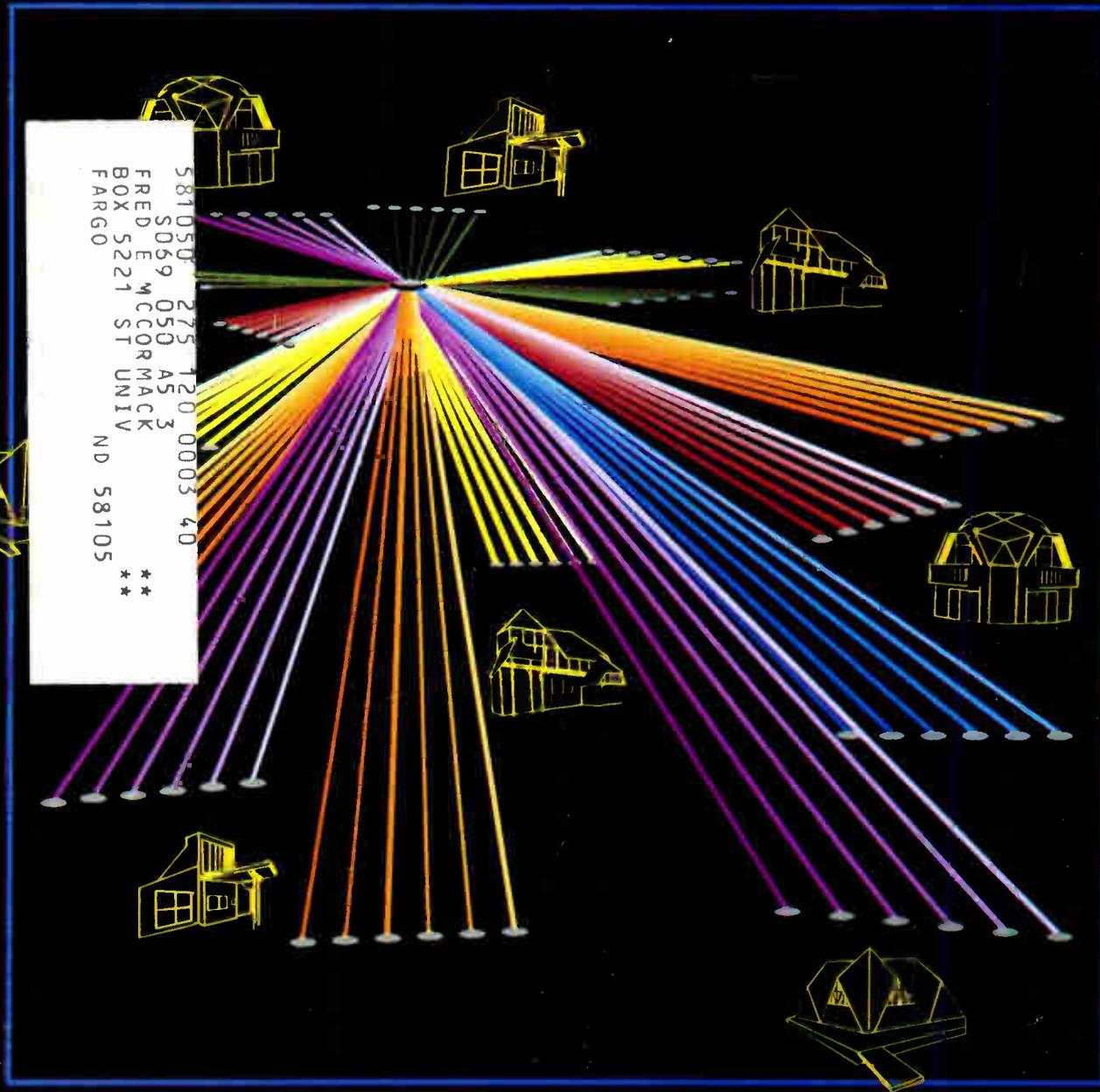


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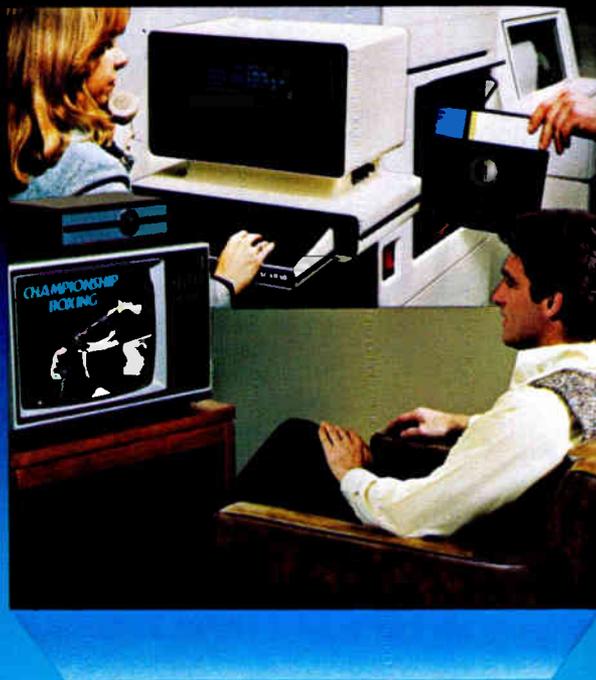


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Communications-Engineering Digest
Reporting the Technologies of Broadband Engineering

October, 1980
Volume 6, Number 10

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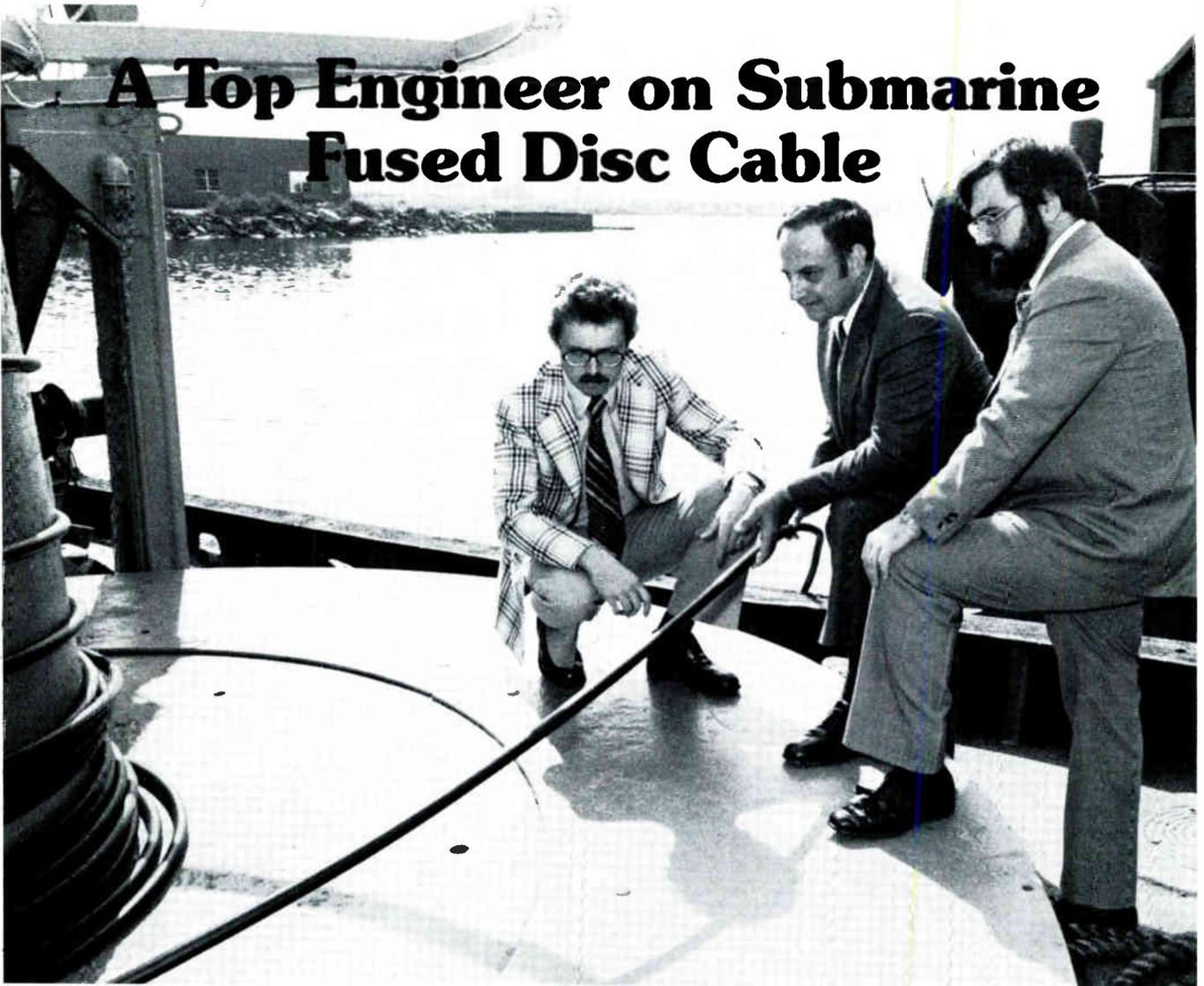
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Richard M. White, Vice President, Engineering for Vision Cable Communications, Inc. of New York, N.Y. had this to say in a recent letter to us:

"...Thank you and your associates for the excellent technical support supplied by General Cable through all phases of design and construction of our recent submarine cable crossing in our Bergen County, New Jersey system.

"Our primary concern was to install a cable with superior mechanical strength and high specific gravity while still retaining the same electrical characteristics as your standard Fused Disc Cable.

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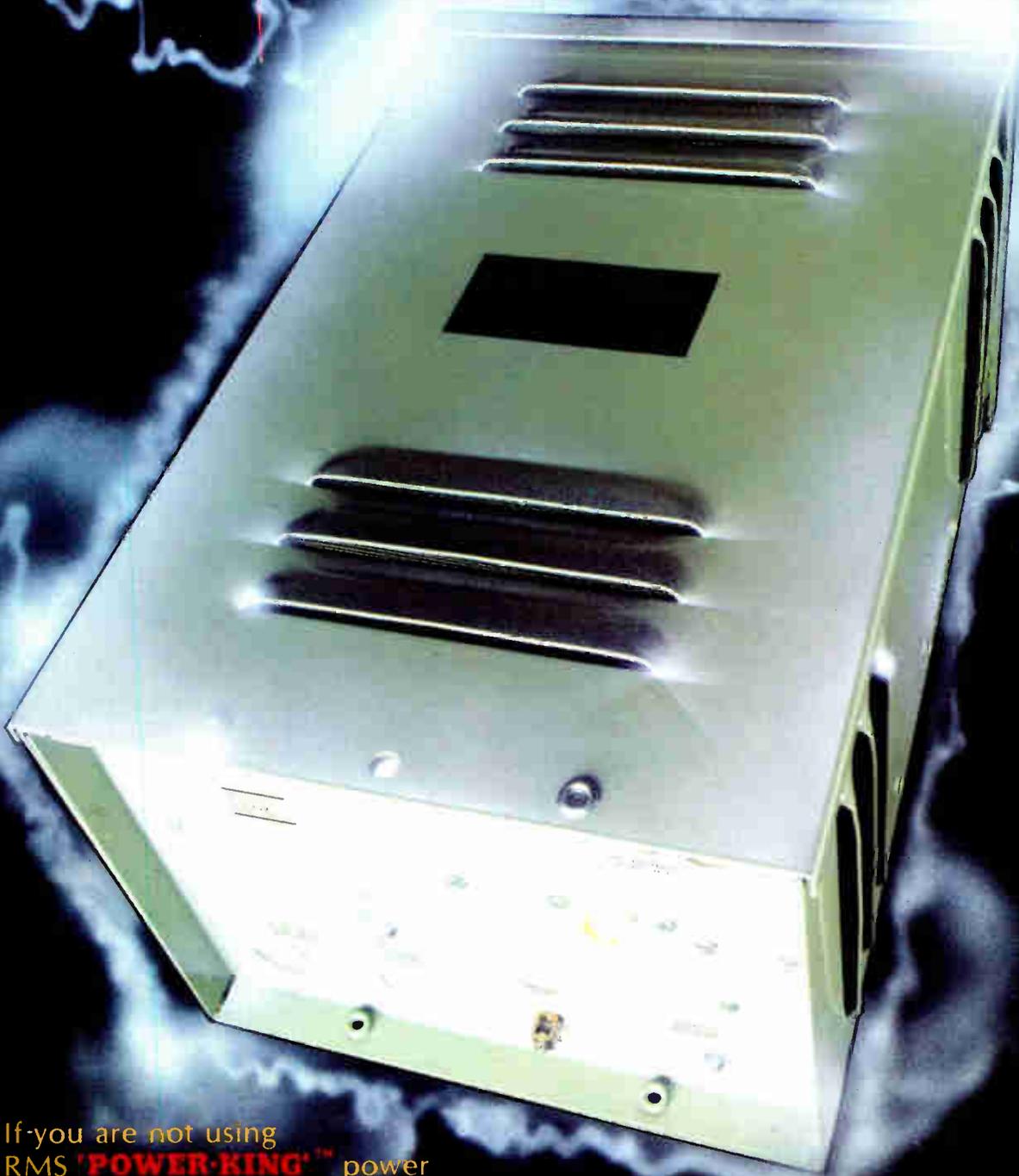
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C-ED **News** **at a** **Glance**

Commission Considers Slashing Tickets

WASHINGTON—If the **Federal Communications Commission (FCC)** doesn't alter its course soon, operators of broadcast stations and cable systems will be looking for a new way to determine the technical competence of technicians and engineers. **The FCC has already abolished the Third Class radiotelephone license, and is considering doing the same to First Class and Second Class tickets as well.**

Ninety-six station operators responded to an inquiry by the Commission, and turned up equally divided (48-48) on whether or not to abolish the licenses. Supporters of the license requirement said they preferred to hire an operator who has "demonstrated some degree of technical knowledge and ability by passing a required examination." However, a study done for the FCC by the **Georgia Institute of Technology concluded, in part, that possession of a license "does not assure such technical competence."**

Cox Tests Home Banking

SAN DIEGO, CALIFORNIA—**Cox Cable Communications and HomeServ, Inc., will offer the first bank-at-home via CATV service late this year** in San Diego, according to a Cox spokesperson. Around 200 homes will take part in Cox's Mission Cable System experiment, joining financial institutions yet to be named.

The largest CATV system in the United States with 175,000 subscribers, the Cox system will be used as a pilot project of the INDAX system in conjunction with its decision to be a vendor for The Source, as a basis of the company's future steps into two-way service.

Bell Computer Plans Cable Work

ATLANTA—**A new Bell computer system that can conduct a dialogue with its operator—both asking and answering questions—identifies the work components needed for cable-placing and splicing projects, and then generates a tentative work schedule, and computes useful data for tracking work progress.**

Called Mechanized Standard Time Increment Calculation (MSTIC), the interactive system is usually operated by a clerk in an engineering office or construction management center. The operator uses a keyboard terminal to exchange information with a computer programmed to ask prompting questions.

Before scheduling the job, a construction supervisor surveys the site and makes corrections in the computer's estimate, if needed, to account for unusual working conditions.

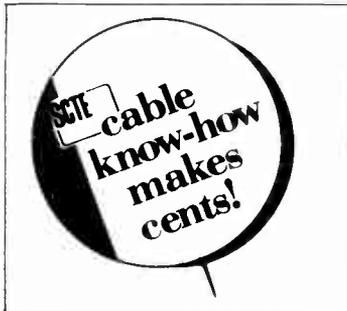
Construction supervisors can add data on actual worktime to the information already stored by MSTIC for progress-report preparation and lost-time calculations.

The system is now available to all Bell System companies through Western Electric.

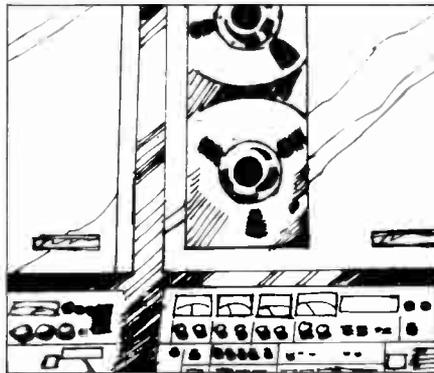
Subscription Television Industry Forms Association

The Subscription Television Association (STVA) has been formed by five of the seven companies operating in the STV field. The new STVA president is Rinaldo Brutoco, of Universal Subscription TV.

Other STVA members include Wometco, American Subscription TV, National Subscription TV and Subscription TV of America.



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Editor's Letter

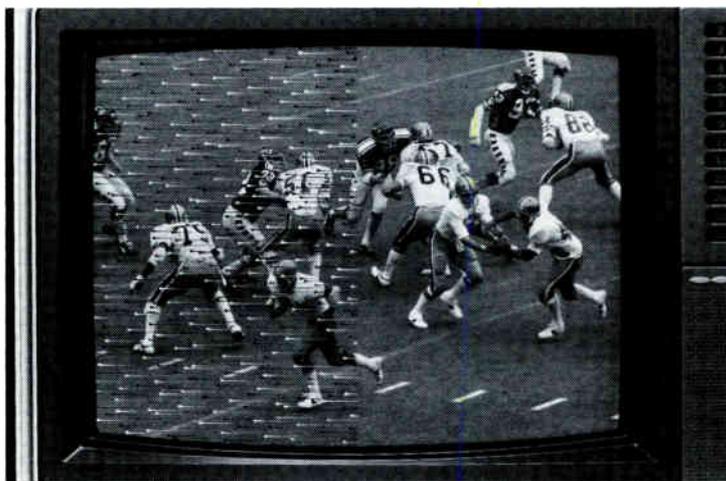
Channel space. Used to be that there wasn't enough to go around. But the story is different now. The explosion in cable technology, providing more channel space on the coax, has been matched by revolutions in other carrier technologies.

This issue of **C-ED** takes a look at another of those channel space providers, Multipoint Distribution Services (MDS). The Special MDS Section in this issue features a look at how the technology works, who is using it, and what the future holds for MDS operators.

We also take a look at Bloomington, Minnesota in our System Profile, where a Cox MDS system competes peacefully with three CATV systems. Other features in this issue include a look at Bell Labs' new digital compression technique, which makes it possible for the phone company to pump video signals over their two-wire voice circuits. We also take a look at U.S. Tower's new satellite antenna system, which can "see" eleven satellites at once, and at negative security systems for CATV operations.

We are also featuring the members of SCTE's Board of Directors in interviews in our SCTE Comments section. Governing members of the society speak out on various society programs in advance of the Board of Directors meeting scheduled for the Playboy Club in Great Gorge, New Jersey, the middle of this month.

