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Product Profile:  
**Converters**

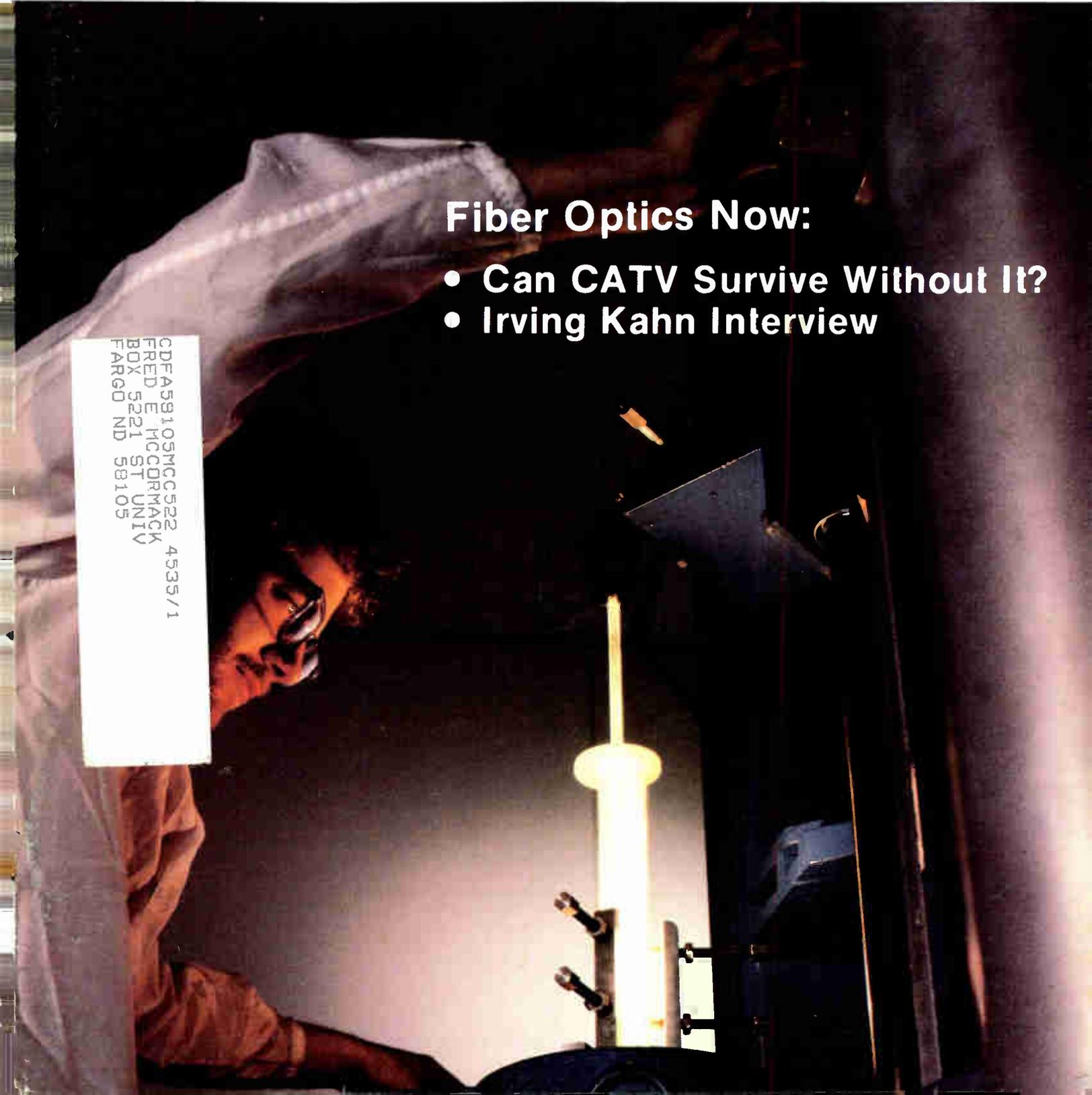
Communications Engineering Digest/The Magazine of Broadband Technology

September 1981

## Fiber Optics Now:

- Can CATV Survive Without It?
- Irving Kahn Interview

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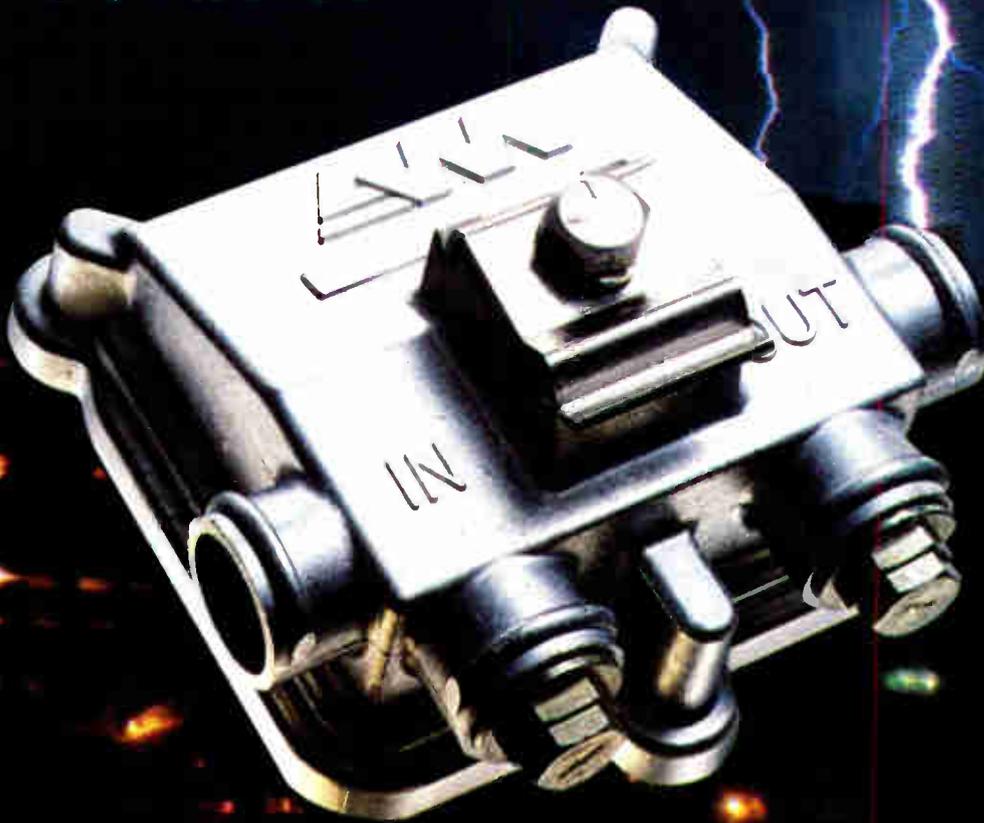
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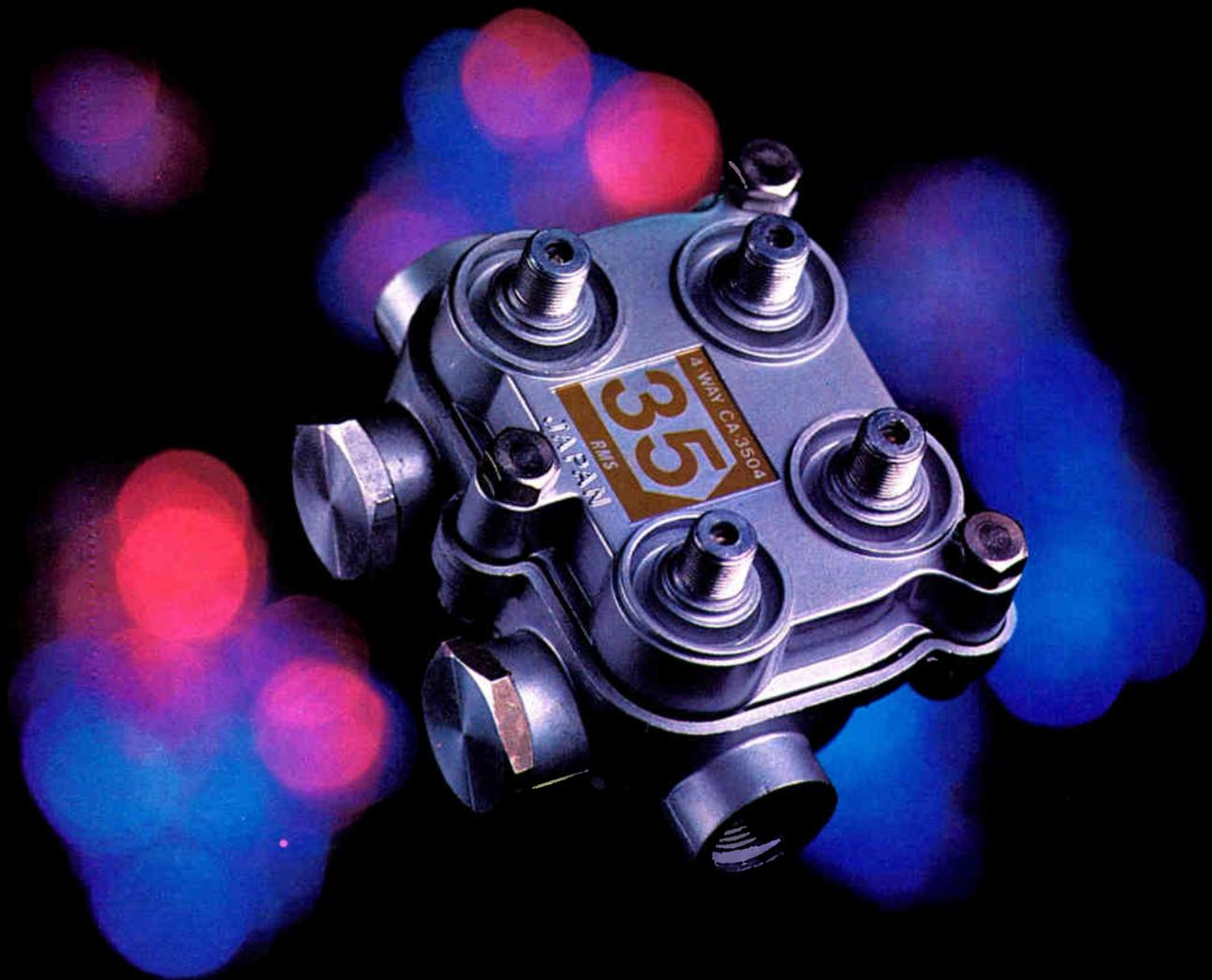
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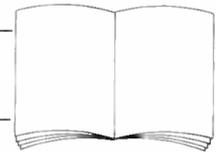
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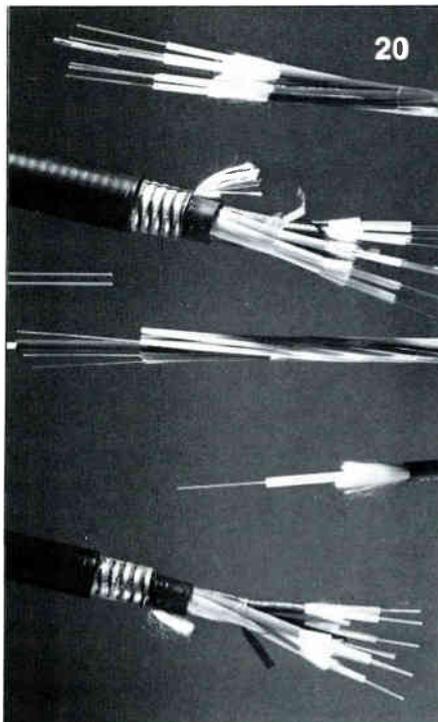
**CED** discusses whether CATV hardware will be able to deliver what the programming side of the industry can offer.

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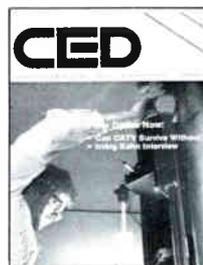


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This new department features a comprehensive guide to converters on today's market.

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### About the Cover

A hair-thin strand of optical glass fiber begins its 100-foot-per-minute descent from the top of a 21-foot high drawing tower at Times Fiber Communications, Inc., plant at Wallingford, Connecticut. The two-mile-long strand of optical fiber is drawn from a 20-inch glass billet heated to 2,000°C in the furnace while a technician monitors. Photo supplied by Times Fiber Communications, Inc.

### International News 48

An international study group will investigate state-of-the-art fiber optics in Japan.

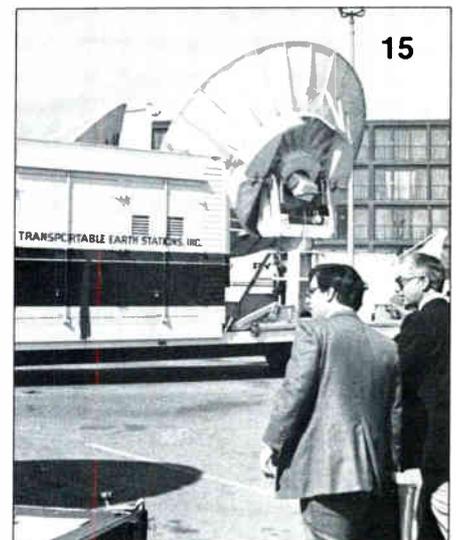
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## SEPTEMBER

**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 Embarcadero in San Francisco, California. Contact the firm at (617) 739-2022.

**8:** A meeting of the **Southern California Cable Club** will be held at the Pacifica Hotel in Los Angeles. Contact Bruce Kaufman, (213) 278-5644.

**9:** The **Appalachian Mid-Atlantic Group** is holding a meeting on "Satellite Technology: Reception Processing" at the Embers Quality Court Inn, Carlisle, Pennsylvania. Contact Lee Burkholder, (717) 263-8591.

**9-11:** A conference on "Cable Television: An Advertising and Marketing Tool," sponsored by the **University of Wisconsin Extension**, will be held at the Concourse Hotel in Madison, Wisconsin. Contact Barry Orton, (608) 262-2394.

**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.

**14-15:** The **Society of Cable Television Engineers** is holding a seminar on "System Test Requirements" at the Hyatt Airport Hotel in Los Angeles. Contact the SCTE, (202) 293-7841.

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

**15-17:** The **American Newspapers Publishers Association** is holding a seminar on "Electronic Publishing" at the Fairmont Hotel in Dallas, Texas. Contact ANPA, (703) 620-9500.

**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.

**18-20:** The city of **St. Louis**, Missouri, is holding an area cable exposition at the Cervantes Convention Center. Contact Peggy Baker, (314) 725-6783.

**21:** A meeting of the **Dallas Cable Club** will be held at the Hilton Inn, Dallas, Texas. Contact Buzz Hassett, (214) 421-1421

**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:** The **International Radio and Television Society** "Newsmaker Luncheon," with FCC Chairman Mark Fowler as speaker, will be held at the Waldorf-Astoria Hotel in New York City. Contact IRTS, (212) 867-6650.

**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.

**25-27: Catel-Expo**, the CATV exposition arm of Crimpers Promotions, Inc., will sponsor "Programming Sources '81," a programming exposition and conference, at the Las Vegas Hilton Convention Center. Contact Don Mittman, (516) 543-6189.

**27-29:** The **Pacific Northwest Cable Communications Association** is holding its 26th annual meeting at the Spokane Sheraton in Spokane, Washington. Contact Bill Thompson, (509) 337-6532.

**28-30:** The **Minnesota Cable Communications Association's**

annual convention will be held at the Radisson South, Minneapolis, Minnesota. Contact Dick Joyce, (612) 888-3939.

**29-October 1: COMSEC '81**, the International Communications Security Conference and Exposition at Chicago's Hyatt Regency O'Hare. Contact Michael A. O'Bryant, (617) 739-2022.

**30:** The **Iowa Cable Television Association** will hold its annual convention at the Marriott Hotel in Des Moines, Iowa. Contact Neil Webster, (319) 252-1343.

**30-October 2:** The **Mid-America Cable Television Association** is holding its 24th annual meeting and show at the Exhibition Hall and Municipal Auditorium in Kansas City, Missouri. Contact Rob Marshall, (913) 887-6119.

## OCTOBER

**3-4:** To demonstrate cable TV's potential, the **Milwaukee Cable TV Expo '81** will be held at the Milwaukee Exposition Convention Center and Arena, Milwaukee, Wisconsin. Contact Robert F. Seefeld, (414) 271-4000.

**4-6:** The **National Cable Television Association** and the **Cable Television Administration and Marketing Society** are co-sponsoring the National Software Symposium and Exposition at the New Orleans Hyatt in New Orleans, Louisiana. Contact Char Beales, (202) 775-3629.

**4-6:** The fall convention of the **Kentucky CATV Association** will be held at the Executive Inn, Owensboro, Kentucky. Contact Patsy Judd, (502) 864-5352.

