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Tech Review

Communications Engineering Digest/The Magazine of Broadband Technology

July 1981

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- Multiple Headend System
- Scrambling Techniques





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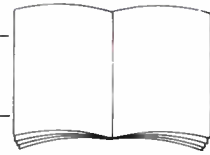
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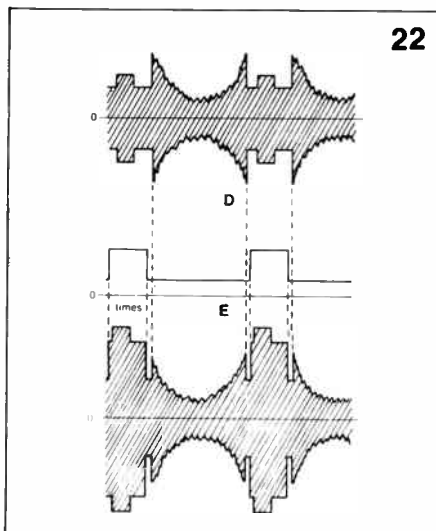
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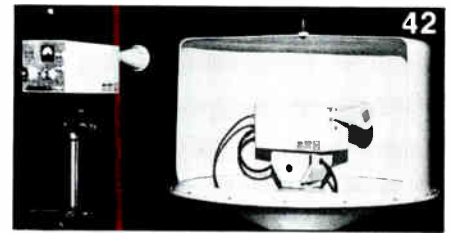
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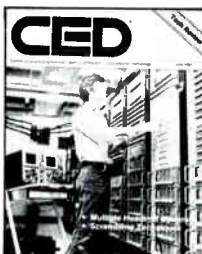
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A UA-Columbia Cablevision technician adjusts the output of a color television modulator at the system's main headend in downtown San Antonio. A network of eight neighborhood headends provide signals throughout San Antonio's 400 square miles.

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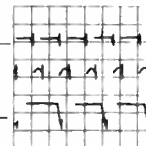
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## Translator Tango

The FCC has denied a petition to allow retransmission of AM broadcast signals by FM translators in rural areas without primary radio services. The Rocky Mountain Broadcasters Association (RMBA), representing small market radio and television broadcasters in Utah, Montana, Wyoming and Idaho, asked the commission to create an "FM translator [AM input]" service to permit FM translators to retransmit AM broadcast signals in areas beyond the primary service contours of existing AM and FM stations. The commission also rejected the petition on technical and resource grounds. It said the petitioner had not stated how an FM translator would overcome various technical difficulties.

## Dickens Does Dallas

Chronic public television viewers have often been characterized as a unique viewing segment. The demographics have caused many an advertising executive to dream wistfully of having access to Public Broadcasting Service channels. Now a new bit of information can be revealed, one that could cause PBS to vault into the home videocassette market. According to PBS officials, more than six percent of all public television contributors own videocassette machines. That may not seem like a lot to those of us who spend our time doing things other than scanning the videocassette statistics, but it is interesting: the figure is more than double the national penetration rate. Because of this, we could see the creation of a Public Television Video Club that would be offered to PBS members nationwide and marketed along the lines of a book-of-the-month club.

## Power Play

RMS Electronics is positioning itself to introduce a non-interruptible power supply for both cable and data processing users by late 1982. The latest move toward that goal is an agreement in principle for RMS to acquire Kenyon Magnetics. Kenyon is a New Jersey-based manufacturer of ferroresonant transformers and other magnetic devices. The acquisition is expected to provide RMS with a broader capability in expanding its line of power supplies. If the agreement is consummated as expected, Kenyon will become a wholly owned subsidiary of RMS.

## Hold the Onions

The subscription television industry recorded its first megasub recently. Passing the one million household mark is significant not only because of the peculiar importance of that number but because it shows how fast the industry has grown in the last few years. Only three and a half years ago, the combined STV stations served fewer than 45,000 subs. Now STV Association officials are predicting even greater numbers soon. STVA Chairman Rinaldo Brutoco projects that STV subscribers will double in the next 15 months. He also points out that 24 STV stations will be operating by the end of the summer. Fifteen additional stations have been granted permits but have yet to begin transmitting, and another 50 STV applications are pending at the FCC.

## Dial a Book

Turn your library into a community communications center, urges the Public Service Satellite Consortium (PSSC). How? According to PSSC's second library survey, libraries connected to a cable system can offer teleconferencing via satellite, without requiring an initial investment in hardware. The survey, conducted by Mary Diebler, PSSC service department specialist, profiled 86 libraries in over 28 states, including rural and urban, academic, public and special libraries. Cable libraries would have access to live or taped continuing education programs. Public information could also be disseminated over the network. The American Library Association, a PSSC member, is now investigating the use of video-teleconferencing. It will be able to reach more of its membership through this nationwide satellite cable library network, Diebler said.

## Playing Fair

Several companies that are in direct competition with American Telephone and Telegraph or feel that they will soon face competition from AT&T have formed a coalition to discourage anti-competitive practices in the telecommunications and information service markets. The coalition is called FOCUS (Fair Opportunities for Competition in the United States). Its goal is to provide Congress, the Reagan administration and the public with multi-industry information concerning innovations and improvements information services and technology and jobs, consumer interests, foreign sales and national defense. To achieve these ends, Gus Grant, vice chairman of Southern Pacific Communications Company, said FOCUS will present legislative proposals to Congress for restructuring the telecommunications and information service industries. Companies involved in FOCUS include SPCC, General DatComm Industries and Millicom.

## Stiff Upper Chip

An economically viable teletext system may be the key to general public acceptance instead of fiddling around with complex graphics. At least that's what British teletext enthusiasts contend. Ken Shilson, who represents British Videotex and Teletext in Washington, D.C., offered some facts to explain the British position. Shilson pointed to a recent survey of 409 viewers conducted by Philips Video. The survey found that more than 75 percent of the viewers consider teletext either "most useful" or "could not do without it." At the same time, graphics ranked low in importance. Shilson then applied this information to sales of teletext sets. "They were measured in the hundreds in the United Kingdom while the price of sets and decoders was high," he said. "As soon as the price fell below \$250 [added on to the cost of a new television] sets started selling at the rate of 8,000 per month." Apparently, the key to keeping the price down is to stick with practical graphics for the time being and forsake some of the snazzier models that make irrational use of the medium. The British way of doing things, says Shilson, is to add on new options as the price drops. "Manufacturers need a low cost technology today that they can develop over many years. They do not want to be saddled with an over-sophisticated system that can never break through to mass sales."





## JULY

**12-15:** The 13th annual **New England Cable Television Association** convention and exhibition will be held at Dunfey Hyannis Hotel, Hyannis, Massachusetts. Contact the association, (603) 224-3373.

**15-16:** **Coaxial Analysts** is conducting a workshop on "Managerial Development in the Cable Television Industry" at the Sheraton Tech Center, Denver, Colorado. Contact Lynette Anderson, (303) 778-7700.

**15-18:** The **Florida Cable Television Association** annual convention will be held at the Lago Mar Resort in Fort Lauderdale, Florida. Contact Convention Chairman James L. Cooper, (305) 527-6620.

**20:** The **Dallas Cable Club** meeting will be held at the Hilton Inn. Contact Buzz Hassett, (214) 241-1421.

**20-21:** A workshop on "Managerial Development in the Cable Television Industry," sponsored by **Coaxial Analysts**, will be held at the Sir Francis Drake, San Francisco, California. Contact Lynette Anderson, (303) 778-7700.

**20-24:** The annual convention of the **Community Antenna Television Association** will be held during a four-day cruise aboard the S.S. Emerald Seas. Contact Celeste Rule, (405) 947-7664.

**21-25:** A **Jerrold** technical seminar will be held in Hatboro, Pennsylvania. Contact Len Ecker, (215) 674-4800.

**23-24:** A two-day seminar on "Satellite Communications" is being sponsored by **TeleStrategies, Inc.**, at the Copley Plaza, Boston, Massachusetts. Contact TeleStrategies, (703) 734-7050.

**25-26:** A two-day seminar for entrepreneurs interested in low-power television, sponsored by **Lo-Power Community TV**, will be held in Denver, Colorado. Contact Lo-Power Community TV, (602) 945-6746.

**30-31:** **Coaxial Analysts'** two-day workshop on "Managerial Development in the Cable Television Industry" will be held at the Barbizon Plaza Hotel, New York City. Contact Lynette Anderson, (303) 778-7700.

## AUGUST

**2-4:** The **Michigan Cable Television Association's** annual convention will be held at the Hyatt Regency in Dearborn, Michigan. Contact Mike Welch, (312) 693-9800.

**4-6:** A **Jerrold** technical seminar will be held at the Holiday Inn/Southeast, Englewood, Colorado. Contact Len Ecker, (215) 674-4800.

**6-7:** **TeleStrategies, Inc.**, is sponsoring a seminar on "Telecommunications Technologies, Opportunities and Strategies for Senior Management" at the Hyatt Regency in San Francisco, California. Contact TeleStrategies, (703) 734-7050.

**9-12:** The **New York State Cable Television Association's** summer conference will be held at the Holiday Inn on Grand Island, New York. Contact Fred DiMaggio, (518) 463-6676.

**11-13:** The **1981 Construction and Utility Equipment Exposition** will be held at the Johnson County Airport in Olathe, Kansas. Contact DJM, Inc., (305) 685-3766.

**17:** Southmedia Company and Scientific-Atlanta will host a dinner meeting of the **Atlanta Cable Club** at the Atlanta Stadium Club, Atlanta, Georgia. Contact Marian McConnell, (404) 898-8500.

**18-19:** "Managerial Development in the Television Industry" is the topic of a workshop sponsored by **Coaxial Analysts** at the Peachtree Plaza, Atlanta, Georgia. Contact Lynette Anderson, (303) 778-7700.

**18-20:** The **Institute of Electrical and Electronics Engineers'** 1981 International Symposium on Electromagnetic Compatibility will be held at the University of Colorado, Boulder, Colorado. Contact Charlotte Tyson, (303) 447-5072.

**19-21:** The 3rd annual Satellite Communications Users Conference, sponsored by "**Satellite Communications**" magazine, will be held at the Regency Hotel, Denver, Colorado. Contact **Satellite Communications**, (303) 988-4670.

**19-23:** The **Rocky Mountain Cable Television Association** is holding its annual meeting at the Ramada Snowking Inn, Jackson Hole, Wyoming. Contact Al Carola, (307) 362-3773.

**20-22:** The **Southern Cable Television Association** convention and trade show, the Eastern Show, will be held at the Georgia World Congress Center, Atlanta, Georgia. Contact the group at (404) 237-8228.

**23-26:** CTAM '81, the annual conference of the **Cable Television Administration and Marketing Society**, will be held at Harvard University in Boston, Massachusetts. Contact Lucille Larkin, (202) 296-4219.

**27-28:** A two-day seminar entitled "Understanding Telecommunications Technologies for Non-Engineers" is being sponsored by **TeleStrategies, Inc.**, at the Marriott Hotel, Saddle Brook, New Jersey. Contact TeleStrategies, (703) 734-7050.

**31-September 4:** The **Community Antenna Television Association** is sponsoring a technical training seminar on system distribution, problems, failures, tests and measurements at the Regency Plaza Hotel, Minneapolis, Minnesota. Contact the CATA Engineering Office, (305) 562-7847.

## SEPTEMBER

**1-3:** A **Jerrold** technical seminar will be held in Quebec, Canada. Contact Len Ecker, (215) 674-4800.

**1-3:** **Information Gatekeepers, Inc.**, is holding its Fiber Optics Exposition '81 West at the Hyatt Regency in San Francisco, California. Contact the firm at (617) 739-2022.

**9-11:** The **New Mexico Cable Television Association** annual convention will be held at the Roswell Inn, Roswell, New Mexico. Contact Oscar Davis, (505) 538-3701.

**10:** The **Bay Area Cable Club** is holding a meeting at the San Francisco Press Club, San Francisco, California. Contact Diane DiSalvo or Lou Soucie, (408) 998-7333.

**14-16:** The **Wisconsin Cable Communications Association** will hold its annual fall convention at the Radisson LaCrosse, LaCrosse, Wisconsin. Contact Tom Hanson or Lynne Walrath, (608) 256-5299.

**16:** The first annual **Paul Kagan Associates**-sponsored conference on "Cable TV Franchise Law" will be held at the Mayflower Hotel in Washington, D.C. Contact Paul Kagan Associates, (408) 624-1536.

**21-25:** **ISS '81**, the international symposium on switching, will be held in Montreal, Quebec. The symposium is sponsored by Region 7 of the Institute of Electrical Engineers, the Canadian Society of Electronic Engineers and the Canadian Telecommunications Carriers Association. Contact John Benet, (514) 761-5831.

**23-25:** The **Public Service Satellite Consortium** will hold its sixth annual Conference for Satellite Communications Users at the Washington Hilton Hotel in Washington, D.C. Contact Polly Reed Rash, (202) 331-1154.





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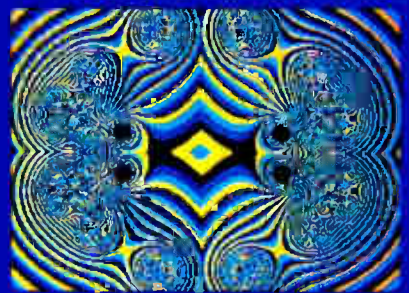
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## NCTA Reveals Plan For Aeronauticals

Last month we devoted several pages to cable television and its relationship to aeronautical frequencies. Central to the discussion were the Federal Communications Commission's requirements for notification, the political realities relating to the Federal Aviation Administration and, of course, the famous exchange between noted cable engineers Archer Taylor and Sruki Switzer about alternatives to channelization and offsets.

As expected, the issue has warmed this summer and is expected to become even hotter as word spreads of the FCC's inclination toward establishing some sort of rigid channelization plan. Not waiting for the hammer to drop, the National Cable Television Association, in reply comments in the official proceeding on Docket 21006, has proposed a two-point alternative to channeling, based firmly on the belief that cable television is a closed system.

"This would give system operators a positive incentive to build and operate a closed system," says Wendell Bailey, NCTA vice president for science and technology. "A rigid channelization plan would be a distinct barrier to technological innovation."

NCTA begins with the premise that cable television systems do not pose a threat to air safety. In reality, however, FAA officials, who insist that signal leakage from cable systems could cause air disasters, must be satisfied. NCTA proposes having the commission prepare a definition of a closed system based on requirements established by the FCC Advisory Committee Report released in November 1979. At the same time, the FCC would require careful monitoring to assure compliance with the minimum standards both initially and at regular intervals, perhaps once each year.

Part two of the plan would allow for cable systems which meet the above requirements to be able to use what frequencies and power levels they choose, while systems which do not meet the requirements would then have to comply with the amended rules including possible frequency offsets where appropriate.

According to NCTA, this plan would ensure the safety of aircraft, meet the FAA requirements for interference-free regulation; and provide the cable industry with the technical flexibility critical to innovation and experimentation.

Although even one case of interference may be one too many for the FAA, which has pushed the FCC for strict rules on signal leakage, the interference from cable systems which has occurred is relatively insignificant, according to NCTA. "We're not convinced it is a real problem," says Bailey, "I've studied 912 cases of airplane interference from one recent quarter. Of those cases, 230 were caused by other airplanes and only one case of interference was caused by a cable system."

Bailey told us that while the FCC has NCTA's proposal under consideration, he is hopeful of being able to meet with FAA officials in order to get them to look upon his solution favorably and come to agreement. If such a compromise cannot come about, let it be said that the alternative cures could definitely be worse than the disease.

On another front, congratulations are due for TeleCable's Nick Worth and Wavetek's Syd Fluck. They were recipients last month of NCTA's annual engineering achievement awards. Nick was honored for his important contributions in "operations" for the fast growing MSO. And Syd received recognition for "development," stemming from his application of microprocessors for sweep generators. Both men, it was said, epitomize the engineering professional in the cable television business. We certainly concur.

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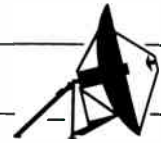
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## Malrite Stay Lifted

NEW YORK, NEW YORK—The United States District Court of Appeals for the Second Circuit has lifted the stay that has prevented cable systems from adding distant signals. At least for the moment, cable operators can legally add as many distant signals as they wish. There is still legal maneuvering possible that could ultimately have the stay reimposed; however, at the present time, the cable industry is celebrating.

"Right now there is a window and any system can add any distant signal," said Brenda Fox, general counsel for the National Cable Television Association. "Any system can also totally and lawfully ignore the syndicated exclusivity rules. Whether the window will ever shut or not, we have no idea. The point is that right now, there is a window."

The court responded to a petition filed by the NCTA asking for an immediate dissolution of the stay that was originally imposed November 19, 1980, pending the outcome of the appeal. When the court upheld the FCC's rescission of the distant signal and syndicated exclusivity rules June 16 of this year, the stay was ordered dissolved.

Initial reaction from the resale common carriers who transport the distant independent television stations to cable systems was effervescent.

"We think it's all over as far as the courts are concerned," said Roy Bliss, executive vice president of United Video, which carries independent television station WGN out of Chicago. "We're going full steam ahead. Anyone who turns on now has an 80 percent chance of staying on forever because it's legal and if things change later, they could be grandfathered."

"All the MSOs we talk to are taking a different stance," explained Nory LeBrun, general sales manager for Turner Cable Sales, which markets WTBS. "Everybody's doing their own thing—some are going slow, some are moving quicker. But obviously, we're very pleased. We'd like to think that all of the systems that have us on just for the nighttime hours (approximately 1.7 million subscribers) will go full time," he continued. "I would hope that adding two or three million subscribers is possible within the next couple of months, but there are so many variables."

Despite the positive response from the cable industry, the issue may be far from over. The National Association of Broadcasters has already filed with the Second Circuit Court asking for a reinstatement of

the stay pending review by the Supreme Court. In order for this to happen, two of the three judges who ruled that the stay should be dissolved would have to reverse their ruling, according to Michael Horne, the attorney representing the NAB.

The broadcasters, together with the motion picture industry and representatives of sports interests, are trying to revive a form of the FCC cable prohibitions through copyright legislation. Both houses of Congress have had continuing hearings on the possibility of abolishing the compulsory license for retransmitting distant signal programming. But the issue remains unsettled.

## Magnavox Puts 440 MHz On the Road

LOS ANGELES, CALIFORNIA—Magnavox CATV Systems has constructed a mobile laboratory to train cable television technicians how to operate its line of 440 MHz equipment.

Magnavox will also make the mobile training center available to cable television companies that are bidding Magnavox 440 MHz equipment in a franchise application and wish to demonstrate the system to city fathers, according to C. Richard Mullen, vice president of marketing and sales.

Housed in a 46-foot trailer, the center contains over \$500,000 in equipment, including a 16-amplifier cascade. The cascade is installed in a temperature-controlled chamber to demonstrate how the 440 MHz system is affected by temperature changes. The temperature in the chamber can be set anywhere between -40°F and +140°F.

The mobile center introduced at the show is the first of three models Magnavox will construct.



*The major purpose of Magnavox's mobile training center will be to train field technicians to operate and maintain 440 MHz equipment.*

## Pioneer's VIP System Reconstructed in Ohio

COLUMBUS, OHIO—Pioneer Communications of America has re-constructed its VIP, two-way interactive demonstration system and multi-media presentation recently shown at the National Cable Television Association convention in Los Angeles at its corporate headquarters in Columbus.

The demonstration system contains an actual CATV headend package of computer and other hardware, which permits the VIP functions of polling for viewer response, addressable control and status monitoring of plant and terminal.

The system also contains the "two-way plus" unit, which includes the BT-series VIP terminals, keyboard and printer, home security terminal and micro-computer interface adaptors. Access to the entire display in Columbus will be scheduled upon request for the purpose of demonstrating the system to community leaders from areas where the equipment is being bid.

Pioneer, which has long been associated with Warner Cable Communications because of its contribution to Warner's Columbus QUBE system, is searching for its own identity. The company is aggressively marketing its two-way interactive equipment to the entire cable industry, and the new demonstration site will serve as an important marketing tool.

Pioneer's multi-media presentation of the VIP system is now also available to cable operators in a seven-minute, three-quarter inch tape. The presentation outlines in step-by-step format how the elements required of one-way addressability, two-way security, two-way entertainment, text and information retrieval incorporate into a standard cable system. The program can be edited by the operator to fit into franchise presentations or used for general company promotions.

## Township Uses Coax In Water Metering Test

CLINTON TOWNSHIP, MICHIGAN—A six-month pilot project to provide remote water reading services over coaxial cable has been scheduled for Clinton Township. The participants are the municipality's water management department, Comcast Cablevision of Clinton, and Communications Supply, Inc., of West Chester, Pennsylvania. The purpose of the test is to ascertain the feasibility of coaxial communications for this type of monitoring.

The test will involve the installation of 50 TRU-500 digital/RF modems, distributed by Communications Supply, in the homes of Clinton residents. The meters will be monitored by computer at Comcast's headend over two-way facilities. An additional computer will be installed at Clinton Township's municipal headquarters to allow the city's employees to familiarize themselves with the system. There are tentative plans to expand the system to include all 22,000 homes in the municipality if the test proves successful.

Initially, only water meter reading will be tested. A Communications Supply spokesman said, however, that the TRU-500 is also capable of monitoring electric and gas utilities; fire, intrusion and medic alerts; remote disconnect or re-connect of subscribers; control of scrambling and descrambling of pay television programs; and interactive services.

Communications Supply has also entered into an agreement with E-COM Corporation of Sterling, New Jersey, to exclusively market E-COM's digital and RF communications modems and terminals in the United States. E-COM signed a worldwide manufacturing and marketing agreement with Communications Equity Corporation of Toronto, Communications Supply's parent company. Communications Equity will manufacture E-COM products on an exclusive basis at its plant in Toronto and distribute them worldwide through its subsidiaries.

Communications Supply has also announced the appointment of Jim Bailey as general manager and Jim Emerson as marketing manager.

## SCTE News



### SCTE Appoints Huckabee

WASHINGTON, D.C.—Robert M. Huckabee has been appointed manager of member services, announced Thomas Polis, president of the Society of Cable Television Engineers. Huckabee will report to Judith Baer, executive vice president, and is responsible for the administration of member services, future SCTE meetings and conference arrangements. Huckabee was formerly with the Association of Labor-Management Administrators and Consultants on Alcoholism, headquartered in Rosslyn, Virginia.

"His prior experience is well-rounded to meet the growing needs of SCTE," Polis said.

The society also announced the release of a major survey mailed to nearly 3,000 members in late 1980. The 60-page 1981 SCTE Member Profile, priced at \$20 for members, contains four sections of regional responses, with graphs and charts. The document is an overview of current industry trends in employment, wages, tenure, education and benefits.

16/July 1981

Also, two society meetings scheduled for July and September have been cancelled: Orlando, Florida, and Los Angeles, California.

Instead, "the SCTE staff has been directed to concentrate its attention on the 1981 SCTE Fall Conference on Emerging Technology," Polis said. The conference is scheduled for November 16-17 in San Antonio, at the La Mansion Hotel. SCTE expects 300 people to attend the conference, which will be chaired by Robert Luff of UA-Columbia of San Angelo, Texas.

## Business Notes



★ Carson Cable Television Company has awarded an approximately \$1 million contract to **RCA Cablevision Systems** to supply equipment and installation services for a new cable TV system in Carson, California. The contract calls for supply of custom headend equipment, amplifiers, distribution equipment and set-top converters. RCA also will undertake the equipment installation, checkout and testing of the total system, covering about 150 miles and under construction in stages.

★ **TOCOM, Inc.**, has received an order from Sammons of Fort Worth to provide its TOCOM 55 Plus™ and TOCOM III Cable Security™ Systems for installation in Fort Worth, Texas. This \$6 million order is the initial release of orders expected to total more than \$20 million in sales for TOCOM to Sammons of Fort Worth over the next three years. It represents the largest contract that TOCOM has yet received for its 55 Plus product line. The initial order for Fort Worth calls for the delivery of 30,000 TOCOM 55 Plus terminals over a 15 month period, beginning in October 1981. Additional orders are expected as the system is built over the next three years.

★ **Harris Corporation** has received a contract to install a satellite video uplink station for Christian Media Network. The uplink will be installed at the Network's headquarters and studio in Bloomington, Minnesota. The Christian Media Network will initially be sharing satellite Satcom I, transponder 16. The Christian Media Network will transmit between the hours of 7:00 p.m. and 1:00 a.m. Eastern time. The uplink station will use Harris' new nine-meter motorized kingpost antenna with Cassegrain feed.

★ **Clearview Cable TV** of Tallahassee, Florida, is installing a 22,176-foot fiber optics cable system to provide quality signals to outlying homes in its service area. The fiber optics installation, built by Times Fiber Communications, is part of the system's upgrade from 15 to 35 channels.

★ **Jerrold Division** has closed two major deals. Viacom Cablevision of Dublin, California, has agreed to purchase 25,000 Jerrold Starcom II® JSX/DI converters. The MSO will use the new set-top units in the upgrading of its Salem, Oregon, system. Cable Services Company of South Williamsport, Pennsylvania, will buy \$2.3 million worth of headend and distribution equipment from the Jerrold Division to build more than 3,000 miles of new turnkey plant, including 2,000 miles in Audubon, New Jersey, for Audubon Electronics and 400 miles in Malvern, Pennsylvania, for Harron Cable Company. Approximately half of the Jerrold equipment specified in the agreement will be for 400 MHz operation.

★ Midwest Corporation has been named distributor for **Catel's** line of modulators.

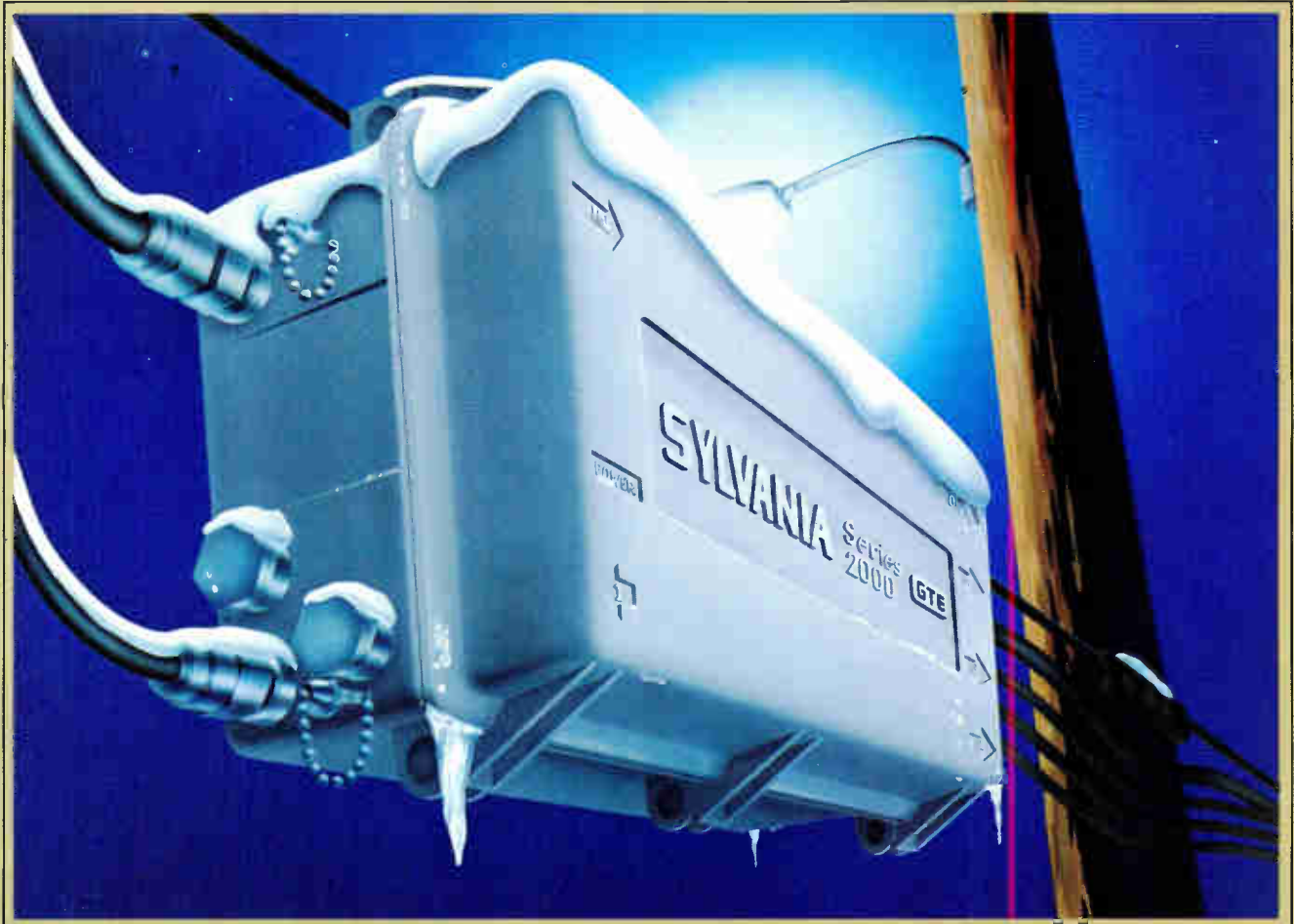
★ **Warner Amex Satellite Entertainment Company** has developed an optimized transmission technique to provide superior audio for its stereo MTV: Music Television service, which it will launch August 1. Called the "stereo transmission processor," the headend unit consists of two components that receive the satellite signal and launch it into the cable system on an FM frequency. The two companies that manufacture the processors are Learning Industries and Wegener Communications.

★ **Harron Communications Corporation** has formed a subsidiary, Harron Cable Interconnect, Inc., to construct an AML microwave relay service to interconnect 29 cable systems in the Philadelphia area. Hughes Microwave has conducted path studies and is preparing engineering and design plans and specifications for the extensive AML network. The broadcast facilities will transmit from a 400-foot microwave tower centrally located in Charlestown Township, Pennsylvania. The site, which has the highest elevation between Harrisburg, Pennsylvania and Atlantic City, New Jersey, will enable HCI to reach all existing cable systems within the Philadelphia ADI. HCI's studio and earth reception facilities will be located nearby in Malvern, Pennsylvania along with the administrative and sale offices.

★ The **Electronics Industries Association** has chartered P-6.1 working group on fiber optics systems. The group was formed to provide guidelines from a systems-need viewpoint on requirements and priorities for the development of fiber optics component standards. Under the chairmanship of Hank Dorris of Bell Laboratories, the group will include representatives from industrial fiber optics equipment manufacturers, the DOD user and other members of the government and academic community.



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# Serving a Sprawling City with a Multi-Headend System

**S**ince 1978, UA-Columbia Cablevision has been building a 35-channel cable system to serve San Antonio, Texas, and its growing suburbs, a market of 320,000 potential subscribers. The project is a massive one, requiring more than 3,000 miles of cable plant spread across 400 square miles. The \$30 million system UA-CC engineers designed for San Antonio may well serve as a model for other sprawling urban systems that will be constructed in the United

States in the coming years.

