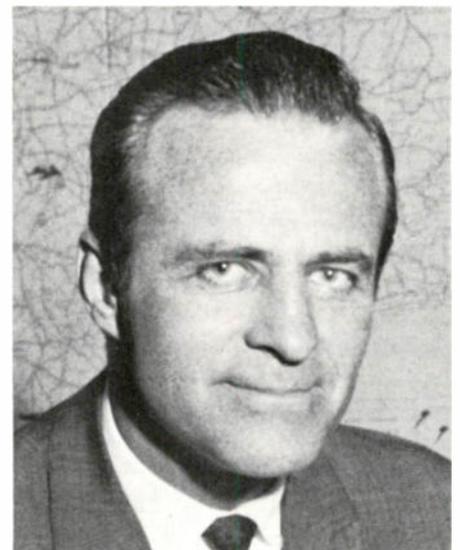
In an unusual high-pressure move, Piedmont Triad TV, owners of WUBC, had followed up their FCC petition with a filing in the U.S. Court of Appeals for the District of Columbia, asking the court "... to require the Commission to cease its unreasonable delay in ruling."

The thrust of the broadcaster petitions was to request that the system be forced to operate under the restrictions of the original franchise agreement.

Under circumstances which suggest some resentment on the part of the Commission toward the

tactics of the broadcasters, the matter was considered and a decision rendered more than one week prior to the deadline for filing of reply comments by Jefferson-Carolina.

In denying requests of all three broadcasters, the Commission claimed there had been no showing that the cable system would have any impact upon the broadcast stations. Consequently, the FCC opinion stated that it would be "inappropriate" to order termina-



Mr. Green

tion of either the origination or paid advertising at this time.

Secondly, the FCC decision observed that the questions raised must be settled by rule-making rather than by adjudicatory proceedings. "We intend shortly to initiate rule-making, in which we may gather other data on the implications of such operations," the opinion stated. The decision was 5-0, with Commissioner Wadsworth absent.

State Sales Tax Looms Over Colorado Systems

Alan Harmon, president of the Colorado Cable Television Association, called an emergency meeting last month to discuss the announced state sales tax on CATV service in the state. However, until the group can meet with, and persuade the Department of Revenue, the taxes will be collected.

The Director of Revenue of the State of Colorado, John H. Heckers, has advised industry representa-

tives that under new rules, cable television will be subject to a 2% sales tax.

According to a cable television spokesman who has been in contact with the Department of Revenue, "the Director was unable to appreciate the fact that most cable television activities, which bring in signals from outside the state, are the same as interstate telephone service, which is not subject to the state sales tax."

Undoubtedly related to the new interpretation of the Colorado statutes is the fact that the legislature has urged the Director of Revenue to "close up any loopholes" within the present law (1963 CRS 138-5-4). Indications are, however, that cable operators may ask the legislature for clarification if other remedies fail.

In the interim, cable operators will definitely have to pay the sales tax. However they can file a protest and seek relief from the tax through administrative procedures within the Department of Revenue. In the

event that Colorado operators follow this course of action, the Director of Revenue would rule on their protest. Should the CATV operators' objection to the tax be



Mr. Harmon

overruled, they can then take the matter into state district court.

In discussions with *CATV Weekly*, Harmon seemed to feel that there is no basis in the Colorado statutes for imposing a state sales tax on cable television. He cited a 1954 opinion of John F. Healy, former Deputy Director of the Department of Revenue, to the effect that cable television service was not to be included in the businesses which must collect a state sales tax.

TPT Faces Opposition In Signal Importation

TelePrompTer's proposal to carry the signals of nine New York City television stations into Trenton, N.J., which is a part of the Philadelphia market, has met with harsh opposition from 13 copyright owners as well as the Philadelphia UHF.

The copyright owners filing the joint petition are: Allied Artists Television Corp., Danny Thomas Enterprises, Inc., Desilu Productions, Inc., Independent Television Corp., Metro-Goldwyn Mayor Inc., Paramount Pictures Corp., Wolper Productions, Inc., Screen Gems, Inc., Twentieth Century Fox Television Inc., United Artists Tele-

Engineers Check New System



Construction is under way on the Ridgway Cable TV system near Kane, Pa. Don Aiello (l.) and Bull Bugdon (r.) of Ridgway Cable check out TV signals with a portable tower unit and electronic equipment. Paul A. Tabasso, field engineer for Jerrold Electronics Corporation of Philadelphia (c.) looks over area map with Aiello. (Photo courtesy of Kane Republican)

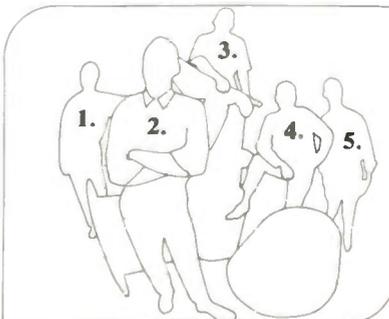


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vision Inc., Universal Pictures, Walt Disney Productions Inc., and Warner Brothers-Seven Arts Inc.

Copyright interests asked the FCC to prohibit importation of the signals pending an evidentiary hearing on TelePrompTer's proposal, and "upon such hearing, permanently to prohibit the carriage of New York City television market signals" into Philadelphia.

The petition by the copyright owners argues that their "obvious interests" in the proposed carriage into the Philadelphia market have "already been established and recognized by the Commission." It cited a memorandum opinion and order issued by the FCC May 8 which granted copyright owners participation in the Delaware County Cable Television case, a large consolidated proceeding involving CATV entries to the Philadelphia market and still pending before the

Commission. In that order, the FCC said the copyright owners' participation "should be of assistance."

However, the Commission at the same time stressed that the participation of the copyright interest was "only for the purpose of assisting and determining whether the extent to which CATV importation of distant TV signals outside of the normal program distribution process affects the liability of independent TV service.

And, the Commission added, "The proceeding is not concerned with whether the copyright owners have a remedy with respect to CATV distribution of copyrighted programs.

The Supreme Court, in the Fortnightly case, handed down its verdict exempting CATV systems from copyright liability about five weeks after the Delaware County decision.

New York Cable Firms Attempt To Freeze Comtel's Operations

The FCC has turned down a joint petition by TelePrompTer and Manhattan TV Cable Services which operate CATV systems in Manhattan, to "freeze" the subscription list of Comtel, which leases Bell's facilities, as of June 26. This was the date the Commission issued its Section 214 decision requiring utility companies to obtain certificates of convenience and necessity before building CATV systems.

TelePrompTer and Manhattan, rivals of Comtel, noted that, pending court appeal, the Commission held that installation of "drops" to subscribers from trunk and feeder lines already built would not be prohibited. They contended that since the telephone company lines used by Comtel are underground, there is no "reasonable" way to learn whether new construction had taken place. The two CATV firms petitioned the Commission to require disclosure of any construction going on now and to limit the installation of new drops to subscribers as of June 26.

The petition by Manhattan and TelePrompTer further contended that Comtel currently served 8,000

households in N.Y. and said that continued installation of drops could triple service while the U.S. Court of Appeals, District of Columbia, considered the appeals from the Commission's decision.

FCC's CATV Task Force said any such increase would constitute a "marked change in the status quo and should not be permitted till all the facts are known." It recommended that no further drops be allowed until all the information is in regarding Comtel's operation.

Bell countered that the two CATV petitioners were not seeking the "status quo," but were rather seeking to enhance their "competitor's advantage" over Comtel.

The utility company asserted that no further construction of CATV lines has been undertaken and that Comtel was serving 8,000 TV receivers. However, the FCC said that this does not include such bulk subscribers as apartment houses and hotels.

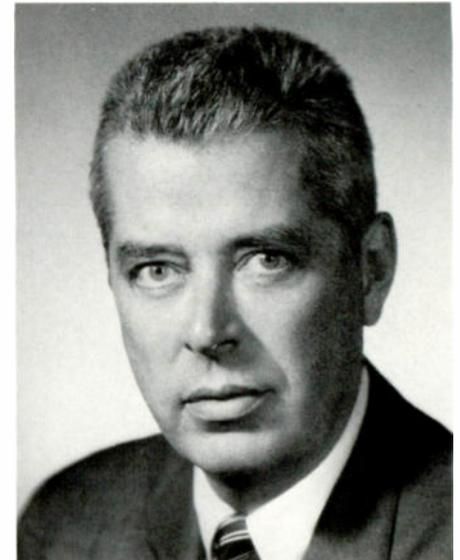
In its decision last week, the FCC said, "In the absence of any showing that Bell has constructed additional CATV channel distri-

bution facilities after June 26 in violation of our orders, we are not disposed to impose any special conditions upon the carrier in New York City merely because the facilities are underground."

The Commission cited information submitted by Bell about the location of the channel system and reiterated its assurances that no uncertified construction had been undertaken since June 26.

H&B Announces Meeting; \$9.5 Million Financing

H&B American stockholders will meet soon in a special session to vote on the proposed acquisition by H&B of Jack Kent Cooke, Inc.,



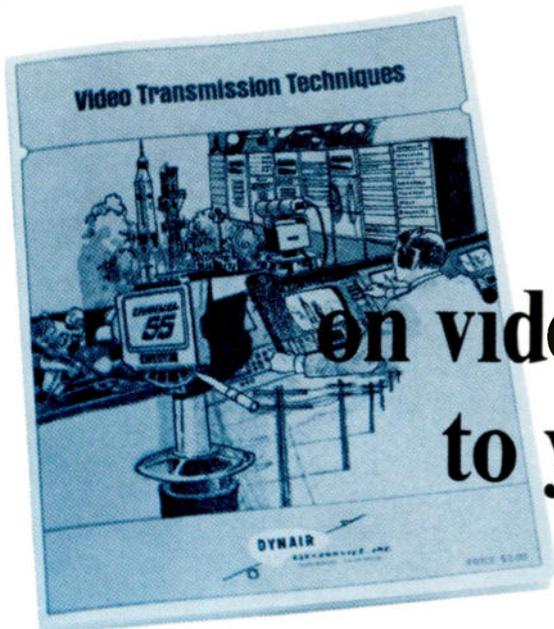
Mr. Jennings

and Continental Cablevision, Inc. in exchange for 1,600,000 shares of H&B common stock.

If stockholders approve the purchase at the October 10 meeting in New York City, H&B will add 20 cable systems, serving approximately 81,000 subscribers, to their present holdings.

William M. Jennings, H&B chairman and president, announced the special meeting date at the same time that he disclosed termination of negotiations for the purchase of General Television, Inc. Jennings and Frederick J. Warren, president of General Television, said both companies were unable to resolve certain questions concerning the proposed acquisition.

Jennings also announced that

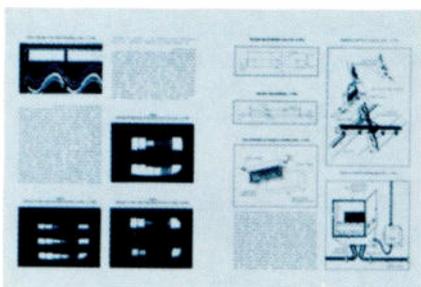


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This new book "Video Transmission Techniques" will be coming off the presses shortly. Reserve your *free* copy now. Published by DYN AIR, this book covers problem areas such as hum, equalization, resolution/bandwidth, balanced-line transmission and many others. This is a limited printing . . . order your copy today.

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Published by DYN AIR, a pioneer in the field of solid-state video cable transmission equipment, this book covers in detail the problems encountered with routing video through cables . . . and presents the solutions!



The photographs shown are sample pages reproduced directly from "Video Transmission Techniques" and are typical of the material presented. Pictorial diagrams, supported by easy-to-understand text and numerous photographs, charts and tables, make system design simple.

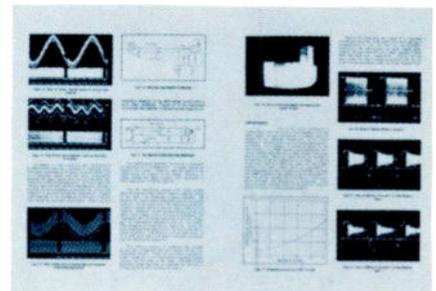
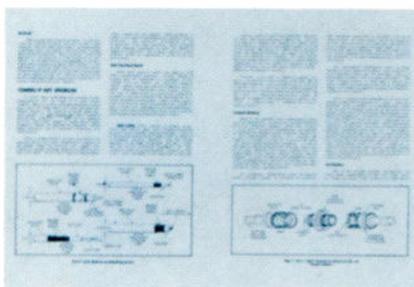
This book includes useful design information for a multitude of systems, both unbalanced and balanced . . . simple and complex. It covers everything from cable types to complex electronic terminations. The problems involved in selecting the

equipment for a particular application are discussed with the exact equipment detailed for many systems.

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H&B has completed arrangements for \$9.5 million in financing. Agreements have been executed by H&B and two insurance companies providing for the purchase by the insurance firms of \$3.5 million principal amount of H&B's 15-year promissory notes. The company has also entered into a new \$6 million bank revolving credit agreement. The proceeds, according to Jennings, will be used for the construction, extension and acquisition of systems.

Cable Cases Go Together Before 9th Circuit Bench

There is increased optimism in CATV legal circles about the outcome of the *Southwestern Cable* appeal since the Ninth Circuit Court of Appeals has elected to decide *Port Angeles* and *Southwestern* together.

Attorney Robert D. L'Heureux, who argued for Port Angeles (Wash.) Telecable before the court some weeks ago, said he has been

notified that the Court will not take any action on the case until it can review the two side by side.

Southwestern Cable involves the legality of the FCC's order prohibiting importation of Los Angeles signals into the San Diego market for new subscribers and prohibiting the carriage of advertising on local origination channels. Port Angeles is appealing an FCC non-duplication order for the protection of KVOS-TV, Bellingham, Wash., against the cable system's importation of Seattle stations. Both cases are based on CATV impact on broadcast markets.

L'Heureux said he is pleased that the Ninth Circuit will consider the cases together. "The court," he said, "seemed very interested during arguments on the Port Angeles appeal, in the high profits broadcasters realize."

L'Heureux had argued that the 100% and 105% return on capital investment indicates that no protection is necessary against CATV impact. While this point was not made in the *Southwestern* appeal, the court will now be able to consider it in connection with that case also.

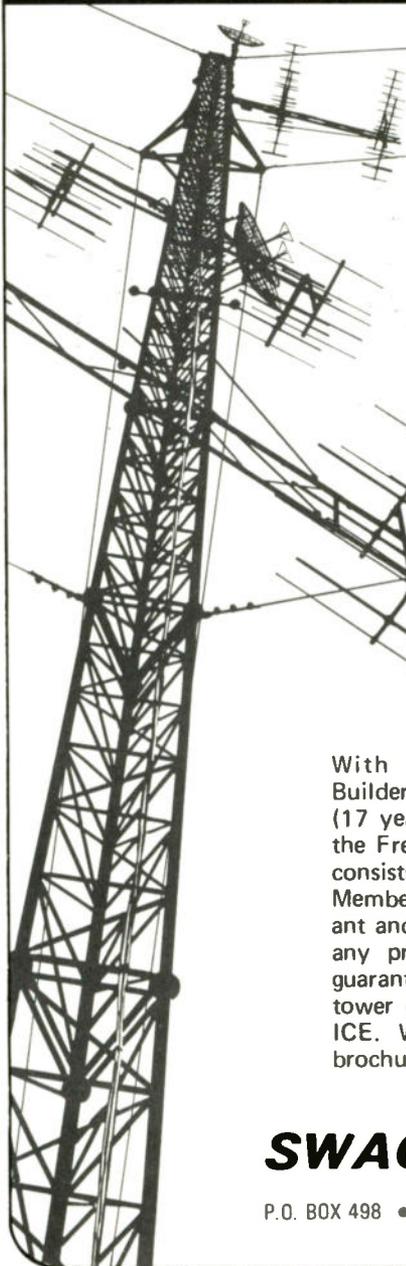
Chairman Hyde Visits Communications Task Force

FCC Chairman Rosel Hyde, according to reports circulating in Washington, attended a closed-door meeting of the President's Task



Chairman Hyde

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Force on Communications and argued strenuously against proposals to slice up the Commission and place functions elsewhere

One question being asked is what will happen to CATV regulation when the Task Force completes its study and makes its recommendations on revamping the present regulatory scheme. Since the courts and the Commission itself have placed CATV in a "neither fish nor fowl" category, the regulation of CATV is a crucial matter in any revision of the nation's policy.

There are some proposals which would break down the FCC into three units, one dealing with allocations of the spectrum, another charged with rulemaking, and the third, which would be a sort of administrative court, deciding who should receive broadcast licenses. Where CATV would fit in under this sort of set-up is a big question. One FCC official suggested that there was a long-shot chance that CATV might have its own agency.

One of the more highly publicized proposals to break up the

FCC was enunciated last May by Commissioner Robert T. Bartley, who said he doesn't think CATV should be regulated by the Commission. The Commissioner suggested abolition of the FCC in splitting its functions under three new agencies.

Under Bartley's plan, there would be set up a Federal Broadcast Commission to have authority over all commercial broadcasting, a Telecommunications Common Carrier Commission with authority over the common carriers, and a Telecommunications Resources Authority, responsible to Congress alone and charged with spectrum allocations.

CRTC To Create System Of "Alternate" TV For Canada

The Canadian Radio and Television Commission has announced that it intends to create "alternative television service" for those areas of Canada that are now receiving service from only one Canadian television station. Current

Calendar

October 6-9. The Michigan CATV Association will meet at the Boyne Highlands, Harbor Springs.

October 15-17. The Kentucky CATV Association will meet at Continental Inn, Lexington.

October 24-25. Mid-America CATV Association's annual fall meeting will be held at the Prom-Sheraton Motor Inn, Kansas City, Mo.

October 29-30. The Mississippi CATV Association meeting will be held at the Heidelberg Hotel in Jackson.

November 10-13. The fall meeting of the California CATV Association will take place at the Del Coronado Hotel, Coronado Island.

January 16-18, 1969. Florida CATV Association will meet at Marco Island.

January 17. The Community TV Association of New England will meet at New Hampshire Highway Motel, Concord, New Hampshire.

January 24-25. The Georgia CATV Association will hold its annual meeting at Macon. 



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New Flexibility for CATV Amplifiers

Benco's high gain, low distortion Benfeed feeder line amplifier uses a "new approach". It's a four-stage silicon transistor amplifier, ideal for feeder line, distribution line, and line extension duties.

This flexibility is a result of highly ac-

curate temperature "tracking" by use of manual and thermistor-controlled gain and tilt. This not only compensates thermal variations within the amplifier but corrects for changes in cable attenuation as well.

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thinking at the CRTC is that the best long-run pattern of alternative television would be a combination

of a public broadcasting network and privately owned local stations.

However, the Commission has

not completely made up its mind. It called a public hearing for September 25 to "develop a national policy" for alternative TV. The Commission said it solicited comments from the existing and proposed television networks.

The CRTC said it would not recommend for approval applications for AM radio stations where local radio and television is already available. They said that this policy, adopted two years ago, was designed to insure that commercial revenue which might otherwise be available to support alternative television will not be diverted "to less important broadcasting services." They said that local TV service, where available, would continue and that alternative TV would not be recommended if it would "deprive viewers of the level of local service to which they have been accustomed."

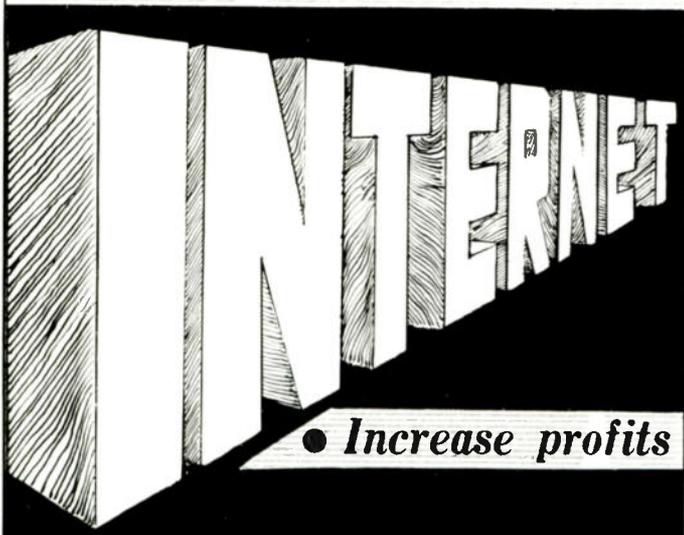
The Commission said it would also consider alternative television's effect on local information, local advertising, local programming (including French, English or bilingual broadcasting).

System Features Cash Contest



Cable TV girls and George L. Sisson, Westery (R.I.) Cable TV manager, show off new system promotion—movie passes for the local origination Movie Club Cash Contest carried daily on the cable channel. (Photo courtesy Westery Sun)

● *Add subscribers with program origination*



● *Increase profits*

● *Provide complete custom tailored programming*

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cable television supplier presents ...

DOUBLE FEATURE

- ① Complete inventory-competitive prices!
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Our warehouse is stocked with CATV equipment and supplies. We offer known trademarks to assure quality. We would like to have the opportunity to serve you. Call us, soon or write for free catalogue.



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Schildhouse Urges REA-CATV Cooperation

The Chief of the FCC's CATV Task Force voiced hope last month that a compromise will be fashioned among the conflicting interests of CATV operators, television broadcasters, copyright holders and telephone companies.

Sol Schildhouse, in a speech to the Northeast Area REA Telephone Conference in Atlantic City, N.J., said that the lesson of history is that "one form of communication relay drives another out."

He added: "Newspapers, magazines, radio—they've all survived the onset of new competition. So will television and telephone."

Schildhouse said that the rush to acquire new CATV franchises is a "symptom of the optimism with which the future of cable is viewed."

More than once in his speech, the FCC's CATV boss invited the REA telephone companies to jump on the CATV bandwagon and expressed hope that the problems of REA help for such endeavors could be resolved. CATV, he said, started

as a "rural phenomenon" and continues to find important acceptance in rural areas. "That is where your interests lie," Schildhouse declared.

Reviewing the options available to rural telephone companies for getting into CATV at present, he reminded them that "tying rural America to the main stream of communications must somehow be made economically feasible."

California PUC Oversees Area Of System Safety

CATV systems, although not legally considered public utilities in California, are now subject to safety regulations of the state Public Utilities Commission through a measure authored by Assemblyman Larry E. Townsend.

The new law, approved unanimously by both houses of the California legislature, authorizes the PUC to require cable systems "to comply with certain safety rules and regulations."

Assemblyman Townsend said

the enactment is "the first major breakthrough for the CATV industry in the area of health and safety."

A year ago, Townsend introduced a bill to place all CATV under PUC regulation, but through the efforts of Walter Kaitz and Bill Bresnan, he was persuaded to change his mind and introduce an anti-PUC regulatory bill, and a measure to set franchise fees at a five percent maximum.

Under the most recent law, the PUC may now, after a hearing, provide orders governing construction, maintenance and operation of company facilities with respect to the health and safety of its employees, customers and the public.

The safety rules, Townsend said, will be provided by two general safety orders of the PUC now operative with respect to overhead and underground electrical construction and facility operation.

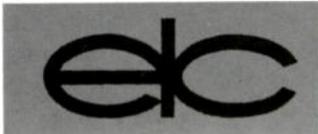
The measure was supported by the California Community Television Association, the International Brotherhood of Electrical Workers and the PUC.

WE SOLVE STEREO FM PROBLEMS!

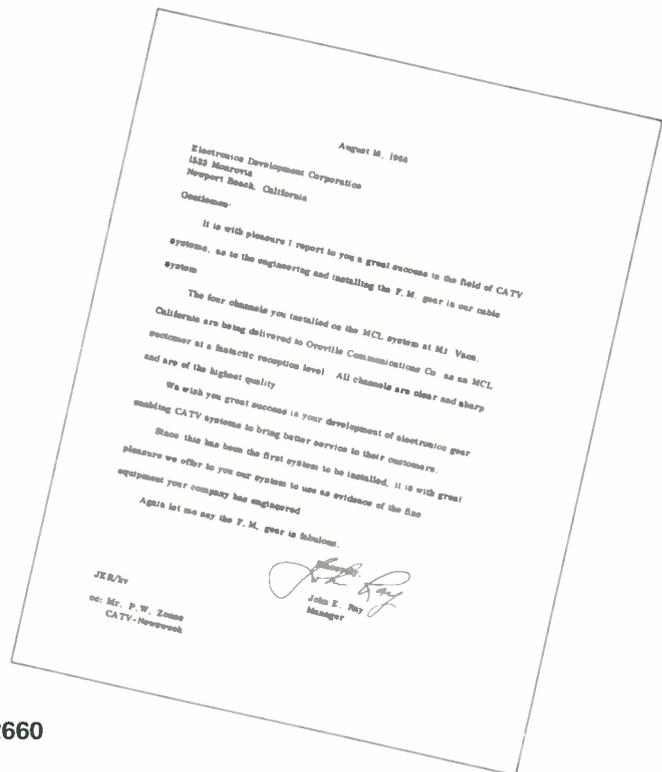
Electronics Development Corporation solved stereo FM problems for the Mt. Vaca, California cable system and we can and are ready to solve your FM problems.

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CATV'er Flays Opponents Of San Diego Case Review

Midwest Television, Western Telecasters and the FCC's own Broadcast Bureau came in for severe criticism by Southwestern Cable for their opposition to Commission reconsideration of its landmark San Diego CATV decision in an answering filing by Southwestern Cable.

The San Diego TV stations and the Broadcast Bureau were declared to have added nothing new and to have failed to answer the points raised by Southwestern when the San Diego suburban CATV system asked the FCC to reconsider both its ban on cable-carried advertising systems and its bars to importing Los Angeles TV stations into the outskirts of San Diego.

The CATV system objected to the questions raised about the objectivity of its own president when he testified as to the extent of off-the-air pickup of Los Angeles stations in the Southwestern Cable area. It also contested the finding by the FCC that 50 percent of San Diego homes would be wired if unlimited CATV expansion were permitted. It predicted it could itself wire 10,000 homes, as opposed to the TV station prediction of 16,500.

As to FCC prohibition of importation of distant signals, Southwestern's filing said, "We have

sought to demonstrate that in this case the Commission intermingled its adjudicatory and rule-making roles to the extent that it ultimately committed prejudicial error. It is clearly reversible error . . . to accept or reject opinion evidence in an adjudicatory proceeding on the basis of a 'policy judgment' . . . when, as here the Commission transcended that limitation and employed its 'expertise' and policy-making attributes in rejecting or accepting evidence, it acted wholly without warrant or support in law."

Cox Cable Communications Files Common Stock Issue

Cox Cable Communications, Inc., a subsidiary of Cox Broadcasting Corporation, announced it has filed a registration statement with the Securities and Exchange Commission covering an initial public offering of 500,000 shares of common stock. These shares will represent a 20% interest with Cox Broadcasting retaining 80%.

A Cox spokesman said, "The proposed offering would be made through an underwriting group managed by Lazard Freres & Co. Proceeds of the public sale would be primarily used for expansion and acquisition in CATV."

The Atlanta-based firm owns systems in Pennsylvania, Ohio,

Washington, Oregon, Indiana, California, North Carolina and Georgia. They reported 84,407 subscribers at the end of last year.

The spokesman said it expected to make the public offering upon the effective date of the registration contemplated early this fall with the offering price and underwriting terms furnished by amendment.

Educational Group Opens New Membership Categories

The joint Council on Educational Telecommunications (JCET) has revised its by-laws to permit a greatly expanded membership list, with new classifications open to organizations which are not primarily concerned with education but which wish to support the work of the Council.

According to officials, JCET was established to coordinate educators' growing interest in communications technology, and the host of recent developments in this field has led the Council to encourage other groups to join as Associate or Sustaining Members.

Frank W. Norwood, executive secretary of the association, said educators today must be informed not only of new tools but of developing public communications policy. Such questions as "the future roles of CATV systems," he said, "have implications for education, and education must be prepared to participate in the decision-making process."

Information about the Council may be obtained from its office, 1126 16th St., N.W. Washington, D.C.

Palmer Says Reschedule 1970 Chicago Convention

In the wake of alleged police brutality at the Democratic National Convention in Chicago, C-Cor Electronics president Jim Palmer has voiced his opposition to the scheduling of Chicago for the 1970 NCTA Convention. In a letter to NCTA Chairman Robert Beisswenger, Palmer said, "Our association should not meet or spend its money in Chicago. The police state tactics of beating news-

System Sales

National Telepix, Inc., a film distributor for TV, has acquired 100% of the outstanding shares of Jellico TV Cable, Inc. of Jellico, Tenn.

Sale has been approved by the FCC's CATV Task Force, of **Kansas CATV, Inc.** Independence, Kansas, and of **Louisiana CATV, Inc.**, Monroe, Louisiana to **American Television and Communications Corp.** The purchase was made from **Narragansett Capital Corp.**

AllChannels Cable TV, Inc., Lafayette, Louisiana, has been sold to **Vikoa, Inc.** of Hoboken, New Jersey. The system, previously owned by local investors, has 2,500 subscribers out of a poten-

tial of 8,800 in the 110-mile cable area.

Oklahoma Cable Systems, Inc. has sold its system in Weatherford, Oklahoma, to **Lon H. Williams** of Mineral Wells, Texas.

Jim Shaw of **Shaw Holdings**, has announced the acquisition by his firm of **Western Cable TV**, Woodstock, Ontario. The system serves 5,000 subscribers.

Skyline TV Cable, a 1,000 subscriber system in Lake Arrowhead, California, has been sold to **Into Cablevision, Inc.**, a subsidiary of **Telesis Corporation.**

A motion to transfer the Emlenton Pennsylvania, franchise from **J. F. Troy** to **Telesonic Associates, Inc.** of Brookville, has been approved by the borough council.

men and cameramen, of brutally attacking young citizens with billy clubs and of repression and dictatorial control of the convention activities are sufficient reasons to absent ourselves from that city." Palmer said that since CATV is directly involved in communications, "NCTA should reschedule its 1970 convention planned for Chicago to a more desirable city and refrain from holding board or committee meetings there."