**21-23:** The **New Mexico Cable Television Association** annual convention will be held at the Hilton Inn, Albuquerque, New Mexico. Contact Oscar Davis, (505) 538-3701.

**22-23: Kessler Marketing Intelligence** is sponsoring the fourth "Newport Conference on Fiberoptic Markets" to be held at the Sheraton-Islander Inn, Newport, Rhode Island. Contact KMI, (401) 849-6771.

**25-27:** The annual convention of the **New Jersey Cable Television Association** will be held at the Meadowlands Hilton, Secaucus, New Jersey. Contact Diane Quinton, (609) 392-3223.

## NOVEMBER

**1-4: Scientific-Atlanta, Inc.**, will hold its seventh annual satellite communications symposium at the Hilton Hotel in Atlanta, Georgia. Contact Ray Stuart, (404) 441-4000.

**3-6:** The **Pennsylvania Cable Television Association** will hold its annual convention at the Pocono Hershey Resort. Contact the association at (717) 234-2190.

**4-6: EFOC '81**, the 2nd European Fiber Optics and Communications Exposition will be held in Cologne, West Germany. Contact Michael O'Bryant at Information Gatekeepers, (617) 739-2022.

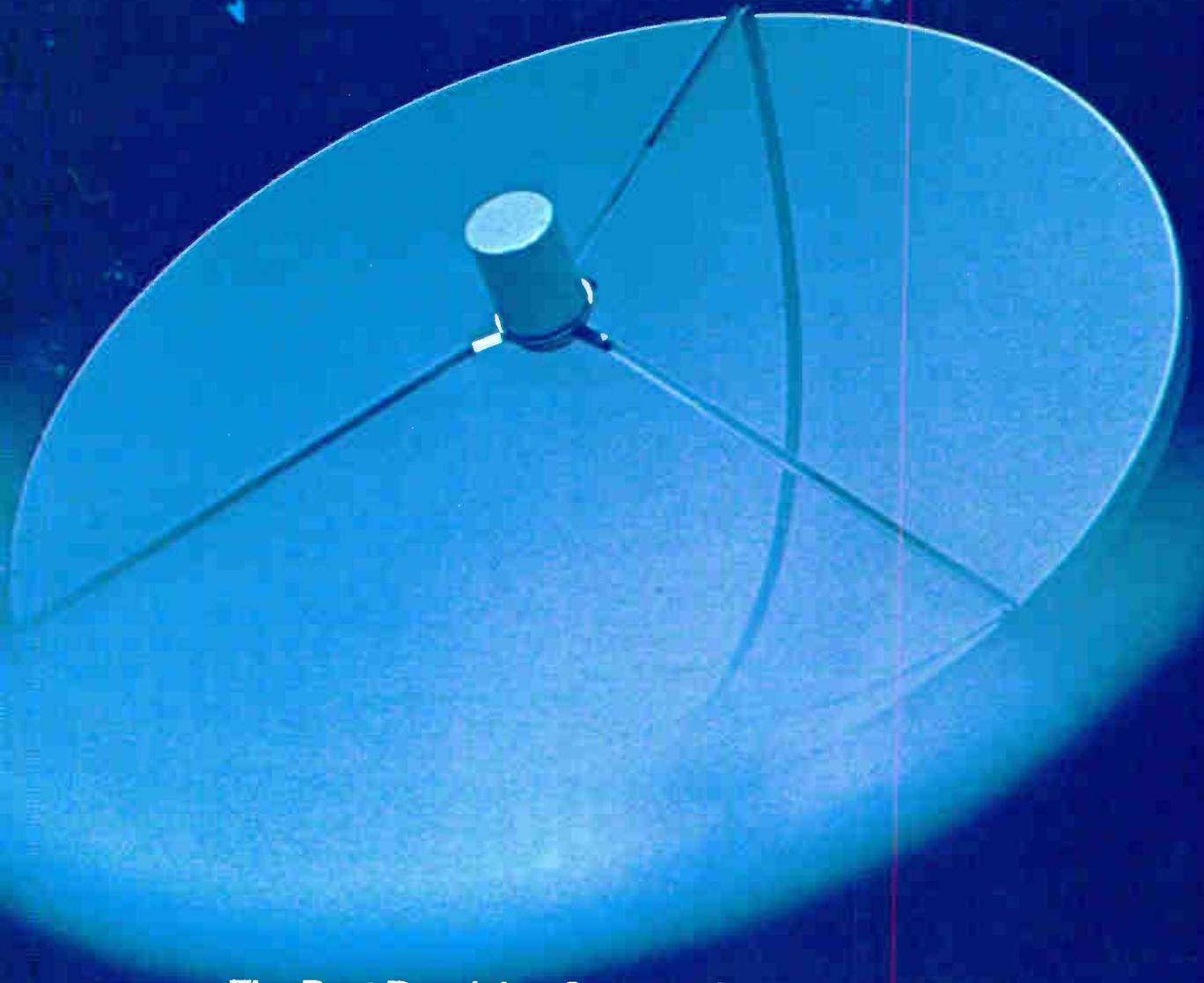
**5-6: TeleStrategies, Inc.**, is holding a seminar on "Telecommunications Technologies, Opportunities and Strategies for Senior Management" at the Twin Bridges Marriott, Washington, D.C. Contact TeleStrategies, (703) 734-7050.

**8-10:** The Arts/Cable Exchange, sponsored by **University Community Video**, will explore the future of cultural programming on cable in Minneapolis, Minnesota. Contact Pat Brenna, (612) 376-3333.

## DECEMBER

**2-4:** The **California Cable Television Association's** annual convention, the Western Show, will be held at the Anaheim Convention Center in Anaheim, California. Contact the association, (415) 881-0211.

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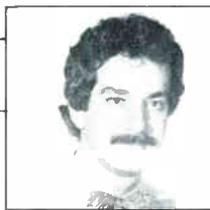
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## The Hardware Must Keep Ahead of the Software

Every week the pages of our sister publication, *CableVision*, are awash with news of new pay services, national networks, mergers and multi-million dollar deals being consummated that presage a dynamic, competitive national programming scene. Financiers are bullish on cable and programming services are busting out all over.

The amount of dollars invested in the programming and services side is truly intoxicating. Whether these services can survive will depend, to a great extent, on the ability of subscribers to utilize them assuming consumer demand is there.

If the demand is there, and we have every reason to believe it will be, will the cable television industry be technically prepared to provide all these goods and services now coming on-line? The number of primitive 12 channel systems out there in the provinces remains high, around 60 percent. Will mandated forced rebuilds be the outcome? While the government has stated it will not get involved in forced rebuilds, the government has been known to reverse itself on policy in the past. Will the quality and capabilities of the technical infrastructure of the industry serve to generate or retard the future revenues of the major multi-million dollar programming services? Can the cable TV industry in its totality shoulder the high risk of failure of several multi-million dollar projects? None have failed yet, of course, but can the market remain bullish generally, when two or three, or even one major project fails?

We are in an exciting and dynamic industry. Franchise battles are being fought across the country. Boston has been decided and there remain 15 major urban franchises to go including the biggies, Chicago, Philadelphia and New York's unwired boroughs. When all the battles are fought and won, it will be the system's technical capabilities that will determine the future of cable TV.

We must campaign for the technical upgrading of existing cable systems. We must urge that new-builds and rebuilds go in with the most sophisticated state-of-the-art hardware. We must urge that the best advice be given to management by engineers and technical personnel. This requires that we campaign for the continuous rethinking and up-grading of the technical knowledge base of engineers and technicians.

Prodding the industry is not enough without also seeking to contribute to filling the need for technical information. Our mission is to provide a context for the dissemination of technical information and the collective wisdom, gained through practical hands-on experience or exhaustive laboratory investigation, of the cable engineering community.

In this month's issue, we focus on one of the technologies, fiber optics and lightwave transmission, that seems to offer great promise as the best way to capture the future advances that the market will require. Also with this issue we introduce a new department, "Product Profile," in which we present comprehensive information, every month, on equipment currently or soon to be on the market. This month we feature set-top converters and terminals.

On another not wholly unrelated note, **CED** joins **CableVision** at the editorial offices of Titsch Publishing, Inc., in New York City and it will be my distinct pleasure to serve as editor of **CED** out of the New York bureau, drawing upon the considerable talents and skills of the journalists here and at our other bureaus. Looking forward to being of service to you.

*George Sell*

# CED

Volume 7, No. 9

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## Satellites



### RCA Seeks Launch Permission For Satcom V

WASHINGTON, D.C.—RCA Americom has applied for permission to launch a fifth in-orbit satellite, expected to be operational by November 1983. Although the common carrier has a backlog of more than 150 customers clamoring to get aboard a cable bird, the proposed Satcom V is not designed to serve cable clients.

"It probably will have a combination of all forms of communications including data, message and some television, but I doubt if you would see any cable on it at all," said Bill Kopacka, manager of CATV sales for RCA.

On December 4, 1980, the Federal Communications Commission granted RCA authority to construct six satellites. Permission to launch four of the birds was granted; another one will serve as a ground spare; and permission to launch the fifth in-orbit satellite was deferred pending proof of "immediately foreseeable customer needs." According to the RCA filing, there are now sufficient customer orders in all areas of communications to justify filing a fifth in-orbit bird.

The proposed domestic satellite system would allow RCA to serve four business markets: video/audio services, commercial communications services, government communications services, and Alascom services. Each of the birds will have 24 transponders. Satcom III-R (131° W. Longitude) will be the prime cable satellite, housing the 23 cable customers that are now on Satcom I. Satcom IV (83° W.L.) will be the geosynchronous perch for 22 more cable clients, beginning with the eight existing services that are now on Comstar D-2, the satellite partially leased from AT&T when the original Satcom III was lost in space.

The majority of RCA's commercial and government service channels will emanate from Satcom I-R (139° W.L.), the replacement for Satcom I, which is scheduled for launch in October 1982. Satcom II-R (143° W.L.), the replacement for Satcom II, which will be sent into orbit in March 1983, will be basically used by Alascom, Inc., for services within Alaska and between Alaska and the balance of the continental United States.

The newly proposed satellite, Satcom V, would fit into the domestic satellite scheme at 66° W.L. Two transponders have been specifically suggested for government services; the rest could have a variety of uses.

One of the largest problems facing RCA is the development of a method of allocating its satellite transponders. Already this year, the FCC has rejected RCA's proposed two-for-one allocation plan for Cable Net II customers (those on Comstar D-2), as well as a proposed restructuring of its present tariff. A possibility is that RCA will sell the rights to a transponder outright, the so-called "condominium approach." Hughes Communications has already asked the FCC to approve such a plan for its Galaxy satellite. RCA could follow suit.

"Our feeling is that if it's approved for the other guys, it could be approved for us, too," Kopacka said.

However, RCA has not determined what its next approach will be.

"There is no plan at this point in time," Kopacka said. "We're looking into it and I think we'll have an answer within a month."

### Satellite Users Await Future

DENVER, COLORADO—The parking lot of the Regency Hotel here was transformed into a supermarket for earth stations as the Third Annual Satellite Communications Users Conference got underway August 19. Irl Marshall, associate publisher of *Satellite Communications*, said the final conference tally was 700 to 800 registrants, 600 exhibitors and 100 speakers.

The attendees came to view the exhibits of 80 companies and to sit in on 32 panel discussions. The sessions

ranged from DBS (see "Satellites and Carriers," page 47) to techniques for installing earth stations.

Anthony Chiaviello, managing editor of *Satellite News*, attributed the success of the conference to the growing number of businesses that are interested in utilizing satellite communications, particularly banks and insurance companies. Approximately 25 percent of the conference dealt with cable television, according to Chiaviello.

The keynote speaker at the opening luncheon August 19 was Emanuel Fthenakis, chairman of American Satellite Company. Fthenakis warned that growing restrictions by foreign governments are threatening worldwide growth of telecommunications. He cited two examples: the efforts by Third World countries working through UNESCO to establish a "new world information order" that would put controls on information transfer of scientific, business and other data via communications media; and artificial barriers that do not permit fast and efficient communications links via satellite between South and North America.

Fthenakis has highly critical of efforts by the Third World to establish, through international regulations, "inspection gates" that would enable Third World nations monitor satellite transmissions and levy fees for satellite positions over their space territory.

On the optimistic side, Fthenakis predicted that by 1990 communications will be a \$100 billion business in the United States.



Earth stations on display at the Third Annual Satellite Communications Users Conference ranged from transportable earth stations to multi-satellite antennas.

## News

### Warner Amex Plans Dallas QUBE Headquarters

NEW YORK, NEW YORK—Warner Amex Cable Communications, Inc., has announced plans to develop its QUBE Cable Communications Center in Dallas, Texas. The facility will become the company's headquarters for the QUBE service and the master programming facility for the Dallas cable system now under construction. It will house executive offices, customer service headquarters, a complete systems complex, master control facilities, editing stations and a tape library. A separate adjoining building will contain a full production studio. Warner Amex will initiate QUBE service to its first customers in Dallas' downtown area early next year.

### FCC Proposes 200 MHz For Digital Terminations

WASHINGTON, D.C.—The Federal Communications Commission has proposed reallocating 200 MHz for digital termination systems which could be used in the provision of electronic information service, a radio version of cable television's local loop concept. Earlier this year, the

Commission authorized frequencies for such use by common carriers, but this latest proposal would open the use of data communications technology to private concerns as well. At the same time, the FCC also accepted for filing the first application from a common carrier for digital electronic message service. ISA Communications, an Atlanta-based resale common carrier owned by Insurance System of America, the Wausau Insurance Companies and the American General Corporation, anticipates completion of a 30-city network by 1985. ISA is currently offering high speed digital service through the Satellite Business Systems network.

## Business Notes



★ **Comsearch, Inc.**, has broken ground for its new office and laboratory facilities in Reston, Virginia. The building will contain 10,000 square feet and will have a shielded enclosure for radiation susceptibility measurements. Construction of the two-story structure is expected to be completed in early 1982. Comsearch is a frequency coordination company providing services for satellite earth stations and point-to-point microwave systems.

★ More than 75 miles of 3/4-inch and 1/2-inch Lumifoam III coaxial cable manufactured by **Times Wire & Cable** is being used to rebuild twin systems operated by United Cable TV of Illinois Valley, Inc., in Peru and Mendota, Illinois. The system, founded in 1951, has 14,000 subscribers. It is being upgraded from 212 MHz to 300 MHz and will be compatible with a similar rebuilt stage completed two years ago. It will expand from 12 channels to 28—including HBO, Escapade and Cinemax.

★ **TOCOM, Inc.**, has concluded an agreement with Dow Jones & Company that will make possible widespread use of cable television for the delivery of Home Information Retrieval Services. Under the agreement, TOCOM will produce 2,000 home interface terminals that will enable Dow Jones to utilize two-way cable, in addition to telephone lines, in providing its new retrieval service to subscribers. Agreements have been worked out with the following cable systems: Bergen County, New Jersey; Clearwater, Florida; Pasadena, California; Lakewood, Colorado; Fort Worth, Texas; and St. Louis County, Missouri. The agreement to offer cable service in these areas followed initial field testing of the equipment in the Dallas planned community of Las Colinas and implementation of the system in the Park Cities area of Dallas.