Paul A. FitzPatrick



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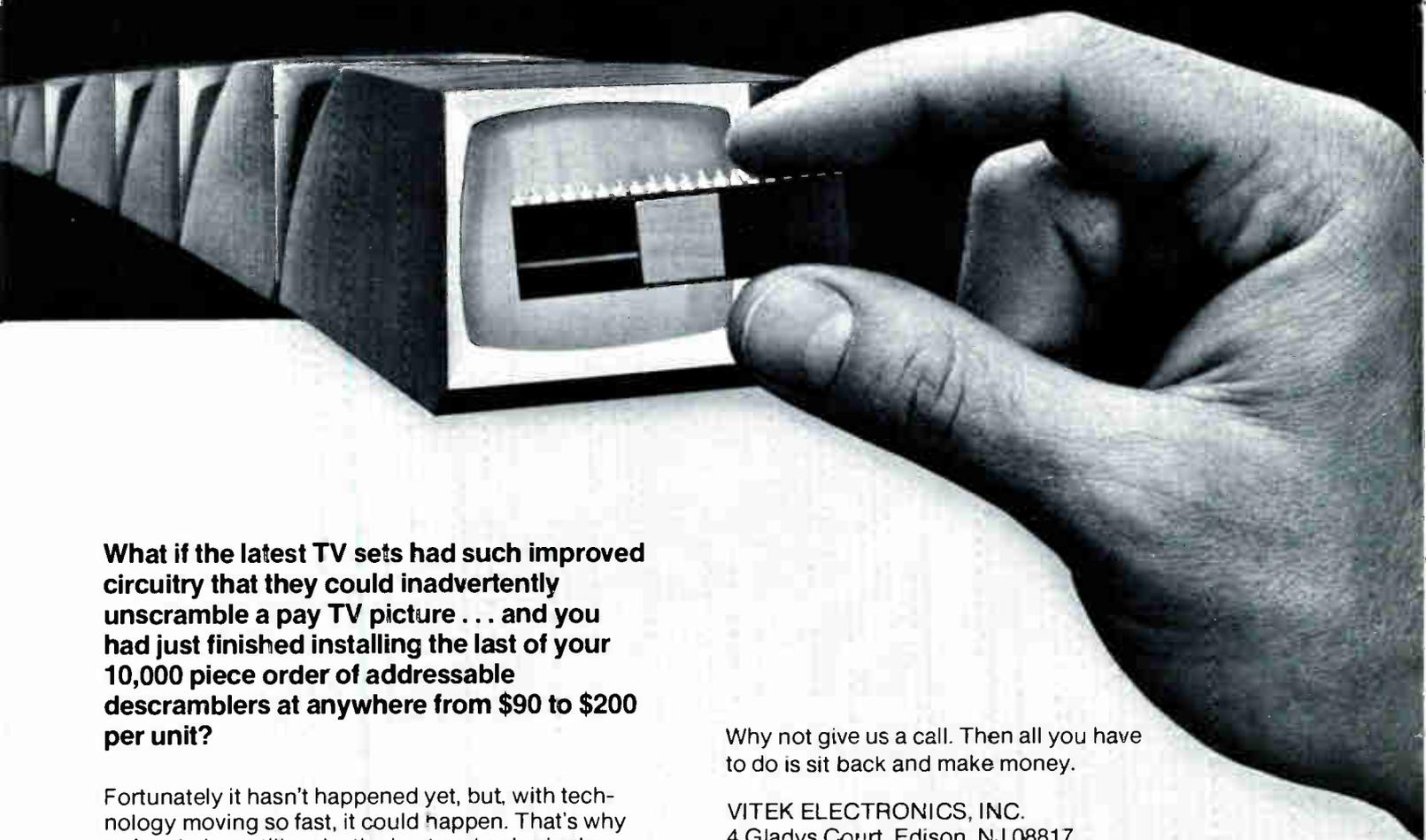
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Conversations With The Board

by *Dennis DuBe'*

How do members of SCTE feel about the Society? How can the Society be more useful to its membership? I asked these and other questions of a dozen SCTE Board members during the month of August in telephone interviews conducted from **C-ED's** Denver offices.

What I got as answers surprised me in some ways, and in other ways was no surprise at all. The real reason behind the phone calls was to introduce myself to the Board members, to help me associate names, voices and faces in SCTE. But what the series of calls turned out to be was a review of SCTE's activities.

I first called Ralph Haimowitz, whom I had met at the CATA show in Snowmass, Colorado. I asked him what was happening with the Southern branch of SCTE. "The southeast region does not have an organized chapter," he said. "Georgia has a chapter, and they seem to be active, but Alabama dropped theirs. Everybody seems to be happy with the job SCTE is doing at the national level, and they don't seem to have the time or effort to do something regionally."

Haimowitz felt it important to point up the fact that SCTE, CATA and NCTA compliment each other in their efforts to influence legislation and make the world better for cable. "It works out pretty well," he said.

Richard Covell, from GTE Sylvania CATV Transmission Systems in El Paso, Texas, felt that local meetings were important. "I'd like to see us put in some more effort on chapter meetings and local meetings at SCTE," he said. "If you have a reasonable fee and good instructors, the industry will supply the people to teach."

"We've got to give these guys in the field a chance to get out there and learn," he said.

James Grabenstein, SCTE's Secretary, remarked that he was proud of the level of activity in Region 6, where he has been working and residing. The

Chief Engineer for Potomac Valley TV Cable in Cumberland, Maryland, for 20 years, Grabenstein is moving to Ocala, Florida, to work for the Microdyne Corporation as an applications engineer.

"We have been having regularly scheduled meetings in our region for about six years," he said. "We are on a three month schedule, which means about four meetings every year. That's more than any other chapter in the country." He pointed out the difficulties in getting publicity for events at the chapter level, "If there is some way that the magazine could help with this, it would be very useful," he said.

Kenneth Hancock, on the other hand, urged **C-ED** and society members to pay a little more attention to Canada. "One of the things that a number of society members in Canada feel is that an awful lot of society effort is directed toward the states and very little up here," he said. "Certainly the magazine could assist in that effort," he said, "by giving publicity to the fact that there is a Canadian region, and that there are a number of members up here."

Hancock, now with the consulting firm of Phillip A. Lapp in Ottawa, Ontario, noted that the environment for the Canadian cable operator was different than that for U.S. cable operators, due to the differing regulatory environment in Canada. "We should address the interests and needs of the Canadian region, and the differences that exist between the Canadian needs and the general needs in the states," he said.

Thomas Jokers, Engineering Director for Continental Cablevision in Quincy, Illinois, also expressed a sentiment for more local activity. "It's too expensive for companies to send a lot of people to seminars in distant locations," he said. "With the registration fee, transportation and housing, you will find that companies are reluctant, and that people are reluctant to go. We want to get people to the

point of being able to do their job," he said. "We want to advance people, to help them develop themselves. That is the purpose of the Society. But we have to have technical information coming in and available to these people that they can understand."

"Historically it's the people that are out there on the firing line, who are climbing the poles, that need the help," he said. "I know the stuff reasonably well myself, but that's the area where I have the most difficulty; finding qualified people and training them."

Larry Flaherty, the Region 2 director, allowed that since he had just changed jobs, he hadn't gotten much organized for the states of Colorado, Idaho, Montana, New Mexico, Texas and Wyoming. "It's difficult to find the right kind of program idea," he said. "We are thinking of trying to do some activities that the cable companies could pay for that wouldn't be as expensive as sending people away for conferences."

"We have about 60 SCTE members here at UA-Columbia in San Antonio, but I am the only one who gets out a couple of times a year to the SCTE seminars. It's not in the budget to send that many people to seminars, with transportation and money and the whole thing. It costs about \$500 just to send somebody somewhere and put him up, if not more, so the company won't do it."

He mentioned the value of SCTE's new videotape series, which is designed to be useful to the local operator and technician. "That's a step in the right direction," he said.

Jerry Bybee, ATC's North Central Regional Engineer and SCT's Eastern Vice President, agreed with that sentiment. "The small guy who pays his society dues can't get time off, or the financial backing, to go to our seminars," he said. "We have in a way concentrated on the upper echelon SCTE and upper echelon company personnel. We are not really doing anything for him," he said. "Our support for the local meetings on the majority has been bad."

"I'd like to see something supportive of the guys in the field," he said, noting that the existing SCTE programs shouldn't be trimmed to provide new services, but that additional directions should be sought.

October 15-16, 1980

SCTE Seminar To Cover Text And Data Delivery

The 1980 SCTE Conference on Emerging Technologies will explore various text and data delivery systems and provide an in-depth look at the engineering and management issues confronting the broadband/cable television industry.

Set for the lush Playboy Club in Great Gorge, New Jersey, the seminar will focus on domestic and international projects, and will help in defining problems, potentials, applications and executions of text and data systems.

The conference will be formatted to assist decision-making executives, managers, engineers, designers and regulators involved in the expanding business of cable/broadband communications. Sufficient time has been

scheduled for audience participation.

Conference chairman for the 1980 session is John LoPinto. The luncheon speaker will be Bill Donnelly, Vice President and Group Supervisor of New Electronic Media, of Young & Rubicam. He will speak on "New Media Activities and Advertising in Cable."

The conference will also feature a "Welcome To SCTE" wine and cheese party, especially for new SCTE members. The reception will be hosted by SCTE Board member Marty Moran.

Advance registration is \$200 for members, and \$300 for non-members. Rooms are available at the Playboy Hotel for \$49 per night. Registration prices will be significantly higher at the door.

SCTE Offerings

Tapes Get Rave Reviews

The videotapes released by SCTE have been getting rave reviews from members who have seen them. **C-ED** interviewed several SCTE members during the last weeks of August, and encountered repeated praises of the tapes.

SCTE President Larry Dolan called the tapes "really great" and said that although there was a lot of good information around for the cable technician, it was hard to get. "The tapes are a good way of doing it," he said.

Larry Flaherty, another member of the SCTE Board of Directors, echoed Dolan's remarks. "I think that the SCTE videotapes are a step in the right direction," he said. "This is getting the information to the right people. The tape on pole climbing was especially good, and it's possible that we will be showing some of the tapes at some of our meetings." Flaherty also thought the tape on reading signal level meters was good.

SCTE Executive Vice President Judith Baer agrees. "We will continue

to produce the tapes," she said, commenting that the tapes were an excellent way of getting training material to the systems. "There will be more videotape programs because they are an extremely effective training vehicle, especially for this industry, because the VTRs are built into the cable industry."

"We will continue to produce the tapes as long as the response warrants the tremendous upfront investment we have to make," she said. "We have invested about \$50,000 for the first ten tapes, and we are still in the hole."

Tape titles are Confident Climbing Classroom, Confident Climbing Field Demo, CATV SLM Basics, CATV SLM Errors and Accuracy, Video Test Signals, Video Waveform Measurements, HF RF Sweep Generator Basics, RF Sweep Generator Applications, CATV Converter Repair Procedures, and Multi-Channel Converter Alignment. Tapes are \$75 per copy, and may be purchased by sending a pre-paid order to SCTE at 1900 L Street N.W., Suite 614, Washington, D.C. 20036.

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Warner Amex Institutes Job Training Program In Cincinnati

CINCINNATI—Warner Amex Cable Communications, Inc., of Cincinnati has announced that it will recruit job candidates in the greater Cincinnati area for training as cable TV installers and technicians.

Each male and female applicant selected will receive 13 weeks of intensive training in the areas of manual, intellectual and psychological skills. The curriculum will cover more than 15 hours of classroom work and 320 hours of on-the-job training. All students will be compensated during training, and the additional personnel will augment the existing Warner Amex staff of installers and technicians serving the greater Cincinnati.

Gustave M. Hauser, co-chairman, president and chief executive officer of Warner Amex said, "The training program, which will concentrate on young people from an age group where the unemployment rate is most severe, has been designed to not only ease this pressing community need but to also provide Warner Amex with highly skilled, qualified technicians to serve our growing network of cable systems within the greater Cincinnati area."

Warner Amex has constructed a 33,000 square foot two-way, interactive QUBE cable TV facility in Blue Ash, Ohio, to eventually serve 42 greater Cincinnati communities that have awarded the company cable TV franchises. These communities offer Warner Amex a potential of more than 170,000 homes. QUBE interactive TV allows subscribers to "talk back" to the studio by means of response buttons on specially designed home consoles that are "electronically linked" to the QUBE installation.

Warner Amex Cable Communications, Inc., a jointly owned company of Warner Communications, Inc. and the American Express Company operates 148 systems in 29 states serving some 700,000 subscribers. QUBE systems are currently under construction in Pittsburgh and Houston.

Telcom Partnership Appoints Larry Brown President of Cablevision Training Center

ST. LOUIS, MISSOURI—Larry A. Brown has been appointed president of newly formed Cablevision Training Centers, Inc., a national and St. Louis area education facility designed to prepare minorities and economically deprived individuals for employment and business opportunities within the cable television industry.

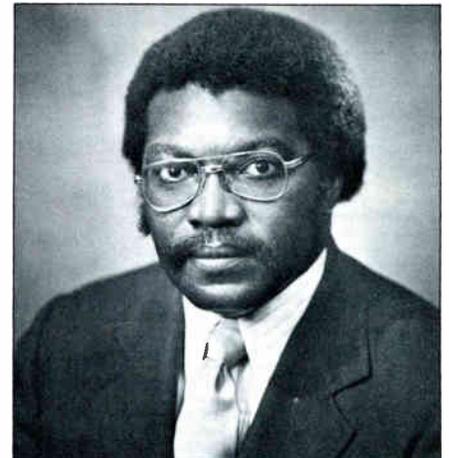
Designed to initially train cable TV installers, technicians and linemen at its St. Charles County headquarters beginning in September, the Centers are a joint venture of Telcom Engineering, Inc., an international telecommunications firm based in West St. Louis County, and Teleprompter Corporation, New York, the nation's largest cable television company.

Brown will direct development and expansion of the Cablevision Centers' training programs and use of minority resources throughout the United States. He also will be chief liaison with private industry, labor and government agencies.

Cities currently under consideration by Brown for establishing training programs similar to that based in St. Louis include New York, Boston,

Philadelphia, Detroit, Chicago, Cincinnati, New Orleans and San Francisco.

Brown said he expects about 200 local and out-of-town students to be



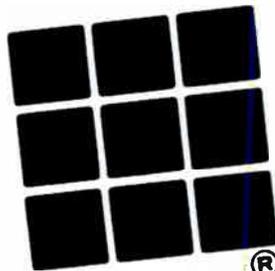
trained at the Centers' headquarters during its first year of operation. After a two-month classroom and field training program, students will be hired for on-the-job training by several national and local cable TV companies.

Cablevision Training Center has received support of various federal Comprehensive Employment Training Act Prime Sponsors (CETA) and the Private Industry Council of Metropolitan St. Louis, an organization of the Regional Commerce and Growth Association. The Center is a certified member of the Missouri Association of Private Career Schools, and has been endorsed by the International Brotherhood of Electrical Workers (IBEW). The Missouri Department of Elementary and Secondary Education has participated in development of the Training Center programs.

Continued on page 21

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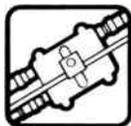


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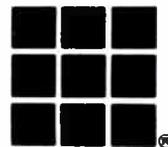
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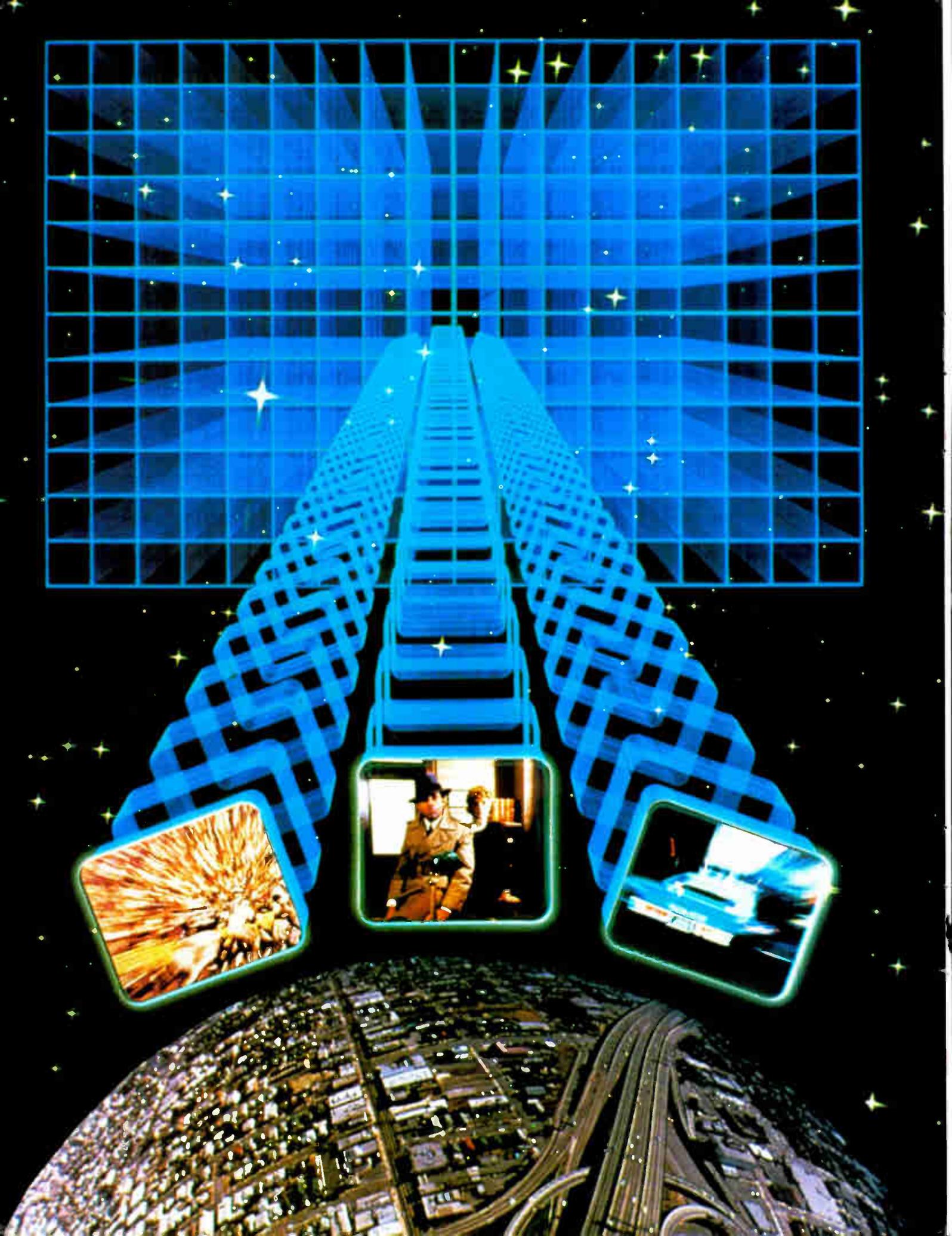
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Continued from page 12

Scientific-Atlanta To Furnish AP Satellite Antennas, Cable Atlanta Set-Top Terminals

ATLANTA, GEORGIA—Scientific-Atlanta, Inc., has signed an agreement to furnish its new 3-meter antenna to California Microwave, Inc., of Sunnyvale, California, for its satellite ground stations. The ground stations will be used by The Associated Press for satellite distribution of audio and newswire service. It is anticipated that up to 400 antennas will be delivered in 1980, with total deliveries expected to reach 900 by the end of 1981.