The heart of the UA-CC design is a system of multiple headends. The cable system has nine headend units arranged in spokelike fashion around downtown San Antonio and linked by microwave, as shown in Figure 1. The multiple headend approach was necessary because of excessive noise levels that occur after a television signal has passed through a cascade of 22 amplifiers, a distance of ten miles, according to Cal Broussard, the project manager for

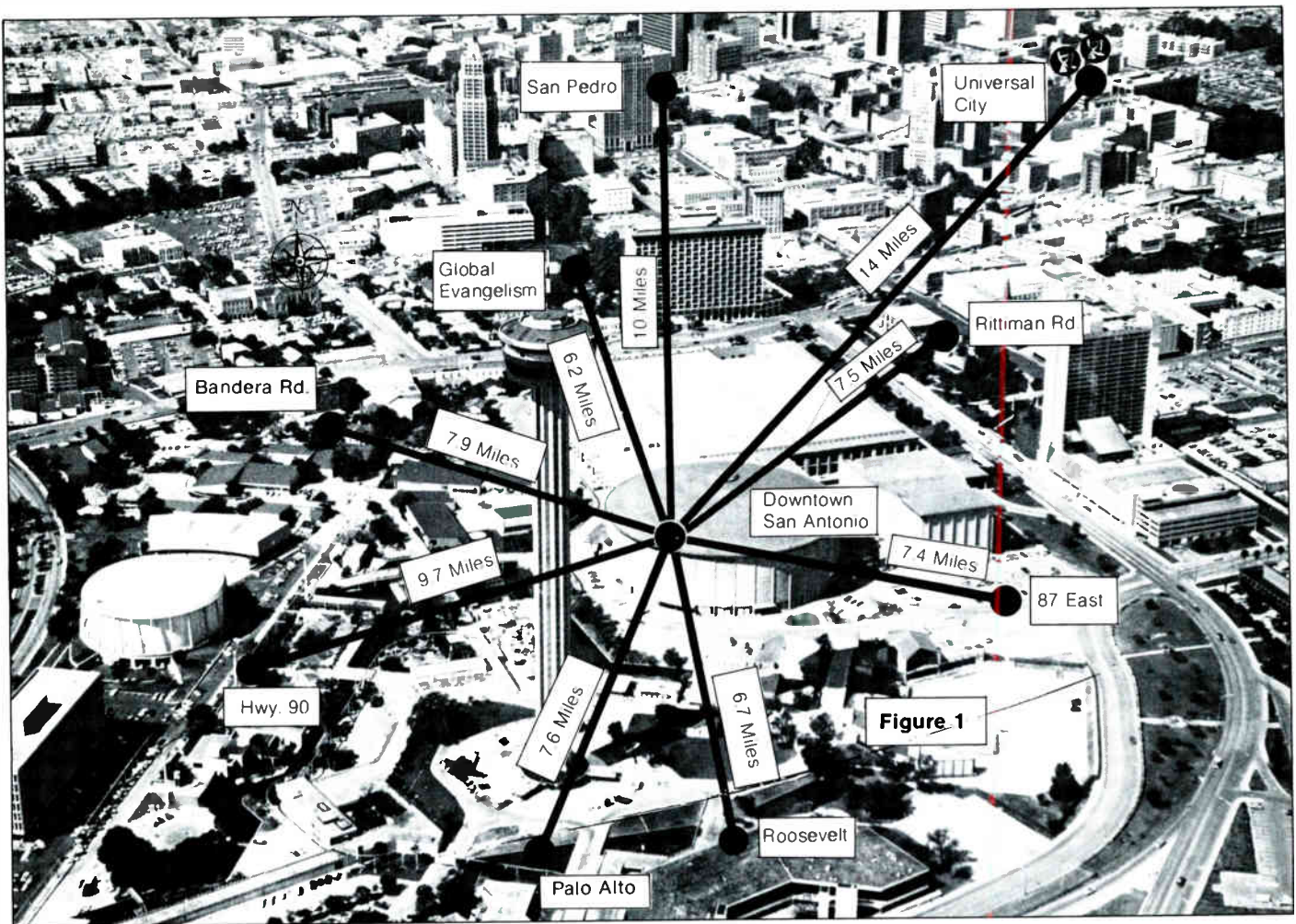
UA-Columbia Cablevision in San Antonio.

Multiple headends also enabled UA-CC to design the system to serve the needs of individual neighborhoods. Rather than dividing the city into "nice pie-shaped wedges," UA "bent" the area served by each headend along demographic lines. Separate headends serve the city's black community, Mexican-American community and the personnel stationed at the four military bases in the San Antonio area. This enables each neighborhood to view specialized pro-



*Richard Keith, a technician for UA-Columbia Cablevision, adjusts the output level of an RCA color television modulator at the headend facility in downtown San Antonio.*





gramming. A little league game, for example, that might be of interest to one part of town can be carried on one loop without being carried over the entire system. UA is also using the distinct demographic differences of some loops as a "laboratory" to gauge the responses of various socio-economic groups to different cable marketing techniques.

Another advantage is that multiple headends limit the effect of a power outage. If one headend is knocked out, the others continue to send programming.

## Headends

The system's earth station is located in University City, 14 miles from downtown San Antonio. Satellite signals are microwaved from the earth station to the downtown hub or main headend, located atop the 21-story National Bank of Commerce, 626 feet above mean sea level. The hub also receives off-air signals for the entire system and sends the satellite and off-air signals via microwave to the neighborhood headends.

The primary headends at Universal City and downtown have eight racks of RCA cable television equipment. Each of the seven smaller headends has two racks of RCA equipment, two modulators

and one demodulator. The modulators are used as the automatic gain control and automatic slope control channels for the trunk system.

## Construction

So far, UA has turned on 1,000 miles of the system, serving 46,000 San Antonio subscribers at a 53 percent penetration rate. All the mapping for the system has been completed and 95 percent of the plans have been approved by UA and RCA, which is supervising part of the construction. The total length of the system will be 3,246 miles.

RCA is building plant at a rate of 70 miles a month, aerial, and six miles a month, underground, excluding apartment complexes.

The first phase of the system, begun in 1978, consisted of 860 miles of plant, including 30 miles of plant built around the Universal City headend. The first phase cost \$7 million to build.

In spring 1980, a helicopter lifted racks of headend equipment to the top of the National Bank of Commerce building. The operation took place despite Texas rain squalls.

Construction of the \$21 million second phase of the system got underway in

October 1980. RCA has been supervising a workforce of local contractors from two self-supporting bases in San Antonio. A mobile fleet, equipped with RCA two-way radios, runs field operations over the 400-square mile area.

When completed in about two years, the entire system will be composed of 9,500 amplifiers, 47,500 line extenders, more than 5,000 miles of cable, 3,246 miles of plant, 95,000 taps, and 464 power supply sources. That equipment will have been put in place by some, 500,000 manhours by subcontractors and 120,000 man hours by RCA employees.

Some other special equipment will be built into the system, in keeping with UA-CC's theme of "entertainment, education and information."

## Local Origination

Three studies for locally-originated programming have been set up, and UA-CC has purchased more than \$1 million in broadcasting equipment from RCA Broadcast Systems, Camden, New Jersey. The studio equipment includes four TK-760 color cameras for studio and field use and a TK-76 electronic news-gathering camera. Local programs will be recorded on any of three RCA one-inch

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helical scan videotape recorders. Slides and motion picture films can be entered into the television system using an RCA TK-28 telecine system.

Each of the studios is completely set up, except for video tape recorders and cameras. The cameras will be brought in when a studio is going to be used. Television signals will be sent via microwave to the downtown studio on Magic Drive, where recording will take place. UA-CC is also equipped with a mobile van to direct field production.

All the studio equipment is available to community groups, along with free production assistance, allowing community access to a system that already has free channels for the black community, the Mexican-American community, the school system and the local government.

Another service to the community provided by UA-CC and RCA is an emergency audio alert system for civil defense. An authorized party can telephone a headend, enter a tone-encoded signal and have his message heard on every channel in the system. A microphone at the headends serves the same purpose.

Already, UA-Columbia feels it may have to expand the system if San Antonio continues to grow as it has the past few years.



San Antonio, home of The Alamo.

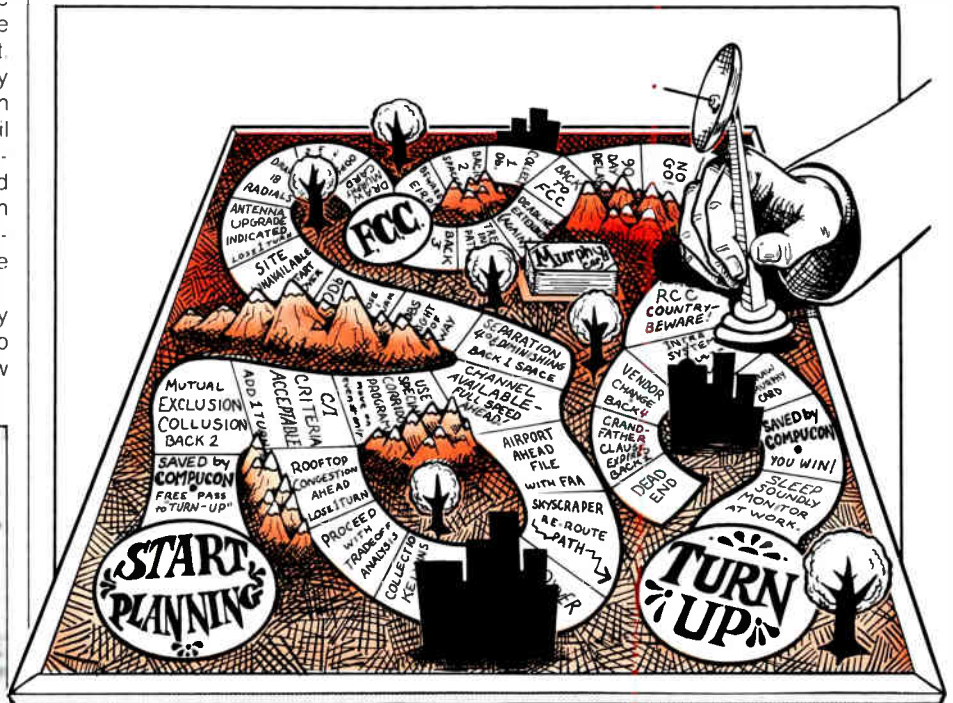
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# Examining Scrambling

By Karl D. Stephan, University of Texas at Austin.

In a perfect world, no one would need to encode or scramble cable TV signals. Unfortunately, some subscribers are far from perfect, so system operators often must use scramblers and descramblers to prevent unauthorized reception. This article explains the technical details of several scrambling systems now on the market, together with their individual advantages and pitfalls. It will also examine future technical developments in this area.

Literally hundreds of methods for scrambling TV signals have been patented in the last 30 years, but fewer than a dozen have found wide use by standing the tests of practicality and economy. All the successful techniques have one feature in common: they do something to the normal TV signal so that it cannot be received by a standard home receiver. Midband and superband channels are "scrambled" in that most normal TV sets cannot tune to them, but many new receivers cover these frequencies. True scrambling techniques do more to the signal than just placing it outside of a broadcast TV channel.

Along with the scrambled signal, a key of some sort is usually transmitted to enable a properly authorized subscriber to receive the channel. The key fits into the descrambler, which is typically a unit inside the subscriber's home and is often combined with the set-top converter. Just as there are locks on the market priced anywhere from \$0.50 to thousands of dollars, the prices and qualities of descramblers vary widely, depending on the degree of security desired.

The scrambling family tree is shown in Figure 1. All systems can be divided into the largely digital methods and the largely analog ones. By digital, we mean techniques which actually convert the video signal into "ones" and "zeroes." Such

methods are still prohibitively expensive for most consumer-type applications, but progress in this area will be very rapid in the next four or five years.

The other main branch is the analog method, most commonly used up to now. Some systems operate on the video signal before it is modulated on the RF carrier. These are classed as baseband methods. Most popular schemes operate on the video-modulated IF or RF carrier, because no expensive demodulation-remodulation step is required in the descrambler. These are called RF scramblers.

The RF schemes in use scramble the video-modulated carrier in one of three ways:

1. By adding some extraneous signal to it.
2. By subtracting a vital part of the signal, such as the carrier.
3. By multiplying the signal by another signal so as to distort it beyond recognition by a normal TV.

The detailed discussion of these methods will begin with an additive technique, the interfering-carrier system.

## Interfering-Carrier System

Figure 2A on page 23 shows a spectrum analyzer display of a normal channel. The video carrier is the tallest signal to the left, and the audio subcarrier is 4.5 MHz above it. Surrounding the video carrier and extending above it are the video sidebands, which contain the picture information. The interfering-carrier scrambling method works by placing a rather strong, modulated signal (Figure 2B) 2.25 MHz above the video carrier, to produce the sum signal shown in Figure 2C. The scrambling carrier does two things. First, it produces a terrific beat pattern that overpowers the actual video information. Second, when the interfering carrier mixes with the normal video carrier at the TV receiver's video detector, it produces a mixing product at  $2.25 \text{ MHz} \times 2 = 4.5 \text{ MHz}$ , which just happens to fall on

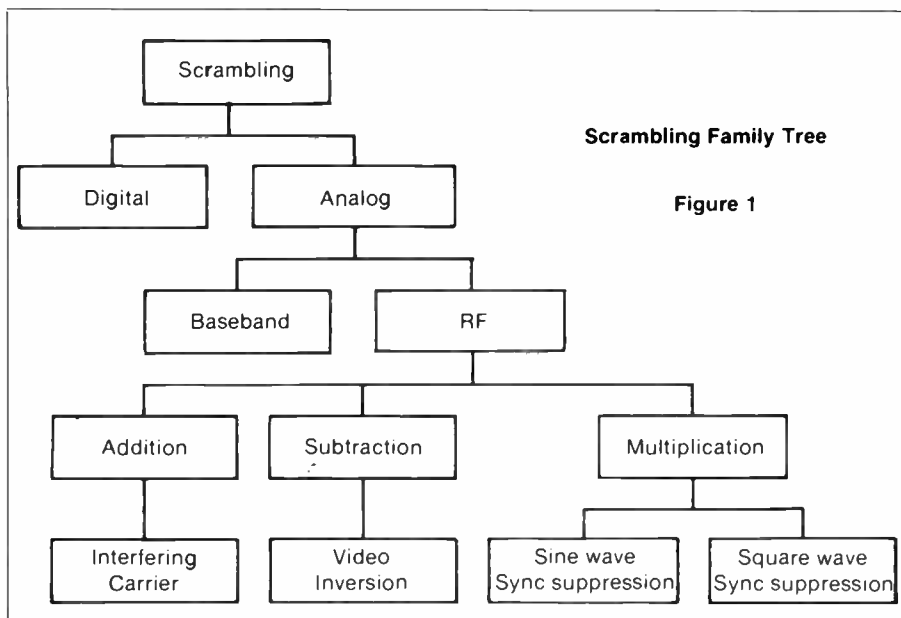


Figure 1



top of the audio subcarrier. The modulation on the interfering carrier substitutes annoying noises for the normal sound. Viewed from the standpoint of picture and sound destruction, this method is one of the best.

The corresponding descrambler works by doing the opposite of the scrambler—it uses a very deep trap to attenuate the interfering carrier to a point where it no longer causes problems. The traps are in-line, passive devices, and can be made stable enough to cause little trouble. The main service-call problems tend to be related to the trap's inability to eliminate the interference completely, causing residual picture beats. Another problem is really system-related: as the number of scrambled channels goes up, the number of traps required for a subscriber who wants all the channels goes up one-for-one. That is, ten descrambled channels require ten separate traps. Reflections, interactions and mechanical problems of mounting the things start to make this method increasingly unattractive at that point.

### Video Inversion

This method was popular some time ago, but has recently seen little application, possibly because of its relatively complex descrambler and the ease with which it is defeated.

Figure 3A shows an oscilloscope display in time of a standard video-modulated RF carrier. The sync tips are the rectangular parts of the envelope farthest away from the zero line, and they are, of course, what the TV receiver uses to position the picture on the screen properly. The video inversion method works by subtracting from the signal a constant RF carrier (Figure 3B) at the same frequency as the actual RF carrier. The result is shown in Figure 3C. At the sync tips, the original carrier and the subtracting carrier have nearly canceled out; they are the parts of the scrambled signal nearest the zero line. During white portions of the video signal, when the original in 3A was nearest the zero line, the subtracted carrier overpowers it, so now the white parts of the picture are highest in 3C. The video has been inverted so the low parts (white) are high and the high parts (black and sync) are low.

What does a TV set do with all this? Figure 3D shows the scrambled signal as it comes from the set's video detector. The sync clipper looks at a threshold (shown by the dashed line), to find the sync pulses at the highest part of the signal. Notice that the highest part is now whatever is white, or light-colored, in the scene. The sync circuits assume this video information is sync, so typically what ends up in the middle of the screen is a jagged white sync bar, which jumps about as the program material changes.

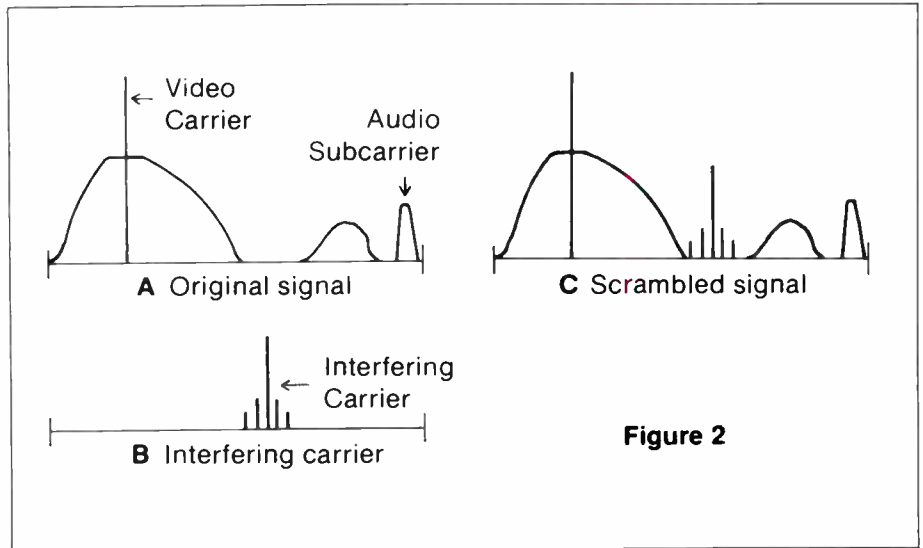


Figure 2

The sound is usually unaffected.

The video inversion technique will sometimes produce a vaguely recognizable picture, especially if the scene being televised is stationary. Print is often readable, and scenes with strong vertical patterns such as color bars will lock in.

The descrambler for the video inversion method sounds simple: it just adds back the carrier that was subtracted out at the headend. The job is harder than it seems, in that the carriers must be precisely matched in amplitude and phase, or else distortions of color and luminance will occur. Carrier reinsertion requires a sophisticated phase-lock loop and good, stable set-top converter oscillators, none of which is cheap. Another disadvantage is that by reversing the TV receiver's video detector diode to invert the polarity of the signal, an acceptable picture can

often be obtained. This trick becomes very popular in college towns with an electrical engineering department on campus, although the newer sets with detector ICs present more of a challenge to the would-be cheater.

### Sine-Wave Sync Suppression

The next method is popular, probably because of its reasonable effectiveness combined with relatively inexpensive descrambling circuitry. Figure 4A on page 28 shows the normal video-modulated RF signal again, but this time, it is sent through an analog multiplier. This is a device which multiplies the signal amplitude by another external scrambling signal. This device is typically a dual-gate MOSFET, whose amplification of RF energy varies as the gate bias changes.

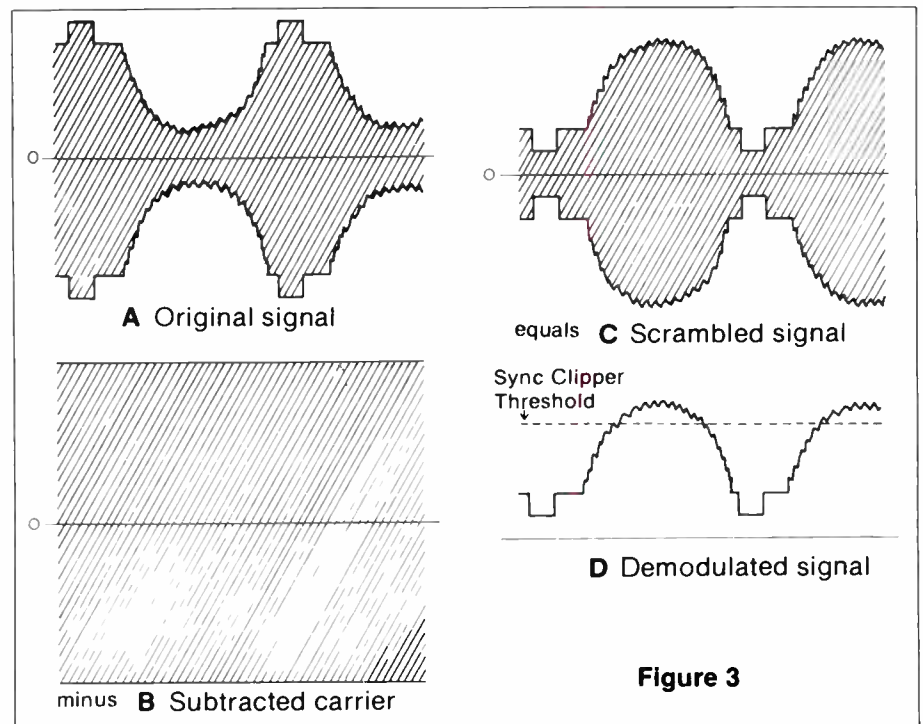
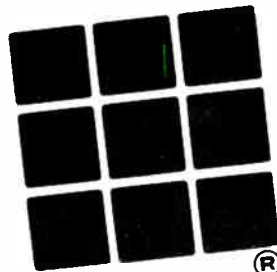


Figure 3

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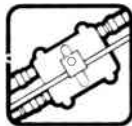


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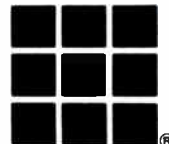
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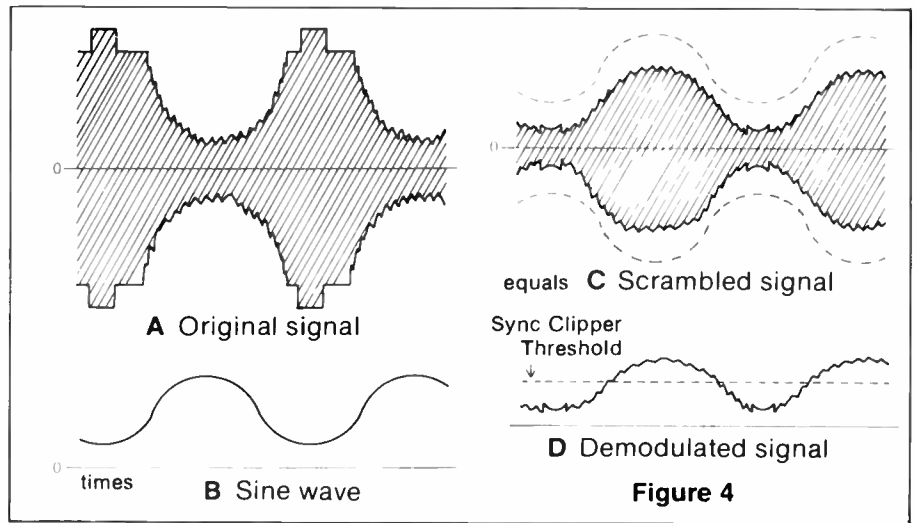
The scrambling signal is a sine wave at the horizontal sync frequency (Figure 4B), phased so that the trough coincides with the sync tip of the incoming signal. The result of this is shown in Figure 4C, where the sync tips have been "squashed" by the troughs. At the same time, the signal representing the center of the picture has been boosted so that it is almost always the highest part of the scrambled signal.

Figure 4D reveals that at the TV's video detector, the sync clipper is again misled to believe that the active video part of the signal is sync, and the real sync bar lands in the center of the screen. This renders the picture useless.

The scrambling quality is comparable to either the video inversion method or the square-wave method to be discussed later. There is a tendency for the scrambled scene to be more stable, since the center of the picture is always boosted the most. On the other hand, the sync bar almost always splits the picture down the middle, so the result is not very viewable anyway.

The descrambling method is quite clever. At the same time the video carrier is squeezed and expanded, the channel's audio subcarrier is given exactly the same treatment. The audio subcarrier, being FM, should normally have no amplitude changes, and this fact is used by the descrambler. A block diagram of the circuit is shown in Figure 5.

A tap samples the signal and sends it to a filter which selects the scrambled channel's audio subcarrier. That signal is AM-detected and used to drive a variable-gain amplifier (again, typically a dual-gate MOSFET). The variable-gain stage is automatically adjusted so as to flatten out any amplitude changes in the audio subcarrier. Not only does the TV now receive a smooth audio subcarrier, but the video signal is automatically



restored as well. The same operation that restores the audio subcarrier exactly cancels the action of the scrambler at the headend, and a normal signal results. Since the decoding key on the audio subcarrier is sent with every channel independently, there is no limit to the number of scrambled channels.

Of course, the word "exactly" should not be used, since nothing ever cancels out exactly except on paper. With a properly operating system, a good audio subcarrier filter and small drift in the set-top converter, the residual scrambling signal is negligible. Some problems can still occur, however.

If the frequency of the audio subcarrier drifts from the center of the filter (due to set-top instability, for example), the FM modulation of the audio signal will be slope-detected by the filter. This can cause banding in the received picture, synchronized with the sound modulation.

A similar problem can occur if loose plant connections cause the audio subcarrier RF level to jump up and down. This

difficulty appears as streaks and flashes, especially during windy days. Finally, if headend IF filters are misaligned so as to introduce spurious AM on the audio subcarrier, banding problems will occur on all receivers.

## Square-Wave Sync Suppression

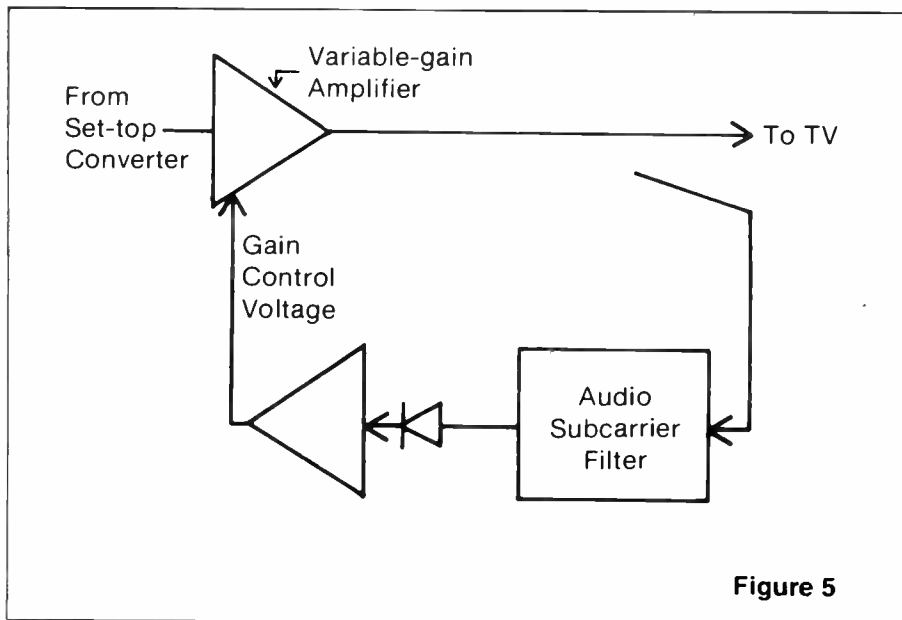
Varieties of this method probably form the majority of scrambling systems in use today. Unlike the previous systems, its operation is semi-digital and can make use of the explosion of digital devices and products available in recent years.

A typical example of this method is presented in Figure 6 on page 33. The normal video-modulated RF signal in Figure 6A is again multiplied by a 15.75 KHz signal phase-locked to the horizontal line frequency. This time, however, the scrambling signal is a square wave, and it causes a variable attenuator to switch between two different values of attenuation. During the active video (picture) part of the horizontal line, the signal goes through at a normal level. During the blanking interval, just before and after the sync pulse, 5 to 6 dB of attenuation is switched in. This causes the sync pulse and burst to fall below the level of the active video.

Just as in the sine-wave sync suppression method, the TV receiver's sync clipper will be fooled into thinking some part of the video is actually sync, and a wavy sync bar (black, in this case) will occupy much of the screen. The general appearance of the scrambled picture is similar to that of the video inversion method, except that luminance values are normal, not negative. An occasional picture will lock, but usually it is stationary and has a dark average picture level. Letters can sometimes be read. The sound is normal.

There are several descrambling methods, differing only in the details of

*Continued on Page 33*







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**RCA Cablevision Systems**

## RCA Begins Phase Two of San Antonio System



Final adjustments on the UACC headend are made by technician, Richard Keitr. The central-hub headend is situated atop the 21-story NBC building in downtown San Antonio. The 32-channel headend utilizes RCA CTM-10 Modulators and CTD-10 Demodulators.

San Antonio, Texas—After successfully completing 1,068 miles of plant in the UA-Columbia Cablevision system here, Cablevision Systems was awarded the contract to begin part two. Reputed to be the largest single system in the country when completed, San Antonio will have some 3,246 miles of plant. RCA and UACC finished design and mapping of this new phase in early February, 1981. To assure that no one area is left totally without service until last, RCA is coordinating this turnkey operation to be built from each of the nine hubs outwards. As described by UACC

Project Manager, Cal Broussard, the availability of cable service to the franchise area will spread like the concentric circles created by a stone thrown in a lake.

UACC is employing RCA Model 172 Mid Band Split Trunk Amplifiers to provide 32 active channels of programming. The system is capable of 36 channels. The San Antonio system is a total RCA turnkey capability project, from the RCA Broadcast Systems supplied video studios, through the multi-hub headends and onto the RCA constructed and equipped distribution system.

## I've Got an HRC Headend, You've Got an IRC Headend. Who's Right?

The question of who has the right or wrong 54 channel headend system is only relevant when related to the specific cable system locale and the franchise requirements. The right system is the one installed after a careful evaluation of the franchise. No matter what that system is, RCA Cablevision Systems can supply it.

The Harmonically Related Carrier system (HRC) and Interval Related Carrier system (IRC) are Coherent Headends. Both have higher headend costs compared to a standard headend, yet they allow bridger levels to be increased, lowering distribution costs. The HRC system requires picture carriers to be shifted to harmonics of 6 MHz which is used as a reference. All channels, ex-

cept five and six, shift 1.25 MHz lower than normal assignments. Channels five and six shift 5.25 MHz lower in frequency. In some locations, this procedure may result in an intolerable amount of signal ingress from off-air TV signals.

With an IRC headend, all channels, except five and six, operate on normally assigned frequencies. Channels five and six must be shifted to fall in with the other channels. Only five and six are shifted to frequencies where it is impossible that they be coherent with off-air TV channels. A maximum of two channels can operate coherently with off-air TV channels as part of an IRC cable system. The result is that an IRC system will have fewer channels

affected by the ingressing of off-air signals. An IRC system still allows the same 5 dB increase in amplifier level as an HRC system.

RCA Cablevision Systems believes that investors will benefit by purchasing a system type with an established record of performance and reliability. RCA has experience providing all types of headend systems.

For a detailed description of 54 channel headend systems, write to Cable Today, RCA Cablevision Systems, 8500 Balboa Blvd., Van Nuys, CA 91409. Request Cablevision News, Volume 1. (Ref.) 400 MHz CATV Systems and recommendations. By John Ovnik, Chief Engineer, RCA Cablevision Systems.

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**RCA Cablevision Systems**

## TRUNK LINE

**Q:** *One of our subscribers has been reporting interference on his FM receiver ever since his TV was connected to the cable. The FM receiver is a separate unit from the TV and is plugged into a different house circuit. Could you help us locate the problem?*

**A:** The RCA Customer Service Group was quick to respond. After an intensive investigation into the situation at the subscriber's residence, the source of the problem was located. Apparently the TV oscillator on Channel 3 was creating radiation interference. Under normal circumstances, the possibility of the home TV receiver being operated on Channel 3 simultaneously with the FM radio being on would be remote. But, in this case, the set-top converter output was Channel 3... the radiation culprit! No matter when the TV was used it would interfere with the FM receiver.

There were three equally adequate solutions to the problem. First, the FM receiver could be relocated to a position in the room where the distance from the TV eliminates the radiation interference. Second, the installation of a rooftop, attic, or other remote antenna and disconnection of the

built-in antenna on the FM receiver would have established the necessary distance from the radiation source. Third, it would also be possible to change the output channel of the converter from Channel 3 to a channel that did not have the radiation problem.

In this case, the subscriber's FM receiver was relocated across the room. The interference problem was eliminated.

---

RCA's Trunk Line Column answers current questions by readers submitted to Cable Today. All questions sent to RCA become the property of RCA and the publication of the question and the corresponding answer is at the discretion of the Cable Today staff. Questions should be sent to: Cable Today, RCA Cablevision Systems, 8500 Balboa Blvd., Van Nuys, CA 91409.

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## RCA Adds New 800 Phone Line

RCA Cablevision Systems has initiated a new "800" telephone number. Serving the eastern half of the country, the new number is:

**1-800-345-8104**

This new RCA "800" number joins the western service number: 1-800-423-5651.

## RCA Provides Environmental Protection

RCA CATV products are designed to protect signals from the ravages of the environment. We begin with the housings. All are double gasketed with an outer weather seal and an inner RFI seal. Corrosion-resistant aluminum is used in the construction and all hardware is stainless steel. External 30 dB back-matched test points have protective caps on all inputs and outputs to eliminate the need to break the amplifier seal when making level checks. Physically the smallest amplifier on the market, RCA housing and fin surface areas provide more than 600 square inches of external radiating area. This maintains low internal operating temperatures for maximum unit life.



The RCA environmental test lab is a tough proving ground for amplifiers.

On the Arizona desert, RCA amplifiers have been subjected to direct heat temperatures of 140°F. In severe lightning areas and in the lab, transient and surge tests have been conducted with the amplifiers continually meeting speci-

fications. During laboratory cascade tests, equipment performed at specification during temperature testing from -40°F to +140°F. And for protection in a maritime environment, RCA has conducted salt spray tests to military specifications (MIL-STD-810 Method 509) and to ASTM (B117-64). Units were salt fog tested in 5% salt solution at 95°F for 500 hours with laboratory tests revealing no mechanical or electrical deterioration or malfunctions.

RCA Cablevision Systems invites all cable operators to visit the RCA Environmental Test Lab in North Hollywood. See for yourself why RCA products are known to be proven tough.