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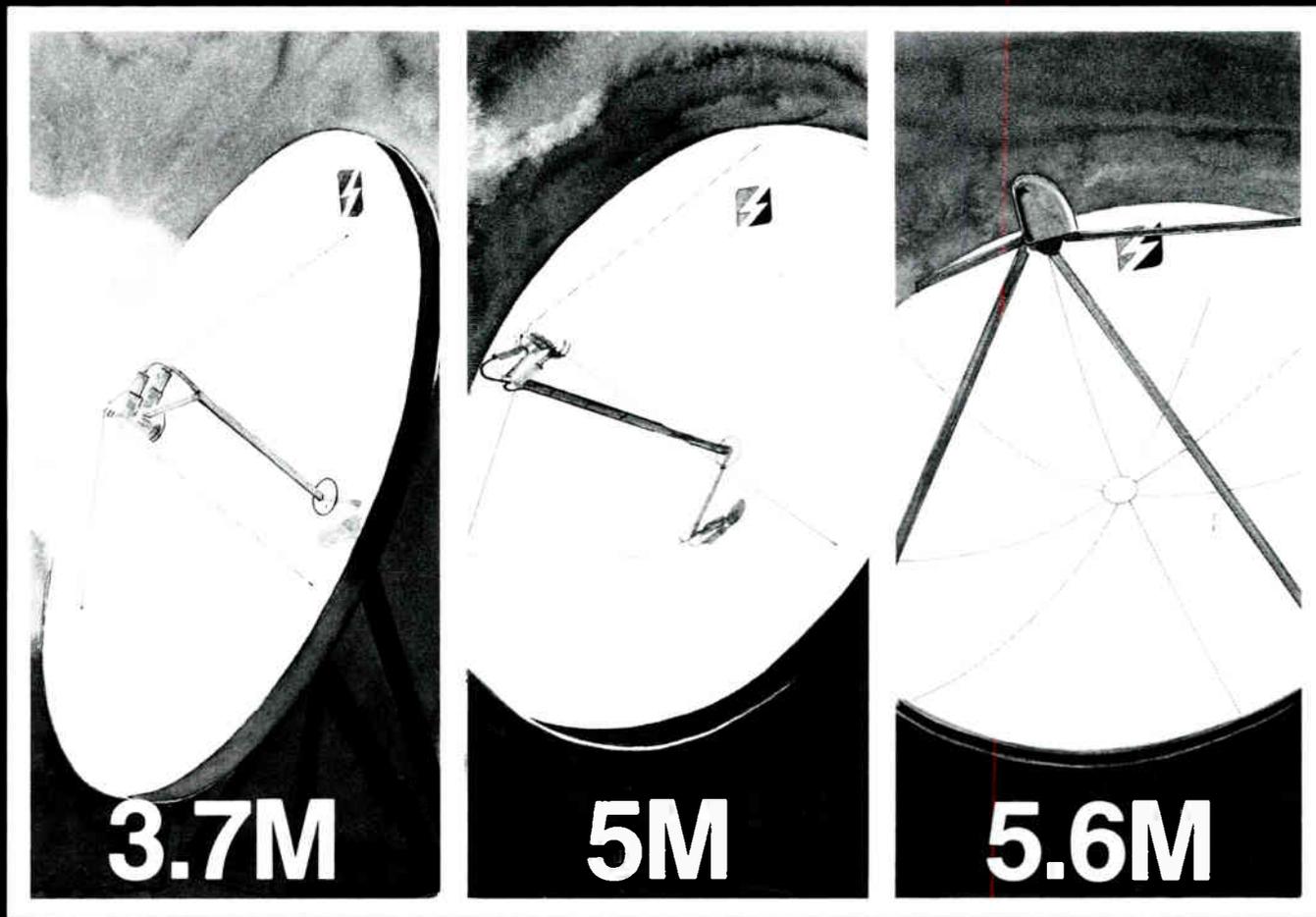
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# Can Fiber Optics Compete With Coax On Coax's Turf?

By George Sell, editor.

**W**hile fiber optics and laser approaches have found myriad applications in military, telephone and computer systems, the CATV industry has been slow to respond. Many factors contribute to this, including economic, psychological and technical reasons. But it is rapidly becoming economically unreasonable to resist building with fiber optics. There is mounting pressure to upgrade systems significantly and fiber optics clearly is the wave of the future, technologically. Copper prices continue to escalate while fiber is made from abundant sand and the processing costs are quickly falling. Extending the distance of unrepeatable lines means a reduction in electronics and their in-field maintenance. The high bandwidth of fiber optics means radically increased message-carrying capacity and that means nearly unlimited future add-ons, such as interactive services, subscriber-computer interfacing and videotext and teletext opportunities.

But change is resisted in a conservative industry contented with its assured profits. Promises of a future "blue sky" fall on skeptical ears. Engineers and technicians, schooled in hands-on coax experience, will shy away from technology that has been sold to them as high-tech, physics-intensive razzle-dazzle.

However, in a fascinating recent book by Princeton physicist Gerard K. O'Neill, titled *2081: A Hopeful View of the Human Future*, in which the author takes 1981 'known' technologies and projects them into the future 100 years and describes what life will be like, places heavy emphasis on communications as a great "driver of change." What figures most dramatically in O'Neill's 21st century communications is video applications of satellite and fiber optic systems.

## Laser Revolution

The interest in lightwave communications dates from the first demonstration of the LASER (Light Amplification by Stimulated Emission of Radiation) in 1960. Bell Telephone Laboratories had been toying with the idea of optical transmission since 1945 and with the laser they found an answer. It was with the wedding of lasers and glass fiber waveguides in the 1970s that fiber optics caught everyone's imagination.

Essentially, a laser is a sandwiching of layers of semiconducting crystals that convert electrical current into a nearly monochromatic coherent light beam. When butted against a highly purified glass fiber thread, the light emitted travels into the fiber and is contained by the internal reflecting nature of the glass fiber not unlike a mirrored tunnel. The intense light beam travels the length of the fiber to a photocenter, another semiconducting element, that converts the photons of light into electrons of current.

Lasers, today, have reached a high level of efficiency. For example, General Optronics mass produces lasers with a monochromatic output that produces a highly linear pulse and an emitting area of only 1.3 microns. This laser comes pigtailed with a standard 50 micron core fiber that is butted to the laser, contacting a minimum of 50 percent of the laser's front facet optical output. General Optronics warrants the life of this laser to be at least 10,000 hours of continuous or intermittent use.

The state-of-the-art of optical fiber production is even more impressive. Times Fiber Communications mass produces CATV fiber optic cable at its \$2 million, 20,000-square-foot facility in Connecticut, using a 21-foot vibration-isolated drawing tower. The 5.0 mil glass thread is drawn from a preform billet heated to 2,000° C and positioned by two

orthogonally-oriented laser-controlled position sensors that align the fiber to within one-thousandth of an inch for a concentric coating of silicone resin. This graded index fiber is then jacketed in polyurethane and wound into various cable types, an example being a two-fiber cable with an over all diameter of 0.4 inches with a maximum pull strength of 250 lbs.

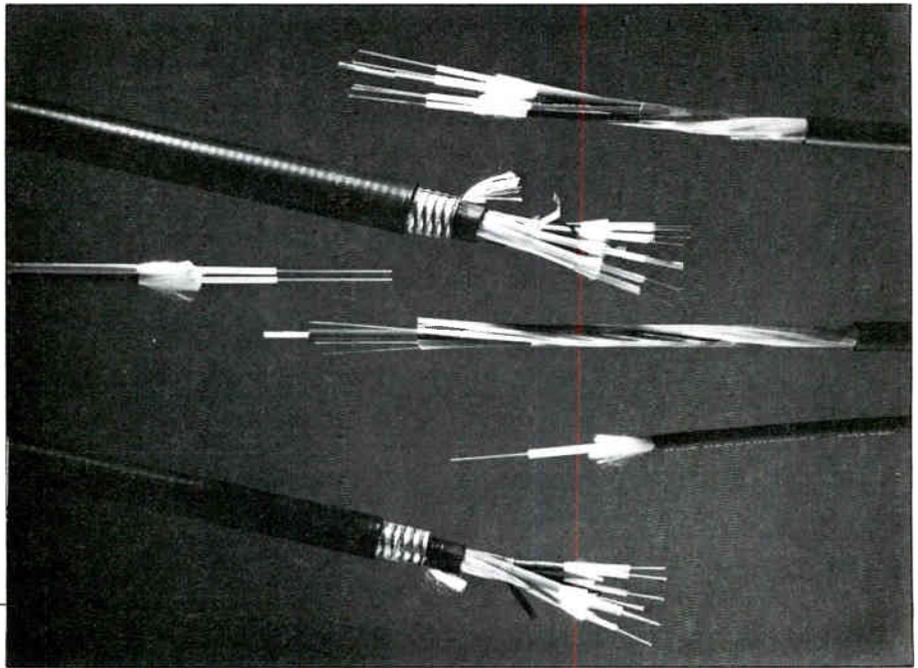
Laser-driven fiber optic transmission systems have many advantages over conventional electrically driven copper wire coaxial cable systems. Glass, being a dielectric, is impervious to electromagnetic or radio frequency interference. It is also immune to electrical surges or atmospheric lighting. It is safe to handle in that it can't spark or shock and there is complete ground isolation. There is no signal leakage or cross-talk problems with fiber and signal security is not a worry. It is well suited to either analog or digital transmission because there is very limited distortion or degradation of the signal over great distance. Unrepeated lines of 30 km. may soon be possible. The extremely high bandwidth of fiber is well known and as many as six channels can be carried per single fiber.

For technicians and construction workers, fiber is much easier to handle than coax because it is lightweight, strong, more flexible, can go into much smaller duct work, and can be layed without concern for EMI environments. Also, glass is non-corrosive, giving it much longer life in the ground.

## Slow Response

Cable engineers who have looked into fiber optic applications seem to agree that fiber optics works well in trunking and headend configurations. But most will scoff at fiber optics being used in distribution.

And they are probably right given the



primitive systematics of most operating CATV systems with the traditional approach of headend-to-trunk-to-feeder-to-drop-to-set-top converter in each subscriber's livingroom. Many engineers with an eye to the future, however, are telling of new systems approaches that will allow for more efficient distribution, greater ease of interactive operation and computer interfacing. Those systematics will also be built more efficiently with fiber optics. One commonly discussed would remove the necessary converter electronics out of each home and place this function at a remote site, such as on a pole or in the basement of a highrise building from which whole neighborhoods could be served. This would reduce the number of conversion points in a system.

Another systematic approach under discussion is analogous to the telephone switching network. According to Dave Hardwick of Valtec, a leading supplier of fiber optics to military, telephone and computer markets, "In such a system, each subscriber would be connected to a 'central office' and would have the ability to 'link up' numerous sources of information or, in an interactive system, initiate information from the home to cause . . . a banking transaction or a remote shopping purchase." Hardwick, however, is of the opinion that fiber optics will not make major penetration into the CATV industry as systems are presently constituted.

Richard Cerny of Artel, and formerly with Valtec, is in general agreement with Hardwick's perceptions. But Artel is committed to supplying to video markets. Artel is presently manufacturing a local origination package, called EN 1000, for remote transmission to and from, say, a sporting event or a convention. The link between the control console and the microwave van would be a fiber optic cable, providing lightweight ease of handling. Concern for routing is signifi-

cantly minimized due to fiber's immunity from EMI. So, there is no need for frequency equalization or an FM modulating/demodulating system in this baseband application.

Cerny and others believe that interactivity will push CATV toward fiber optics. Also, the purity of signal quality provided by fiber optic transmission will become more important with the introduction of high-resolution TV sets and videotape recorders. But Cerny sees fiber optics as having the same CATV distribution problems as it had in 1973 due to CATV system configurations.

### Integral Pieces

But integral pieces of the systems puzzle are emerging. Times Fiber Communications is now marketing several innovative fiber optic packages. One is its Fiberblock TVRU receiver system which will deliver up to 24 "clean" satellite channels from antenna to headend over an unrepeaters 1.0 km. fiber optic link.

Another significant innovation is TFC's minihub system for local distribution in urban highrise apartment buildings. The minihub, located in the building's basement, provides the focal point for all internal and external signal interfaces. The CATV feeder cable, whether coax or fiber, is connected with the minihub. From there, the channels are distributed on an "as authorized" basis. The minihub is modular and can be stacked to meet future requirements.

From the minihub, two optical fiber waveguides provide distribution to each of up to 24 subscribers. In individual apartments, mounted on a wall, is an optical connectorized Residence Interface Unit that provides video and FM distribution as well as connection with a

keypad. The keypad is handheld with a digital readout and is the subscriber's means of channel selection and interaction with the system.

Problems remain, however, for totally optical CATV systems. One problem that continues is the development of multiple-port couplers or splitters that would not require conversion from light to electricity. According to Gary Miller of TFC, "Nothing has been done in fully integrated optics comparable to integrated circuits since 1974 and I don't see anything happening for another ten years or so."

A Canadian company, Canstar, has had on the market for three years a bidirectional coupler with up to 200 ports that is totally optical. But there are unacceptably high signal losses that preclude their use in CATV distribution. Ron Doyle of Canstar states that with a 'star' configuration of ports, say one in and 199 out, "The loss is proportional to the number of ports. Loss would amount to 1/199th of the signal out of each port, less your excess loss which would be in the neighborhood of 1.5 dB."

So, totally optical distribution without resort to conversion to electricity remains to be solved in the next decade. This means that for now, fiber optics cannot fully compete with coax on coax's turf unless new builds and rebuilds go in with new, innovative total-system reconfigurations. Will coax retard the CATV industry and prevent CATV from capturing the potential enhancements on the horizon? Will the ill adapted distribution system that has evolved around coax technology cause the CATV industry to miss its future opportunities? Surely, other industries will come along to exploit those opportunities, including the telephone companies, and cable systems just may become the dinosaurs of the Communications Age.

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# Kahn on Fiber: Silence Is Sabotage

The impact of fiber optics on the cable industry is the subject of this interview with Irving B. Kahn, president and chairman of Broadband Communications, Inc., and Chairman of General Optronics Corporation. It was Kahn who, along with Hughes Aircraft, developed the super-high-frequency microwave service called Amplitude Modulation Link (AML) in 1966. Since 1969 Kahn has campaigned for the introduction of fiber optics in CATV.



**CED:** Irving, why is fiber optics important to the future of the cable industry?

**Kahn:** Much of the value that's placed on cable systems today isn't placed on what they are earning today—it's the potential they presumably will be able to earn as a result of the multi-services they can offer. Now they are not the only ones who can offer these multi-services. The more that they delay with getting to the ability to technologically do what is almost their birthright, they give Ma-Bell, among others, the opportunity. The first guy who gets that piece of fiber into the home has done with fiber what we did with coax versus Bell wire. Bell wire had a very limited capacity. Here we came with coax and we snuck in with it and got away with it. You can't do that with fiber for the simple reason that it has such an incredibly big bandwidth, so incredibly large that the most imaginative guy is going to have a hard time figuring out all the uses that you're going to make out of this 10,000 lane highway that you're putting in.

The amazing thing is, it doesn't cost you with fiber initially any more for 10,000 lanes than for five. As long as you're putting in five and five is competitive with coax five, management says, "Great, I got all these other ones free, if I use them, ok, if I don't, no loss." Whereas if you do it like they're doing now—dropping two pieces of coax into the ground—they have a fixed life which can be as short as six or as long

as 15 years, but all the time that cable is lying in the ground and not being used, it's dead. You put that piece of fiber in there, we have no reason to believe that that damn thing is going to take any moisture and it's going to live. The best accelerated life tests talk in terms of a century.

**CED:** Do you think the cable industry is going to be hurt by continuing to resist change?

**Kahn:** We, as an industry, have been the most resistant to change largely because we grew like topsy. The price of cable

**"Does the engineer want to play a more important role and be on management's team or does he want to be a saboteur? At the moment, silence is sabotage."**

stock is based largely on the future and the so-called "blue sky" that cable is going to bring. The whole cable industry, en masse, and all of its new cities that it's going into, are all based on what they say is today's technology and stay away from this "blue sky," when, in fact three or five years from now, just about the time they've gotten invested, you're going to have satellites coming into the home and they're going to take away a piece of pay TV, and they're going to take away a piece of the additional networks. Simultaneously, you're going to start to have a

strong play for a second system in town that's going to come in to do all the things that we're not now doing, and the telephone company may be at the head of that list. So, some of the promise that we are relying on for the growth of this industry is being eroded because we are not making the moves, technically, to take advantage of what we could have as our own domain and we are losing it rapidly. And the guy who's as responsible as any for that is the chief tech in a system who is largely motivated by fear. But he shouldn't be.

Once the financial community reasons out (and they're not all idiots, it just takes them a little longer) that there are alternate routes, one of them is going to start to make noises and come out with a paper saying how the cable industry is not such a good deal in the first place and you're going to have another panicsville in these stocks that's going to materially affect the value.

**CED:** How can you say it's engineering's fault when management makes the decisions?

**Kahn:** Look at the number of 12-channel systems. Is the fact that they haven't been modified management's fault or engineering's fault for not advising management? Does the engineer want to play a more important role and be on management's team or does he want to be a

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saboteur? At the moment, silence is sabotage. To have a "me, too" guy sitting around who thinks he's got it made and he's not looking, that's dumb. The world is not going to stop dead. Furthermore, while you're sitting there luxuriating in the belief that you know where it's at, you've got Ma Bell, you've got General Telephone, and you've got other guys with a lot of money who want into this business. You've got towns starting to ask questions.

**CED:** By going from established coax systems in place with a pretty good

**"It is the common responsibility of the cable industry to start to set up realistic training programs to train and upgrade its own people."**

workforce developed of coax technicians, to fiber optics, lasers and photodetectors in the big MSOs' plants, are we talking about eliminating a large number of technicians?

**Kahn:** Not necessarily. It's a lot easier, it's a lot simpler, a lot quicker to build with fiber. The training cycle will not be difficult. What you don't know about, you're afraid of. We are in a dynamic expansion area. It's not likely that a reasonable guy, even one who's got some years on, if he's got a molecule of sense, can involve himself in fiber and survive. At the same time, chances are by doing that he will be able to do more work and you may not have to hire as many new people.