Street Opens Office

Sam Street, who has resigned from his position as Director of Field Services of NCTA, has an-



Mr. Street

nounced that his firm S.S. Street & Associates, will be located at 10816 Horde, Wheaton, Md. Street's new firm will include financial brokerage and management consulting.

Television Presentations To Market ITC Converters

Television Presentations Inc. recently announced that it will be exclusive marketer of International Telemeter Corp. converters.

The patent and design rights to the three converters developed by ITC were acquired by Manhattan Cable Television, Inc. which designated TPI exclusive marketing agent. The three converters known as ITC Focus 12, ITC Plus 13, and ITC prefix Gamut 25 will drop the ITC and take the prefix TPI.

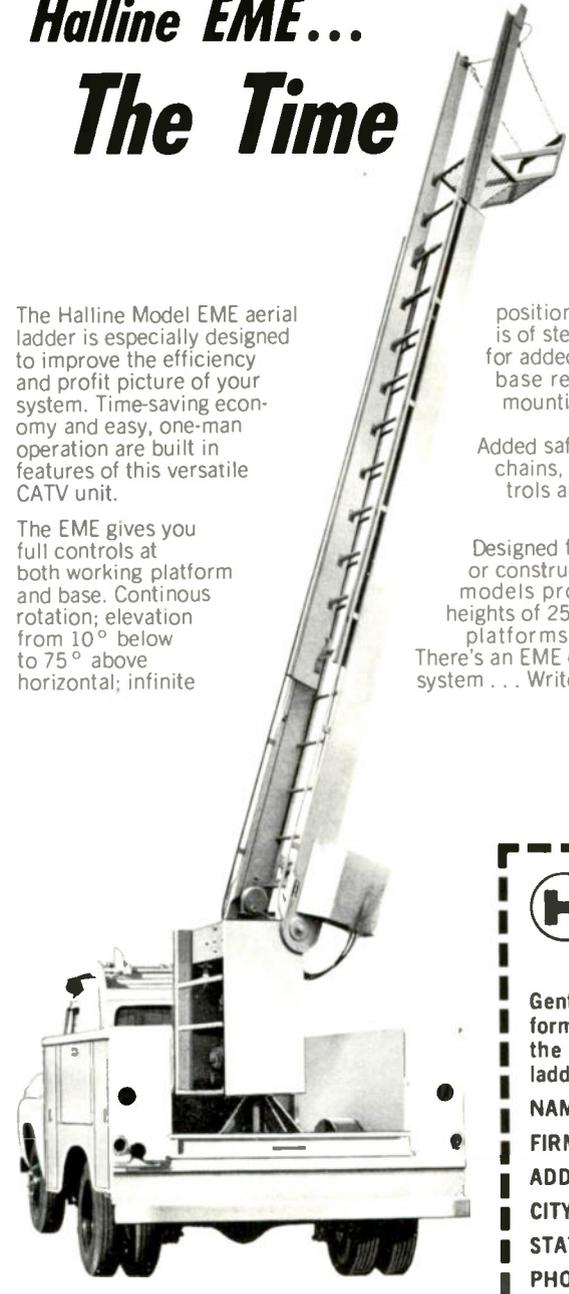
Telesis Subsidiary Buys Lake Arrowhead System

Skyline TV Cable, a 1,000 subscriber system in Lake Arrowhead, Calif., has been sold to Intro Cablevision, Inc., subsidiary of Telesis Corporation. President of Skyline is Ray Torian, secretary treasurer is Dean Kiner. The former owner of the system, Lionel Crowley, will continue to operate a portion of the formerly combined system under the name of Lakeview TV Cable, Inc.

Intro Cablevision is involved in CATV construction and is West Coast distributor for Telesis equipment.

Torian told industry news magazine *CATV Weekly* that plans for this year include a \$60,000 expansion of existing facilities. First order of business, he said, will be the extension of existing cable into new residential areas. Torian said that Hogan-Feldman, of Burbank, Calif., acted as brokers in the sale. TVC

Halline EME... The Time Saver!



The Halline Model EME aerial ladder is especially designed to improve the efficiency and profit picture of your system. Time-saving economy and easy, one-man operation are built in features of this versatile CATV unit.

The EME gives you full controls at both working platform and base. Continuous rotation; elevation from 10° below to 75° above horizontal; infinite

positioning of ladder. Construction is of steel and reinforced fiberglass for added strength, light weight. The base requires minimum area for mounting. Optional foot pedal top-side controls.

Added safety features include double chains, slip clutch, emergency controls and 12-volt D. C. Heavy Duty Electric Motors.

Designed for any type of maintenance or construction work, a choice of four models provides extended platform heights of 25' to 35'. Four types of work platforms and baskets are available. There's an EME exactly suited to your CATV system . . . Write for full information today!

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Gentlemen: Please send full information on the TIME SAVER — the new Halline CATV aerial ladder.

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Systems

Abram Patlove has been appointed executive vice president of International Telemeter Corp., a Gulf & Western subsidiary. In the position, Patlove will direct the CATV franchise acquisition, development and operation programs. Patlove has been systems development manager for Jerrold, and more recently, vice president of CATV operations for Vikoa, Inc.

Lawrence F. Comfort has been appointed to the position of engineering manager of Westmoreland Cable Company. He will be responsible for the technical operation of the New Kensington, Pa. system.

Fred Volquardsen has been elected president of Color Cable TV Systems, Inc., at the annual stockholders meeting. The MSO operates systems in Ruidoso, Carrizozo, Tularosa, Hatch and Dunken, N. Mex. Volquardsen manages the Ruidoso and Carrizozo operations.

Donald Donat has been appointed manager of the Rancho Bernardo system in California.

John Ratliff has been named assistant regional manager for Cablevision of Charlotte, North Carolina.

Joan Lloyd has been promoted to manager of San Clemente (Calif.) Cable TV. She previously served the company in a sales capacity.

Charles Williams has been named chief engineer for El Paso (Tex.) Cablevision Co., and American Cablevision system.

Suppliers

Vikoa, Inc. has announced the appointment of **Alan M. Jaffrey** as manager of the firm's electronics

division. Prior to joining Vikoa, Jaffrey served on the staff of Gulf & Western Industries.

Gay C. Kleykamp has been named director of marketing-engineering for Ameco, Inc. His experience in the cable television industry includes a position as director of technical sales for Kaiser CATV. He has also served as marketing manager for Kaiser Aerospace & Electronics Corp.

Donald B. Gregory replaces **Gay Kleykamp** as director of technical sales for Kaiser CATV. Gregory was previously CATV project engineer, responsible for all engineering research, design and development of Kaiser CATV products. His new responsibilities include direction of system layout and design, technical field services and training school departments.

Dynair Electronics, Inc. has announced the appointment of **Newlon D. Benner** as vice president of finance and treasurer. Benner formerly held the same position with Cohu Electronics, Inc. He has also been with Arthur Young and Co. of Los Angeles as a CPA. Dynair also announced the appointment of **Donald N. Bowdish** to the position of Senior Applications Engineer. Bowdish will be working with customers and distributors in special systems development.



Mr. Kleykamp



Mr. Bowdish

William O. Dresser has been elected president of the ITT Wire and Cable Division. He has been

with ITT since 1966 as staff assistant to ITT's president. Previously he was president of Dresser Products, Inc.

Danny Forbess has been named U.S. engineering representative for Cascade Electronics. He has been technician, chief technician and chief engineer for several cable systems, most recently with General Communications. Forbess will be headquartered in Henderson, Colo.

Anaconda Electronics has announced the promotion of **Jay K. Hubbell** to the position of central regional sales manager. Hubbell



Mr. Forbess



Mr. Hubbell

will be headquartered in the Chicago area for the 15-state central region.

Garry L. Powell has been appointed district manager of ELSCO Arizona, Inc. As manager of the Arizona office, Powell will offer assistance in television system planning and engineering to CATV systems, educators, and others. Powell was formerly sales engineer for ELSCO Colorado, Inc., in Denver.



Mr. Powell



Mr. Yeaton

Stuart E. Yeaton has been named manager of telecommunications sales for General Cable Corporation. As manager of communications sales, Yeaton is responsible for sales of both wire and cable products as well as products manufactured by General Cable's subsidiaries. Most recently, Yeaton has been manager of divisional sales.



**Our total product line consists of two items:
Complete CATV System Design
and Complete System Construction.**

**We offer *highest* quality in each for new systems
or rebuild of existing systems.**

Our constant objectives are to design and build the best CATV systems possible, and to provide you with every possible service during your project. We know that total integration of system design and construction, including complete head-end surveys, assures top efficiency in building highest system performance. CSC specializes in total CATV design and construction . . . understands your problems . . . knows how to solve them.

PRECISE PLANNING

Detailed pole maps showing house count by street and pole line inspection for make-ready rearrangements provide you with accurate information to determine overall system cost per home. Minimum down time in system rebuild, whether your present plant consists of a thousand or twenty thousand subscribers, assures you the best public relations.

EXPERIENCE

CSC backs every project with 7 year's nationwide experience in CATV system construction, including both aerial and underground techniques.

Only full-time permanent personnel—people who know CATV—form CSC's crews. Surveyors . . . linemen . . . technicians . . . all are craftsmen whose only standard is to give you maximum quality.

INDEPENDENCE

Benefit from the unique services of an independent contractor. No direct ties with equipment manufacturers or suppliers assures selection of equipment based on maximum return for your investment. CSC is completely objective in this vital function. Selection is made for your system's requirements . . . and with your unique problems in mind CSC works full time with you as well as for you.

COMPLETE SERVICE

CSC handles the entire system design and construction project for you. Every detail is planned to remove the worry from your shoulders. If you're looking for total CATV experience that guarantees superior workmanship in every phase of construction, contact us for courteous consultation.

Let CSC handle your turnkey project . . .
we'll make your problems our problems.

Call Jim Nishimura

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COMPLETE SYSTEM CAPABILITY



International Video Corporation has named **Robert L. Natwick** central district sales manager. Natwick was formerly sales engineer for Maryland Telecommunications in the Midwest. He will be headquartered in Chicago and will be responsible for sales in the 13 central states. IVC has also named a new distributor. Taft Broadcasting Company will sell color cameras and videotape recorders to the CATV and broadcast markets in Texas through its Houston and Dallas offices.

Steve J. Manley has been named sales engineer for eastern Pennsylvania and New Jersey by the CATV systems division of Jerrold Electronics. Manley will be responsible for all types of cable television system equipment and turnkey CATV construction contracts.

Collins Radio Co. has announced the election of **Dr. Thomas L. Martin, Jr.** and **David H. Foster** to the company's board of directors. The appointments were made to fill vacancies created by the retire-

ment of **R.T. Cox** and the resignation of **C. J. Lynch**.

HTV Systems, Inc. has named **David H. Coe** sales manager and **Peter J. Miller** production engineer. Coe was previously marketing manager for Bendix Corp. Microwave Devices, Inc. and is also president of the Bainbridge, N.Y., CATV system. HTV has also appointed **Charles J. Burgio, Jr.**, manager of mechanical engineering.

Visual Electronics Corp. has announced the appointment of four CATV/CCTV distributors for the company's Information Systems line. Named were **Lake Systems**, **Visual Systems—NYC**, **K and M Electronics Corp.**, and **Taft Broadcasting**.

Blonder-Tongue Laboratories has announced the appointment of three new sales representative organizations. **C.T. Carlberg & Associates** of Albuquerque will cover New Mexico; **Lectro Sales Company** of Detroit will cover Michigan; and **Gene Piety Factors** of Honolulu will represent the firm in Hawaii.

American Enka Corp. has named **Stanley F. Luques** acting general manager of the Brand-Rex Division. Luques, who is presently director of manufacturing and engineering, joined the company in 1950. American Enka announced his interim appointment simultaneously with the resignation of **Bruce Van Wagner** who is joining **Anixter Brothers, Inc.**, of Chicago, distributors of wire and cable. The Brand-Rex Division also has a new Midwest Regional Manager, **Sanford L. Smith, Jr.** Smith has held various sales and marketing positions with **Phelps Dodge Copper Products** for over 10 years.

Professional

Berry Cullen Cohen Los Angeles, has been appointed new advertising agency for **Anaconda Electronics**.

Robert M. Booth, Jr. and **Julian P. Freret** have announced the formation of the partnership **Booth & Freret** for the practice of law in Washington, D.C. (rvc)

DELTA ELECTRONICS LIMITED INTRODUCES THE ALL NEW FST-4 FIELD STRENGTH METER.



FEATURING:

- All silicon solid state circuitry
- 54-250 mHz in one continuous range
- Separate and continuous audio and video monitoring
- Highly sensitive 200 μ a meter movement
- 5 microvolt to 3 volt input capability
- Powered by 110 V.A.C. or 2 self contained 9 volt batteries

Equip your lab and each of your service vehicles with the rugged, dependable, and accurate **FST-4** Field Strength Meter. The **FST-4** will save you time . . . will save you money . . . during installation & maintenance of your system. Order now. CATV systems cannot afford to be without the **FST-4**.

For further information on the **FST-4** and other quality CATV equipment from Delta write or phone

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WORLD'S FIRST LOCAL COLOR CABLECAST

History was made on April 18, 1968,
6:30 PM, Palm Desert, California.

The world's first locally originated
public service program*
was cablecast in color to
10,000 subscribers of the

Coachella Valley CATV system. Cable
management and subscribers
alike were enthusiastic about the
results. Color quality was as
good or better than any color
programming previously re-

broadcast from Los Angeles. According to Bill Daniels,
President of Daniels Management Co., Denver:

"Outstanding local color will be part of our service in Coachella Valley
because of recently purchased IVC color cameras and
recorders. IVC's equipment mates well with cable systems . . .
and IVC's price breakthrough now brings local color within
reach for nearly any cable operation. I sincerely urge other
cable operators to consider color equipment so they can take
advantage of rapidly increasing color set saturation."

To see how IVC can add color
to your cable operation, turn the page.

* World's first local color cablecast was originated April 17, 1968. An IVC-100 color camera was set up in the auditorium at College of the Desert, Palm Desert. At a stage lighting level of 400 ft. candles, a one and one-half hour program of the Riverside County Industrial Development Council was taped in color on an IVC-810. This tape was played back the following evening (via the IVC-810) over the Coachella Valley cable system. Photo above is off-the-set image of actual cablecast seen by subscribers.



\$14,000



\$4,700



LOCAL COLOR WITHIN REACH FOR CABLE SYSTEMS

IVC-100 COLOR CAMERA offers full broadcast-quality color at low cost. It is as easy to operate and maintain as standard monochrome cameras. The IVC-100 features: three-tube vidicon design, integral viewfinder, simplified controls, built-in sync generator and encoder. Options allow camera operation of a remote recorder, remote control of multiple cameras from a control room, use of external encoder and sync generator. Using the built-in sync generator and encoder, the IVC-100 requires only two wires (power in, video out) to produce NTSC-type pictures for input to the IVC-810 or cable system. A film chain version of the IVC-100 is also available.

IVC-810 COLOR RECORDER (IVC-800 monochrome version available for only \$4,200) offers accepted 1" IVC Format* that allows one full hour of recording on small-sized 8" NAB reel of tape. Uses 30% less tape than other formats . . . at an average saving of \$15 per hour. Provides outstanding high-resolution NTSC-type color pictures with bandwidth exceeding 4.2MHz . . . with 400 lines of picture information. Electrical pushbutton controls make operation a breeze. "Alpha" tape path minimizes dropouts. Can be operated in portable case or fixed rack mount. Stop motion is standard; slow motion and electronic editing are available at extra cost.

* Accepted format by Bell & Howell, GPL and RCA

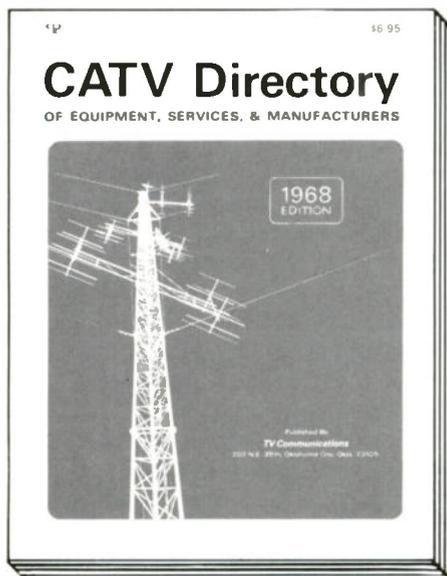
Phone IVC today for your own demonstration of local color cablecasting.



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This new directory lists over 3,000 CATV products and services offered by 887 CATV manufacturers, suppliers and professional firms.

(It's handy to have around.)



The new 1968 CATV Directory of Equipment, Services & Manufacturers is now available! It's the most comprehensive CATV directory ever published . . . and it's edited specifically to be of maximum help in your system construction and operation. Product listings cover every category of equipment from antennas to matching transformers . . . every service from system design and engineering to subscriber promotion and legal counsel.

Major directory sections include Manufacturers and Suppliers — Addresses and General Data . . . Antennas, Towers and Head-End Buildings . . . Head-End Electronic

Equipment . . . Distribution Equipment . . . Transmission Lines, Connectors, Fittings and Accessories . . . Construction Materials, Tools and Equipment . . . Local Origination and Studio Equipment . . . CATV Test Equipment . . . Microwave Antennas and Equipment . . . CATV Services . . . and Communications Attorneys.

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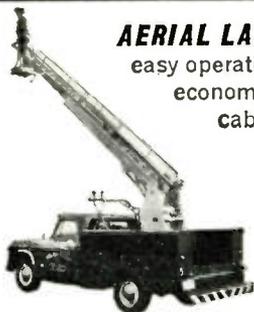
CATV Directory

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TO ORDER TURN TO PAGE 111

TV Communications

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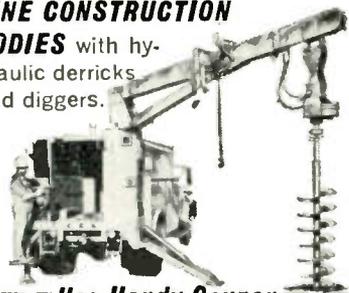


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Construction Reports

Moulton, Ala. — Moulton Video Cable System has sold its franchise for the city to Atchinson & Associates of Decatur. The firm is presently planning to begin construction within the next 30 days.

Newport Beach, Calif. — Wayne Hauser, head of Newport Beach Cablevision, Inc., has announced that construction on his 160-mile system is now underway. Scheduled completion date of project is July 1, 1969.

Bainbridge, Ga. — Bainbridge TV Cable, Inc. held a grand opening recently to introduce subscribers to its facilities.

Thomasville, Ga. — Installation of the system is expected to be completed by the end of the year, it was announced by H. M. Diambra, executive vice president of Clearview of Georgia, Inc.

Junction City-Fort Riley, Kan. — Philip G. Wilcox, manager of Junction City-Fort Riley Cable Television Co., has announced that the rebuild of his firm's system is nearing completion. Cable has been replaced and new broadband amplifiers have been installed. When the new tower is constructed, subscribers will be able to receive ten channels instead of the present five.

Medicine Lodge, Kan. — Medicine Lodge CATV, Inc. has awarded a turnkey contract for its system to Ameco Cable TV Corp. The system is expected to be operative soon and will offer 5 channels video plus a 24-hour time/weather service.

Groveland, Mass. — The Stan-Fran Corp. has announced that construction is scheduled to begin soon. Under the 10-year franchise, the city will receive \$500 for the first year and \$100 increase per year up to \$1000. Subscriber rates have been set at \$15 installation and \$5 per month.

North Platte, Neb. — Harry Peck, vice president of North Platte Multi-Vue, Inc. has announced that his firm's system is scheduled to be energized soon. The 8-channel system will offer all 3 networks, an ETV channel, and 4 channels originated

by the Grand Island cable system. Grand Island programming includes a time/weather service, UPI news, a movie channel and a local interest program channel.

Smithtown, New York. — Construction has begun on the system which belongs to Suffolk Cable Corp.

Sanford, N.C. — Grand opening ceremonies were held recently for Cablevision of Sanford. The 17-channel capacity system is presently offering 6 channels video.

Xenia, Ohio. — Cable installation has begun, it was announced by Herbert W. Hobbler, president of Xenia Cable TV. The system is offering 11 video channels plus a time/weather service channel. Rates are: \$15 installation; \$5 monthly.

Pendleton, Ore. — Wes Stone, manager of Pendleton Community Television, has announced that his firm's system is now undergoing an expansion program. Five video channels will be added plus a time/weather service.

Franklin Township, Pa. — The system is nearing completion, it was announced by TUP Cable Co., Inc. The 35-mile system, constructed by Vikoa Construction Co., will offer 10 channels. The fee paid to the city will be 5% of gross.

New Holland, Pa. — Enterprise Television and Cable Co., a subsidiary of Enterprise Telephone Co., has awarded a turnkey contract to Kaiser CATV for their 34-mile system.

Decherd, Tenn. — Earl Grover, vice president of Franklin County CATV, Inc., has announced that their expansion project is nearing completion. Cost of the four miles of plant plus equipment used is estimated to be around \$16,000.

Sherman, Tex. — Vumore Company has announced that it is undertaking a \$250,000 expansion program in the next year to rebuild and expand its 70-mile system. The firm is planning to add three UHF and one educational channel.

Danville, Va. — Danville Cable Antenna Television has announced that construction is now underway.

Durand, Wisc. — Henry Nieoff, manager of Durand Cable Co., has announced that his system is nearing completion and will be operational in the near future. Six channels are being offered.

TVC

Introducing the most versatile vidicon camera ever built – Cohu's new 3200 series!



IT'S A CCTV CAMERA – completely self-contained. Just add a single coaxial cable to any video monitor and it's ready to operate. Want high resolution? Plug in one of four optional integrated-circuit sync generator boards for 525-, 729-, 873-, or 945-line scan patterns.



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Greensboro Viewers Get Five New Channels

Sparks fly at city council meeting but public-service cablecasting wins approval. Advertising sales will finance multi-channel local origination project in North Carolina community. Operations to start immediately.

Six votes had already been cast "Yes" and the decision was running in favor of Cablevision of Greensboro. The "voters" were the seven members of the Greensboro, North Carolina City Council. The issue involved was a change in the City Ordinance covering cable TV which would permit Cablevision to do unrestricted local program origination and sell advertising.

The opposition was formidable. In the combined market of Greensboro-High Point-Winston-Salem, there are 3 network affiliated VHF stations and an independent UHF. (The market is the 45th ARB with

409,000 homes average weekly circulation.) All 4 stations had come out strongly against this ordinance change. In what was looking like a losing fight for the TV stations, three of their lawyers had just completed lengthy arguments about the "evils of CATV" and the ruination of "their market."

As one critic pointed out, "When these TV fellows say it's 'their market,' they really mean it!" A Cablevision spokesman pointed out that:

The Greensboro newspaper owns the Greensboro CBS TV station.

The Winston-Salem newspaper

owns the Winston-Salem NBC TV station plus the local AM & FM radio station and holds the Winston-Salem cable franchise.

The principals in the Greensboro UHF TV station own 2 radio stations in Greensboro.

The High Point ABC TV station owns a radio station in the same market.

Of the 1.4 million viewers in the market, 25,000 are served by cable TV. According to the FCC the three Greensboro network affiliated stations had gross revenues of \$5,511,122 and net income before taxes of \$1,471,543 in the year of 1966. But a healthy profit pic-



Greensboro studios include film chain facility shown at left, and control room with console shown at right.

ture did not discourage broadcaster opposition to cable TV originations.

TV news cameramen from the three stations scurried through the crowded council chamber with their hand-held silent-film cameras, shooting footage for their local news programs. At the rear of the chamber a team of technicians manned the remote video tape unit of Cablevision. As they had done in six preceding weeks, the cable people were taping the entire meeting. And, regardless of the outcome on the ordinance change, the council's deliberations would be played back that evening during *prime time*, starting at 8:00 P.M.

Then it was time for the Cablevision attorney, Dan McAlister, to make his statement. He raised the question of public interest and free enterprise and it was obvious that his argument had made a hit with the councilmen. In addition, he pointed out that the TV stations annually pay the City of Greensboro \$25 each. Cable TV pays 3% of its gross income or approximately \$10,000 per year, he observed.

The final vote was unanimously "yes." The council chamber was suddenly full of congratulations and condolences. George Green, vice president and general manager of the Jefferson-Carolina Corporation (which owns and operates Cablevision of Greensboro was grinning broadly and shaking hands.

Green had joined Jefferson-Carolina as general manager only 11 months before and in that short span the company had moved into 16 cities (15 in the Carolinas and one in Georgia) with a total of some 100,000 viewers on the cable.

Green, too, had spoken briefly at the council meeting and had gotten his licks in at the opposition by offering the local CBS station a free dub of the tape his men were making. As expected, the station did not accept his offer to play it back in *prime time*. "How could they?" Green remarked later. "They are locked in by a tradition and time limitations. We can do the public service job that they cannot do. Cable can bring a



Mayor makes sign-on appearance for Greensboro cablecasting, while system manager Jack Gourley and Jefferson-Carolina v-p George Green watch from the wings.

new viewing dimension to our subscribers. Most important, we can do it in prime time. With us, Public Service is not a myth." Green further stated, "The economic impact issue raised by the TV stations really brings tears to my eyes. Look at the figures—owning a network affiliated VHF station in a major market is a 'license to steal.'"

Within minutes after the council meeting, Green's office was crowded with his team of executives: Al Varden, chief engineer; Jack Gourley, central regional manager; Bob Barefoot, business agent; Phil Jackson, director of origination; and Hartwell Conklin, recently retained as an origination consultant after 15 years in commercial TV as a production manager, news director, and station manager; Reid Phillips, advertising manager; and Larry Caudle, sales manager.

The question at hand was how to get a studio built in a matter of 14 days and follow through with the beginning of local origination.

Green began by consulting with the president of Jefferson-Carolina, Michaux Crocker (who is also the treasurer of Jefferson-Standard Life Insurance Co.) and coming up with an investment figure. They decided on \$70,000, of which \$40,000 would go for equipment and \$30,000 for studio and office space.

The nucleus of a staff was already on the payroll and some quick figuring by Barefoot showed that the origination effort would require a payroll and operating budget of \$13,000 per month.

The big problem was a physical one—where and how to build a studio. Conklin suggested a "building within a building." Jefferson-Carolina already owned a huge metal warehouse adjacent to Cablevision of Greensboro's headend. The plan was to take half of this warehouse and build within it a studio, control room, and a projection and equipment room. By Tuesday morning after the council meeting on Monday, a general contractor had started to work.

Varden and Conklin meanwhile had to design the facility. They elected to build a professional facility from top to bottom. The studio is 24' x 24' and is complete with "cyc" and ceiling-hung Kleigl lights. The video equipment is a package from TeleMation.

The next project was a program schedule. Conklin and Jackson came up with a 7½ hour program day, five days a week, with 4½ hours of live programming and three hours of film. The live seg-

been added), a traffic girl and Jackson as operations manager. Estimated payroll was \$7,000 per month.

After 12, 20-hour days, all was in readiness. The studio was ready and the operating staff was standing by. There were two days left before the "station" was to go on the cable.

All that was left was production of commercials for the six clients who were signed up as bingo sponsors. The number had been lim-

ington Report"—Horace Korne-gay, Democrat United States Congressman, 6th Congressional District—N.C.

Friday, August 30—"Candidates Forum"—William Osteen, Republican candidate for U. S. Congressman, 6th Congressional District—N.C.

All political time is free and every candidate has the right to equal time. This offer has been made on all Jefferson-Carolina systems that are able to originate under the terms of their local permits.

Plans for the future include a three-camera mobile unit for news, public affairs and local sports. In addition, a feature movie channel—"Night People Theatre"—will operate 6 hours per day, from 8:30 P.M. to 2:30 A.M. This late hour cablecasting was selected for the many shift workers who reside in the cable area and now have no entertainment after 1 A.M.

At another spot on the cablevision dial, "The Baby-Sitting Channel" offers non-violent cartoons from 8 A.M. to 6 P.M. daily. A weather channel, AP news channel and stock ticker channel round out the local origination fare.

In summary, the Greensboro system provides 5 channels of off-the-air TV, 5 channels of origination and 5 channels of FM music.

After his first month of operation, how does Green feel about origination? "It's a lot more expensive and involved than I had imagined," he says. "But if you're going to look professional, you have to hire pros and buy the best equipment and products available.

"The ideas that you can begin meaningful originations with a time/weather camera and a part-time high school student is nonsense. Our clients are happy—and don't forget, these are mainly guys who, prior to cable TV, had never been able to use TV to sell their product against the giant advertisers. Our subscribers are happy and sales are up. Most important, we are able to build a public service image in the community that we could have never acquired any other way. It's all worth it, even if we just break even." [TVC]



Initial programming includes TV Bingo show; note use of two cameras for more professional production. Bingo display is J. R. Hampton & Associates equipment.

ments include news, public affair interviews, stock market reports, religious programs and bingo. The film portion of the daily schedule includes two hours of cartoons and one hour of educational film.

Phillips, a former radio time salesman, began organizing a sales staff for the origination unit. He took some of the top salesmen from Caudle's staff and began teaching them how to sell cable-time instead of cable-installation. They used a rate card worked out by Phillips, Conklin and Jackson.

Caudle meanwhile began educating his salesmen on how to sell local origination as another feature of CATV service.

Jackson was drawing up a staff for the new "station." It includes: two cameramen, a floor man, producer-director, studio engineer, a male on-camera announcer, Corris Baines, a 14 year veteran of broadcasting, a female announcer-public affairs director, a film director (two more film editors have since

ited to six, due to limited production time for their spots.

By the time 9 o'clock rolled around on Monday, August 19th (2 weeks after receiving the go-ahead from the City Council), everything was set; Channel 7 began cablecasting with a devotional by a local minister followed by a live interview with Greensboro Mayor Carson Bain.

Examples of live prime time public affairs programming that followed are:

Monday, August 26—"Meet Your Councilman"—Walter Cock-erham, Greensboro City Councilman.