Scientific-Atlanta introduced the 3-meter antenna in January, 1980. The 3-meter antenna consists of compact components that can be economically transported and assembled. Special handling equipment is not required for installation at remote sites or on roof tops.

California Microwave, Inc., has previously purchased Scientific-Atlanta antenna products for its satellite communications systems. These purchases include a large quantity of 4.6-meter antennas for the Mutual Broadcasting System and several 11-meter antennas for domestic satellite stations in Oman.

Scientific-Atlanta has also signed an agreement with Cable Atlanta for over \$1 million worth of set-top terminals. The initial order is for 15,000 of Scientific-Atlanta's Series 6700 Set-Top Terminals. Delivery to Cable Atlanta is expected in the fall of 1980.

Cable Atlanta's 1,600-mile cable TV system will offer over 50 channels of programming to 200,000 homes in Atlanta and suburbs.

The set-top terminal order brings to \$4.6 million Cable Atlanta's total orders for Scientific-Atlanta equipment. Earlier orders included Scientific-Atlanta's newly introduced 400 MHz 50-channel distribution equipment. Cable Atlanta also has ordered Scientific-Atlanta's satellite earth stations, headend receiving and processing products and related equipment.

Columbus Bank Customers Transact From Home

COLUMBUS—Customers of Banc One Corp, a Columbus holding company, will be able to view their bank

accounts, receive statements and pay bills electronically from their living rooms, according to Ron Alsop of the *Wall Street Journal*.

Banc One, in cooperation with OCLC, Inc., a non-profit corporation that operates a nationwide computer network for libraries, will provide a TV-telephone interface device that will allow customers to dial up the computer, view their accounts, and order payments made directly from Banc One's facilities, all by telephone.

Although just an experiment, Banc One officials have been considering the system for several years. Approximately 200 families will participate in the program, according to Banc One officials. Other features that the system will provide include encyclopedia access, public library card catalog information, and community information, such as schedules of public meetings.

Future services may include loan applications, weather information and home consumer shopping, an official said.

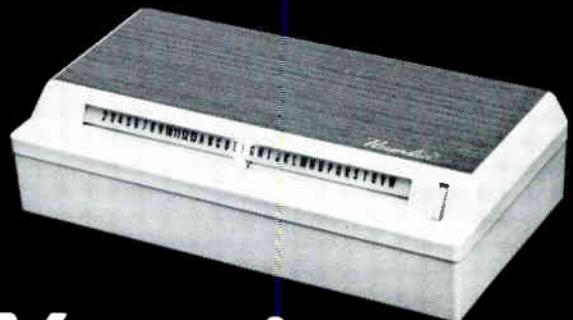
Biddle Introduces Cable Fault Dector

CANTON, MISSISSIPPI—A radar cable fault detector is being marketed by the Biddle Company of Plymouth Meeting, Pennsylvania, which promises to simplify the process of finding faults in CATV cables.

Recently tested on lines of Canton

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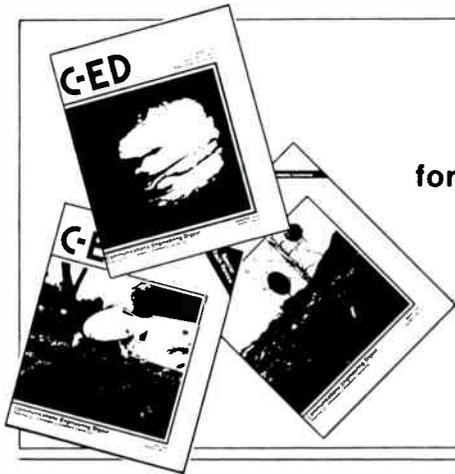
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Cablevision and M-R Cable TV of Canton, Mississippi, on both aerial and underground installations, the equipment not only gives automatic read-outs of the distance between the set and the fault, but also displays the characteristic of the fault on an oscilloscope screen, which helps determine the cause of the fault.



The radar-based device operates on either AC or DC with internal rechargeable batteries, and locates and indicates the distance to single or multiple faults or taps from one foot to 80,000 feet away. Variable pulse widths and continuously variable horizontal shift and horizontal magnification to 5X are said to provide clarity and precise viewing of the display, according to the Biddle Company.

The company claims that the set will cut down on the time and labor needed to locate faults. Previously, maintenance crews had to use a procedure called "the halving method" in which the fault was located by backtracking down the cable from a known point until the fault was passed. This procedure was especially difficult when more than one fault was involved.

The equipment can also be used to test new installations, locate unauthorized taps and measure cable lengths. Additionally, according to the Biddle Company, the set can be operated by less skilled personnel than oscilloscopes, ohmmeters and other expensive pieces of equipment.

Alarm, Telco Groups Eye CATV

Alarm Industry Set To Oppose Cable Franchises

"Since I know of no instance where a cable company has voluntarily decided to cooperate with the alarm industry by making its cable available on a reasonable and equitable basis, I must reluctantly conclude that it will not happen unless we make it happen."

With those words, Norman Rubin, president of Supreme Burglar Alarm Corporation and chairman of the National Burglar and Fire Alarm Association (NBFAA) Cable TV Committee signaled the new policy of the NBFAA to oppose cable TV franchise applications in any city, if the application includes provision of security services by the CATV operator.

"Although most cable companies have adopted a conservative 'wait and see' attitude, there are a growing number of areas where cable interests have actually entered the alarm business, and where the two industries have clashed over the extension of the cable franchise to include alarm services, and where both cable and alarm companies are researching ways to cooperate," Rubin said.

"It is my sincere conviction that, if left undisturbed, [cable companies] will, within a few years, be providing security services to more residences than the present alarm industry as we know it," he warned. "Cable could ultimately take over a substantial part of the lower risk commercial market."

Rubin advised alarm system operators to be on the lookout for cable franchise applications containing alarm and security proposals. "It would be well for the local alarm industry to band together when cable franchises are being awarded, and retain competent counsel to protect its interests. Nipping these actions in the bud is obviously the right way to proceed."

Rubin also suggested that the

NBFAA investigate the possibility of having language inserted in the Communications Act Rewrite to "protect the alarm industry from unfair competition from a cable network monopoly."

Speaking before the annual meeting of the NBFAA this spring, Rubin reviewed the development of two-way cable technology since TOCOM's pioneering efforts in the early 70s, and cited several cities where alarm industry representatives have successfully blocked CATV efforts to get a foothold in the alarm market, including

Nashville, Tennessee; Jefferson County, Kentucky, and the Borough of Queens, New York.

Rubin also charged that the cable industry press has been blind to the advanced technology of the security industry. "The lavish praises assigned to [Warner Cable Company's] so-called new security system only bears testimony to the fact that the writers for the cable industry are ignorant of the state-of-the-art technology of the alarm industry and are expert to the nth degree in the art of touting their own products," he said.

Expert Urges Telcos To Seek CATV Franchises

"Do whatever you can to get into the [CATV] business," urged Paul H. Stolz, of the firm of Ernst & Whitney, to the members of the National Telephone Cooperative Association in Las Vegas earlier this year.

"Provide Cable TV service for your area if there is any possible way," he said. "If no service presently exists, go through the necessary steps and get into the business. If someone else already has the franchise for your area, try to buy him out."

In a talk entitled "The Changing Challenges to Rural Telephone Companies," Stolz told the representatives of independent telephone cooperatives that the changes facing rural telephone systems in the next five years will make the changes of the last 30 years look like "child's play."

"Electronic communications is going to become a much more important part of our society five years from now than it is today. It is not a question of whether these things are good or bad, right or wrong—they are here."

He stressed that small telephone company operators must keep abreast of new technologies, especially digital

processing of voice and video signals. "I'm not referring only to digital switches and digital transmission, but to a system with total digital capability. There is a growing pressure for the availability of digital communications in all areas," he said.

He urged telephone company operators to move toward providing all the possible communications services in their local areas, including paging, alarm, and mobile radio, as well as cable TV.

He asked, "Why am I so concerned about the cable business? Modern systems can be built with two way digital amplifiers which make the system ideal for digital communications. There are already cable systems that are using spare capacity for this purpose.

"As technology continues to develop, you may find yourself in the position, a few years down the road, of having a cable company with facilities hanging on your poles capable of providing the same service you are. It might even be better, faster and maybe even cheaper.

"So my first suggestion," he said, "is to get in the cable television business in your area if there is any possible opportunity to do so."

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INTERMOD

By Glenn Chambers

There are two topics I would like to discuss in this issue. Both concern those technical people with an interest in the SCTE and in CATV.

SCTE Meetings

First, are local SCTE meetings and seminars still being held? We rarely receive any meeting notices, or notices of upcoming local or regional technical seminars.

To me, the heart of any organization is in the field members. Without them, it is no organization at all. They pay the dues and should get the benefits. This is why the SCTE was formed in the first place. Service to the general membership is a must. Local meetings and seminars can and do fill a necessary need for the field members.

National seminars are great, but few of us can afford the time or money to travel around the country to attend. Few CATV companies will send a technician to meetings which can be as much as several hundred dollars in transportation, food, lodging, admission, and salary costs. If you don't live in or near a large city, you may never attend an SCTE seminar.

Local, state, and regional groups can really serve a need and desire in their areas. Almost anyone can drive a few, or even a few hundred, miles to attend a one- or two-day seminar. If the subjects covered are meaningful to them, they'll be there.

Local seminars do take a lot of time and effort for someone to organize, but I know there are a lot of people like me who feel that time spent on technical seminars is well worth the effort. If one person leaves a seminar with a little more knowledge, it was worthwhile.

If your region does have technical seminars or meetings, we can help. Advance notice to us will allow us to advertise the meeting in **C-ED**, and it costs nothing. The benefits can be great. The better your advertising, the greater the attendance and participation.

If you would like to have a seminar, but are having problems getting speakers, we may be able to help you here also. There are many technical and

engineering people who really enjoy being asked to speak at technical seminars. Also, most large CATV equipment manufacturers have one or more people who are available to present papers or to demonstrate their equipment. There are lots of good speakers on almost any technical topic. It costs you nothing to get them. A simple "Thank You" is payment in full.

If you would like our help in advertising an upcoming meeting or seminar, or in getting speakers, drop me a note. Let us know the date, time, and location of the meeting or seminar, topics to be covered, and length of the presentation. I'm sure we can help, with some advance notice.

Hands-On Articles

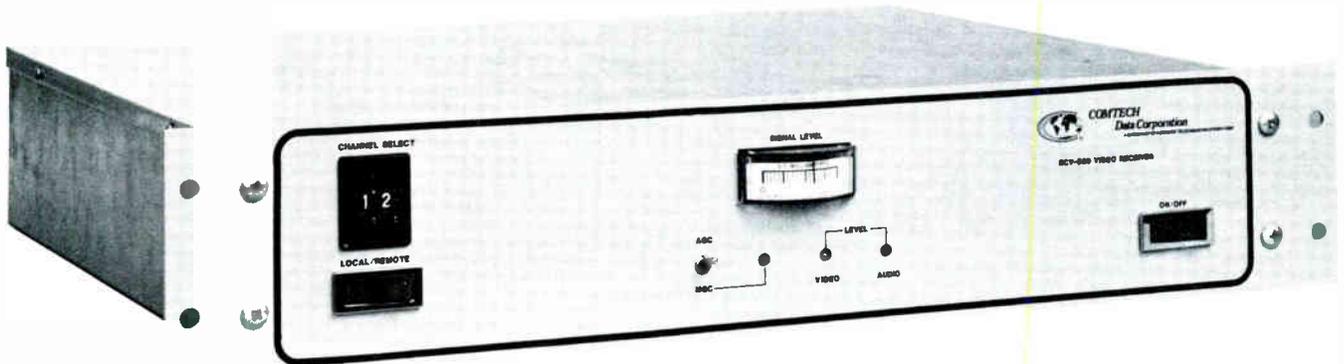
My second topic this month concerns technical articles in **C-ED**. We have received several requests to publish basic-level technical articles. There are two main reasons why the really good technical articles of a few years ago have all but disappeared from the CATV magazines. Number one, the people who authored those articles, being experts in the industry, have moved onward and upward in their fields. As a result, their free time has become so limited that most just can't devote the time and effort required for research and writing.

Number two, many capable authors feel that all possible basic subject material has been covered by other authors. Few people want to spend their time documenting a subject which has been thoroughly covered. It is extremely difficult to get anyone to write on basic or medium-level topics.

C-ED is now taking a hard look at a complete series of low and medium-level articles entitled *Back To Basics* on CATV theory and practical system applications. These articles would range from *What is a Signal* to *Using Computers in CATV*. A writer has been found, and some articles have been written.

If you would like to see this series appear in **C-ED**, or have other suggestions, please let me know as soon as possible. Your opinions will be important on whether they are printed or dropped.

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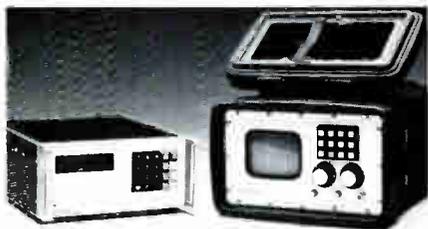
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Negative Security

Using Traps To Catch Profits

by Dennis DuBe'

Negative security devices are playing a major role in CATV systems, helping CATV operators increase revenue and reduce loss of service and equipment due to tampering and theft.

Positive security devices are also playing a major role in CATV systems, helping operators increase revenues and reduce losses of service and equipment due to tampering and theft.

In fact, vendors of both positive and negative devices are making similar statements, as system operators look for increased security as a result of the remarkable growth of subscriptions to premium TV channels.

The explosion in pay TV subscriptions has brought several new security systems to the market, fueling the debate over the relative advantages of positive and negative security.

But the truth of the pay TV story is that systems that are getting high percentage penetrations of pay TV are switching to negative devices over

positive, due to the lower cost. Michael Jeffers of Jerrold Electronics asserts that while one-third of subscribers opt for pay services on a national basis, pay penetrations in some systems are ranging as high as 75 percent.

The difference between positive and negative security is the type of customer that gets the security device. In positive security, the device is a descrambler or converter, which is placed in the homes of pay TV subscribers. It can also be a positive trap, which filters out the premium channel's scrambling signal. In negative security, the device is a filter, and it is installed at the home of the non-premium TV subscriber.

"The negative traps are becoming more popular with the higher penetrations," says Eagle Comtronics' Chester Syp, "because the cost is around five dollars per trap. If you have 60, 70 or 80 percent pay penetration, then it becomes cheaper to put the negative trap on the non-subscriber's homes."

The ratio of premium to regular subscribers might be so low in older systems that only positive security can be considered, because it is tied directly to the income derived from subscriptions.

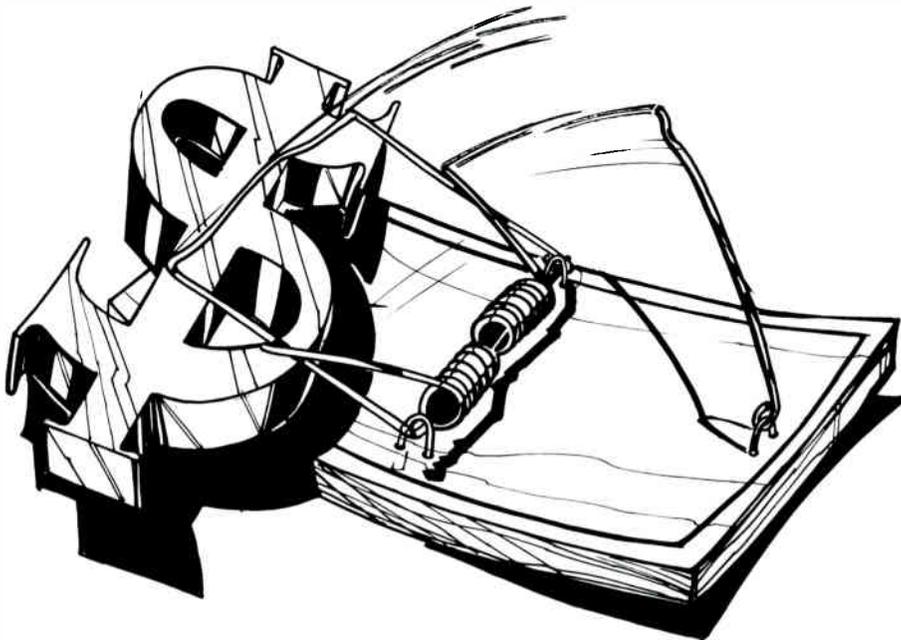
Traps fall into two categories, lump circuit-type traps and cable-type traps. Lump traps consist of capacitors and coils in a circuit contained in a rigid mounting structure. Cable traps are made from lengths of coaxial cable and are based on the quarter-wave stub principle. A number of manufacturers make various types of lump circuit traps, but only Vitek Electronics has the rights to make the cable trap.

Vitek's Paul Ellman asserts that the most effective form of security is the negative trap, because it not only allows a cleaner signal into the subscriber's set, but it is less prone to tampering.

"One of the things a system likes to strive for is to deliver a good product, which means bringing in and delivering a good picture from the head-end," he said. "Anything that handles the picture before it gets to the subscriber is bad. With a positive security system you are always affecting the signal-to-noise ratio, some more than others."

"If you put an active piece of gear in line with your premium channel, you first muck up the picture, then you try to straighten it out. You have to be affecting the picture, you have got to be depreciating it somewhat," he said.

A trap also adds the extra margin of security by being placed out of reach of the subscriber on the pole. The trap is less often stolen, altered, or damaged by the subscriber because of its location. "If the subscriber wants to climb the pole, he'll climb the pole," Ellman said. "Even a locking connector can be beat. What you are trying to do is eliminate the white collar crime."