If we were a mature industry, their concern would have a degree of validity. But in CATV we haven't scratched the surface, and expansion is so dynamic, no way that it's going to affect the status quo guy and, in fact, it will make him more valuable, make the industry more efficient, and maybe with fewer people and more automation. If he doesn't do it, someone else is going to do it. And they're going to compete him right out of business.

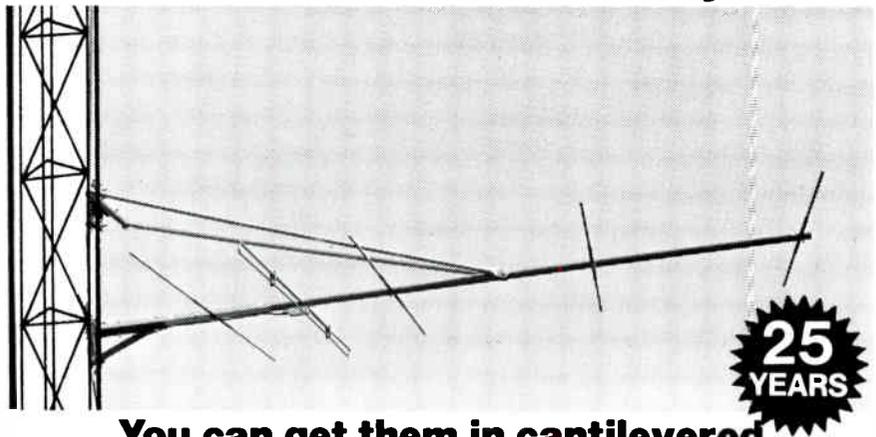
If you set up standards and give them some formal training and then recognize that with pay, you would have less turnover and better staff, and you would upgrade the industry. And part of that training can go into fiber.

Times Fiber Communications cannot find enough bodies to install fiber systems right now. And they can't train them fast enough. The irony is they are starting to get orders and they don't have the people to do it. They haven't got ten guys who can install, and the orders are coming.

It is the common responsibility of the cable industry to start to set up realistic training programs to train and upgrade its own people.

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**Kahn:** We must crusade for the technician upgrading himself. He is in the most technologically violent upheaval world and he generally doesn't know it. If we can show that it's in his best interest to upgrade himself, we will be doing the industry and the technician a service. In three or four years from today there's going to be no place for him if he doesn't move with the times. He will be unemployed. The last thing he will do is to pull down the cable system that he built while they over-wire him with fiber.

**CED:** He's afraid that the new technology is going to make him unemployed but the fact is that he can stay with the new

technology and ensure that he won't be.

**Kahn:** Not only ensure that he won't be, he can have something a whole lot better. This same technician can become a top fiber technician with less than ten hours of in-field training. And he's going to love it because here you can take a mile of fiber that weighs 45 lbs., we can ship by United Parcel anywhere in the United States. Furthermore, this liberates women because a woman can become a fiber technician because you do not need brute strength.

**CED:** So you think it's really a question of a person who might be a field technician now in coax having the technical basis

for, perhaps, a retraining that would put him in tune with fiber optics?

**Kahn:** There'll be enough room to absorb all the "grunts" in the industry. On the other hand, there is a requirement where **"If he doesn't move with the times, he will be unemployed. The last thing he will do is to pull down the cable system that he built while they over-wire him with fiber."**

the chief engineer or the top guy, if he's to retain that status, will have to do a little work. He's going to have to learn a little bit more about this technology.

A good engineering mentality has a natural inquisitiveness. And if management performs its function, it will get a guy interested and make it worth his while because it's worth your while. You've got him already partly trained and at least he's there. Furthermore, you have available to you now a whole new field of technology-oriented graduates who are coming out of other industries. I can buy PhD's today damn near as cheap as I can buy an assistant chief technician of a system. And I'd much rather have a young kid with a technical background who I can train and I'll waste a year or two. When I'm done I'll have a far better product for an efficient management of that system.

The creative, experimental mentality has to prevail in the industry, and it doesn't. That's more basic than engineering or anything.

**CED:** Is there still a problem with laser diodes? Aren't they difficult to control in terms of an inherent temperature problem?

**Kahn:** When Bell made the decision to consider LEDs as well as lasers and they created the Burris-type LED, they did that because at that point in time, about five or six years ago, the technology of lasers, particularly gallium-aluminum-arsenide injection lasers. . .the life was unreliable, there was a heat problem, and they were afraid of them because they didn't have it. Today, we are producing by Bell standards and by Bell's kind of predicted testing, million-hour lasers. The light outputs effectively have gone from a half a milliwatt to where we can now put not only 5.0 milliwatts over that, but we have some lasers that we will be announcing that will be many times more powerful. They exist, right now, and they're in systems, right now.

**CED:** Tell me more about these million-hour lasers.

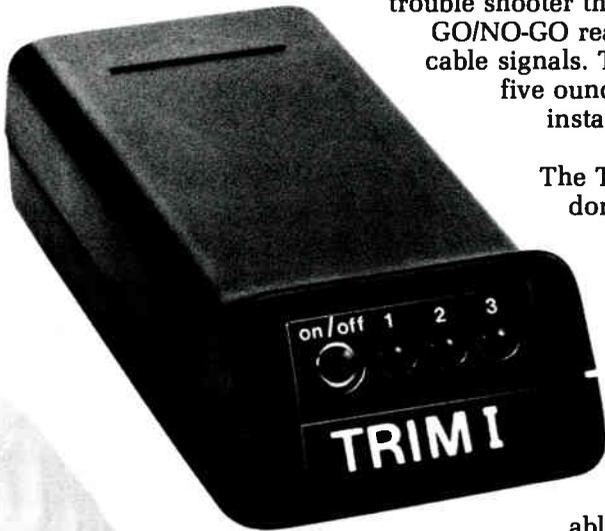
**Kahn:** We sell them with a 10,000-hour warranty. The reason we're giving a 10,000-hour guarantee, to be perfectly candid, is I wanted to start with that and

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see what the competition did and, as soon as they came to equal it, come out with 100,000 hours guarantee. The only way you could come up with a million is to use what Bell uses as projected tests. There are two methods of arriving at lifetimes of products for reliability. One is projectable, which Bell has developed over the years, and the other, actual on-line working tests in which nobody can tell you a laser will last more than ten, 12, 15,000 hours because that's the only number of hours they've been able to test. But the industry and the world accepts the projected lives more and more. And when you consider 24 hours a day, 365 days a year, you're only up to about 7,000 hours and how long will an amplifier last?

**CED:** What about the cost of fiber?

**Kahn:** We started with fiber three years ago and you were paying \$1.50 a meter with a 10 to 12 dB loss. You can buy fiber today with a 4.0 to 5.0 dB loss for between 20 and 15 cents. When fiber gets to a nickel-a-meter which could be this year if the volume is there, it is then so damn cost effective that it's unbelievable. In fact, it comes out to be a fraction of the price of copper.

**CED:** A potential disadvantage to fiber is that rebuild with fiber will be slow and costly.

**Kahn:** Let's take New York City or any major city where you're going to go through ducts or go underground. In order to do that with coaxial cable you'd have to put in your own ducts or make deals or drill and it's expensive. With fiber, I can go into New York City and put my pieces of

**"Why go from a literal horse-and-buggy to a Stanley Steamer, when you can readily see a jet sitting on the runway?"**

fiber through the same ducts that the cable is in and the telephone company won't even know it's there! Where it cost me \$30 a foot to build New York, I could fractionalize that in cost, right now, and have infinitely more efficiency and capacity in the ground that will be good for expansion for the next 25 or 30 years.

**CED:** Intensive R&D in fiber optics might be something that frightens system operators and they might want to wait until the research settles down before they implement it in their systems.

**Kahn:** Should the industry rely, as it has, on its suppliers for its R&D? Wouldn't it make sense, for example, if at the least every major MSO now had in place ten miles of fiber so they could study it

themselves? This doesn't require big bucks. Now, just consider two forms of economics: one, the initial cost. If I want to go ten miles, which is the normal wheel-and-spoke distance of a cable system, I'm going to have a minimum of two and a half to four amplifiers a mile. Amplifiers are in the range of \$4,000 and \$6,000 each. Maybe you make a deal and get them for \$3,500. For ten miles you need over 25 amplifiers costing you about \$70,000. One small laser transmitter does the whole job and it will cost maybe \$4,000. More importantly, service and maintenance. I've got to allow one engineer for so many amplifiers. With lasers, if anything goes wrong, you don't even touch it in the field. You plug in another one and take it back to the bench. If you figure the operating costs of a system, which are going up very dramatically, you will see that the old-line cable operator, as long as he stays put with what he's got, is building trouble. The coax hardware guys, even the good ones. . . naturally they're not going to push it. They're going to tell you how great the existing amplifiers are and how great this new coax is and the guy buying it believes it and the guy in the town in the competitive hearing believes it.

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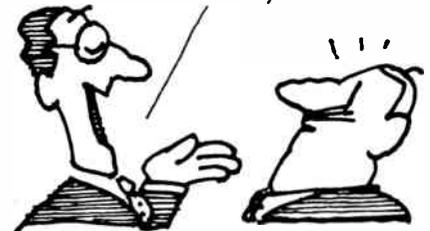
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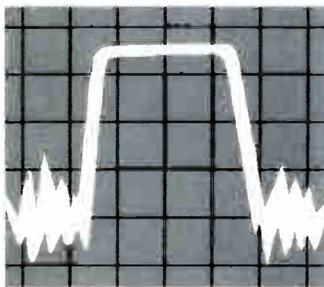


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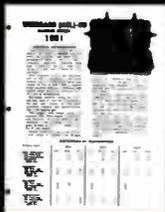
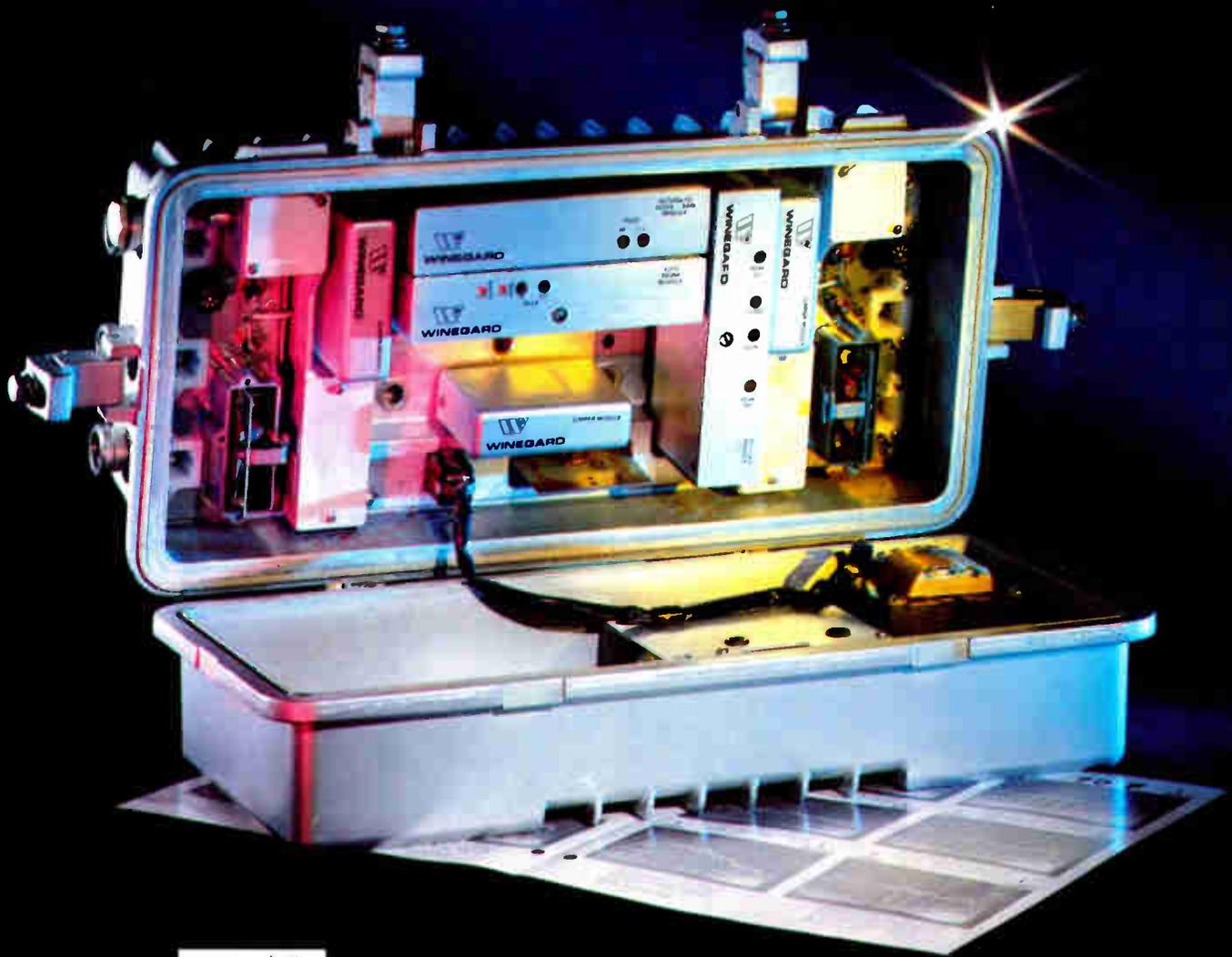


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# Several things on your CATV

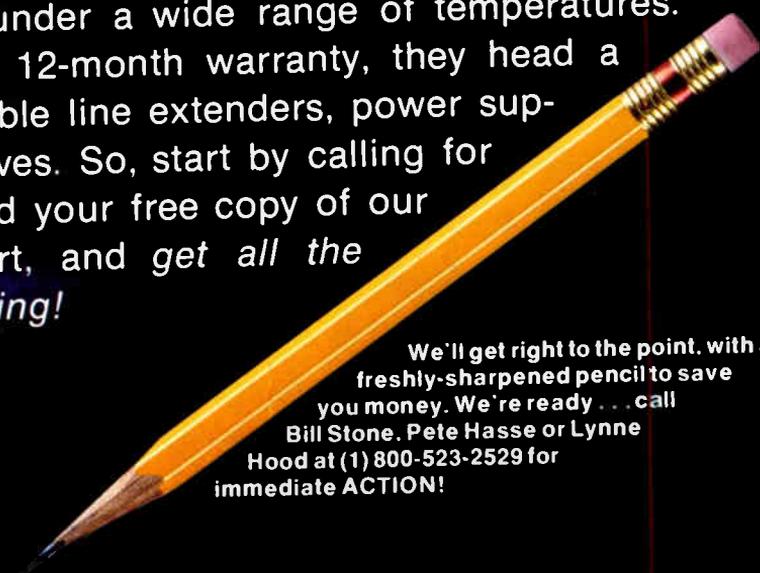


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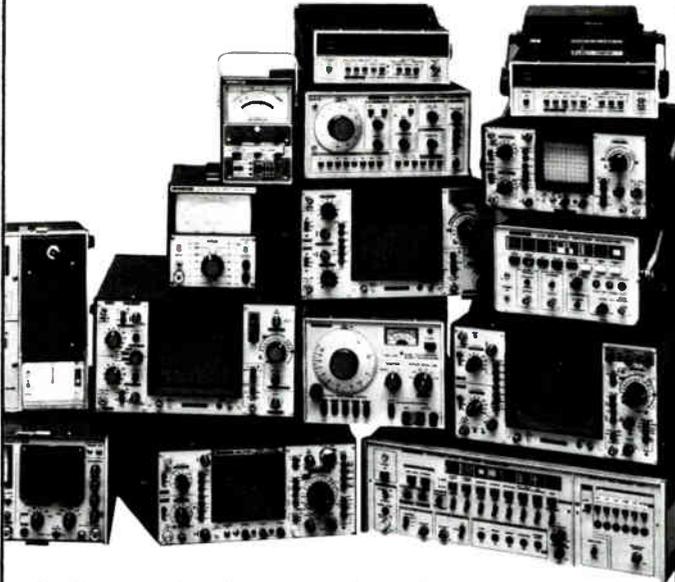
# Product Profile

This month, **CED**'s "Product Profile" examines set-top converters that are on the market now or will be introduced in the coming year. Profile commentary begins on page 34 and a list of set-top converters and their characteristics begins on page 36.



# Converters

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## Product Profile

**T**he equipment featured in this, **CED's** new department called "Product Profile," is set-top converters and terminals, the subscriber's access to the system operator's program offerings. By presenting general information on every model currently or soon to be on the market, **CED** hopes to help operators make informed choices. Perhaps the reader will be able to select several manufacturers whose products seem to fit known needs and contact them for more specific information.

What follows is a chart that lists over 50 converter models. The reader will notice immediately there is little standardization in converters or in the terminology used to describe them. **CED** has attempted to be consistent in the descriptive terms used so as to aid comparison. For example, the term converter itself.