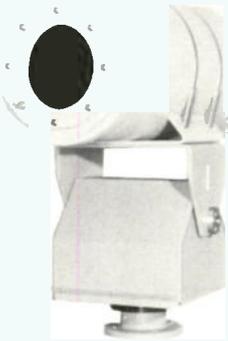
Tuesday, August 27—"Meet Your Department Head"—George Seay, Director of Human Relations, City of Greensboro.

Wednesday, August 28—"Candidates Forum"—C. W. Phillips, Democratic Candidate for North Carolina House.

Thursday, August 29—"Wash-

A WORD ABOUT AQUA

Aqua Instrument Co., has been for years, a dependable prime manufacturer of the broadest line of highest quality CCTV accessories, a few of which are shown here.



Explosion proof pan and tilt unit with explosion proof housing.



Weatherproof TV camera housing with pan and tilt unit on wall bracket.



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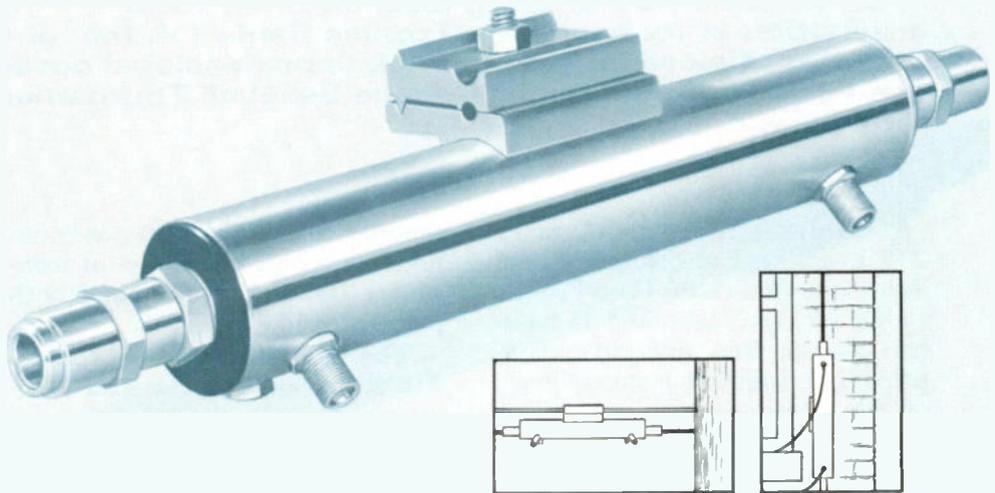
Now Aqua offers the same superior design and manufacturing capability to the CATV field.

Of particular interest to CATV system operators will be the Aqua Silent Pan and Tilt Units and Pre-positioning Devices for studio use.

For improved performance and greater dependability in CATV equipment, it will pay you to look first to Aqua.

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AQUA'S long-standing reputation for quality and reliability in the CCTV industry is now being applied to the complete design and manufacture of quality CATV products. VERSATAP is the first in what will be a long line of significant new developments for the CATV field.

The AQUA VERSATAP, an important major achievement in CATV directional tap design, requires only one model for both metropolitan and rural installations. The VERSATAP'S slim line housing, only 1½" in diameter and 8¼" in length, together with its unique mounting bracket and AQUA all weather-proof connectors,* permits both strand mounting and vertical riser applications as illustrated. Two or more VERSATAPS, each with four tap ports, may be combined to provide any number of tap outlets without introducing any additional mismatch. One and two tap port versions are also available. VERSATAP'S compensating circuitry delivers a uniform signal level at each set location. The positive center conductor seizure, preventing conductor pullout, is accomplished from the exterior without opening the tap. VERSATAP'S all wrought aluminum construction, completely anodized and permanently color coded, together with passivated stainless steel fasteners, insures the optimum in all weather reliability and maximum life expectancy, together with complete elimination of RFI leakage.

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Origination Premiere... College Baseball Tourney

In an all-out effort to bring local citizenry local origination at its best, ComTronics Cable TV, Inc. of Grand Junction, Colorado, gave complete professional coverage to the 1968 National Junior College Baseball Tournament.

A cablecasting "first" made headlines last spring in Grand Junction, Colorado. ComTronics Cable TV, Inc., televised 15 baseball games, live, over five days, providing complete local coverage of the National Junior College 1968 Baseball Tournament.

The Decision

Such a feat would be remarkable for an established TV station—covering as many as four games a day five days straight, including night games. It is particularly commendable considering that it represented ComTronics' first venture into cablecasting, with only the March NCTA cablecasting

seminar in Salt Lake City as training. The event was a test of manpower and equipment—and both performed like veterans.

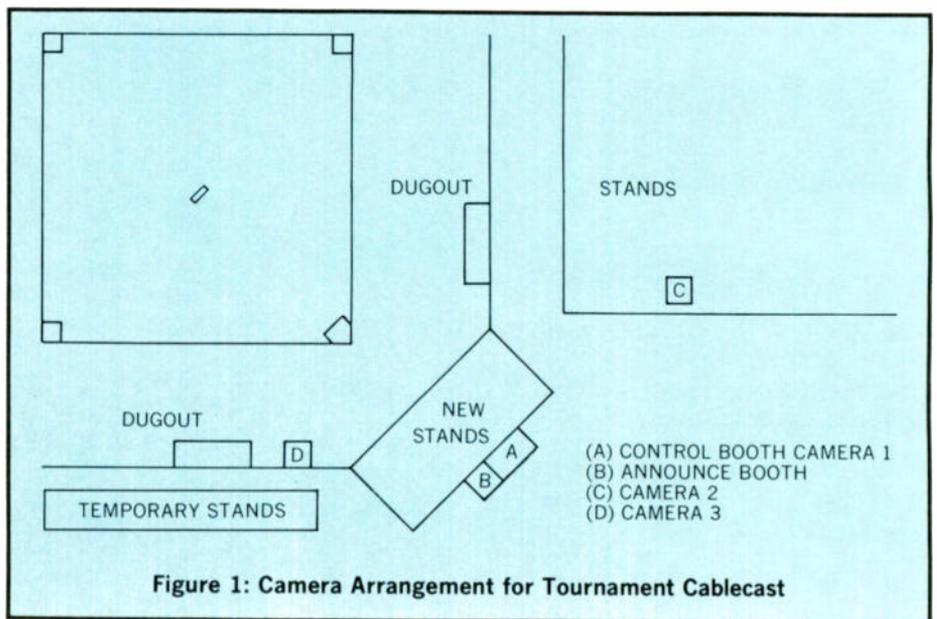
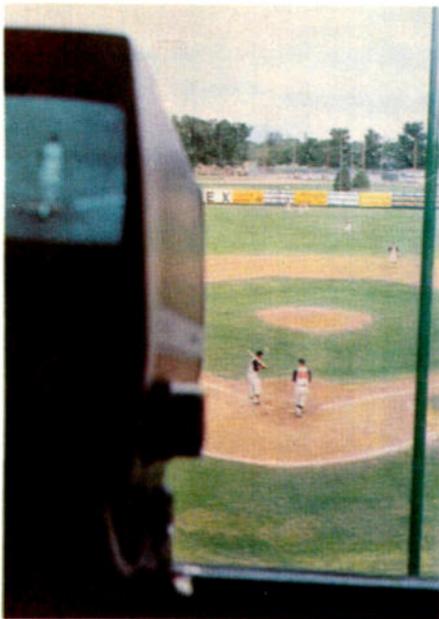
The National Junior College Athletic Association Baseball Tournament features the top eight junior college baseball teams competing for the national crown. Tom Worster, manager of ComTronics and member of the baseball committee, and Ed Drake, assistant to the vice president of GenCoE, Inc., and district manager of ComTronics, decided that an event of such stature should be televised to the baseball-loving community. When Tom approached the baseball committee about the idea, the main objections raised concerned the

quality of the cablecast and doubts that TV coverage would hurt gate receipts.

Tom overruled these objections by promising not to publicize cable carriage of the games until one week before the tournament to minimize the effect on advance sales, and optimistically (as it turned out, correctly) assured members that quality of the production would be professional. ComTronics also sought and won

Below left: Playing field as seen past camera in control booth atop stands.

Above right: ComTronics' spacious studios provide for multiple interview or panel discussion program format.





approval from the City Council, and the Parks Director nodded permission to lay cable through the park.

To announce the game, Worster decided to simulcast with radio station KWSL, using the radio's play-by-play announcer. Since the cablecast was a public service to subscribers but the radio coverage was commercial, ComTronics showed slides during radio commercials in order to maintain continuity of programming.

The Preparation

Two months before the tournament, the management-technical team of Worster, Jim Neese, chief

engineer, and Paul Knox, chief technician, began preparing facilities. They constructed scaffolding and special booths above the grandstand to house cameras, control equipment and the radio announcer booth. From a 12' x 6' booth, 20 feet above ground, a viewfinder camera with 10:1 zoom lens covered home plate to show the pitcher, batter and catcher in a "cover" shot. A second camera was housed in a 6' x 6' plywood booth on scaffolding 20 feet high over third base and was used for close-ups of the pitcher, left-handed batters and to cover the runners.

A third camera was set up on an enclosed platform in the grandstand on the first base side for

close-ups of the pitcher, right-handed batters, action at third base and home plate, and for panning the crowds. All cameras were modified by TeleMation, Inc., to operate at broadcast standards.

Control equipment was housed in the twelve-foot booth with Camera #1. Included were the TeleMation Multicaster, which fed EIA sync pulses and drive to the live cameras and performed switching functions; preview and program monitors; a carousel projector mounted in a shadow-box for slides and messages, and a Spotmaster tape machine for the audio portion of the messages.

Three-thousand feet of aerial cable and 1,200 feet of under-

ground cable (across the park) were installed to feed the head-end from Lincoln Park Stadium.

After the hardware was set up, all staff members involved in the cablecast studied network and Denver-broadcast baseball games to learn how the pros work. They also read numerous articles on camera locations for baseball. Thus armed, the team began taping local college and high school games, reviewing tapes after each session, criticizing rough spots and working out the necessary changes, "to achieve something close to professionalism," said Worster.

The Cablecast

On May 30, the tournament began. Cable subscribers saw all four games the first day—live; four games on May 31, three on June 1, two on June 2, one on June 3 and the final, championship game

on June 4. And they watched a very professional telecast. Control booth observers noted that even the announcer turned from the field to call plays from the monitor!

What did the system accomplish by producing this expensive origination? Tom Worster comments, "When advertising hit about our cablecasting the tournament, three of Grand Junction's motels called to be connected. Many new customers were hooked up, and there is no way to tell how many subscribers stayed on the cable when they might have disconnected for the summer.

"The objections voiced by the baseball committee were quelled. The quality was excellent, and the number of people that attended the games far surpassed any year of the past ten consecutive years that the tournament has been held in Grand Junction. The commis-

sioner of baseball, William D. Eckert, applauded our efforts, as did Jim Gallagher, who is in charge of major league relations with colleges.

"Edwin (Duke) Snider and Jocko Conlin, guests of honor at the tournament, congratulated us on a fine job, as did our City Council, City Manager, civic leaders, baseball committee and heads of business in Grand Junction.

"The most gratifying results were from our subscribers. Hundreds of cards, letters, notes, telephone calls and personal comments poured in. And all of them congratulated us for an outstanding public service rendered."

Next year, ComTronics plans to promote the tournament cablecast much earlier than they were able to this year—and they plan to sell coverage of the game to local advertisers. They also will be equipped with a remote van to

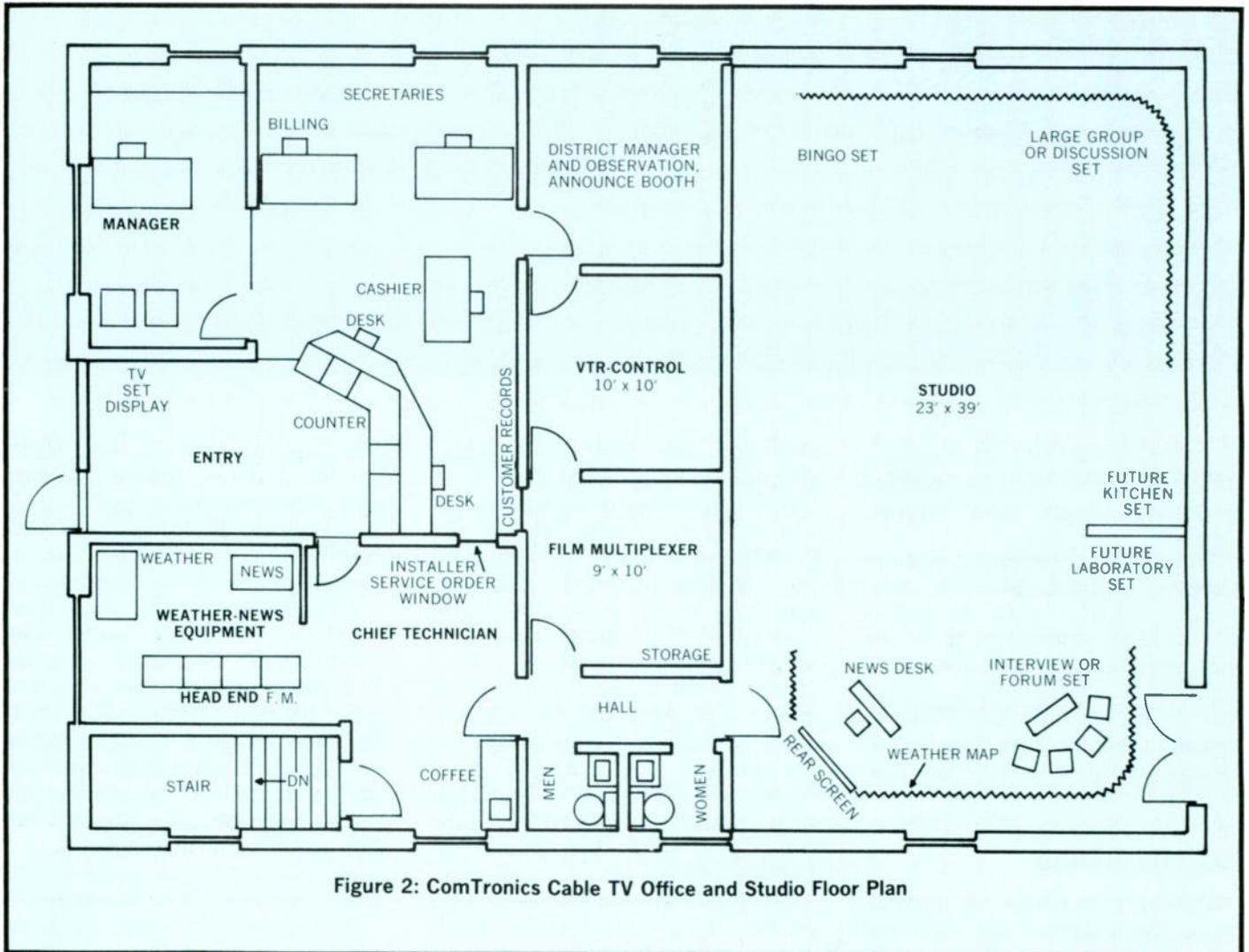


Figure 2: ComTronics Cable TV Office and Studio Floor Plan



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YOU NEED SUPERIOR'S VIDEO PAIRS!**

Superior Video Pairs are *balanced pairs*, individually shielded, that eliminate AC hum and maintain studio-quality picture transmission. So, for high-definition television transmission from studio to head-end, from remote pick-up points to head-end or from remote pick-ups to studio to head-end . . . insist on Superior Video Pairs. Flexible Video Pairs for patchcords and flexible video leads also available.

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Frequency	db/1000 ft. @ 68° F
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5 MHz	3.7
10 MHz	5.2
15 MHz	6.4



**SUPERIOR
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CORPORATION**



Regular cablecasting fare in Grand Junction includes TV Bingo program, originated from ComTronics studio facilities.

simplify set-up procedures.

About the System

ComTronics has been serving Grand Junction, an All-American City, with twelve channels—including the local broadcast station—since March, 1966, after a popular vote granted a permit to the hybrid company of Community TV and Wentronics TV, both of whom had been turned down in earlier votes. At that time, the office space was remodeled.

Cable ETV, Too

The building includes a 23' x 39' studio, with space planned for a news desk and rear projection screen; an interview or forum set; future laboratory and future kitchen sets, Bingo set, and large group set. The enclosed control booth, engineered by Sam Kichas, is equipped with an Ampex VR-7500, TeleMation Multicaster video control center, Spotmaster audio tape deck, and preview and program monitors. A separate 9' x

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It's an effective way to make your advertising dollars go farther or to help promote your system to subscribers. Sound interesting? Then just fill out the coupon and mail it. We'll supply quotes without obligation.

It's a good idea...do it now!

Gentlemen: I'd like to put reprints to work for my sales program. Please send quotes on the reprint specified below.

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 Article CATV Weekly

Date of Issue _____ Change to _____ Pages _____
 Color: Same _____
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 Min. order is 500.

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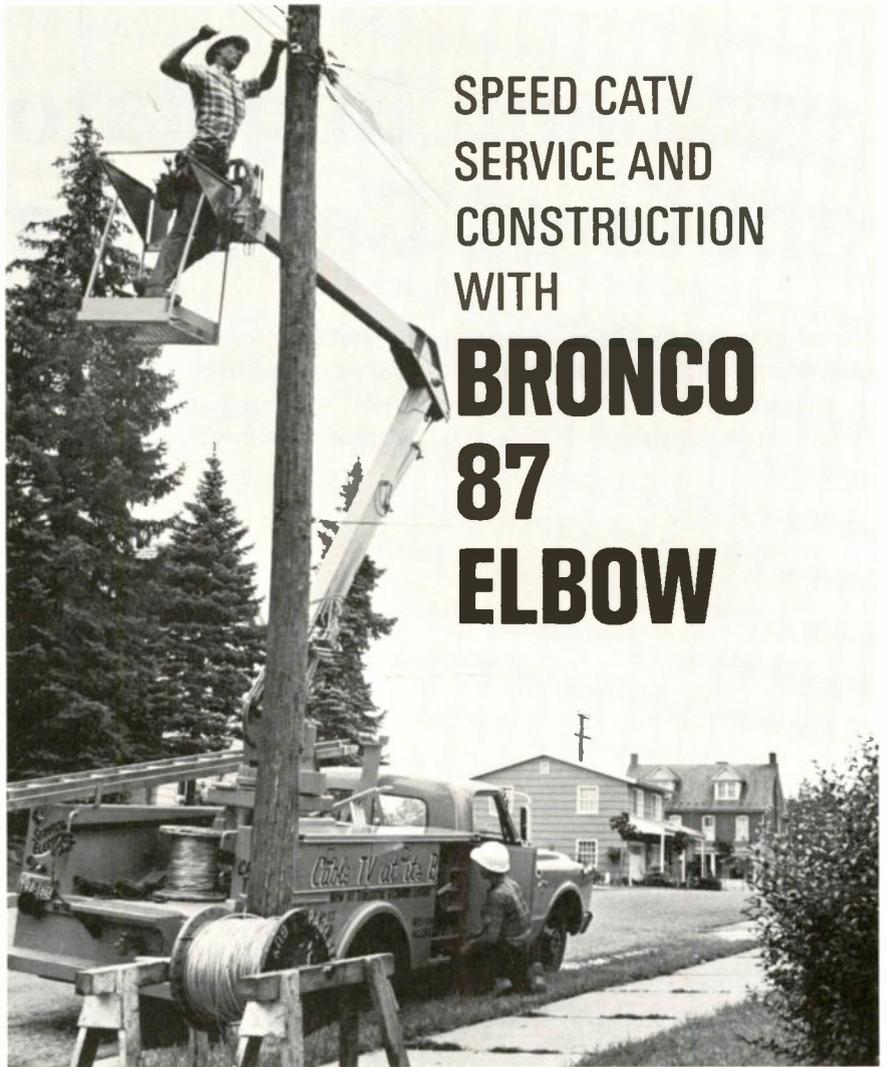
10' booth houses the film and slide multiplexer. Adjacent to the front office are head-end equipment and Weather Channel '97'.

Besides developing a regular schedule of interview programs, news and weather shows, films, Bingo, and specials, ComTronics has worked out a unique arrangement with Mesa County Schools to provide educational programs to the schools and community. Spearheaded by Ed Drake and Joe O'Hara, director of special services for Mesa County Schools, the arrangement gives the schools full access to all equipment and the studio for the producing and taping of telecourses.

The school system purchased most of the cablecasting equipment and pays ComTronics for maintenance and studio rental. ComTronics in turn is buying 50 percent of the equipment and also furnishes the technical "know-how" and maintenance personnel. Eventually, says Worster, the school district will provide its own technical personnel and cameramen.

Darrell Needham, coordinator of ETV for the school system, instructs high school students in television methods and is producer/director of all educational programming. From 9 a.m. to 3 p.m. during the school year, use of the facilities for school programming takes priority. Most programming conflicts are worked out monthly, when ComTronics and Mesa Schools each submit a proposed program schedule. (The only problems Tom sees in this arrangement are the unscheduled conflicts, such as a news break, which can't be covered live if the school is using the facilities. However, he added that sufficient equipment is on hand and channel space is available to program two channels simultaneously.)

Despite such conflicts that may arise, the marriage of Mesa County Schools and ComTronics Cable TV certainly has brought local ETV and public service television to Grand Junction long before either could have done it alone. It is an imaginative, economical solution to the increasing need for community and educational television services. TVC



SPEED CATV SERVICE AND CONSTRUCTION WITH **BRONCO 87 ELBOW**

One CATV operator puts his men on top the job with five Bronco 87's for his 36,000-subscriber system

Here's an economical, versatile aerial device to put your men on top the job fast — Bronco 87 elbow. It carries a 300-pound man- and tool-load quickly and smoothly to 32-foot working heights in the 87-27-1 model and up to 36-foot positions in the 87-31-1. With no outrigger jacks to set, your lineman is in the bucket and up to the job within seconds after arrival at the site. And, the Bronco 87's compact design provides excellent mobility in busy traffic or on narrow side streets.

On the job, the Bronco 87 may be used to speed service, cable stringing, patrolling, and installation. Uniform-stress design of the all-steel upper and lower

arms assures even load distribution through the base frame and torsion-bar stabilizer. End mounting of the easy-access bucket permits straight-shot access to narrow work positions and provides a three-sided work area. The 95-degree lower- and 125-degree upper-arm flight pattern furnishes the flexibility to get into almost any work position.

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Legal and Regulatory Facets of Cablecasting

The entry of system operators into such areas as program origination brings many new legal and regulatory questions to confront the industry. Just how will CATV fare legally? Here are some answers.

*By Morton L. Berfield
Cohen and Berfield
Washington, D.C.*

As an ever increasing number of CATV operators move into the area of program origination, we are just commencing to glimpse the broad diversity of information, educational and entertainment services possible by cablecasting. As the extent and significance of origination increases, cablecasting will inevitably come to the forefront of attention.

Increasing attention will be forthcoming from those whose scrutiny you have come to expect—that is, attention will be focused on CATV by the Congress, by the Federal Communications Commission, by copyright holders, and by the telephone companies. And although CATV's past experience with these parties has not always been 100 percent favorable, at least the names and the arenas are familiar.

Cablecasting—with all its potential for service—also brings with it commensurate responsibility and a host of legal and regulatory ramifications. As of this date there are no prohibitions on cablecasting, but there is clear evidence that the shape and form of cablecasting will be greatly influenced by forthcoming legal and legislative decisions.

As you have come to expect, the primary focus of governmental scrutiny will be from the Federal Communications Commission. At this time, it is fair to observe that the FCC has really set no firm policy regarding cablecasting. The Commission has observed, however, “. . . that the public interest is served by encouraging CATV systems to act as additional outlets for community self-expression.” It is also true that, after making clear that private microwave in the community antenna relay service (CARS) cannot presently be used for program origination, the Commission has instituted a rule-making proceeding to determine if CATV operators should be permitted to employ their private microwave facilities for origination. But beyond these very tentative initial steps, no full-fledged Commission policy has yet emerged.

This is due, in large part, to the pendency of the jurisdiction and copyright litigation and legislation and also to the fact that, in the past, cablecasting was not a particularly important aspect of CATV. All of this has changed now. The basic jurisdiction and copyright litigation has been completed; cablecasting has ad-

vanced in importance and is beginning to edge into the spotlight of Commission attention.

Commission policies on cablecasting will probably evolve in several rule-making proceedings such as: those involving use of CARS; those involving telephone company proceedings where questions will be raised as to the propriety and legality of the restrictions on program origination contained in many leaseback tariffs and pole attachment agreements; and those involving top-100 market and similar adjudicatory situations where specific origination proposals will be before the Commission. Out of all these decisions a Commission cablecasting policy will emerge.

As to the policy which will evolve, there is good reason for optimism. For example, the case for utilizing microwave for origination is strong, and no really valid objections exist. A successful conclusion to that rule-making is a definite possibility. The cablecasting restrictions contained in telephone company tariffs and pole attachment agreements will come under increasing criticism, and judging by the result of the recent telephone company proceedings before the Commission, particularly the Section 214 and the Carterphone decisions, the prospects are bright for a significant easing, if not outright elimination, of such restrictive provisions. The recent Commission emphasis on local, public service with respect to television (for further details I refer you to recent findings regarding Oklahoma broadcasters) should certainly redound to the benefit of cablecasting. For if local, public service video programs are in the public interest, the capacity of CATV to present such programs in every community of any size must be considered a great plus factor.

Although there are these many hopeful signs, a balanced view requires a few notes of caution. First, there will be those in the broadcast industry who will oppose cablecasting at every turn. This opposition will particularly center on the question of commercial sponsorship of cablecasting. It is my view that a Commission prohibition as to commercial advertising on cablecasting would, under present law, be of extremely dubious legality. Yet a court test may be required—and a battle over commercials may soon be in the offing.

In this connection, there are two recent Commission

rulings which may well result in important court cases. First, in a proceeding involving systems in the San Diego area, the Commission prohibited those systems from commercial advertising for program origination. However, in a more recent ruling involving the Greensborough, North Carolina system, the Commission refused to ban origination commercials. Also in that case, the Commission indicated that some type of rule-making proceeding or inquiry would soon be initiated to develop overall policies on this question.

While the Commission will be the source of much governmental cablecasting policy, it should also be kept in mind that Congressional action could be decisive. In the past, legislative proposals concerning Commission jurisdiction and copyright have contained provisions relating to—and restricting—CATV origination. The recent Supreme Court decisions have, of course, outdistanced these prior bills. But it seems reasonable to assume that the opponents of cablecasting will continue their efforts to inject prohibitions and restrictions into whatever legislative proposals may arise in the wake of the recent Court decisions.

Also, cablecasters should be aware of the ramifications which can arise in an election year. As you know, broadcasters who permit use of their facilities by candidates for public office are required to provide "equal time" for other qualified candidates. While cablecasting has never been held to be subject to equal time requirements, the NCTA Code and prudent and responsible judgment call for cablecasters to follow suit. An example of what can be involved occurred recently when a letter was filed with the Commission complaining about the issue of equal time for local candidates on a CATV origination channel. The Commission asked the CATV system to comment, which it did—reciting in detail all the steps the system had taken to insure that all known candidates in the election were afforded an equal opportunity to appear. Consequently, the Commission completely vindicated the CATV system.

It is mandatory that cablecasters be prepared to meet such complaints by having been fair in the use of cable facilities. The same philosophy should hold true in the case of editorials or discussion programs where controversial issues are raised or a particular individual or group is attacked. Opposing views should be solicited and presented and any parties attacked given an opportunity to respond. Of course, in particular factual circumstances your attorney should be consulted.

You should realize that cablecasting can involve state and federal laws with which you may not have previously come in contact; there are specific laws relating to privacy, slander, libel and lotteries. Therefore be extremely careful as to the form and content of your cablecasts. The NCTA Code is a particularly helpful guideline and checklist as to potential problem areas. Also, and this is most important, be sure that your contracts for program materials subject to copyright contain the necessary clearances.

All of these concerns—in addition to their unfamiliarity—may seem burdensome. But, having survived the First and Second Reports and assorted other decisions, and with the recent victories in the Supreme Court, the CATV industry should be in good fettle to advance to its full public service potential. TVC

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"Fables Of These Times" About Cablecasting

Progress invariably raises questions in the minds of many, and the move of cable systems into local programming is no exception. The author answers with facts from Telesis' multiple system operations.

*By Richard F. Shively
President, Telesis Corporation*

Many stories of how a cable system of a thousand subscribers ran the local television station out of business are currently fashionable. Also popular are dire prophecies which foretell how many excellent little cable systems will go from bankroll to bankruptcy because they are overburdening themselves with programming expenses.

It is amusing to relate these stories—and, in fact, the whole embryonic business of cablecasting, with the humor of the late James Thurber. It is truly unfortunate that he isn't with us today to supplement his perceptive *Fables of Our Times*—and humorously dispatch a few "Fables of These Times."

There is a faint resemblance between those who are not in or associated with the cable business who can so patently predict what will happen to cablecasting, and the lead character in Thurber's "The Owl Who Thought He Was God." You'll recall the Owl was drafted as the leader of the birds and beasts because he was able to see in the dark and to answer all questions promptly and satisfactorily—albeit his answers were confined to the phrases: "Who," "To Wit," and "To Woo." Of course the Owl got himself and all of his followers killed—which caused Thurber to draw the moral that "You can fool too many of the people too much of the time."

Thurber must have had cablecasting in mind when he penned several other of his famous fables. The cable operator who spends all of his—and the bank's—money to compete with the networks, will end up just as the Moth in Thurber's "The Moth and The Star." You will remember the Moth tried every night to fly to a certain star—which happened to four-and-one-third light years away (something like 25 trillion miles). "You don't chase stars," his father counselled him. "Go find a good bridge lamp instead." That seems like pretty good cablecasting advice.

At the other extreme is the cable operator who does nothing. He's like "The Bear Who Could Leave It Alone." This fellow, Thurber tells us, was a drunk. Every night on his way home from work he would stop by the neighborhood bar, have a few pops, get

very happy—even ask the bartender to find out what the bears in the back room wanted—and then go home. At home he would trip over the furniture, knock down the floor lamp and fall on the baby bears. So, he took the pledge. No more booze. And he felt so good that he would rush home, full of energy and enthusiasm . . . and *trip over the furniture, knock down the floor lamp and fall on the baby bears*. The moral being, quite appropriately, "You might as well fall flat on your face, as lean over too far backward."