Explaining that it is the converter or descrambler that is the weakest spot in any cable security system, Ellman said that it is impossible to outsmart the determined subscriber. "What one clever engineer can encode, another good engineer can decode," he said. "You are better off using a negative pay TV security device, rather than bringing the picture into the home" where the subscriber can experiment with it, he said.

"The real advantage of a cable-type trap is that it looks like wire," Ellman said. "The average guy is not going to climb the pole and start monkeying around with the wires. They're scared to death about doing that."

The disadvantages of traps include the fact that the costs of installation are incurred from the non-pay subscribers. The lower the total revenue from pay, the higher the cost for trapping and installation. Traps often affect adjacent channels as well, causing some diminution of the audio signals at higher channel frequencies. Some traps have a tendency to drift off frequency as the temperature changes, although Eagle Comtronics' Ken Kennedy explained that temperature/per-

formance variations are due strictly to circuit design.

"It's entirely dependent on circuit design," he said. "You can make a narrow trap with cable and you can make a narrow trap with coil and capacitors."

"Eagle's trap is made by a mechanical and electrical integrational technique, which is important in this type of filter," he said, explaining the difference between lump circuit and cable traps. "It's important to keep all the components mechanically rigid as well as providing for temperature compensation of the individual components. That alleviates any problem that you might encounter with temperature variations over a wide range."

"That's why it has been such a successful product," he said. "You can achieve stability through any number of techniques. How well you do your job designing the circuit mechanically and electronically is important."

Vitek's Ellman pointed out that all traps will drift as the temperature changes. Some traps have a very narrow filter "notch," he said, so when they drift, their filtering action actually passes from the premium channel to

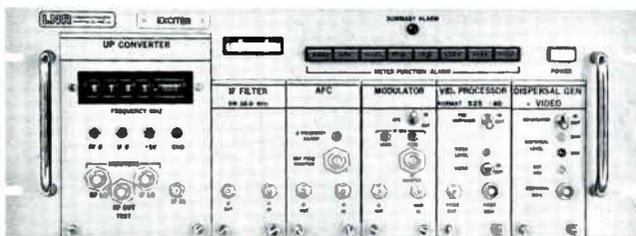
an adjacent frequency. "The Vitek trap has a broad notch, and it is actually deeper than most," he said. "We'll spec our taps at either 50 or 65 dB, which is up on the notch. So even though it drifts, it is still maintaining function."

Eagle's Kennedy said that traps could be made for any bandwidth. "You can make a trap wider by adding more elements to it," he said. "If you make them very, very narrow, you can get away from affecting the adjacent channels, but then you have stability problems whether its a cable-type trap or a lump circuit-type trap.

"Our most common cable TV filter, in our specifications, has a 55 dB notch under full temperature swing. At the extreme of conditions, it will maintain that 55 dB notch, and typically the center point at 72 degrees will be 68 or 70 dB."

Negative security devices are relatively cheap, priced around five dollars each in large quantities, compared to as much as \$100 per subscriber for converters/decoders. Installation costs are generally about the same, because the turnover, or "churn," in pay TV subscribers would be the same for positive or negative devices.

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Digital Compression Technique Allows Video Over Phone Lines

HOLMDEL, NEW JERSEY—Scientists at Bell Laboratories have demonstrated a new "bandwidth compression" technique that may make it possible to carry video signals over conventional copper-wire digital-carrier telephone lines.

"This technique can be used for videoconferencing and should help reduce the cost of transmitting such signals between remote locations," according to Arun N. Netravali, head of the Visual Communications Research Department at Bell Labs in Holmdel.

Television signals are commonly transmitted in analog form, requiring a medium able to handle a bandwidth of about 6 MHz. Typically, coaxial cables or microwave transmission systems are used because they can handle a bandwidth requirement of this nature while conventional telephone lines cannot.

In contrast, when the television signal is digitized, it requires about 64 million bits of information per second to represent a monochrome signal and over 100 million bits for a color signal. These millions of bits of information can be reduced by techniques of bandwidth compression.

"By digitizing the television signal and using a bandwidth compression technique," Netravali said, "we can compress the information into a 1.5 million bit-per-second signal that can be transmitted over wire pairs of our T1 telephone line."

Bandwidth compression, or more correctly "bit-rate reduction," reduces significantly the amount of information needed to reconstruct a video signal at the receiving end.

Previous bit-rate reduction techniques consisted of storing one frame of a video signal, comparing the incoming frame with it, and transmitting only intensity changes of picture elements in a new frame. These



A.N. Netravali (left) and J.D. Robbins, Bell Labs' Holmdel, N.J.

techniques, called "conditional replenishment," can reduce the transmitted bit rate from about 100 million to about 3 to 6 million bits per second without significantly degrading the quality of the video image.

Conditional Replenishment is an application of differential pulse code modulation where intensity differences between frames of video information are transmitted rather than frames themselves.

To accomplish this, each television frame is divided into two parts: one part which is practically the same as the previous frame and the other part (called the moving area) which has changed since the previous frame.

Two types of information are transmitted about the moving area: addresses specifying the location of the picture samples in the moving area, and information by which the intensities of the moving area picture samples

can be reconstructed at the receiver. Comparison with the previous frame intensities requires storage of an entire television frame, both at the transmitter and the receiver. Since the motion in a real television scene occurs randomly and in bursts, the amount of information about the moving area will change as a function of time.

To transmit this information over a channel, which works at a constant bit rate, the output of the encoder has to be smoothed by storing it in a buffer prior to transmission. In this buffer, the encoded data are read in at an irregular rate but they are read out to the channel at the constant bit rate of the channel. If the buffer gets nearly full, then certain samples are deleted from transmission, thereby reducing the resolution.

The visibility of the blur introduced by these strategies is low since it is

generally introduced when there is a large motion in the scene, in which case the human visual acuity is low. In the last 5 to 10 years several improvements of the conditional replenishment technique have been made, resulting in commercially available encoders.

A new, more efficient technique involves estimating the motion of objects in the scene and then comparing successive frames that are spatially displaced by that amount of movement. This scheme is referred to as "motion compensation" coding. Intensity comparisons are made between the location of the original picture element and its estimated location in the previous frame rather than between two picture elements at the same location in each frame.

Motion-Compensated Coding also uses a comparison of intensities between succeeding frames, but it does not compare the picture elements at the exact same location as is done in conditional replenishment.

Instead, encoding is performed by estimating the velocity of objects and

then using this estimate to compare intensities in successive frames which are spatially displaced by an amount equal to the distance the object has moved.

Thus, if in a frame time a point on an object moves from one location to another, then instead of comparing intensities at the same location in each frame as in conditional replenishment, the intensities between the two displaced locations are compared.

If the estimate of displacement is accurate, then the intensity difference between the original point and the point to which it moved is much lower than the intensity difference at the same location in two adjacent frames, resulting in a lower amount of information to be transmitted.

Algorithms for estimating translations of moving objects from frame-to-frame have been devised recently. They are simple to implement in hardware.

Computer simulations have shown that for many video-conferencing scenes, the bit rate can be reduced to as little as one-half to one-third that of

the conditional replenishment technique. Further development is required to reduce these computer simulations from the research stage to a practical system that can be put in service.

Although the quality of the "motion compensation" video at 1.5 million bits per second appears to be acceptable for videoconferencing applications, it would not be acceptable for TV broadcast quality transmissions. Image smearing can occur when there is excessive motion in the scene or when the television cameras are panned across a scene. In videoconferencing systems, the cameras are usually fixed in one position and there is very limited motion in the scene.

"Using T-carrier on single wire pairs for video signals is not only cheaper," according to Netravali, "but many localities that are now served only by single-pair T1 lines could use this system for videoconferencing in the future." The Bell System began installing this digital carrier system in 1962 and has over 70 million T1 carrier miles already in place across the country.



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Security, Competition Concern MDS Operator

C-ED Survey

By Glenn Chambers

There was some concern, and some disagreement, among operators of Multipoint Distribution Service (MDS) systems during a recent C-ED survey of their problems and future plans. As expected, those operators who specialized in supplying pay TV programs to subscribers apparently have more problems and concerns than those catering solely to industrial and commercial users.

One of the larger concerns of most pay TV MDS operators is over the security of their product from organized signal piracy. "It's bad enough that most experimenters and electronics buffs are building their own receiving stations," said one industry operator, "but when commercial manufacturers start selling to the general public, we have problems."

Being over-the-air services, MDS and Subscription Television (STV) are particularly vulnerable to theft of service since most people feel that anything transmitted through the air becomes public domain. They don't feel that it is either illegal or immoral to receive and decode the signals. The FCC, in their Public Notice #11850 of Section 605, takes a different view and states that it is unlawful to "receive and benefit" from or "receive and divulge"

the contents of common carrier signals.

To create even more headaches for MDS operators, **73 Magazine** (for radio amateurs) printed an article in August, 1979, on do-it-yourself MDS antennas and downconverters. Since then, at least one manufacturer, Lab-Tronics, has made available kits based on the **73 Magazine** article.

The only real recourse that MDS operators have from individual signal piracy is effective scrambling of the visual and aural carriers. An effective scrambling technique helps to ensure that those persons who build or buy an antenna and downconverter do not receive an intelligible signal.

According to one electronics instructor at a midwestern college, MDS signal decoding offers a challenge to his students. Part of their lab assignment is to design and construct an effective descrambling device for the local MDS signal. The signals derived are not sold or used, at least officially. Unfortunately, pay TV service via MDS is most effective financially in large cities, and most large cities have electronics schools and electronics manufacturing.

There are almost as many different scrambling schemes as there are manufacturers who want to produce them. Perhaps the simplest of all

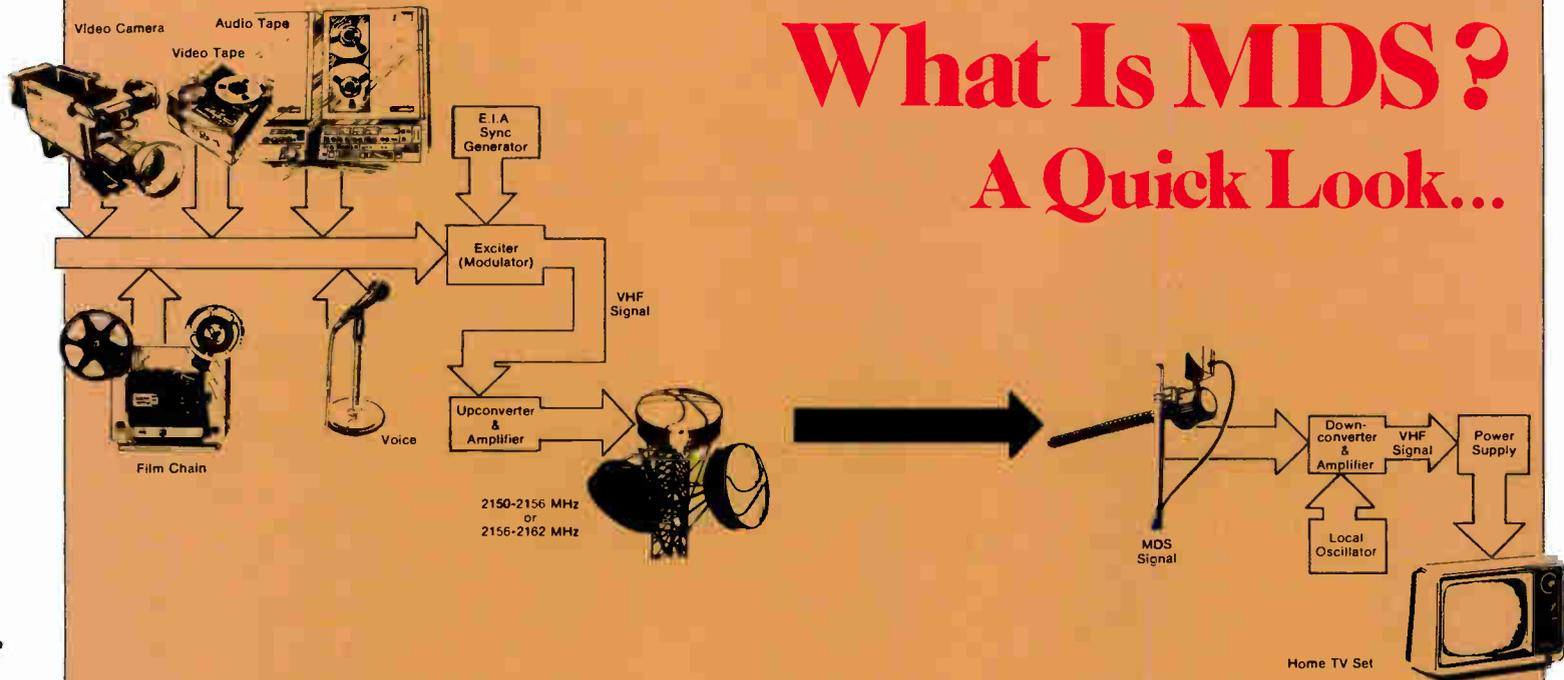
scrambling techniques is the insertion of one or more additional carriers about half-way between the visual and aural carriers. This "jamming carrier" is usually modulated with sine wave or other modulation which creates loss (or inversion) of sync and distorted sound in a normal TV receiver. Decoding is done with a passive notch filter which removes the jamming carrier. This method is probably least expensive of all the proposed scrambling techniques.

Other actual or proposed MDS scrambling methods include those currently in use or proposed for CATV pay channels. One of the most secure (and expensive) proposed methods for MDS security is the use of radio-addressable downconverters/decoders. These would be similar to cable TV addressable descramblers in that the scrambling (encoding) signals would be randomly selected by a computer. Decoding and addressing signals would be transmitted in the vertical interval, or on a separate, discrete frequency signal.

Another concern of MDS pay TV operators is the future viability of their product, if and when cable television systems are built in their service area. Non-pay TV MDS operators feel that there will always be an increasing market for their services as point-to-

What Is MDS?

A Quick Look...



Multipoint Distribution Service (MDS) is a common carrier microwave service authorized by the FCC to operate at relatively low frequencies. Occupying the bands between 2150 and 2162 MHz, MDS carriers provide specialized private TV programs or data to customer-selected locations, usually within large metropolitan areas.

Either of two six MHz channels are usually authorized: channel 1, 2150 to 2156 MHz or channel 2, 2156 to 2162 MHz are the specified MDS channels, with a four MHz data channel (2156 to 2160) designated channel 2A, used in some applications.

Originally intended to serve the needs for local data distribution, video-conferencing, and similar applications, MDS is now receiving considerable usage as the vehicle for local distribution of premium TV signals.

An MDS transmitter usually consists of two major components: an exciter and an upconverter/amplifier. It often includes a number of sub-assemblies, depending on the type of programming being transmitted and the type of program security utilized.

An exciter accepts standard video and audio signals from a variety of sources, including studio cameras, microphones, VTRs, satellite receivers, film chains, tape recorders, or other sources. Standard EIA sync is normally required. The exciter generates a standard television signal, much like a

standard CATV modulator, with an output signal level of approximately 60 dBmV. Output impedance is usually 75 ohms.

Output signals from the exciter are routed to an upconverter. Exciter signals are heterodyned against a local oscillator. The resultant 2150 to 2156 MHz or 2156 to 2162 MHz signals are then amplified using a linear traveling wave tube (TWT) or other device. Output power of the amplifier at this point is usually about ten watts visual and one watt aural, which may be increased, if desired, for area coverage.

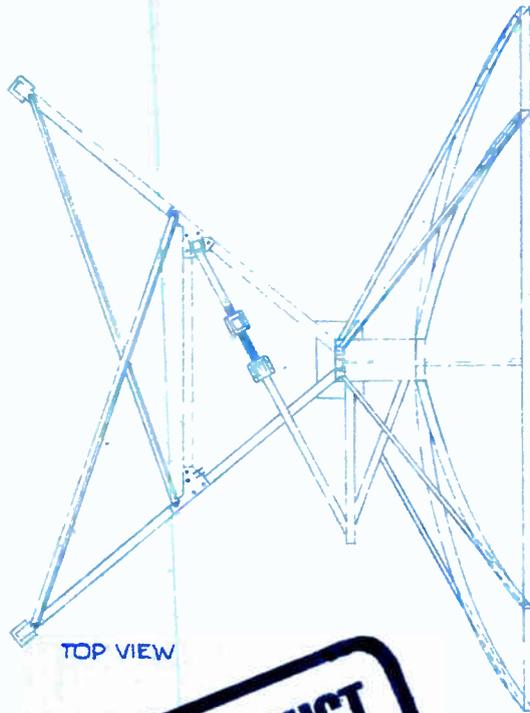
The amplified signals are then fed through a wave guide and then through the transmitting antenna. Antenna directional pattern is usually selected to give the best possible signal coverage to the area desired. Omnidirectional antennas are most common, but bidirectional and cardioid patterns have been used for special applications.

At the receiving site, an antenna and downconverter are required. Extremely directional antennas are used for maximum capture of the transmitted signals, and to reduce ghosting from signal reflection.

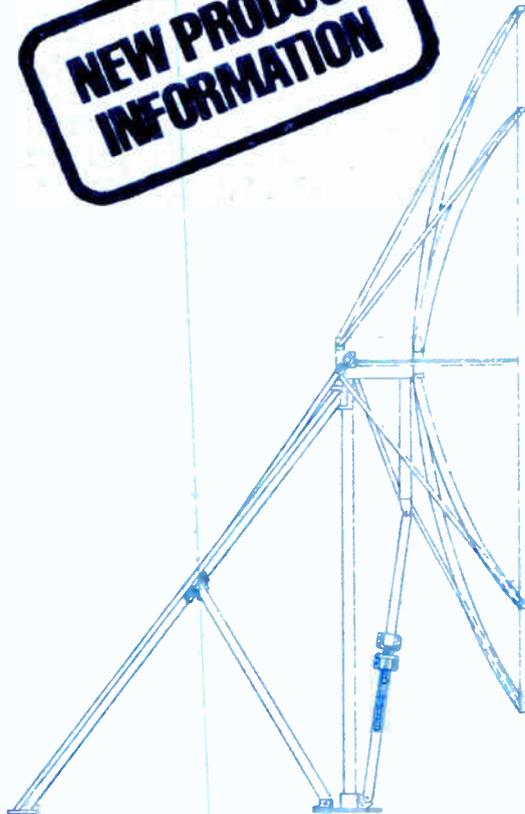
Within the downconverter, incoming signals are heterodyned with a local oscillator which may or may not be crystal controlled. Downconverter output signals, usually lowband, are routed to the TV set. Figure one shows the block diagram of a typical MDS transmitter and downconverter.

... MDS is now receiving considerable usage as the vehicle for local distribution of premium TV signals.

Gardiner's new 5.6 meter antenna: A classic case of "more for less."