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Don't let your system or customers be caught short while you're waiting for back-ordered passive components. RCA Cablevision Systems can immediately take your order for all the necessary components to build an entire system or for a limited quantity of replacement units. Just call RCA Cablevision Systems toll free: East 1-800-345-8104 or West 1-800-423-5651. In California (213) 891-7911.

## Color Television Modulators and Microwave Transmission

RCA Cablevision Systems' products have numerous versatile applications in the cable and related communications industries. The modular design of RCA equipment allows purchase of only those options required. Here's how RCA CTM-10 modulators and CTD-10 demodulators perform cost-effectively in microwave transmission.

The microwave center picks up distant broadcasts with an antenna. An RCA CTD-10 demodulates the signal for microwave transmission. Due in part to the RCA CTM-10, simultaneous sound and picture transmission is

highly economical. Interfacing with the microwave equipment, the RCA CTM-10 "Microwave Modulator" handles the combination picture and sound signal. In this special configuration, the CTM-10 works with the subcarrier (4.5 MHz) audio without the need for the audio module. There is a substantial economy in purchasing the RCA CTM-10 less this module.

RCA is experienced, tested and proven in the customization of modulators, from a routine customer switching request to specialized microwave applications.

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"Design and Construction of CATV Systems" is published by RCA to inform the cable operator about system design, construction standards, turn-on and alignment procedures and general maintenance practices which are recommended for optimum system performance. For a limited time, this 100-page manual is yours FREE for the asking.

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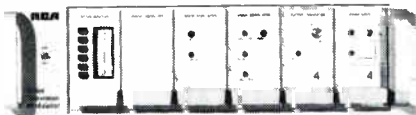
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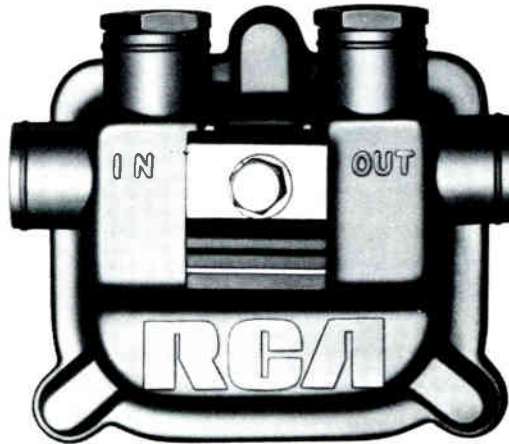
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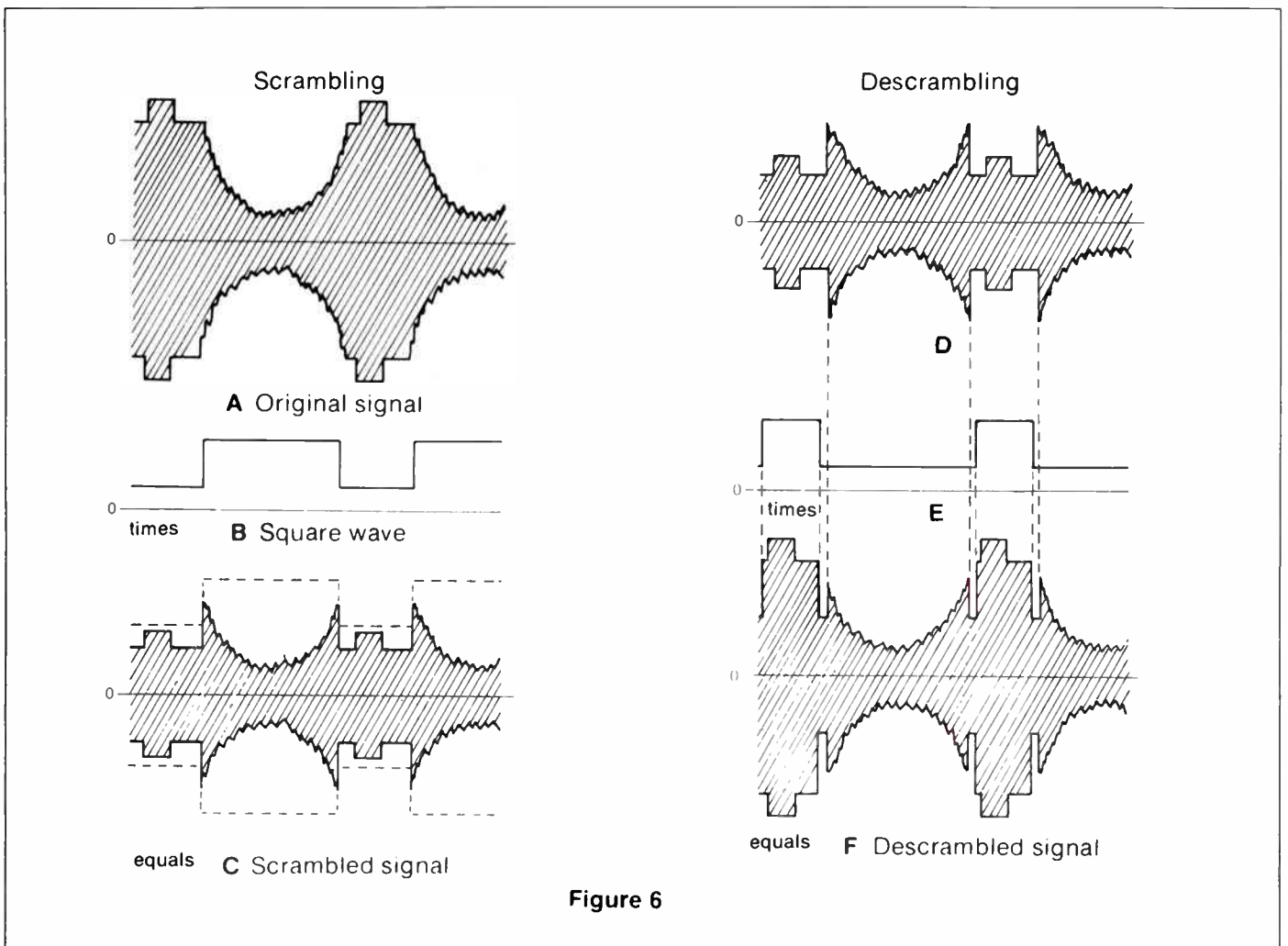


Figure 6

Continued from Page 28

how the proper timing information is transmitted to the descrambler. The actual descrambling operation is shown in Figures 6D-6F.

At the descrambler, the scrambled signal in 6D is again multiplied by a square wave, except that where it was attenuated before, it is now enhanced or boosted. This action of raising the signal level during the blanking interval restores the sync tip to its original height and permits normal reception. The descrambler is simplified because it is easier to build a circuit that will switch between only two levels of attenuation than it is to make one that has infinitely many levels, as in the sine-wave system.

How does the decoding signal in 6E get to the descrambler? One technique is the so-called out-of-band method, which transmits the timing pulses from the headend outside the TV bands, often in an unused portion of the FM band. A separate receiver attached directly to the incoming drop detects this timing pulse and sends it to the descrambler. This method works very well for one scrambled channel. To descramble more than one channel, using the same decoding signal, requires that all the scrambled channels be frame-

synchronized. This process is expensive and inconvenient. The alternative, which is to use more decoding signals, becomes wasteful of valuable spectrum space and awkward to handle.

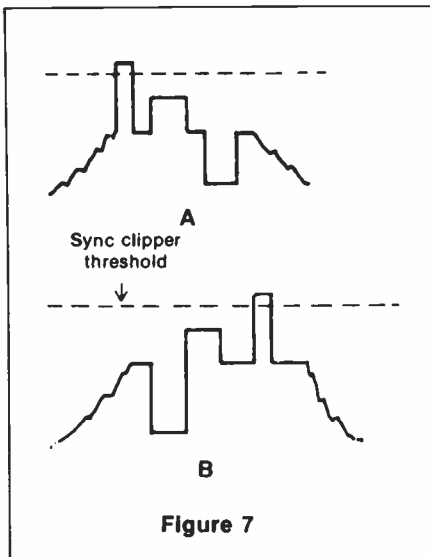
The more common solution is the in-band method, which transmits the decoding timing information on the scrambled channel's audio subcarrier. This poses no limit to the number of scrambled channels, but places additional technical restraints on the descrambler. It must now retrieve fairly exact timing information in the presence of interference from nearby video carriers and chroma subcarriers. Add set-top converter drift to this picture and you get quite a technical challenge, with some fundamental problems built in. As in all engineering tradeoffs, something is never obtained for nothing. The advantage of unlimited scrambling capability can outweigh the above drawbacks.

What problems can occur with this technique? Since the square-wave descrambling is basically an on-off or digital operation, we should expect it to work either very well or not at all. Such is the case. Notice that in Figure 6E, the descrambling square wave is slightly narrower than the width of the scrambling pulse, shown by the dashed lines. This is

an allowance for the errors in timing that will inevitably appear. The scrambler timing causes the signal to be suppressed a microsecond before the descrambler enhances it, and vice-versa after the sync pulse. The microsecond of delay appears as two small notches in the descrambled signal (Figure 6F). These will normally be invisible except on an underscanned set, where they appear as white vertical bars on either side of the active video. Slight errors in timing will change the width of the bars, but otherwise leave things undisturbed. The fact that nothing happens during active video to distort the viewed signal is an advantage.

If the timing gets off too far, one of the two cases in Figure 7 on page 34, will occur. In Figure 7A, the descrambler is enhancing the scrambled signal before the scrambler suppresses it, causing a spike to appear at the leading edge of the blanking interval. The TV's sync circuits lock on this unreliable spike instead of the true sync pulse, and usually severe side-to-side picture motion (flag-waving) occurs. In Figure 7B, the timing is erroneous in the opposite direction, with similar results.

Another problem happens when interference of any kind gets into the decod-

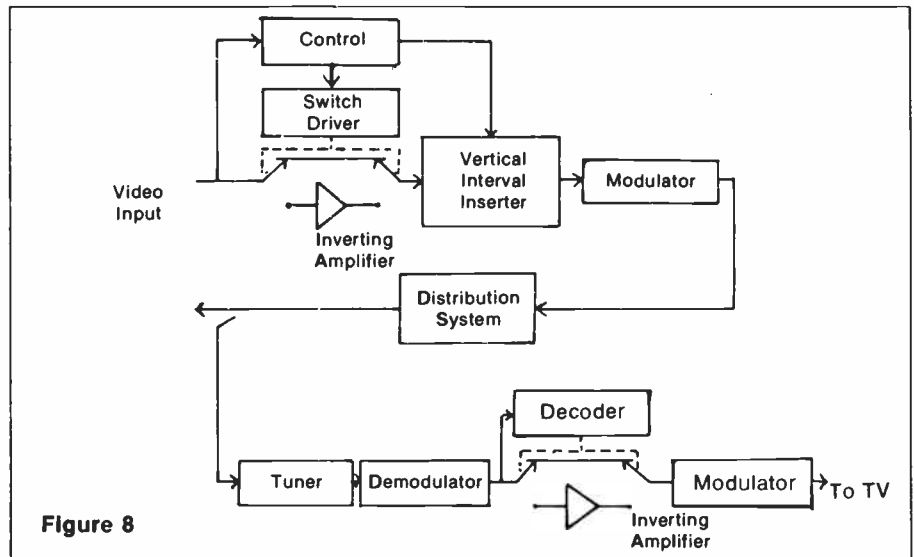


ing-signal passband of the descrambler. Causes are numerous (character generators, set-top drift, ignition interference), but the result is to trigger the descrambler at the wrong time. Both in scrambled and non-scrambled pictures, this difficulty appears as black or white lines popping across the screen. Unlike the analog sine-wave method, when this system fails, it fails abruptly. The popularity of this method implies that such troubles are not too common.

### Baseband Methods

Baseband scramblers require working with the baseband video signal, rather than the video-modulated RF or IF signal. Because of the lower frequencies involved (four MHz instead of up to 70 MHz), more complex operations can be carried out. One disadvantage is that at the subscriber's location, the RF signal must be tuned, demodulated, descrambled and remodulated for transmission to the subscriber's TV where it is once again demodulated. Signal quality suffers from all this extra processing, not to mention the added cost of the local modulator and demodulator circuits.

Since there are several types of baseband systems and the details of each are not immediately available, this article will briefly describe a hypothetical system combining several features of existing systems. At the top of Figure 8 is pictured a headend scrambling system diagram. The video to be scrambled arrives at an electronic switch, controlled by a switch driver circuit. During some horizontal picture lines, the video goes straight through to the modulator and is transmitted normally. At other times, selected at random by the control circuit, the video is sent through an inverting amplifier and transmitted upside-down, as in the video inversion method. During the vertical interval, the scrambler inserts a special digital code containing information about which lines are normal and



which are inverted. This data goes out over the cable system in the scrambled signal.

At the subscriber end, the scrambled signal must first be demodulated. A decoder circuit reads the information in the vertical interval and uses it to control its own set of electronic switches. These re-invert the incoming inverted lines, and leave the normal lines alone. The picture is restored to its original state, and the baseband video is then remodulated onto a carrier for use by the subscriber's TV.

The relative complexity of this scheme is offset by the fact that a would-be cheater has to invest in some fairly sophisticated digital equipment in order to crack the code.

### Future Trends

What can be said about the coming forms of cable television scrambling? For one thing, more digital and microprocessor-controlled techniques will be used. There is a rather rigid ceiling on the price most system operators are willing to pay for descramblers, and this ceiling eliminates many more elaborate scrambling schemes that involve extensive analog and RF processing. On the other hand, the marginal expense of adding complexity to a custom digital IC or a microprocessor is relatively small and predictable, both in terms of direct manufacturing cost and physical size. The manufacturers will therefore tend to work on advances in the more predictable digital area, in preference to RF techniques.

This trend toward digital systems also will give rise to a move toward baseband set-top converters. Other things being equal, circuits for use at video frequencies are cheaper than those working at RF, neglecting the demod-remod process necessary for baseband descrambling. If the set-top converter of the future does indeed expand into a computer terminal with display capabilities using the home

TV set, video circuits will already be in use for the computer graphics anyway.

How far will digital techniques go in replacing analog circuitry for scrambling use? There are a few systems available which take in a video signal at baseband, convert it to a purely digital form occupying the same bandwidth, and perform the inverse operation at the descrambler. The scrambled signal bears no discernable relation to the original signal, and as far as the scrambling quality is concerned, this can be regarded as the ultimate method. Unfortunately, the descrambler price is in the \$3,000 range, making it far too expensive for anyone except satellite link operators. The basic problems of cost arise from the precise synchronization needed and the digital-to-analog conversions, all of which proceed at frequencies of at least 30 MHz. The inexpensive MOS ICs available today fail above about 4 MHz, and the prices and sizes of the faster ICs have a long, evolutionary path to travel before they can be considered for home use.

An intermediate step between all-analog and all-digital systems is a scheme using digitally-controlled analog delay lines. Both charge-coupled devices (CCDs) and surface-acoustic-wave (SAW) delay lines are capable of storing video information. This ability can be used in a type of scrambling known as line-swapping, in which selected lines are interchanged.

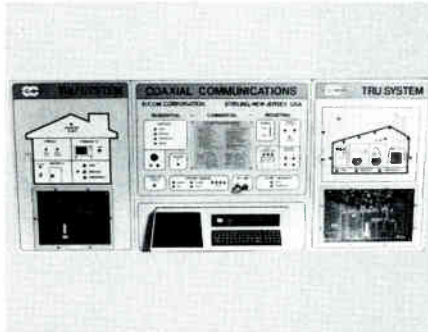
Whatever new techniques arise, it will pay in the long run to find out as much as possible about the different systems offered, in order to make an intelligent choice based on sound engineering knowledge and experience.

*Karl D. Stephan is working toward a Ph.D. in electrical engineering with a specialty in microwave engineering at the University of Texas at Austin. Stephan served as a design engineer for Scientific-Atlanta.*



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New lockable Securit System prevents CATV signal theft and lost operator revenue. Easily installed at aerial transition points or to exterior walls, Securit System also allows faster subscriber audits, is easier to maintain and eliminates the need for callback service calls. Boxes are weatherproof and tamper-proof.

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# Catching Up on Tech: NCTA Technical Sessions

**C**able operators had a chance to catch up on advances in cable technology at 14 technical sessions at the NCTA convention in Los Angeles. The seminars explored a wide range of topics from rural system design to tips on selecting addressable systems.

Not all the news that operators heard at some of the technical sessions at the National Cable Television Association convention was good. For example, they learned that the explosion in low-power television may bring about an explosion in signal interference; better communication with utilities can ease make-ready problems, but there is no way to get around the fact that utilities can cause major construction delays; and if you are waiting for cable-ready TVs, don't hold your breath.

On a lighter note, operators came away with encouraging news on a new market—audio services—and with tips on selecting an addressable system and in designing rural cable systems. The following is a summary of nine of the NCTA technical panels.

## Addressability

The two-part technical session on addressability and pay TV security examined addressability from two angles: part one dealt with hardware and software in addressable systems, and part two dealt with the experiences several MSOs have had with addressable systems.

In the first session, Charles Eissler, director of market research for Oak CATV, stressed that addressability is needed to safeguard the security of pay channels and to cut the costs of adjusting a subscriber's pay menu. Addressability at the headend, Eissler said, will enable cable operators "to replace a one-ton truck and a 180-pound installer with a 95-pound data entry clerk."

Carl Schoeneberger, engineering manager for TOCOM, discussed the design of the 55 Plus system, and Larry Brown, general manager of planning for Pioneer Communications, presented a technical summary of the VIP addressable system.

Joseph Stern, president of Stern Telecommunications, recommended the use of addressable taps as a means of preventing subscribers from tampering with converters.

The highlight of the second session came when Gary Tjaden, vice president of engineering and technology for Cox Cable, described the epidemic of theft of service that swept one of the Cox systems after it introduced a second and third pay service. Subscribers discovered that by cutting a single wire in their multichannel converter they could unscramble all premium channels. Instructions on how to steal service appeared on billboards in schools, and "kids were telling their dads what color wire to snip," said Tjaden. He estimated that 20 percent of the subscribers in the system tamper with their boxes.

Tom Polis, vice president of engineering for Comcast, reminded operators that the price tag of addressability is high. After all costs are considered, installing and maintaining an addressable system over the 15-year term of a franchise costs \$37,000 per mile, four times the cost of the cable, said Polis.

## Aeronauticals

There have only been five documented cases of radiation from cable television systems interfering with aeronautical navigation channels. Despite the negligible number of occurrences, the possibility of such radiation causing an air tragedy has moved the FCC, at the prodding of the Federal Aviation Administration, to term the problem "overwhelmingly important."

"This is very important to the cable industry in terms of credibility," said Cable Bureau Chief William Johnson. "And the problem is literally sucking up all our resources."

Last fall, the cable bureau was receiving about 30-35 clearance requests each month from cable systems attempting to comply with FCC Rule 76.610. After the FCC crackdown, the number of compliance applications rose dramatically, hitting 280 last April. This has caused difficulties at the cable bureau in processing the applications and checking the FAA frequency lists for possible conflicts.

The problem will soon be remedied, according to Clifford Paul, electronic engineer at the cable bureau. Paul said the bureau is in



*Cable Bureau Chief William Johnson says that his bureau plans to recommend relaxation of radiation standards.*



the process of computerizing its system for determining conflicts. There is no firm date for completion of the system, but Paul indicated that it is a priority and will be accomplished as soon as possible.

At the same time, the bureau staff intends to recommend a relaxation of the radiation standards. The move could come this summer, according to Johnson. Although the standards will probably be relaxed, Robert Ratcliffe, chief of the compliance branch of the cable bureau, said the standards are going to remain "fairly strict" to avoid any future air tragedies.

"The problem is not that the probability is high," Ratcliffe said. "The problem is that it exists."

## Audio Services

FM stereo service can be a new frontier for cable operators, but three ingredients must be present to make it happen: unique audio product must be available economically, nationwide; a method must be developed to deliver a premium audio signal, and cable operators must take audio services seriously. This was one of the points made at the NCTA technical session on audio services.

Ned Mountain, senior engineer for UA-Columbia, told the operators that a successful audio service must offer full stereo, 15 kHz bandwidth for quality sound, low noise, low distortion and full dynamics. UA-Columbia's cable system in San Angelo, Texas, recently expanded its audio offerings from 11 FM signals to 18 and received a tremendous increase in requests for FM taps, from approximately 40 new installations per quarter in mid-1980 to over 140 new taps a quarter in mid-1981. The expanded audio service, called Music Theatre Plus, included additional FM broadcast signals brought in via microwave, a satellite subcarrier, an all weather station and a channel called "Ear To The World" that offered selections from short wave broadcasts.

Responding to questions from the floor, Robert Placek, president, Wegener Communications, said that a handful of satellite transponders, each carrying 20 or 30 FM stereo channels, could deliver 100 or 200 audio services:

## Cable-Ready TVs

Television set manufacturers demonstrated their willingness to work with cable companies in developing cable-ready television sets by sending three representatives to a technical panel on cable-ready television sets at the NCTA convention.

W.T. Collins, vice president of consumer affairs for RCA, opened the discussion by stating that the main problem preventing the development of cable-ready TVs is the lack of an approved or agreed upon plan on the delivery of channel frequencies. Collins called on set manufacturers and cable operators to work together to develop a standard channel plan.



*A successful audio service must offer full stereo 15 kHz bandwidth, said Ned Mountain, senior engineer for UA-Columbia.*

The problems confronting cable-ready sets, however, are numerous. L. H. Hoke, manager, television receiver engineering for Magnavox, pointed out that even after a cable-ready television set is developed, operators cannot expect the sets to be commonplace until seven years after introduction, the average time currently operating sets would remain in use.

One thought that was prevalent among operators who asked questions was the vast difference between the speed in growth of cable-related services and the slow pace of the television set market. Because of this, the type of television set common in subscribers' homes will probably never be on par with the latest technological services, such as two-way and addressability, that are being offered over cable. Therefore, the industry probably cannot look to cable-ready TVs as a substitute for converters supplied by the cable operator.

Michael Jeffers, vice president, advanced development for Jerrold, said his firm would cooperate in developing frequency standards for cable television, but cautioned that cable-ready televisions will have to be able to accommodate cable systems with capacities higher than 400 MHz.

The third television set manufacturer on the panel was Michael J. Palladino, consulting engineering for General Electric.

## Current Technologies

The current technologies seminar offered advice and updates on topics ranging from the latest in connectors to the interference problems that low-power television may cause for cable television operators.

One speaker with grim news for operators was Early Monroe, president of EDM & Associates. Monroe warned that "the explosion in the use of VHF bandwidths" in low-power television may cause major interference problems for cable operators at

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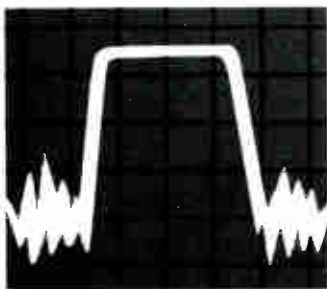


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the headend, on the line and at subscriber terminals. To make the problem worse, said Monroe, the FCC has placed the burden of proving interference on the cable system. Monroe recommended that operators find out who has filed low-power applications in their area and work with the applicants to make sure the requested frequency will not interfere with cable television operations. Once the low-power stations are operating, cable companies should keep a detailed record of interference.

Bill Gilbert of Texscan presented a paper on the configuration and components of an automatic status monitoring system. Constant computer monitoring of line equipment can help a cable

operator reduce down time, improve the technical effectiveness of equipment and pinpoint equipment malfunctions with ease, according to Gilbert.

In a paper entitled "Design Considerations for Mechanical Packaging of a CATV Trunk Station," Wayne Vaughn, senior mechanical engineer for Scientific-Atlanta, discussed such factors as housing geometry and module placement, material selections and thermal design and performance in building a CATV trunk station.

The latest developments in coaxial connectors was the topic of a paper entitled "Tying It All Together." The speaker was William Down, chief engineer for LRC Electronics.

## Fiber Optics

Lewis C. Kenyon, III, an engineer with the Fiberoptic Division of Valtec, discussed the design considerations for using injection laser diodes and avalanche photodiodes in injecting signals into fiber optic cables. Valtec's objective in the experiment was to produce a wideband system capable of supporting at least three FM video channels with better than 50 dB S/N ratio. After testing both single-mode and multimode lasers, Valtec found that it received the best results from NEC and G.O. multimode lasers. According to Kenyon, only the NEC laser achieved the 50 dB S/N ratio, but its noise floor was subject to 3.0 and 4.0 dB variations. The G.O. laser was stable and produced noise 6.0 dB greater than anticipated.

Communications Telephone Technologies Corporation of Dallas, Pennsylvania, has been operating a digital fiber optic system in a rural community in Pennsylvania since October 1978. The problems the company encountered in laying and maintaining the fiber optic cable was the topic of a paper delivered by Craig M. Swinn, vice president of marketing for the company.

In installing the 22 km. fiber system, Commonwealth



Craig M. Swinn, vice president of marketing for Communications Telephone Technologies Corporation, discussed problems his firm encountered while installing fiber optic cable.

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encountered almost every cable installation situation: 11 km. of the cable had to be buried; three km. was lashed to existing aerial cable; and eight km. was lashed to 6M aerial strand. To monitor possible cable damage during plowing, Commonwealth connected an optical time domain reflector meter (TDR) to the cable. The testing unit, however, was damaged during the first day of operation by an unregulated AC generator. Since another TDR could not be obtained in time, Swinn said that Commonwealth's installers employed a less scientific testing method—putting a light source at one end of the cable and checking that the light appeared in each fiber at the other end of the cable.

## Make-Ready

Better communications with utilities can ease delays in make-ready, but in some cases even the best communication between a cable operator and a utility will not alleviate make-ready problems. That was the consensus of the panelists at the NCTA seminar entitled, "Construction Make-Ready: Problems with Utilities."

The panelists offered advice for operators who are going up to bat on make-ready. Operators should first determine the chain of command at the utility and be sure that their requests reach the proper decision maker. Too often, cable operators spend time negotiating with people who do not make final decisions on make-ready. Cable operators should also involve city officials in the make-ready process by keeping them abreast of any make-ready problems that could delay start of cable service. Often, a mayor's phone call can turn the tide at a recalcitrant utility. One way to point out make-ready problems is to document all communication with the utility. If cable construction is behind schedule, a company can direct the wrath of city councils at the utility by showing that the utility is causing the delay.

William Hargan of Feather River Systems Corporation, Auburn, California, underscored many operators' fears about

telephone companies by reading a statement written by AT&T in 1927, in which AT&T expressed its intention to dominate the communications business. "Fifty years later, AT&T is still seeking to dominate the market," said Hargan.

## Rural Systems

Methods of minimizing construction cost per mile and advice on selecting headend sites in mountainous terrain were the principal topics of the NCTA technical session on rural cable systems.

Richard Kirn of Wire Television Corporation opened the session with a discussion of high-gain line extender amplifiers. By building long distribution cascades, operators can eliminate the need for double (trunk/distribution) cable, reduce the number of bridge amplifiers and make extensive use of integrated messenger cable. Kirn also noted that the highest number of channels a cable operator can offer in rural areas is 21. "Fifty-two channel systems won't pay" in rural areas, Kirn said.

Frederick G. Griffen, president of Frederick G. Griffen, P.C., of Lynchburg, Virginia, described a system that his firm designed for the mountainous community of Narrows, Virginia. The key problem that an earlier cable television company faced in the community was choosing a headend site that received quality broadcast signals. The solution Griffen found was to build two headend sites and link them through subscriber cables. Each headend received clear television signals from a different city. One of the headends was located in a graveyard, and Griffen noted that his technicians have had no problem with ghosting at the site.

In the time that remained, Gerald S. Schrage, chief of the system engineering branch for the Rural Electrification Administration, presented a brief history of REA involvement in cable. Most of the cable systems that REA has aided with low interest loans have fewer than ten subscribers per mile.



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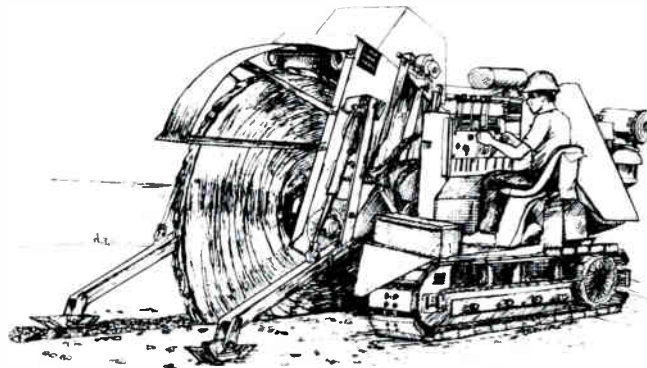
capacity from 35 to 52 channels; the CA5000 (18.5 dB GAIN, greater than 400 MHz, BW) + 5 dB increase in dynamic range. (Wider dynamic range increases length of trunk due to lower noise build-up and lower distortion build-up in cascaded amplifiers.)

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# CEC Tech Review



Industry optimists who predicted that the National Cable Television Association's 30th annual convention in Los Angeles would draw far more participants than any other cable show were right on the mark. The 140,000 square feet of floor space at the Los Angeles Convention Hall and the adjacent North Hall could hardly hold the 350 exhibitors and 15,525 registrants. In this issue, **CEC** will try its best to hold them all, too. In the following pages, **CEC** examines new products unveiled at the NCTA show by over 100 manufacturers.

## Addressability

C-COR Electronics  
Delta-Benco-Cascade  
Magnavox CATV Systems  
Oak Communications  
Pioneer Communications  
Scientific-Atlanta  
TOCOM

## Cable

Belden  
CCS Cable  
Capscan Cable  
Comm/Scope  
General Cable

## Cable Accessories

budco  
Cablemate  
Drop Shop  
Gilbert Engineering  
Jackson Tool Systems  
LRC Electronics  
Panduit  
TelComm Products/3M  
Times Fiber Communications

## Cable Tools

Cable TV Supply  
Progressive Electronics  
SignalVision

## Closures

Channell Commercial  
Reliable Electric/Utility Products  
Roart  
S.A.L. Cable Communications  
Utility Products

## Construction Machinery

Ditch Witch  
Elephant Industries  
Howard Bore Products  
J I Case  
Lamb  
Vermeer Manufacturing

## Converters

Cabletenna  
Oak Communications  
RCA Cablevision Systems  
Zenith CATV

## Headend

Edutron  
Gardiner Communications  
Hughes Microwave Communications Products  
Microdyne  
Nippon Electric  
Phasecom  
Synchronous Communications  
Tele-Engineering  
Times Fiber Communications  
Tomco Communications  
Wegener Communications

## Line Equipment

AEL  
AM Cable TV  
Amplica  
Century III Electronics  
Intercept  
Keystone Electronics  
Texscan

## Pay TV

### Components

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GTE Products/Sylvania  
Hamlin USA  
Pico  
TEST

### Power Supplies

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Communication Distribution/Lectro  
Control Technology  
PowerVision  
RMS

### Satellite Dishes And Receivers

Anixter-Pruzan  
Comtech Data  
M/A-COM

Microdyne  
Prodelin  
Satellite Communications Network  
TES

## Test Equipment

Avantek  
Brad Cable Electronics  
Communications Supply  
ComSonics  
James G. Biddle  
Sadenco  
Videotek  
Wavetek Indiana

## Two-Way Systems

Jerrold Electronics  
Oak Communications  
Pioneer Communications  
Scientific-Atlanta  
TOCOM

## Video

Ampex  
Arvin/Diamond  
Compact Video Sales  
Digital Video Systems  
Harris Video Systems  
JVC  
M/A-COM  
Metrodata  
Midwest  
System Concepts  
Tele-Measurements  
Video Data Systems

## Miscellaneous

Broadband Engineering  
CableBus Systems  
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Conifer  
Cybertech  
Diamond Cable Electronics  
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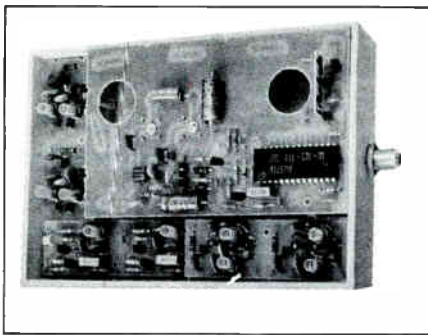
# Addressability

## C-COR

**C-COR Electronics, Inc.**, unveiled its strand mounted addressable converter system, SCAT, an acronym for Security Conversion Addressability Tiering, is a system located outside the subscriber's home or apartment. The firm is developing two models of the system, SCAT 1, designed for individual homes, and Scat 2, designed for apartment and other multiple-unit dwellings. Field trials will commence in July. For information, contact C-COR Electronics, Inc., 60 Decibel Road, State College, Pennsylvania 16801; (814) 238-2461.