Which is to say that in cablecasting we have a medium. It is important to strike the happy.

Cablecasting can be an important service and an excellent producer of revenue. Let me tell you of a specific case. In Southern Indiana we have a small system of some 1,200 subscribers. That's about 40% of potential—and because there is fair to good off-the-air reception of the three networks—new subscribers were averaging only three to four a week.

It was decided that local origination would be a service which would benefit the community—and the cable company. So a few dollars were invested in helical tape recorder and a vidicon camera. That was the first step in equipping a small studio. The system hasn't started programming yet—but the word is out. A couple of the local high school baseball games were videotaped and played back from the head-end on the weather channel. Subscriptions now are averaging—not three or four a week—but 20 to 30!

The baseball game I mentioned was a semi-final game of the state high school tournament. It was played more than 100 miles from the cable city. The cable company sold the game to local sponsors for \$160.00. This covered expenses of the origination. Even though the local team lost in the last inning, many subscribers requested that the game be replayed on the cable. This was done. I can't conceive that the FCC is desirous of depriving viewers of this type of service by recent rulings which discriminate against systems which carry commercials.

The sponsorship of the game in no way affected the revenue of the stations serving the community

and carried on the cable. The local merchants cannot afford to advertise on the metropolitan stations. In fact, the \$160 which sponsored the baseball game for three or four runs on the cable would hardly buy a one-minute spot on the commercial stations.

The fact that a merchant is located in a small community should not prevent him from utilizing video advertising. Cable advertising will help the small merchant to compete. If he can't advertise on the cable—and his big city competitors' advertising is on the cable (due to the fact that the big city advertiser can afford to buy time on the metropolitan TV station) the FCC is thwarting competition and contributing to the further growth of the large and the demise of the small.

If anyone contends that small town cable advertising will siphon revenue from commercial TV, he just hasn't played the numbers game at any advertising agencies.

The viewership of and appreciation for locally oriented programs does not mean, however, that cable operators should race recklessly across the street to purchase equipment in order to become the "local TV station." Because of the high costs of programming—a fact of life of which a number of veteran broadcasters have sounded warnings—and also, because of the temptation for a cable operator to attempt to compete with commercial broadcasters, many unwise operators may indeed end up overextending themselves.

A cablecaster should start each day—perhaps while he is shaving—by repeating a number of times, "I am not a TV station . . . I am not a TV station." This would be good advice whether or not his cable system carries commercials.

Cablecasting is quite different from commercial television. There is no need to compete for audience; there is no need to adhere to an inflexible program schedule; there is no need to be chained to the second-hand of the clock.

There is a need to do exactly what the Federal Communications Commission urges commercial telecasters to do. That is to search out the needs of the community and to fill them. Commercial telecasters can only fulfill this obligation superficially—because of the vast geographic area most commercial broadcasters serve and the minimum amount of time they can devote to local service, other than news.

Cablecasters, on the other hand, have a very limited area to serve. It is an easily-identifiable area. Its needs can be determined easily and can be served by cable.

Cable can best serve the needs of a community because it is a part of a community—and generally a part of only one community. Perhaps cablecasters should adopt the slogan frequently used by other businesses: "Large enough to serve; small enough to care."

If cablecasting is not commercial television—and it certainly is not—then what is it? It could be likened to electronic putty. It is flexible. It is nothing until put to use. And it can be molded to fit the need.

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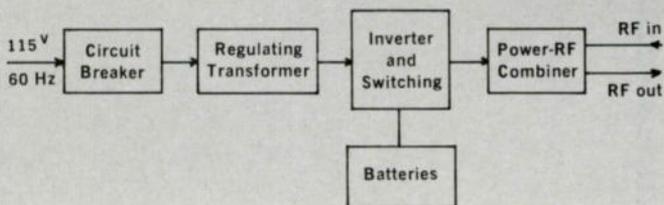
Winter is coming and power outages will become frequent. But you can be assured of an uninterrupted supply of power to all the remote amplifiers of your system, if you install the PS-100 CATV Power System.

The PS-100 Power System consists of a regulating ferro-resonant transformer, an inverter, batteries, and a power-RF combiner. All housed in a cabinet 30" high, 24" wide, and 9" deep, which is pole mounted. Designed with a minimum of complication for maximum reliability, in accordance with good engineering practice. Featuring high quality components throughout, the Power System works well within ratings over ambient temperature range expected in field.

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SPECIFICATIONS: PS-100 CATV Power System; Pole Mounted. INPUT: 95-130V, 60 HzAC, and 24 DC (Batteries). OUTPUT: On 115 AC line: 30V(*) 250W 60 Hz square wave. On Batteries: 30V(**) 250W 60 Hz square wave. OPERATING TIME: (batteries): At 250W: 4 hours, at 110W: 10 hours. SIZE: H30", W24", D9". (*) Optional -30V -60V, (**) Batteries require no booster charging, but should be checked for water annually.

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The most important job for a cablecaster is to mold his service to fit the need. Answers to the following questions should be sought when attempting to design a local origination system: (1) What is the quantity and quality of the off-the-air channels now carried on the system? (2) Is more than one local channel needed to make the system marketable to the public? (3) If only one channel, what is the minimum programming which will be marketable? It is important to begin with a nominal schedule—but a schedule which is locally oriented and which will be enthusiastically received—rather than a full schedule. (4) If more than one channel is needed, what are the most productive and manageable additional services?

As an example, in Nebraska we have a system which is originating four channels of service to supplement the three networks and an educational channel. What is carried on four channels? One is a standard weather channel; one is a movie channel; one is a news and market channel; and the fourth is the local events or variety channel.

The movie channel shows three movies a day. They are shown at staggered times for a period of one week. Because there are many workers in this community who work night shifts till midnight—and since all three commercial television stations sign off at approximately midnight, we show a movie at 12:15 a.m. It was a need we discovered by analyzing the market.

The local events or variety channel is designed to handle local events, interviews, and news.

The news and market channel has been very popular. We use the Alphamatic character generator. In addition to the UPI news, the New York Stock Exchange quotations are carried during the day, and in the evening the appropriate sports scores—major league, high school and college—are displayed on a continuous read-out. During crises, such as the assassination of Senator Kennedy, the news channel has been heavily used.

In this area where the viewing public is restricted to three off-the-air signals, and where the FCC's Second Report and Order prohibits importation because of the top-100-market definition of the community, the cable adds a new dimension to television viewing. Whereas, only three channels were available prior to the cable, now there are eight channels.

Your questions probably are: How much does it cost? And what does the added channel selection do to the viewing of local stations?

The cost is not low. But it appears that it is not too much more than the cost of importing non-duplicated channels (if that were possible). And the difference can be made up for by providing a service to local advertisers. We then provide a completely local service.

Local origination will increase audience to local television stations because it will keep the set turned on at times when it otherwise would have been dark, and the added services will contribute substantially to the evolution of the television set as the communications center in the home.

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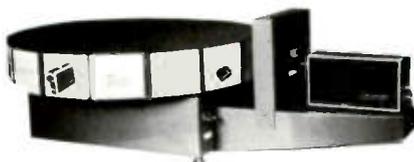
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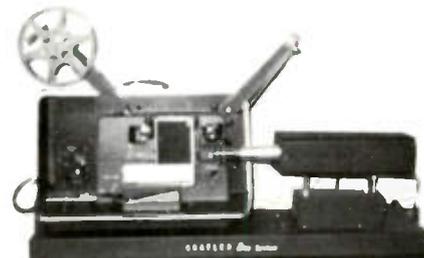
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Cartridge Systems For Automated Cablecasting

Automated cartridge systems are very well suited to many cablecasting uses, as pointed out in this digest of the author's NCTA convention presentation.

By John L. Neff
Broadcast Electronics

About ten years ago, broadcasters faced with the heavy programming pace were looking for means to automate. Some broadcasters bought juke boxes and attempted to fashion automated systems themselves. This, of course, was not the answer, but at least it projected the idea to a few manufacturers who realized there was a need for some type of semi-automated equipment. At this time, Broadcast Electronics introduced a tape cartridge player under the brand name of Spotmaster.

This cartridge system came loaded with a continuous loop magnetic tape. Unlike the reel to reel tape players, rewinding was eliminated. This cartridge system is now an important building block in both small automation systems and systems employing computer programming.

Automated systems are extremely flexible and can be designed to meet your system's individual needs. Today, a CATV operator can order automated equipment largely tailor-made to fit his needs. This can include music, slides, and announcements, and run from a few hours to a complete cablecasting day.

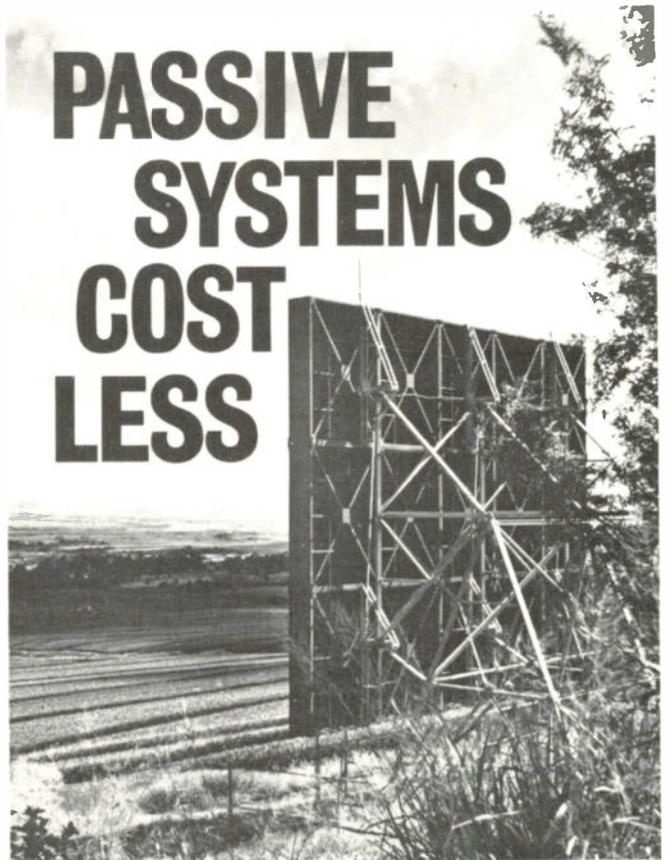
There are many different cartridge units now in use, but automation system engineers have settled on three different systems that best meet their needs. One system is a rotating drum, or carousel, holding twenty-four cartridges. Another is a vertical unit holding fifty-five cartridges. The third is a multiple channel unit, built in modules of five channels. All of these units utilize tones to give commands to start, stop and to switch to the next event.

The multiple channel unit of the type marketed by our firm is available in modules of five or ten channels, and has an amplifier and heads for each deck, thus providing random select. With the random select, one can record twenty or thirty public service announcements on one cartridge which will occupy one deck. This allows an operator to manually select an announcement—and with additional tones, he can trip slides—and at the end of this cartridge, cue the public service cartridge to start. Since this is a continuous loop, the next announcement is cued and ready for play.

Automation is here and is becoming more and more sophisticated each year. I would advise all CATV operators to plan not for today's programming needs, but for the future.

TVC

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Microwave system designers owe it to their customer or company to provide a system with highest possible performance and the lowest possible price. It's the combining of technology and a sharp pencil that points out the better way.

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Use just one passive repeater and you'll take a microwave system design out of the dark ages of system concept. Use just one passive repeater and you'll find places to use more!

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Simplified Color Equipment For CATV Originations

The introduction of low cost, simplified color cameras and VTR's has opened up new opportunities for many cable system operators in the field of high-interest local programming. The following article describes some of the equipment which can be used, its design and application.

*By Frederick J. Haines
Manager, Applications Engineering
International Video Corporation*

Color television is here to stay, and so is CATV local program origination. With local programming formally recognized as a public communications medium, its rate of growth and importance can increase rapidly. This potential for rapid growth, however, will be fully realized only when the nation's cablecasters compete effectively in the quality of the pictures seen by subscribers on the "public service channel." Because color television has mushroomed in the recent past and will soon dominate in the United States, it is increasingly desirable that cable system operators contemplating local public service programming plan their studio facilities for color. The recent availability of low-cost, self-contained color cameras and color recorders which meet broad standards of picture quality, brings local live color within the economic reach of cablecasters.

Figure 1 illustrates the simplicity of a complete color television system, including camera, color video tape recorder, and color monitor. Nothing else is required to pick up and cablecast a live event from a small studio area, or to record and rebroadcast in color a remote local event. A small truck or van, a source of local power, and a few inexpensive lights are all that are needed to record events away from headquarters. In fact, during daylight hours out of doors, no lights are needed for excellent color pictures.

It is believed that the IVC-100 color camera is the first to be completely self-contained, requiring only a power cord and a single coaxial cable to deliver NTSC-type signals to a monitor and CATV program line. Another property of the camera is its light weight, allowing one man to mount the camera on its tripod. Other color cameras currently in use weigh between 130

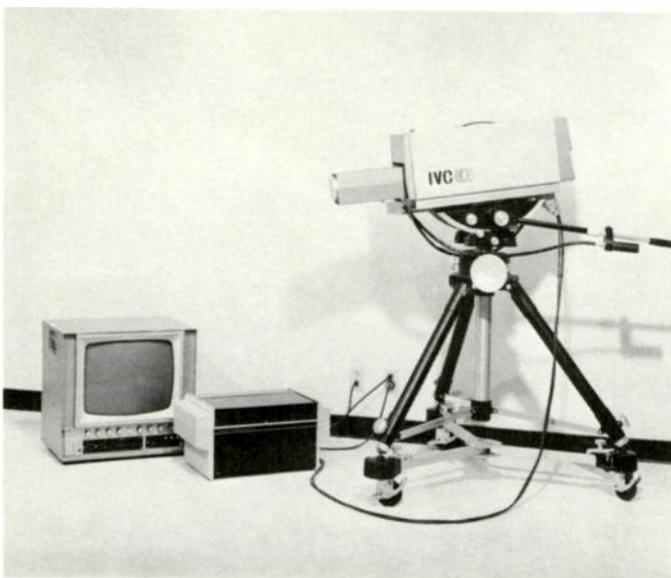


Figure 1: A complete Studio System for Live Color Origination

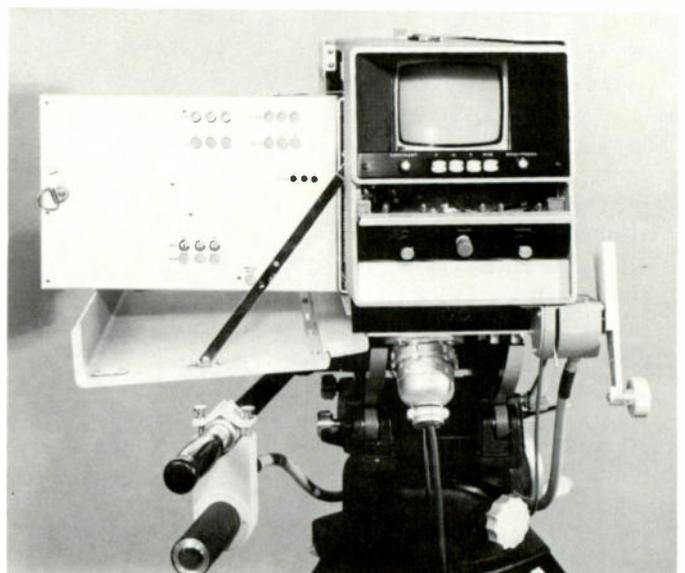


Figure 2: Operating Controls—Electronics Door IVC-100.



Above: IVC-100 color camera is shown in operation during a special promotional project of Pueblo (Colo.) TV Power Inc. at the local fair. System employee Judy Sanchez checks monitor while operating the camera: system manager Norman Bennett interviews the public.



At right: Camera and IVC-810 color recorder are shown in foreground, as Bennett interviews cheerleaders performing at the fair. (Photos by Jim Fish of Foote, Cone and Belding.)

and 400 pounds while the IVC-100 checks in at 65 pounds including the 6 to 1 zoom lens.

The light weight of the camera also permits the use of smaller, less cumbersome and less expensive tripods.

Color Camera Technical Description

The major difference between the IVC-100 color television camera and a black and white television camera is the use of three image tubes required to produce the color signal.

A system of special optical elements called dichroic mirrors are employed to split the light from the lens image into three components: red, green, and blue. Dichroic mirrors have the interesting property of reflecting light of one color and allowing light of other colors to pass through. Thus, light is split as follows:

The image created by the zoom lens appears in focus in the field lens. The aerial image thus derived is transmitted via dichroic beamsplitters and mirrors to the three relay lenses. The exit pupil of the zoom lens is thereby imaged upon the entrance pupils of the relay lenses. The field lens insures that all the light leaving the zoom lens enters the relay lenses, thus preventing port-holing.

The first surface of the front dichroic beamsplitter shunts only red light to the red reflector mirror whence it is transmitted to the red vidicon tube. The blue and green parts of the spectrum pass through to the second dichroic beamsplitter. Only blue is reflected to the blue reflector mirror and into the blue tube. Green passes

through both dichroic beamsplitters directly to the green pickup tube.

The three vidicon image tubes convert the red, green, and blue images on their faceplates into red, green, and blue signals which are then processed into the NTSC color television signal, suitable for cablecasting.

The IVC-100's optical system contributes to high camera performance at low cost. The complete optics (including vidicons) are mounted on a rigid bedplate. All elements are permanently fixed in optimum position at the factory and require no adjustment for the life of the camera. The optical assembly is held in the camera by precision dowel pins; it can be removed in seconds to allow vidicon replacement without optical realignment.

The IVC-100 electronic circuits are contained totally in the camera head. The camera is self-contained even to the extent of an internal encoder in the CATV version. The power requirement of the camera is approximately 75 watts from a standard 117 volt 60 Hertz power source.

All circuit boards in the camera, excepting some tie-point assemblies, are plug-in and easily changed should a fault develop.

The red, green and blue video signals from the pickup tubes are fed to three identical preamplifiers, mounted on one circuit board assembly. The preamplifiers increase the video signal amplitudes to a usable level and correct for the frequency response roll-off created by the stray capacitances in combination with the very high output impedances of the vidicon pickup tubes.

The amplified and corrected signals are then routed

to the red, green and blue processing amplifiers, mounted on one circuit board assembly. The major functions of the video processing amplifiers are to provide for red, green and blue gain controls, red, green and blue black-level adjustments, and clamping. The gain controls allow the three signals to be trimmed to equal levels to compensate for differences in pickup tubes and amplifiers. The black-level, or pedestal controls, allow trimming the black-levels to a match despite slight differences in pickup tubes. An adjustable white clipper

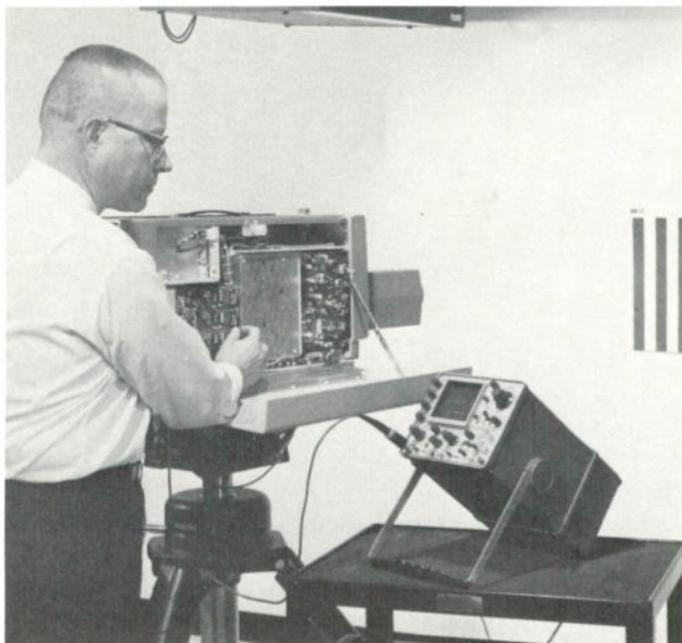


Figure 3: The Author Makes Initial Adjustments to Color Camera Prior to Video Tape Recording Session.

permits the control of extreme white highlights to a selected level, an aid to good color recording.

The red, green and blue signals from the processing amplifier are sent to the viewfinder in the camera, where any one of them may be viewed, or any combination of the three. A Y signal matrix in the viewfinder permits simultaneous viewing of the three signals with proper gray scale rendition. A connector on the bottom of the camera allows use of an external viewfinder monitor if desired. An external viewfinder is practically indispensable whenever those being televised need to observe themselves. A black and white picture monitor which receives its picture from a 59/U cable attached to the camera can be placed on the studio floor for observation by talent "on camera."

The three video signals are also fed to the red, green and blue inputs of the self-contained encoder circuit board. The encoder combines the signals in terms of the NTSC compatible color signal. A connector on the camera provides a source-terminated NTSC video color signal for feed to any color CATV program line.

Two other circuit boards in the camera generate and control the horizontal and vertical sweep currents required to scan the electron beams in the pickup tubes, and produce the various regulated voltages and currents required by the entire camera. The sweep board contains a built-in synchronizing generator and source of burst flag.

If desired, a fully EIA (RS-170) synchronizing generator can be plugged into the camera thus protecting the camera from becoming obsolete should the Federal Communications Commission decide in the future to require CATV to adopt full broadcast signal standards.

In its CATV self-contained form, the IVC-100 operates from its own 2 to 1 interlaced integrated circuit synchronizing generator. This generator has a 31.47 KHz crystal oscillator from which the horizontal and vertical drives and ultimately mixed blanking and mixed sync are derived. The generator also forms the burst flag required by the built-in encoder. Please note that black and white cameras require all of these signals except burst flag.

The encoder, contained on a double sided PC board measuring 6" by 7", uses proprietary circuit techniques for stability and simplicity. Encoding is accomplished on the R-Y and B-Y axes with equal bandwidths. A crystal oscillator operating at 3.58 MHz is contained on the encoder circuit board and is used for derivation of the color burst on the horizontal "back-porch" and for the color information.

For simplicity, the 3.59 MHz oscillator is not directly related to the synchronizing generator and therefore the signal from the basic camera does not have frequency interlace (color lock). However, the camera in this form provides color pictures which are indistinguishable from those obtained from the standard FCC waveform.

With the addition of the optional self-contained FCC synchronizing generator, the camera has frequency interlace and equalizing pulses in the vertical interval and meets all FCC broadcast requirements. The FCC synchronizing generator is unique in that its time base stability (subcarrier with respect to horizontal drive) is in the order of 8 to 10 nanoseconds, compared to typical figures of 30 to 80 nanoseconds, a substantial improvement over previous designs.

The "electronics door" (see Figure 2) on the left side of the unit containing the registration controls, swings out 90° from its storage position, allowing the operator to touch up minor adjustments without leaving his normal viewing position at the viewfinder monitor screen.

When the camera is to be used in a more complex studio the internal encoder board is normally removed. A switch in the "electronics door" is thrown to the *external sync gen* position, readying the camera for operation from the studio master synchronizing generator. This allows switching and fading among several cameras without loss of synchronization. A second switch is placed in the *external encoder* position, making provision to operate the camera from an external broadcast type encoder.

In the studio application under discussion, a 50 conductor studio cable replaces the CATV power cord and coaxial line. The cable, which can be up to 1000 feet long, terminates in a studio junction box, normally rack mounted.

The junction box for use in studio systems contains all facilities to interconnect the camera to its remote control panel, to external sync generators and encoders, to the 117 VAC power source, and to the color recorder control cir-

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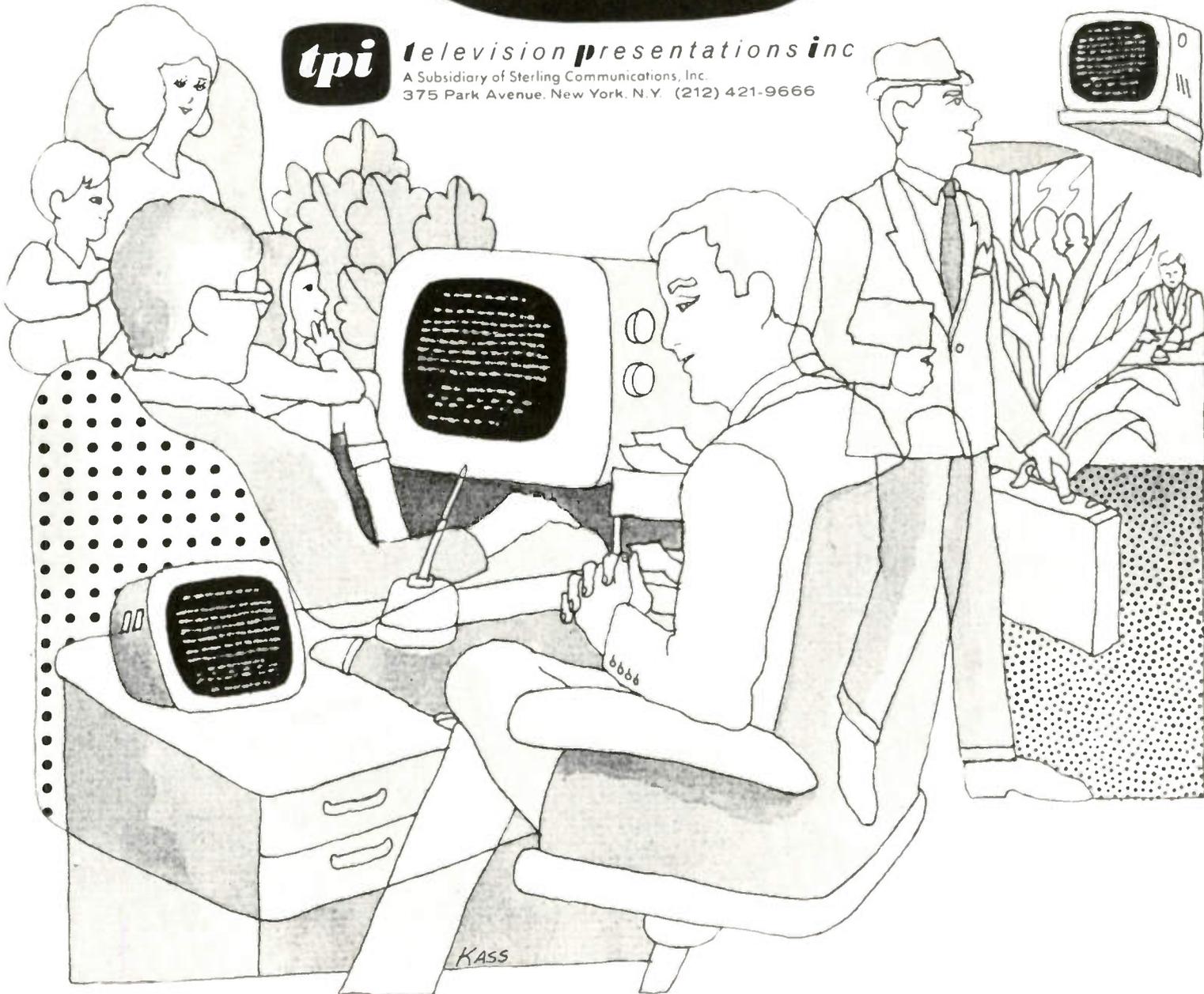
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cuits. Additionally, in multiple camera installations, the tally light and intercom circuits are interconnected through a barrier strip on the junction box.

Camera Setup

Figure 3 shows the ease of adjustment of the IVC-100 camera. All the equipment required (an IVC level setting chart and an oscilloscope) appears in the photograph. This is essentially the same equipment required to properly set levels from a black and white camera.

The chart is hung on the wall or set on a rack in the lighted area to be viewed by the camera. The red, green, and blue video signals are observed on the oscilloscope in turn and adjusted for equal signal outputs. A fast check of this relatively simple adjustment is to view the picture from the camera on a color monitor or receiver. If the red, green, and blue levels are indeed equal, whites in the scene will appear white and blacks will be black.

In addition to the daily checking of signal levels as above, the registration of the three color signals should be "touched up" if required.

The procedure for registration check is most interesting and is usually considered to be a very complicated job. The object of registration is to adjust the sizes and positions of the red, green, and blue pictures so all three are exactly superimposed, forming one color picture. When one of the colors is misregistered, the effect is the same as occasionally observed in the Sunday comics when one of the colors is slightly misplaced.

With the IVC-100 a registration chart as shown in

Figure 4 is viewed by the camera. A special switching arrangement allows electronic superimposition of red over green or blue over green on the camera viewfinder monitor. If either red or blue is not perfectly superimposed on green, the images of the chart will appear out of register. It is easy to adjust the vertical or horizontal centering controls for perfect overlay. Once adjusted, registration will hold for 12 to 24 hours or longer.

Color Recorder Technical Description

The International Video Model IVC-800 video recorder/reproducer is a professional recorder with standard NTSC color capability. It is compact, portable, and fully transistorized, designed for use in CATV local originations and other television applications. It records and plays back NTSC color signals without pilot signals or high banding and can be used with any 60 field system. The composite video input can be from any standard source such as monochrome or color cameras using either EIA or industrial synchronization or from off-the-air receivers. The IVC-800 will record one hour of color or black and white video and audio signals on a single 8-inch reel of 1-inch tape, with a horizontal resolution in excess of 400 lines.