TOP VIEW



SIDE VIEW

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New feed design

The feed for the Gardiner 5.6 dramatically improves polarity isolation and contributes significantly to the higher gain — greater than 45dB.

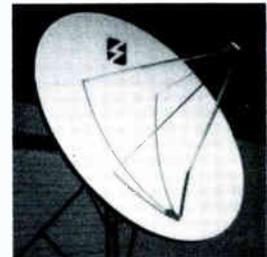
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Gardiner Communications Corporation
The earth station specialists

point communicators. They suggest that any MDS pay TV operator who feels threatened by cable television should start to investigate the potential for other forms of MDS programming in their area.

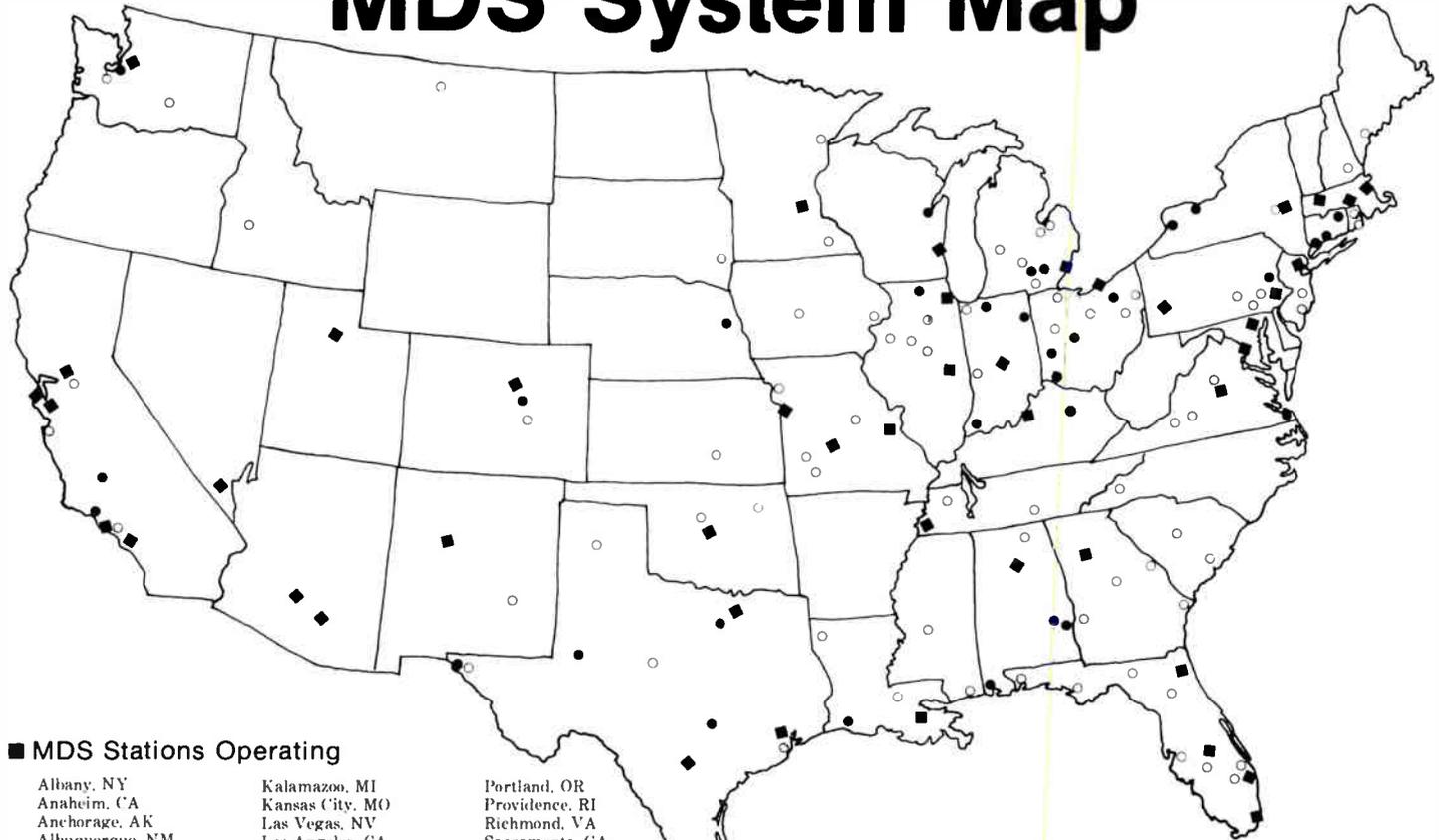
Overall, in spite of what some of the doomsayers are predicting, MDS operations are very much alive and well. Their pay TV operations are growing at an unprecedented rate and

the commercial/industrial operations are discovering new applications almost daily. There is an application pending with the FCC which, if approved, will give even more scope to the MDS spectrum. Newer, better and cheaper security systems are being developed and mass production will make them even more reasonably priced.

One solid fact that emerged during

the survey was that, no matter how well their system was doing, few people will admit that it is an unqualified success. It seemed that there was some sort of cloud hanging just out of sight and they either could not, or would not, verbalize it. Perhaps the common-carrier convention in Washington next month will give us a better idea whether there are any serious MDS problems ahead.

MDS System Map



■ MDS Stations Operating

- | | | |
|------------------|-------------------|--------------------|
| Albany, NY | Kalamazoo, MI | Portland, OR |
| Anaheim, CA | Kansas City, MO | Providence, RI |
| Anchorage, AK | Las Vegas, NV | Richmond, VA |
| Albuquerque, NM | Los Angeles, CA | Sacramento, CA |
| Atlanta, GA | Louisville, KY | St. Louis, MO |
| Baltimore, MD | Memphis, TN | Salt Lake City, UT |
| Birmingham, AL | Miami, FL | San Antonio, TX |
| Boston, MA | Milwaukee, WI | San Francisco, CA |
| Burlington, IA | Minneapolis, MN | Seattle, WA |
| Chicago, IL | New Orleans, LA | Springfield, MA |
| Cleveland, OH | New York, NY | Tampa, FL |
| Dallas, TX | Oklahoma City, OK | Tucson, AZ |
| Denver, CO | Osage Beach, MO | Urbana, IL (2A) |
| Detroit, MI | Palo Alto, CA | W. Palm Beach, FL |
| Fairbanks, AK | Phoenix, AZ | Washington, D.C. |
| Honolulu, HI | Philadelphia, PA | Worcester, MA |
| Houston, TX | Pittsburgh, PA | |
| Indianapolis, IN | Pompano Beach, FL | |
| Jacksonville, FL | | |

○ MDS Construction Permits Granted*

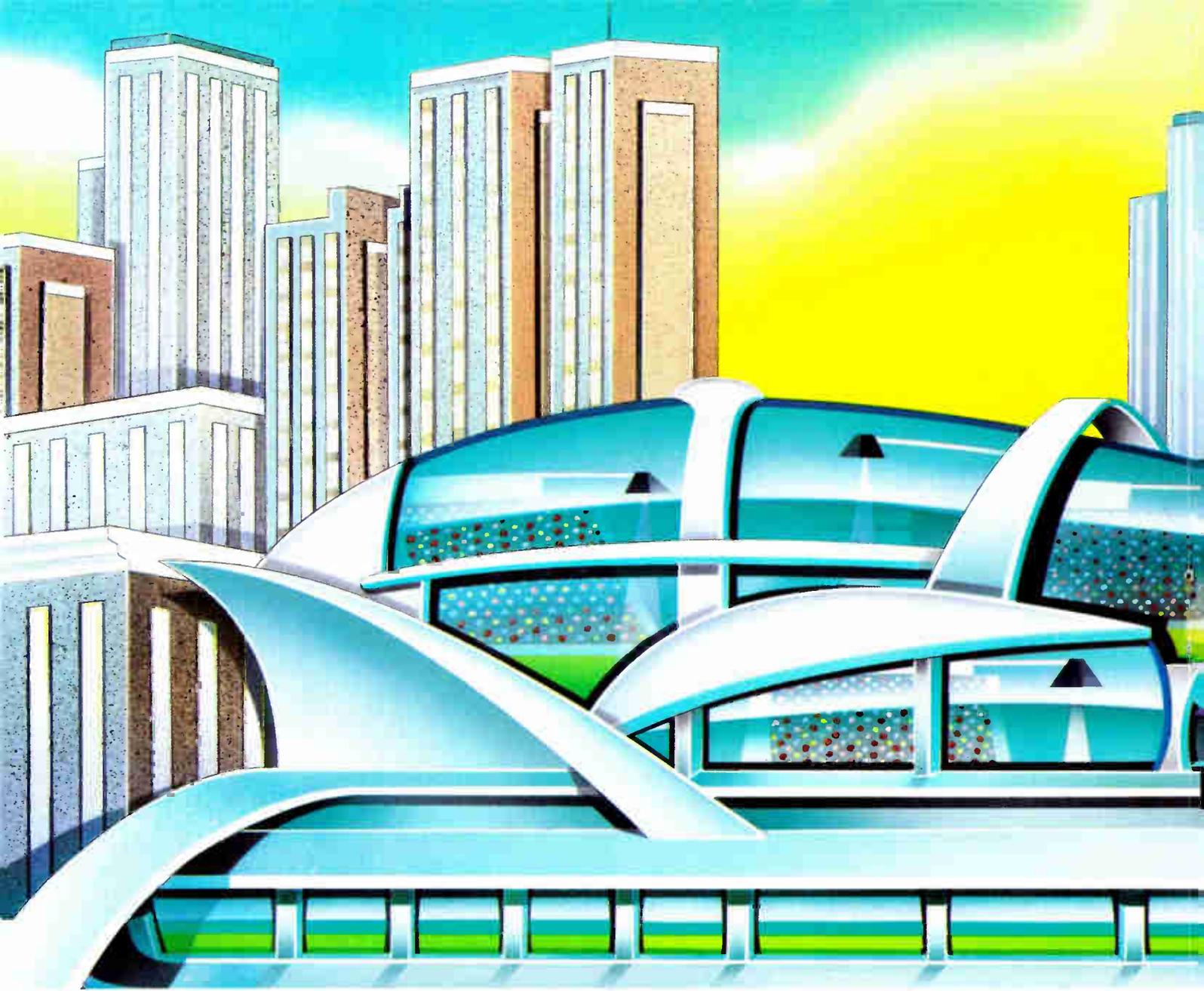
- | | | |
|---------------------|--------------------|-------------------|
| Abilene, TX | Flint, MI | Pensacola, FL |
| Akron, OH (2) | Frostproof, FL | Peoria, IL |
| Albany, NY | Gainesville, FL | Portland, ME |
| Amarillo, TX | Galesburg, IL | Providence, RI |
| Asheville, NC | Galveston, TX | Pueblo, CO |
| Atlantic City, NJ | Gary, IN | Reading, PA |
| August, GA | Gilroy, CA | Roanoke, VA |
| Baton Rouge, LA | Grand Rapids, MI | Rochester, MN |
| Bay City, MI | Harrisburg, PA | Roswell, NM |
| Biloxi, MS | Havre, MT | Saginaw, MI |
| Bloomington, IL | Huntsville, AL | St. Joseph, MO |
| Boise, ID | Jackson, MI | San Juan, PR |
| Bonita Springs, FL | Jefferson City, MO | Santa Barbara, CA |
| Buffalo, NY | Lakehurst, NJ | Savannah, GA |
| Canton, OH | Lancaster, PA | Shreveport, LA |
| Carthage, MO | Lansing, MI | Sioux Falls, SD |
| Charleston, SC | Lima, OH | Springfield, IN |
| Charlottesville, VA | Live Oak, FL | Springfield, MO |
| Cincinnati, OH (2) | Lynchburg, VA | Stillwater, OK |
| Columbia, SC | Macon, GA | Stockton, CA |
| Columbus, GA | Manchester, NH | Terre Haute, IN |
| Contra Costa, CA | Manchester, TN | Toledo, OH |
| Davenport, IA | Mansfield, OH | Tulsa, OK |
| Des Moines, IA | Martin, TN | Westerly, RI |
| Duluth, MN | Monterey, CA | Wichita, KS |
| Elburn, IL | Olympia, WA | Yakima, WA |
| El Paso, TX | Panama City, FL | Youngstown, OH |

● MDS Stations Licensed, Not On Air

- | | | |
|----------------------|--------------------|--------------------|
| Akron, OH | Evansville, IN | New Haven, CT |
| Allentown, PA | Ft. Wayne, IN | Norfolk, VA |
| Ann Arbor, MI | Ft. Worth, TX | Omaha, NE |
| Austin, TX | Green Bay, WI | Oxnard/Ventura, CA |
| Bakersfield, CA | Hartford, CT | Pontiac, MI |
| Bonita Springs, FL | Lake Charles, LA | Rochester, NY |
| Bridgeport, CT | Las Vegas, NV (2A) | Rockford, IL |
| Buffalo, NY | Lexington, KY | St. Croix, VI |
| Cincinnati, OH | Long Island, NY | St. Thomas, VI |
| Colorado Springs, CO | Midland, TX | San Juan, PR |
| Columbus, OH | Mobile, AL | So. Bend, IN |
| Dayton, OH | Montgomery, AL | Tacoma, WA |
| El Paso, Texas | | |

*There are 521 MDS Construction Permit Applications pending

Information Courtesy Paul Kagan Associates



VR-3X: Tunes manually across 24 channels with a single screwdriver adjustment.

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The Dow-Jones satellite network uses 11-meter Harris earth stations at every satellite printing plant location, with LNAs supplied by LNR and high power amplifiers supplied by Varian. The system integration was accomplished by engineers from Dow Jones & Co. Dual-dish installations were planned at several sites, including this one in Denver, but legal and regulatory problems prevented Dow Jones from getting into the common carrier business, as they had hoped. As a result, several of the plants have two concrete pads for dishes, but only one dish.

The DJ satellite system is in use only seven hours a day, according to Lee Glatt, Denver satellite operations supervisor, and the surplus time is available for commercial use.

Unlike electronic news media, national newspapers have the specific problem of getting their papers to distant subscribers while the news in them is still fresh.

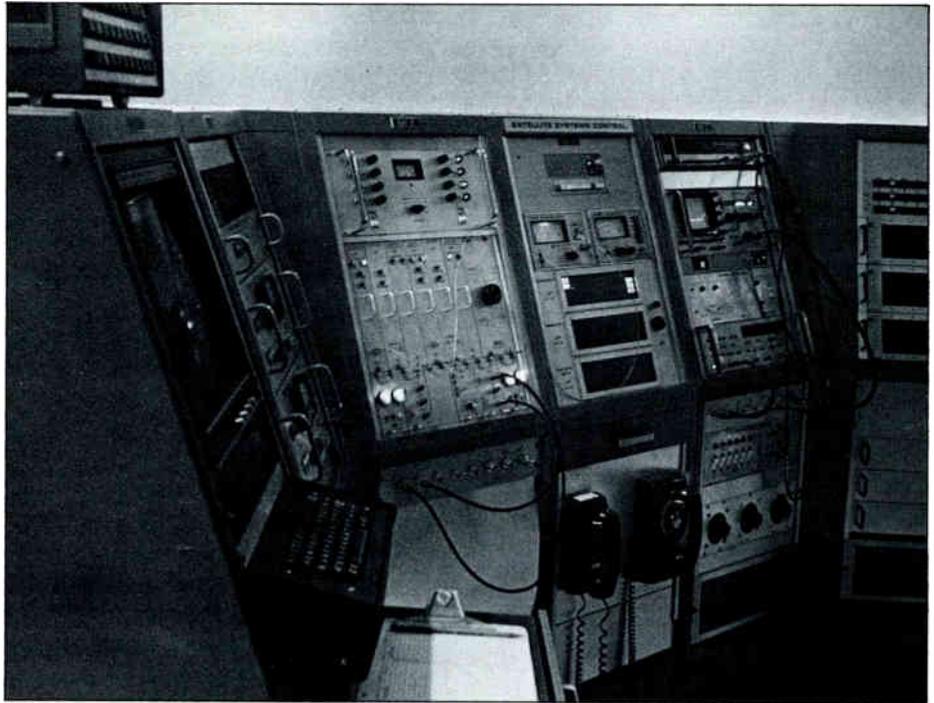
The few newspapers that do consider themselves to be national in scope, such as the **Wall Street Journal**, the **New York Times**, and the **Christian Science Monitor**, have had to distribute their issues by airfreighting them to the major metropolitan markets and rushing them to newsstands, usually arriving a half to a full day late.

The **Wall Street Journal** has worked toward faster delivery nationwide by building a satellite distribution network that transmits the editorial content of the paper to printing plants scattered across the continent. Seven printing plants are currently linked by Harris 11-meter dishes

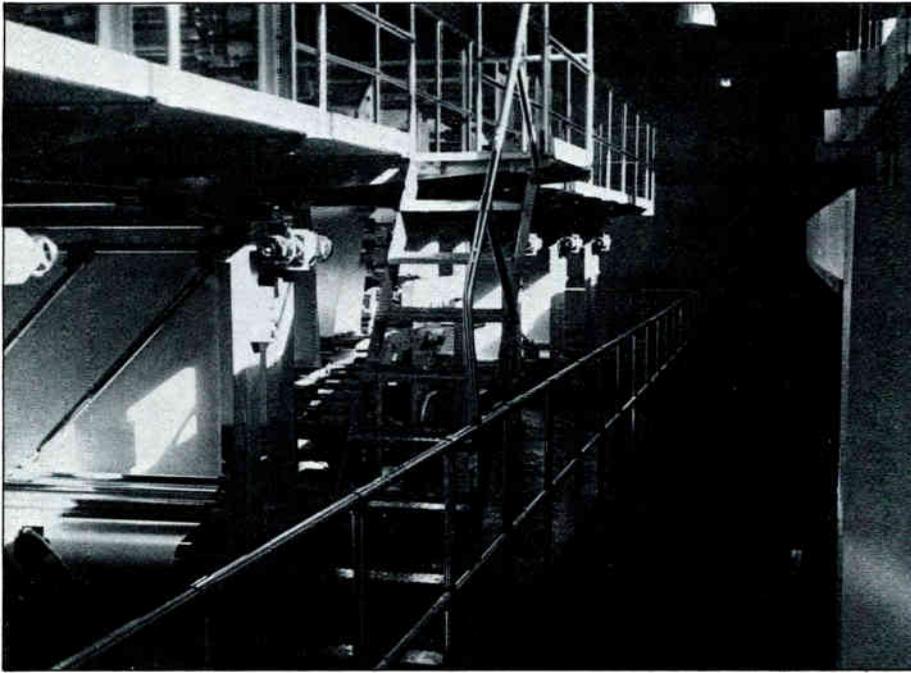
which look at Westar I. Plants are located in Palo Alto, California; Seattle, Washington; Riverside, California; Chickapee, Massachusetts; South Brunswick, New Jersey; Orlando, Florida, and Denver, Colorado.