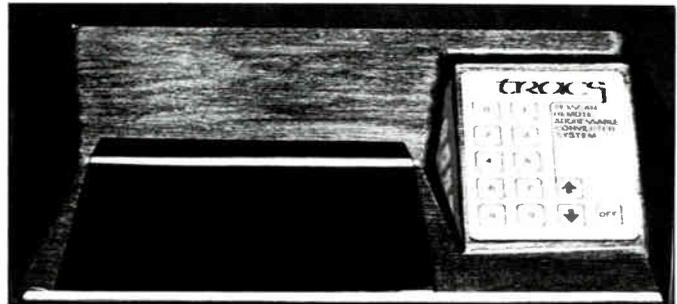


RCA's SCMC-2002.

Converters are becoming more complex and, as such, the term is becoming something of a misnomer. Perhaps the generic term should be "home terminals" since many now do much more than convert incoming signals. Also, in CATV, there are upconverters and downconverters that are equipment elements in the headend configuration and there are converters at the other end of the cable system. In this "profile," **CED** is concerned with the latter.

Another example is the term "security." The term may be used in at least three ways when referring to home terminals: 1. prevention of illegal tapping of a system's signal or signal security, 2. security from equipment theft, and 3. a security system or emergency alarm system as an equipment feature or option.

Most models fall into four basic types: blocks, multichannels, addressables, and interactives. There are others but they are unique. The well known block types, whether set-top or remote control, handheld variations, receive an incoming signal and



The set-top unit in Texscan's remote addressable converter system.

convert it to an output frequency compatible with the subscriber's TV set. The chart displays the channel capacity and input bandwidth for each model. Blocks convert anywhere from one to

Continued on Page 41.

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(the expense is on the pole)

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(all 54 channels come into the house on  
channel 2, 3, or 4)

and to pay per view complexities  
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# Texscan

Texscan Corporation 1981

# Product Profile

Model	Type	Channel Capacity	Input Bandwidth	Signal Security	Special Features	Equipment Options	Availability	Unit Cost in 5,000 Lots
<b>American Electronic Laboratories, Landsdale, Pennsylvania</b>								
AEL-DCU	set-top block, dual-converter	2 midband or 2 superband	126-168 MHz or 216-264 MHz	descrambler	converter function bypass	None	Immediate	\$18.00
AEL-PB7	set-top block	7 midband	123-163 MHz	not applicable	push-button selection; converter function bypass	None	Immediate	\$13.00
<b>Antronix, Englishtown, New Jersey</b>								
BC-40U	UHF block	40 channel total	54-300 MHz	not applicable	no mechanical parts	None	Immediate	\$20.00
<b>Cabletenna Corporation, East Brunswick, New Jersey</b>								
BC-M3L	set-top block	3 midband	156-174 MHz	not applicable	converter function bypass; warranty	None	Immediate	N/A
BC-M7U	set-top block	7 midband to UHF	50-300 MHz	not applicable	crystal controlled; converter function bypass; warranty	None	Immediate	N/A
BC-M7H	set-top block	7 midband to highband	120-162 MHz	not applicable	inverted midband to VHF; channels 13-7; converter function bypass; warranty	None	Immediate	N/A
BC-36U	set-top block	36 VHF, midband and superband	50-280 MHz	not applicable	converter function bypass; warranty	None	Immediate	N/A
RC-36P	wired remote	36 VHF, midband and superband	121-300 MHz	not applicable	push-button remote selection; solid state design; warranty	None	Immediate	N/A
<b>Colormax Electronic Corporation, Edison, New Jersey</b>								
CV2U	VTR converter	VHF, midband and superband	50-300 MHz	not applicable	for use with or without videotape recorders	None	Immediate	\$18.00
CM3V	set-top block	3 midband	156-174 MHz	not applicable	converter function bypass; push-button switch	None	Immediate	\$24.00
CM7V	set-top block	7 midband	123-164 MHz	not applicable	converter function bypass; push-button switch	None	October 1981	\$24.00
RSC8C	wired remote multichannel	30 channel total	50-300 MHz	not applicable	push-button selection; fine tuning; remote on/off	None	Immediate	\$59.00
<b>Hamlin USA, Inc., Seattle, Washington</b>								
CR-2 or CR-3	wireless remote converter	40 channel total	50-300 MHz	not applicable	four channel storing and recall; fine tuning; on/off; LED digital readout	descrambler module	three mo. lead	\$92.00
SPC-4000	set-top multichannel	42 channel	54-330 MHz	not applicable	lighted slide switch	descrambler module	Immediate	\$50.00
MCC-4000	wired remote multichannel	42 channel	54-330 MHz	not applicable	wired remote to set-top box	descrambler module; remote on/off	Immediate	\$52.00
SPC-5000	set-top multichannel	58 channel total	50-440 MHz	not applicable	slide selector; fine tuning; lighted indicator	dual cable capacity	February 1982	\$52.00
<b>Intercept Corporation, Clifton, New Jersey</b>								
Expander 3000	set-top block	3 midband	50-300 MHz	not applicable	converter function bypass; warranty	None	Immediate	\$20.00
Expander 7000	set-top block	7 midband to UHF	50-300 MHz	not applicable	solid state design; crystal controlled; multiple set feed; warranty	None	Immediate	\$20.00
Expander 7000 MS	set-top block	9 midband to UHF and 9 superband to UHF	50-300 MHz	not applicable	solid state design; crystal controlled; multiple set feed; warranty	None	Immediate	\$20.00
Expander 40	UHF block	40 channel total	54-300 MHz	not applicable	no mechanical parts	None	Immediate	\$20.00
<b>Jerrold Division of General Instrument Corporation, Hatboro, Pennsylvania</b>								
Starcom II JSM	set-top multichannel	9 midband	121-169	not applicable	push-button selection; fine tuning	descrambler	four mo. lead	\$30.60
Starcom II JSX	set-top multichannel	36 channel total	50-300 MHz	not applicable	push-button selection; fine tuning	descrambler; addressable system compatibility; JRX wireless remote control	four mo. lead	\$49.70
Starcom IV DSX	set-top multichannel	58 channel total	50-400 MHz	descrambler	LED digital readout	addressable system; compatibility; DRX wireless remote keyboard control	four mo. lead	\$62.65

Model	Type	Channel Capacity	Input Bandwidth	Signal Security	Special Features	Equipment Options	Availability	Unit Cost in 5,000 Lots
<b>Oak Communications, Inc., Crystal Lake, Illinois</b>								
M-21	set-top multichannel	9 midband	120-174 MHz	descrambler	converter function bypass	parental discretion	1982	N/A
TC-35	set-top addressable converter	35 channel total	50-300 MHz	descrambler	16 tier potential; parental discretion	wired remote control	Immediate	\$116.17
TC 56	set-top addressable converter	56 channel total	50-.00 MHz	descrambler	16 tier potential; keyboard selection	RTC 56 wireless remote control	November 1981	\$126.78
KDM 400	set-top multichannel	56 channel total	50-400 MHz	tagging scrambler at headend	15 tier potential; non-addressable; channel storing and recall; parental keylock; LED digital readout	wireless remote control	Immediate	\$88.58
Dimension 2	set-top addressable interactive terminal	56 channel total	54-402 MHz	descrambler	two-way interactive; keyboard selection; LED digital readout; multiple tiering; polling; deactivation of stolen unit; wireless remote	Videotext decoder; dual cable capacity security system	mid-1982	\$270.00
<b>Pioneer, Columbus, Ohio</b>								
BC-1000	set-top block	7 midband	54-216 MHz	not applicable	slide switch; converter function bypass	use of BC-1100 for upper tier conversion	Immediate	\$30.00
BC-1100	set-top dual block	7 midband and superband	54-267 MHz	not applicable	slide switch; converter function bypass	use of BC-1000 for upper tier conversion	Immediate	\$30.00
BC-2000	set-top multichannel	36 channel	54-306 MHz	not applicable	fine tuning; factory set channel allocations	dual cable slide switch	Immediate	\$45.99
VIP system	wireless remote addressable one-way terminal	54 channel	50-400 MHz	inband digital descrambler	digital readout; program and hardware security; dual cable capability	total system compatibility	Fall 1982	\$140.00
VIP system	wired remote addressable interactive terminal	54 channel	50-400 MHz	inband digital descrambler	digital readout; keyboard selection; multiple tiering; eight-digit two-way transmission; dual-cable capability	Two-way security terminal; alphanumeric two-way with hard copy print out; microcomputer adapter; teletext capability	March 1982	\$245.00
<b>RCA Cablevision Systems, Van Nuys, California</b>								
M 002 & 003	set-top multichannel	36 channel	50-300 MHz	not applicable	fine tuning	None	Immediate	\$46.80
SCMG 1002 & 1003	set-top multichannel	36 channel	50-300 MHz	not applicable	fine tuning	None	Immediate	\$44.80
SCMG 2002 & 2003	wired remote multichannel	36 channel	50-300 MHz	not applicable	fine tuning; remote switch wired to box	None	Immediate	\$47.50
<b>Scientific-Atlanta, Inc., Atlanta, Georgia</b>								
Series 6700	modular set-top addressable programmable terminal	54 channel total	54 to 400 MHz	programmable channel authorization	LED readout; parental discretion; unlimited tiering; keyboard control; add-on modularity for future upgrading	descrambler; remote control receiver and transmitter; addressable base	Immediate	\$75.00
<b>Standard Components, Elk Grove Village, Illinois</b>								
Block converter	set-top block	3 midband or 3 superband	156-174 MHz	not applicable	slide switch; parental discretion	None	Immediate	\$16.50
Double converted upright	set-top block	7 midband or 7 superband	120-174 MHz	not applicable	slide switch; fine tuning; parental discretion	specify input channels	Immediate	\$23.00
20/40 position	set-top block	20 channel	50-324 MHz	not applicable	fine tuning; parental discretion	descrambler	Immediate	\$32.50
32/40 position	set-top multichannel	32 channel	50-324 MHz	not applicable	converter function bypass; fine tuning; parental discretion	descrambler	Immediate	\$34.75
Slide converter	set-top multichannel	36 channel	50-300 MHz	not applicable	slide selection; fine tuning	parental discretion	Immediate	\$41.50
Synthesized	set-top multichannel	40 channel	54-300 MHz	not applicable	crystal controlled; no fine tuning	descrambler; parental discretion; LED digital readout	Immediate	\$45.00

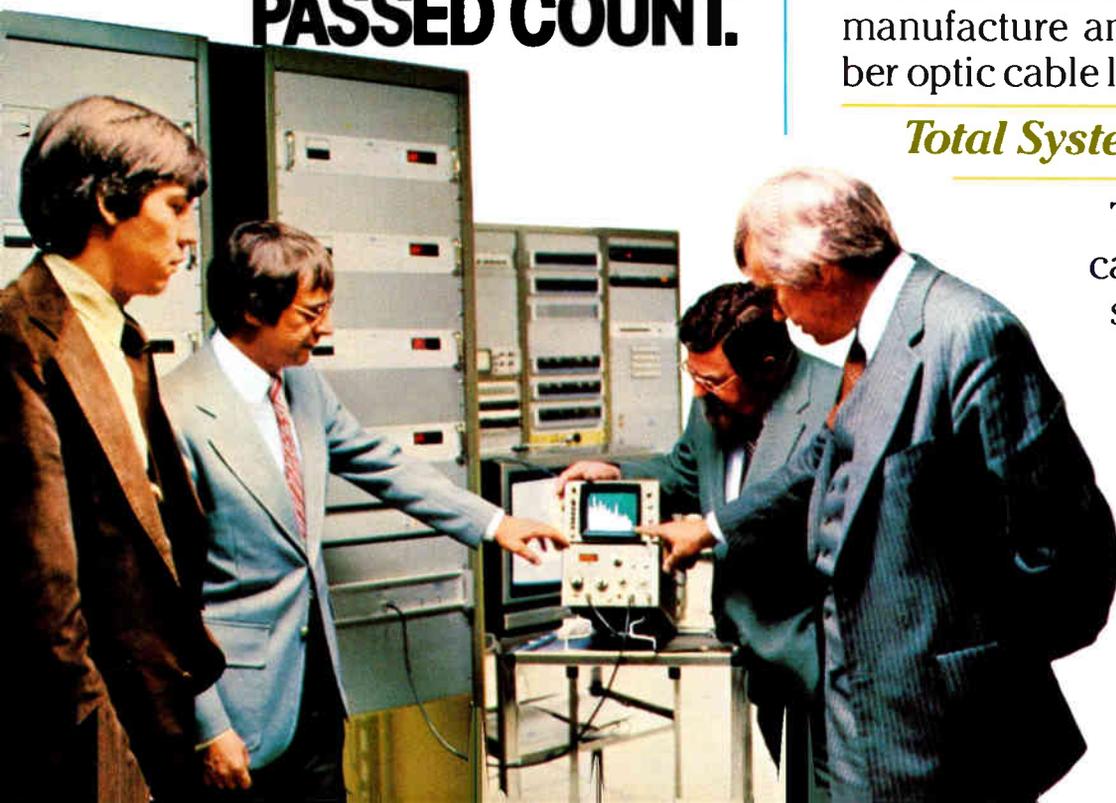
Continued on Page 40.

Every day more than 300,000 CATV subscribers enjoy a better, more reliable picture with fiber optic links made by Times Fiber Communications.

So do system operators. They have found that Times' fiber optic links are virtually "transparent" and deliver signals with no measurable degradation. By replacing coaxial trunks with fiber optics, more coaxial cable and amplifiers can be added to the end of the system—significantly increasing the number of homes passed.

We're the leading supplier of fiber optic links—satellite downlinks, headend-to-studio and hub-to-hub trunks that carry signals with no measurable distortion. We've put in more CATV fiber optic systems than any other company.

## HOW FIBER OPTICS INCREASES YOUR HOMES PASSED COUNT.



*Times officials examine new 7-meter satellite antenna at the company's Wallingford, CT headquarters plant. The TVRO is used for experiments and to test fiber optic satellite downlinks.*

Why Times? Because we're totally committed to the CATV industry. We've been a leading U.S. manufacturer of coaxial cables for 30 years. We've pioneered almost every major technical trend in cables; and we were the first company to develop, manufacture and install reliable fiber optic cable links for this industry.

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Times provides total cable system responsibility because Times is a total manufacturer.

Our new fiber

*Officials check out new 9.5 km fiber optic satellite down-link at United Cable Television's headend in Plainville, CT.*



*A Times field engineer splices a fiber optic cable, during installation, with a portable fusion splicer. Times supervises every installation to assure technical integrity and practical performance.*

optic facility is one of the most modern in America. We make our own glass preforms, draw our own fiber, strand our own cable—aerial/duct, armored burial, and indoor.

You get everything from a single source. We engineer our own opto-electronic components—and supply all other items necessary for complete systems.

### ***Technical integrity and practical performance***

You'll find our Systems Engineering Department has the experience and technical back-up to select and test the best cable configuration and components for optimum, cost-efficient operation. And we supervise the installation of every system to assure technical integrity as well as practical performance.

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TIMES FIBER COMMUNICATIONS, INC.  
**Times Wire & Cable Div.**

An **Insilco** Company

# Product Profile

Continued from Page 37.