## Addressable Wall Plate

**Delta Benco Cascade** introduced its addressable wall plate, model IT-1-6SM. The unit is part of the firm's addressable tap system. The wall plate provides basic service control and individual control of up to six pay channels. The unit is shielded against ingress by a metal back plate, a conductive coating applied to interior housing and anti-tampering mounting screws that are recessed for improved security. An optional expansion connector is available for future control requirements. For information, contact Delta Benco Cascade, 124 Belfield Road, Rexdale, Ontario M9W 1G1; (416) 241-2651.



The model IT-1-6SM wall plate from Delta Benco Cascade.

## Jerrold

The **Jerrold Division** of General Instrument introduced two additions to its addressable Starcom pay system. Jerrold has developed a software "media link" between the Jerrold addressable control system and IBM's customer service product line. Through this "media link" it is now possible for cable operators to provide direct interface between their customer service and billing functions and the addressable control of Jerrold converters, according to the company.

The second addition is the model III headend controller. The models I and II headend controllers enabled the cable operator to select headend compute,

hardware sized optimally for systems up to a maximum of 128 program tag levels and 256,000 subscribers. With the introduction of model III, customers will now be able to increase their headend capability for a multi-terminal operation (up to eight) and wire link connection to a variety of external customer service and billing systems. In addition, the larger computer configuration allows for additional management reports.

For information, contact Jerrold, 2200 Byberry Road, Hatboro, Pennsylvania 19040; (215) 674-4800.

## Magnavox

**Magnavox CATV Systems** unveiled the Magna 6400, an addressable, programmable 64-channel set-top converter. The system can individually convert all channels within the 50-440 MHz bandwidth, according to Daniel Mezzalingua, Magnavox CATV president. An operator can use the Magna 6400 to provide basic service and then upgrade the converter to provide multitier and two-way services, eliminating the need to purchase new converters each time the system is upgraded.

The Magna 6400 system enables a cable operator to control a subscriber's converter from a central computer. The system provides remote tier-level authorization to prevent theft of service, cuts the cost of changing a subscriber's choice of pay channels and enables an operator to access an individual subscriber. In cases of nonpayment, an operator can cut a subscriber's pay channel from the central computer and replace it with a message inviting the subscriber to pay his bill. The operator can also send emergency information on all channels.

For information, contact Magnavox CATV Systems, Inc., 100 Fairgrounds Drive, Manlius, New York 13104; (315) 682-9105.

## Oak Communications

**Oak Communications CATV Division** demonstrated two new headend software packages—Release II and the TC 35 Interfaceable Addressing System (IAS).

Release II headend equipment complements software used to control initial Oak TotalControl addressable systems. It provides single keystroke entry to the most commonly used menus. It expedites data entry, makes data access more flexible and supports special event marketing. In addition, Release II provides management information for cable operators in the areas of customer service and profitability. The computer software can generate the following decoder detail from stored information: last service date and code; service accumulator; last status change data and code; special

event totals from current and previous year; date decoder received from Oak, and field service code numbers.

The IBM Series/1 computer used for the Release II software is currently employed in Oak's one-way addressable TotalControl. It will soon be integrated into TotalControl Dimension II, Oak's addressable two-way interactive system, according to the company.

IAS differs from Release II in that very little customer data is maintained in the cable system's control computer. The IAS system is mated to the cable system's billing service computer, which serves as the "host" for the data collection and control information transmittal capability. "The IAS is a stand-alone system that interfaces the host computer with the cable system's IBM Series 1 'slave' via a dedicated data communications channel," according to William Lipman, director of computer applications.

For information, contact Oak Communications CATV Division, P.O. Box 517, Crystal Lake, Illinois 60014; (815) 459-5000.

## Pioneer

**Pioneer Communications of America** introduced its fourth generation two-way interactive system, called the VIP. The key feature of the VIP is that it can operate as a one-way addressable system and can be upgraded to provide two-way interactive services and non-entertainment services. The system can be upgraded by adding control center software and additional computer capacity at the headend and a two-way interactive terminal in the subscriber's household.

At its most basic level, the VIP system can provide complete one-way addressable services, including pay-per-tier, pre-ordered pay-per-event, non-pay controls and narrowcasting. In addition, the VIP incorporates text retrieval technology, enabling cable subscribers to retrieve hundreds of text pages by calling up the page code.

After the step up to two-way interactive service, the VIP can provide demand pay-per-view programming, theft control and plant and terminal status monitoring. The VIP can also be upgraded to provide: status monitoring, transactional services, interactive educational services, marketable polling data, electronic messaging, text retrieval, software access, utility meter reading and resources and energy management.

The keystone of the VIP system is the BT-1300 interactive subscriber terminal. The unit consists of a main box and a remote control, connected by a rugged wire. The main box includes a 400 MHz converter, downstream data receiver, upstream data transmitter descrambling and a logic processing element. It is

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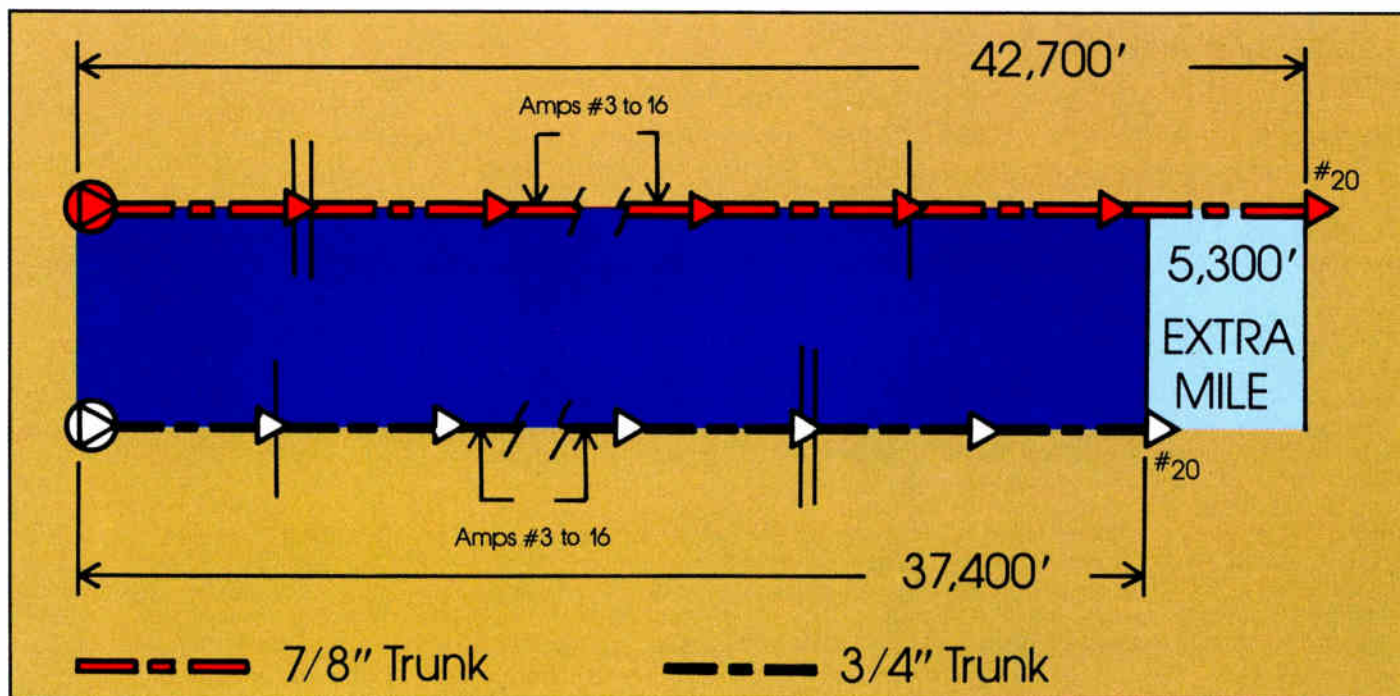
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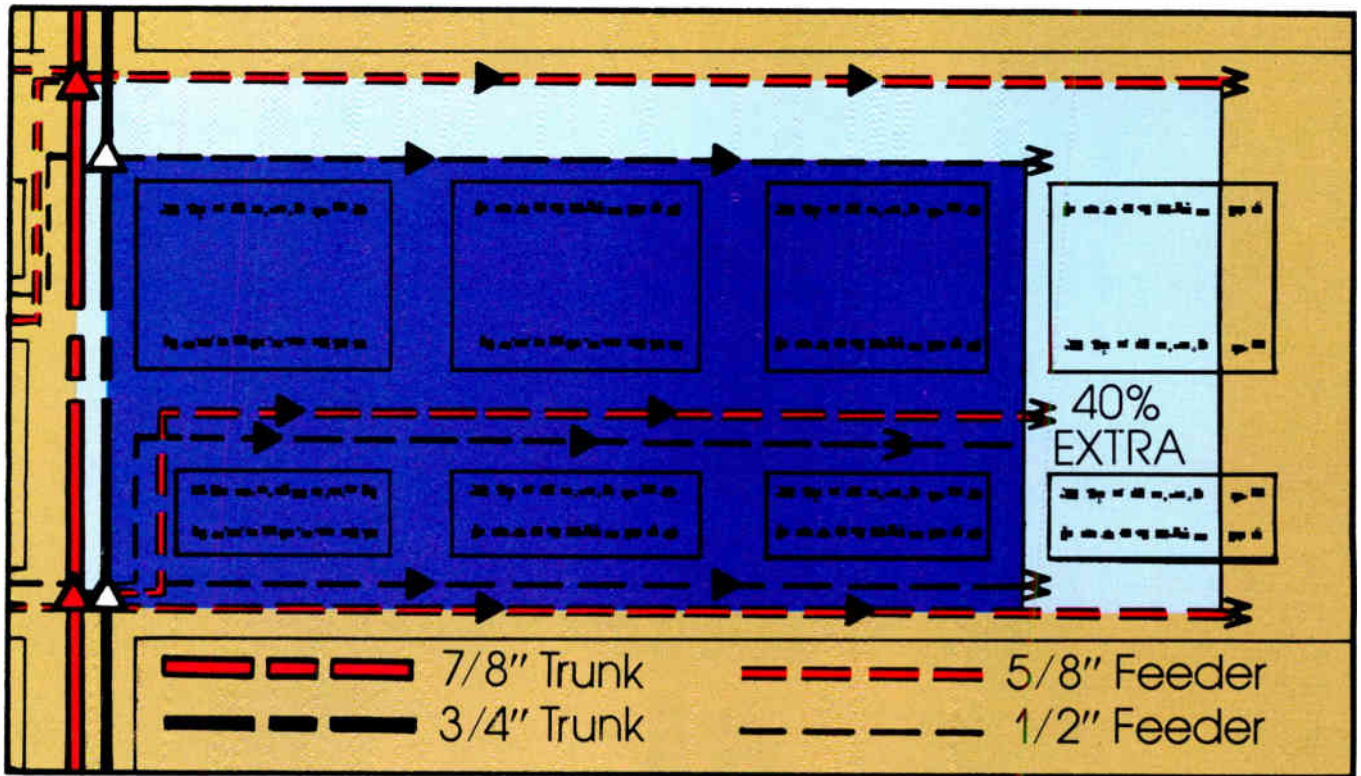
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The BT-1300 interactive terminal, a key element in Pioneer's VIP system.

shielded from RF interference and is housed in a solid steel case to prevent tampering. The box's logic processor enables the subscriber to receive premium programming and permits the operator to disable tiers. The main box also contains a parental control key. The BT-1300 remote control console enables the viewer to select channels and perform all two-way interactive functions.

For information, contact Pioneer, 3518 Riverside Drive, Columbus, Ohio 43221; (614) 451-7694.

## Scientific-Atlanta

**Scientific-Atlanta** presented its series 6700 set-top terminal, a 400-MHz, 54-channel unit that is programmable, addressable and provides scrambling on all 54 channels.

The key element in programming the unit is a PROM located in the set-top terminal. The PROM can be programmed for any combination of service, and an operator can change channel authorization for any terminal by changing the PROM.

Scrambling/descrambling functions in the terminal are performed through variable time-displayed sync suppression. The system has 11 discrete timing positions for 11 different scrambling/descrambling combinations.

An operator can address each terminal individually, adding or deleting channels or disconnecting service entirely. The addressable module in each terminal is controlled at the headend by the Intelligent Control Unit (ICU). The ICU is equipped with non-volatile bubble memories that retain operating data in the event of a power outage, according to Scientific-Atlanta. The ICU can be accessed from two ports depending on the needs of the operator. An operator of a small system can address subscriber terminals through a CRT keyboard; an operator of a larger system can use a computer.

Three options are available for the series 6700: a remote control unit for convenient channel selection for subscribers; a parental discretion feature; and, for operators, a PROM programmer for programming PROMs that are placed in the terminals.

For information, contact Scientific-Atlanta, One Technology Parkway, Box 105600, Atlanta, Georgia 30348; (404) 441-4000.

## TOCOM

**TOCOM** demonstrated a terminal that functions as both a control terminal and a home information terminal. The latest addition to TOCOM's family of 55 Plus™ terminals, the model 5510A, can handle 55 video channels and 55 vertical interval teletext channels, according to John Nolen, vice president of marketing. The 5510A can be addressed by data encoded in the vertical interval for remote authorization and individual program control. It can also be expanded to handle 110 video channels and 110 teletext data channels in a dual-cable system by adding an optional dual-cable (A/B) feature.

Pay services for the 5510A can be controlled by channel or by program in 32 separate and independent service classes designed by the cable system operator. Each class can include any combination of channels. A control mechanism in the terminal also provides a system of pre-authorized pay-per-view, allowing each subscriber to be remotely authorized to receive up to four subscription programs. Pay security is provided by TOCOM's Baseband Encoded Scrambling Technique. Parental discretion coding is available on eight levels.

The key to the 5510A's ability to deliver home information services is a built-in video display generator that constructs and displays text and graphics on the TV screen, says the company.

TOCOM also displayed the companion to the 5510A, the 5504A addressable terminal. It has all of the performance characteristics of the 5510A except it cannot provide teletext.

Both terminals are available with an optional hand-held remote control.

For information, contact TOCOM, P.O. Box 47066, Dallas, Texas 75247; (214) 438-7691.

## Cable

### 450 MHz Drop Cable

**Belden Corporation** will expand its line of CATV drop cable in July from 330 MHz to 450 MHz with a minimum return loss of 26 dB, according to Glen Grosser,

advertising manager for the electronic division. Belden offers two sizes of drop cable, the RG 59 with a minimum return loss of 23 dB, and the RG 6 with a minimum return loss of 26 dB. For information, contact Belden Corporation, Electronic Division, Richmond, Indiana 47374; (312) 232-8900.

## CCS Cable

CCS Hatfield Communication Products has changed its name to **CCS Cable** and is no longer a part of CCS Hatfield, according to Duane W. Christ, who was promoted to president of the new division. CCS Cable is now a full division of Continental Copper and Steel, CCS Hatfield's parent company. Christ was formerly vice president and general manager of the cable operation. Sales operations and product line are unaffected by the name change. CCS Cable will expand its product base in the coming years and recently added a new extrusion line in its Phoenix plant, according to Christ. For information, contact CCS Cable, 5707 West Buckeye Road, Phoenix, Arizona 85043; (800) 528-3341.

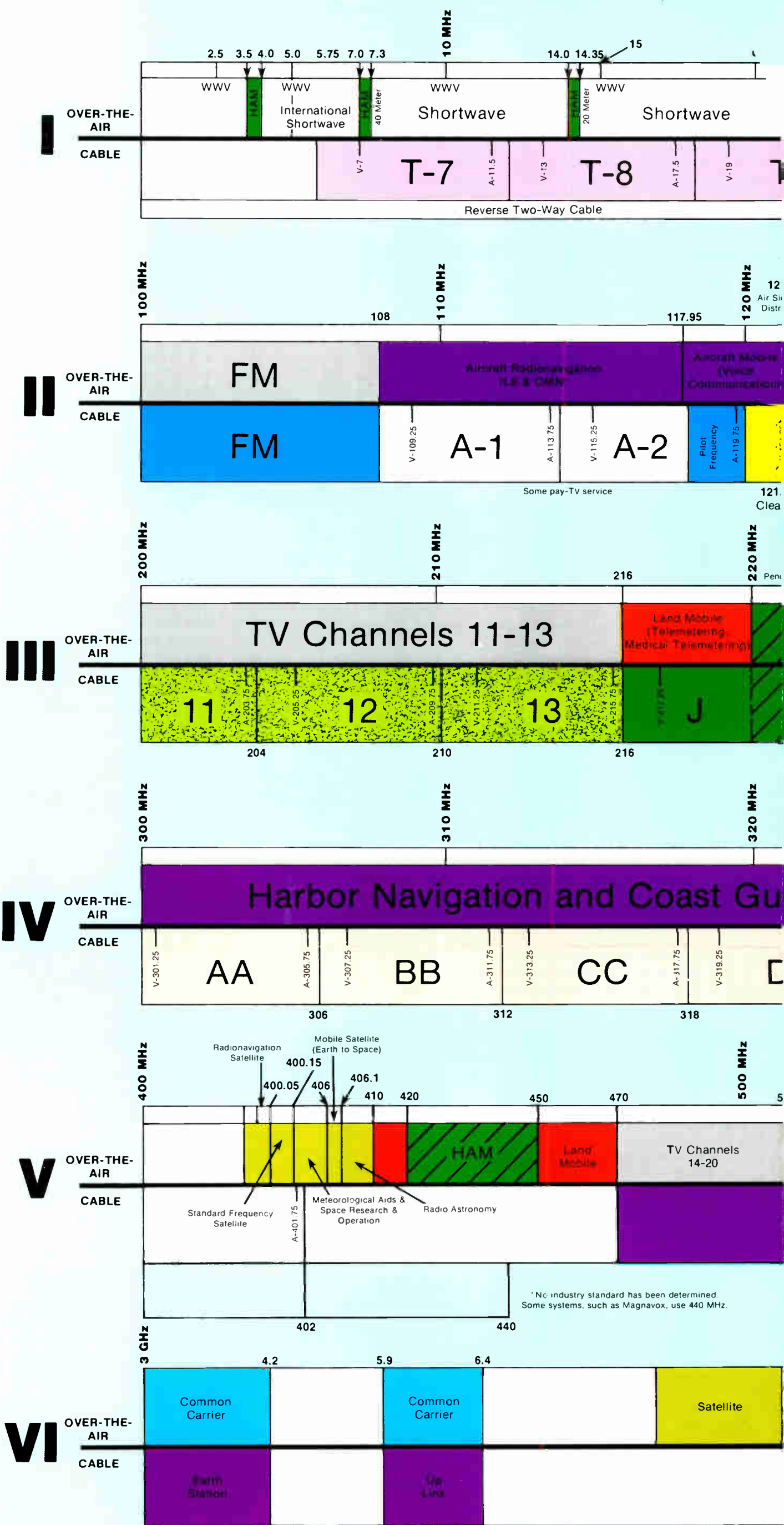
## Messengered Drop Cable

**Capscan** announced that it has installed a new line of dies on its cable extrusion equipment that scribes drop cable to ensure that the messenger separates from the drop cable at the center of the web no matter what conditions the drop cable is in, according to Rex Porter, vice president and general manager. One problem in the CATV industry is that installers frequently rupture the drop cable jacket when they separate the messenger from the drop cable. Capscan began using the new die process on all its single and dual drop cable in May. For information, contact Capscan Cable Company, P.O. Box 36, Halls Mill Road, Adelphia, New Jersey 07710; (201) 462-8700.

## Shielded Drop Cable

**Comm/Scope** brought out its new Super Shield line of multi-shielded drop cable. The shielding on the drop cable provides improved signal isolation and long-term signal protection. The Super Shield drop cable accepts standard connectors. Designed for use in high RF noise environments, such as metropolitan areas and areas near airports and highways, the cable provides isolation from noise ingress and reduces signal egress that could interfere with cable television signals. For information, contact Comm/Scope, Box 199, Catawba, North Carolina 28609; (704) 241-3142.



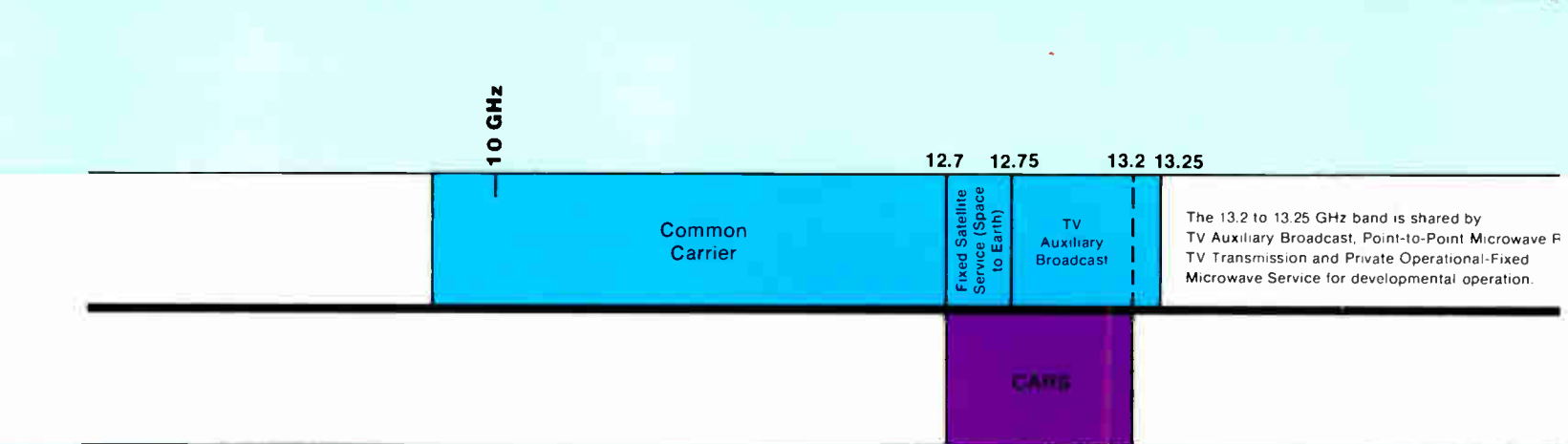
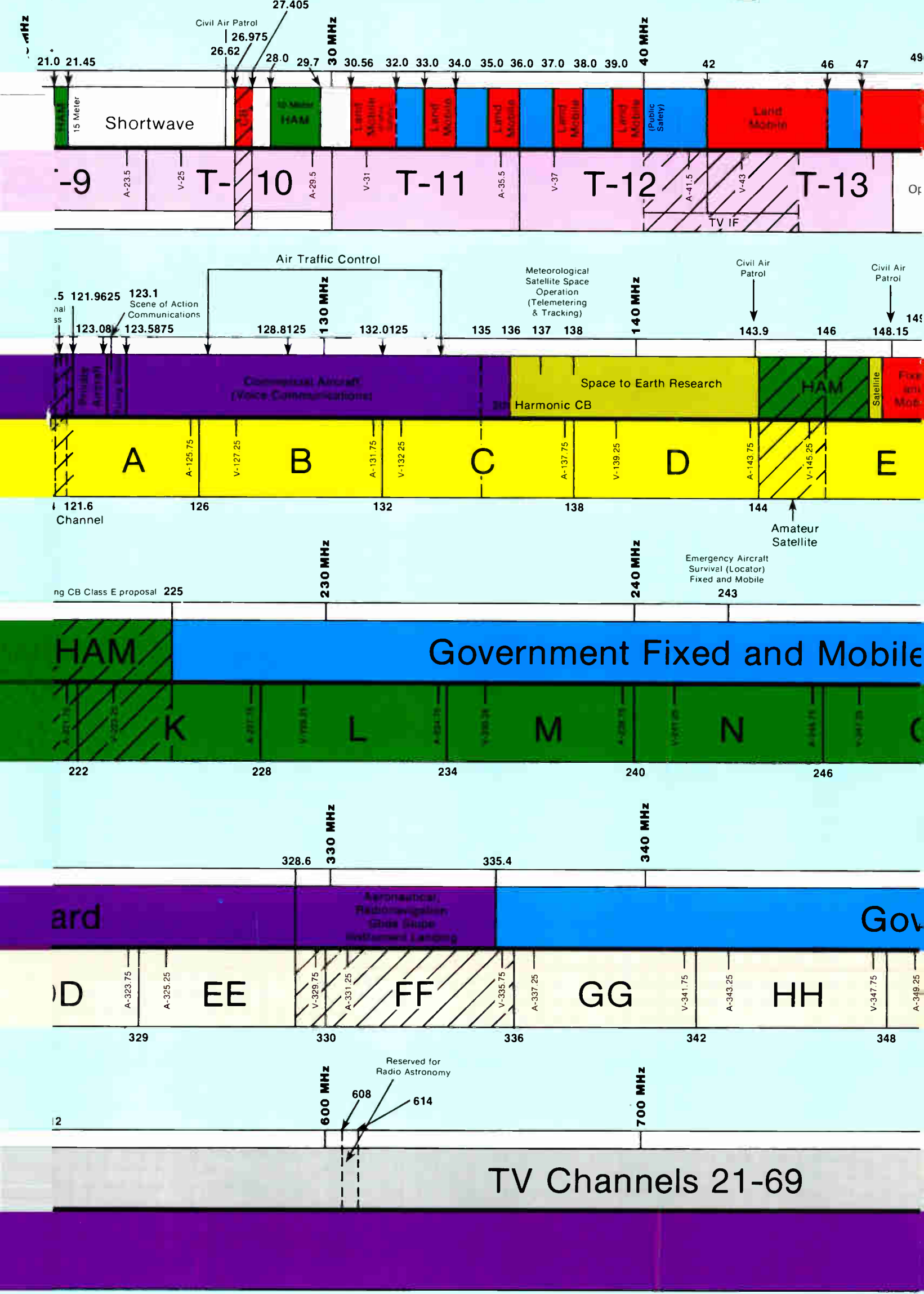


**LRC...always the right connection**



Because there is more than one type of cable, LRC makes connectors that fit all cable types. Other advantages of LRC connectors include: top-quality materials, strict quality control standards for consistent performance. Put LRC custom engineered connectors in your system.

# J's CATV Frequencies



## A Systems Engineer's Guide to S

Buried Footage	Pole To Pole Guy	Joint Use Pole	Place C.J.
Pedestal Location & Buried Drops	Overhead Guy	Concrete Pole	Existing Sidewall
Underground Termination	Aerial Drops	Steel Pole	Place C.J. Sidewall
Bore	Actual/Potential Drops	Place C.A.T.V. Pole	Existing Strut An
Aerial Footage	Power Use Pole	Private Owned Pole	Place C.J. Strut An
Slack Span	Telephone Use Pole	Existing Utility Anchor	Push Bre

Symbol of q  
AM CABLE TV INDUSTRIES, INC., P.C.





# CED's CATV Frequency Allocation Table

## 1981 Edition

(Pull out for entire chart)



**...Wiring America. With true turnkey capability.**

AM CABLE TV INDUSTRIES, INC., P.O. BOX 505, QUAKERTOWN, PA 18951. (800) 523-6742. IN PA (215) 536-1354, Attn: MATTHEW J. LYSEK

The case is impact-resistant, high-density polyethylene with positive action integral latches. There's nothing to assemble, nothing to rust, nothing to wear out. Unlike other containers, the Timesaver II dispenser case is weatherproof. The stretch-wrapped Timesaver II coils are Reelx®-wound—a patented folded figure-8 winding method which completely eliminates twists, tangles and kinks. The wire

There's nothing else like it. It's portable. It's handy. It's rugged. It's reusable. It will boost your efficiency and cut down on scrap. **Tough...light...easy to use.** Timesaver II is simplicity itself. The system consists of only two parts: a reusable dispenser case and 1,000' stretch-wrapped refill coils of Timesaver II drop wire.

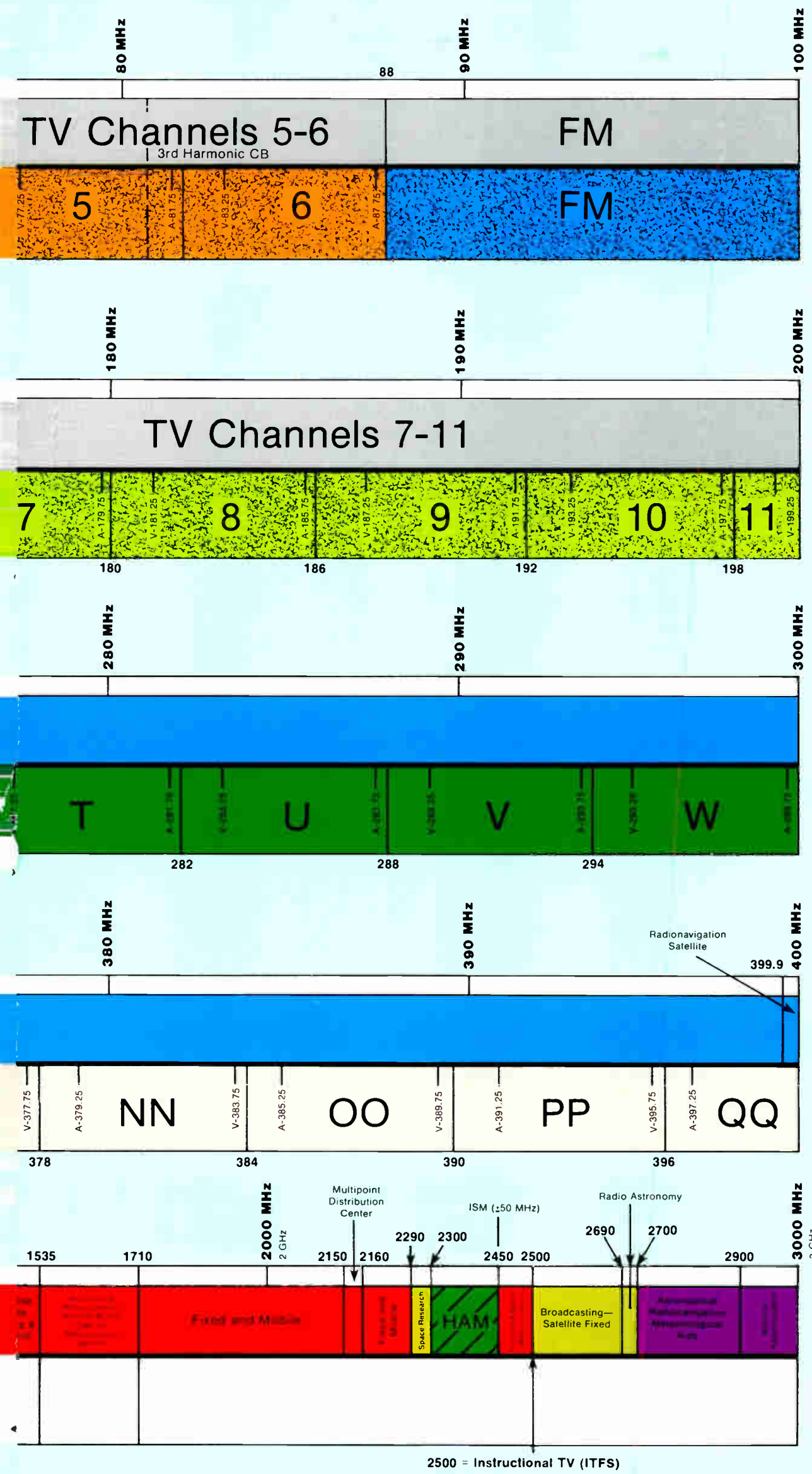
## TIMESAVER II: SPEEDS INSTALLATIONS AND PROTECTS DROP WIRE



**The best way to handle the industry's best drop wire.** Now there's a better way to install drop cable: the new Timesaver™ II drop wire dispenser-refill system, exclusive from Times



# able



## Legend

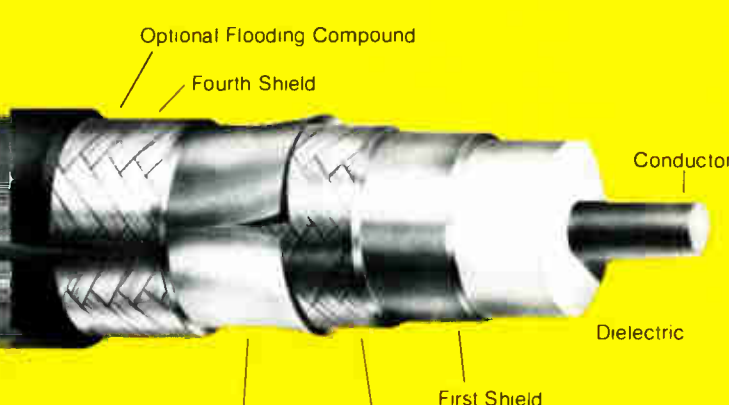
- 7-13
- J-W
- AA-QQ


- Same as Off-Air
- Trouble Areas

**Titsch Publishing Inc.**  
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## Complete answer to drop cable problems.





**TITCS**  
 TIMES FIBER COMMUNICATIONS, INC.  
 Times Wire & Cable Div.  
 1-(800)-243-6904  
 An Inisko Company

# HEAT SHRINK

New From LRC

## The Material

LRC heat shrink is produced from irradiated, cross-linked polyolefin. The cable wall sleeves are flame retarded and provide ultraviolet and corrosion resistance. The material withstands exposure to common chemicals and severe weather conditions. LRC medium wall thickness tubing provides a tough, flexible insulation suitable for aerial and direct burial cable installations.