In addition, four more plants are being built, and three are planned. Naperville and Highland, Illinois; Sharon, Pennsylvania, and Bowling Green, Ohio, are all expected to be on-line by the end of next year, and Beaumont, Texas; Lagrange, Georgia, and Charlotte, North Carolina scheduled to be completed within three years.

The paper's editorial offices are in the financial district of New York City, and composing rooms and advertising offices are located in Chickapee, Palo Alto, Naperville, Highland, Cleveland and White Oak, Maryland.



The Harris earth station control console dominates the **Journal's** Denver operation. In use only seven hours per day, the 11-meter dish system is used to bring the **Journal's** printing material down from Westar I.



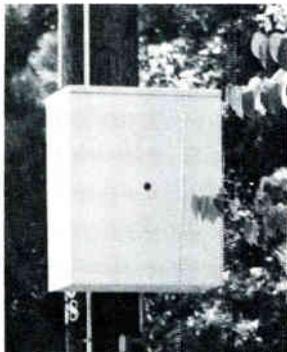
The **Wall Street Journal** pages are scanned and digitized by this piece of equipment developed by Dow Jones engineers in South Brunswick, New Jersey. Based on Muirhead facsimile recorders, the devices were modified to produce page negatives. The data is transmitted at 600

The **Journal's** combined nationwide circulation is around 1.8 million, according to national operations manager Glen Jenkins. The Denver plant circulates 58,000 copies daily in two editions. The first edition comes down from Westar beginning at 3 p.m., and this press rolls around 7 p.m. for the following day's distribution in Montana, Utah and New Mexico. The Colorado and Denver edition is printed at 9 p.m.

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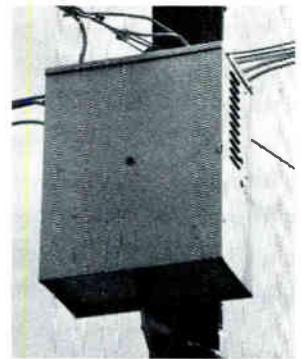
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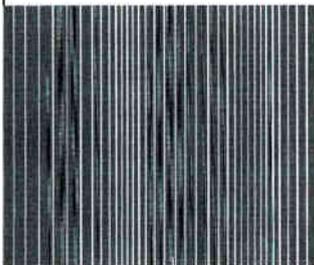
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Kbits/sec., using QPSK modulation. The scanner looks for changes in color density as it scans the original pages in the **Wall Street Journal** composing rooms. The device measures the amount of time that the color density registers either "white" or "black" as the scanning head passes across a spinning image drum.

Commission Proposes Luck As MDS Qualification

The Federal Communications Commission (FCC) is considering changing its method for granting MDS licenses. Currently, licenses are granted after a lengthy, and often expensive, hearing where all applicants are compared to see which would provide the best service.

The commission has held comparative hearings in the past on the assumption that one operator could be better at providing the service than the other. But, because MDS operations function as common carriers instead of broadcasters, the comparisons are irrelevant.

The commission is considering three alternatives: reviewing of written memoranda submitted by the applicants; a lottery; and auctions. The commission seems to be favoring the latter.

While the legality of auctions is being debated, the economic benefits to the FCC of auctions are quite apparent. Licenses would go to the highest bidder. By placing a price on the spectrum, the National Telecommunications and Information Administration (NTIA) reasons in its legal brief supporting the FCC's auction idea, the commission would learn how much the public desires having the spectrum put to specific uses. It could also learn whether more or less spectrum should be allocated to a particular use.

Under the proposed scheme, the applicants would file the necessary applications with the commission which show that they meet the minimum economic and technical qualifications. If the commission decides that there is a public interest issue in the applications, it could choose to use a paper evidentiary process. Otherwise, the commission would make a decision that all the applicants were qualified to serve the public interest technically and economically, and proceed with either an auction or lottery.

Part of the rationale for using an auction or lottery system is the lower court decision that "... luck is not an inadmissible means of deciding the undecidable."

CA-2500

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U.S. Tower's New System Sweeps Sky

Spherical Antenna Sees Eleven Satellites

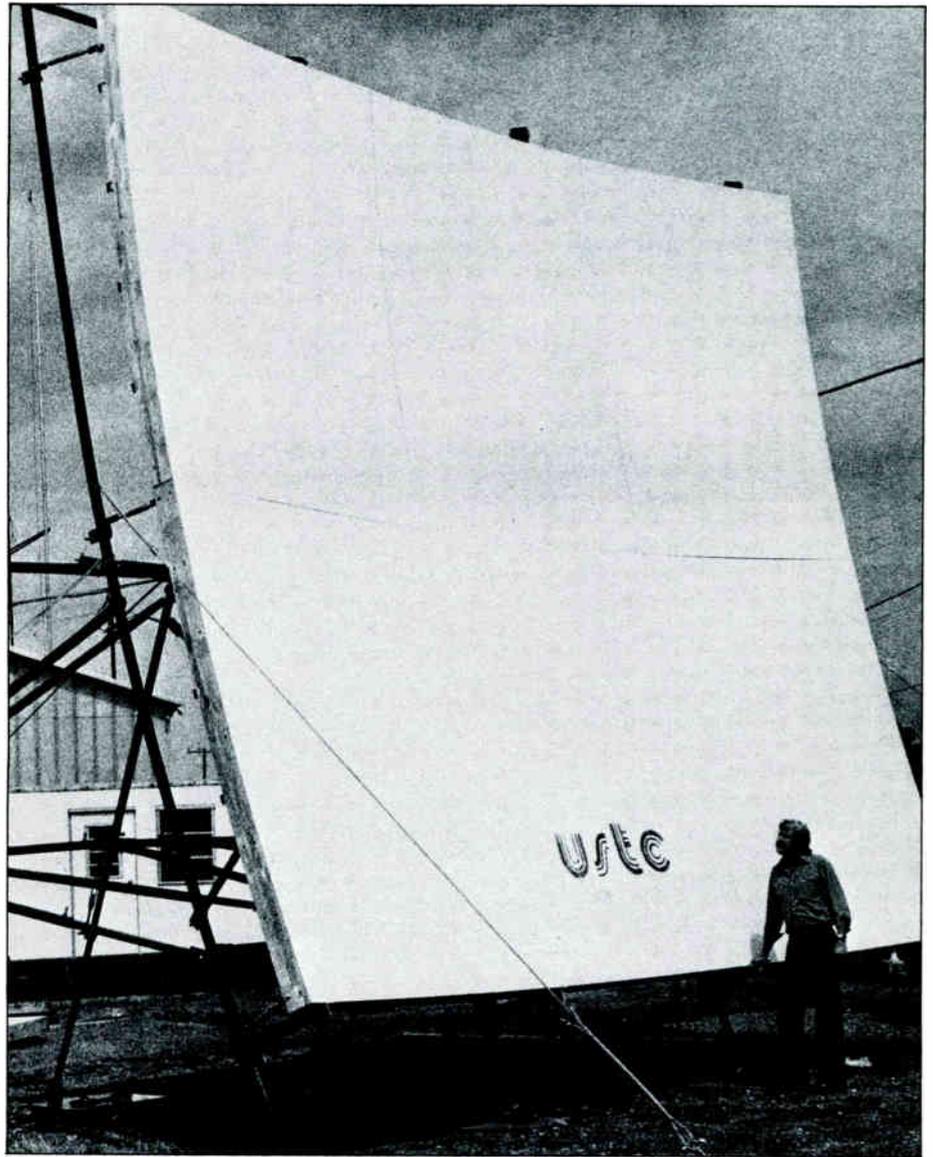
Earth station technology is advancing as rapidly as satellite technology, if the new product announcement from U.S. Tower is any indication. The Afton, Oklahoma company announced in August the availability of a spherical antenna capable of receiving up to 11 satellites simultaneously. Previous antenna designs from U.S. Tower and other companies limited reception to fewer satellites.

The unique design of the antenna allows the reflector, composed of rectangular panels, to be used in sizes from 12 by 12-foot to a 60-foot high and 72-foot wide rectangular structure, depending on individual requirements and geographic location.

Based on a "building block" principle featuring 8-foot by 10-foot rectangles, each antenna is custom designed and constructed as are the individual satellite feed horns. The number and location of the feed horns is determined by what satellites the user wishes to access. A square configuration is used when only one signal is required, and the design becomes rectangular as more signals are required.

The single biggest advantage of the new design is cost, according to U.S. Tower. The spherical antenna is less expensive than building a standard dish requiring the same performance, especially when compared with the eight-meter and larger diameter standard designs since the spherical reflector is fixed and only the feed horns are mobile. This means that the steel backup structure supporting the aluminum reflective surface can be built less expensively than a movable structure.

The 11 satellites providing signals to a single spherical reflector are RCA's F1 and F2, Comstar's D1, D2, and D3,



Western Union's Westars I, II, III, and the three Canadian Anik series satellites. RCA's F3 will be included in the group when it is launched and orbited later this year.

A 20-foot by 24-foot reflector a-

chieves a signal quality equivalent to a 5.6 meter dish looking at a single satellite. The spherical is tested for a minimum of 45 dB gain.

The smallest reflector U.S. Tower engineers recommend for a commer-

cial cable installation is the 16-foot by 20-foot model that achieves a signal quality comparable to a 4.5 meter dish. The advantage, the company points out, is that the spherical will be receiving the same quality signal from 11 satellites simultaneously, as opposed to the one signal received by the dish.

The 12-foot by 12-foot model is primarily for the private commercial industries such as hotels and motels, and will sell for around \$1,600. Larger reflectors are available for areas with lower signal reception to satisfactorily meet the needs of such areas as in the Caribbeans, Hawaii, Mexico, and remote areas of Alaska. A 40-foot by 48-foot model, providing signal quality equal to a 12 meter dish, is priced around \$75,000 delivered, and the large 60-foot by 72-foot model is over \$100,000.

The larger models are necessary for areas that have signals as weak as Intelsat areas, such as Southern Mexico, explained Leonard Mitchell, U.S. Tower's chief engineer. "We have worked closely with Intelsat and AT&T specifications during the development

program for the reflector," he said. "We tested our first prototype last October, and from then have been making improvements in quality and to bring the costs down so they would be accessible for even the smallest system."

Mitchell said that large dishes in low signal areas use expensive cryogenic preamplifiers that cost approximately \$35,000, but USTC's design enables the larger reflectors to use the GaAs FET low-noise amplifiers costing in the area of \$5,000 for the 80 degree Kelvin type. A domestic cable operator could use a 120 degree K type costing about \$1,350.

"Essentially," he explained, "this is what makes our design principle practical. The structure is designed to withstand stress loads of 125 m.p.h. winds with a half-inch of ice by using an all aluminum (.065 sheet) reflecting surface and an all-steel supporting structure. Then, by using mass produced 8' by 10' panels, the reflector can have a fixed azimuth which is custom tailored to each location ac-

ording to longitude and latitude," he said.

Further, each feed horn is custom built per the customer's requirements, and there is a built-in provision for adjusting the elevation of the reflector. Each panel is mounted on four turnbuckles to allow precise phasing of all reflectors to work together.

The company has already received a great deal of interest from cable systems throughout the U.S. and parts of Canada and South America. "Just about everyone is recognizing the fast approaching need to provide signals from more than one satellite," said company President Maynard Weathers, "and they see our reflector as an excellent way to maintain numerous quality signals for prices that would be about the same as two dishes," he said. Weathers referenced the fact that entertainment programming demands have exceeded a signal satellite, and more and more companies are interested in data and information signal transmission to make their operations more time and cost efficient.

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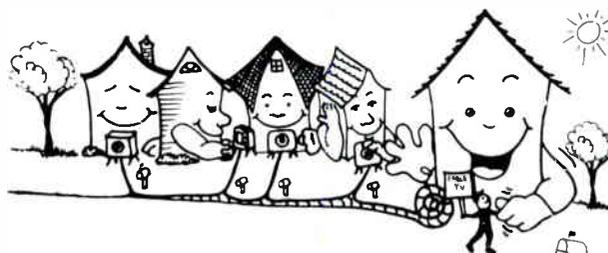
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CATV

Texscan Corp: 2446 N. Shadeland, Indianapolis,
Indiana 46219. (317)357-8781, TWX: 810-341-3184

Theta-Com: 2960 Grand, Phoenix, Arizona 85017,
P.O. Box 27548, 85061. (602)252-5021, (800)528-4066
TWX: 910-951-1399

Cable Programming For October

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders	Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders	
C-SPAN	Monday-Friday	9:30 a.m. to 6:30 p.m.	195*/#	F1, #9	Modern Talking Pictures		12 pm-5 pm (weekdays) 7 am-12 pm (weekends)	243*/#	F1, #22	
					Newstime		24 hrs.	276*/#	F1, #6	
CBN		24 hrs.	No	F1, #8	Nickelodeon					
ESPN	Monday thru Thursday	6:00 p.m. to 4:00 a.m.		F1, #7	PTL		24 hrs.	No	F1, #2	
	Friday,	6:30 p.m., to following Monday, 4:00 a.m.			Reuters			No	F1, #18	
Front Row		2:30 pm-2:30 am	481*/#	E,C F1, #12 P,M F1, #10	SPN	24 hrs. (Sun.)	429*/# auto switch to commercial, on/off respectively		F1, #21	
HBO	October 1	6:00 p.m.	2:00 a.m.	Program	F1, #24	517*, begin SPN Program segment, after Pay TV (10:30 p.m. Eastern, Monday-Saturday).	517#, end SPN Program segment, before Pay TV segment 8:00 p.m. Eastern, Monday-Saturday).			
	October 2	5:30 p.m.	2:30 a.m.	729*/#	F1, #22					
	October 3	5:30 p.m.	2:30 a.m.	Scramble	F1, #23					
	October 4	3:30 p.m.	3:39 a.m.	835*/#	F1, #20					
	October 5	3:30 p.m.	12:45 a.m.	Duplication						
	October 6	5:30 p.m.	1:42 a.m.	940*/#						
	October 7	5:30 p.m.	1:00 a.m.	Take-2 E.						
	October 8	5:30 p.m.	1:30 a.m.	592*/#						
	October 9	5:30 p.m.	2:00 a.m.	Take 2 W.						
	October 10	6:00 p.m.	4:15 a.m.	681*/#						
	October 11	2:30 p.m.	4:26 a.m.							
	October 12	2:30 p.m.	1:09 a.m.							
	October 13	5:30 p.m.	1:00 a.m.							
	October 14	5:30 p.m.	2:27 a.m.							
	October 15	5:00 p.m.	3:00 a.m.							
	October 16	6:00 p.m.	1:38 a.m.							
	October 17	5:00 p.m.	4:00 a.m.							
	October 18	3:00 p.m.	3:45 a.m.							
	October 19	2:30 p.m.	2:03 a.m.							
	October 20	6:00 p.m.	2:27 a.m.							
	October 21	6:00 p.m.	2:19 a.m.							
	October 22	5:00 p.m.	2:33 a.m.							
	October 23	5:30 p.m.	1:47 a.m.							
	October 24	6:00 p.m.	3:24 a.m.							
	October 25	2:30 p.m.	3:30 a.m.							
	October 26	2:30 p.m.	1:39 a.m.							
	October 27	5:30 p.m.	2:15 a.m.							
	October 28	6:00 p.m.	1:00 a.m.							
	October 29	5:30 p.m.	2:52 a.m.							
	October 30	5:30 p.m.	2:40 a.m.							
	October 31	6:00 p.m.	3:26 a.m.							
HTN		8 pm-10 (11) pm	517*/#	F1, #21	Showtime	October 1	3:30 p.m.	3:27 a.m.	576*/#††	E, C, F1, #12, P, M, F1,
KPIX (time permitting)		2-4 hrs. per day	No	F1, #1		October 2	3:30 p.m.	3:29 a.m.		
KTVU		7 am-1 am (weekdays) 7 am-4 am (weekends)	No	F1, #1		October 3	3:30 p.m.	2:27 a.m.		
USA Network			438*/#†	F1, #9		October 4	1:30 p.m.	3:00 a.m.		
	October 1	12:30 p.m.				October 5	1:30 p.m.	2:42 a.m.		
	October 2	12:30 p.m.				October 6	3:00 p.m.	3:29 a.m.		
	October 3	12:30 p.m.				October 7	3:30 p.m.	3:28 a.m.		
	October 4	10:00 a.m.				October 8	3:30 p.m.	2:53 a.m.		
	October 5	11:00 a.m.				October 9	3:30 p.m.	2:57 a.m.		
	October 6	12:30 p.m.				October 10	3:30 p.m.	2:30 a.m.		
	October 7	12:30 p.m.				October 11	1:30 p.m.	3:33 a.m.		
	October 8	12:30 p.m.				October 12	1:30 p.m.	2:31 a.m.		
	October 9	12:30 p.m.				October 13	3:30 p.m.	3:30 a.m.		
	October 10	12:30 p.m.				October 14	3:30 p.m.	2:50 a.m.		
	October 11	10:00 a.m.				October 15	3:30 p.m.	3:12 a.m.		
	October 12	11:00 a.m.				October 16	3:30 p.m.	2:03 a.m.		
	October 13	12:30 p.m.				October 17	3:30 p.m.	2:10 a.m.		
	October 14	12:30 p.m.				October 18	1:30 p.m.	3:01 a.m.		
	October 15	12:30 p.m.				October 19	1:30 p.m.	2:35 a.m.		
	October 16	12:30 p.m.				October 20	3:30 p.m.	3:42 a.m.		
	October 17	12:30 p.m.				October 21	3:30 p.m.	3:29 a.m.		
	October 18	12:30 p.m.				October 22	3:30 p.m.	2:53 a.m.		
	October 19	11:00 a.m.				October 23	3:30 p.m.	3:10 a.m.		
	October 20	12:30 p.m.				October 24	3:30 p.m.	3:35 a.m.		
	October 21	12:30 p.m.				October 25	1:30 p.m.	3:22 a.m.		
	October 22	12:30 p.m.				October 26	1:30 p.m.	3:31 a.m.		
	October 23	12:30 p.m.				October 27	3:30 p.m.	2:37 a.m.		
	October 24	12:30 p.m.				October 28	3:30 p.m.	3:31 a.m.		
	October 25	10:00 a.m.				October 29	3:30 p.m.	2:43 a.m.		
	October 26	11:00 a.m.				October 30	3:00 p.m.	2:30 a.m.		
	October 27	12:30 p.m.				October 31	3:30 p.m.	4:33 a.m.		
	October 28	12:30 p.m.								
	October 29	12:30 p.m.								
	October 30	12:30 p.m.								
	October 31	12:30 p.m.								
SIN		24 hrs.	No	Westar II #6	The Movie Channel		24 hrs.	311*/#E. 519*/#W.	F1, #5	
					Trinity (KTBN)		24 hrs.	No	F1, #14	
					WGN		5:42 am-3 (3:30) am (Mon.-Thurs.) 24 hrs. Sat. & Sun. Ends 3 am on Sun.	No	F1, #3	
Calliope		10:00 a.m. to 1:00 p.m. Saturdays and 6:30 to 7:30 weekdays. No Sunday.			WOR		24 hrs.		F1, #17	
English Channel		Sundays 10:00 p.m. to 12:00 p.m. and Tuesdays following sports (approximately 10:00 p.m.)								