The frequency range required to give good video recordings extends from a few cycles per second to several million. In order to record such a range of frequencies, a high head-to-tape speed (or writing speed) must be available. The high writing speed is obtained by

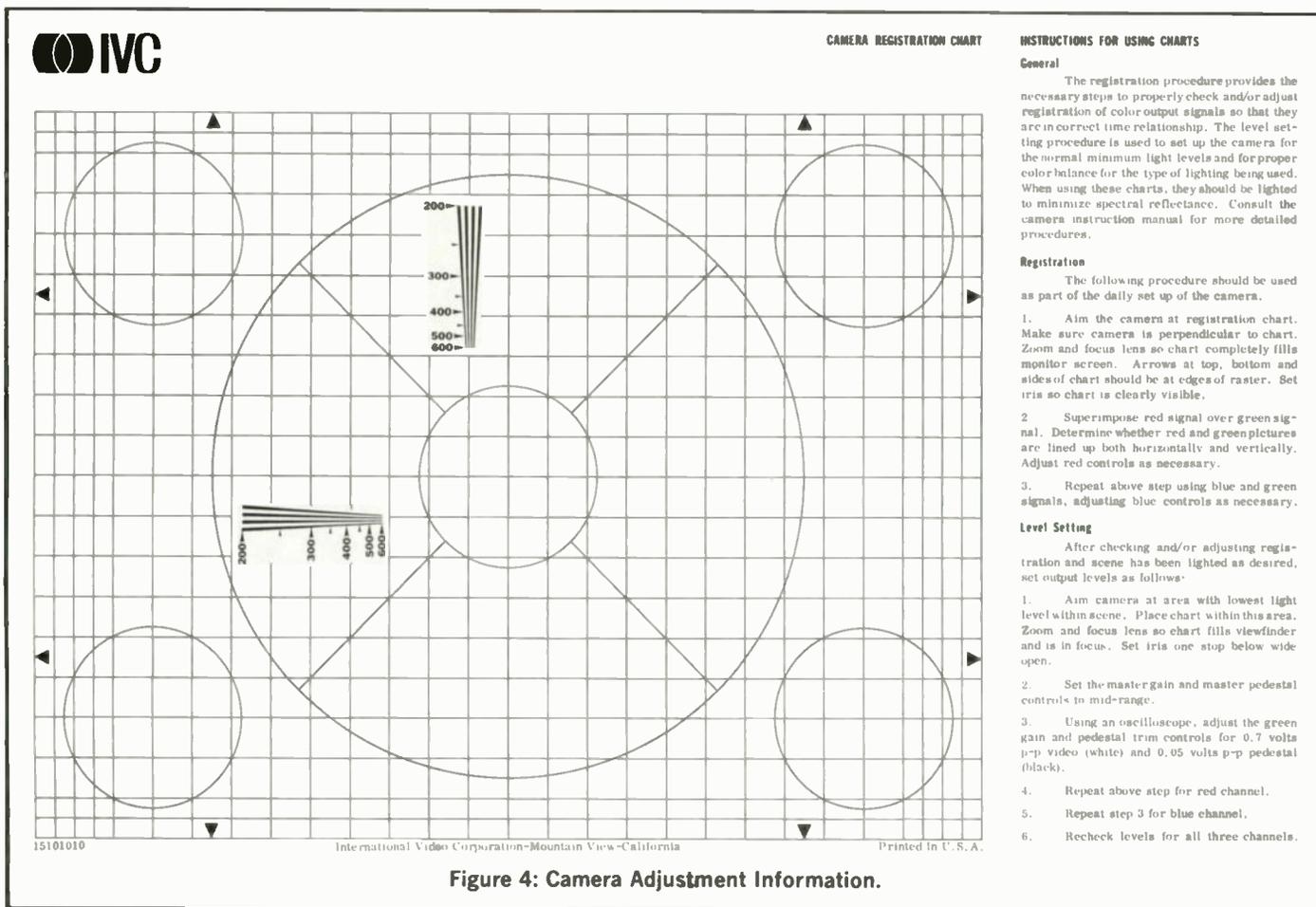


Figure 4: Camera Adjustment Information.



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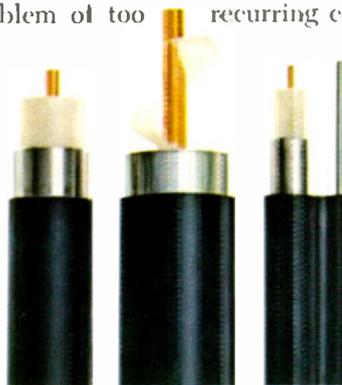
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loss characteristic in the industry (32 dB worst point from 5 to 220 megahertz).

In regards to costs, SPIRAFIL II costs even less than foam cable in some instances. For example, you can use 1/2" SPIRAFIL II in place of 3/4" foam (attenuation is about the same for both) and save about 20% on cable costs. Pressurization is a non-recurring cost that averages only \$30 per mile.

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mounting the video head on a disc and rotating it at a speed of 3600 rpm. The tape is wrapped around a drum at a 4.8° helix and moved longitudinally at a speed of only 6.91 inches per second. The tape movement and head rotation give a video recording speed of approximately 723 inches per second. A control signal is recorded on the lower edge of the tape and is used to assure proper synchronization of the video head during playback. The main audio signal (Audio 1) is recorded on the upper edge of the tape. A cueing track (Audio 2) is recorded next to the control track and can be recorded after the initial video recording if desired.

The tape wrap around the scanning assembly is 360 degrees, forming a closed collar around the assembly. Each rotation of the video head records one video field, including the vertical sync pulse. This wrap also makes

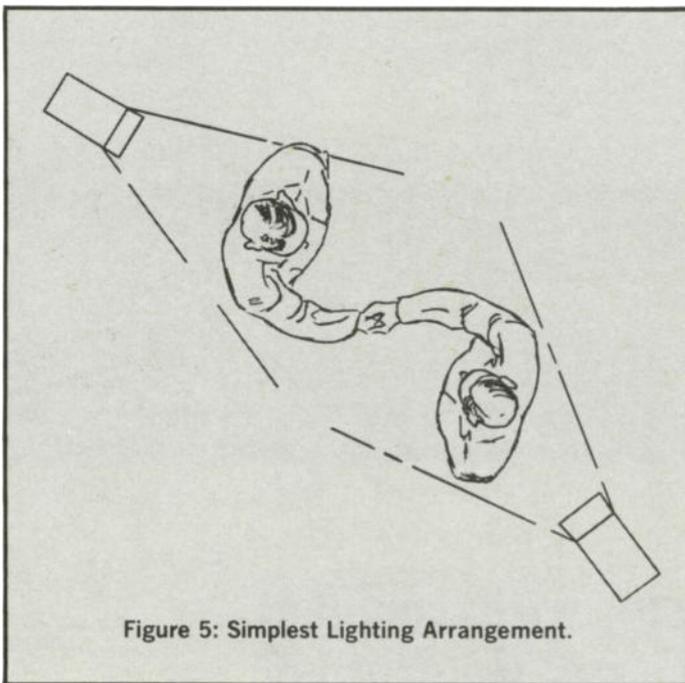


Figure 5: Simplest Lighting Arrangement.

it possible to create an air-lubricating film between the tape and the scanning assembly, virtually eliminating friction, and minimizing the effects of changing temperature and humidity on tape movement.

The IVC-800 uses a single, plug-in video head, eliminating head alignment and matching problems and resulting in freedom from the problems of color hue shift and banding common to multi-head recorders.

Use of solid-state components makes the equipment light and mobile. Stop motion is provided as a standard feature, allowing the user to momentarily stop the program material being played back on one particular field of his choice. A separate Stop Motion control is provided for this purpose.

Of interest to the CATV cablecaster is the freedom from routine adjustment with the IVC-800 recorder. Much simpler in routine use than the camera, it requires only an occasional cleaning of the video and audio recording heads, a simple task. The fixed heads are cleaned using a cotton swab moistened with a solvent such as xylene. The rotating video head is carefully

cleansed using a lint-free cloth and xylene solvent. No other routine maintenance is required for the recorder.

Using The Color VTR

Thread the tape and push the play or record button. The recorder is ready to play back or record new material either in color or black and white. Separate high-torque turntable motors permit fast forward and rewind; 90 seconds maximum in either direction. A front-panel timer allows rapid location of program material within a reel of tape.

If desired, the recorder will operate either in its case or vertically in a 19-inch relay rack. Because all control functions are relay actuated, the recorder can be operated from a control console or other remote control point. Because of its low weight of 57 pounds, the IVC-800 series recorder is readily used in the field or in a remote van.

Technical Support Requirements

A single color camera, one color tape recorder, and a color monitor, comprising the simplest complete color system, can be operated and maintained by existing technical personnel in most CATV operations. The equipment required for routine maintenance and adjustment is found in all CATV service shops; a 20,000 ohm-per-volt meter, and an oscilloscope. In addition some television test charts of insignificant cost are needed. If the budget is not too restricted, a few additional items will make life a bit easier. Accordingly, the equipment recommended for a one camera, one recorder system is as follows:

1. Color monitor, IVC model M19.
2. Vacuum tube voltmeter, RCA model WV-986.
3. Wide-band oscilloscope, Tektronix model 545 or 535 with 1A1 preamp, or Tektronix model 422, or Hewlett-Packard model 140A with 1402A and 1421A plug-in units, or Tektronix, model 529, or Ball Brothers, model Mark 21.
4. Light meter, Gossen Luna-Pro.
5. Registration and resolution test charts, IVC 15101010, or EIA 18" x 24" opaques.
6. Color bar generator, Telemeasurements Model 3518-131, or Riker, model 552-1.
7. Color monitor demagnetizer, Allied Radio cat. no. 11C 1613.

The lighting equipment required for a small, one-camera studio is as shown in Figure 5 and costs less than \$100. Of course, a third light, mounted above the subjects and tilted down at about a 45° angle (top lighting), would improve the picture at slight additional cost.

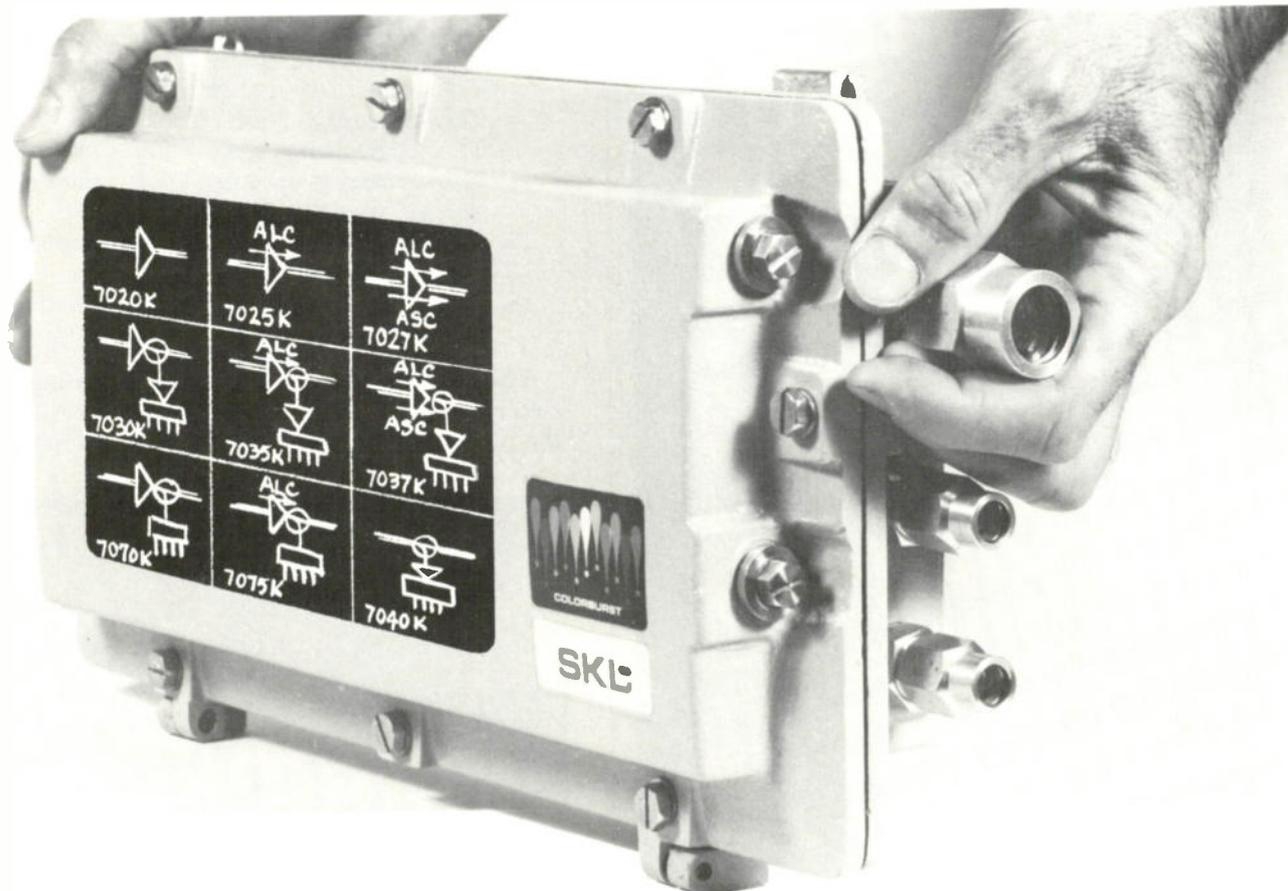
A More Complex Studio

For those cablecasters willing to take on a moderate engineering burden in caring for a system of moderate complexity, the following test equipment is indicated:

1. Color monitor, Miratel model MCR-15.
2. Wide-band oscilloscope, Tektronix model 422.
3. Vectorscope, Tektronix model 526.

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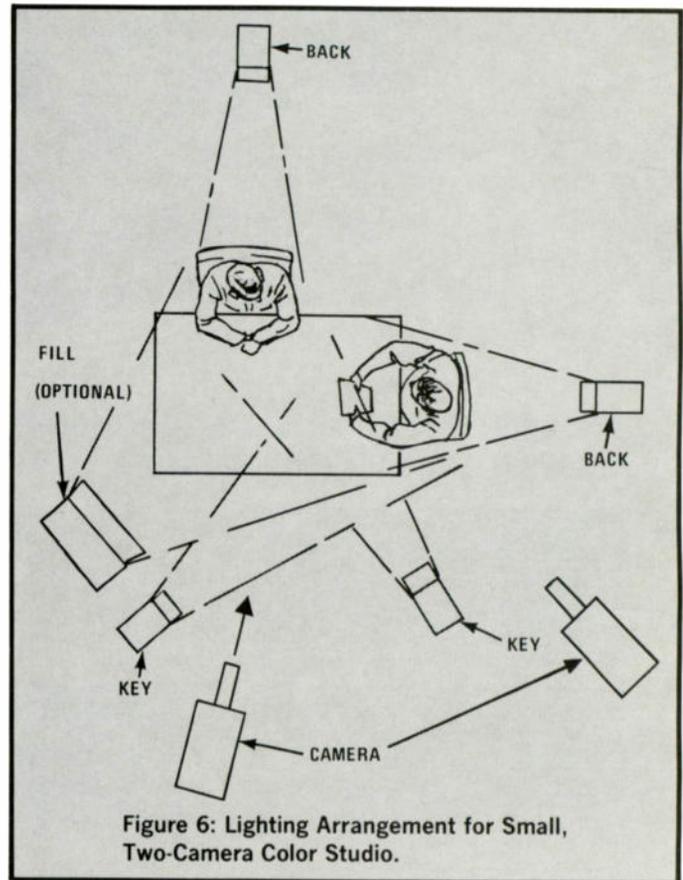


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4. Color Sync Generator, TeleMation, model SG-2000.
5. Color Bar Generator, Telemeasurements, model 3518 or Riker, model 552-1.
6. Test signal generator, Riker, model 6601.
7. Vacuum tube voltmeter, RCA, model WV-98-C.
8. Light meter, Gossen, Luna-pro.
9. Light box, D-vel labs.
10. Test pattern transparencies,
EIA Resolution chart
EIA Registration chart
EIA Linearity chart
EIA Logarithmic gray scale
11. Video sweep generator, Allen, model 960/100 GM or Kay, model 154C.
12. Signal generator, Hewlett-Packard, model 651B.
13. Frequency counter.
14. Color monitor demagnetizer, Allied Radio, cat. no. 11C1613.

Figure 6 shows a typical lighting arrangement for a two camera studio in a space approximately 10' x 15'. By placing the lights further back from the subjects,



enough illumination is available for a multiple interview situation involving three or four people. By adding another fill light and additional key lights, larger groups can be televised.

It should be apparent from the foregoing, that with the modern, simplified color equipment now available, color cablecasting is no more difficult and only slightly more costly than doing a good job with black and white cameras.

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CATV Industry Profile...

Superior Continental Corporation

An inspection of the operations and philosophies of one of the leading CATV cable producers makes plain the growing sophistication of our industry, and explains the continued expansion of that firm.

An interest in the recently completed coaxial cable plant at Sherills Ford was the occasion for a TVC visit to Superior Continental facilities. But some unique marketing concepts, along with an unusual emphasis on engineering and testing, proved equally impressive to the writer.

The spirit of growth which dominates Superior Continental Corporation seems to contrast the quiet Hickory, North Carolina, environment, an area long dominated by furniture and textile industries. Nestled in the heavily wooded hills, next to a small lake, the half mile long coaxial cable plant of Superior Continental stands as a symbol of man's dominance over nature. Copper, aluminum and plastics from the earth meet in this shining new facility.

Here at Sherills Ford, specialized men and specialized tools are dedicated solely and exclusively to the production of coaxial cables. From raw materials to completed cables, strict controls are applied, in keeping

with the necessary requirements for producing low-loss coax that will meet CATV standards up to 300 MHz.

The new coaxial cable plant is the latest expansion move of the 14-year old company. Prior to its acquisition by Continental Telephone Corporation in 1967, Superior had passed the \$25 million mark with five separate plants located in North Carolina, Texas and Iowa. Shortly after the combination with Continental, Superior opened a new Research and Engineering Center at Hickory where extensive mechanical, electronic and environmental testing of coaxial cable materials is conducted.

A large library, chemical laboratory and printing facilities lend an almost academic atmosphere to the industrial research and development operation. The sincerity of the scientific exploration and product perfection is reflected by company management. "We've worked hard to sell a product based on long term performance for the user, rather than compete on a lowest



(Left photo) Warner T. Smith (center) discusses growing cable sales with James M. Bowman (l.) vice president, marketing and Benjamin W. Hughes, RF product manager. (Right photo) Coy Isenhour at extruder puts poly jacket on 3/4" Alumgard.

first cost basis," says Warner T. Smith, executive vice president. "For the past several years we have been interested in seeing some performance standards for cable," he added, "and with the leadership of NCTA and the cooperation of the reputable manufacturers, we are finally seeing progress in that direction."

Smith was recently promoted from vice president for research and engineering by company president James L. Robb. Having been named a vice president of Continental Telephone, Robb spends much of his time at the corporate headquarters in St. Louis, with Smith in charge of the Superior complex.

Superior Cable has occupied a major position in the television coaxial cable business for several years. Marketing vice president James H. Bowman explains it this way: "A basic reason for our consistent growth in sales to the CATV market has been our willingness to guarantee our products. This has paid off as the industry has steadily become more sophisticated—particularly during the last 12 months." Benjamin W. Hughes, RF product manager, is equally enthusiastic about cable television prospects. "We are highly encouraged by this more mature and more knowledgeable market. It makes our sales and servicing functions much easier than has been the case in previous years."

Smith obviously feels that his company has fought an uphill battle to relate a healthy sales curve to honest manufacturing and performance standards. "The cable operator is entitled to the opportunity to buy a cable based on uniform performance standards and method of measurement," he declared.

"We have tried to be conservative in our promises; to make doubly sure that we earn the confidence of the cable operators," Hughes observed. "We meet electronic specifications and delivery schedules. And we try hard to solve the problems that inevitably come up," he added.

Sees Underground Trend

We discussed the future of the cable television business and Superior Continental's future plans with Warner Smith; we asked where the primary emphasis will be so far as CATV cables are concerned. His answer, in a word, "underground." Cable television, in his opinion, will follow the pattern set by telephone and power utilities. "We see buried plant as being very important in the future," he emphasized. He cited the history of successful underground operation by telephone companies in pointing out that long term operating savings more than offset initial cost of buried construction.

From a briefing on concepts, philosophies and plans, the TVC inspection turned into a protracted facilities tour. A pleasant 25 minute drive from the executive offices we reached the Sherills Ford plant. The site chosen for the coaxial cable facility is close enough to Hickory for convenience—but far enough from the urban area to permit unlimited expansion. The enormity of the cable plant belies the relatively small staff required to operate the modern, highly automated production machines.

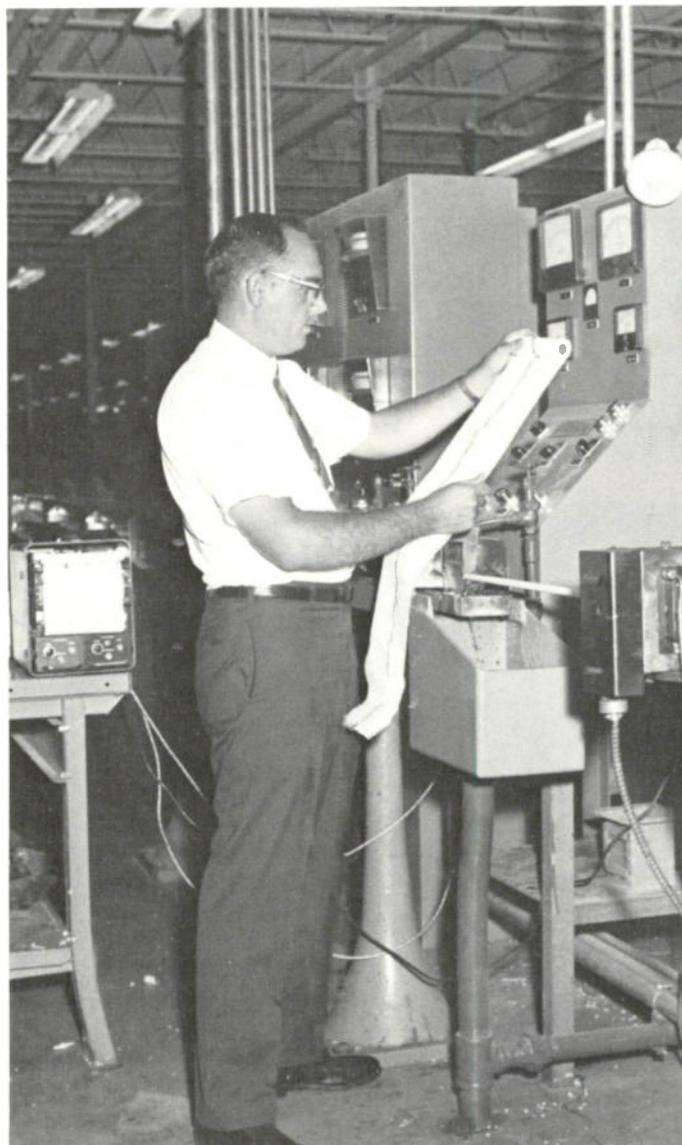
Alan Oxford, plant manager, explains that only a few dozen men are required to turn out the variety of CATV coax which ranges from drop cable to one-inch trunk

cable. Most of the actual research and development work and all of the marketing effort is supplied by the headquarters staff.

Expansion Already Underway

Walking through the cable plant, two facts become apparent. First, the production capability of the new Superior Continental cable operation is impressive. But the steady outflow in filling orders has prevented the build-up of even a moderate warehouse inventory, in spite of around-the-clock plant operation. Oxford explains that an expansion of the extruder facilities is currently underway in order to keep pace with demand and create the desired inventory levels.

It is obvious from the attitude of the production folks at Sherills Ford, as well as the marketing and management echelons back at home base, that a great deal of attention is paid to meeting customers' requirements



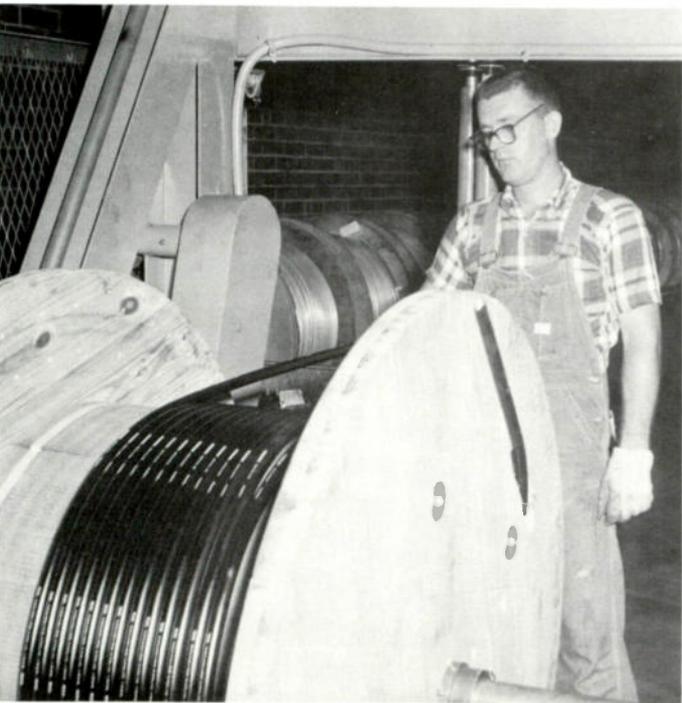
J. Allen Oxford, cable plant manager, examines chart recording of diameter and capacitance from continuous monitoring as core is extruded. Polyethylene foam is extruded around the pre-heated copper center conductor. From this point, core passes through series of cooling troughs to take-up equipment.

for both product performance and delivery dates. It would probably be accurate to say that from its inception Superior Cable—and now Superior Continental—is a customer-oriented company.

Walter L. Roberts, who directs research and engineering, explains that “the Superior management and marketing concept requires the support of each sales engineer in the field by a specific engineering group.” When a sales or engineering assignment dictates, assistance is provided by specific production executives



Meeting in the Research and Engineering Center library are (l. to r.) John J. Wardell, corporate advertising manager; Walter L. Roberts, director of research and engineering; Lawson J. Styles, vice president, manufacturing; and Benjamin W. Hughes.



Charles Bolick guides first traverse of 3/4" Alumagard onto 2000 ft. reel. Cable on reels in background will receive the same jacketing. Flame treating sets sequential footage and identification markings.

whose regular responsibilities include “close tactical support” of sales engineering people.

Engineering services offered

One arm of the Superior operation that has become increasingly well known to cable television operators is Comm/Scope, which provides systems engineering, planning and construction services. Probably the main reason for the success of Comm/Scope is its vice president and general manager, Vern L. Coolidge. Having begun his CATV career in 1952 in Williamsport, Pennsylvania, Coolidge has been involved in the planning and construction of some of the largest cable systems in the country.

Several engineers and technical specialists provide the capability to carry out Comm/Scope's continuously scheduled projects. These include every facet from the basic consideration of feasibility to signal survey, strand mapping, design and finally system construction. Coolidge also calls on his consulting background to provide system testing and analysis with complete test reports supplied to customers.

Another basic, if not unique, facet of Superior's approach to the CATV market is regular contact with individual system operators. Ben Hughes supervises the Superior field sales effort in CATV, covering the entire U.S. in his travels. That Superior executives such as Hughes are highly mobile may be partly explained by the company's ownership of two Lear Jets, plus two other corporate aircraft. The fact that Ben has been so active in his attendance of state and regional CATV association meetings probably contributed to his recent election by the NCTA associate members as their official representative on the Association board of directors.

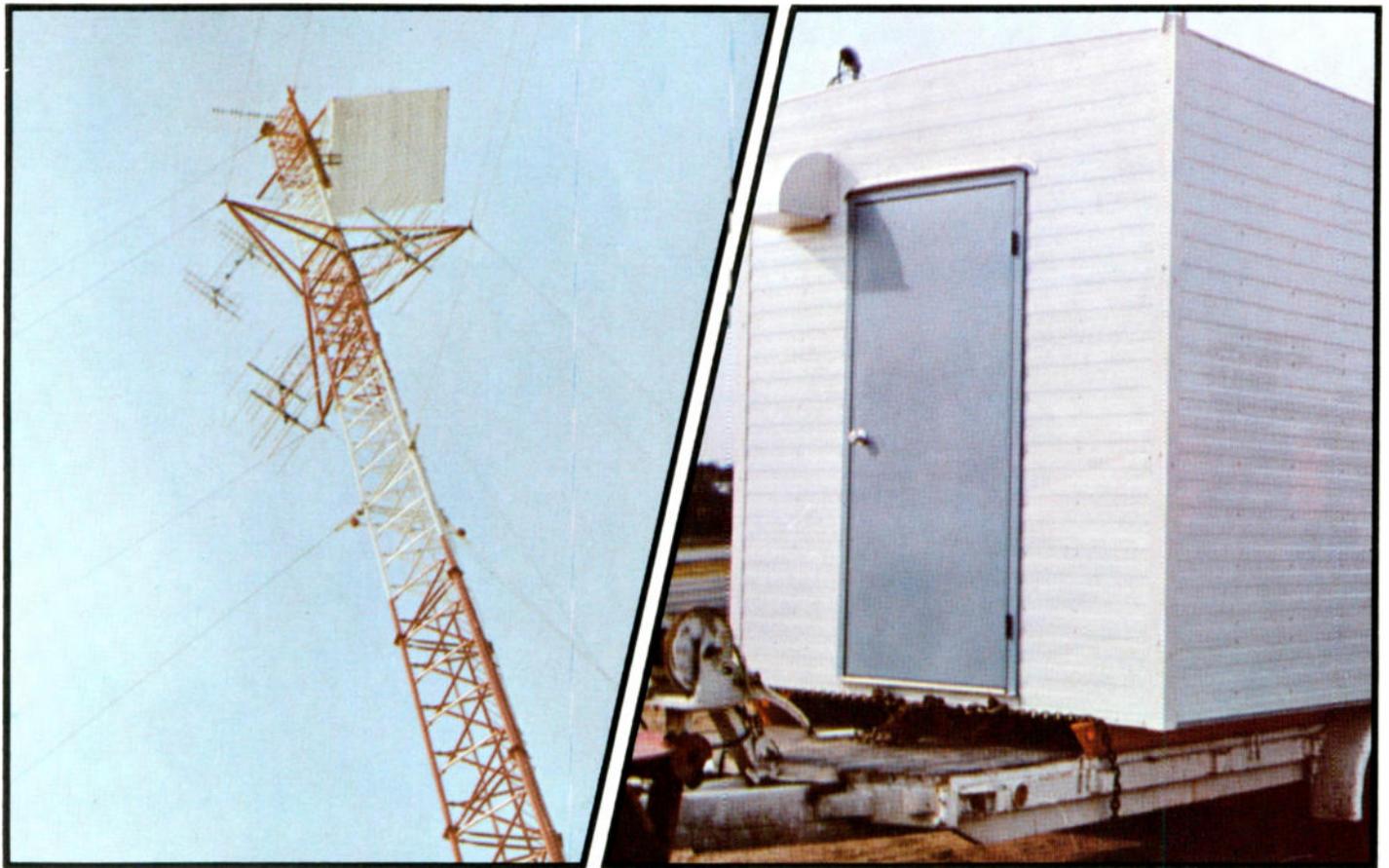
Characterized by energetic men and fast growth Superior Continental adds its growth story to the success story of the cable television industry. Basic engineering undoubtedly was the framework upon which Superior's aggressive marketing has been built. Jim Robb, who joined the company at its inception, is an engineering graduate of George Washington University and former Assistant Chief Engineer for the Rural Electrification Administration in Washington, D.C.