## The Advantages

LRC offers heat shrink for individual connector types cut to insure proper cable overlap. Available in three sizes, LRC's heat shrink accommodates all six cable sizes. When using LRC connectors, only entry and splice lengths are needed. The flexibility of custom size tubing eliminates waste and reduces inventory. With the addition of heat shrink tubing to LRC's established line of connectors you now have the advantage of single supplier convenience.

**LRC** ELECTRONICS, INC.  
901 SOUTH AVE. HORSEHEADS, N.Y. 14845  
 PHONE 607-739-3844

a subsidiary of



TIMES FIBER COMMUNICATIONS, INC.  
 Times Wire & Cable Div.  
 An Insilco Company



drop cables are available in refill coils for the Timesaver II system. To improve your installers' efficiency, productivity, and to reduce costly waste and scrap, let Timesaver II do the job for you. So look to Times for leadership. Times Wire & Cable Division, 358 Hall Avenue, P.O. Box 384, Wallingford, CT 06492. Telephone (800) 243-6904.



REELX is a registered trademark of Windings, Inc.

pays out easily, without strain, stress, or overruns. Timesaver II refills are shipped to you palletized for easy handling, storage and inventory. They stay clean and coiled from the moment you get them until the last foot is installed. Times' drop cable has set standards for the industry for more than 25 years. Today, our standard RG59/U





## Fused Disc Cable

**General Cable Company** presented its fused disc M-III coaxial cables to the cable television market. The M-III will replace General Cable's fused disc-III series 450 coaxial cables, which were introduced in 1979. The M-III cables feature metric sizing, 450 MHz bandwidth and 60 channel capacity. For information, contact General Cable Company, Woodbridge Center, Woodbridge, New Jersey 07095; (800) 526-4241.

## Cable Accessories

### Cable Drop Tag

A new economical cable drop tag that eliminates the job of tracing cable drops was introduced by **budco, Inc.** The CDT-301 maximizes control and minimizes costs by providing cable systems with permanent cable drop identification that is easily applied and installed. Made of durable polyurethane, the CDT-301 is designed to last the useful life of the standard PVC cable drop. Lettering or numbering is fully weatherproof when marked on the tag with the CMP-501, a special cable drop tag marking pen that penetrates the tag's surface and forms a lasting chemical bond. In addition to the CDT-301, budco has a "mini" drop tag, the CDT-302. The CDT-301 has a writing surface measuring 1-inch x 2.5-inch, while the CDT-302's writing surface is 1-inch x 1.25-inch. For information, contact budco, Inc., 4910 East Admiral Place, Tulsa, Oklahoma 74115; (800) 331-2246.

### Service Ducts

**Cablemate Products, Inc.** is marketing a new service duct, called Quick-Stall™. The duct can handle ten or more service lines in one raceway and can also house standard mini-midget VHF, UHF, two- and three-way hybrid splitters and couplers, according to the company. The duct features hinged, one-piece construction, and an adhesive backing for quick installation is available as an option. The nominal size of the duct is 1.750 inches high and .75 inches wide. The duct comes in eight-foot lengths. For information, contact Cablemate Products, Inc., 666 Sugar Lane, Elyria, Ohio 44035.

### Parental Key Lock

**The Drop Shop** brought out its model AB-2LK coaxial locking switch designed to permit parental control over programming content on pay TV systems. The firm is also marketing a parental guidance key lock trap designed for antenna shut off (RF grounding via decoupling capacitor) in STV or as a shut off of an MDS

downconverter. For information, contact The Drop Shop, P.O. Box 284, Roselle, New Jersey 07203; (201) 241-9300; (800) 526-4100.

### Test Connectors

**Gilbert Engineering** introduced a new line of test connectors, ranging in dimensions from 3/4 to 1 3/8. The new product adds to Gilbert's full line of coaxial connectors. For information, contact Gilbert Engineering, P.O. Box 23189, Phoenix, Arizona 85063; (800) 528-5567.

### Multiple Cable Blocks

**Jackson Tool Systems** presented its new multiple cable blocks with molded Lexan™ plastic frames. The blocks are shipped set up for all cable sizes, including .412-inch, .5-inch, .625-inch, .75-inch, .875-inch and one-inch, jacketed or unjacketed. Lexan frames virtually eliminate breakage and reduce overall weight of tools by 30 percent, according to the company. The following models are available: the 1038-1-10, a ten cable multi-block; the 1038-1-4, a four cable multi-block; and the JP-1-2, a two cable multi-block. Replacement Lexan frames for the PY-750 single roller are also available. For information, contact Jackson Tool Systems, P.O. Box 6, Jackson Lane, Clayton, Ohio 45315.

### Custom Heat Shrink

**LRC Electronics, Inc.** has introduced a line of custom heat shrink products. LRC sells the heat shrinks custom cut to fit its connectors and will also cut them to any length a purchaser requires, according to Bill Down, LRC's chief engineer. For information, contact LRC Electronics, Inc., 901 South Avenue, Horseheads, New York 14845; (607) 739-3844.

### Bundling System

**Panduit Corporation** displayed its Panduit Pan-Steel™ bundling and identification system for use in severe environmental conditions. The self-locking stainless steel ties in the system are installed with a tool that automatically tensions and cuts off the ties flush when a pre-determined tension is reached. The Pan-Steel™ ties have resistance to abrasion, radiation, weathering, corrosion and temperature extremes. They have a 100 lb. minimum loop tensile strength and are available in four lengths for bundles up to eight-inch diameters. Also included in the system are a stainless steel mount, stainless steel marker plate, metal acid etching pen, and indenter marker press. For information, contact Panduit Corporation, 17301 Ridgeland Avenue, Tinley Park, Illinois 60477; (312) 532-1800.

## 3M Products

**3M's TelComm Products Division** introduced a family of coax cable construction and maintenance products designed to alleviate problems caused by moisture, corrosion, cut cable and short product life. One of the products is the CXBB/Gel coax closure and 4441 Gella compound for use in reenterable buried and aerial main-trunk splices. The closure and encapsulant are transparent for ease in locating the connector. Another product is the Scotchcast® CX3840 coax closure and 4407 compound for use on subscriber service drops. Once the compound has been poured, the closure can be sealed and buried. The TelComm division also brought out cable cleaning products and a wide range of tapes, including electrical coating tape, vinyl wrapping tapes and corrosion protection vinyl tape. For information, contact TelComm Products Division/3M, 3M Center, Saint Paul, Minnesota 55144.

### Cable Dispenser

**Times Fiber Communications, Inc.** unveiled its Timesaver II drop wire dispenser-refill system. Timesaver II is a



*Times Wire & Cable's dispenser-refill system for protecting and installing drop wire.*

portable reusable dispenser case that contains up to 1,000 feet of Times drop wire. The case is impact-resistant, high-density polypropylene, and the stretch-

wrapped Timesaver II coils are Reelex®-wound to eliminate twists, tangles and kinks. Timesavers drop wire in coils ready to put in the Timesaver dispensers. For information, contact Times Fiber Communications, Inc., 358 Hall Avenue, P.O. Box 384, Wallingford, Connecticut 06492; (203) 265-8580.

## Cable Tools

### Coaxial Stripper

**Cable TV Supply Company** is distributing the Coaxial Stripper from Paladin Corporation. The stripper is a two-bladed coax tool that removes dielectric, braid and outside insulation. The tool will hold the cable in place while making a series of consistent 360 degree cuts. The tool comes with an interchangeable blade cassette, giving the user a variety of strip configurations. The removable cassette blades are rated for up to 5,000 strips with reliable strip length and crisp cutting edge. The tool strips all coaxial wire with O.D. of .14-inch to .30-inch. For information, contact Cable TV Supply Company, 835 Industrial Highway, Unit 4, Cinnaminson, New Jersey 08077; (609) 829-0100.

### Cable Locator

**Progressive Electronics, Inc.**, is marketing its model 507 tracker II system for locating underground cable. The unit can trace cable in three ways. The high power transmitter can be attached directly to the cable, wire or pipe being traced. If a direct connection is not possible or the cable cannot be taken out of service, an inductive coupler can be used. If neither method is practical, the unit is equipped with an inductive antenna. For information, contact Progressive Electronics, Inc., 432 South Extension, Mesa, Arizona 85202; (602) 834-4308.

### Coring Tools

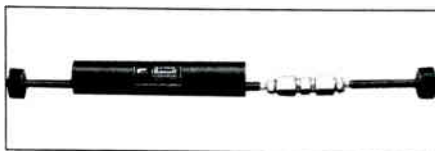
**SignalVision, Inc.**, introduced a new series of cable coring tools, the B-412-SVCT for coring .412-inch cable; the B-500-SVCT for coring half-inch cable; and the B-750-SVCT for coring .75-inch cable. The tools are available with T-handles and ratchet type snap-on handles. For information, contact SignalVision, 22732-B Granite Way, Laguna Hills, California 92653; (714) 586-3196.

## Closures

### Connector Protector

**Channell Commercial Corporation** introduced its KCP-500 series and KCP-

2000 series connector protectors. The protectors are an ABS plastic splice enclosure designed to house and protect coaxial cable connectors from rust, corrosion, electrolytic action and other forms of deterioration. The reuseable enclosures are designed for both aerial and underground use and are unaffected by salt spray, acid or alkali soils, fertilizer, insecticides, mildew or fungus growth. The KCP-500 series specifications are: length, eight inches; inside diameter, .5 inches; and outside diameter, 1.062 inches. The specifications for the KCP-2000 series are: length, 12 inches; inside diameter, 1.875; and outside diameter, 2.375 inches. The firm also introduced a redesigned version of its underground tap housings. For information, contact Channell Commercial Corporation, 620 West Foothill Boulevard, Glendora, California 91740; (213) 963-1694.



*The KCP-2000 series connector protector from Channell Commercial Corporation.*

### Reliable Electric

**Reliable Electric/Utility Products** displayed its outside plant series of CATV closures. Its line ranges in height from the TV 40, 18.25 inches, to the TV1000, 42.75 inches. The closures are equipped with screen louvers in the front and backplate assemblies for housing ventilation. Internal security is provided by a padlock hasp, and optional cylinder locks may be field installed. For information, contact Reliable Electric Company, 6565 North 60th Street, Milwaukee, Wisconsin 53223; (414) 353-1010.

### Zero Profile Closure

**Roart** brought out its Out-A-Sight™ zero-profile, below-grade cable television distribution closure. The model 511 is built with fiberglass reinforced materials and is nonconductive, noncorrosive and lightweight, according to the company. The design incorporates straight-through cabling for connection to individual or multiple residences. The closure's green top cover can withstand a load bearing weight of 10,000 pounds, according to the company. One feature of the closure is a trapped bubble of compressed air around installed active or passive devices to prevent water contact. The housing is ten inches in diameter and 18 inches high. For information, contact Roart, a division of Cable Spinning Equipment Company, 4956 North County Road 18, Minneapolis, Minnesota 55428; (612) 535-3040.

## Apartment Boxes

**S.A.L. Cable Communications, Inc.**, displayed its line of indoor/outdoor apartment boxes and pedestals. Its apartment boxes are available in heights from 12 to 24 inches and in widths from eight to 18 inches. Depth is six inches. The boxes are made from 16 gauge galvanized steel and include a half-inch plywood backboard for mounting equipment. Its pedestals range in height from 23.5 to 46 inches. For information, contact S.A.L. Cable Communications, Inc., 5 Hub Drive, Melville, New York 11747; (800) 645-9062.

## Utility Products

**Utility Products Company** unveiled its TV-60LP low profile pedestal. The model is 21.5 inches tall and provides 30 percent more space than pedestals of equal height, according to the company. The pedestal is available with two styles of accessory mounting brackets for universal component installation. A standard feature of the TV-60LP is a horizontal hasp that accepts to a 3/8-inch bail padlock. Utility Products says the TV-60LP is manufactured with a five-step finish to ward off corrosion and is designed to last a minimum of 25 years. For information, contact Utility Products Company, 6565 North 60th Street, Milwaukee, Wisconsin 53223; (414) 353-1010.

## Construction Machinery

### Ditch Witch Plow

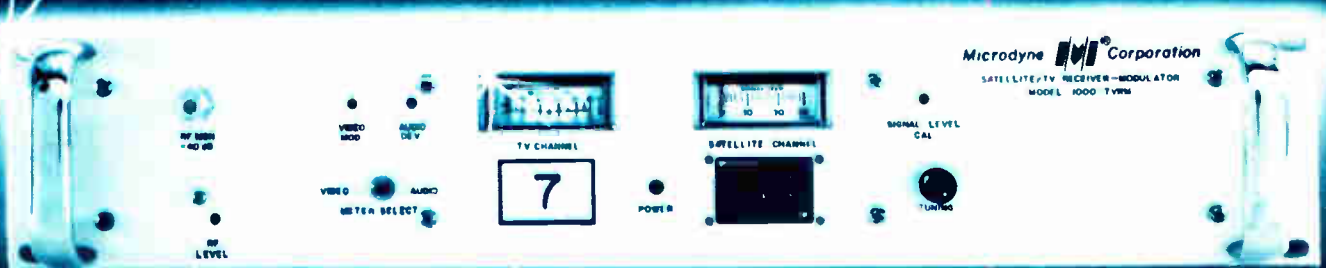
**Ditch Witch** displayed its V250 lawn plow which is narrow enough to fit through a 36-inch yard fence. The four-wheel drive unit is powered by two hydraulic motors operating four 60-pitch chains, one to each wheel. The vibratory unit is powered through a mechanical "V" belt



*The Ditch Witch V250 lawn plow.*



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### System Components

#### Receivers



**1100-TVR(X24)**  
Frequency agile 24 channel, remotely tuneable



**1100-FFC(X1)S**  
Frequency agile 24 channel, manually tuneable

**1100-TVRM**  
Frequency agile 24 channel, manually tuneable receiver, with integral head end modulator.

**Low Noise Amplifier**  
120 & 100° K  
low noise amplifiers

#### Head End Modulators

**1100-HEM**  
Fully tuneable modulator, channels 2 through 13 plus A through I.



**1000-TVM**  
Dedicated modulator VHF and Mid Band.

#### Customer Service

We are dedicated to customer service.

In most cases, we are able to service our satellite receivers and have them back to you within 48 hours. Our complete system science provides us with the technology necessary to service our components and support our customers.



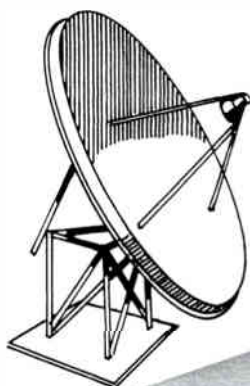
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(Broadcast Quality Picture)



# at \$1,870<sup>00</sup>

(In quantities of 10)

Model 550



## Model 550 Satellite Video Receiver

Check the specifications and compare the price. The Model 550 features fully agile 24 channel selection, signal strength meter, AGC/MGC select, 6.2/6.8 MHz standard program demods and remote control capability — One year warranty. Comtech has more than a decade of experience and leadership serving the satellite communications industry. **Immediate delivery available.**

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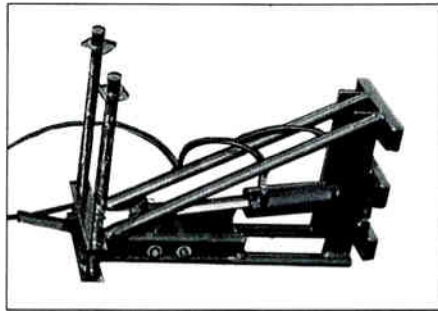
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linkage. Self-lubricating, replaceable greaseless bushings in plow linkage joints provide dependable service, according to the company. Blade options for the plow include a standard blade that provides coverage from nine to ten inches and optional blades that provide coverage from 12 to 13 inches. The CATV blade has a greater bend radius for CATV cable. For information, contact The Charles Machine Works, Inc., P.O. Box 66, Perry, Oklahoma 73077; (405) 336-4402.

### Line Replacer/Installer

**Elephant Industries, Inc.**, displayed its model EIP8 hydraulic power unit and model EISP replacer installer. The unit is designed to pull old steel and copper service lines out of the ground and pull new line through the old hole. It can operate in a trench as small as 14 inches wide and 48 inches long. The EISP, when equipped with the eight HP hydraulic power unit, can pull line at ten to 15 feet per minute. For information, contact Elephant Industries, Inc., P.O. Box 3626, 3949 N. U.S. 41, North Fort Myers, Florida 33903; (813) 995-7383.



The model EIP8 hydraulic power unit and model EISP replacer-installer from Elephant Industries.

### Boring Machine

**Howard Bore Products Manufacturing** is marketing the Boredillo boring machine. The principal advantage of the Bore product is that "by telescoping the legs and lowering the drive shaft to the same level as the bit, you can use more pressure against the bit in hard formations without bowing the stem," according to the company. The unit bores and reams to eight inches in reasonable soil conditions and is capable of boring up to 200 feet. It is powered by a five HP Honda engine and weighs approximately 100 pounds. For information, contact Howard Bore Products Manufacturing, 13332 Bee Street, Dallas, Texas 75234; (214) 241-5564.

### 10:1 Chute-Blade

**J I Case** introduced a 10:1 chute-blade for use on its Mini- and Maxi-Sneaker self-propelled ride-on vibratory

plows. The new chute-blade increases the amount of a cable an operator can lay in a day and decreases damage to cable, according to Case. The 10:1 ratio refers to the radius of the chute curve in relation to the cable's diameter. Its design reduces the frequency of kinks and flat spots while laying .75-inch coaxial cable. Most industry chutes use a 4:1 ratio. The hinged 10:1 chute-blade permits cabling with curves. The firm also introduced a hydraulically driven trencher attachment for front mount installation on the Maxi-Sneaker. The attachment has a maximum dig depth and width of 36-inches by four-inches. For information, contact J I Case,

Light Equipment Division, P.O. Box 9228, Wichita, Kansas 67277.



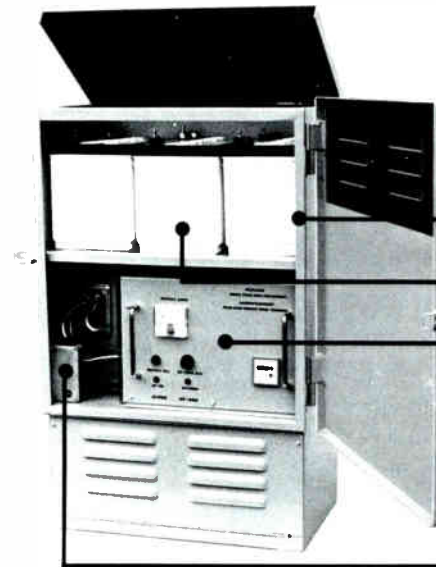
J I Case's Maxi-Sneaker vibratory plow, equipped with the new 10:1 ratio chute-blade.

# When your power goes off you keep on going

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PERFORMANCE AND RELIABILITY  
FIELD PROVEN BY THOUSANDS  
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FROM COAST TO COAST.

COMPARE THESE ADDITIONAL  
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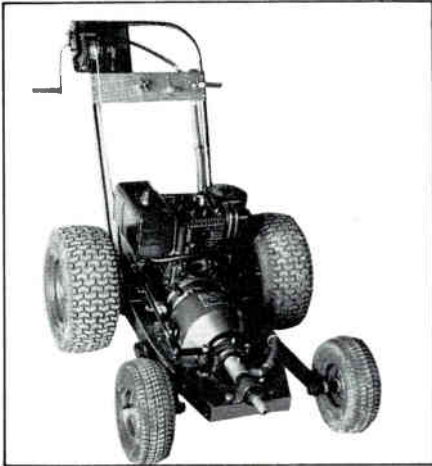
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Telephone (404) 963-7870  
Florida Address: P O Box 10185  
Sarasota, Florida 33582  
Telephone (813) 371-3444

## Underwunder

The **Lamb Corporation** displayed its new model M-16 Underwunder boring machine. The M-16 is equipped with an 8 HP disc clutch, ICC series, Briggs & Stratton. The 150-pound machine bores



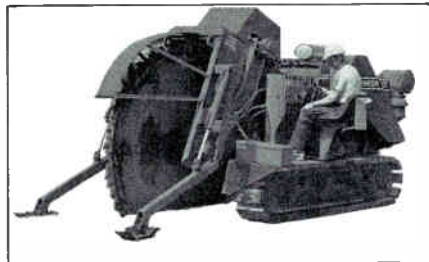
The model M-16 Underwunder from The Lamb Corporation.

holes to 14 inches in diameter in dirt and to six inches in diameter in rock. It bores distances in excess of 200 feet and utilizes city water pressure or air in cutting. The drill system consists of .75-inch seamless tubing. For information, contact The Lamb Corporation, P.O. Box

950, Addison, Texas 75001; (214) 233-3833.

## Concrete Cutter

**Vermeer Manufacturing Company** is marketing the T-600D concrete cutter. The machine has a seven-foot diameter wheel equipped with 90 carbide-tipped rotary cutters. It will cut a four-inch wide strip through most rock and reinforced concrete, according to Vermeer. Units that cut a five-inch or six-inch width are also available. The cutter is equipped with hydraulic stabilizers to reduce machine bounce and assure accurate cutting depth control. The T-600D moves on rubber track pads that provide traction on concrete and asphalt and prevent road damage when maneuvering the machine. For information, contact Vermeer Manufacturing Company, Pella, Iowa 50219; (515) 628-3141.



The T-600D concrete cutter from Vermeer.

## Converters

### 36-Channel Converter

**Cabletenna Corporation** presented its model RC-36P 36-channel converter. The product consists of a converter body and a remote control channel selector with fine tuning and an on/off switch. Power consumption is 4 watts at 115 volts, 60 Hz. The converter has the following specifications: bandwidth of output channel, 6 MHz (within 2 dB); gain, 2 to 6 dB; noise figure, 12 dB nominal, 14 dB max.; cross-modulation, -60 dB;



The RC-36P remote converter from Cabletenna.

second order distortion, -60 dB; fine tuning range, 3~4 MHz; input return loss, 5~10 dB; and output return loss, 13 dB. For information, contact Cabletenna Corporation, 12 Edgeboro Road, Building Two, Unit Four, East Brunswick, New Jersey 08816; (201) 238-7660.

## 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.



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# “At last, an MDS Downconverter designed and built, from the inside out, for system profitability.”

Jack Schnabel  
Sales Manager  
TEST, Inc.

## Introducing TEST's Model 1K, the new, state-of-the-art, crystal-controlled microwave receiver.

### Precision design, inside and out

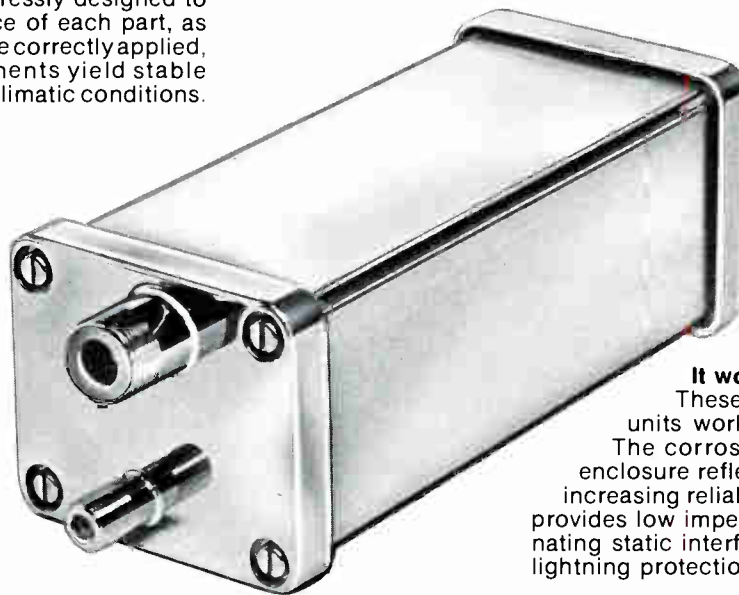
Superb performance and dependability are the result of circuitry expressly designed to maximize the performance of each part, as well as the unit itself. These correctly applied, state-of-the-art components yield stable operation even in severe climatic conditions.

### Moisture locked out

Long, trouble-free life is assured because moisture is positively locked out by the weatherproof gasket seals and the humidity-proof metal housing.

### No detail overlooked

Even the connectors have been designed as an integral part of the housing. They provide exceptional R.F. and environmental characteristics.



### Low-noise, high R.F. gain models available, too

Add more customers in weak signal areas using TEST's new low-noise, high R.F. gain models 10K, 20K and 30K. Sized the same as a 1K, these provide an extra 10dB, 20dB or 30dB of low noise R.F. preselector gain.

### It works as good as it looks

These highly-tooled, compact units work as good as they look. The corrosion-resistant, all-metal enclosure reflects environmental heat, increasing reliability and stability. It also provides low impedance grounding, eliminating static interference while increasing lightning protection.

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### Each Model 1K is ready to install and includes:

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TEST sells only to bonafide operators and their contractors.



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For more information on Hughes AML systems, write or call: Hughes Microwave Communication Products, P.O. Box 2999, Torrance, CA 90509 · (213) 517-6233. For 24 hour emergency service: (213) 534-2170. In Canada: Micro-Sat Communications, Ltd., 975 Brock Road South, Pickering, Ontario, Canada L1W3A4 · (416) 839-5182

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## Oak Communications

**Oak Communications, Inc.**, is marketing the model KDM 400 Oak Moduline, a 56-channel synthesized converter/decoder. The unit "brings multi-level



*The Oak Moduline model KDM 400 56-channel synthesized converter/decoder.*

tiering to system operators not requiring addressability," according to the company. The converter provides sinewave sync suppression decoding with 15 tier operation. Each terminal can be programmed for up to 15 secure tiers on any combination of channels. If a subscriber tunes to an unauthorized channel, the KDM 400 will tune to snow and discontinuous sound and video. The first local oscillator in the unit is tuned by frequency synthesis; the second is AFC controlled. NTSC or HRC frequency options are available. Oak also offers a remote control unit, the RKDM-400, which provides the same random access channel selection features that are available on the converter/decoder. For information, contact Oak Communications, Inc., CATV Division, P.O. Box 517, Crystal Lake, Illinois 60014; (815) 459-5000.

## RCA Cablevision

**RCA Cablevision Systems** introduced a 36-channel set-top converter that features a double-balanced diode mixer for quality reception and an input filter that screens out spurious signals and cross-modulation. The unit uses a single control address switching technique for high reliability, with only the varactor bias voltage being switched instead of the RF, according to the company. The firm also displayed a distribution line for 400 MHz operation and 54-channel headend equipment. For information, contact RCA Cablevision Systems, 7355 Fulton Avenue, North Hollywood, California 91605; (213) 764-2411, (800) 423-2403.

## Remote Converter

**Zenith CATV** introduced its SC 100 remote computer-controlled converter. The SC 100 is a 54-channel PLL converter. It handles input frequencies ranging from 54-400 MHz and is tunable to standard frequency, HRC and ICC. The Zenith "Space Command®" remote control features keyboard micro-computer controlled channel access, direct

access to two-way scan, and TV on-off. The specifications of the remote control are: input impedance, 75; input return loss, 10 dB min.; noise figure, 13 dB max.; gain 6 dB typical; operating level, -10 to +20 dBmV and cross-modulation @ +15 dBmV input, 56 dB. For information, contact Zenith CATV Sales, 1000 Milwaukee Avenue, Glenview, Illinois 60025; (312) 391-8338.

## Headend

### Time Base Corrector

**Edutron, Inc.**, unveiled its Y-688<sup>32</sup> Total Error Corrector and its CCD2H series of time base correctors.

The Y-688<sup>32</sup> accepts component or composite signals and performs all functions of time base correction and picture improvement in the component, y-688, form, bypassing the root cause of most errors before they occur, according to the company. The y-688 component process also makes improved imaging processing possible, setting a new industry standard, according to Edutron.



*The CCD2H series time base corrector for Edutron.*

The unit features 32-line superwide instantaneous window Phase Comp™ one- and two-line digital look-ahead velocity compensator and phase error corrector. It features luminance noise reduction to 10 dB and chroma noise reduction to 10 dB.

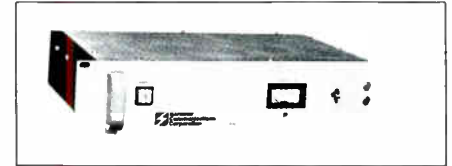
The CCD2H series offers a wide 2H input window, horizontal enhancement and noise reduction, full proc amp controls, and super transparency for all heterodyne non-segmented VTRs. The line is available in NTSC and PAL standards.

For information, contact Edutron, Inc., 6649 Peachtree Industrial Boulevard, Norcross, Georgia 30092; (404) 447-4422.

### IF Modulator

**Gardiner Communications Corporation** presented its TM-2400 television IF modulator. The unit has a meter for both video and sound modulation levels, an automatic white limiter, and ten-pole band pass filter. Users can change the operating channel by changing a p.c. board assembly. Aural and visual circuits are also modular, aiding in field maintenance. Specifications include: high impedance or 600 ohm audio input; differential gain of  $\pm 0.5$  dB; a differential phase of  $\pm 1.0$  degree; and a 6 to 270 MHz frequency

range. Gardiner also unveiled an insurance plan to protect operators from interference to their TVROs. For information, contact Gardiner Communications Corporation, 1980 South Post Oak Road, Suite 2040, Houston, Texas 77056; (713) 961-7348.



*The TM-2400 television IF modulator from Gardiner.*

### AML Receivers

**Hughes Microwave Communications Products** has expanded its line of AML receivers to include 440 MHz. It has also achieved a 3 dB noise figure on its 300, 400 and 440 AML receivers. The receivers offer input/output frequencies of TV channels 2-55; FM broadcast band and Aux 1 and 2 (non-standard channel plans are available on special order). For information, contact Hughes Microwave Communications Products, 3060 West Lomita Boulevard, P.O. Box 2999, Torrance, California 90509; (213) 534-2146.

### Microdyne

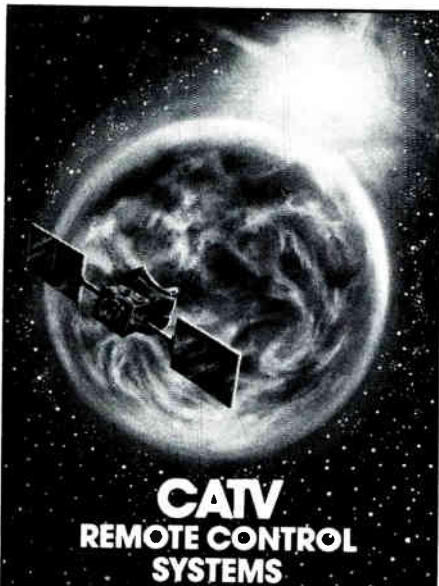
**Microdyne Corporation** brought out its model 1000 TVM modulator.

The 1000 TVM features video/audio metering, saw IF filtering, front panel RF monitoring +60 dBmV output level, peak white level clamping and optional IF loop-through. All spurious responses are 60 dB down, and TV output channel can be changed by replacing a p.c. board. The unit will interface with any 600 ohm balanced audio source (normally OdBm) and 75 ohm negative sync (normally 1Vp-p) video source.

For information, contact Microdyne Corporation, P.O. Box 7213, Ocala, Florida 32672; (904) 687-4633.

### Frame Synchronizer

**Nippon Electric Company, Ltd.**, brought out its FS-16 frame synchronizer. The unit incorporates four times subcarrier sampling and nine-bit quantizing, according to the company. The model includes a digital input/output port for applications requiring access to the input or output functions in the digital domain. Its compact size (three inches by 19 inches) makes it suitable for use in mobile production units, according to Nippon. For information, contact NEC America, Inc., Broadcast Equipment Division, 130 Martin Lane, Elk Grove Village, Illinois 60007; (312) 640-3792.



**From Monroe Electronics, Inc.**  
**Satellite Cue Tone Receiver**  
**Model 3000R-64**



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- 4 co-axial SPDT switches for base band video or IF switching
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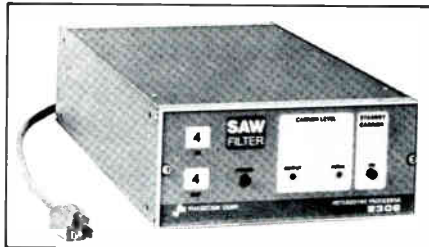
Northern CATV Representatives:  
 800-448-1655  
 Monroe Electronics Factory:  
 716-765-2254



**MONROE ELECTRONICS, INC.**  
 216 Housel Avenue  
 Lyndonville, NY 14098

**Heterodyne Processor**

Phasecom is marketing a heterodyne processor that is equipped with a surface acoustic wave (SAW) filter. The model 2306 includes an automatic notch control that attenuates the aural carrier only to a selected level of between 9 and 30 dB below the video carrier and maintains it at that level. As a result, the



Phasecom's model 2306 heterodyne processor.

processor is conservatively specified as having a maximum group delay of 50 nanosec at the color sub-carrier, according to the company. Another feature is a horizontal sync tip AGC that improves signal handling capabilities and reduces impulse type noise at the output. Automatic switching for CW signals is provided. The model 2306 also contains an output AGC loop for maximum stability and internal bandpass output filtering. Specifications include full 60 dBmV output over the entire frequency range; spurious output of -60 dB at rated output and -65 dB at +55 dBmV output; and cross-mod of -80 dB at 8 dBmV input. For information, contact Phasecom Corporation, 6365 Arizona Circle, Los Angeles, California 90045; (213) 641-3501.