Model	Type	Channel Capacity	Input Bandwidth	Signal Security	Special Features	Equipment Options	Availability	Unit Cost in 5,000 Lots
<b>Standard Components, Elk Grove Village, Illinois</b>								
Synthesized pushbutton	set-top multichannel	60 channel	54-402 MHz	not applicable	push-button channel sequencing; LED digital readout	descrambler; parental discretion; wired remote control	Immediate	\$55.00
<b>Sylvania, El Paso, Texas</b>								
4040	set-top programmable converter with wireless remote	58 channel	52-402 MHz	not applicable	no fine tuning; channel storing and recall; scanning; LED digital readout	parental discretion; wireless remote; descrambler	September 1981	\$69.90
4041	wired remote programmable converter	40 channel	52-300 MHz	not applicable	no fine tuning; LED digital readout built in; remote wired to box; channel storing and recall; keyboard	remote on/off	Immediate	\$61.50
4058	wired remote programmable converter	58 channel	52-402 MHz	not applicable	no fine tuning; integrated circuit operation; remote keyboard wired to box; LED digital readout; channel storing and recall	remote on/off	Immediate	\$62.00
<b>Texscan Corporation, Indianapolis, Indiana</b>								
Tracs system	set-top terminal	54 channel	54-400 MHz	computer authorized remote pole-mounted converter	scrambling not required; LED digital readout; multiple set service from remote converter; any channel tiered	interactivity; handheld remote control	December 1981	\$158.00
<b>TOCOM, Inc., Dallas, Texas</b>								
Paymate 1001	set-top converter/descrambler	1 channel conversion	preselected midband	descrambler	fine tuning, converter function bypass, one year warranty	parental key control	October 1981	\$26.95
Paymate 1002	set-top converter/descrambler	2 channel conversion	preselected midband	descrambler	fine tuning, converter function bypass, one year warranty	parental key control	October 1981	\$28.95
DCN3B-1	set-top block	3 midband	156-174 MHz	not applicable	no fine tuning, converter function bypass, one year warranty	parental key control	September 1981	\$16.50
BC-700	set-top block	7 midband	preselected midband	not applicable	fine tuning, converter function bypass, one year warranty	parental key control	Immediate	\$23.50
5504A	set-top addressable terminal	55 channel total	50-402 MHz	baseband scrambling	parental discretion; baseband operation; 24-hour emergency alert; preferred channel memory; keyboard control; on-screen channel ID; subscription program	wireless remote, dual cable switch, VTR output	Immediate	\$149.40
5510A	set-top addressable terminal	55 video 55 teletext	50-402 MHz	baseband scrambling	full channel teletext; on screen text and graphics; parental discretion, baseband operation; 24-hour emergency alert; preferred channel memory; keyboard control, on-screen channel ID.	two-way interactive function; wireless remote control; dual cable switch	January 1982	\$225.00
<b>Vitek Electronics, Inc., Edison, New Jersey</b>								
Midband converter	set-top block	7 midband	123-163 MHz	not applicable	fine tuning; integrated circuit operation	None	Immediate	\$18.00
<b>Zenith, Glenview, Illinois</b>								
SC100	set-top multichannel	54 channel	54-400 MHz	not applicable	LED digital readout; keyboard selection; microprocessor controlled; wireless remote handheld keypad	None	October 1981	\$90.00
Z-TAC	wireless remote addressable terminal	54 channel	50-400 MHz	scrambling video inversion and/or sync suppression	headend addressability; programmable tiering, remote volume and on/off; set-top unit operable without remote control	basic teletext and graphics capability	May 1982	\$150.00

40 channels, depending on its capacity. Usually a converter function bypass allows Channels 2 to 13 to pass unconverted to the TV set's channel switch. Most require fine tuning by a knob on the unit and some offer descrambling. Most remote block types are wired by a cord to a box on the set-top while some are wireless.

Multichannel converters take all incoming signals and output a selected signal through one channel on the subscriber's set.



The Oak 12-channel midband converter/decoder.

usually Channel 3. The subscriber selects all channels to be viewed using the channel selector, a pushbutton, rotary switch, or keypad on the converter unit. A few have a bypass for lower channels which require subscribers to use the TV set selector only for those channels.

Many new-builds and rebuilds are upgrading to addressability. Addressable converters imply additional headend hardware that provides the system operator with the increased revenue generating capability of pay and pay-per-view tiering. An addressable system is one-way from the headend to the subscriber's terminal. Ten models are now on the market offering various features. Some are interactive.

The interactive terminals usually involve system-wide reconfiguration for two-way subscriber access to various services such as videotext, opinion polling, at home banking, shopping from the home, or computer interfacing.

Most converters in the **CED** chart do not offer a decoder or scrambler/descrambler feature. When they do not, not applicable appears in the signal security column. When a decoder/descrambler is offered as an option, it is listed in the equipment options column.

The special features column describes aspects of each model that set it apart from others. Mentioned in this column are features that are standard for the basic unit only, while the equipment options column lists additional features that are not included with the basic unit. When no options are offered with that model, "N/A" appears in the column.

The last column, unit cost in 5,000 lots, is included to give the reader some sense of pricing. The figure listed will be the price for a single basic unit, without any options, when that unit is sold to a system operator in lots of 5,000. The reader must understand that unit prices are almost always negotiable and are contingent on such factors as size of the total lot or purchase made, who is buying, whether the buyer is a distributor or an MSO, how good of a customer the buyer has been in the past, etc. Consult directly with sales managers for manufacturer's unit prices for models that fit your system's future needs.

Future issues of **CED** will profile equipment products on a regular basis. It is hoped that the new department will be of service to engineers, system operators and manufacturers, providing a one-stop, comprehensive overview of what's available.

# Econo-Line Drop Splitters

## 5 to 400 MHz

Model ES-3 Two-way  
Model ES-37 Three-way  
Model ES-7 Four-way  
Model ES-10 Eight-way

ZINC, DIE-CAST  
Corrosion-resistant and sealed for outdoors. Integral grounding block. Impedance 75 ohm. Connectors (machined) F61.



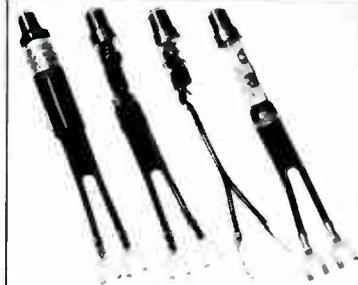
### SPECIFICATIONS

Model	ES-3	ES-37	ES-7	ES-10
Splitting loss 5-300 MHz	3.5 db	3.5 db	6.6 db	10 db
		6.6 db		
300-400 MHz	4 db	4 db	6.8 db	10.2 db
		6.8 db		
Isolation (min.)	30 db	30 db	28 db	28 db
Return loss (min.)	20 db	20 db	20 db	17 db

## Matching Transformer

75-300 ohm

Model MT-E  
Aluminum housing.  
F61-plated brass.  
300 ohm, twin-lead with soldered lugs. 3 capacitors provide total isolation from ground. Ground is soldered to the chassis for positive contact.  
Bandwidth 5-900 MHz



### SPECIFICATIONS

Frequency range	5-400 MHz
Insertion loss	.5 db
Response	±.25 db
Balance	≥36 db



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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.** We have an aggravating and expensive problem in our system. The drop F connectors corrode onto the tap port threads. When we try to unscrew the F connectors, the tap ports break off. This requires replacement of the entire tap plate. We have been using silicone grease on the threads but nothing seems to help. Do you have any suggestions?

**A.** I do not know of any sure way to remove seized F connectors from tap ports. There may be some lubricant or solvent which would work but I have not found one. Perhaps our readers can suggest something.

The best way to cure this type of problem is to not let it start. There are several common materials and procedures to prevent

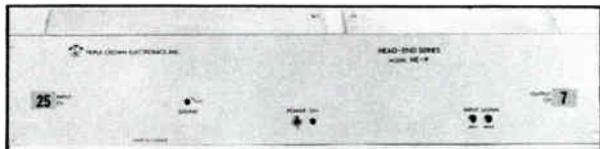
the problem by sealing all moisture and air (if possible) away from the juncture of the fitting and F port threads. Most commonly used are short length of heat or air shrinkable tubing. Made of an expanded compound, the tubing attempts to return to its smaller size under certain conditions. Heat shrink tubing contracts when heat is applied. Air shrink tubing contracts when it is removed from its evaporative solvent. If properly applied and shrunk, either product should prevent fitting seizure.

Another sealing method which many systems use consists of a rubber boot similar to those used on automobile sparkplugs. To use, remove the F fitting from the drop cable, slide the boot onto the cable, small end first. Remake the fitting and partially fill the boot with Dow Corning DC-11™ or similar silicone lubricant. When the fitting has been snugly tightened on the lubricated tap port threads, slide the boot as close to the tap plate as possible. Be sure to cover the fitting and all threads. People who use this method swear that it keeps the fitting and tap ports in like-new condition. All materials used for sealing may be purchased from most major CATV equipment suppliers.

**Q.** I found a copy of your magazine in the library and think it is very interesting. I do not work in cable television but am into electronics. After seeing the high wages being offered by some companies through the employment agencies, I think that I would like to get into cable engineering. Can you tell me how to get the training I



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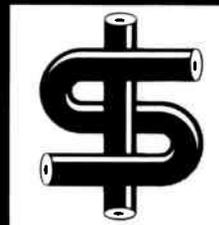
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would need and where the best paying jobs are? Thanks very much.

**A.** Our company policy prohibits our involvement in employment situations other than accepting paid advertising. We can offer some suggestions to would-be cable television employees which may help them to find a job in the industry. My first suggestion is to not expect to make a lot of money when you first start. Most companies can and will provide training, and many have excellent educational benefits, but no one will pay a trainee the same salary as is being offered to an engineer.

To find a job in cable, our suggestions are:

1. Contact local and area cable company offices and explain your interest in getting into the field. Take along a one or two page resume showing current and past employment, technical education (if any), geographical preferences, and any other meaningful personal and professional information.

2. If you have never been employed in cable television, send a copy of your resume to the Society of Cable Television Engineers, 1900 L St., N.W., Suite 614, Washington, D.C., 20036. They will forward your resume to several companies who subscribe to their personnel service.

3. Contact the advertisers and agencies listed in cable TV magazines. Agency fees are usually paid by the employer.

4. Place your own ad in a cable TV magazine. They are quite inexpensive for the amount of help they can be.

One of the above should result in a job offer if you have a real desire to work in cable television.

**Q.** On many manufacturer's specification sheets, there is a specification listed as "single triple beat." For other manufacturers, there is a listing for "composite triple beat." Are these two beats the same thing or are they two different types of beat? Which should be used for our measurements?

**A.** Single triple beat signal distortions can be generated from combining three discrete frequency carriers ( $f_1 + f_2 + f_3$ ).

This specification was quite useful in some manufacturing and testing applications since it could be easily produced and measured. It is less useful under actual operating system conditions.

Composite triple beat (CTB) refers to the additive effect of third-order beats in a system which carries a large number of channels. For example, with a 35-channel system, there are more than 330 individual beats produced on or near the Channel 10 visual carrier (193.25 MHz) alone. As the number of system channels is increased to 40 or 50 channels, the number of third-order beats is also greatly increased. Since all of the combinations of carriers which produce the beats are constantly varying slightly in frequency, the frequency of the beats will also vary slightly. They can be very visible and annoying in the desired channel's picture.

Composite triple beat distortion amplitude is a result of the additive nature of the individual beats. On a given instant, several individual beats may be on one particular frequency. The more beats that are present around a carrier, the more chances are that their combined signal levels will produce higher (worse) levels of CTB. If uncontrolled, CTB can severely limit trunk amplifier cascade lengths in systems with many channels. High levels of CTB will create more picture degradation than is acceptable by subscribers and by good system engineering practices.

There are a number of ways in which CTB may be minimized in cable television systems. Some of the more common are:

1. Reduction of trunk amplifier output levels and therefore the spacing between amplifiers.
2. Using amplifiers which are especially designed to reduce third-order products, such as those which use the feed-forward technology.

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3. Shorten trunk amplifier cascade lengths by using large (3/4-inch and 1-inch) trunk cables.
4. Using headend electronics which are designed to reduce CTB, such as harmonically related carriers (HRC) or inter-related carriers (IRC or ICC).
5. Using a combination of the above methods plus others designed for a specific system.

To get back to your question, single triple beat is great for checking an amplifier's triple beat production on the test bench. Composite triple beat tests, assuming that you have the proper test equipment, are more meaningful in the system.

may be used to serve the TV set. Many of them are not polarized.

One quick check you can make on the set is to see if the power plug can be easily reversed in the wall plate without forcing it. If so, measure the voltage from the antenna terminals to the grounded F fitting. There may be no voltage now. If no voltage is present, mark the plug and the wall outlet. Tell the set owner what you have found and suggest that they correct the problem. Place a note in your records detailing the problem and what you advised the owner to do.

**Q.** One of our installers recently came across a TV set which has a voltage between the antenna terminals and the drop F connector. We know the drop is well grounded and the subscriber says his TV just came back from the repair shop. We are afraid that this voltage may shock someone or may damage the TV set. Who is at fault?

**A.** AC voltages which appear between the antenna terminals of a TV set and a grounded drop are usually from one of two causes, both of which are TV set related.

Most commonly, an RF bypass capacitor at the point where the AC power enters the set can short. This can place the TV set chassis at a potential of 115 volts with respect to ground, as in Figure 1.

The other common problem is a TV set design problem. In some less expensive sets, one side of the incoming AC power line is connected directly to the metal chassis. The power cord on these sets is usually polarized, with one prong wider than the other, to prevent the chassis from being connected to the "hot" side of the AC wall receptacle. Unfortunately, many wall receptacles will not accept the added width of a polarized plug and people have trimmed the plug to fit. Or, an extension cord

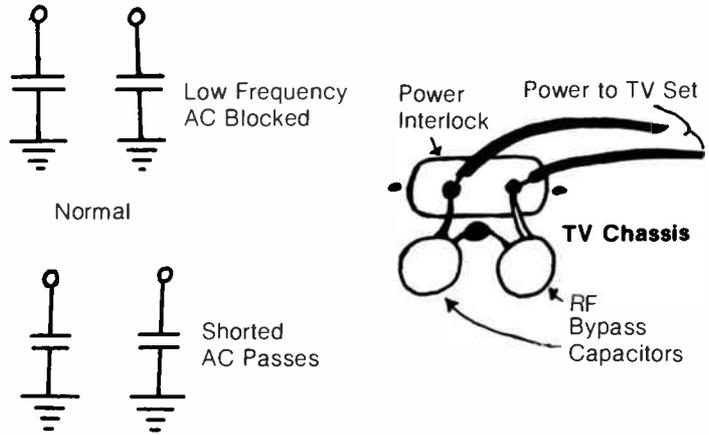


Figure 1

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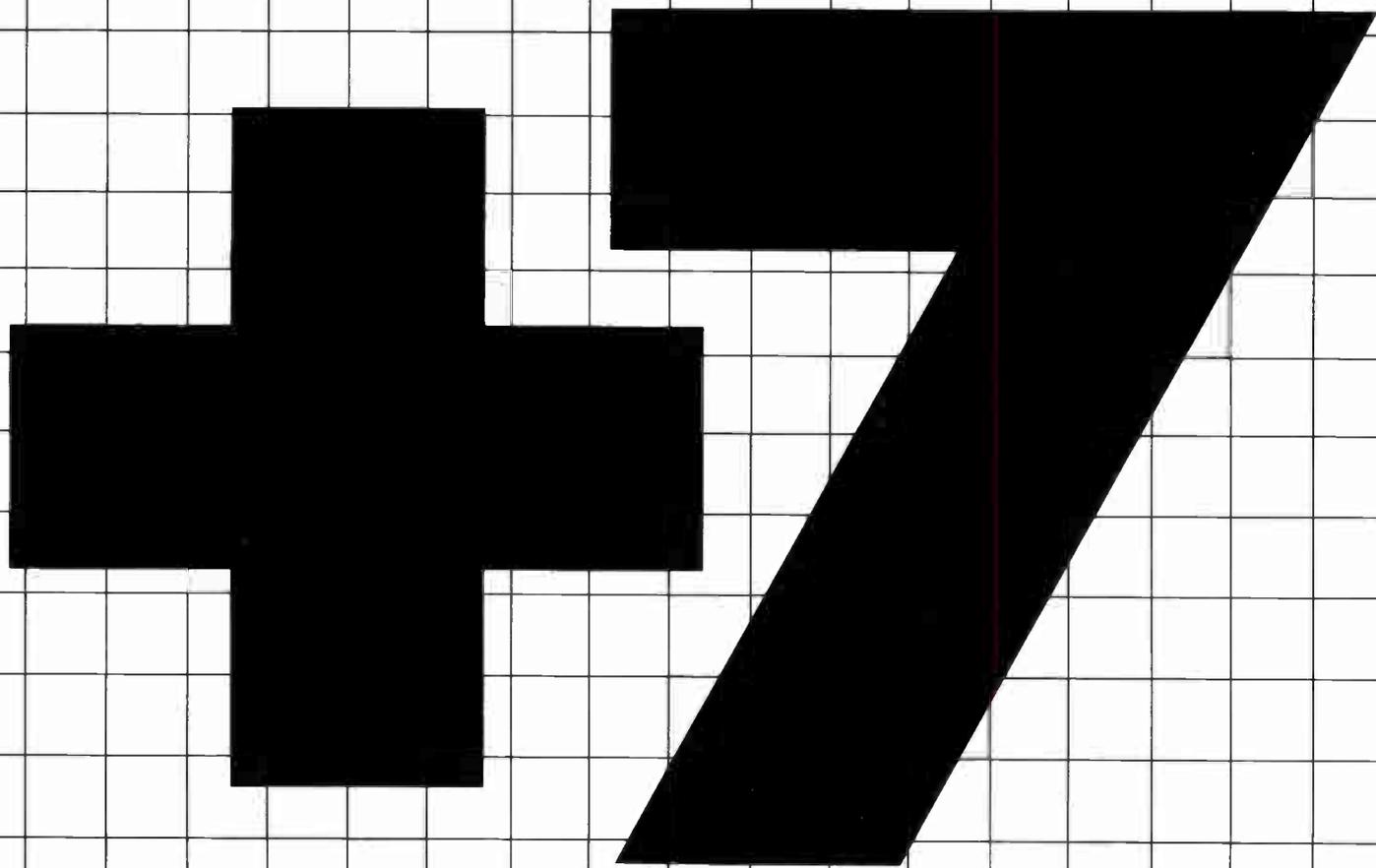
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# International News



## Study Mission Will View Fiber Optics in Japan

NEW YORK, NEW YORK—Japanese manufacturers of fiber optics and optical electronic devices recently have made statements that point to an extensive Japanese commitment to R&D with an eye to world markets. An International Industrial Study Mission to Japan will examine Japanese claims and explore the state-of-the-art of Japanese fiber optics technology through visits to major manufacturers and discussions with important officials in industry and government.