Spirit and high goals

Warner Smith holds an electrical engineering degree from the University of Maryland. He began his communications career in 1938 as an engineer with the REA where he became assistant chief of staff engineering, telephone engineering division. He joined Superior in 1960, as chief engineer. When Robb stepped into his broader role with the parent company, Smith assumed top management responsibilities.

An engineer with his feet on the ground, Warner T. Smith has some definite ideas about meeting the growing needs of the cable television business. “Long term performance. . . uniform standards and measurement methods. . . strong leadership in discovering new techniques for longer life and lower cost plant.” These are some of his ideas. And it seems apparent that the entire organization reflects the spirit and the high goals of the executive vice president.

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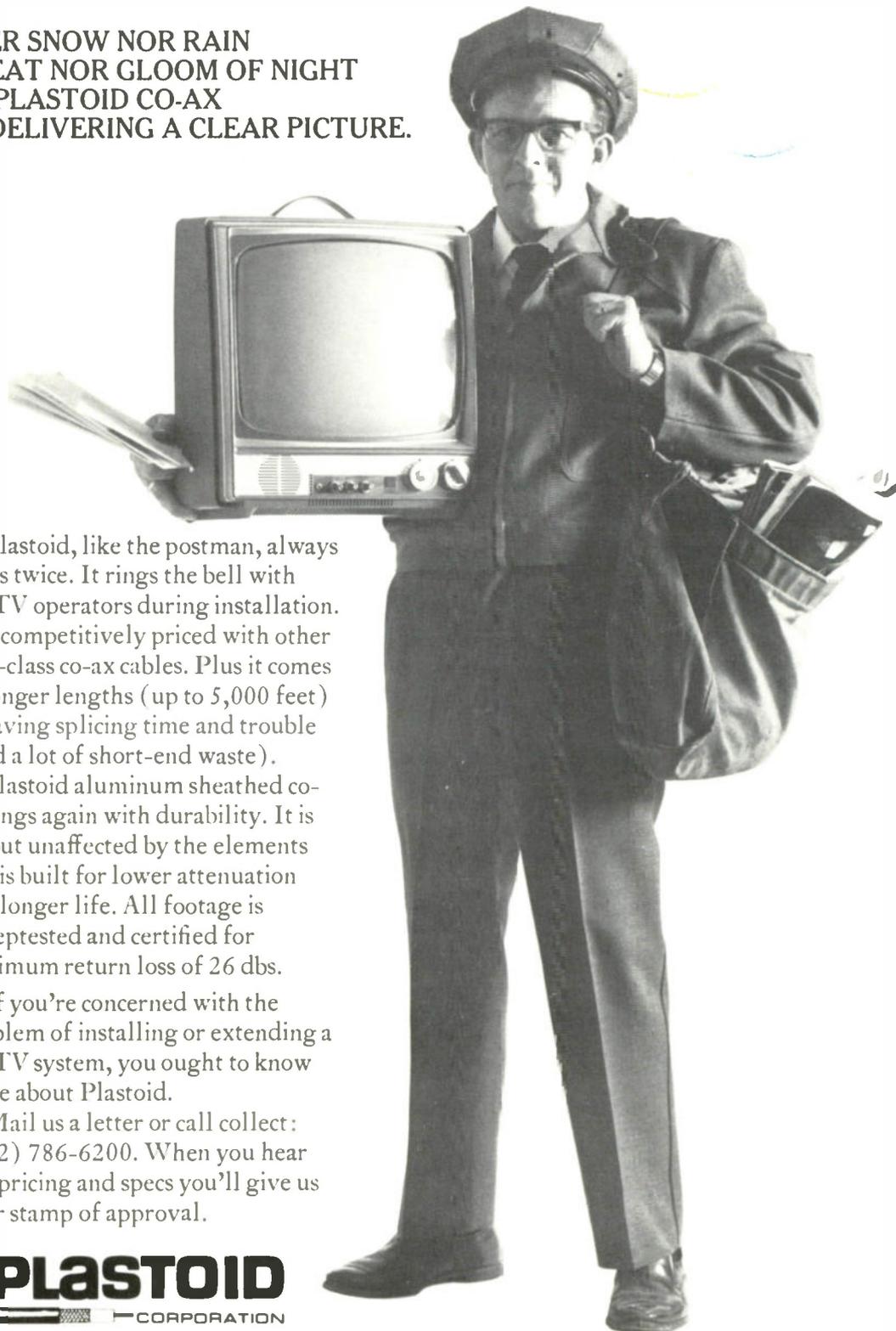
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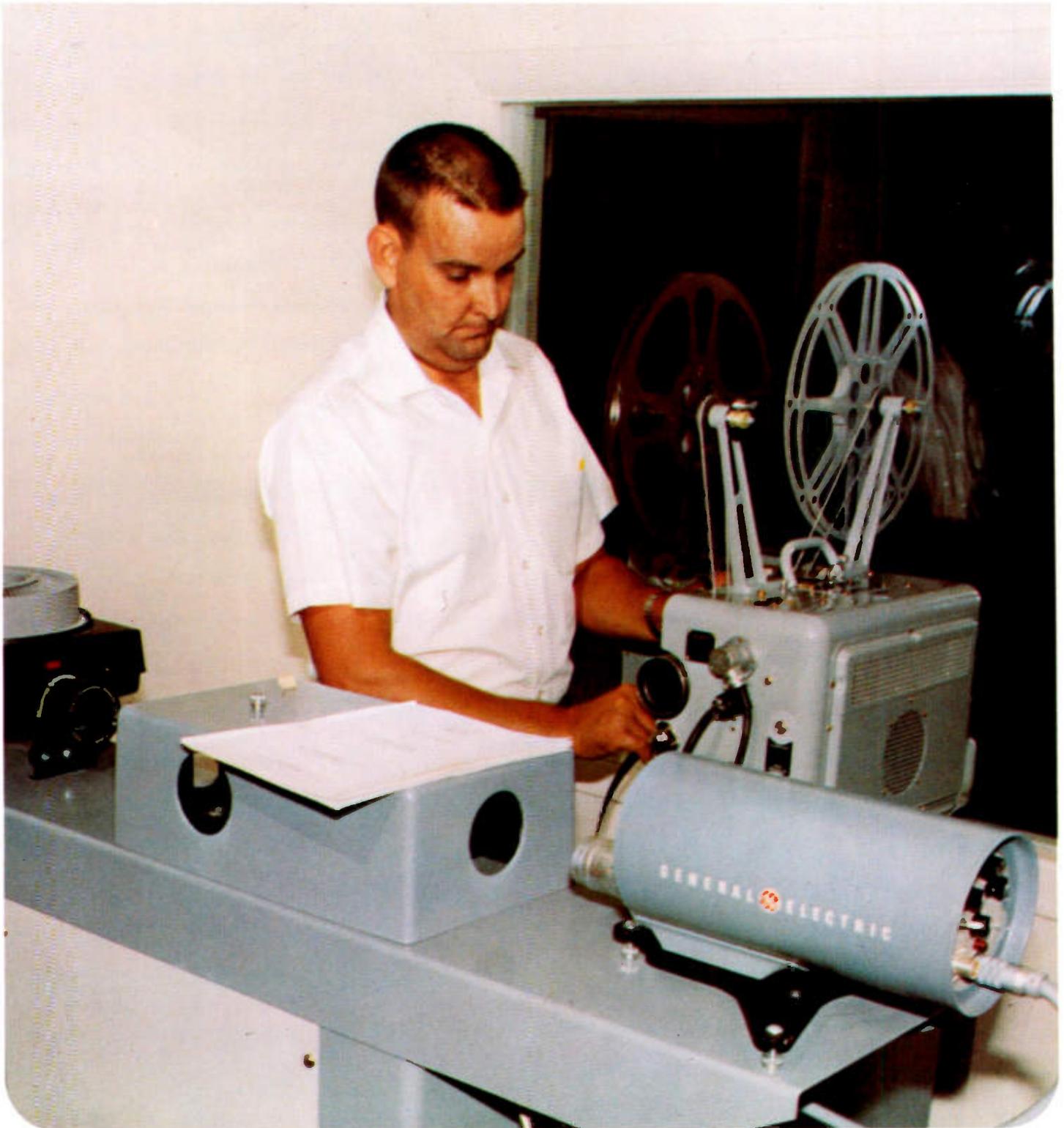
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TV Communications

CATV Technician



Jim Neese, ComTronics Cable TV Chief Engineer, readies TeleMation film chain for cablecast on the Grand Junction, Colorado system.

Camera Maintenance • Two-way Transmission • Relating System and Equipment Specs

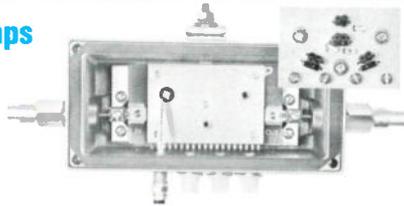
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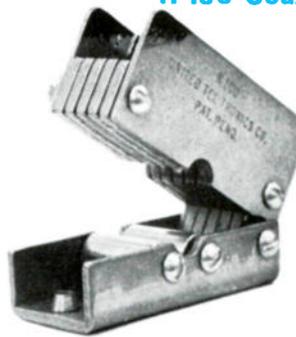
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Care and Maintenance of Television Cameras

As more and more CATV systems undertake some form of local programming, their technicians will assume many of the operating and maintenance duties in the studio, and will need data such as the following.

*By Tom J. Cunningham
Eastern Regional Manager
Concord Communications Systems*

The most important component in any camera is, of course, the camera tube. It is this device that converts the light energy of an optical image to an electrical signal that may be amplified and put into a form that will reproduce that optical image on the screen of a kinescope. Of the many types that have been developed, those that have found the widest use are the Image Orthicon, Vidicon, and more recently the Plumbicon.

It is the Vidicon Camera towards which we will direct our attention since it is more apt to be encountered in CATV applications. However, most of the same precautions and maintenance procedures apply equally to all other types.

The camera tube is an evacuated glass cylinder with a photo-sensitive surface at one end and electrical connecting pins at the other. Being a vacuum tube, it is subject to the familiar problems of breakage, heater burn-out, microphonics, diminishing cathode emission, etc. However additional problems are introduced because of the delicate photo-electronic target that is the basic signal-producing part of the device. It can be damaged permanently in any of three ways: optically, physically, or electrically.

The most common optical abuse to which the camera tube is subjected is the accidental exposure to direct sunlight, or the prolonged focusing on bright artificial lights. The former will almost instantly destroy that part of the target that

receives the sun's image, and the latter will impress upon the target a semi-permanent image of the brightest portions of the scene. Therefore it is mandatory that careful consideration be given to what the camera is going to "see" before the lens is uncapped. A good rule to follow is: always cap the lens whenever a camera is left unattended. A temporary alternative is to turn the camera toward a blank wall or a background with no sharp contrasts when it is to be left for only a short time. It is to be noted that the above action takes place regardless of whether electrical power is applied to the camera or not. Many camera tubes have had to be replaced because an operator assumed that turning off the power was the final step in the shut-down procedure. "Burned in" images, if not too severe, can often be eliminated by focusing the camera on a brightly illuminated white background for an extended time.

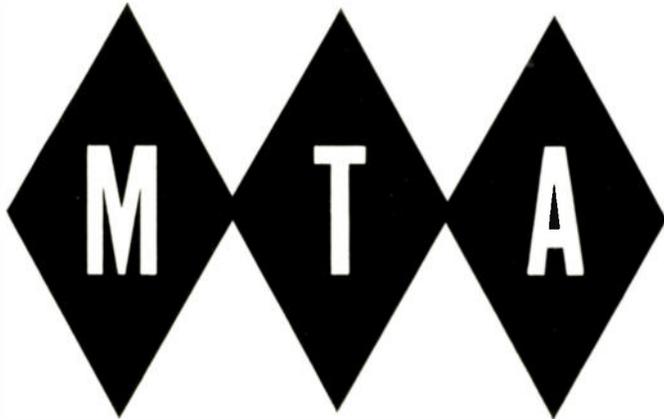
The modern TV camera will give good performance within a wide range of physical parameters. There is one frequently encountered physical enemy of the camera tube that bears mention, however, and that is vibration. Great care is used in the manufacturing process to eliminate the possibility of stray particles inside the tube. But during the course of normal use, some dislodging of tramp material or bits of the cathode is inevitable. If these particles are allowed to fall upon the target, a permanent spot occurs and an unblemished image is

no longer possible. The camera tube should, therefore, always be shipped or transported with the photo-sensitive surface *up*. In applications calling for installation near sources of continuous and severe vibration, it is well worth considering the use of shock mounting to minimize the problem.

The most critical electrical considerations, at least those that must be maintained in correct mode of operation to prevent damage to the camera tube, are deflection circuits. The loss of either horizontal or vertical scan can in a short period of time permanently damage the target. Those cameras that have "driven" deflection circuits; i.e., circuits that depend on incoming horizontal and vertical pulses from which to develop current in the deflection yoke, usually have scan failure protection circuits. Basically, these act to bring the beam voltage below cut off in the event of the loss of current in the deflection yoke. Certainly these circuits must be periodically checked to assure their immediate response to malfunction. We see then an important hint in the servicing of television cameras—disconnect the camera tube when servicing a camera except where the camera tube is involved and you have ascertained that deflection current is present.

The performance specifications of any television camera can be adversely affected by misadjustment of the following:

(1) Beam and target voltage settings



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(2) Linearity and deflection controls

(3) Video amplifier frequency response

(4) Electrostatic and magnetic focus adjustments

(5) Optical focus and iris setting

The proper settings of beam and target controls are probably the most misunderstood and most frequently misadjusted of all the adjustments on the camera. In general the lowest beam current and target voltage settings that will give a video signal of the proper amplitude and signal-to-noise ratio are those to be desired. One phenomenon to be prepared for in the adjustment of beam and electrostatic focus is a condition called "beam flutter." This occurs at or near the point where perfect electrical focus is achieved, and shows up as a low frequency flicker in the picture. The only alternative is to adjust focus for the best compromise in resolution without the flicker.

Height, width, and linearity controls are obvious. However the novice is often misled into under-scanning the target which can produce a picture of proper proportions but at the sacrifice of resolution and signal-to-noise ratio. In the absence of the more sophisticated linear optical image simulators, the operator must determine by adjustment that he is utilizing the entire target area. The operator must also be on guard while making linearity adjustments that the reproduction equipment, monitor, is linear. Critical applications call for the use of a grating generator to assure perfect adjustment.

Video amplifier response is adjusted for the maximum resolution and minimum low frequency phase shift, which shows as a streaking of large objects in the picture. Focus adjustments are fairly simple, and it is easy to determine the proper setting.

No attempt will be made to document the circuitry involved in the camera or its maintenance except the caution to check supply voltages and plug-in connections at periodic intervals.

Properly adjusted, the modern TV camera is remarkably trouble free and will give many thousands of hours of excellent performance with minimum maintenance. 



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Two-way Transmission On Your CATV Cable

Techniques for two-way transmission on CATV coax vary considerably in sophistication and equipment cost requirements. The following discussion compares these techniques from the standpoints of application, engineering and equipment.

By Gaylord G. Rogeness
Director, Research & Development
Anaconda Electronics Company

There is no doubt that the same CATV pioneers who envisioned 12 VHF channels and then 20 and more channels on the cable system have also considered the possibilities of two-way transmission on the cable. Rather than speculate on the many applications of the total communication system on which a number of

articles and presentations have been written, this article shall cover the general methods required to provide two-way transmission on the cable.

The frequency spectrum of the coaxial cable in today's system extends from DC (zero frequency) to from 220 to 300 MHz as shown in Figure 1. The cost of cable in the CATV system is $\frac{1}{4}$ to $\frac{1}{3}$ the total cost of the system installation. Yet, there are very wide bands of unused frequencies on the cable. The applications of the unused frequency bands are presently limited to the availability of equipment, and the needs and ingenuity of the cable system operator. The equipment development and availability can be stimulated by the demands of the cable system operator. The equipment necessary to provide two-way transmission can be as simple as using existing am-

plifiers with modified power mode bypasses, filters external to amplifier housings or the more advanced totally integrated amplifier in a single housing efficiently making use of the unused spectrum which is not on the market at this date.

Two-way transmission systems have been in operation for many years. The best examples are those techniques used by the telephone companies for two-way voice transmission. Two techniques utilized to provide two-way voice transmission are the hybrid-type repeater and negative impedance repeater. A third type of two-way transmission system considers the Anaconda Electronics S-6 carrier system which operates on the principle of frequency multiplex. (i.e., transmit at one frequency and receive on a different frequency). The frequency multiplex principle is probably the most di-

ABOUT THE AUTHOR



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

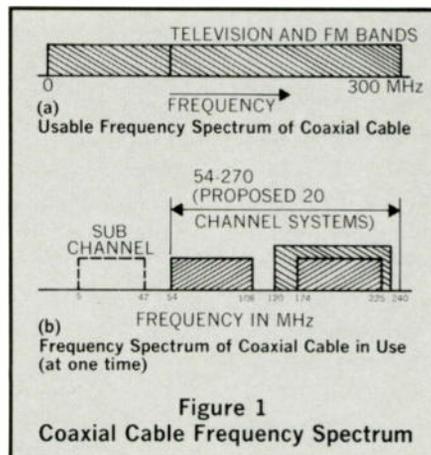


Figure 1
Coaxial Cable Frequency Spectrum

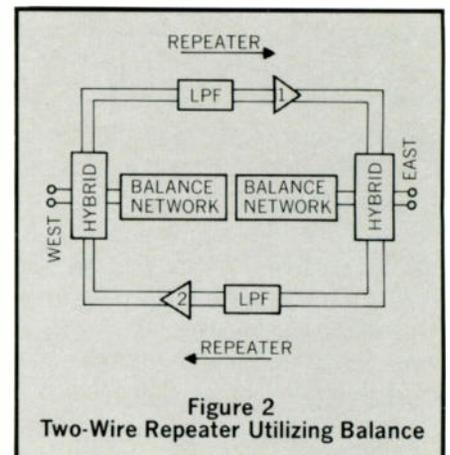


Figure 2
Two-Wire Repeater Utilizing Balance

rect method at this time of obtaining two-way transmission on the CATV cable.

Hybrid-Type Repeater

The hybrid-type repeater block diagram is shown in Figure 2. In order for this repeater to work properly, a high order of balance in the hybrids is required to attenuate energy circulating from an amplifier output to its input by way of the hybrids and the other amplifier of the repeater. Failure to provide adequate attenuation will result in "singing" or oscillation of the circuit. The balance of the hybrids is determined by the degree to which the impedance seen looking into each intermediate section of line matches the impedance of the balancing network connected to the opposite arm. Balance, or high transmission loss, must be maintained not only over the voice-frequency band but out-of-band as well, to keep the loss of the circuit greater than the gain at all frequencies. To reduce the out-of-band balancing problem, low-pass filters are frequently used as shown in Figure 2 to provide high loss above the voice-frequency transmission band. The net loss around a sing-path is generally referred to as the singing margin.

The same paths which can give rise to singing also account for echo returned to the subscriber as he is talking. Thus, singing and echo performance are the controlling factors in setting the repeater gains in most long two-wire voice-frequency circuits.

Negative Impedance Repeater

Voice-frequency amplification on two-wire circuits was available only in the form of hybrid type two-way repeaters until the advent of the E-type negative impedance repeater in 1948. A block diagram of a negative impedance repeater is shown in Figure 3. A negative impedance repeater operates on the principle of inserting negative resistance in the line, thereby reducing the overall impedance and increasing the voice-frequency signal currents. This results in transmission gain in the

same sense as that resulting from a repeater of the conventional type. Repeaters of this type are bilateral, thereby providing amplification for both directions of transmission. They have the additional advantage that, in the event of a tube or transistor failure, transmission along the line is still possible, although at substantially high loss.

The impedance inserted in the line is approximately proportional to, and the negative of, the impedance strapped in the adjustable network associated with the repeater. The repeaters act as negative loss pads. As in any repeated circuit, the amount of negative impedance of "gain" inserted in the line is limited by consideration of such things as circuit singing (oscillations), echo return loss, etc.

Frequency Multiplex

The present CATV systems are frequency multiplex systems. Many independent channels are placed on the cable, each channel defined by a band of frequencies. However, the repeater amplifiers now in use amplify the television and FM signals in one direction only. An example of a two-way frequency multiplex system is shown by the frequency spectrum in Figure 4. The frequency spectrum is divided into a transmit and receive band. Channel one information is transmitted from the Cen-

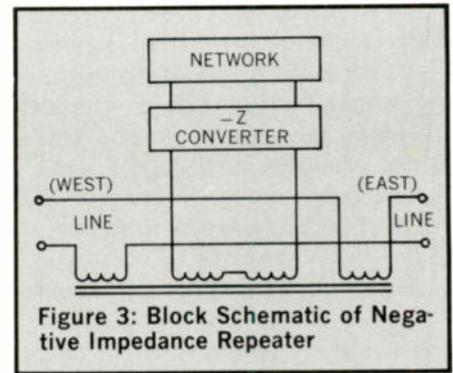


Figure 3: Block Schematic of Negative Impedance Repeater

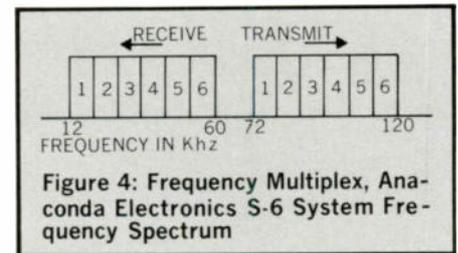


Figure 4: Frequency Multiplex, Anaconda Electronics S-6 System Frequency Spectrum

tral Office in the frequency band from 76 KHz to 116 KHz and received in the frequency band from 16 KHz to 56 KHz. The frequency multiplex approach to two-way transmission on the CATV cable is attractive because of the wide range of unused frequency spectrum on the cable. The next section considers two-way transmission in the CATV system.

Leaving most of the applications of the two-way transmission system to the cable system operator, two shall be mentioned in this section. One application of two-way transmission is the provision for monitoring amplifier performance at a central location by the use of

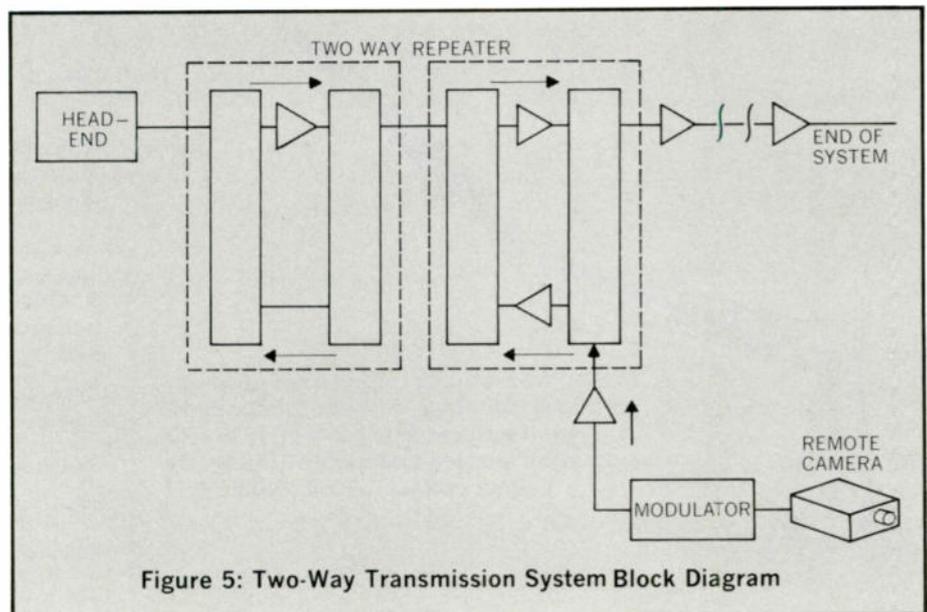


Figure 5: Two-Way Transmission System Block Diagram

a low frequency carrier or carriers. This is a very practical application. A second application, requiring a subcarrier and a channel width to accommodate the video signal is shown in Figure 5.

A remote camera is located at a point of interest in the area served by a CATV system. To allow for distributing the signal to all sub-

scribers on the system, the output of the remote camera modulates an RF carrier, is transmitted in the reverse direction over the cable in a band of frequencies separate from that used for forward transmission, is processed at the head-end site and then placed on the cable in the forward transmission frequency spectrum. A block dia-

gram of the head is shown in Figure 6.

Two-Way CATV Repeater

A block diagram of the two-way CATV repeater is shown in Figure 7.

The transmission direction is defined by the frequency spectrum, so therefore, complementary filters may be utilized to split the forward and reverse transmission channels. Only those frequencies passed by the filter will be amplified. A separate amplifier will then amplify the forward transmission and the reverse transmission channels. The frequencies chosen for reverse transmission may be low enough such that the attenuation of the cable will not require an amplifier.

Realization of this amplifier can be accomplished by connecting two amplifiers, each in separate housings to two complementary filters, or the circuits can be designed to fit in a single housing. An example of the complexity of the complementary filter is given in the next section.

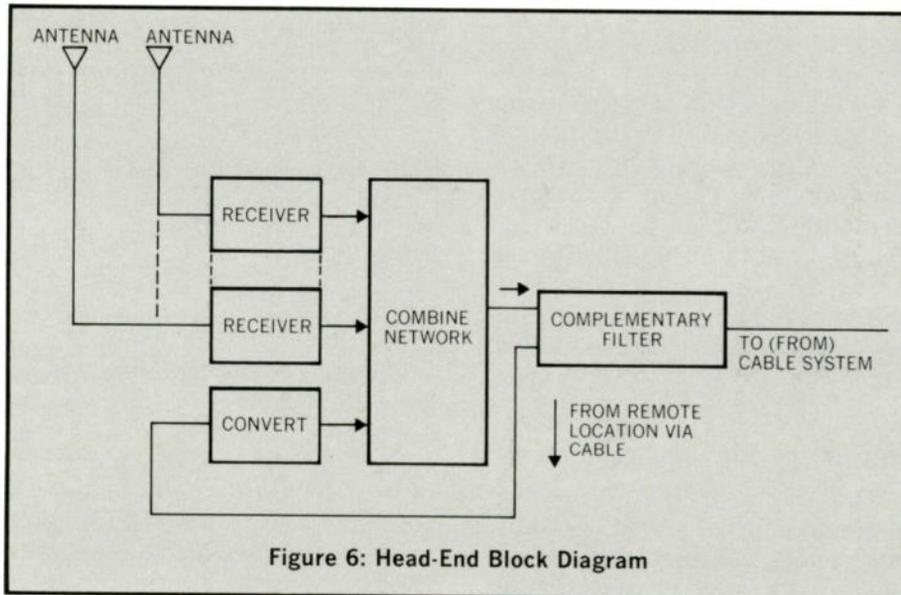


Figure 6: Head-End Block Diagram

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Complementary Filter Design

The schematic of a complementary filter designed to split the frequency at 110 MHz is shown in Figure 8. This filter provides minimum attenuation of 50 dB at frequencies 10% from the cutoff frequency. The filter response of the combined input and output filters is shown in Figure 9.

The advantages of the complementary filter are that it can be designed for minimum transition region and good amplitude response and impedance match in the passbands. By "stacking"

these filters, the frequency spectrum may be divided into many bands without the use of more complicated bandpass filters.

Splitting the frequency spectrum into many bands requires additional amplifiers beyond the one required for forward transmission of the standard VHF channels. In order to accommodate the additional electronics in a reasonable housing, the trend toward micro-miniaturization and hybrid circuits is indicated. The next section will show an example of one of these hybrid amplifiers.