**Talking Controller**

**Synchronous Communications, Inc.**, introduced two products that utilize voice chips.

The TIC-1000 talking interface controller incorporates a voice synthesizer integrated circuit to provide the user with a device that can verbally respond to DTMF tone command. When installed at a remote headend site, the TIC-1000 can be accessed from any telephone or DTMF tone generator. The unit will automatically answer a phone call, identify the site location, request a three-digit security code, and upon security clearance, allow the user to control 24 outputs and monitor 24 inputs, according to Vince Borelli, Synchronous president. The device enables a CATV operator to install a remote device in the headend that can verbally report the status of satellite receivers, switchers, signal processors, etc., and, if necessary, make changes.

The model FAOC-60 frequency agile output converter is synthesized 60-channel converter. The technology of the LSI PLL frequency synthesizer locks the

ultra low noise VCO to the required frequency necessary to convert TV IF to any CATV channel in the 54 to 400 MHz range. The FAOC-60 provides spurious output 60 dB below the video carrier and an output level of +60 dBmV. When used in conjunction with a signal processor or modulator, the FAOC-60 provides a backup system for any channel put on a CATV system.

For information, contact Synchronous Communications, Inc., 7180 Wooded Lake Drive, San Jose, California 95120; (408) 268-3714.

**Commercial Insert**

**Tele-Engineering Corporation** has developed a cue tone receiver to automatically insert commercials from videotape player to local spot availabilities on satellite channels such as CNN and ESPN.

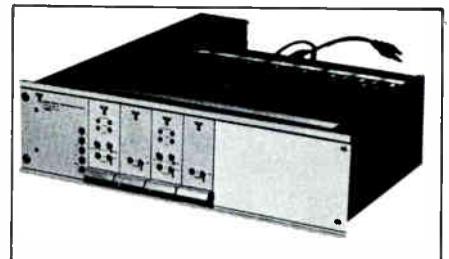
The Ad Machine is a digital design, rack-mounted unit with a PROM chip. The basic unit has dual channel capacity to receive cue tones from any two satellite channels and insert commercials from two videotape players onto both channels. Models are available for up to six channel operation.

The Ad Machine is available with touch tone telephone and programmable video switcher (PVS) override options. The unit is compatible with available videotape players.

For information, contact Tele-Engineering Corporation, 2 Central Street, Framingham, Massachusetts 01701; (617) 877-6494.

**Fiber Optics**

**Times Fiber Communications** introduced its Fiberblock System, a fiber optic TVRO receiver system that can deliver up to 24 satellite channels from a TVRO to a headend, up to a distance of 1 km. The system utilizes a block conversion method in which the low noise amplifier output in the 3.7-4.2 GHz range is translated to a frequency band from 1.6-1.1 GHz. A wideband fiber optic link is then used to transmit this signal to the headend. At the headend, optical receivers and upconverters, permitting the use of any satellite receivers, are mounted in a single standard 5.75-inch high rack.



The Fiberblock System from Times Fiber Communications.



Operators could also use optical receivers and TFC's Fiberblock baseband output-modularized receivers at a substantial cost saving, according to the company. For information, contact Times Fiber Communications, Inc., 358 Hall Avenue, P.O. Box 384, Wallingford, Connecticut 06492; (203) 265-8580.

### 36-Channel Upconverter

**Tomco Communications, Inc.**, displayed its SSC-2000 38-channel upconverter. It converts any TV IF source to any TV channel, two through W, including A-1, A-2 and A-3. All spurious outputs are typically greater than 60 dB down, eliminating the need for any output bandpass filters. Specifications include: input frequency, TV IF, 45.75 MHz video carrier; 41.25 MHz audio carrier; gain 25 dB minimum,  $\pm 0.5$  dB response flatness; output level, +60 dBmV video carrier, adjustable; and frequency stability,  $\pm 0.025$  percent. For information, contact Tomco Communications, Inc., 1145 Tasman Drive, Sunnyvale, California 94086; (408) 734-8401.

### Audio-Plexor

**Wegener Communications Inc.**, introduced its 1100 Audio-Plexor, a subcarrier multiplex system that provides multiple voice, program or data channels above video for satellite or terrestrial microwave transmission systems. The system has sufficient linearity and bandwidth to allow up to eight channels to be multiplexed on a single subcarrier. The following channel bandwidths are available: 3.1, 5.0, 8.0, 10.0 and 15 kHz.

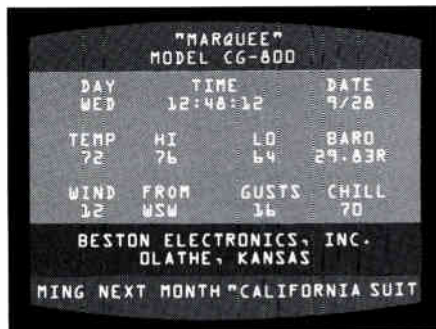
Wegener Communications also presented its series 1600 Audio Transmission System, which provides 15 kHz bandwidth program channels for the transmission of stereophonic or monaural audio channels above video in satellite distribution networks. Stereo channels are transmitted as separate left and right channels using individual narrow bandwidth, low deviation subcarriers for transmission of each discrete channel. At the receiving end of the link, the left and right audio channels are available or may feed an optional stereo generator/FM modulator for insertion on a cable system in the FM broadcast band. In typical applications, up to four stereo channels may be transmitted without degradation of the video and its program audio channel.

For information, contact Wegener Communications, Inc., 150 Technology Park, Suite 1, Norcross, Georgia 30092; (404) 448-7288.

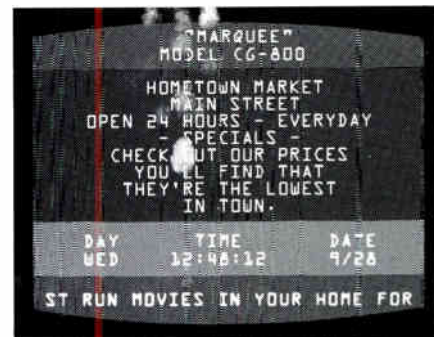
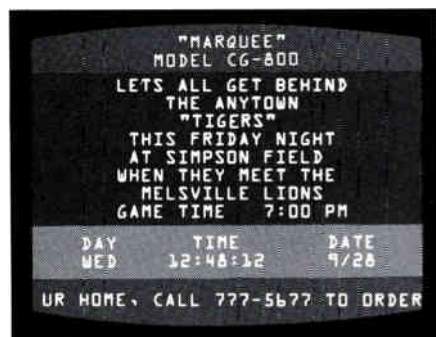
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# Line Equipment

## Sub Split Amplifier

**AEL**, a division at Winegard CATV Division, displayed its AEL 84 400 MHz sub split amplifier. The amplifiers are modular, allowing a system operator to order only the modules needed for his system. All modules are heat sunk to the finned casting for greater heat dissipation. The AEL 84 also features low power consumption. The AC bypass capability is 12 amps, trunk line and six amps, distribution line. For information, contact Winegard CATV Division, P.O. Box 329, Montgomeryville, Pennsylvania 18936; (215) 855-1535.

## Directional Tap

**AM Cable TV Industries, Inc.**, displayed its line of 400 MHz directional taps. The line includes an eight-way tap and a two- or four-way tap. The firm says that it is developing other active and passive devices for installation in cable television systems. For information, contact AM Cable TV Industries, Inc., P.O. Box 505, Quakertown, Pennsylvania 18951; (215) 282-4241, (800) 523-6742.

## Low-Noise Amplifiers

**Amplica, Inc.**, introduced two low noise amplifiers, the Waveguide model AXM 123304 and Coax model AXM 123306. The two units offer three dB noise figure (290°K) over the total 11.7-12.2 GHz Satcom receive band. The amplifiers utilize low loss isolator/single ended GaAs FET input circuitry. The two amplifiers share the following specifications: gain small signal minimum, 30dB; gain flatness maximum,  $0.5 \pm \text{dB}$ ; power output @ 1 dB compression minimum, +10 dBm; third order intercept typical, +24 dBm; and operating voltage nominal, +13.5 VDC. For information, contact Amplica, Inc., 950 Lawrence Drive, Newbury Park, California 91320; (805) 498-9671.

## Feedforward Amplifier

**Century III Electronics, Inc.**, introduced its 4100 series 400 MHz feedforward amplifier. The series is designed for long-haul super-trunk systems or for high-level distribution applications.

The heart of the system are pairs of integrated circuits that operate in a "feedforward" configuration to give 18 dB lower distortion characteristics than the available conventionally designed cable television amplifier, according to the company. Signal levels in the unit are

maintained by AGC and ASC circuits, responding to dual-modulated pilot carriers generated at the headend or to factory selected video carriers. The unit is convertible to Sub-split or Mid-split 4200 series amplifier stations with the installation of modules and interconnecting RF cables.

The unit contains a built in AC power inserter and a modular DC power supply. An optional redundant power supply module allows operations from 30 to 60 VAC or 50 to 100 VAC. The feeder outputs in bridger stations are protected by self-resetting, four-amp circuit breakers, limiting the current in each feederline to a safe level, according to the company.

For information, contact Century III Electronics, 3880 East Eagle Drive, Anaheim, California 92807; (714) 630-3714.

## Intercept

**Intercept Corporation** unveiled a wide array of line equipment products, including A/B switches, a ground breaker "feed-thru," a grounding block and a 3000 FM and 3000 DEF expander.

Intercept's 90 series A/B switches comes in three models. The 903 has one 300-ohm and one 75-ohm input. The common port is a 300-ohm twin lead. The 90HP has the same connection config-

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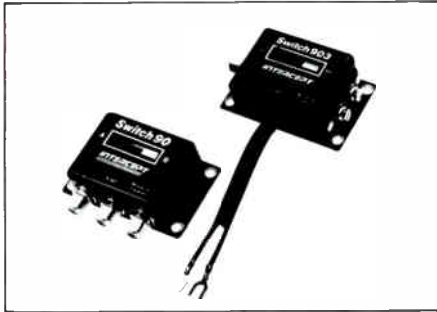
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Status Monitoring Interface Available



uration but has a built-in high pass filter to prevent low frequency and CB signal ingress. The third model, the 90, has all 75-ohm ports.



Intercept's A/B switches.

The GBFT ground breaker "feed-thru" is designed to guard against fault currents and prevent converter malfunction by isolating the grounds (metal-to-metal contact) between the subscriber drop and the home terminal. The unit acts as a "feed-thru" for RF.

The G1HP grounding block is equipped with a high pass filter to prevent low frequency and CB signal increase at the drop. The unit eliminates the use of multiple matching transformers with high pass filters for second and third sets, according to the company.

The Expander 3000 FM converts channels A, B and C to FM 88-106 MHz to permit those channels to carry FM audio

signals. The Expander 3000 DEF converts channels D, E and F to channels 2, 3 and 4 premium node.

For information, contact Intercept Corporation, 215 Entin Road, Clifton, New Jersey 07014; (201) 471-2212.

## Keystone

**Keystone Electronics Corporation** displayed its DT-330 wideband four-way directional tap. Return loss (min.) for input, output and taps is 20 dB; isolation (min.) for tap-to-tap is 28-30 dB and for tap-to-outlet, 28-30 dB. The power passing capability is 5 amps and hum modulation is better than -60 dB, according to the company. Frequency range is 5-300 MHz and 5-400 MHz. Response is 0.25 dB. The unit features plug-in, replaceable circuitry plates for later interchange of tap values without disturbing trunk signal or through power. For information, contact Keystone Electronics Corporation, 830 Monroe Street, Hoboken, New Jersey 07030; (201) 869-3679.

## "Vital Signs" Monitoring

**Texscan Corporation** presented its "Vital Signs" computer-controlled system that reports the status of light parameters of amplifiers in a cable television system. The system is designed to provide speed in locating and correcting system mal-

functions and outages and to give operators the ability to predict problems before they become serious.

Vital Signs is designed to interface with all vendors' amplifiers and to be an integral part of Theta-Com's T 300/400 series. In order to be monitored, each amplifier must be equipped with a monitor transponder.

Vital Signs offers a solution to return-path noise problems in two-way systems, particularly those with security features, by controlling, as well as monitoring, reverse-bridger switching. This feature reduces the amount of low frequency ingress since only one reverse path is "on line" at any instant of time, according to the company.

Each transponder module measures up to eight parameters continuously. Each of these modules has its own digital address and function code, which the operator can type into a keyboard. The PPI (processor plant interface) interrogator sends down the forward path a narrowband frequency modulated digital signal. This signal asks a specific transponder to send back a specific measurement. The transponder responds with a NBFM signal digitally coded on the return channel to the headend, where the results are printed on a CRT display. The system monitors each transponder location in turn.

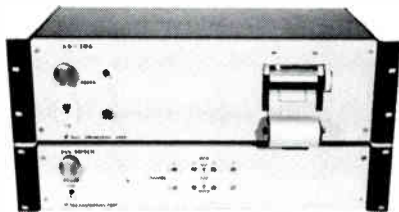
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For information, contact Texscan Corporation, 2446 North Shadeland Avenue, Indianapolis, Indiana 46219; (317) 357-8781.

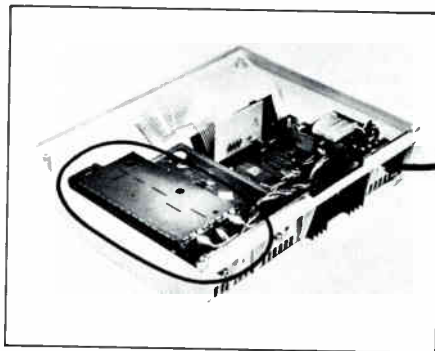
## Pay TV Components

### Eagle Comtronics

**Eagle Comtronics, Inc.**, displayed its line of security filters, including multiple-channel traps, single-channel traps and decoding filters. The line includes high and super-band units, anti-corrosion nickel plating and thick-wall brass housing. The bandwidth is 450 MHz and the units are temperature compensated  $-40^{\circ}$   $+140^{\circ}$  F. Radiation is  $-140$  dB minimum. A security shield is available. The firm also presented its 500 MHz tap, which it says has low insertion loss and R.F.I. specifications that exceed FCC requirements. For information, contact Eagle Comtronics, Inc., 4562 Waterhouse Road, Clay, New York 13041; (315) 622-3402.

### Sylvania

**GTE Products Corporation**, Sylvania CATV Division, introduced an all-channel in-band descrambler, model 4023, as an option to the programmable converter model 4040. The in-band descrambler is used in conjunction with scrambler model 5301 to provide com-



Sylvania CATV Division's model 4023 in-band descrambler.

plete freedom in selecting channels to be secured for pay options. The in-band descrambler is adapted to the inside of the converter by means of plug-in phono type jacks and eliminates the need to solder or unsolder wires. The signal, scrambled by a field proven sync suppression technique, attenuates the area of the sync pulse by 6dB and restores the signal in the descrambler by using timing pulses modulated directly onto the audio carrier. For information, contact Sylvania CATV Division, GTE Products Corporation, 10841 Pelicano Drive, El Paso, Texas 79935; (915) 591-3555.

### Multi-Level Descrambler

**Hamlin** displayed its MLD-1200 multi-level descrambler. The unit provides up to 12 levels of pay TV and can be programmed for 12 series of multiple channels for many combinations of pay channel selection. The MLD-1200 is a separate, self-contained device that is compatible with almost every make or model of converter, according to Hamlin. It connects to the output of the converter RF box, and power is provided by a plug-in transformer. Separate pay level combinations can be offered to individual subscribers by changing memory chips in the MLD-1200. For information, contact Hamlin USA, Inc., 35 Corporate Woods, #209/9101 West 110 Street, Overland Park, Kansas 66210; (913) 381-7469.

### Strand Mount

**Pico** displayed its new strand mount, which enables operators to add a second and third level pay TV even if the taps are already occupied by first level security devices. The mounts can be attached directly to the strand or under the house eaves. The mount is made of high-impact, molded nylon, making it impervious to salt erosion or industrial pollutants, according to the company. The mount is available in two models. The SM-S strand mount short is designed for use with notch filters and tier traps. The SM-L strand mount large is designed for use with super notch filters, "promo" decoders, dual filters and tier traps. For information, contact Pico Products, Inc., 1001 Vine Street, Liverpool, New York 13088; (315) 451-0680.

### Scramble Guard

**TEST** presented its Scramble Guard pay TV security system. The system includes the model EC TV encoder/generator, which generates a RF signal that scrambles the picture and sound of a conventionally modulated channel. The model DC TV decoder, installed in the subscriber's home, requires no power or maintenance and is sealed by a security screw, according to the company. The model LS lower adjacent sound generator provides security for a premium channel system that does not have an active channel located on the channel assignment just below the premium channel frequency. These systems are vulnerable to theft of inferior signals by detuning the TV set. The final component is the model PE pre-emphasis amplifier. It sharpens mid- and high-band pictures by compensating for the decoder trap skirts. For information, contact TEST, 16130 Stagg Street, Van Nuys, California 91406; (213) 989-4535.



# Power Supplies

## Servicing Products

Alpha Technologies introduced two products to facilitate maintenance and servicing of its AP models standby power supplies.

One is an option called the service power inserter (SPI), consisting of a connector and switch installed in the output line-filter. The other is a service power supply (SPS) to be used in conjunction with the above option.

The SPS may be connected to the standby unit and the CATV system's power can be switched to this power supply. The standby unit can now be serviced while power is provided for the CATV system from the alternate source. Batteries and components may be exchanged or replaced without worry of disrupting the cable system service, according to Alpha.

The service power supply, Alpha model AP-60S, is specifically designed to perform the task described above. This unit converts 115 VAC utility power to a regulated, 60 Vrms square wave output voltage.

For information, contact Alpha Technologies, 5676 Dorset Street, Burnaby, British Columbia V5J 1L7; (604) 430-1476.

## Status Monitoring

Communications Distribution Corporation unveiled its Lectro status monitoring system for power supplies. The system can function with a wide range of computers, from a simple TTY or Radio Shack home computer to a commercial computer. The entire headend interface "modem" is housed in a single 3.5-inch high rack. The interface unit has data storage, series-to-parallel converters, and RF transmitter and receiver to interface to the system. A single parallel standard plus (Certronics Standard) is provided for connection to the computer. For all commands the system uses the ASC11 standard, which is found on most teletype and home computers. An operator can interrogate a box by typing four ASC11 characters to select the box, two additional characters to select the module within the box and a question mark to request a read out. For information, contact Communications Distribution Corporation, 650 Athena Drive, Athens, Georgia 30603; (404) 353-1159.

## Control Technology

Control Technology brought out its Pax Citation standby power supply. The unit's closed-loop feedback system provides voltage regulation in the inverter

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mode. A true rms detector continuously samples the inverter output voltage and provides a feed-back signal to maintain a constant 60 or 30 VAC,  $\pm 5$  percent. The battery in the power supply contains a system called "Cycle Charge" that the company says eliminates excessive water evaporation out-gassing and plate deterioration that is associated with conventional "Trickle Charger's." The Cycle Charge brings the battery to optimum voltage, shuts off and will not reenergize until after stand-by operation or 24 hours, whichever is first. The system extends battery life by 200 percent, according to the company. For information, contact Control Technology, Inc., 1881 State Street, Garland, Texas 75042; (214) 272-5544.

### PowerVision

**PowerVision** introduced its model 113C power supply. The unit features fast transfer (16 msec), short circuit protection, surge protection on input and output and 30-second time delay before re-transfer. The unit's power regulator converts unregulated utility power to 12 ampere 30 or 60 VAC quasi-square wave power with  $\pm 2$  percent line and load regulation. Options for the unit include status monitoring and input lightning arrestors. The firm also redesigned its model 350 30-50 volt power supply to

provide 115 VAC input/120 VAC output. For information, contact PowerVision, 1044 Pioneer Way, El Cajon, California 92020; (714) 588-1272.

### RMS

**RMS CATV Division** presented its model PS-SB3060 standby power supply and model PS-ABP auxiliary battery pack. The ferro-resonant unit converts 115 volt-60 Hz commercial power to either a 60 or 30 volt square wave output voltage. It features time-delay relay, primary input circuit protection, on-off primary overload circuit breaker, input and output pilot light indicators and a 115 VAC convenience outlet. The newer model power supplies from RMS are completely modular and all components are placed on sliding trays for easy maintenance. For information, contact RMS Electronics, Inc., 50 Antin Place, Bronx, New York 10462; (212) 892-6700; (800) 223-8312.

## Satellite Dishes And Receivers

### Anixter-Pruzan

**Anixter-Pruzan** is marketing its model ES-40200CD five-meter earth

station. The dish has the following specifications: minimum gain at 3.7 GHz, 44 dB; minimum gain at 3.95 GHz, 44.5 dB; and minimum gain at 4.2 GHz, 45.1 dB. The VSMR is 1.3 to 1 maximum. Cross-polarization isolation is 30 dB minimum. Subsystem noise temperature at 10° elevation is less than 40°K. For information, contact Anixter-Pruzan, 4711 Golf Road, Skokie, Illinois 60076; (312) 677-2600.

### Comtech Data

**Comtech Data Corporation** brought out its model 550 satellite video receiver. The model incorporates a modular approach that provides full 24-channel tuning with a digital switch. The unit also has a manual gain select (MGS) to aid in aligning antenna systems. The unit



The model 550 satellite video receiver from Comtech Data.

features a signal strength meter, AGC/MGC select, 6.2/6.8 MHz program demod and remote control capability, and 8 dB threshold. Contact Comtech Data, 613

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South Rockford Drive, Tempe, Arizona  
85281; (602) 968-2433.

## M/A-COM

**M/A-COM** introduced the VR-4XS satellite receiver. The receiver features a frequency agile synthesizer as the local oscillator and has front panel selectable 12- or 24-channel frequency agility.

Standard features include threshold extension, dual conversion, baseband output (including subcarriers and dispersion waveform) modular construction, LNA power via a rear panel connector and the extensive use of plug-in cards



M/A-COM's VR-4XS satellite receiver.

which encourages a variety of configurations and applications, according to the company.

For information, contact Microwave Associates Communications, 63 Third Avenue, Burlington, Massachusetts 01803; (617) 272-3100.

## Microdyne

**Microdyne Corporation** is marketing its seventh generation satellite TV receiver, the 1100-FFC(X1)(S). The frequency synthesized 24-channel receiver can be manually tuned using front panel controls without the use of crystals. The unit has dual video outputs and a threshold of  $\pm 8.0$  dB C/N. The threshold extension circuitry is a standard feature that ensures optimum video performance with low carrier-to-noise ratios, according to the company. The receiver is fully EIA and CCIR compatible. Operators can obtain additional flexibility by adding the optional model SCB-1 subcarrier demodulator, which provides up to four standard or special subcarrier demodulators covering a range from 4.5 to 8.0 MHz. For information, contact Microdyne Corporation, Box 7213, 491 Oak Road, Silver Springs Industrial Park, Ocala, Florida 32672; (904) 687-4633.

## Prodelin

**Prodelin, Inc.**, has expanded its line of small diameter earth stations to include a five-meter dish. Like the firm's three- and 3.7-meter dishes, the five-meter dish is manufactured using a segmented, compression-molded technique. The antenna is shipped in 12 interlocking and interchangeable segments, minimizing

packing and shipping costs, according to George Gilbert, director of marketing. Each segment is field-replaceable.

The unit's Cassegrain feed can be supplied with either single or dual polarization. Circular polarization is also available. The antenna has transmit capability, said Gilbert. Specifications include: midband gain, 44.5 dB and VSWR, 1.25.

For information, contact Prodelin, Inc., P.O. Box 131, Hightstown, New Jersey 08520; (609) 448-2800.

## Multi-Satellite Dish

**Satellite Communications Network** presented a new type of antenna capable of receiving simultaneous transmissions from up to 14 different satellites. Called the Simulsat™, it can receive signals from any satellite within a 52-degree field of view. It has the following specifications: gain at midband, 43.5 dBi; half-power beamwidth, 1.0 degree nominal; beam separation, three degrees; polarization isolation, >25 dB; and adjacent satellite isolation, >25 dB. For information, contact Satellite Communications Network, 1 World Trade Center, Suite 8833, New York, New York 10048; (212) 466-0507.

## TES

**Transportable Earth Stations, Inc.**

**PRIESTER SUPPLY  
COMPANY, INC.**

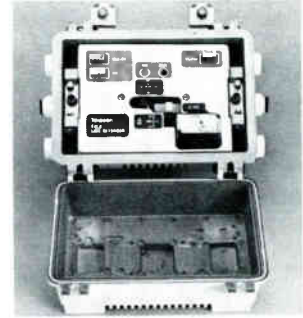
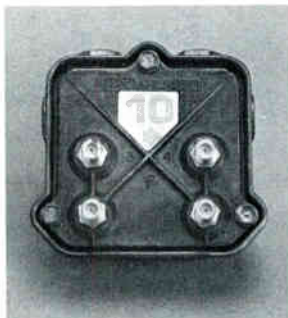


**Texscan**

Priester's 50 years of service in Texas as a stocking distributor, and Texscan's successful history as a manufacturer of CATV test and distribution equipment make a winning combination. Priester stocks for fast delivery Texscan/Theta-Com's full line includ-

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is marketing the Compact 42, a portable in uplink and downlink facility. When completely set up, the 42-foot trailer functions as a fully self-contained earth station with the ability to transmit on the standard uplink frequency band of 6 GHz and receive on the 4 GHz band.

The Scientific-Atlanta five-meter antenna has been adapted to fold down for easy transportation. Space-age stabilizing legs secure the dish to achieve correct alignment and a stable signal. The legs use the trailer weight as part of a ground mounting system designed to operate in wind loads up to 60 mph. The entire system has been designed to be set up by one man.

Other features of the transportable earth stations include: reinforced 42-foot trailer built with air-ride suspension; specially built 60 kw, three-phase generator; a separate fuel supply for the generator with capacity for 48 hours of continuous use; four tons of air conditioning; and full redundancy and monitoring.

For information, contact Transportable Earth Stations, Inc., 3130 Damon Way, Burbank, California 91505; (213) 841-6042.

## Test Equipment

### Avantek

**Avantek, Inc.**, is marketing its model TVO-8370 voltage tuned oscillator. The unit has a frequency range of 3.6-4.2 GHz and is also available with a range of 3.7-4.3 GHz. Its power output is +10 dBm Min., with power output variation of  $\pm 0.5$  dB typical. The tuning voltage range is +1 to +14 V, with a maximum of +15 V. Input capacitance is typically 45 pf. Frequency drift over the operating temperature range of 0°C to +65°C is 35 MHz typical. For information, contact Avantek, Inc., 3175 Bowers Avenue, Santa Clara, California 95051; (408) 727-0700.

### Brad Cable

**Brad Cable Electronics, Inc.**, brought out its new Auto Sweep™, which is designed to plug directly into a Wavetek 1402A and eliminate manual channel selection. The microprocessor-controlled unit features three mode selections: single direct keyboard access; step foot switch; and auto sweep. The time delay between channels on auto mode can be adjusted from one to nine seconds. The auto sweep may be halted at any point—reverse/forward mode and then auto sweep can be resumed. For information, contact Brad Cable Electronics, Inc., 224 Nott Terrace, P.O. Box 739, Schenectady, New York 12301; (518) 382-8000.

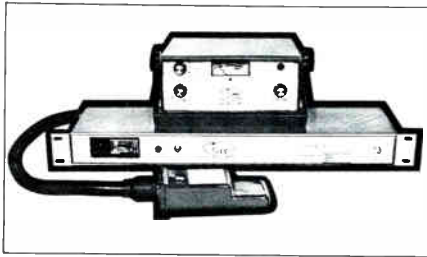
### Signal-Level Meter

**Communications Supply, Inc.**, is

marketing the Trim 1 signal-level meter, a compact, hand-held trouble-shooter that clips to an installer's belt. It is equipped with a micro-switch tuneable between high and low bands and an internal potentiometer that can be adjusted to calibrate a specific range of channels. It gives immediate go/no-go signal checks. It is powered by a nine-volt battery and weighs five ounces. For information, contact Communications Supply, Inc., P.O. Box 1538, West Chester, Pennsylvania 19380; (800) 345-8286, (800) 662-2428.

### Leakage Detector

**ComSonics, Inc.**, introduced its Sniffer™ RF leakage detection system. The detector is light enough for shoulder carrying and can also be mounted under the dashboard of a car. Its sensitivity is



*ComSonics' Sniffer™ RF leakage detection system.*

typically better than  $0.06 \mu\text{V}$ , enabling it to detect leakage at levels below -80 dBmV. The signal source can be mounted in a 19-inch rack at the headend. The system enables technicians to check for RF leakage while driving along a cable television line at speeds of 25 to 40 miles per hour, according to the company. In fourth quarter 1981, ComSonics will market an HRC option. For information, contact ComSonics, Inc., P.O. Box 1106, Harrisonburg, Virginia 22801; (703) 434-5965.

### Multimeter

**James G. Biddle Company** has introduced a digital multimeter that continuously measures volts, ohms and amps and shows the readout on a large three-digit LED display. Accuracy on all ranges and settings is one percent, with low range capability extending from 0.1 to 99.9. A special "surge-lock" mode allows measurement of voltage and current surges while a unique "invert" feature permits the display to be read if the instrument is turned upside down. Clamp jaws open to a full two inches. The instrument case is molded of high-impact ABS "double-insulated" plastic; there is also a break-resistant clear plastic display window. For information, contact James G. Biddle Company, 510 Township Line Road, Blue Bell, Pennsylvania 19422; (215) 646-9200.

### Sadelco

**Sadelco, Inc.**, unveiled two pieces of test equipment, the Digit-Level™-200 signal level meter and the model SC450 spectrum calibrator.

The signal level meter comes in two models: the DL-200-VS, with a superband range of 216 to 450 MHz; and the DL-200-VU, with a UHF range of 470-812 MHz. Both models have VHF range of 54-216 MHz and can handle 4-45 MHz with an optional attachment. The portable units feature large, three-digit readout, a complimentary analog meter, a programmed attenuator, 0.1 dB resolution, built-in speaker and automatic electronic shut-off.

The model SC450 spectrum calibrator has an accuracy of .25 dB and operates over a range of 4.5 to 450 MHz. The unit incorporates an all solid state white noise generator whose spectral output level is made flat to within  $\pm 0.25$  dB. It also features a fixed frequency crystal controlled CW generator that can be adjusted on a panel meter to 1 millivolt  $\pm 0.25$  dB. Other features of the calibrator are 73.5 MHz CW reference generator and a pulsed RF reference generator.

For information, contact Sadelco, Inc., 75 West Forest Avenue, Englewood, New Jersey 07631; (201) 569-3323.

### Videotek, Inc.

**Videotek, Inc.**, introduced a video vectorscope (model VSM-5) and a video waveform monitor (TSM-5).

The VSM-5 offers NTSC standard 525 lines, 30 frame (60 Hz field) inputs: selectable A/B video, looping BNC inputs and subcarrier "A" select. It has a five-inch CRT and mounts in a 5.25-inch vertical rack space. Input return loss is 40 dB minimum, 46 dB typical, 50 Hz to 5 MHz; input isolation is 60 dB minimum, 70 dB typical at subcarrier frequency; and input level range is: AC 1.0 Vp-p  $\pm 6$  dB; DC,  $\pm 5\text{V}$ .

The TSM-5 offers standard NTSC 525 lines, 30 frame (60 Hz field rate) scan; standard PAL 625 lines, 25 frame (50 Hz field rate) scan. Inputs: selectable A/B video looping BNC inputs, AC or DC coupled. Output: separately buffered video out 1 Vp-p into 75 ohm termination.

For information, contact Videotek, Inc., 125 North York Street, Pottstown, Pennsylvania 19464; (215) 327-2292.