Organized by the Technology Transfer Institute in New York, the mission is scheduled for November 29, 1981, through December 13, 1981, and has been designed for top management involved in the manufacturing of fiber optics and technical researchers interested in the increasing high technology of Japan's producers.

The enigma worth investigating seems to be whether the Japanese intend to package high technology applications for near-future export in competition with American and European manufacturers. Referring to the claims of Japanese manufacturers, the head of the American delegation, Dr. Paul Polishuk, president of Information Gatekeepers, Inc., wonders, "Are they really real?" While research has been intensive in Japan, little in the way of applications have appeared in Japanese society.

In the hope of furthering technology exchanges, the study mission will also be briefed on Japanese laws and regulations governing imports and exports, and a reciprocal study mission from Japan to the United States is being proposed.

The Technology Transfer group will visit Japanese fiber optics firms such as Nippon Telephon and Telegraph (NTT), Hitachi Ltd., Nippon Electric Company Ltd., Nippon Sheet Glass Company, Dia Nippon Cables Ltd., Mitsubishi Electric Corporation, Tenjin Ltd. and the Hi-Ovis project at Nara. Also, the delegation will be briefed on such quasi-governmental organizations as MITT, VISDA, and JTI.

## Japan Invests \$82 Million In Opto-Electronics

TOKYO, JAPAN—Next month, Japan plans to begin operating an opto-electronics laboratory that will develop opto-electronic integrated circuits. The circuits will combine laser devices and photo

detectors on integrated circuits.

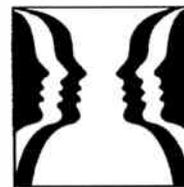
The laboratory is a joint effort by Japanese manufacturers and the Japanese government, which plans to invest \$82 million in the laboratory over the next six years. The laboratory will involve 11 major computer, electronics and communications firms.

The laboratory will be managed by the Opto-Electronics Applied System Engineering Research Association, a group that was formed last January to oversee the research of its member companies. The laboratory's staff will number around 30 in its first year and will grow by 50 percent by 1983, according to Japanese officials.

Opto-electronics is expected to develop into a \$4.5 billion annual industry.

## Exhibitors Line Up For ifcom

COLOGNE, GERMANY—The first ifcom—International Telecommunications Fair—will take place here from November 4, 1981, to November 6, 1981, in combination with the Telecom Germany '81, Congress for Telecommunications in Business and Industry.



**deutschland  
köln 81**

More than 100 exhibitors from all countries are expected at this new event. They will be from the fields of speech, data, video, text and wideband communications, radio equipment, telecommunications systems, network management, training and research. There will also be information companies and information processing, components and modules.

Leading the field of foreign exhibitors so far are companies from the USA (12) and Canada (seven), followed by Japan (three) and Switzerland (four), France, Great Britain (two each), as well as Italy, the Netherlands, Austria and Sweden. So far 42 companies from the Federal German Republic are definitely registered.

The emphasis of the ifcom is not so much system presentation, but rather information, demonstration and advice on specific user-related problems. Functional demonstration will, therefore, play a significant part on the exhibition stands. Furthermore, within the scope of contact offices, there will be a facility for direct clarification of a company's specific user-related problems with the manufacturers.

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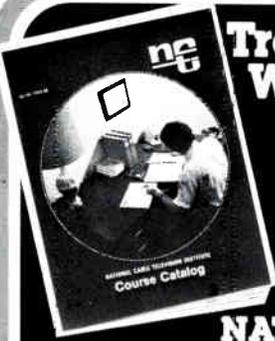
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Product Profile:  
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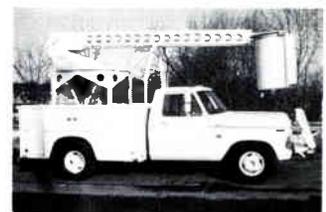
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Jack Schnabel  
Sales Manager  
TEST, Inc.

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

### Precision design, inside and out

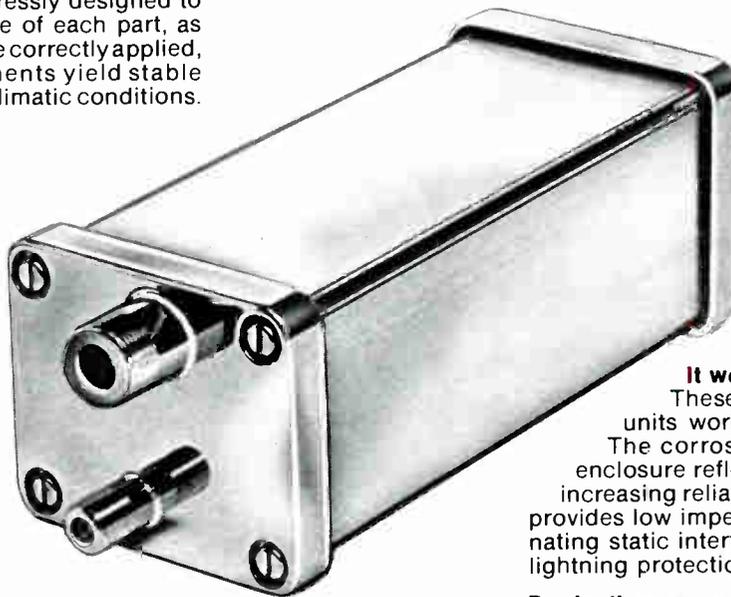
Superb performance and dependability are the result of circuitry expressly designed to maximize the performance of each part, as well as the unit itself. These correctly applied, state-of-the-art components yield stable operation even in severe climatic conditions.

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

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Compare this new, stable crystal-controlled microwave receiver to any you've seen. Only TEST has incorporated channelizing output filters that free these units from off-channel interference and unwanted spurious responses.

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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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- **Complete installation instructions.** Your installation personnel are provided a detailed instruction sheet with every unit.

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**MA-12G:** Superior performance □ high power transmitter output (+27 dBm) □ optional Fail Soft 2W (+33 dBm) ADA □ 19" rack-mountable.

Both feature 12.7 to 13.2 CARS Band operation □ PSIT and common carrier frequencies around 12 GHz □ 40 channel CARS Band capability □ available in 12.5, 25, or 50 MHz frequency plans.

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MAC can deliver the FM advantage of superior picture quality in a variety of configurations. The right system—at the right price—to meet your growing needs. For example, our MA-12X receiver and transmitter make the

backhauling of signals from remote sub-heads a practical alternative to cable or AM. When greater performance and power is required, our MA-12G system is perfect for handling multiple power splits and multihop/long haul relays.

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mote distribution problems, speak to the experts who can help you put together a complete FM microwave system including antennas, towers and installation. You can count on MAC technology to bridge the distance between you and your subscribers. Call Duke Brown at (617) 272-3100. 63 Third Avenue, Burlington, Mass. 01803.

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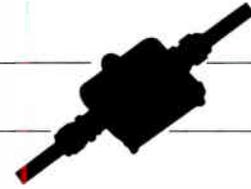
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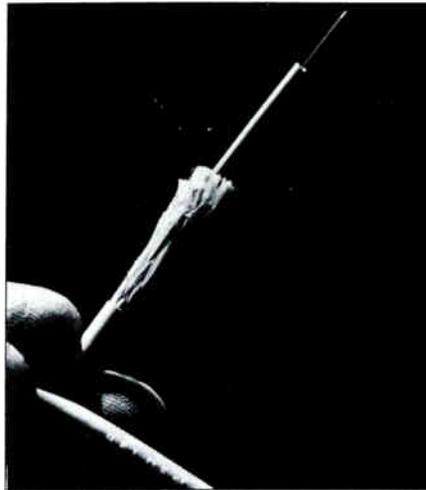


## Fiber Optics

### Low-Loss, Wide-Band Graded Index Fiber Optic Cable

A new series of 50-micrometer core graded index fiber optic cables with attenuation of 4.0 dB/km max. at 850 nanometers and a 400-MHz/km bandwidth has been introduced by **Belden Corporation's** Fiber Optics Group. The series 2272 is available in one, two, six, 12, and 18 fiber constructions. The 50-micrometer core graded index fiber, glass-clad to a 125-micrometer diameter, has an overall diameter of 250 micrometers including the protective composite outer coating. Numerical aperture is 0.20. Individual fibers in series 2272 are contained within plastic buffer tubes. In one- and two-fiber constructions, Kevlar braiding surrounds the tubing for tensile strength and crush resistance. Larger multi-fiber designs feature a jacketed Kevlar strength member centered within the buffer tube array. All designs utilize a light-blue PVC outer jacket imprinted with the Belden part number. Overall cable

diameters range from 3.8 mm (0.15 in.) for the single-fiber construction to 18 mm (0.71 in.) for the 18-fiber version. Series 2272 passes the VW-1 flame test. For information, contact Belden Corporation, 2000 South Batavia Avenue, Geneva, Illinois 60134.



*The Belden series 2272 low loss/wideband graded index fiber optic cable.*

### Artel Extends Capability Of Fiber Optic Video Transmission

A fiber optic transmission system has been introduced by **Artel Communications Corporation**. The SL-2000 transmits broadcast quality video and audio over more than three kilometers without the need for repeaters or equalizers. The SL-2000 is a modular 19-inch rack mounted, LED/PIN based system has built-in LED overload protection for the ultimate in reliability. In addition, the SL-2000 is equipped with self-monitoring, self-testing and diagnostic features. Alarm outputs monitor critical signal levels. The SL-2000 surpasses NTC-7 specifications over distances in excess of three kilometers. Video signal-to-noise ratio of 70 dB is achievable in systems up to one mile in length. Automatic video gain control is included to minimize the effect of program input level changes. AGC circuitry is switchable, as are the DC-clamping and squelch circuits. A range selector switch allows the SL-2000 to be reconfigured for long and/or short length systems without adjustment. The loop-through input conforms to EIA RS-170 and CCIR standards for baseband com-

## 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 :

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TELEX 56-7488

posite video. Dual video receiver outputs are provided for video and 20 MHz broadband signals. Separate audio modulator/demodulator modules allow the simultaneous transmission of video and studio-grade audio over one fiber. For information, contact Artel Communications Corporation, P.O. Box 100, West Side Station, Worcester, Massachusetts 01602; (617) 752-5690.



The SL-2000 fiber optic video transmission system from Artel Communications.

## Test Equipment

### Sadelco Introduces White Noise Generator

Sadelco's new model SC 450 spectrum calibrator white noise generator is

the successor to Sadelco's model 260B calibrator. The model SC 450 covers the present and future CATV frequency ranges from 4.5 to 450 MHz and is accurate to within 1/4 dB. The SC 450 incorporates design innovations including Sadelco's patented method for calibrating signal level meters and other CATV equipment. The instrument may also be used for measuring the gain, loss and response of amplifiers, splitters, filters, cables, etc. The unit also provides an economical means for sweeping complete systems. For information, contact Sadelco, Inc., 75 West Forest Avenue, Englewood, New Jersey 07631; (201) 569-3323.

## Miscellaneous

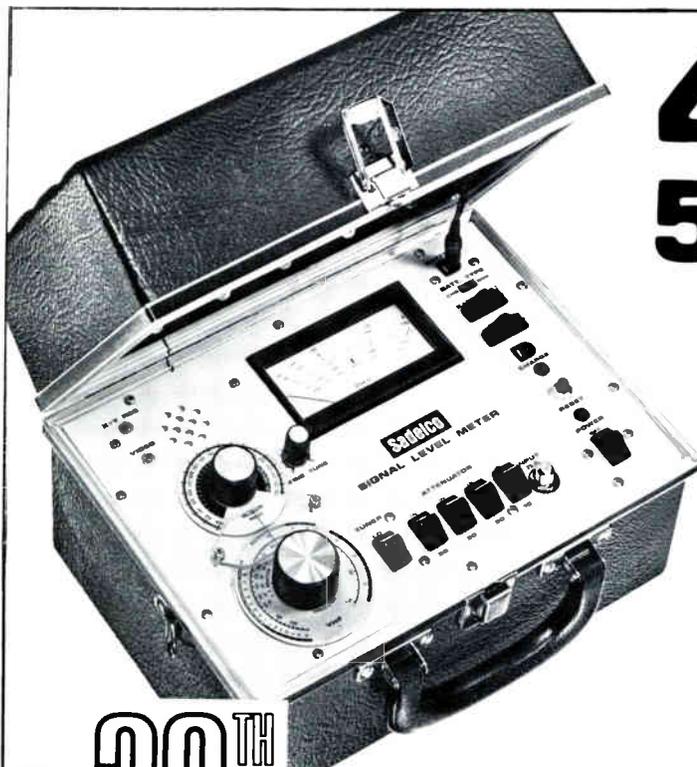
### Merrimac Industries Markets Dual Conversion TVRO

Merrimac Industries has introduced its SR-1 satellite receiver which receives every 4.0 GHz satellite channel. The SR-1 has dual conversion for image free reception, crystal control, fully tuneable second audio subcarrier (4.0-8.0 MHz), simultaneous reception of two audio subcarriers, LNA power supply, low power consumption—20 watts, built-in DC block and remote control convenience.

For information, contact Merrimac Industries, Inc., 41 Fairfield Place, West Caldwell, New Jersey 07006; (201) 575-1300.

### Klein Tools Adds Cable Hoists, Lock-Outs

Klein Tools, Inc., has added two cable hoists and lock-out equipment to its expanding product line. The cable winches can be used to pull, lift, stretch and align. Pulls and releases by ratchet action, one notch at a time. Units are ruggedly built with heavy-gauge plated steel frame and arm with a large durable grip. Swivels are made of high-tensile manganese-bronze. Catalog #28301 has a 1,000 maximum load capacity with a maximum load lift of 12 feet. Leverage factor 15:1. Catalog #28302 has a 2,000 pound maximum load capacity with a maximum load lift of six feet. Leverage factor 30:1. Klein Tools' lock-outs are designed for locking out power sources such as disconnects, switches and panel boxes. Double interlocking hasp of tempered steel with patented interlocking tabs for extra security. Two sizes are offered, one with a 1.0-inch closed hasp I.D. and the other 1.5-inch. Both lockouts have capacity for six padlocks and the bodies are coated with red plastic. For information, contact Klein Tools, Inc., 7200 McCormick Road, Chicago, Illinois 60645; (312) 677-9500.



# 450 MHz 52 Channels

PLUS . . .

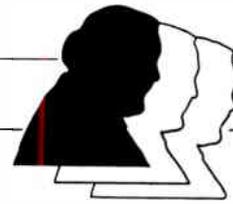
the FS 3D-VS Professional SLM has Built-in Quality Features . . .

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★ **Tom Ledbetter**, a television industry veteran, has been named system manager for **Cablevision of Parsons**. Ledbetter will come to Parsons, Kansas, from Wichita Falls, Texas, where he has served as assistant general manager and previously as director of programming for the rapidly growing American Television and Communications system. ATC is parent company of Cablevision of Parsons. Ledbetter will be responsible for the day-to-day operation of the system, including programming, marketing, public relations and overall management and administration.

★ **Vitek Electronics, Inc.**, a subsidiary of Augat, Inc., has appointed **Joe Griffin** as vice president of marketing, a new position. Griffin will be responsible for developing new products for Vitek and will manage Vitek's national sales force, coordinate its staff of marketing applications specialists and direct all marketing research, advertising and sales promotions efforts. Prior to joining Vitek, Griffin held the position of director of marketing

and sales at U.S. Pioneer Electronics Corporation. Griffin holds an MBA from DePaul University, Chicago.



Joe Griffin

★ Three top staff members have been named at **American Cablevision of Indianapolis**, the new cable television system which will serve viewers in

Indianapolis and several adjacent unincorporated areas. American Television and Communications Corporation, parent organization of ACI, has appointed **Frank Reinemeyer**, former assistant general manager of the Toledo, Ohio, cable system, to be general manager of American Cablevision of Indianapolis. Other new employees named to the American Cablevision management team are **Ron Enas**, chief engineer, and **Joe Marzano**, marketing manager. Enas joined ATC in 1979 as chief engineer for the developing Rochester, New York, system.