E = eastern
C = central
M = mountain
P = pacific

All program times are listed for the eastern time zone, unless otherwise noted.

† Commercial substitution 601*/#; Thurs. baseball 706*/#.
†† On-line 679*/#; off-line 753*/#; access 843*/#.

TEST TODAY

THE MDS ANTENNA...

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During the last three years, we at TEST have worked with MDS operators across the country to develop the products needed now and in the future.

MDS operators have asked for an antenna that is rugged, has low wind loading, is cost effective and is designed for easy installation.

We are proud to present TEST's lightweight MDS ANTENNA which is made of corrosion resistant steel and is designed to be strong, easy to assemble and erect.

The TEST Antenna is designed for long life and trouble free service, with a dipole that is pressure tested to keep water out. The end result is a system that will keep working even in the most extreme weather conditions.

Available in 3 sizes, the TEST Antenna meets your medium, high, and extra-high gain requirements.

New TEST Downconvertors

Test produces a complete line of MDS Receiving equipment for both residential and MATV systems—Products include: Antenna/Downconverter combinations for ease of installation, Crystal Controlled units for extreme stability and Low Noise units for low signal areas.

From Close-In to Deep Fringe reception areas, TEST has your equipment requirements covered.

Details and performance specifications on this and all products are available on request, please call (213) 989-4535.

TEST

Tanner Electronic Systems Technology, Inc.
16130 Stagg Street, Van Nuys, California 91409



Cable

Vitek Offers Jumper Trap

Jumper traps that can filter the output levels of settop converters to prevent set overloading are available from Vitek Electronics of Edison, New Jersey.

The distortion in TV pictures caused by converter overloading shows up as distortion or a beat in the TV picture, and is caused by inadequate filtering of the upper adjacent video carrier at the converter output.

The Jumper Trap is a combination jumper cable and upper adjacent video notch filter, and is installed between the set top converter output and the subscriber's TV set.

Vitek Jumper Trap eliminates the need for a jumper cable, and its male/female connectors insure easy installation.

For more information, contact Vitek Electronics at Four Gladys Court, Edison, New Jersey 08817, or call (201) 287-3200.

Earth Station

Compact Switch Module Permits Centralized IF and Video Switching

A compact control module that switches IF and video frequencies for applications such as microwave routing, and satellite and cable TV channel selection, is being introduced by Tele-Engineering Corporation of Framingham, Massachusetts.

The Tele-Engineering PVS Switch Module is a control board that permits switching of IF and video frequencies from a single, compact housing. For application flexibility, it incorporates 12 coaxial connectors that offer various input/output configurations, such as 4 coaxial form C contacts, or 11 inputs on 1 output. Isolation is better than 100 dB between contacts.

Incorporating a replaceable, self-contained power supply, the Tele-Engineering PVS Switch Module is available for IF, video, video with audio follow-on, or tone activated switching. A single 5½" × 9½" × 19½" housing accommodates up to 4 modules that can

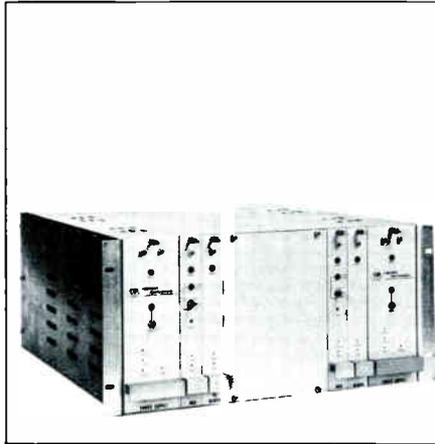
be manually or remotely controlled, or supervised by a 7 day programmable event selector.

Literature is available. For infor-

mation, contact Tele-Engineering Corporation, Ernest O. Tunmann, 2 Central Street, Framingham, Massachusetts 01701, or call (617) 877-6494.

COMTECH Introduces Terrestrial Microwave Systems

Comtech has introduced the Model M-100, designed to retrofit any existing terrestrial microwave radio system with high-speed digital capabilities ranging from 40 Kb/s to 3 Mb/s.



The unit's quadrature phase (QPSK) modulation technique provides high efficiency packing for fully loaded networks. The basic configuration incorporates modulator, demodulator and power supply modules housed in a tray designed for 19-inch rack mounting. The tray can accommodate a single modem, dual modems, or a single modem with a hot standby and automatic switch. The optional switch monitors the on-line modem and switches to the standby modem upon fault detection. The tray will also

accept two power supplies that can be arranged to operate independently or in an OR'ed configuration.

To accommodate system needs the Model M-100 is provided with a variety of IF and digital interfaces and options. The group band option is provided with 75 ohm unbalanced or 130 ohm balanced IF and either V.35 or RS-449 digital. The super group modem is provided with 75 ohm IF and V.35 digital. The DOV option has a 75 ohm IF and V.35 or T-1 digital. The DOV modem operates anywhere in the baseband of the microwave radio.

Front panel controls provide for manual IF and data loop-back functions. These controls and other modem status indications are available via rear panel connector for interface with existing microwave status and control systems. Units incorporating redundancy can be configured for remote switching.

The Model M-100 is highly filtered and does not require additional external filters for interface with the microwave system. At C/N of 25 dB, error performance is greater than 10⁻⁹. At the C/N of most domestic terrestrial microwave networks, the Comtech Model M-100 will operate virtually error free.

For additional information, contact Comtech Data Corporation, 613 South Rockford Drive, Tempe, Arizona 85281, or call (602) 968-2433.

New Equipment Automatically Inserts Commercials On Toned Satellite Programs

Channelmatic, Inc., Alpine, California-based manufacturer of satellite tone switching and custom control systems, has developed a totally automatic system for inserting VCR-based commercial spots into the slots provided by program suppliers such as Cable News Network.

According to Bill Killion, president of Channelmatic, most program suppliers that offer the option to insert local advertising are surrounding the time slots with high-speed four-digit DTMF codes. The new equipment

utilizes these codes to control VCR automation and switching equipment, thereby inserting the spots automatically.

This equipment makes it very profitable for the cable operator to sell low-cost time on such services. In the past, the requirement for a full-time operator—as well as the almost impossible task of inserting the commercials manually—have resulted in little use of the local time slots.

Literature and applications information is available from Channelmatic, Inc., 2232 Lindsay Michelle Drive, Alpine, California 92001, or by calling (714) 445-2691.

Miscellaneous

ECC Introduces Two Thick Wall Heat-Shrink Cable Sleeves

Electronized Chemicals Company, a division of High Voltage Engineering Corporation, announced immediate availability of two Insultite™ Thick Wall Cable Sleeve heat-shrinkable lines: ITCSF, a flame retardant product line, and ITCSN, a non flame retardant line.



Both ITCSF and ITCSN products, by retaining toughness and weather-

ability, are ideal for a variety of aerial, underground and URD direct buried applications. ECC cable sleeves readily conform to a wide range of connector and splice configurations. Thanks to shrink ratios of up to four to one and a large choice of tubing sizes, they insure snug and water resistant fits—without cracking or splitting.

ECC Insultite cable sleeves are available with adhesive sealants to

satisfy most environment sealing requirements, or uncoated for electrical protection. Standard cut lengths range from six inches to 48 inches. Custom lengths are available upon request.

Free testing samples and specification sheets are readily available by contacting ECC Customer Service, Electronized Chemicals Company, Burlington, Massachusetts 01803, or by calling (617) 272-2850.

Case Offers

Complete Line of Cable Plows

Case now offers seven different models of single purpose cable plows from 18.6 kW (25 hp) to 58 kW (78 hp), including the Mini-Sneaker, Maxi-Sneaker, 30+4, DH4, DH5, DH7 and the 475 Cable Layer.

The 26.1 kW (35 hp) Mini-Sneaker, equipped with the P40 plow, direct-buries cable up to 475 mm (18") deep. The 26.1 kW (35 hp) Maxi-Sneaker, also equipped with the P40, and the 22.4 kW (30 hp) 30+4 with P60 plow, both bury cable down to 610 mm (24"). 32 kW (43hp) DH4 and 44 kW (59hp) DH5 units with P60 plow bury cable a

maximum of 762 mm (30") deep. The 53.7 kW (72 hp) DH7 with P80 plow also buries cable to 762 mm (30") deep. And the largest of the Case single-purpose cable plows, the 58 kW (78 hp) 475 Cable Layer buries up to 51 mm (2") O.D. cable to 914 mm (36") cover depths.

All Case line-layers feature hydrostatic drive. Rubber-tired units (all models except 475) have heavy-duty differentials and articulation for mobility and traction. The Case 475 is an integral crawler-vibratory plow especially designed for large utility and utility contractor jobs.

Case line-layers feature a patented

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- for UPI NEWSTIME
- for special services

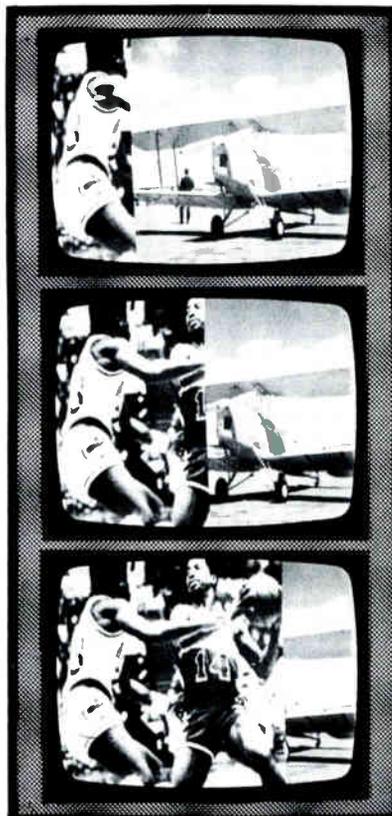
Add a few hundred video channels to your cable system through use of Colorado Video Slow Scan TV equipment.

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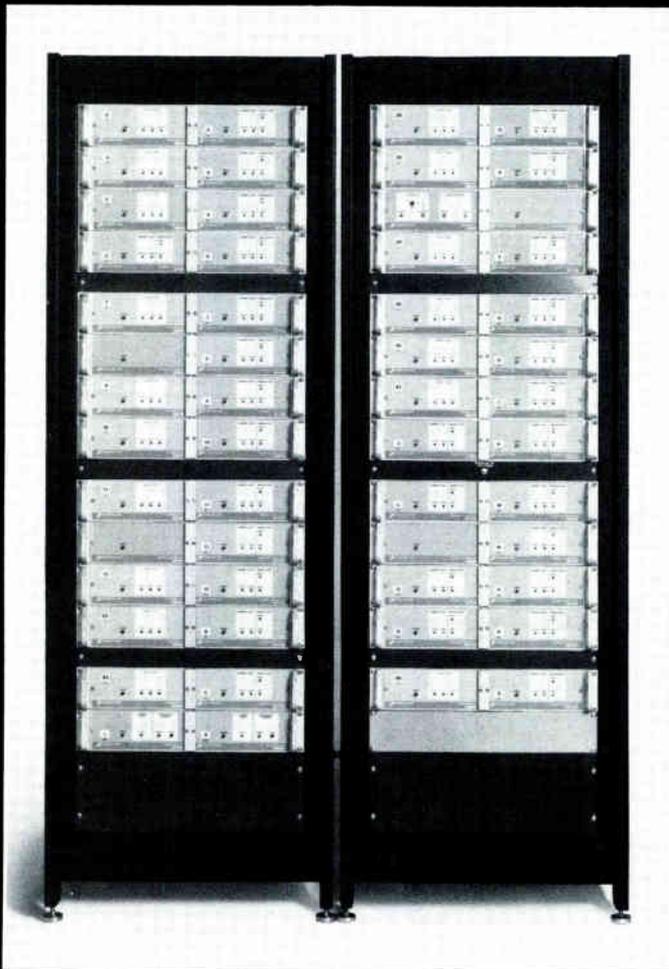
Contact us for technical specifications and applications notes.

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hinged drop chute with a removable gate which isolates vibration from the line being buried. And it permits restringing service loops without cutting lines.



As on all Case line-layers, the line-layer itself attaches to the drive unit with an eight-point suspension system with rubber bushings to isolate the vibration from the drive unit and operator.

Case cable plows have no long exposed drive shafts that can catch on

clothing or other objects. Perfectly balanced eccentric weights, which create the vibratory action, are completely enclosed. On the DH series models and the 475 cable layer, vibration speeds can be independently and infinitely controlled. Patented skid-shoes hold to edges of the cut, and constant hydraulic down-pressure assures that lines are buried at the required depth.

C-COR Electronics, Inc. Introduces Quad Line Extenders

C-COR Electronics has introduced a new series of Line Extender Amplifiers utilizing quad circuitry with bandwidths of 300 or 400 MHz with 28 and 31 dB gain. The Quad Extender Amplifier gets its name because it contains a quad circuit which consists of four transistors mounted on a common substrate and heat sink. The hybrid extender amplifier which utilizes a hybrid integrated transistorized circuit RF amplifier is becoming difficult to produce in the quantities necessary because the demand for hybrid units

Feed-type or pull-through bullet-type blades are available for varying depths. And for tougher plowing conditions, Case APC (Adverse Plowing Conditions) blades increase production footage, especially in hard, tight or clay soil conditions.

For further information, contact J.I. Case, Light Equipment Division, P.O. Box 9228, Wichita, Kansas 67277, or call (316) 945-0111.

has increased beyond the manufacturers' ability to supply. C-COR has produced the Quad Extender Amplifier to ensure deliveries on schedule and to meet our customers' requirements.

The Quad Line Extenders feature optimized carrier-to-noise ratio since the equalization and slope control are located interstage. This is especially beneficial when extender amplifiers are cascaded. The Quad Line Extenders were designed in the exact physical configuration as the presently produced hybrid Extender Amplifiers and will retrofit to previously manufactured C-COR equipment. The other circuitry

the sam II saves you time!
The digital frequency control lets you select a channel quickly with no peaking errors.



This meter provides you these features for \$1,495.00

This METER also features:

- An Internal Calibrator
- A full 4MHz to 300MHz
- A built in spectrum analyzer
- A % hum modulation circuit

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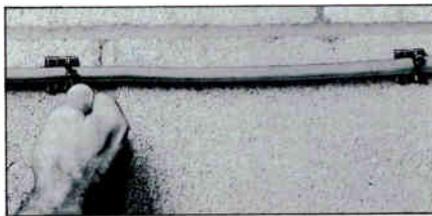
such as gain control, plug-in equalizers and pads are identical to those used in the hybrid extender amplifier.

The Quad Line Extenders are covered by C-COR's two-year warranty. In fact, preliminary information shows that the Quad Line Extenders run cooler than their hybrid equivalents due to massive heat spreader and heat sink in the new C-COR design. C-COR equipment has always been known for its reliability and it is felt that the cooler operation of the Quad Line Extender will enhance the reliability of the product.

For further information, contact Fred C. Kummer, 60 Decibel Road, State College, Pennsylvania 16801, or call (814) 238-2461.

Epoxy-Applied Cable Tie Mounts

An epoxy-applied mount for securing cables and wires to most surfaces including concrete and masonry is announced by Panduit Corporation Electrical Products Group, Tinley Park, Illinois.



The mount is available in black weather resistant nylon for outdoor use (Part No. EMS-A-O) and natural nylon (Part No. EMS-A). It is used with any PANDUIT™ miniature, intermediate or standard cross-section cable tie to provide a quick, economical, dependable method of mounting.

Typical applications of the mount are in cable TV, communications or electrical construction where a reliable, secure mount is required outdoors, in basements on steel, aluminum, glass, wood or virtually any masonry surface. The mount reduces total installation cost by eliminating labor needed to drill holes and install anchor bolts. The mount is designed for use with EMA epoxy and, when properly applied, has a pull-off force exceeding 60 pounds.

Design features include: integral finger grips along the edge of the mount allows the mount to be held by the fingertips, thereby keeping installers' hands free of epoxy; and dovetail channels in the base improve mechanical bond strength. Panduit offers EMA epoxy mixer cups packaged with mixer sticks. The epoxy can be mixed in less than a minute.

Two types of kits are available for MRO and construction applications. One kit contains three weather resistant mounts and one cup of epoxy with mixer stick. The other kit contains 12 weather resistant mounts, four cups of epoxy with mixer sticks and 12 weather resistant cable ties.

The epoxy-applied mounts, epoxy mount kits, and the full line of PANDUIT™ wiring products are sold only through Panduit Electrical Products Group Distributors nationwide.

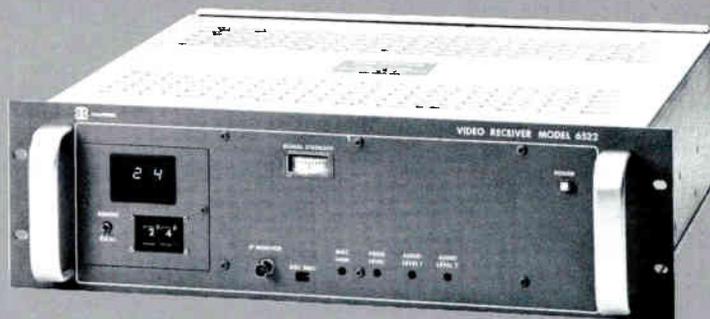
For further information on the epoxy-applied mount, contact Panduit Corporation, 17301 Ridgeland Avenue, Tinley Park, Illinois, or call (312) 532-1800.

The Harris Satellite Video Receiver..... Quiet Quality

Quietness is Important.

- A quality video receiver is silent and invisible, processing signals with no degradation. The sound and video fidelity of Harris Model 6522 Receiver is outstanding.
- A quality video receiver must reject noise. Under low signal conditions when pictures from other receivers break up, Harris Model 6522 delivers good video. Our tracking filter demod* makes the difference.
- A quality video receiver must do its job without demanding attention. Install a Harris 6522 Receiver, then ignore it. You'll get reliability. If it fails (nothing is perfect forever), call our 24-hour telephone service number (305) 724-3000.