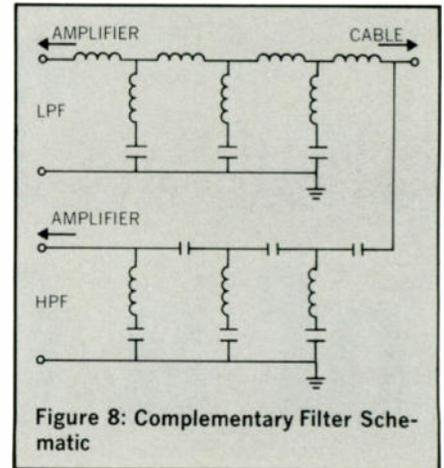


Figure 8: Complementary Filter Schematic

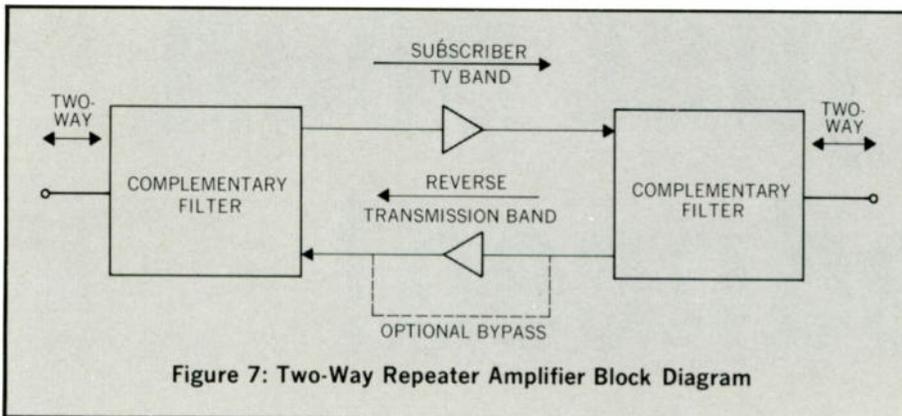


Figure 7: Two-Way Repeater Amplifier Block Diagram

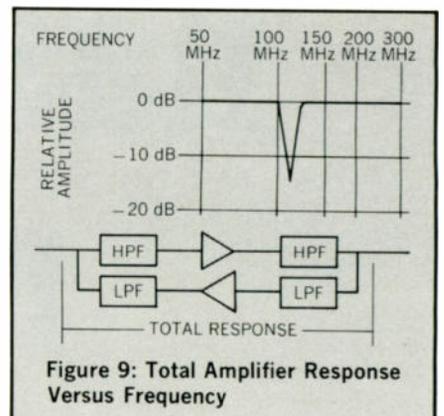


Figure 9: Total Amplifier Response Versus Frequency

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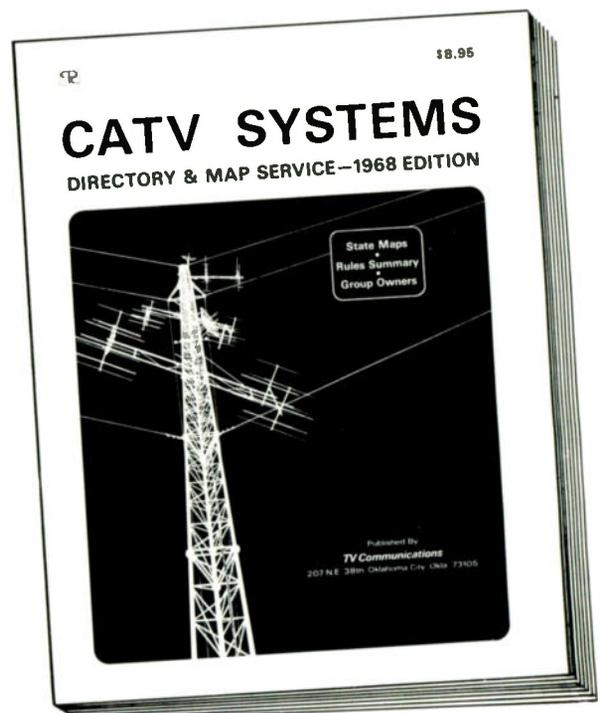
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The GBC viewfinder camera has far more to offer than just small size. Its key circuit functions are contained on plug-in printed circuit boards. Should a problem occur, there's no need to waste time searching for a troublesome part. The circuit board in which there is a problem can be taken out and replaced with a plug-in module in seconds. There's no downtime.

It offers features found in viewfinder cameras costing up to three times its price: built-in binary micro-logic 2:1 interlace sync generator; built-in high definition 5-inch monitor; all latest type integrated circuitry; automatic light compensation over range of 4000:1; composite video and sync switchable to modulated RF; remote rear focus control. VF302SG, \$1375 user list.

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Hybrid Circuit

The requirement for more complete utilization of the coaxial cable frequency spectrum means more electronics to provide the needed amplification in each frequency band. The additional electronics will require either (a) a larger housing, (b) a second housing at various repeater locations or (c) the extensive use of microelectronics in the same housing sizes in use today. One example of microelectronics is the thin-film hybrid circuit shown in Figure 10.

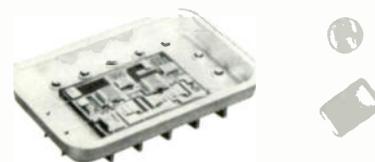


Figure 10: Thin-Film Hybrid Circuit

This particular circuit is capable of providing 20 dB of gain from 10 KHz to 300 MHz with gain flatness of ± 0.5 dB and a noise figure less than 5 dB. This thin-film microcircuit might be considered a building block of the multi-purpose repeater amplifier stations of the total spectrum CATV system. The use of microelectronics circuits such as the one shown here will eliminate the need for multiple housings or prohibitively large housings at a repeater station. These hybrid circuits are not now available in production quantity so the cost is quite high. However, just as the cost of the first RF transistor tried in an early solid-state amplifier a few years ago came down in cost from \$90 during the development phase to less than \$6 when the amplifier was in production, the cost of the hybrid circuit will follow the same pattern.

Two-way transmission on the CATV cable is certainly technically feasible. The frequency multiplex approach to total usage of the cable frequency spectrum is the most attractive at this time. The availability of amplifiers designed specifically to accommodate two-way transmission on the cable may still be a few years away. However, customer demand for a product of this type would shorten this time considerably.





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Relating Equipment Specifications To CATV System Specifications

For maximum system performance, system design and component specifications must be properly coordinated. The following approach to this problem can be used to insure top performance from a well-designed system.

It was not so long ago that the process of designing a CATV system was a pretty simple thing. The designer merely looked for equipment which had the highest "output capability" and lowest "noise figure" and sometimes cost was the sole determining factor! If the designer gave any thought at all to derating his amplifier specifications because of cascading, it was usually done on the basis of extrapolating a theoretically square law cross-modulation characteristic. In other words, he assumed that the cross-modulation improved by 2 dB for each output level decrease of 1 dB. Equipment for measuring cross-modulation at normal system operating levels was not available. In fact, there was little agreement throughout the industry as to how to go about measuring cross-modulation and signal-to-noise ratio.

Things are different today. Manufacturers are capable of measuring distortion at levels which were

considered impossibly low until recently. Equipment specifications have become realistic and meaningful. Also, they can be used to facilitate design of entire systems. In this article, the cross-modulation ratio and signal-to-noise ratio are considered to be the limiting characteristics although it is recognized that this may not necessarily always be the case.

Noise and Cross-Modulation

In designing a system, one must decide first on the minimum allowable signal-to-noise ratio and the maximum allowable cross-modulation ratio. Simons has shown that the results of Carson's work indicate that a signal-to-noise ratio of 43 dB is the ratio at which noise is "just perceptible." There seems to be reasonable agreement on the maximum allowable cross-modulation ratio of approximately -50 dB. These are figures which will be used in the example given later.

Transportation Line

In a CATV system several things are usually influenced by its geography. They are: antenna site, location of central hub, routing of trunk lines and length of trunk lines. While one might reasonably employ a more scientific procedure for determining the cross-modulation, signal-to-noise ratio and other specifications for the trunk or "transportation" line from the antenna site to the central hub, it seems to make good sense to build this part of the system as good as is economically feasible so that picture degradation at the hub is minimized.

In most systems, the hub is its showcase. Here the pictures are displayed to prospective subscribers. The system designer usually strives to obtain picture quality at the hub essentially as good as at the antenna site. In order to accomplish this, the signal-to-noise ratio of the head-end equipment and transportation line amplifiers must be high. Also, their distortion components must be negligibly low. This is the heart of the system and should be designed accordingly. Here only the best is good enough!

Feeder Line

Now, let us skip the trunk lines for the moment and discuss the feeders or distribution lines. The purpose of these lines is simply to carry the signal power which is ultimately supplied to the television sets. The higher the signal



ABOUT THE AUTHOR

J. Earl Hickman is vice-president of engineering for Ameco, Inc. He graduated from the University of Arizona with a B.S.E.E. degree, and was chief engineer for Gila Broadcasting Co. in the early forties. He also built radio stations KSUN and KAWT. Hickman joined Ameco as its first chief engineer in 1952. For eight years he was vice president-engineering & manufacturing of Kaiser Cox Corp. He was named president of Ameco Engineering Corp. in March, 1966 and vice-president of engineering in

February, 1968. Hickman is part owner of two CATV systems and is past president of Arizona CATV Association and past WEMA secretary.

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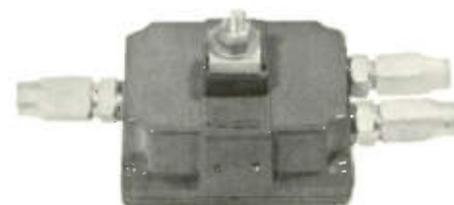
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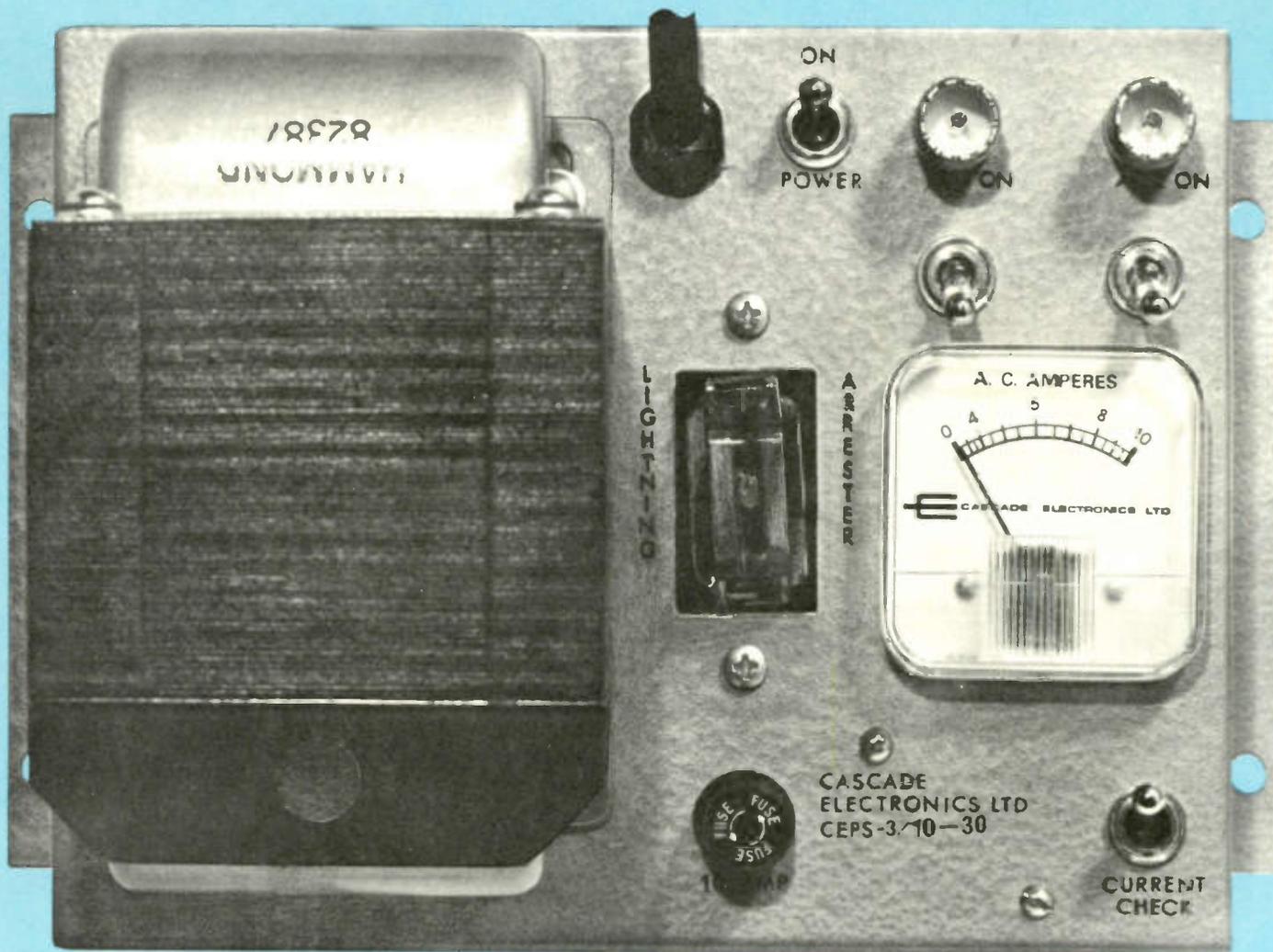
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CEPH-2 Housing - 12 x 12 x 7 3/4"

Weight:

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CEPS-3/10 - 16 lbs.

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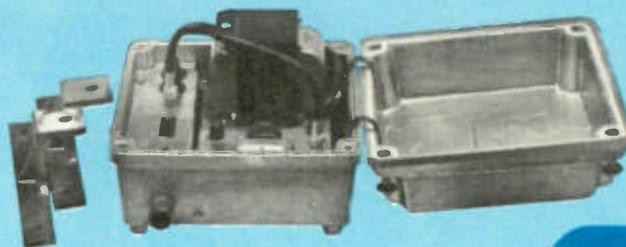
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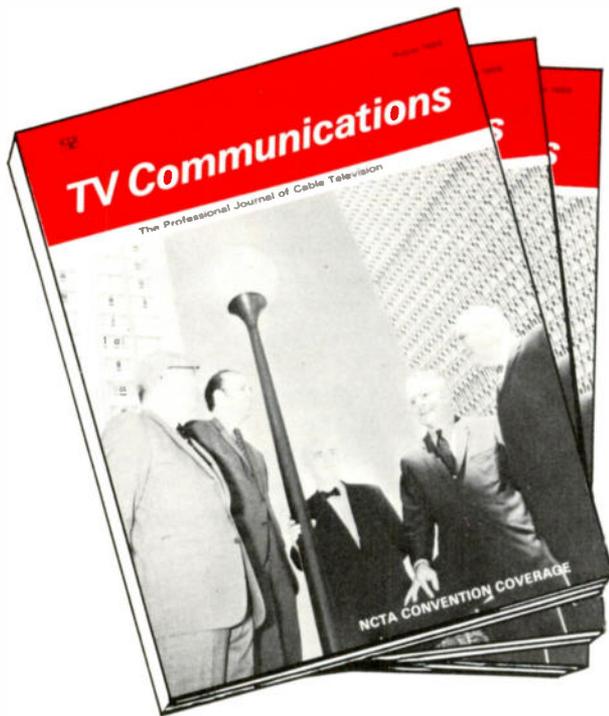
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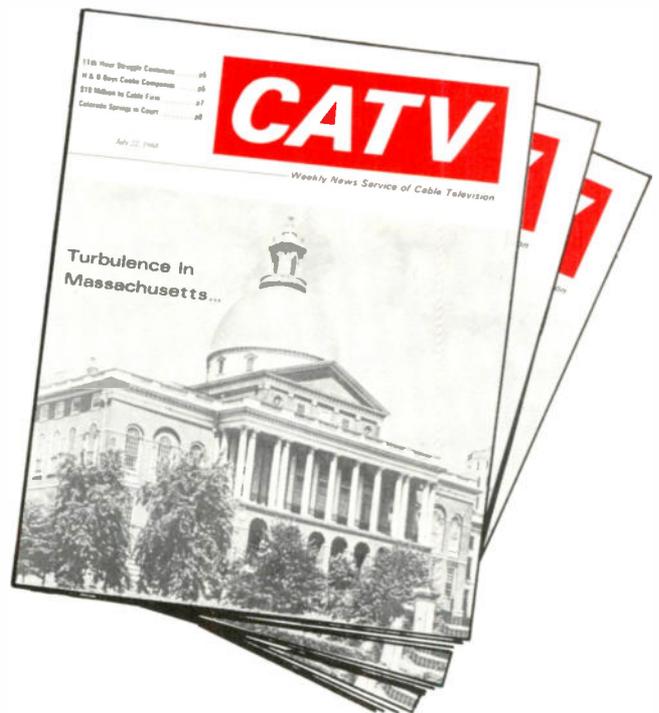
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voltage on these lines, the lower the percentage of insertion loss of the tapoff devices. Therefore, it would seem that since levels here should be kept high that cross-modulation would be a more severe problem than noise. Indeed, this is the case. A typical bridging amplifier or line extender will have a cross-modulation ratio at normal operating level of around -72 dB. Now, in the case of a bridger driving three extenders, the cross-modulation of such a feeder will be

$$\begin{aligned} -72 + 20 \log_{10} 4 &= \\ -72 + 12 &= -60 \text{ dB} \end{aligned}$$

Now, let us examine the feeder's noise characteristics. A typical bridging amplifier actually consists of a 10 dB directional coupler, driving an amplifier which has a noise figure of 10 dB. This bridger will then have an effective noise figure of

$$10 + 10 = 20 \text{ dB}$$

If the lowest signal level that the bridger ever receives is +15 dBmV, its signal-to-noise ratio given by

$$S_i - N_T - F = S/N$$

where S_i is input signal level, N_T is thermal noise input level, and F is the noise figure

$$S/N = 15 + 59 - 20 = 54 \text{ dB}$$

Assume that the line extenders have noise figures of 12 dB each. The signal-to-noise ratio of each line

extender, assuming an input signal level of +20 dBmV is

$$20 + 59 - 12 = 67 \text{ dB}$$

Three such extenders cascaded have a signal-to-noise ratio of

$$67 - 10 \log_{10} 3 = 67 - 5 = 62 \text{ dB}$$

Adding the noise power ratios of the above, we have

$$4 \times 10^{-6} + 6.3 \times 10^{-7} = 4.63 \times 10^{-6}$$

The signal-to-noise ratio of the feeder then is

$$10 \log_{10} \frac{1}{4.63 \times 10^{-6}} = 53.3 \text{ dB}$$

From this it is seen that the feeder's signal-to-noise ratio is determined mainly by the signal-to-noise ratio of the bridging amplifier. This might lead one who is concerned with the design of amplifiers to concentrate on improving the noise figure of his bridger. However, if it is noted that the 53.3 dB signal-to-noise ratio is a more comfortable margin insofar as picture quality is concerned than is the -60 dB cross-modulation, the bridger noise figure loses some of its importance.

From the foregoing it would seem that the system designer should operate the line extenders right up to the maximum and take most of his system cross-modulation here since he can keep the cross-modulation to a low level on the trunk lines by operating the trunk amplifiers

at low levels. Since the signal-to-noise ratio of a typical feeder will exceed the minimum acceptable system signal-to-noise ratio by approximately 10 dB, the noise contribution of the feeder can ordinarily be ignored in system design. In such cases, the total system signal-to-noise ratio is within 1 dB of that of the trunk/transportation line. In system design, a good rule to follow insofar as cross-modulation on feeders is concerned is to allow for equal contributions of distortion from the feeder and the trunk/transportation line or, in the example chosen here, a cross-modulation ratio of -56 dB for each, since cross-modulation products add on a voltage basis. This choice seems to be a good compromise since it provides utilization within 3 dB of the distribution amplifier maximum output levels while allowing for the distortion of a reasonably long trunk/transportation line.

Trunk Line

It was mentioned above that the levels on the trunk line could be lowered to the value necessary to produce the desired cross-modulation ratio. This can only be done at the expense of the signal-to-noise ratio unless the gain of the amplifier is reduced. For practical reasons which are not covered here, the gain of trunk amplifiers is seldom less than 18 dB or more than 25 dB. For purposes of this discussion, a value of 22 dB has been chosen.

Let us now consider an example of a typical system. We have already decided to design toward certain values of cross-modulation and signal-to-noise ratio. They are summarized in figure 2. Since the feeder design has already been established, we now must see if the trunk/transportation specifications can be met.

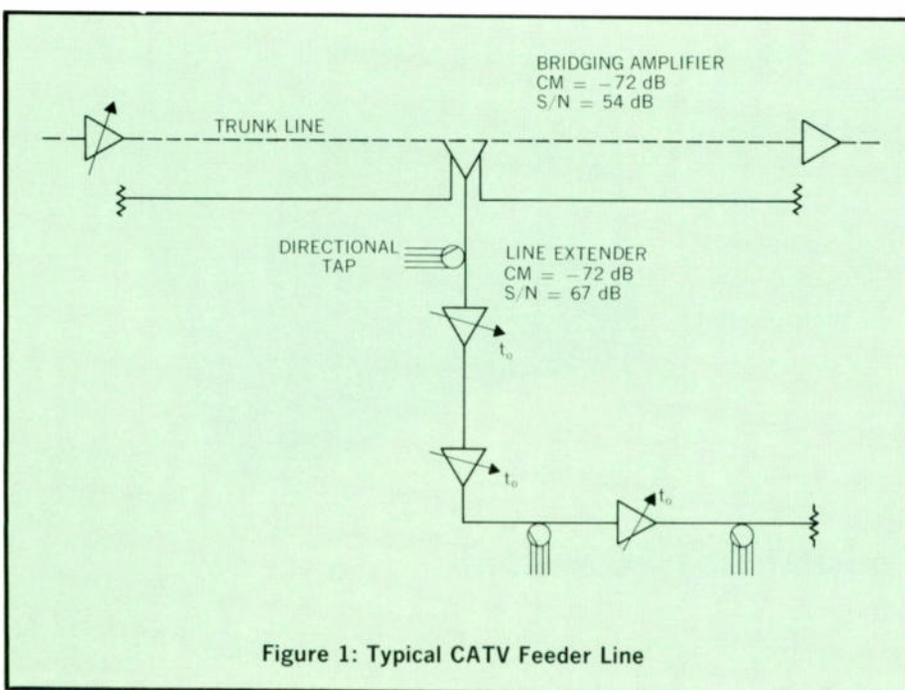
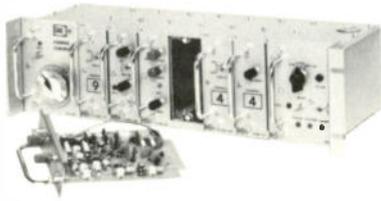


Figure 1: Typical CATV Feeder Line

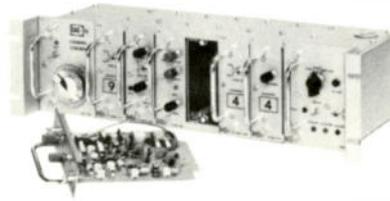
Portion of System	Maximum Cross-Modulation Ratio, dB	Minimum Signal-to-Noise Ratio, dB
Overall System	-50	43
Transportation/Trunk	-56	44
Feeder	-56	50

Figure 2: Typical System Specifications

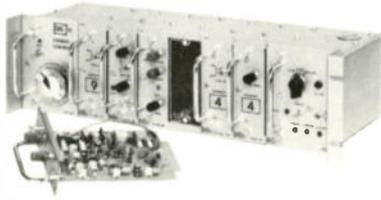
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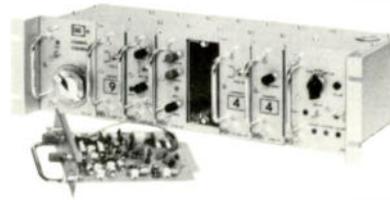
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The specifications for the trunk/transportation amplifier are given: noise figure = 10 dB, recommended operating gain = 22 dB, cross-modulation ratio = -90 dB at output level of +32 dBmv, recommended operating at output level = +32 dBmv. Assume that the electrical length of the total of the transportation and trunk lines is 750 dB.

If it is assumed that the amplifier behaves in accordance with a square law cross-modulation characteristic in the vicinity of the recommended operating level, L_R , the transportation/trunk cross-modulation ratio, CM_S , and the transportation/trunk signal-to-noise ratio, S/N_S are given by equations (1) and (2).

$$CM_S = CM_R + 2(L_O - L_R) + 20 \log_{10} n; \quad (1)$$

$$S/N_S = L_O - (N_T + F + G) - 10 \log_{10} n; \quad (2)$$

where: L_R is recommended output level; CM_R is cross-modulation ratio at output level L_R ; L_O is the actual output level; N_T is the thermal noise input level (-59 dBmv

at 20°C); F is the amplifier noise figure; G is the amplifier gain; n is the number of cascaded amplifiers. All quantities above are expressed in decibels.

Solving (1) and (2) simultaneously for n by eliminating L_O between them gives a value of n which represents the *maximum number of amplifiers*, n_{max} , which may be cascaded for a given set of specifications:

$$n_{max} = 10^{\frac{[CM_S - CM_R - 2(S/N_S + N_T + F + G) - L_R]}{40}} \quad (3)$$

Now let the electrical length of the system, D , be given by (4).

$$D = nG, \text{ in decibels.} \quad (4)$$

$$\text{Then } n = \frac{D}{G} \quad (5)$$

$$\text{and } n_{max} = \frac{D_{max}}{G} \quad (6)$$

We are still assuming the given set of specifications previously shown.

Substituting (6) in (3) and solving for D_{max} gives

$$D_{max} = 10^{\left[\log_{10} G \cdot \frac{G}{20} + X \right]} \quad (7)$$

$$\text{Where } X = \frac{CM_S - CM_R - 2(S/N_S + N_T + F + L_R)}{40} \quad (8)$$

It is interesting to note that solving (7) for G produces

$$\log_{10} G \cdot \frac{G}{20} \cdot \log_{10} D_{max} + X = 0 \quad (9)$$

Where X is as defined in (8) above.

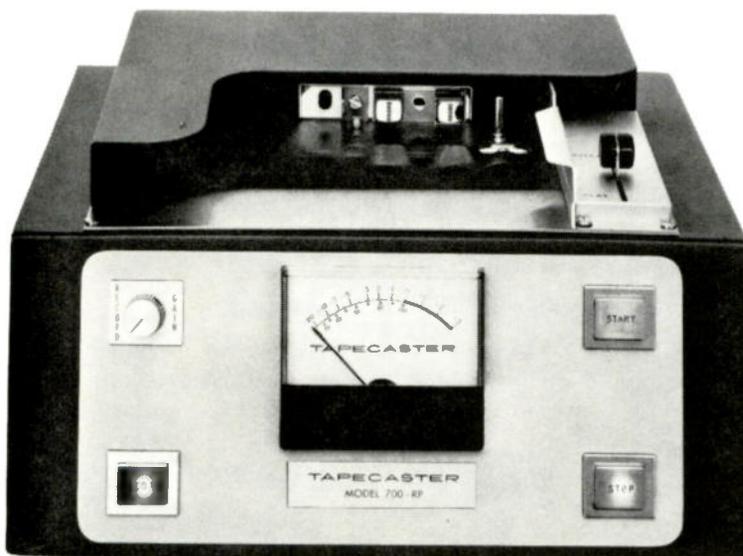
If we consider D_{max} and G to be dependent and independent variables, respectively, we could easily find a value of G which would give a maximum system electrical length which, due to a poor choice of symbols, we shall call $D_{max \ max}$ and leave as an exercise for the reader. The reader will recognize equation (9) as a transcendental function, the roots of which are not easily determined. They may be found either graphically or by trial and error, and are of interest here only academically.

Let us now tabulate the numerical values of the variables of (8) and solve for D_{max} .

$G = 22$ dB; $L_O = +32$ dBmv; $CM_S = -56$ dB; $N_T = -59$ dBmv; $S/N_S = 44$ dB; $F = 10$ dB; $L_R = +32$ dBmv; $CM_R = -90$ dB.