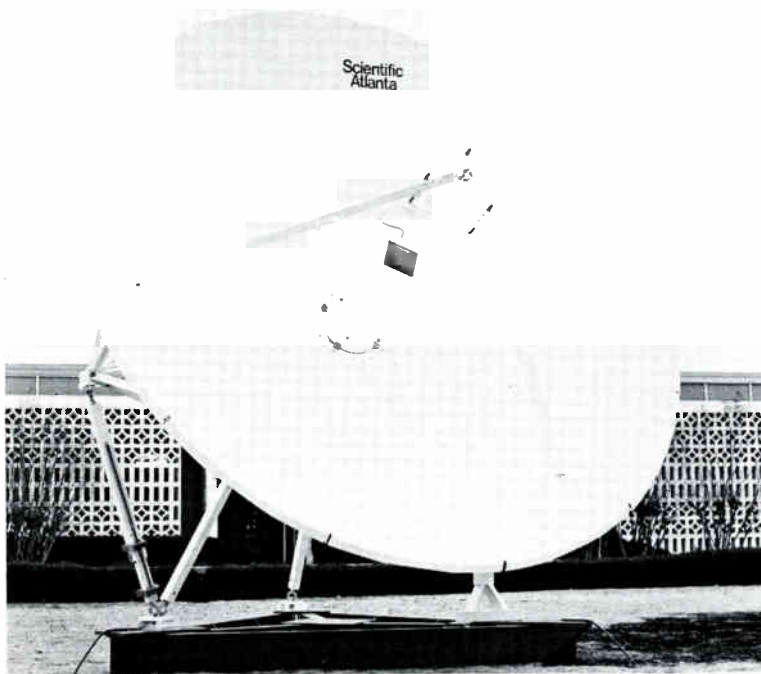
### Wavetek Indiana

**Wavetek Indiana** unveiled two new sweep generators

The model 1080 sweep generator sweeps from 1 MHz to 1000 MHz, featuring 1 percent display linearity, digital readout and an "auto-zero" circuit that improves frequency accuracy and virtually eliminates frequency drift, according to



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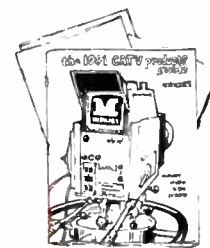


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the company. The unit has three operating modes: CW,  $\Delta F$  and full sweep. It has an output power range of +60 to -10 dBmV.

The model 1201 video sweep generator covers the .0 to 11 MHz frequency band. Optional center frequency, sweep width and markers and the standard 0 to 20 dB PIN diode attenuator can be remotely controlled or programmed from a rear panel connector. The unit presents a flat  $\pm 0.25$  dB sweep signal at a 1.0 vrms output level.

For information, contact Wavetek Indiana, 5808 Churchman, P.O. Box 190, Beech Grove, Indiana 46107; (317) 787-3332.

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## Two-Way Systems

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### Jerrold

The **Jerrold Division** of General Instrument Corporation announced several enhancements to its cable security system. At the headend, the system now includes dual disk drives that operate in a shadow mode, providing a hot standby. The headend computer can also handle a larger variety and amount of data storage per subscriber. Another modification is that the system can now automatically handle opening and closing signals so that cable operators can market the security service to commercial accounts. The modem in the subscriber's home also now includes a universal I/O port and can handle more complex alarm processing.

Jerrold is also developing **Communicom**, a two-way interactive system that offers a flexible form of pay-per-view selection and can provide opinion polling and home security services. The hardware for the system is a modified Jerrold Starcom IV converter. The converter provides all the functions of a conventional pay TV converter and is equipped with infrared remote control circuitry. The way the system operates is if a subscriber chooses to be eligible to receive pay-per-view programming, he is assigned an authorization number. To choose a pay-per-view program, the subscriber punches in his code number and selects the channel.

For information, contact Jerrold Division, 2200 Byberry Road, Hatboro, Pennsylvania 19040; (215) 674-4800.

### Indax

**Oak Communications CATV Division** has begun delivery of Indax terminals to Cox for use in Cox's Indax test market in San Diego. The two-way terminal, built at the request of Cox, performs the following functions: one-way videotex, two-way information retrieval, interactive

banking, impulse buying and catalog shopping. The unit has interface ports that can be connected to home security and energy management hardware in the home. The terminal also has an EIA interface, enabling subscribers to connect a home computer to the terminal and use the home computer for keyboard entry. Oak is developing its own Dimension II interactive terminal. For information, contact Oak Communications CATV Division, P.O. Box 517, Crystal Lake, Illinois 60014; (815) 459-5000.

### Pioneer Home Security

**Pioneer Communications of America** introduced another level of two-way service, home security, to its collection of interactive products and systems. The VIP Security System includes fire alarm service detecting both heat and smoke; medical alert; emergency "panic" alert; and burglar alarm. The system is compatible with many varieties of sensors including door and window contact, motion detection, pressure pad, strobe and infrared beam. The system can function either as a stand alone operation or as part of the total interactive VIP System with complete entertainment and data communications structure. An additional advantage available in the Pioneer Security System, even when used as a stand alone operation, is its plant diagnostic capability. The VIP System diagnostic unit provides continual monitoring and evaluation of both the total security system and cable plant status. For information, contact Pioneer, 3518 Riverside Drive, Columbus, Ohio 43221; (614) 451-7694.

### Scientific-Atlanta

**Scientific-Atlanta** is developing the series 2300 energy management and security monitoring system. Energy management requires a one-way cable path, and security monitoring requires a two-way path. An operator can offer subscribers either energy management or security monitoring or both.

The series 2300 consists of four major components: the communications control unit, model 2310; the subscriber interface unit, model 2320; the remote control unit for energy management, model 2330; and the alarm controller, model 2340. The communications control unit, located at the headend, is programmed to issue up to four electric load shedding instructions for energy management. The subscriber chooses the energy management schedule. The subscriber interface unit, located at the subscriber's home, contains the energy management module and executes energy management through the remote control unit. The remote control unit disconnects an appliance upon receiving a control signal from the

subscriber interface unit. A fail-safe timer will automatically reconnect the appliance in the event of a communications system failure.

For information, contact Scientific-Atlanta, Inc., One Technology Parkway, Box 105600, Atlanta, Georgia 30348; (404) 441-4000.

### TOCOM

The **TOCOM Cable Security™** system is now in operation or under contract in 70 systems, according to TOCOM's John Nolen. At the NCTA show, TOCOM displayed a prototype of a home alarm terminal which combines the functions of the TOCOM HT-3B home terminal and the TOCOM III alarm and security panel in one unit. The combined terminal is designed to cut the cost and speed the installation of the cable security system, according to Nolen. The combined unit is currently under development, and TOCOM plans to introduce it at the Eastern Show in Atlanta. For information, contact TOCOM, P.O. Box 47066, Dallas, Texas 75247; (214) 438-7691.

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## Video

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### Video Production Switchers


**Ampex Corporation** introduced its AVC series video production switchers. A principal feature of the series is that all panel control knobs have been eliminated. All switcher adjustments except for Quad Split and Color Background can be made from two centrally located "adjust panels" containing up/down and on/off push-buttons and the pattern positioner, according to Ampex. The AVC series also makes extensive use of internal memories, decreasing the amount of adjustment required. Dual-current sharing power supplies are standard to enhance reliability and improve signal performance. Standard features in the AVC series include pushbutton setup, key memory system, three keyers per M/E, a preview monitor system, 70 patterns, auto pan, half-halo borders, non-linear auto-transitions, independent Matte generators and downstream mixer/keyer. Options include the key border generator, a RGB shadow chroma keyer, an isolation key, auxiliary buses and backup CPU. For information, contact Ampex Corporation, Audio-Visual Systems Division, 401 Broadway, Redwood City, California 94063; (408) 255-4800, (212) 736-6118.

### Weather Video

**Arvin/Diamond** is marketing the Sat-Weather™ system that converts National Oceanic and Atmospheric Administration satellite weather pictures into color video. The system offers continuous color video



# PICO PUT IT ON THE LINE



Add second and third level Pay TV, even if the taps are already occupied with first level security devices.

Now you can securely put all your traps and decoders "on the line" with a PICO Strand Mount.\* Placing your security away from taps makes tampering virtually impossible.

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\*A versatile adapter is also available for installing your Strand Mount on a structure or under the eaves.

output, manual or automatic operation and up to 200-frame digital memory.

The key component in the system is the SW-3 signal processor-colorizer. The unit accepts input from the National Weather Service telephone line and/or WEFEX. The incoming digital signal is decoded and digitized, assigned one of four color programs, has its graphics enhanced and is recorded in one of two internal picture memories. The two memories alternate between the read and write mode so that an earlier picture is continuously replaced by a later transmission. The result is a video output that will display the latest satellite picture in realistic colors.

The second component is the DCDS-3 digital disc memory. The unit can store and replay up to 200 pictures. The sequences can be edited, and selectable replay speeds allow the operator to play back time-elapsd weather video sequences.

For information, contact Arvin/Diamond, 4490 Old Columbus Road, N.W., Carroll, Ohio 43112; (614) 756-9211.

## Mobile Generators

**Compact Video Sales, Inc.**, introduced two mobile generators for videotape and film production. The 55 KW AC is a gas-powered generator equipped with a 460 cubic inch Lincoln-Mercury engine housed under a three-inch fiberglass soundproofing. It features a 6,000 DFM blower system to reduce noise and provide maximum efficiency, according to the company. It has an 80-gallon fuel tank. The 60 KW AC diesel-powered generator features a turbo-charged Allis-Chalmers diesel engine housed under three inches of fiberglass soundproofing. The generators are available in both truck and trailer mounts with a choice of interchanging hitch arrangements. For information, contact Compact Video Sales, Inc., 1104 West Chestnut Street, Burbank, California 91506; (213) 843-3232.

## Digital Products

**Digital Video Systems, Inc.**, unveiled four digital products that it plans to place on the market in September.

The DPS-103 time base corrector offers a six TV line window and an optional 256 line window. It corrects any heterodyne VTR.

The DPS-162 master sync generator is totally digital. Sync-to-burst is kept within less than one nanosecond. The unit features programmable pulse widths.

The DPS-175 test signal generator features microprocessor signal generation and control. All patterns are generated as digital luminance and chroma components.

The firm also brought out its DPS-100 diagnostic system.

For information, contact Digital Video Systems, Inc., 716 Gordon Baker Road, Willowdale, Toronto, Canada, M2H 3B4; (416) 499-4826.

## Digital Still Store System

**Harris Video Systems** introduced its IRIS digital still store system. The IRIS puts as many as 5,800 stills online for multiple user access. Inputs can be from



*The HVS 630 Digital Framestore Synchronizer from Harris Video Systems.*

photographic slides, artwork, film, VTS, character generators, network feeds and cameras. The key component of the IRIS system is the new HVS 630 Digital Framestore Synchronizer. When a signal is received, the 630 digitizes it in component form and stores it in a 16K RAM-based frame memory. Using a PROM-actuated memory controller, it reads out the signal in precise synchronization and re-codes it in correct vertical, horizontal and color synchronization, according to the company. The component coding results in a system that is "inherently immune" to color phasing problems, "cycle jump" and horizontal picture shift, according to Harris. Features of the 630 include automatic mode switching, and "dual mode" hot switching, which permits switching of asynchronous input sources without disrupting output video. If input video is lost, the 630 either freezes on the last picture or cuts to black, depending on the setting of a board-level switch. Options for the 630 include a digital noise reducer, a correct color D.O.C. and a video compressor/positioner/effects unit. For information, contact Harris Video Systems, 1255 East Arques Avenue, Sunnyvale, California 94086; (408) 737-2100.

## Three-Tube Camera

**JVC** displayed its KY-2700 three-tube color camera. The camera features dual-edged vertical and horizontal contour correction, 500 lines resolution and 54 dB signal-to-noise. Its registration specs are 0.1, 0.4 and 0.8 percent. The camera is equipped with 14:1 servo zoom lens, automatic beam control, automatic white balance with memory, automatic

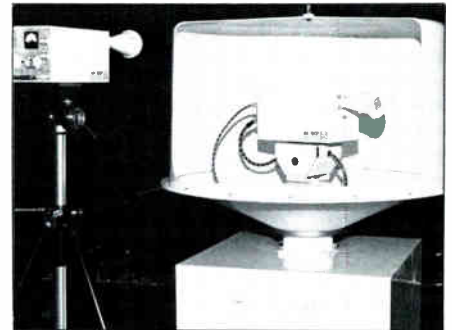
black stabilizer circuit and low 18-watt power consumption for extended battery life. For information, contact US JVC Corporation, Dept. 000, 41 Slater Drive, Elmwood Park, New Jersey 07407; (800) 821-7700, Ext. 7005.

## Community Access System

**Microwave Associates Communications** unveiled a new system for providing remote feed to a local origination or news channel. The CAN™ (Community Access News) system is a microwave link between studio or headend and a camera in the field.

The heart of the system is the MA-13CP transmitter/receiver. Both units are portable, have waveguide connections and can accept a variety of antennas. They are normally equipped with 18 dB gain horns for ranges up to one mile. Ranges of five miles can be realized with two- or four-foot parabolic antennas. The transmitter weighs seven pounds and has a 115/230 VAC power pack.

The system can be configured in three ways. For local origination events near the headend, the transmitter can send the programming directly to the headend. If an operator knows he will be recording



*The MA-13CP transmitter (left) and receiver, from Microwave Associates Communications.*

many events from an area far from the headend, he can construct a central receive sight. The sight can receive signals from the mobile transmitter and relay it to the headend with parabolic antennas. The transmitter can also relay the signal to a receiver connected to the cable trunk. The cable trunk then transmits the programming to the headend for processing.

For information, contact Microwave Associates Communications, 63 Third Avenue, Burlington, Massachusetts 01803; (617) 272-3100.

## MetroData

**MetroData** displayed its system 120 expandable multichannel character generator/display system. The unit can be expanded from one to six channels on a single mainframe and is designed to



provide any configuration of local and wire service programming channels. The display comes with a choice of 16 background and line-by-line colors, two font styles and a color wipe mode, among other features. It can provide automatic time or events based scheduled display of such information as classified advertising and a premium channel's scheduling. For information, contact MetroData, 2150 North 107th, Suite 420, Seattle, Washington 98133; (206) 367-2100.

## Video Van

**Midwest Corporation** unveiled its M-1 and M-20 video vans. The M-1 is a 1981 Econoline-type van equipped with a wide range of video and audio equipment. The M-1 is prebuilt and available from stock within 30 days, according to Dick Byrum, creative services director. The firm is marketing the van with a promise that if the van is not delivered within 30 days, Midwest will deduct \$2,000 from the price. Standard video equipment includes: two Hitachi FP40S three-tube cameras; two Hitachi OP40 operating panels; two Hitachi VM-508 five-inch viewfinders, a Videotek VM8PR color monitor; a Tektronix 528 waveform monitor, a Sony VO286OA UMatric recorder/editor, a Microtrak 6455 audio console and a wide range of speakers, microphones, lenses and switchers, among other.

The M-20 is a versatile mid-range vehicle that is designed to provide the field producer with a comprehensive videotaping or broadcasting vehicle, according to the company. Standard equipment includes heating and air conditioning, signal and power panel and production overhead lighting. For information, contact Midwest Corporation, Mobile Unit Group, 1021 West 8th Street, Cincinnati, Ohio 45203; (513) 651-1904.

## QuantaVision™

**System Concepts, Inc.**, displayed its QuantaVision™ System, a multichannel information display system based on microprocessor technology.

Each channel in the system is equipped with an independent, self-sustaining character generator, including video boards, RAM memory and power supply. If the character generator for one channel fails, no other channels will be affected. The character generators are also interchangeable.

The system features two typefaces as standard, an upper and lower case serif type face and an all capital letter sans serif type face. The system offers eight font display sizes for each type face. Eight colors are available for the letters and background.

The display elements of a program format, including title, colors and character display font size and border, may be

changed or repositioned at any time without reprogramming at the factory. QuantaVision is available with a newspaper entry system for classified ads.

For information, contact System Concepts, Inc., 2440 South Progress Drive, Salt Lake City, Utah 84119; (801) 974-0992.

## Cable Access Van

**Tele-Measurements, Inc.**, unveiled the CAV-1 cable access van for local origination and public access programming.

A principal feature of the van is that all electronic components are mounted on two portable rack consoles that can be rolled off the van for close-to-the-scene operation. This frees equipment operators from being stationed in the van when the source of the video programming is far away, and eliminates the problem of communicating long distances between the camera and electronic equipment, according to William E. Endres, president.

An Econoline-type vehicle, the CAV-1 unit comes equipped with a 6.5 KW continuous-duty generator for full electronic operation, heating, air conditioning and work lights. The van is equipped with two Sony studio DXC 1800 cameras with power zoom lens and ITE tripods, a Sony ½-inch Betamax VTR editing system, a Panasonic WJ 4600 special effects switcher, a Panasonic WR 450 six-input selectable audio mixer, Sony dual PVM 8200 MB color monitors and RCA triple TC 1206/03 black and white monitors. Other video equipment is also included.

For information, contact Tele-Measurements, Inc., 145 Main Avenue, Clifton, New Jersey 07014; (201) 473-8822.

## Character Generator

**Video Data Systems** announced a new generation of message character generators. The MCG-2500 is a 32 page stand-alone single channel character generator designed for use as a premium channel wrap-around program guide. It has applications as low-level newspaper systems, local news, community bulletin board, or access channel program source.

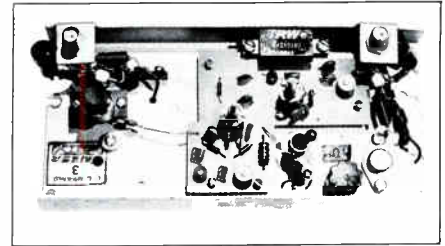
The system provides line by line color, three character heights, two character widths, upper and lower case, and graphic characters. The characters are further enhanced with line-by-line selection of black and white characters with or without edging and 16 choices of font enhancement. The system is flexible with operator control of individual display times ranging from ¼ to 62 seconds.

For information, contact Video Data Systems, 205 Oser Avenue, Hauppauge, New York 11787; (516) 231-4400.

# Miscellaneous

## Broadband Engineering

**Broadband Engineering, Inc.**, announced the availability of a push-pull hybrid replacement that converts the Theta-Com/Kaiser Phoenician KCEC



*Broadband Engineering's BMK-212 (KCEC) installed in a module.*

line extender to 35-channel push-pull capacity. The modification enables an operator to use his mid-band and super-band for such applications as pay TV and extra channels. The unit, the BMK-212, can be installed in 15 minutes. It features a high/low voltage selector switch and surge and over-voltage protection. The BMK-212 is only one of the replacement electronics Broadband markets for upgrading the capacity of cable system components. For information, contact Broadband Engineering, P.O. Box 1247, Jupiter, Florida 33458; (305) 747-5000.

## Alarm Control Terminal

**CableBus Systems Corporation** introduced its ACT-1 CableAlarm™, a residential terminal and cable communicator that combines easy installation with functions such as fault detection and alarm encoding, according to the company.

For easy installation, connectors for supervised panic buttons, fire and intrusion loops are made using color-coded push-on terminal blocks. No wire stripping is needed. An installer matches the insulation color on a wire to the color adjacent to the terminal and presses the wire on with a hand tool.

Outputs from the ACT-1 will drive local annunciators and will activate a backup telephone dialer if desired. The ACT-1 can be mated with deluxe alarm panels such as the CableBus LKC-50, and is designed to be mounted inside most stand-alone alarm panel housings.

For information, contact CableBus Systems Corporation, 7869 S.W. Nimbus Avenue, Beaverton, Oregon 97005; (503) 643-3329.

## CableData

**CableData** demonstrated a new addition to its family of on-line management information systems, the On/Line Exclusive System. The software system is designed to interface between

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addressable converters and the business activities at the office. One entry in the software system accomplishes both the order taking and the converter turn on/off. Each converter in the CableData system is continually turned on or off according to preassigned billing codes to ensure system security. The software feature accommodates multiple tiers and is flexible enough to operate with all addressable converters manufactured by major suppliers, according to the company. The principal advantage of the system is that it uses one computer and one data base to minimize the chance of confusion and error. CableData designed the software for use by systems with up to 500,000 subscribers. For information, contact CableData, 3200 Arden Way, Sacramento, California 95825; (916) 485-2911.

## MDS Downconverter

**Conifer Corporation** has introduced its next generation of MDS downconverters, the model MDPLN. The MDPLN employs a crystal-controlled local oscillator and features a selective input filtering circuit with two stages of pre-amplification providing 35 dB minimum conversion gain and a maximum 2.5 dB noise figure. Encased in a weatherproof anodized aluminum housing, the MDPLN includes an IC regulated, UL approved, matched power supply; -25 dB test point; boot collar and rubber boot on the output "F" jack; and complete easy mounting hardware. For information, contact Conifer Corporation, P.O. Box 832, Burlington, Iowa 52601; (319) 752-3607.

## Management Systems

**Cybertech, Inc.**, is marketing an addressable CATV management system. The Cybertech System provides a wide range of functions, including maintenance schedules, subscriber billing and customer inquiry.

The system will display each subscriber name as payments are entered. If batch is out of balance, selection and correction can be made by scrolling, forward or backward, while viewing a total of 26 transactions at once.

For information, contact Cybertech, Inc., 3100 Broadway, Suite 1111, Kansas City, Missouri 64111; (816) 561-1800.

## Channel Selector

**Diamond Cable Electronics, Inc.**, is marketing The Digital Head cable TV channel selector. The solid state unit has 36 channel capacity and features digital fine tune with lock-in memory. It has a sensor touch keyboard, with no springs, moving parts or buttons. The selector is water, dust and shock resistant and is housed in a high impact Cyclocac™ case.

For information, contact Diamond Cable Electronics, Inc., 1025 State Street, P.O. Box 739, Schenectady, New York 12301; (518) 346-1107.

## Digital Equipment

The goal of **Digital Equipment Corporation** is to become a one shop supplier to the cable television industry of the hardware and software operators' need for addressability, management and videotext/teletext, according to Dick Rose, CATV marketing manager. The firm is developing relationships with software houses such as Applied Data Research on such functions as subscriber management. At the NCTA show, Digital displayed its VAX™ family of 32-bit computer systems. The family consists of two VAX processors, the VAX-11/780 and the newer VAX-11/750. Smaller than the 780, the 750 offers the same 32-bit programming, the same software and 60 percent of 780's performance. For information, contact Digital Equipment Corporation, Merrimack, New Hampshire 03054; (603) 884-6108.

## MDS Transmitter

**EMCEE Broadcast Products** displayed its MDS television transmitter, the TTS-20. The unit features color or monochrome transmission, modular design, oven-controlled crystal oscillator and individually calibrated peak output power metering. Units comply with FCC rules and are also type accepted for use with SCA at rated power or with the EMCEE TSA-100A 100 watt amplifier. The equipment is designed for 19-inch rack mounting. Output power is 1-20 watts peak visual; .1-2 watts, average aural. Output frequency is any 6 MHz channel between 2150 MHz and 2162 MHz. Type of emission: A5, visual, F3, aural. Input impedance is: video, 75 ohms unbalanced; audio, 600 ohms balanced. Output impedance is 50 ohms. Harmonic suppression is 60 dB minimum. Differential phase is  $\pm 3^\circ$  and differential gain is  $\pm 0.5$  dB. Its power requirements are 105-135 VAC. 60 Hz, 500 watts. For information, contact EMCEE Broadcast Products, a division of Electronics, Missiles & Communications, Inc., White Haven, Pennsylvania 18661; (717) 443-9576.

## Lightning Elimination

**Lightning Elimination Associates, Inc.**, has gained UL approval for its plug-in component protector, part of its Kleanline electronic filtering system. The units intercept and dissipate the full force of lightning-induced surges and are sensitive enough to filter out a wide spectrum of RFI, EMI and EMP and the induced transients and noise pulses found in most manufacturing environments, according

to the company. For information, contact Lightning Elimination Associates, Inc., 12516 Lakeland Road, Santa Fe Springs, California 90670; (213) 944-0916.

## Design System

**Monroe** introduced its Cable-Aid™ system for helping engineers design a cable television system. An engineer keys in the span length and the type of tap desired and the Monroe system computes the high and low end signal levels (dB) and the tap value required. The system will also show where to insert line extenders and equalizers. Engineers can then press two more keys and receive a printout of the bill-of-materials needed for construction. The Cable-Aid system is capable of handling manufacturers' specs for every value of each type of hardware and 16 cable types simultaneously. In minutes, an engineer can compute the cost of an alternate design using another manufacturer's specs. For information, contact Monroe, The Calculator Company, The American Road, Morris Plains, New Jersey.

## SCR Opto Couplers

A family of 200/250V SCR opto couplers was announced by **Motorola**. This family includes the Motorola MOC3002, MOC3003 and MOC3007. All offer a high isolation voltage of 7500V. The opto couplers are designed for control of loads and equipment powered from 110/120 Vac lines and where extremely high isolation is required between input and output. They have a maximum output current rating of 300 mA, making them useful for direct control of low current loads or to drive higher power SCRs and Triacs. For information, contact Motorola Semiconductor Products, Inc., P.O. Box 20912, Phoenix, Arizona 85036; (602) 244-4306.

## Hybrid Amplifier

**TRW RF Semiconductors** released a preliminary specification for its CA4600 400 MHz cable television hybrid amplifier. The CA4600 is a thin-film hybrid gain-block manufactured with a gold monometallic process for high reliability, according to the company. The specifications of the component include: gain @ 50 MHz,  $34.0 \pm 1$  dB; frequency response, 40-400 MHz ( $\pm 0.4$  dB); slope cable equivalent (50-400 MHz), +0.5 to +2.0 dB; output capability @ -57 dB X-MOD 52 channel flat, +48.5 dBmV; noise figure on CH H 14, 7.5 dB max.; return loss input/output, 18 dB min.; and operating temperature (sink), -20°C to +100°C. For information, contact TRW RF Semiconductors, 14520 Aviation Boulevard, Lawndale, California 90260; (213) 679-4561.

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UA-Columbia Cablevision, Inc.  
5 Fir Court  
Oakland, NJ 07436  
Attn: Steven Raimondi  
Director of Engineering, East

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United Cable Television, a leader in the cable T.V. industry, has an immediate need for a Chief Technician in its Plainville, Connecticut operation.

Applicants should have at least 5 years experience in field operations; this should include experience in line maintenance, systems proofing, FCC and other testing. Individual will be responsible for coordinating the technical staff, therefore, must possess strong supervisory skills. An electronics background is essential.

Interested applicants should send resume and salary requirements to: UNITED CABLE TELEVISION CORPORATION of CONNECTICUT, Attn: General Manager, 319 Cooke St., Plainville, Connecticut 06062. An Equal Opportunity Employer M/F.



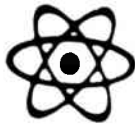
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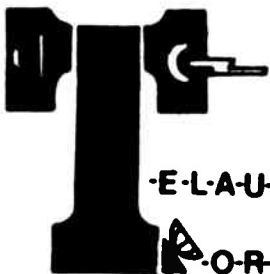
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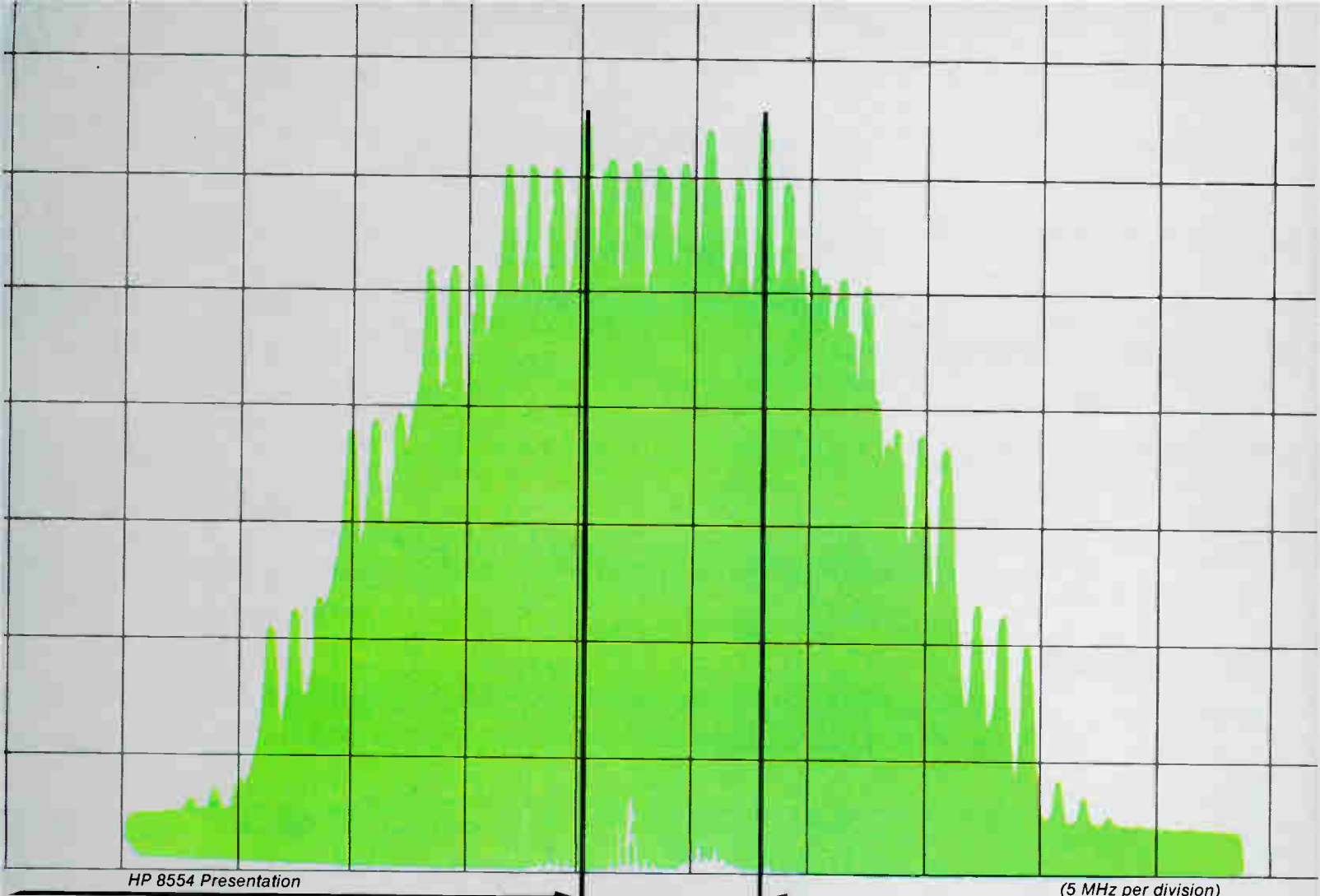
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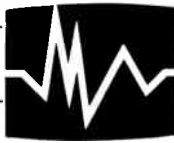
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"Out of Sync" is a service provided by **Communications Engineering Digest** to our subscribers. We will help you locate answers to all technical questions submitted. On urgent problems, or problems lacking in essential detail, **CED** may respond to you by phone prior to publication.

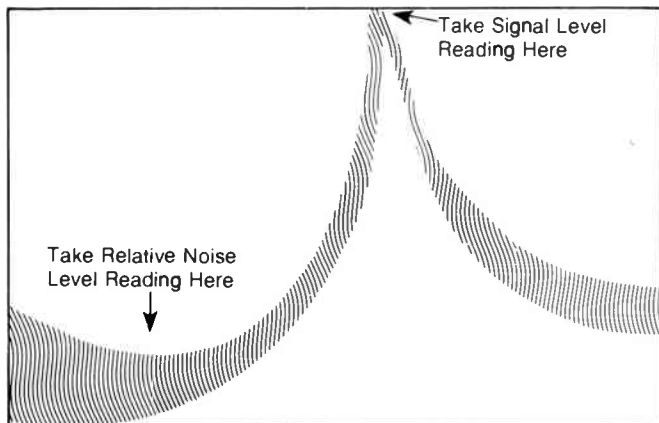
Names and locations will not be published without written authorization. Send your questions, and possible solutions, to "Out of Sync," **Communications Engineering Digest**, Titsch Publishing, Inc., P.O. Box 5400-TA, Denver, Colorado 80217.

**Q.** I have heard conflicting statements on how often it is necessary to perform signal-to-noise measurements on a cable system. The Federal Communications Commission says that once each year is enough. Some of the engineers in our company feel that this is not nearly often enough. What do you recommend?

**A.** Most system engineers feel that signal-to-noise measurements are an excellent way to keep track of several important parameters within a system. This does not mean that full scale signal-to-noise tests are done every few days or even several times each year. Rather, in many cases, "relative" signal-to-noise readings are routinely taken by maintenance personnel whenever they have occasion to do any trunk amplifier testing.

The best way to set up a system for relative S/N checks is to start recording relative readings when system is new and (presumably) in excellent condition and balance. Failing this, the next best way to establish relative readings which are reasonably accurate is to record them just after or even during the annual FCC proof of performance tests.

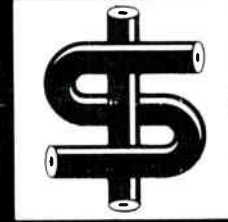
A simple way to determine relative S/N levels is to select one channel which has no lower adjacent sound carrier. Channels 2, 5, and 7 work well (if Channel 1 is not used) as reference channels. If other channels are isolated from the lower adjacent channel in your system, they should work equally well.