★ **MetroData Corporation** has enlarged and expanded two of its service centers. Cable engineer **Matt I. Kruger** will continue to manage the Eastern Regional Field Engineering Office located in New York. Kruger joined MetroData in January 1981 after five years as an independent cable industry engineering consultant. **Charlie A. Baum**, who also joined MetroData earlier this year, will be headquartered in the Eastern Regional Office. Field engineering support services

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in the Western United States will be provided directly from MetroData's new corporate headquarters located in Concord, California.

★ **Magnavox CATV System, Inc.**, has appointed **Salvatore L. Yorks** to the position of field service engineer to the Magnavox Technical Services Department. Before joining Magnavox CATV, Yorks served as headend technical supervisor and outside plant supervisor for Syracuse Cable Systems. He is a member of the Society of Cable Television engineers.



Salvatore L. Yorks

★ **Group W Satellite Communications** has named **Walter Nichol** engineering manager of its operation, starting August 17. Nichol currently serves in a similar capacity at Group W television station KPIX/San Francisco, where he has been stationed since 1976. Nichol, a Group W staffer since 1968 will coordinate engineering projects for GWSC's operations headquarters, currently under construction in Stamford, Connecticut.

★ **Turner Broadcasting System** Board Chairman R.E. "Ted" Turner announced the promotion of two new vice presidents at TBS. **Robert Sieber** has been named vice president of research and **Gene Wright** has been named vice president, engineering. Wright has been director of engineering for Turner Broadcasting since March 1979. Prior to that, he was chief engineer of WTBS. Since March 1978, Sieber has been director of marketing for WTBS. He also has been responsible for TBS research, including WTBS, Cable News Network and Turner Broadcast Sales. Prior to joining Turner Broadcasting, Sieber was director of research for the Atlanta-based Cox Broadcasting Corporation.

★ **James H. Smith, III**, vice president and general manager of **Cox Cable San Diego**, was recently elected to a two-year term on the board of directors of the **California Cable Television Association**.

★ **John H. Chapple** has been named executive vice president and general manager of **Syracuse Cablesystems**. Chapple replaces Frank Nuessle, who has left Syracuse to become general manager of the firm's Portland, Oregon operation. Employed by the firm since it began operations in September 1978, Chapple previously served as assistant general manager handling a variety of administrative duties including coordination of the 1,000 home fire-alarm pilot project.

★ Ray O'Toole, vice president for the Eastern Region of **United Cable Television Corporation**, has announced that **Chuck Pumphrey** has been named general manager of East Lansing and Meridian Township, serving some 11,000 subscribers. Pumphrey's office will be located in East Lansing. He has been an employee of United for three years, beginning as an installer for United Cable TV of Northern Illinois and most recently as regional marketing director for the Eastern Region. In addition, **Dan Backus** has been named plant supervisor and technical projects coordinator for the company's Michigan operations. Backus will be working with Michigan State University, overseeing experiments in the development of two-way services in the East Lansing and Downriver Complex.

★ **Heritage Communications, Inc.**, has announced the appointment of **William E. (Skip) Pratt** as the general manager for the Mississippi cable television systems. Prior to joining Heritage, Pratt was manager of several Teleprompter Corporation/Cable TV systems in the suburbs of St. Louis. Before joining Teleprompter Corporation, Pratt was area director of corporate development for Sammons Communications where he was responsible for the complete development of cable television franchising throughout 91 municipalities of the St. Louis county area. Pratt retired from the United States Army with the rank of Major in 1979. In the military, he served as a senior electronics communications officer and a training development staff officer.

★ **Rollins CableVision** has announced the promotion of **Kent Higgins** from general manager of the Wilmington cable television system to regional manager for Rollins CableVision in Rhode Island and southeastern Massachusetts.

As regional manager, Higgins will construct and operate a 52-channel interactive, state-of-the-art cable television system serving portions of Rhode Island and southeastern Massachusetts. He will also oversee five cable television operations.

Higgins is president of the Philadelphia

Cable Club, a former member of its board of directors in Connecticut and former vice president of the West Virginia Cable Club Association.

★ **Bonneville Satellite Corporation** has named **Gary W. Horrocks** as managing engineer.

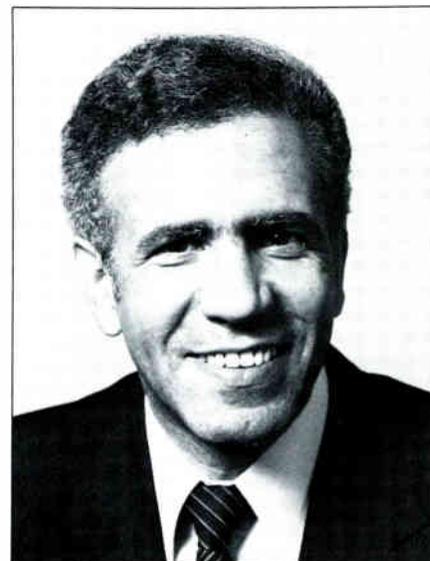
Horrocks will be responsible for all engineering and technical areas including the construction and operation of Bonneville Satellite's Salt Lake City uplink facility, which is scheduled to become operational in July 1981.

Prior to joining Bonneville Satellite Corporation, Horrocks was director of engineering at KCPX AM and FM radio, and KTVX television, Salt Lake City, where he worked for 20 years in various engineering positions.

★ **Glenn T. Clark** has been appointed vice president/general manager of **SelectTV of Wisconsin, Inc.** Clark is responsible for overseeing all Wisconsin operations. He replaces Burton McQueen, who recently became a member of SelectTV's New Business Development Division.

Clark has been with the over-the-air pay-television service since 1971. Previously he was director of data processing with Robert Block Advertising.

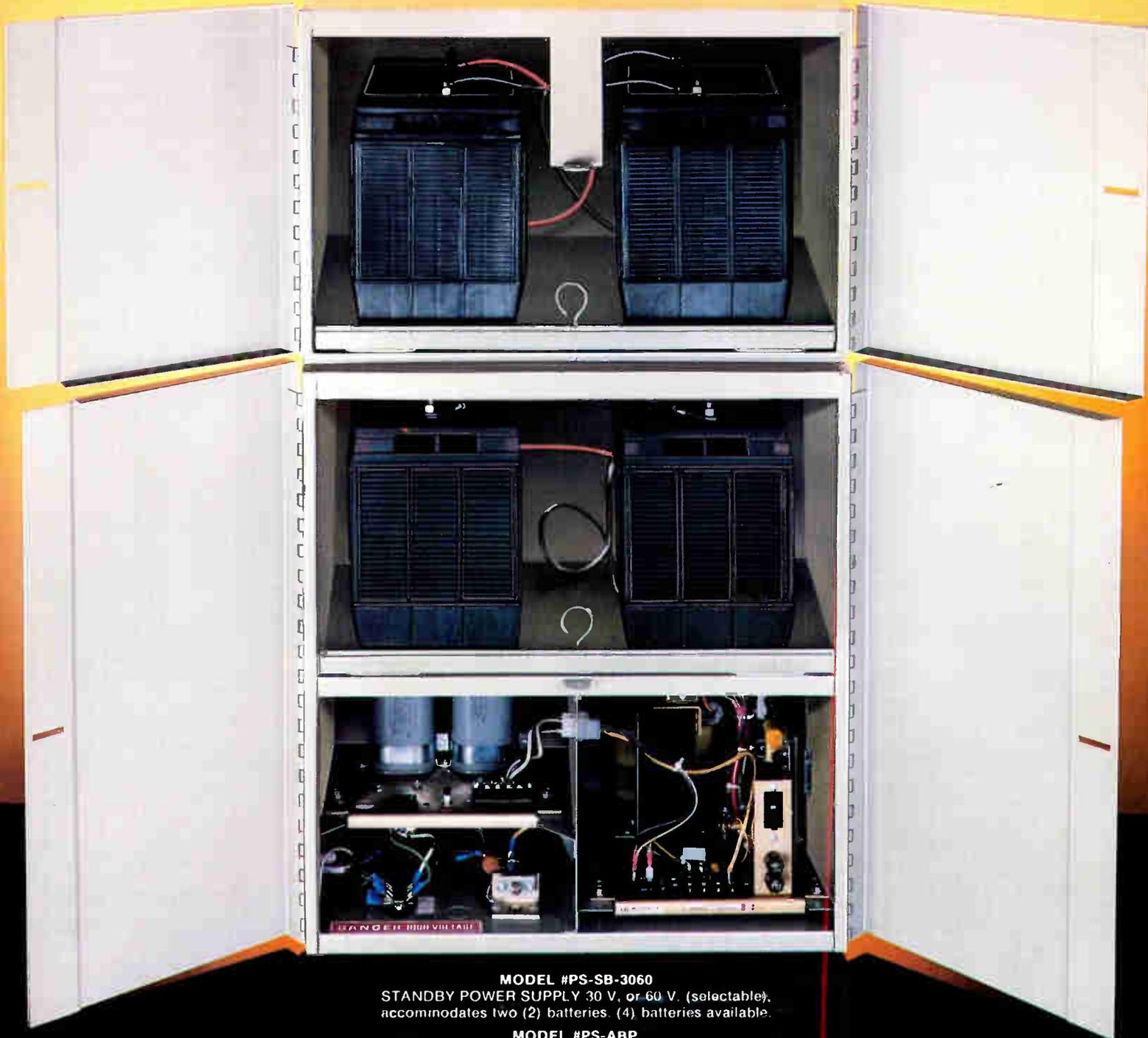
★ **Roosevelt Mikhail** has been named director, CATV engineering for **Warner Amex Cable Communications, Inc.** Mikhail will be responsible for interface activities for the metro system engineering group with field project engineering, headquarters engineering and operations groups. Formerly a corporate senior staff engineer for Warner Amex, Mikhail joined the company in 1974 as a regional engineer in Atlanta, Georgia. He is a graduate of Cairo University, Cairo, Egypt, where he earned a BSEE.



Roosevelt Mikhail

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AUXILIARY BATTERY PACK, "Piggy-Back" Housing to accommodate two (2) additional batteries. Use with Model  
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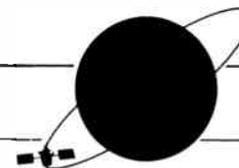
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<b>ARTS</b>		9:00 p.m./12:00 a.m.		F1.#1	<b>National Christian Network</b>		6:00 a.m./8:00 p.m.	073*/#	Comstar D-2.#4V
<b>ACSN</b>	Weekdays: Weekends:	6:00 a.m./4:00 p.m. 6:00 a.m./1:00 p.m.	192*/#	F1.#16	<b>National Jewish Network</b>	Sunday	noon/4:00 p.m.		F1.#16
<b>AETN</b>	Mon.-Sat.: Sunday:	4:00 p.m./7:00 p.m. 4:00 p.m./6:00 p.m.		F1.#15	<b>Nickelodeon</b>		8:00 a.m./9:00 p.m.	311*/# (E.C.M) 519*/# (P)	F1.#1
<b>BET</b>		11:00 p.m./2:00 a.m.	018*/#	F1.#9	<b>PTL</b>		24 hrs.	None	F1.#2
<b>Bravo</b>		8:00 p.m./6:00 a.m.		Comstar D-2.#3H	<b>Private Screenings</b>	Fri.-Sat.	12:00 a.m./3:00 a.m.		Westar III.#7
<b>Cabletext</b>		24 hrs.	None	F1.#6 Vertical Blanking	<b>Reuters</b>	Weekdays	4:00 a.m./7:00 p.m.	None	F1.#18
<b>CBN</b>		24 hrs.	None	F1.#8	<b>SIN</b>		24 hrs.	None	Westar III.#8
<b>Cinemax</b>		24 hrs.	None	F1.#20/23	<b>SPN</b>		24 hrs.	None	Westar III.#9
<b>CNN</b>		24 hrs.	None	F1.#14	<b>Showtime</b>		24 hrs.	None	F1.#12 (E.C) F1.#10 (M,P)
<b>C-SPAN</b>	Weekdays: Sundays:	9:30 a.m./6:00 p.m. Precedes USA Network, three to four hours	195*/#	F1.#9	<b>Trinity (KTBN)</b>		24 hrs.	None	Comstar D-2.#9V
<b>ESPN</b>		24 hrs.	None	F1.#7	<b>USA Network</b>				F1.#9
<b>Escapade</b>		8:00 p.m./6:00 a.m.		Comstar D-2.#4V	Off-times are listed below. For on-times, see notes below.				
<b>Eternal Word Television Network</b>		7:00 p.m./11:00 p.m.		Westar III.#12	Sept. 1	2:00 a.m.	Sept. 16	3:30 a.m.	
<b>GalaVision</b>	Weekdays: Saturdays: Sundays:	8:00 p.m./3:00 a.m. 3:00 p.m./3:30 a.m. 1:30 p.m./3:00 a.m.		F1.#18	Sept. 2	3:00 a.m.	Sept. 17	4:00 a.m.	
<b>HBO</b>	Sept. 1 Sept. 2 Sept. 3 Sept. 4 Sept. 5 Sept. 6 Sept. 7 Sept. 8 Sept. 9 Sept. 10 Sept. 11 Sept. 12 Sept. 13 Sept. 14 Sept. 15 Sept. 16 Sept. 17 Sept. 18 Sept. 19 Sept. 20 Sept. 21 Sept. 22 Sept. 23 Sept. 24 Sept. 25 Sept. 26 Sept. 27 Sept. 28 Sept. 29 Sept. 30	5:00 p.m. 2:54 a.m. 5:00 p.m. 2:16 a.m. 5:00 p.m. 2:30 a.m. 6:00 p.m.  3:39 a.m. 5:30 p.m. 1:39 a.m. 5:30 p.m. 2:07 a.m. 5:00 p.m. 3:05 a.m. 5:30 p.m. 2:16 a.m. 5:30 p.m.  2:43 a.m. 5:30 p.m. 2:32 a.m. 5:30 p.m. 2:45 a.m. 6:00 p.m. 2:36 a.m. 5:30 p.m. 2:30 a.m. 5:30 p.m.  2:46 a.m. 6:00 p.m. 1:49 a.m. 5:00 p.m. 3:07 a.m. 5:00 p.m. 2:13 a.m. 5:00 p.m. 2:04 a.m. 5:00 p.m.  2:08 a.m. 5:30 p.m. 2:56 a.m. 5:00 p.m. 2:19 a.m. 5:00 p.m. 2:40 a.m.	Program 729*/# Scramble 835*/# Duplication 940*/# Take-2 E 592*/# Take 2 W 681*/#	F1.#24 F1.#22 F1.#23 F1.#20	Sept. 3 Sept. 4 Sept. 5 Sept. 6 Sept. 7 Sept. 8 Sept. 9 Sept. 10 Sept. 11 Sept. 12 Sept. 13 Sept. 14 Sept. 15	5:00 p.m. 2:30 a.m. 6:00 p.m. 3:00 a.m. 3:30 a.m. 3:00 a.m. 3:30 a.m. 3:00 a.m. 2:30 a.m. 2:30 a.m. 2:30 a.m. 2:30 a.m. 2:30 a.m. 2:30 a.m. 4:00 a.m. 4:00 a.m. 3:00 a.m. 3:00 a.m. 3:30 a.m. 3:00 a.m. 3:00 a.m. 3:00 a.m. 3:00 a.m. 3:00 a.m. 3:00 a.m. 3:00 a.m.	Sept. 16 Sept. 17 Sept. 18 Sept. 19 Sept. 20 Sept. 21 Sept. 22 Sept. 23 Sept. 24 Sept. 25 Sept. 26 Sept. 27 Sept. 28 Sept. 29 Sept. 30	3:30 a.m. 4:00 a.m. 4:00 a.m. 3:00 a.m. 3:30 a.m. 3:00 a.m. 2:30 a.m. 2:30 a.m. 4:00 a.m. 4:00 a.m. 3:00 a.m. 3:00 a.m. 2:30 a.m. 2:30 a.m. 3:00 a.m. 3:00 a.m. 2:30 a.m. 2:30 a.m. 3:00 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.	None	F1.#3
<b>Lifestyle</b>		24 hrs.	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: Weekends:	noon/5:00 p.m. 8:00 a.m./1:00 p.m.	243*/#	F1.#22	<b>Women's Channel</b>		24 hrs.	None	F1.#6 Subcarrier
<b>MTV: Music Television</b>		24 hrs.	None	F1.#11					

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

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

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5-NF 7-13, high band	-75db	2.0db	-10db	-2db
5-NF J-W, super band	-70db	3.0db	-15db	-3db



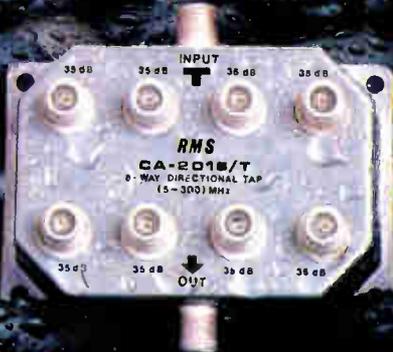
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