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$$D_{\max} = 10 \left[\log_{10} 22 \cdot \frac{22}{20} + \frac{56 + 90 - 2(44 \cdot 59 + 10 \cdot 32)}{40} \right]$$

$$= 10 (1.34 \cdot 1.1 + 2.70) = 10 (2.94)$$

$$= 8.70 \text{ decibels} \quad (10)$$

Since the transportation/trunk line of the example is only 750 dB long, and we have a capability of 870 dB, we have a safety margin. Our trunk will require

$$\frac{750}{22} = 34 \text{ amplifiers.}$$

Let us see how much safety margin we actually will have. The trunk signal-to-noise ratio given by (2) is

$$S/N_s = 32 \cdot (-59 + 10 + 22) \cdot 15.32$$

$$= 44 \text{ dB.}$$

The cross-modulation ratio will be

$$CM_s = (-90 + 20 \log_{10} 34)$$

$$= -90 + 31 = -59 \text{ dB.}$$

So the margin is really not very much. If the system length had been

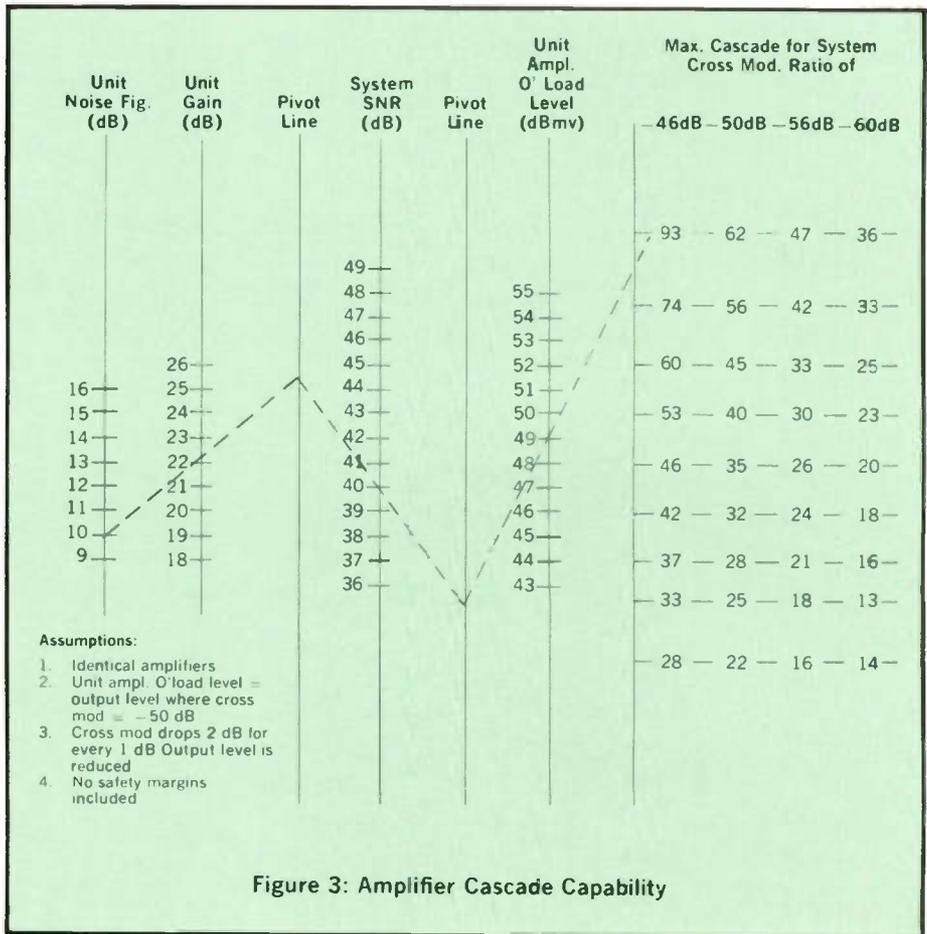
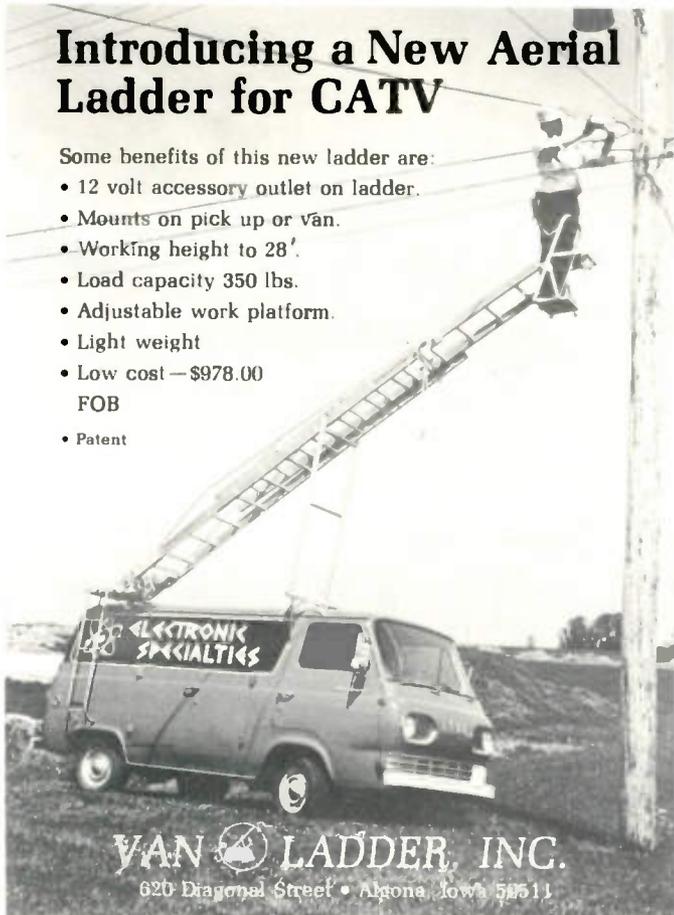


Figure 3: Amplifier Cascade Capability

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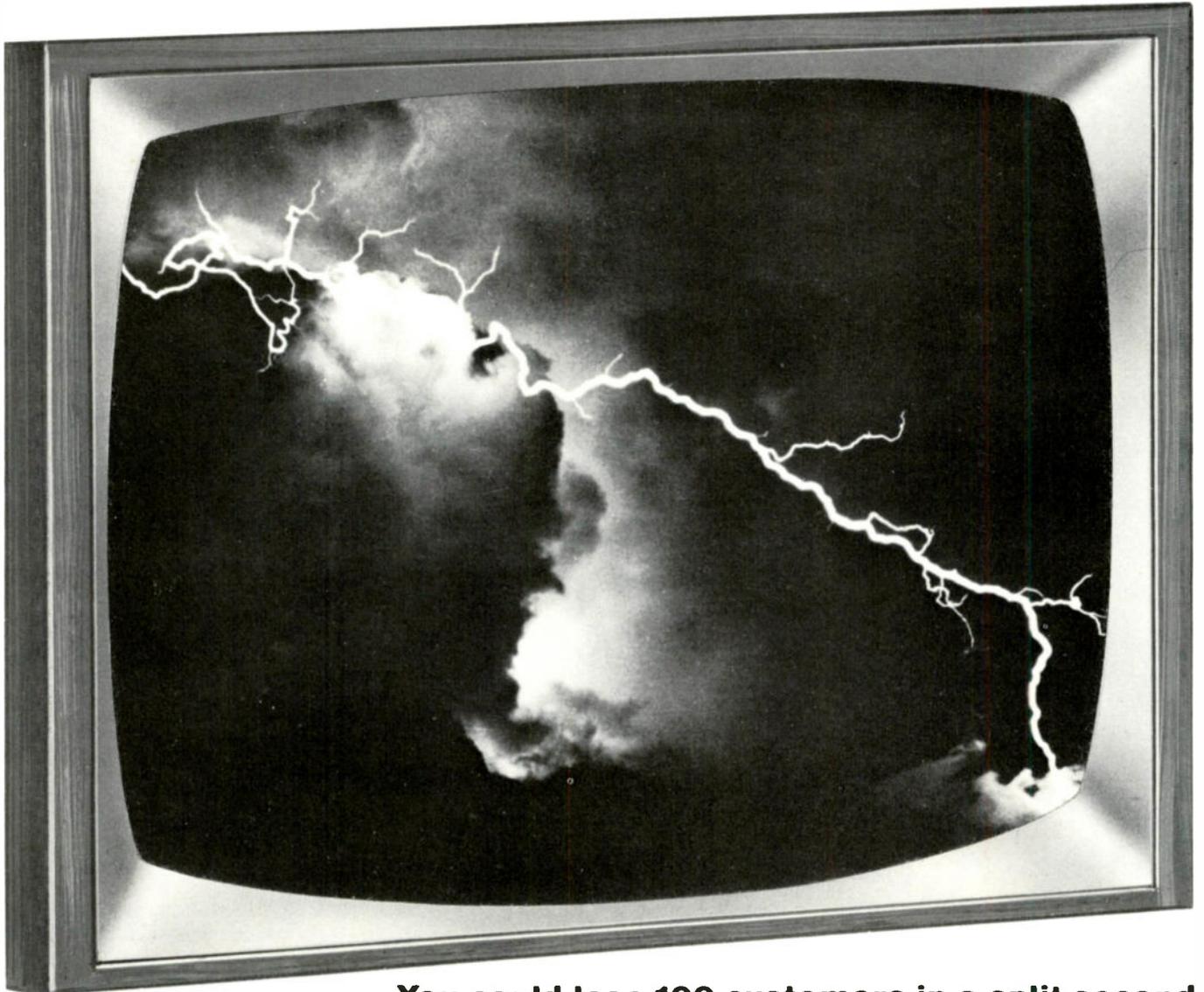
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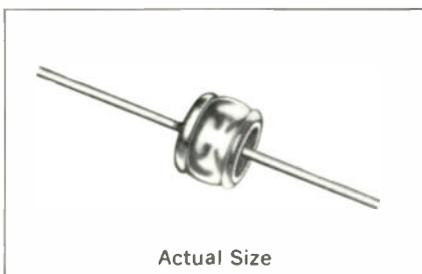
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longer than 870 dB, we could have reduced the operating gain, used more amplifiers, and still maintained the system specifications. *However, the amplifier should not be operated outside the gain range specified by the manufacturer.* No mention has been made of other limiting factors such as frequency response and level stability. These are extremely important but beyond the scope of this article.

Summary

The basic system design should reasonably proceed as follows:

1. Transportation line should be as distortion free and noise free as economically feasible.

2. Feeder lines should be designed with cross-modulation as the limiting criterion.

3. Trunk lines should be designed with proper distortion and noise characteristics to join the transportation line to the feeder lines and give the desired overall system performance. Known specifications can be plugged into equation (7) in order to check the feasibility of the trunk line length. The nomograph of figure 3 is also very useful.

4. Depending on the equipment used, sufficient safety margin must be observed in the design to allow for variations in frequency response and levels which might cause the system to vary beyond the specification limits.

5. Of course, return loss, second order distortion,³ equalization,⁴ and temperature compensation are important in system design and must be given due consideration. TVC

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- (3) G. C. Rogness, "Using Midband to Increase Cable System Channel Capacity," *TV Communications*, April, 1968 Vol. 5, No. 4, pp. 83-88.
- (4) W. A. Rheinfelder, *CATV System Engineering*, Second Edition, TAB Books, Thurmout, Maryland.

In the past 3 years there has been a marked change in the shortage of qualified CATV technicians:

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PRODUCT REVIEW

NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

NEW JERROLD HEAD-END, TEST, AND DISTRIBUTION EQUIPMENT

Jerrold Electronics Corp. has announced the availability of its new Commander head-end unit for FM programming on CATV systems. The solid-state Model CFM-4 is modular in design and provides from one to 14 FM outputs from a single power supply/post amplifier. The tuner of the CFM-4 can be set for any FM frequency. Also new are two Commander modulators and a demodulator. The modulator model CCM-A is designed to accept video and basic audio from local sources and generate a standard vestigial sideband television signal on any VHF TV channel. Model CCM-C differs only in that it employs a different audio module to accept a 4.5 MHz aural sub-carrier. The demodulator Model CCD is a solid-state, industrial-type, television broadcast receiver. The unit accepts any standard VHF TV channel 2 thru 13.

The company is also introducing two new distribution units. Directional-coupler Flexitaps feature one of two different top pieces, each of which has seized center conductor facilities but differs in fittings used to introduce the cable. Six different values of printed circuit directional couplers are available with isolation values of 3, 6, 9, 14, 19 and 25 dB. Five varieties of outlets are available on bottom pieces. The new taps are electrically designed to provide low insertion loss and high isolation. Star-line drop savers are also making their appearance with the Jerrold line. They are engineered to provide the amplification necessary to adequately feed up to four TV sets from a single drop line. The units are available in four models, two locally-powered for indoor use and two remotely-powered for outdoor use.

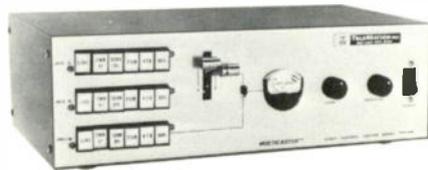
An RF solid-state test set, Model TS-300-7F is also being introduced by Jerrold. The set is designed for CATV systems to provide measurement-by-comparison tests of active or passive systems equipment for return loss, gain, and loss characteristics in the frequency range from one MHz to 300

MHz. The solid-state tester is comprised of a sweep generator, a measurement comparator, a post-amplifier, attenuators, and other switching and equalizing circuitry.

For further information on these new products contact CATV Systems Division, Jerrold Electronics Corp., 401 Walnut Street, Philadelphia, Pa. 19105. Phone (215) 925-9870.

TELEMATION CONTROL CENTERS, NEW CAMERA

TeleMation has announced the development of three video control centers. The TMV-650 Multicaster gives cablecasters a choice of three operation modes: synchronous industrial, external EIA or internal EIA. The unit features two vertical-interval program buses, a preview bus and a split-arm fader control and is designed



for as many as four industrial type vidicon cameras. The center includes looping jacks to eliminate the need for separate video distribution amplifiers; a video processor; video level meter, and gain and pedestal controls. Similar to the 650, the TMV-600 has one program bus and no split-arm fader control, but provides choice of sync, vertical interval switching of composite and non-composite sources, and simultaneous playback and recording. The TMV-707 camera control is engineered to distribute power, drive pulses, intercom and tally voltage to the camera, and process camera video to meet EIA specifications.

A new vidicon camera has also been announced by the company. The TMC-2100 is convertible from self-contained operation to a two-unit system. Plug-in sync options include: crystal-drive, 2:1 Interlace, and EIA. The VF-2100 7" solid-state viewfinder may be factory-installed or supplied in kit

form for field conversion.

Also new from TeleMation engineers is the automatic message center, Model TMM-300. The unit is designed to enable as many as 22 3" x 5" information cards or Polaroid camera shots to revolve around a television camera, ferris-wheel fashion. The center is operable in three modes: "sequence," full revolution of the message wheel to display each card; "stationary," with the camera focused on one card indefinitely; and "Sector," sequential scanning of any group of cards.

For further information on these new products contact TeleMation, Inc., 2275 South West Temple, Salt Lake City, Utah 84115. Ph. (801) 486-7564.

NEW CASCADE DISTRIBUTION EQUIPMENT

The recently developed CEDT-3 modular directional tap has been introduced by Cascade Electronics Ltd. The unit features plug-in modules which may be interchanged to provide tap values of 12, 16, 20, 24, 28 and 32 dB. Standard 5/8"-24 .412 cable connectors are provided and .500 fittings are available. Two and four-output taps are priced at \$13.50 and \$14.85 respectively. The CAT-3/5 active tap, also new to the line, is designed to replace the CAT-2/5 tap. Improvements include circuit design on a glass-epoxy board and a new compact housing. The tap is also available in pedestal configuration. Another addition to the Cascade line is a new external-seizing cable connector.

The company is also introducing a new wideband line splitter. The CELS-2 is engineered to provide two equal outputs from either trunk or feeder lines. Return loss at input and both outputs is said to be 20 dB over the 50-250MHz bandwidth, and tap-to-tap isolation a minimum of 18 dB. Splitter loss is rated at 3 dB at Ch. 2, and 3.5 dB at Ch. 13.

For further information on these new products contact, Cascade Electronics, Ltd., Electronic Ave. Port Moody, British Columbia, Canada. Phone 939-1191.

FAIRCHILD HIGH RESOLUTION CAMERA

Fairchild Space and Defense Systems has introduced a new high resolution closed-circuit television camera. The model TC-550B is designed to operate at scan rates up to 1323 lines/frame with full deflection. The camera is said to furnish over 1200 lines of horizontal resolution at rates of 1029 lines/frame.

The unit is engineered to produce signals conforming to EIA RS-170 and RS-343 standards and to be capable of continuous operation over a wide range of light levels, temperature and humidity without readjustment. Automatic compensation for light level

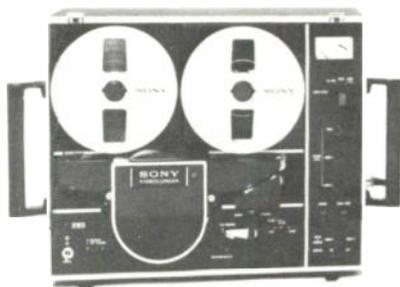


variations greater than 10,000 to 1 is provided. Other features of the camera include gamma correction and video polarity reversal and white peak clipper.

For further information on this new product contact Fairchild Space and Defense Systems, 300 Robbins Lane, Syosset, L.I., N.Y. 11791. Phone (516) 931-4500.

COLOR-COMPATIBLE VTR NEW TO SONY LINE

A video tape recorder that features either color or monochrome recording is now available from Sony Corporation. The Model EV-210 is designed to provide full NTSC color recording and playback with the new Sony CLP-1A color adaptor. Other features of the tape unit are slow-motion and full



stop-motion in both color and monochrome, dual audio channels and manual control for accurate tracking. Remote control and electronic editing options are also available for the new machine. The EV-210 is engineered to be compatible with any existing closed-circuit TV system. List price of the tape unit is \$3750. The CLP-1A lists for \$1000.

For further information on these new products contact, Sony VTR Division, 47-47 Van Dam Street, Long

TV Communications

Island City, New York 11101. Phone (213) 371-6567.

TELESIS DEVELOPS NEW DIRECTIONAL TAP

Telesis Corporation has introduced a new directional tap, model 3625, described as an economically priced sealed tap that is both weather-tight and free from RFI. All 3625 taps are designed to use the same housing, which remains connected to the feeder cable, once installed. When a change in number of outlets or in attenuation is required, only the plug-in module (the cover) is changed. Modules come with one, two or four outlets, and attenuations can range from 11 to 30 dB. Metal-to-metal contact between housing and module-cover, plus a Z-shaped joint, are engineered to shut out RFI.

For further information on this new product contact Keller-Crescent Co., P.O. Box 25, Evansville, Indiana. Phone (812) 425-5145.

ALLIS-CHALMERS PRODUCES ALL TERRAIN VEHICLE

Allis-Chalmers has announced the availability of a new all-terrain vehicle designated the Terra Tiger. The 400-pound unit can be used to service remote head-ends and tower sites. It features a 10 horsepower, air-cooled engine, single T-bar level control for steering, throttle and brake, and positive 6-wheel drive. It has seating capacity for two passengers with 11 cubic feet of storage area for equipment. The vehicle is designed to attain speeds of up to 25 mph on land and 4 mph on water. Price of the unit, which comes with its own trailer, is \$1,395.

For further information on this new product, contact Allis Chalmers Outdoor Power Equipment, Box 512, Milwaukee, Wisconsin 53201.

GENERAL MACHINE MULTIPLE DROP WIRE

A new clamp designed specifically for placing multiple drop wire is now available from General Machine Products Co., Inc. The D Multiple drop wire clamp is a stainless steel unit comprising two identical semi-circular shells and two flat wedges which are held together by a tail wire. In use, the shells are interlocked on the wire and pressed together. The wedges are slipped into the tab rails on the sides of the shells and tapped lightly to seat them firmly. The tail wire can then be placed over a drive hook or a drop wire hook. In addition to the D drop wire

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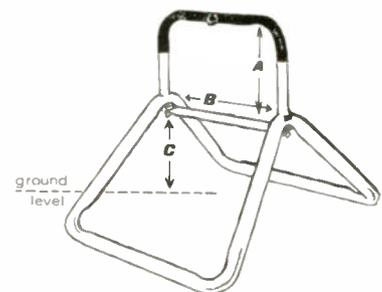
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SG15	10"	15"	12"	\$19.95

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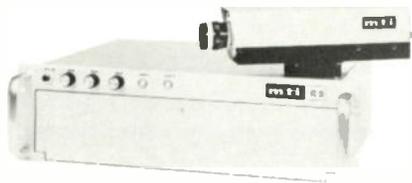
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(707) 795-5533

clamp, GMP also offers the B and C Clamps. The B Clamp is designed as a three-piece unit made of aluminum with a stainless steel bail. The C Drop Wire Clamp is similar in design and function to the Type B except that it's made of copper.

For further details on these new products contact General Machine Products Co., Inc., Old Lincoln Highway at Pennsylvania Turnpike, Trevoise, Pa. 19047. Phone (215) 357-5500.

MTI VIDICON CAMERA

MTI division of KMS Industries, Inc. recently announced the addition of a new vidicon camera system to its line. The VC-20 series is a solid-state system consisting of a separate camera head and control unit. The camera



head measures 2 3/4" x 9 3/4" and weighs 3 1/2 pounds. Features of the unit include a Quantum light sensor designed to provide a constant video output level over variations in light levels of 4000:1, a solid-state preamplifier engineered to provide a low noise content signal at low light levels, and 800 plus TV lines of horizontal center resolution at 0.5 footcandles illumination. The unit is available at 525, 875, 945 and 1023 horizontal scanning rates. Single or dual camera head operation is possible from one control unit. Prices are \$3,195.00 for single

camera head, external sync units and \$3,395.00 for self-contained sync units.

For further information on this new product contact Maryland Telecommunications, Inc., York and Video Roads, Cockeysville, Md. Phone (301) 666-2727.

GENARCO ANNOUNCES FOLLOW SPOTLIGHT

A new follow spotlight, the Spotmaster, has been announced by Genarco, Inc. The unit features a motorized voltage regulation assembly designed to maintain proper gapping and even burning of carbons. The light is intended for use in either permanent or mobile installations. It is said to project 14,000 lumens of light and operate continuously for 2 1/2 hours from 2-7 mm copper coated carbons. Improved features, according to Genarco, include burner design and new shaft bearings and spring stops for smoother non-binding of carbons. A balanced douser is provided for fading.

For further information on this new product contact Genarco, Inc., Subsidiary of Robins Industries Corp., 15-58 127th St., College Point (Flushing), N.Y. 11356. Phone (212) 445-7200.

AMPEX VIDEOTAPE RECORDERS

Two new additions to the Ampex Corporation line of closed-circuit videotape recorders have been placed on the market. The Model VP-4900 playback unit will sell for \$995 and the Model VR-5100 playback/record unit for \$1,600. The two units feature a video response of 3 MHz and a horizontal resolution of 300 lines. The video signal-to-noise ratio is 42 dB.

A rotary transformer in the drum assembly is said to provide increased reliability of signal transmission from the head. Both new video tape units



feature four-minute rewind and fast forward speeds. Both units operate at a tape speed of 9.6 inches per second, a writing speed of 1,000 ips, and offer one hour of playing time.

For further information on these new products contact Ampex Corporation, 401 Broadway, Redwood City, California. Phone 415 367-4151.

NEW AERIAL LADDER

Van Ladder, Inc. has recently introduced a new ladder designed for CATV application. The ladder is mounted on a pick-up or van and extends to a working height of 28 feet. Load capacity is 350 pounds. Other features include



a 12-volt accessory outlet on the ladder and an adjustable work platform. Price is \$978.

For further information on this new product contact Van Ladder, Inc., 620 Diagonal St., Algona, Iowa 50511.

SCIENTEK REMOTE CONTROL

Remote on-off control of TV monitors, video tape recorders, TV cameras and similar equipment is made possible with a new unit from Scientek. The

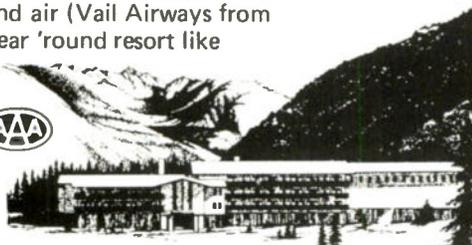
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Video Commander VC-100 detects the presence of a video signal and performs the turn-on function. If the signal disappears the unit is switched off automatically. A remote control element is installed at each unit to be controlled and both the input power line and TV cable are connected to it. The entire system is designed to be adaptable to existing cable equipment.

For further information on this new product contact, Scientek, 631 18th St., Santa Monica, Calif. 90404. Phone (213) 451-0754.

NEW CATEL SOLID-STATE MODULATORS

The Catel Corporation has added a completely solid-state, self-contained series of television and FM modulation equipment to its line. The series features four units: a television modulator, Model TM-2200A; FM modulator, Model FMX-2000A; stereo sub-carrier modulator, Model SM-2100, and FM heterodyne repeater, Model FMR-2200. All of the units incorporate a



self-contained power supply and JEDEC registered, silicon transistors. According to the company, the new series is aimed at providing efficient and reliable solid-state equipment at low cost.

For additional information on this new product, contact the Catel Corporation, 517 Marine View Avenue, Belmont California. Phone (415) 592-3776.

CRAIG VTR

The availability of a new helical-scan video tape recorder has been announced by Craig Corporation. The Craig 6402 unit features a full-field, slant-track, two-head frequency modulated recording system, and a rotary transformer head assembly, which is said to eliminate hard-to-clean mechanical brushes and slip-rings. The unit utilizes 1/2" magnetic tape at 9 1/2 inches-per-second tape speed for maximum 50 or 60-minute recording or playback time on either 7" or 8 1/4" reels. Audio re-record capability makes it possible to re-record sound track

without disturbing the video portion. Other features include automatic audio and video level controls; built-in 2:1 sync generator, providing electronic editing techniques; slow motion fixed at 1/12 normal speed, and stop motion for reproduction of any single field of video information. Slanted tape



deck for the supply reel is designed to eliminate idler assemblies and inclined tape guides. This feeds tape in direct alignment to the drum, a design step which is said to minimize tape tension and to extend tape and head life. Suggested list price of the unit is \$1200.

For further information on this new product, contact Craig Products Division, Craig Corporation, 2302 E. 15th Street, Los Angeles, California. 90021. Ph. (213) 623-2421.

BERKEY-COLORTRAN QUARTZ LIGHTING

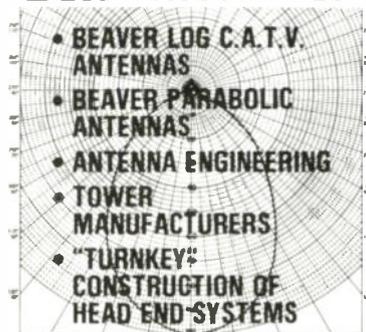
Berkey-ColorTran has recently introduced several new "quartz" lights to add to its line of lighting equipment.

The 2000-watt Multi "20" focusing "quartz" light is constructed to provide uniform light distribution with smooth focusing control from flood to spot. The unit can be stand mounted or supported by standard equipment. At 20 feet, using a 2000 watt lamp, intensity can be varied from 106 foot-candles in the flood position to 799 in the spot position. The light operates directly from 120 volts, AC/DC. Accessories include two and four leaf barndoors, single and double scrims, diffusion glass and dichroic daylight conversion filters. The unit is priced at \$107. A set light designed to provide smooth and flat background lighting with sharp barndoor cutoff is also new to the line. The fixture weighs less than five pounds and is ventilated for continuous duty operation. Five hundred to 1000-watt tungsten-halogen "quartz" lamps are available. The light can be stand mounted, supported by standard grip equipment or positioned for floor use. The LQB-BA stand mounted model is priced at \$54.90 and the LQB-BA/TV handling model is priced at \$58.00. A Tru-Broad focusing "flood" light is also being produced by Berkey. The center of the beam produced by the light is designed to be very flat and without peak. The unit incorporates a full-focusing control to permit both the coverage and intensity of the light to be varied. The TV model weighs 8-3/4 pounds and is supplied with a yoke incorporating a C-clamp.

For further information on these new products contact Berkey-ColorTran, Inc., 1015 Chestnut Street, Burbank, California 91502. Phone (213) 843-1200. TVG



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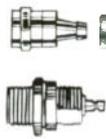
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program 16mm sound films throughout your CATV system.

With all these important features, applications and low price too, isn't it good sense to put TELEMOBILE to work for you soon? For more information, fill in and mail the coupon below today.



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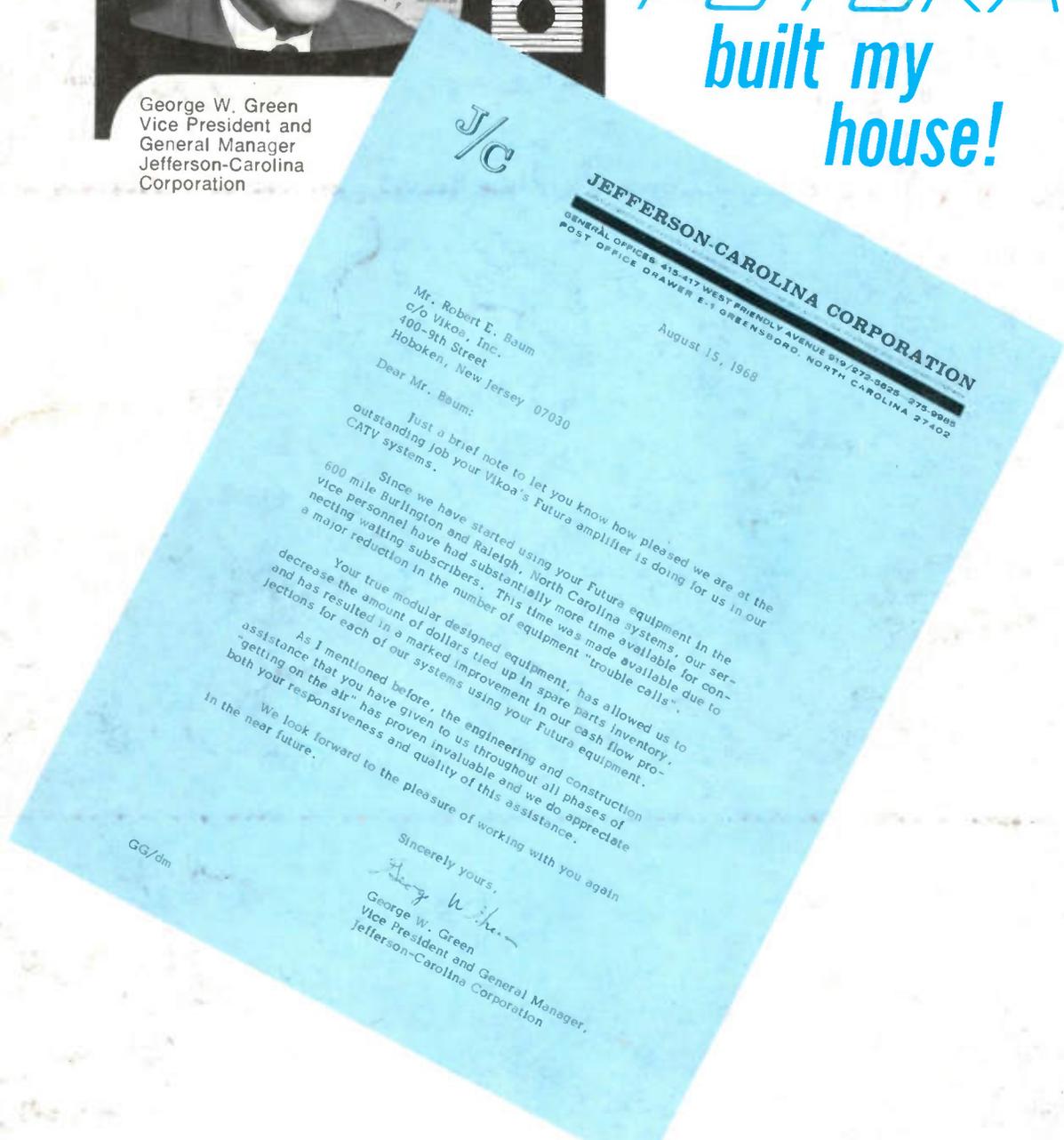
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Vice President and
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August 15, 1968

Mr. Robert E. Baum
c/o Vikoa, Inc.
400-9th Street
Hoboken, New Jersey 07030

Dear Mr. Baum:

Just a brief note to let you know how pleased we are at the outstanding job your Vikoa's Futura amplifier is doing for us in our CATV systems.

Since we have started using your Futura equipment in the 600 mile Burlington and Raleigh, North Carolina systems, our service personnel have had substantially more time available for connecting waiting subscribers. This time was made available due to a major reduction in the number of equipment "trouble calls".

Your true modular designed equipment, has allowed us to decrease the amount of dollars tied up in spare parts inventory, and has resulted in a marked improvement in our cash flow projections for each of our systems using your Futura equipment.

As I mentioned before, the engineering and construction assistance that you have given to us throughout all phases of "getting on the air" has proven invaluable and we do appreciate both your responsiveness and quality of this assistance.

We look forward to the pleasure of working with you again in the near future.

Sincerely yours,

George W. Green
George W. Green
Vice President and General Manager,
Jefferson-Carolina Corporation

GG/dm



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