At the output of the amplifier under test, just read and record the visual carrier level of the desired channel(s). Then tune the SLM down in frequency until the lowest meter indication is shown. Record this level. You now have a couple of reference signal levels. In future tests, comparison of current levels of each signal with the recorded levels will quickly show whether the ratio (difference between levels) has changed. If the system was properly set up when the initial readings were taken, the only change in the ratio will be less difference between readings. This

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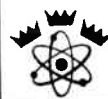


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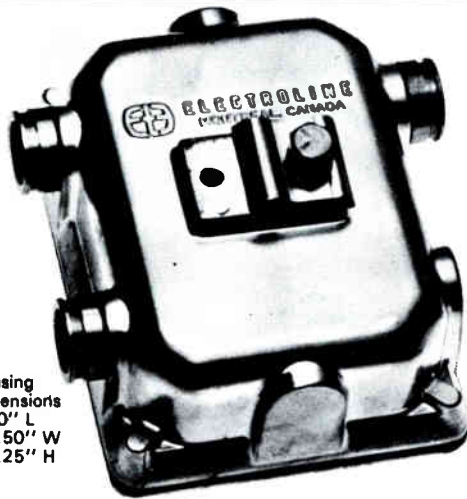
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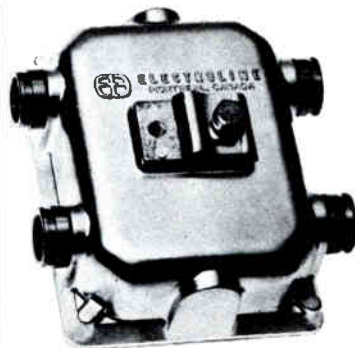
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will indicate a worsening of signal-to-noise picture quality and shows that some system components may be failing.

Of course, this method does not accurately reflect the true system signal-to-noise and should not be used for FCC proof readings. It is an excellent reference tool and should be used as frequently as possible. One problem with newer cable systems is that if one of the two IC chips fail, a complete system outage may not occur. The gain of the amplifier may just drop to about unity gain. Should this occur, succeeding amplifier AGC circuits may compensate for the loss of gain and signal levels will check good, but pictures will be snowy. Relative S/N measurements will show up the increased noise as a reduced ratio. If an IC chip output reduces for any reason, or if almost anything else causes a reduction in amplifier output, the system noise will increase and the ratio will be lessened.

Naturally, signal-to-noise ratios become worse as the signals pass through more amplifiers. As a "rule of thumb," each time the cascade of amplifiers is doubled, signal-to-noise becomes worse by 3.0 dB. This rule holds up well in actual system measurements and can be used to determine whether noise levels are approximately correct.

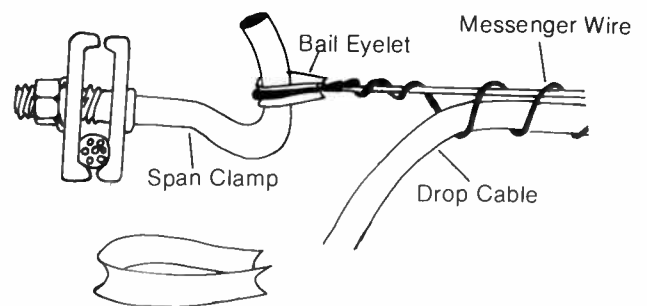
To get to your question, I feel that S/N measurements should be taken as often and at as many different points in your system as time and manpower will permit. This is a great preventive maintenance tool also.

**Q.** In one of your articles, you mentioned something called a "bail eyelet" which should be used on drop cable installations. I have found no other references to them. My questions are:

1. What are they?
2. How are they used?
3. Where can we get them?

**A.** First, the article in question said "may be used" not "should be used." They are an optional item and may or may not be of benefit to you in your particular system.

They are small metal eyelets such as might be used to form the loop on a cowboy's rope end. Their purpose on an install is to prevent the support wire on messengered drop cable from rubbing and wearing on a span clamp. In some areas, wear, corrosion and rust can weaken the messenger wire to the point where it breaks easily under ice loading and/or the vibration from high winds. A bail eyelet can help to prevent the wear. The figure below shows how a bail eyelet is used for drop cable installation.



**Figure 1**

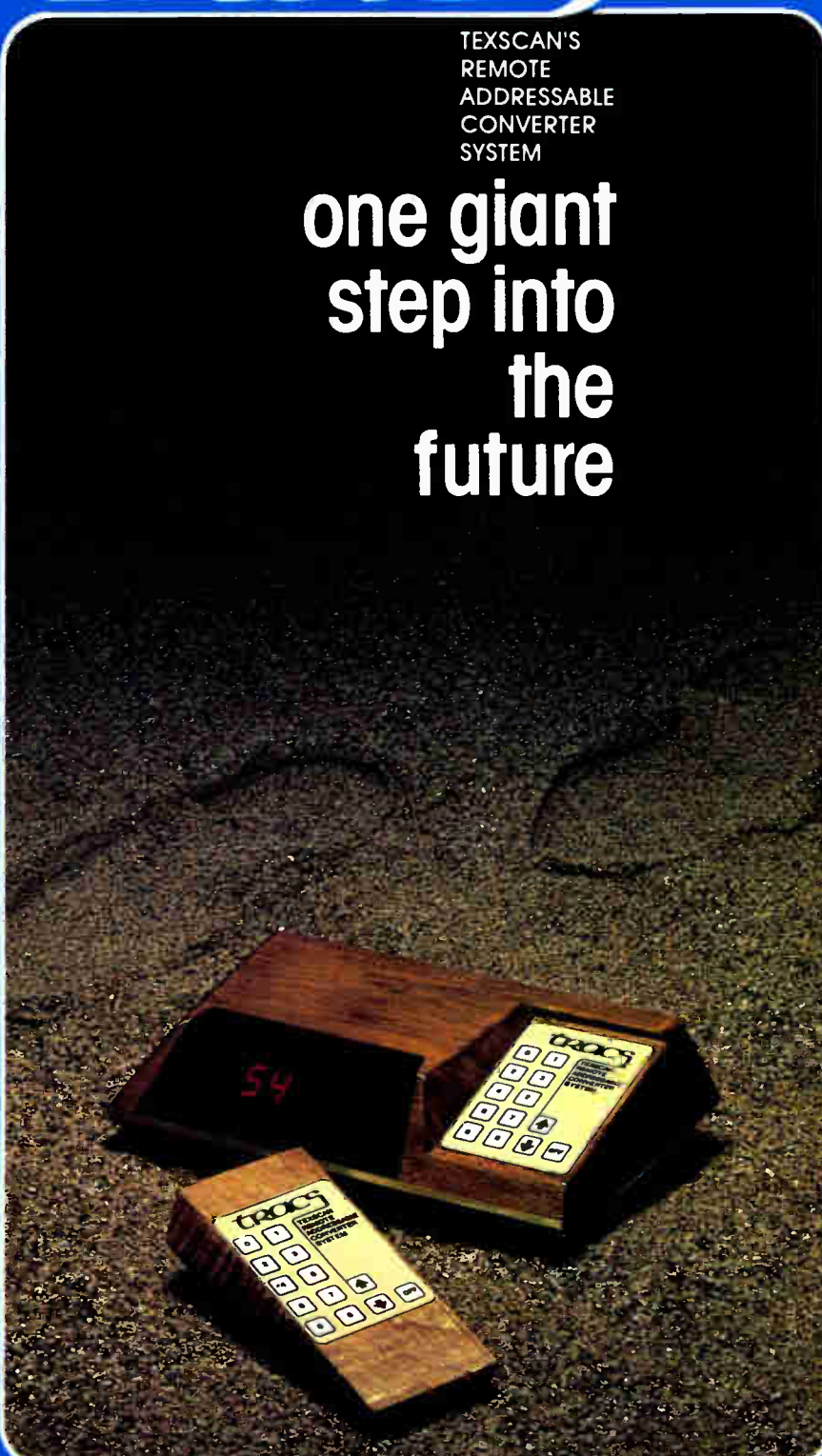
Bail eyelets may be purchased from almost any supplier who handles cable installation products. If used, I recommend buying the cheaper ones which are galvanized steel, rather than the ones made of brass.



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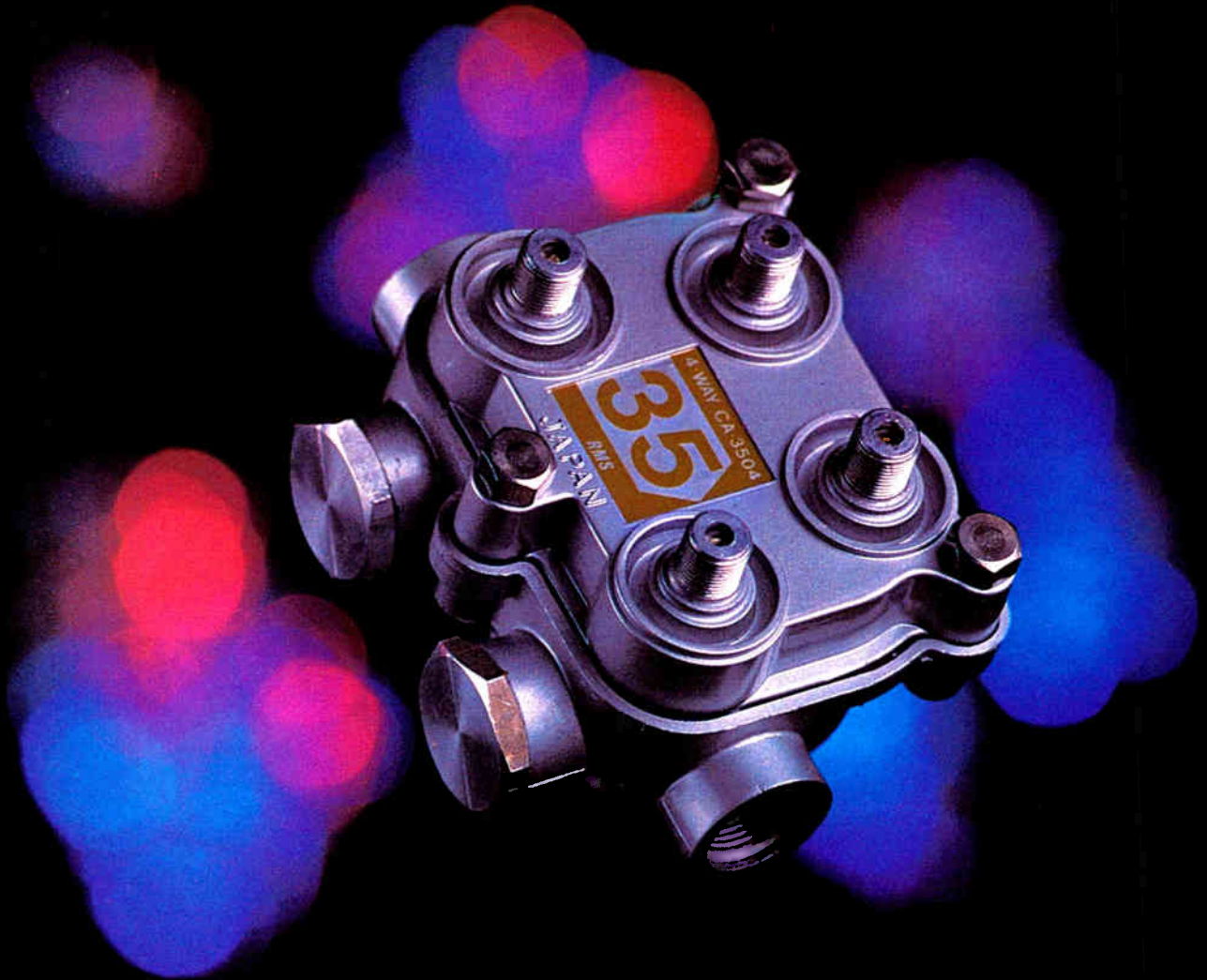
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## FAA Frequencies

Most people in cable television are aware that the Federal Communications Commission is really starting to check systems and to fine those who are found to be in violation of their rules. Most frequently cited for rules violations are those systems that are using frequencies which are, or could be, in conflict with those used by the Federal Aviation Administration for communications with and guidance of private, commercial and governmental aircraft.

Some people still feel that it is unlikely that the minute amount of RF signal power which might leak from a cable system could possibly affect the transmission or reception of signals in an airplane which is thousands of feet above the system. However, the FAA has stated that it is not only possible, but has actually been heard and measured. The FCC backs them up. We thought that some insight into how various aircraft radio and guidance systems perform might help to assure the doubters that it really is possible. Actually, it really does not matter whether you are a doubter or a believer. You must comply or be subject to a substantial fine if caught violating the rules.

Three important bands of frequencies are used to communicate with aircraft. Of particular interest to all cable systems is the band of frequencies from 74 through 76 MHz. These are in the guard band between Channels 4 and 5. Of interest to those systems which carry signals in the midband are the FAA frequencies between 108 and 136 MHz. This includes cable Channels A-2 through the video of Channel 3. A third band of FAA frequencies extends from 225 MHz upwards to well past 300 MHz. This takes in all the superband channels from just above the visual frequency of Channel K. If you have any cable signals on any of these frequencies and have not received approval from the FCC to use them, you had better hope that your system does not get checked.

One of the more crucial group of aircraft signals which may receive interference is called the Instrument Landing System (ILS). A complete ILS system consists of several different signals and frequencies. One of these systems consists of a series of marker beacons which use frequencies around 75 MHz to let an aircraft determine the correct speed and height to approach an airport runway. The outer markers are usually located

some four to eight miles from the end of the runway. Their small transmitters are amplitude modulated and have an output power of about 3.0 watts. This signal is fed into an antenna which directs the signal upwards in a cone shaped pattern. Pilots can tell their height above the marker by the width of the signal as the plane passes through the centerline. For instance, at 1,000 feet, a plane with an air speed of 185 miles per hour will pass through this outer marker in 8.9 seconds.

Other beacon marker transmitters are spaced between the outer marker and the runway. These are also designed to give a pilot specific information on his proximity to the runway. An interfering signal could cause the pilot to get false information and at the speeds required for landing large planes, there is not much room for error.

Another ILS signal is called the glide slope. This is a very narrow beam which is transmitted at an angle to help the pilot to descend at the correct angle. Transmitting within the frequency range of 330 to 335 MHz, this signal controls an indicator bar within the cockpit which tells the pilot to "fly up" or to "fly down" as required.

There is another ILS signal called a localizer which operates similarly to the glide slope but tells the pilot, through another indicator, to "fly right" or to "fly left" to be on the correct approach. These signals are transmitted in the 108 to 112 MHz band of frequencies and are paired with a glide slope channel.

Aircraft use a number of other systems such as the more traditional VHF Omnidirectional Radio (VOR) and Distance Measurement Equipment as well as direction finding equipment. Much of this equipment operates in the 108 to 118 MHz frequency range. Military aircraft use much of the same equipment in addition to precision radar and Ground Controlled Approach (GCA) procedures.

It should be obvious that if your system is using frequencies within the FAA spectrum and if the system has severe signal leakage, your system could cause interference to aircraft communications and guidance signals. I sincerely hope that there is no interference to the aircraft communications when you fly into one of the many cities that has cable television. Even more, I hope there is none when I fly there.

*Glenn Chambers*

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## France Conducts Videotex Test

PARIS, FRANCE—A large-scale public test of France's videotex technology is underway. In April, the first of 2,500 homes in the Paris suburb of Velizy were hooked up to computers which provide two-way communication with the database information and services of nearly 200 organizations. The trial will continue for approximately 18 months.

Known as Teletel, the French interactive system is based on the "gateway" concept, which permits users instant access to existing databases of "third party" organizations throughout the country. The organizations range from railroads and airlines to mail-order houses and even the Club Mediterranee.

One feature of the Velizy test is the inclusion of the new "smart card" technology, an advanced form of credit card containing a microchip with a 4,000-word memory. The combination with Teletel "will provide users with a more comprehensive interactive service than is currently available anywhere in the world," according to Roy Bright, head of Intelmatique, the promotional arm of France's national Telematique program.

Velizy residents in the test will be equipped with Teletel adapters for 2,100 color television sets and with 400 black and white terminals. Three hundred of the total 2,500 users also will be equipped with smart card facilities.

Among services available in the Velizy trial are: regular information retrieval, such as news reports, weather conditions, stock market prices, airline schedules, mail order catalogs; two-way transactions, such as "teleshopping" from home, making travel and hotel reservations, and banking transactions; an electronic "mailbox," permitting the sending, reception and storage of messages; home entertainment, providing access to a wide range of computer games; and calculations, making it possible to use the home television set in place of a home computer for expenses, income tax and other calculations.

## Argentina Awards Harris \$30 Million Satellite Contract

MELBOURNE, FLORIDA—Harris Corporation has won an international competition to design and install one of the world's largest domestic satellite communications systems in Argentina. The initial contract is valued at approximately \$30 million.

The company will deliver 38 earth stations to help extend television, radio, telex and telephone service to the remotest corners of 2,300-mile-long Argentina, which has an area about that of the U.S. east of the Mississippi.

The Harris Satellite Communications Division here will install part of the system this year and complete it in 1982. This is the company's first sale of a nationwide system in the growing South American market.

Twenty-four of the 38 Argentine earth stations will be located in small communities, ranging from the Andes in the northwest to Tierra del Fuego on the continent's southern tip. Three of them will be installed at Argentine bases in Antarctica.

Eight of the stations will link the remote satellite terminals to the existing microwave and coaxial cable network in the more-populated areas of Argentina. Two of them are designated "sub-master" stations, because they will provide electronic maintenance and control service for all the other stations in their regions.

The remaining earth stations will be transportable units on flatbed trailers. They can be dispatched at a moment's notice to disaster areas, or to cover remote sports or news events.

The Harris earth stations in the outlying regions are designed for unattended operation, requiring only a maintenance visit once a month. Each will have its own battery and diesel-generator power supply, which will switch on automatically if local electricity fails.

## Canada Launches Program For Rural Satellite Services

OTTAWA, ONTARIO—Canada's Department of Communications has launched a program of information and technical advice to help rural and remote communities wishing to receive a multi-channel package of Canadian satellite radio and television services authorized by the Canadian Radio/Television and Telecommunications Commission April 14.

For community distribution of these signals by means of television and radio transmitters or cable TV systems, a broadcasting license from the CRTC and a technical certificate from the department will be required. The CRTC has called for applications for local licenses from remote and underserved communities wishing to receive and distribute the new satellite program services.

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★ **Roger R. Turner** has been appointed vice president and director of operations for **Colony Communications, Inc.** Turner will be responsible for all day-to-day administrative and operations functions for the Providence, Rhode Island based MSO. He joins Colony from Park Broadcasting, Inc., Ithaca, New York, where he was vice president, radio. Turner's communications experience includes 28 years in management, sales, program management and on-air experience.

★ **United Cable Television of Colorado** has appointed **Ray Deveraux** construction and line maintenance manager in charge of systems under construction in Colorado. Deveraux has most recently served as northern metro engineering manager in suburban Denver for United. He has been with the company for 24 years.

The company also announced that **Rick Clevenger**, vice president for engineering in the Colorado subsidiary, has been named engineering manager for Colorado and three other major markets: Boise, Idaho; Tulsa, Oklahoma; and Connecticut.



*Ray Deveraux*

★ **Ken Yoshikawa** has joined Torrance-based **Satori Electric of America, Inc.**, as vice president sales and marketing for the U.S. Satori Electric of America is a new company that manufactures mechanical switches and markets liquid crystal displays and light emitting diodes. It is wholly owned by Satori Electric Corporation of Japan. Yoshikawa had

been product line manager for switching power supply components at TRW Power Semiconductors, Lawndale, California. He joined the company in 1973 and held a variety of sales and marketing positions.

★ **Comm/Scope**, the M/A-COM subsidiary, has named vice presidents.

**Bill Gooden** was named Comm/Scope's vice president of finance. He was controller of Comm/Scope while it was a subsidiary of Valtec Corporation and was later Valtec's corporate controller before its merger with M/A-COM last September.

**Greg Couch** was appointed vice president of human resources for Comm/Scope, which he joined back in 1976. He has been in charge of personnel administration for the last five years. Prior to that, Couch had served in various industrial relations and personnel positions at Superior Continental Corporation in Hickory, North Carolina.

**Joe Teague** was named vice president of sales administration. He has been associated with Comm/Scope and its antecedents for the past 21 years, first in manufacturing and later in sales. Most recently he had been Comm/Scope's director of marketing.



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General representative for Europe: Catec AG Luzern/Switzerland, Habsburgerstr 22. Tel. 041-23-90-56 Telex: TELFI 78168. In Canada: R.F. Communications



# Avantek's AR-1000 brings satellite CATV receiver costs down to earth.

## Get broadcast-quality picture plus savings of 20% or more.

With new satellite CATV transponders coming and more programming available, the cost of adding channels is a major consideration in selecting a receiver. Avantek has the answer in our new Simulchannel™ AR1000... the most advanced expandable multi-channel receiver available. You save more and more with every channel you add to the AR-1000.

## Use less space at your system's headend.

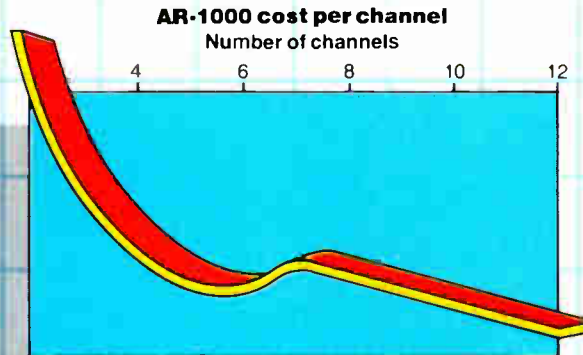
Imagine a six-channel receiver that fits into seven inches of a standard equipment rack, or twelve channels in just 14 inches. Compare that to bulky conventional receivers that eat

up many times as much expensive space.

## The secret is block downconversion to 1.2 GHz IF.

By combining the AR-1000 with Avantek's ACA-4220 LNA/downconverter at the antenna you can save the space

and cost of a separate down-converter for each receiver. By downconverting to the industry's new standard, centered on 1.2 GHz, you avoid interference from broadcast signals, while the 940-1440 MHz frequency range lets you use less expensive, more flexible cable.

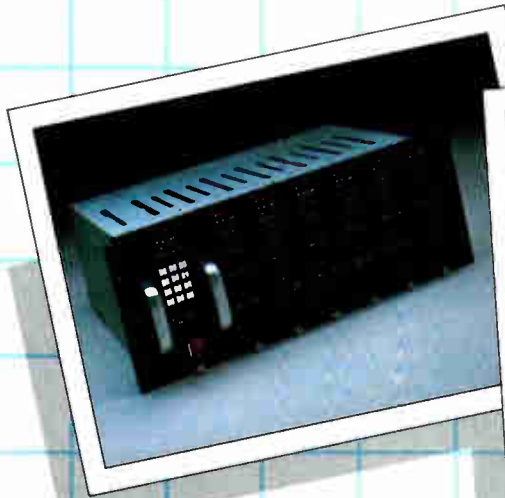


## Years of experience helped Avantek build the most advanced satellite receiver.

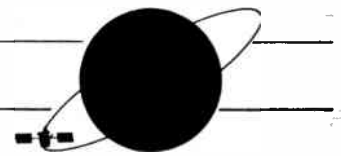
Avantek has supplied LNAs, oscillators, downconverters and test equipment to CATV businesses for more than ten years. During that time, we've made only the highest quality equipment. That's why the AR-1000 has features such as full digital tuning, threshold extension, automatic frequency control and 40 dB dynamic range.

## Learn how Avantek's AR-1000 can save you money and space.

Let us send you complete technical details. Then, ask us for a demonstration. We're sure you'll like what you see. Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95051, (408) 496-6710.



# Avantek



Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders	Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
<b>ARTS</b>		9:00 p.m./12:00 a.m.		F1.#1	<b>Nickelodeon</b>		8:00 a.m./9:00 p.m.	311*/# (E,C,M) 519*/# (P)	F1.#1
<b>ACSN</b>	Mon., Wed., Fri. Tues., Thurs. Weekends:	7:00 a.m.-5:00 p.m. 7:00 a.m.-7:00 p.m. 7:00 a.m./noon	192*/#	F1.#16	<b>PTL</b>		24 hrs	None	F1.#2
<b>AETN</b>	Mon.-Sat.: Sunday:	4:00 p.m./7:00 p.m. 4:00 p.m./6:00 p.m.		F1.#16	<b>Private Screenings</b>		Fri.-Sat.: 12:00 a.m./3:00 a.m.		Westar III.#7
<b>BET</b>		11:00 p.m./2:00 a.m.	018*/#	F1.#9	<b>Reuters</b>	Weekdays	4:00 a.m./7:00 p.m.	None	F1.#18
<b>Bravo</b>		8:00 p.m./6:00 a.m.		Comstar D-2.#3H	<b>SIN</b>		24 hrs	None	Westar III. #8
<b>Cabletext</b>		24 hrs	None	F1. #6 Vertical Blanking	<b>Showtime</b>	July 1 July 2 July 3	3:00 p.m. 3:30 p.m. 3:30 p.m.	2:45 a.m. 3:13 a.m.	Program 576*/# Scramble
<b>CBN</b>		24 hrs	None	F1.#8					(starts 24-hour service)
<b>Cinemax</b>		24 hours	None	F1.#20/23	<b>SPN</b>		24 hrs		Westar III, #9
<b>CNN</b>		24 hrs	None	F1. #14	<b>Trinity (KTBN)</b>		24 hrs		Comstar D-2, #9V
<b>C-SPAN</b>	Weekdays: Saturday:	9:30 a.m./6:00 p.m. Noon/5:00 p.m.		F1.#9	<b>USA Network</b>				F1.#9
<b>ESPN</b>		24 hrs.	None	F1.#7	Off-times are listed below. For on-times, see notes below.				
<b>Escapade</b>		8:00 p.m./6:00 a.m.		Comstar D-2.#4V	July 1	2:30 a.m.	July 17	4:00 a.m.	
<b>GalaVision</b>				F1.#18	July 2	3:30 a.m.	July 18	3:00 a.m.	
<b>HBO</b>	July 1 July 2 July 3 July 4 July 5 July 6 July 7 July 8 July 9 July 10 July 11 July 12 July 13 July 14 July 15 July 16 July 17 July 18 July 19 July 20 July 21 July 22 July 23 July 24 July 25 July 26 July 27 July 28 July 29 July 30 July 31	5:30 p.m. 5:00 p.m. 3:30 p.m. 3:00 p.m. 3:00 p.m. 5:30 p.m. 5:00 p.m. 5:30 p.m. 5:30 p.m. 5:30 p.m. 3:30 p.m. 3:30 p.m. 5:00 p.m. 5:00 p.m. 5:30 p.m. 5:30 p.m. 5:00 p.m. 2:30 p.m. 3:00 p.m. 5:00 p.m. 5:30 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m. 5:00 p.m.	2:49 a.m. 3:38 a.m. 4:00 a.m. 3:43 a.m. 2:30 a.m. 2:37 a.m. 3:23 a.m. 2:50 a.m. 2:08 a.m. 3:38 a.m. 3:19 a.m. 1:51 a.m. 2:53 a.m. 2:25 a.m. 12:57 a.m. 2:37 a.m. 4:13 a.m. 3:30 a.m. 2:30 a.m. 2:07 a.m. 3:01 a.m. 2:00 a.m. 2:28 a.m. 3:09 a.m. 4:15 a.m. 2:24 a.m. 2:40 a.m. 2:25 a.m. 3:39 a.m. 3:30 a.m. 3:35 a.m.	Program 729*/# Scramble 835*/# Duplication 940*/# Take-2 E 592*/# Take 2 W 681*/#	F1.#24 F1.#22 F1.#23 F1.#20	July 17 July 18 July 19 July 20 July 21 July 22 July 23 July 24 July 25 July 26 July 27 July 28 July 29 July 30 July 31	4:00 a.m. 3:00 a.m. 3:00 a.m. 2:30 a.m. 3:00 a.m. 1:30 a.m. 2:00 a.m. 4:00 a.m. 3:00 a.m. 4:00 a.m. 3:30 a.m. 2:00 a.m. 3:00 a.m. 1:30 a.m. 6:00 a.m.		
<b>HTN</b>		7:00 p.m./2:00 p.m.	517*/#	Westar III, #7 (E,C,M) F1. #21 (P)	<b>WGN</b>		24 hrs.		
<b>Lifestyle</b>		24 hours	None	F1.#3	<b>WOR</b>		24 hrs	None	F1.#17
<b>The Movie Channel</b>		24 hrs	None	F1.#5 (E,C) F1.#11 (M,P)	<b>WTBS</b>		24 hrs.	None	F1. #6
<b>Modern Satellite Network</b>		Weekdays: noon/5:00 p.m. Weekends: 8:00 a.m./1:00 p.m.	243*/#	F1.#22	<b>Women's Channel</b>		24 hrs.	None	F1.#6 Subcarrier
<b>National Christian Network</b>		6:00 a.m./8:00 p.m.	073*/#	Comstar D-2, #4V					
<b>National Jewish Network</b>		Sunday: Noon/4:00 p.m.		F1.#16					

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

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



**NEW**

# ADVANCE TRAPS By Eagle

**We've created a new generation of Super Traps for Multi Pay-TV Security.**

**Advanced technology for super band applications.** Until now, CATV state-of-the-art limited the use of traps to low and midband frequencies.

Now, due to a **technological breakthrough**, Eagle's New 5-Pole Advance Traps can be used at higher frequencies including **high band and super band**...all the frequency requirements you'll need for the foreseeable future.

**No Video Degradation- Minimal Audio Degradation On Adjacent Channels.**

Advance Traps are designed for use with adjacent channels with little or no affect on the audio or video performance of adjacent channels. Clearly, your subscribers will receive exactly what they pay for.

**Traps...Still the most reliable, flexible, and economical method to secure Multi Pay-TV Channels.**

Traps from Eagle are time proven. And the more subscribers you add, the lower your investment.

With Advance Traps, you are assured of traditional Eagle quality. Our traps are **completely potted to prevent absorption**, are stable over wide temperature ranges (-40° to +140°F) and our machined and interlocked housing is stronger than standard traps with welded or soldered cases.

Advanced Traps from Eagle, we've created a new generation just when you need it.

For complete Advance Trap and Tier Filter specifications, call or write for our new security filter brochure.

### Specifications-5-Pole Single Channel Traps

Model #	Rejection Depth	Lower Video	Lower Adj. Sound	Upper Adj. Video
5-NF 2-6, low band	-75db	.5db	-4db	-.5db
5-NF A-F, mid band	-75db	1.0db	-5db	-1db
5-NF G-I, mid band	-75db	1.5db	-6db	-1db
5-NF 7-13, high band	-75db	2.0db	-10db	-2db
5-NF J-W, super band	-70db	3.0db	-15db	-3db



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## NOTE:

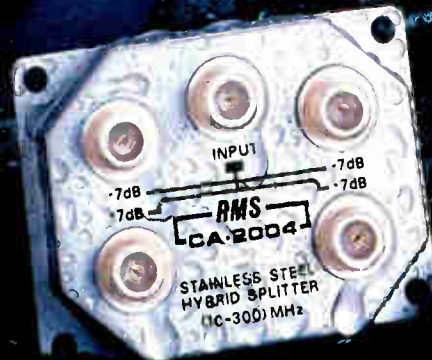
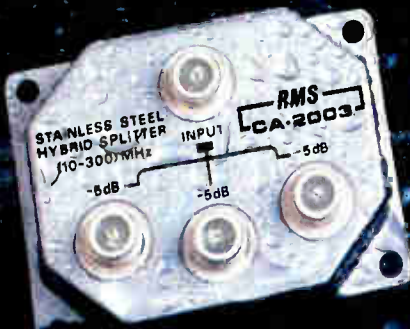
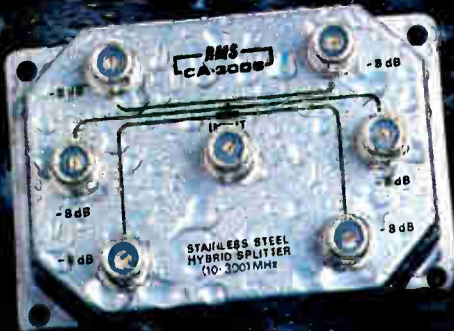
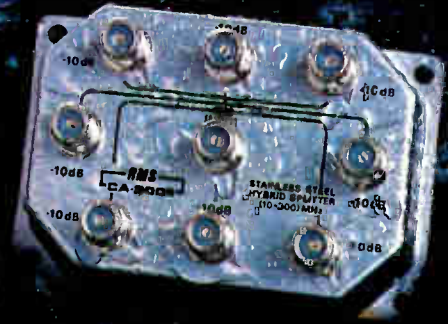
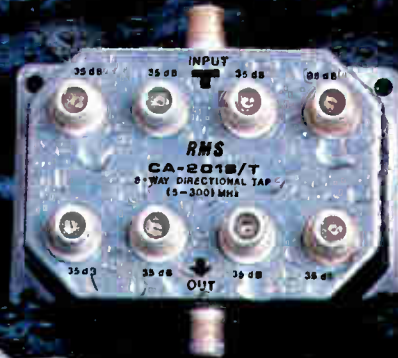
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