*Patent applied for.



FEATURES:

Frequency agility, local or remote control; automatic polarization switching; dual conversion.



COMMUNICATION AND
INFORMATION PROCESSING

HARRIS CORPORATION Satellite Communications Division
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TELEX 56-7488

Don't compromise.

Now one pay TV hardware system has enough flexibility to meet you on your own terms.



The Jerrold Starpack® system . . . the world's best-selling converter line . . . is now the world's most complete pay line.

The Jerrold converter line, installed in more homes than any other, is now available with all these pay delivery options . . .

- **Multi-channel descramblers** built into our converters for descrambling on all channels.
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- **New Midband terminal** with built-in multi-channel descrambling.
- **New converter adapter** adds multi-level pay to existing converters.
- **New addressable control** of all terminals through our new head-end computer controller system.

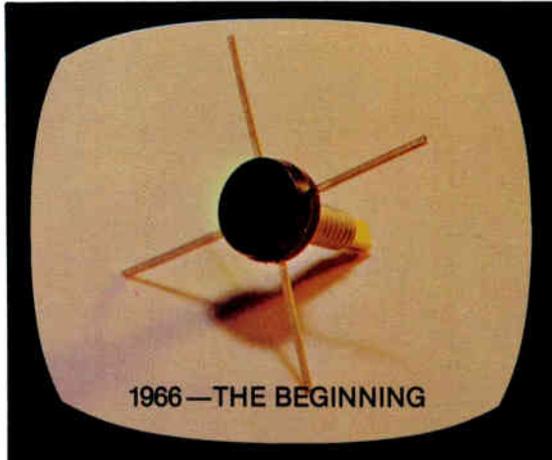
All elements are compatible. Start now with the configuration that meets today's needs and be confident you can upgrade to meet tomorrow's opportunities.

For information, contact General Instrument Corporation, Jerrold Division, 2200 Byberry Road, Hatboro, PA 19040, 215-674-4800, 800-523-6678; in Pennsylvania only, 800-562-6965.

**Jerrold . . .
systems you can build on.**

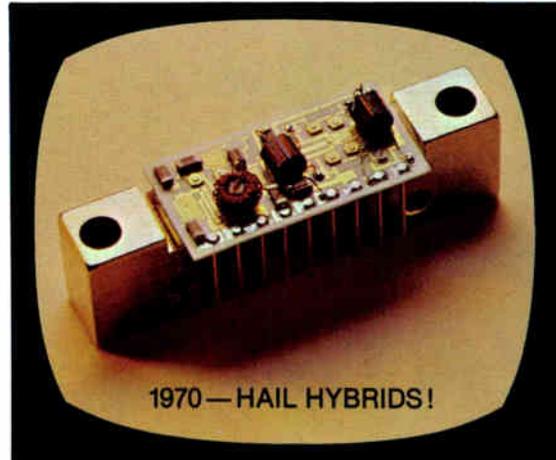
GENERAL INSTRUMENT

Four Major Milestones in CATV Amplifiers.



First transistors made and characterized especially for CATV amplifiers.

From TRW, of course.



First hybrids for CATV. Elimination of interconnects provides inherent increase in reliability, ease of field repairs. Improved performance over discrete amplifiers.

TRW does it first. Again.



First hybrids with all gold systems, the optimum for ruggedness and reliability. Gold die with ballasting resistors and fine geometry has dramatically improved the performance.

And TRW is first. Again.



We started 1980 as the first and only supplier with 34 dB gain. And we're not stopping. Ahead is the next generation with radically-improved noise figure and output capability.

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The Linear Amplifier Planbook

Published by: A.P. Systems, P.O. Box 488, Milford, PA 18337

This is largely a collection of Motorola publications for those who are interested in building linear amplifiers. Although the headings are directed toward hams, most of the circuits are of more interest to CB operators, since they cover low-frequency (27 MHz) circuits.

If you want to build a good CB linear, this book may be worth the \$11.95 price. Then again, you might just want to write to Motorola and get their Engineering Bulletins.

Good luck to all you who build them. Hope Uncle Charlie or the local CATV tech doesn't catch you with a kilowatt linear.

We give the Engineering Bulletins a three star rating.

Rating: *****

Engineer's Notebook Published by Radio Shack, a division of Tandy Corporation. Cost: \$2.49 Author: Forrest M. Mims, III First Edition, Second Printing—1980

This is a notebook of technical drawings and circuits for the experimenter. Mr. Mims has done his usual excellent job on this notebook. It is filled with a large cross-section of the circuits most people like to build and build upon.

It starts with a review of the basics which is not at all the usual deadly dry rendition. It continues with a section on MOS/CMOS circuits which includes gate packages, combinational logic, sequential logic, RAMS and music chips. TTL/LS integrated circuits, and a large section on Linear Integrated Circuits round it out for complete coverage.

Written in a lab notebook style, this is one of the better treatments that we have seen. If you are a builder or tinkerer, or have any interest in circuits, this is the book for you. We give it our highest five star rating. —Glenn Chambers

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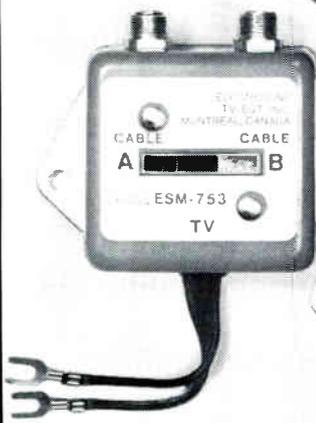
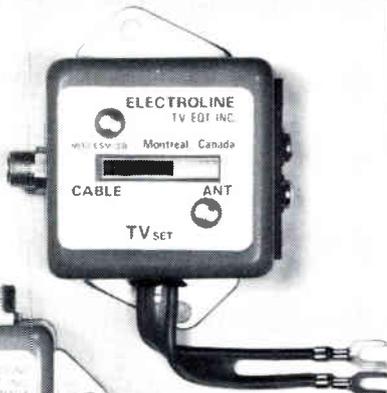
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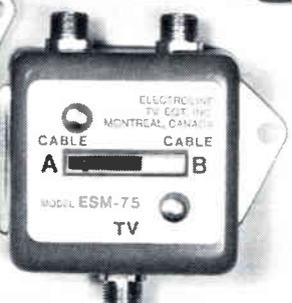
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Quiet Confrontation In Bloomington

CATV operators were warned several years ago of the dangers to the CATV industry posed by Multipoint Distribution Services (MDS). Similarly MDS operators were warned of what could happen to their businesses if cable operations moved into their territories.

Bloomington, Minnesota, has witnessed such a confrontation. Originally wired for cable by TCI in the early 70s, and subsequently sold to Storer, the Northern Cablevision system in Bloomington is a 35-channel dual-trunk two-way operation. Among their premium offerings is Home Box Office (HBO).

Cox announced plans to operate an MDS system featuring HBO originating from downtown Minneapolis, just a few miles away, in 1977. A representative of Cox visited the Northern Cablevision office, according to Northern's manager Stephen Nierengarten. "They said they were coming in with a premium channel, and said that since they were also engaged in cable operations elsewhere, they wanted to keep a good rapport with cable operators in their MDS area," he said. "We had some apprehensions at first, but in fact things have worked out quite well.

"Essentially, in my market they have gone in to complexes that haven't wanted cable. The MDS system can go in with a minimum of trouble. They hook directly to the MA (Master Antenna) system.

"The main objection apartment building owners have against cable is external wiring. When we try to sell these complexes we have to externally wire them, and the owners are extremely reluctant to have the wires all over the outside of their buildings, so it has become sort of a closed market to us. The MDS people have been free to go in there, and its O.K. with us.

"We have yet to run into a building where they have had an MDS service and wanted to change to cable. There are a couple of places where it might come up, where its just a matter of time before they want to accept external wire."

Nierengarten expressed hope that the peace would continue between the cable operation and the Cox MDS system, but pointed out that conflicts were always possible, especially since they were both carrying HBO. The only real problem he foresees concerns the cable system's right to penetrate into buildings that are already under contract with Twin Cities Home Theatre.

"They have apartment owners sign contracts, the same type of contract that we have them sign," he said. "It gives Cox the right to be the exclusive distributor of communications services in that particular building. Now, we can do that because we are the franchise holder in this community. If we want to go into a place that is already under contract with Cox, and the tenants want us in, I don't think they can restrict us from going in there just because of their contract.

"But it hasn't come up yet."

Twin Cities manager Terry Presely agreed that the CATV-MDS confrontation was anything but heated. "The cable

System Profile

operators feel that we are not a threat to them," he said. "The big fear that went around four or five years ago was that the minute cable came to town MDS was out.

"We have found it to be not true. If anything, we are being competitive. We have lost very few of our apartment complexes to cable. We have lost two, maybe three, in three years. There are a few complexes that we have been serving jointly, but generally our biggest advantage is that a lot of the apartment complex owners don't want to see a lot of cables and wires running around on the exterior of their buildings."

Presely said that since people in the Minneapolis area can receive five or seven channels off the air, depending on location, the demand for full service cable is low. "The biggest thing they are looking for around here is the premium channel," he said, "something special with movies, sporting events, entertainment and that kind of stuff. We have found that apartment owners feel the same way."

The Twin Cities system leases most of their gear from Microband, and uses an earth station owned and maintained by General Communication, a local cable company.

Northern Cablevision personnel couldn't think of any major technical problems caused by the proximity of the MDS service, but had plenty to say about radio station WDGY, a 50,000 watt/AM radio giant located in Bloomington.

"The radio station is right in the middle of the city," Nierengarten said. "The cable systems completely surrounds their transmitting tower. That tends to play havoc with us a lot. We have a local origination studio, and a public access studio. What we find is that the third harmonic of the radio station comes in on the color burst of the video signals. We pick it up in our video tape recorders.

"We are getting a diagonal banding through our pictures, and there is not a damn thing we can do about it. We think it is coming in through the heads on the VTRs. If we go to a film chain, or a studio camera, everything is fine, but when we use the VTRs the distortion comes right in."

Northern Cablevision's plant was built by TCI beginning in 1971. It was switched on in 1974, shortly before TCI sold the system to Storer. TCI put up 210 miles of plant before selling, and Storer is in the process of expanding the system to 360 miles. "We currently have 270 miles built," Neirengarten said. "We have designs in hand for another 80 miles, with a few sundry areas to go.

"The entire 210 mile TCI original build is all Thetacom. When Storer took over, they started buying and installing Magnavox, everything but converters. Any operator who runs a converter plant will tell you stories of woe," he said. "Our plant itself is a real sturdy plant, but 80 percent of our service calls are for converters. At day one all the converters were Jerrold. But one day we needed some converters fast, and couldn't find any Jerrolds, so TCI got us some Oaks. When Storer took over they bought Hamlins. Then, for whatever reason, they decided to buy Sylvanias. Now they are buying Hamlins again. I wish like heck the whole system was Hamlin. Both the field people and the management people like the Hamlins. They are not remote, so they don't get banged around a lot, and they are very durable."

Any operator who runs a converter plant will discover that a great number of converters disappear, Nierengarten said. People rip them off, when the people move, the converters move. "It gets expensive," he said.

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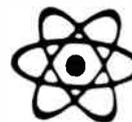
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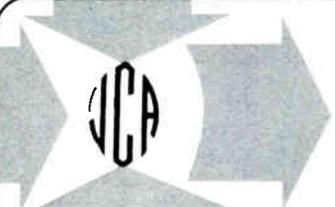
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He has received degrees in electrical engineering and naval science from Columbia University and successively served Corning Glass Works as an engineer, sales manager and general manager of a department.

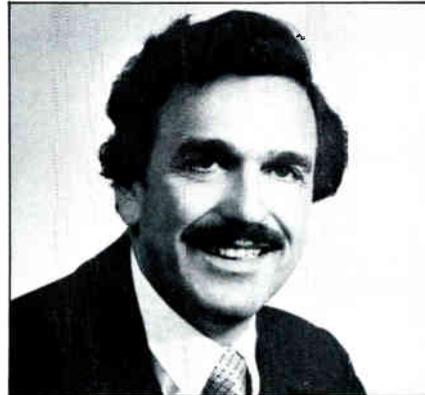


★ Due to significant growth in sales and the continued expansion of its full line of distribution and terminal CATV products, **Eagle Comtronics** has announced several managerial appointments.

Chester J. Syp has been named National Sales Manager, **Dominic "Doc" D'Alfonso** has been named National Manager of in-house sales, and **Greg Lauth** as Director of Field Engineering and Customer Service.

In his new position, Lauth will provide technical support in System Engineering applications for Eagle customers. Lauth previously managed Eagle Comtronics Quality Control and Warranty Repair Departments. Prior to joining Eagle in 1979, Lauth was

employed in the engineering department at a large CATV manufacturer and has considerable experience in the areas of new product development, performance testing and developing turnkey CATV systems.



★ **Robert E. Miller** has been appointed Manager of Fiber Optics Systems Engineering by **Times Fiber Communications, Inc.** of Wallingford, Ct.

According to an announcement by Allen M. Kushner, Vice President of Times Fiber Communications, Mr. Miller will head a team of engineers, lab and field technicians to design, install and maintain fiber optic communications systems. Fiber optics is a new method of point-to-point transmission of information which has many advantages over hard-wire cable transmission in CATV, telecommunications, computers, and control systems.

"The primary mission of Systems Engineering is the development of customer-oriented fiber optic systems—including all components and test equipment—with the highest reliability-to-cost ratio," Mr. Miller stated. "We are now completing a major new facility for completely integrated production of optical fibers and cable, and expect to become one of the leading competitors in this field."

Mr. Miller joined Times Fiber Communications recently after 15 years as an electro-optical engineer and project manager for Hughes Aircraft Company in Culver City, CA. Previously, he was a Senior Engineer in Research at North American Aviation (Rockwell). He has also been an Assistant Professor at California State University at Los Angeles.

Mr. Miller is a U.S. Navy veteran, holds two engineering degrees from

the University of California at Los Angeles and is a Registered Professional Engineer in Control Systems.

Times Fiber Communications is now the world's largest producer of coaxial cable for the CATV, military and industrial markets. TFC is a subsidiary of the Insilco Corporation.

★ **Merlin Demaray** has been appointed Chief Engineer at **Arvin/CATV**, Jack D. Cauldwell, general manager, has announced.

Formerly Systems Engineering Manager for Ranco, Inc. of Columbus, Ohio, Demaray also held positions in product development and applications engineering at that firm.

A graduate of Tri-State University, Demaray holds a Bachelor of Science degree in electrical engineering. He also received electronics training while in the United States Air Force.

According to Cauldwell, Demaray's appointment reflects Arvin/CATV's rapid growth and product line expansion. The company manufactures electronic equipment for receiving satellite and radar weather pictures, as well as directional taps and switches for cable television.

Arvin/CATV is a division of the Applied Technology Group of Arvin Industries, Inc.



★ **Irwin S. Sylvan**, Vice president, Marketing of Anixter Bros. has been named President of Anixter—Mark, the earth station and microwave antenna division of Anixter Bros., Inc. it was announced by Bruce Van Wagner, Vice President of Operations.

Sylvan will direct the operations of Anixter's antenna division in the worldwide communications market. The company operates a manufacturing facility in Des Plaines, Illinois.

★ **Peter C. Moody** has been appointed Manager, Product Safety and Reliability for **General Cable Company**, a division of GK Technologies, Incorporated, it was announced today by Irving Kolodny, Vice President, Research and Technical Services for the division.

In making the announcement, Mr. Kolodny said, "Mr. Moody brings broad engineering, test, inspection, quality control and quality assurance experience to this important assignment. He will be responsible for monitoring product safety and reliability for our Apparatus (Mopeco, Puregas, Telsta), Cornish Products Division."

Mr. Moody, who joined General Cable in 1948, has held a number of quality control positions, including Manager of Technical and Quality Control for General Cable. He is an honors graduate of London University where he was awarded a B.A. degree in 1948.

★ **General Cable Company**, a division of GK Technologies, Incorporated, announced that **Milton Tenzer** has been appointed staff vice president

and director of research.

Tenzer is a graduate of The Cooper Union in New York, New York, a senior member of IEEE and a licensed professional engineer in the states of New York and New Jersey. He was co-chairman of the International Wire and Cable Symposium from 1953 to 1978



and has served on many government and industry technical panels. He is the author of numerous technical papers and chapters in several books.



★ **Charles L. Pater** has been named manager-fiber optics group, for **Belden Corporation**, Robert W. Hawkinson, president, announced. Pater will be responsible for directing all optical fiber product development, manufacturing, marketing and sales activities.

Pater, 35, received his MBA degree in 1977 from DePaul University, and a master of science degree in mechanical engineering in 1970 from Cleveland State University. Pater was graduated with a bachelor of science degree in mechanical engineering from Michigan Technological University in 1968.

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have not seen or used this device and can make no recommendations on it. If you buy one, we would like to hear how well it works.

Q. I am Chief Technician in an older cable system. The system has been kept fairly free from signal leakage (radiation) until we connected our cable into the existing system in some large apartment buildings. Their cables are old and of poor quality. Signal leakage from them is causing lots of complaints among nearby non-subscribers who threaten to notify the FCC. The owner of the buildings has refused to rewire his system. My question is: Can the FCC hold us responsible for radiation from the apartments or is it their problem? My manager says it is their problem, but I say it is ours. Who is right?

A. According to the FCC, it is the responsibility of the cable system to prevent excessive signal leakage within their system. When you connected to the apartment system, it became an extension of your system. You are responsible. Since the apartmenthouse owner has refused to rewire the building, the FCC says you have two choices. You can rewire the building at your own expense (or otherwise correct the problem) or you can refuse service to the building until their wiring is corrected. The FCC suggests that a decision be made before the irate neighbors notify them. Happy wiring.

Q. We recently heard of a mechanical device for climbing poles without using regular climbers. It is a portable device, not vehicle mounted. None of our regular suppliers have any information. Can you help us to locate one, if there really is such a device?

A. The only "climbing device" which resembles your description is a Utility Climber #UC-101 manufactured by Amacker Products, Inc. We are sending a brochure on it. It is portable and allows you to climb poles without climbers. We

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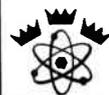
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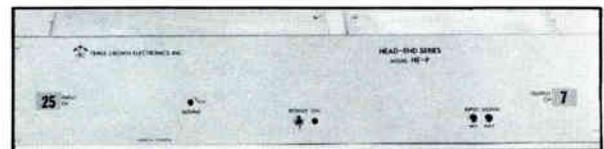
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