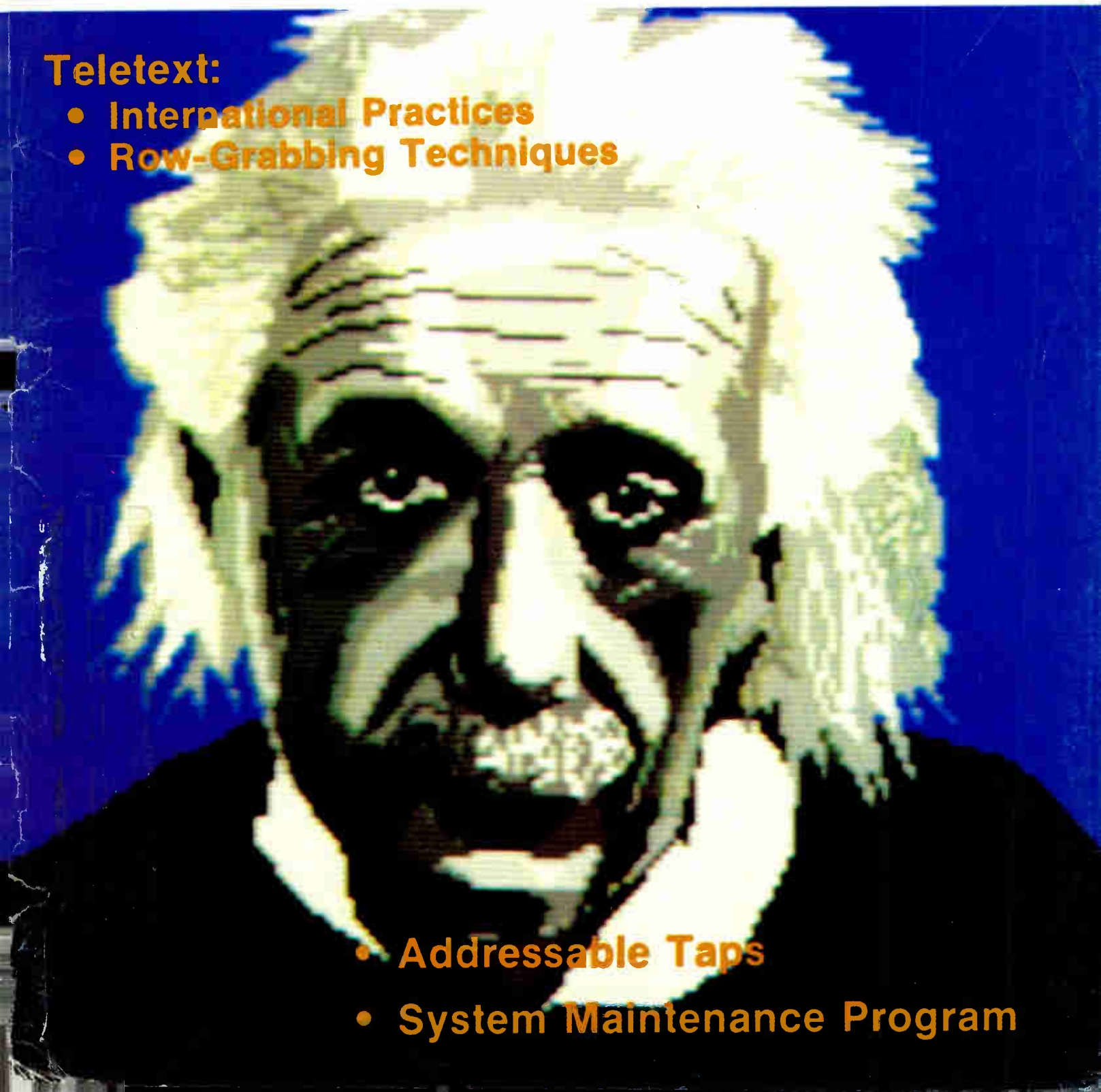
CED™

Product Profile:
Trunk Amplifiers

Communications Engineering Digest/The Magazine of Broadband Technology December 1981



Teletext:

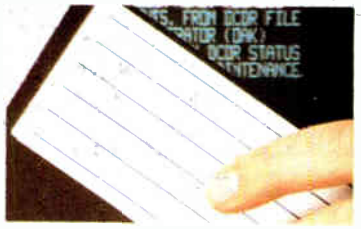
- International Practices
- Row-Grabbing Techniques

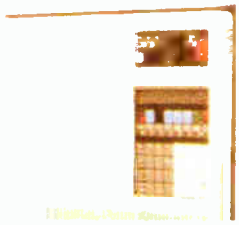
- Addressable Taps
- System Maintenance Program

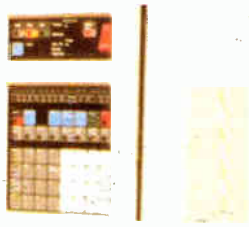
Comparing addressability?

Hardware is just half the story.

Oak software is the rest.







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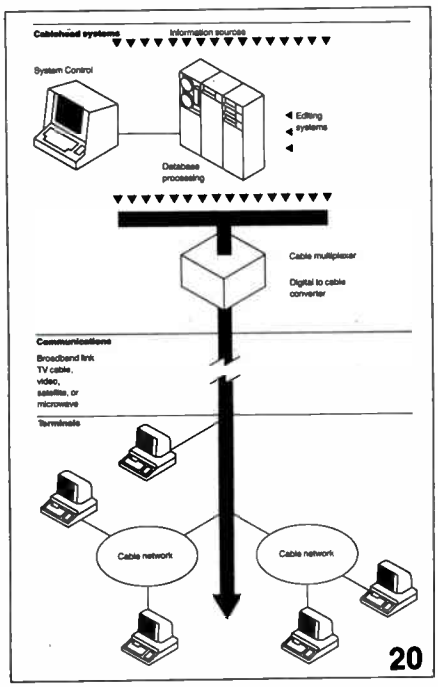
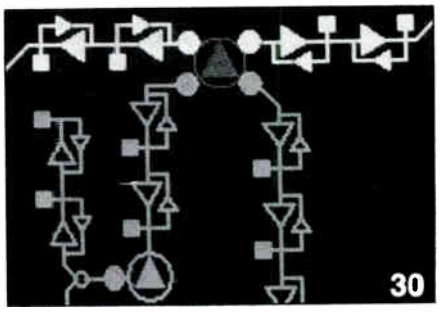
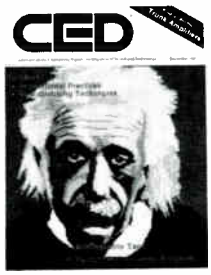
Contents







About the Cover

Imagine what Albert Einstein would have done with videotex. This is what videotex did with Albert Einstein, relatively speaking. This videographic representation was generated using Telidon teletext software, the French videotex system that is compatible with the *de facto* AT&T North American standard. Photo courtesy of Telidon.

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"Amazing that Sony could come up with a state-of-the-art computerized system on its first try," Cohen continues. "And because it's specifically designed for one-inch, it lets me do more with my equipment than other editors."

Broadway Video is both a production and post-production facility in New York City. Its recent credits include "The Best of Saturday Night Live," major political campaigns, promos for the cable network Showtime, and a variety of industrial shows.

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HUMAN EDITORS MAY HAVE BUT NOT OUR SONY."

Randy Cohen, Broadway Video

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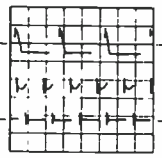

Up for Grabs

Although primarily intended for use in broadcast areas, the FCC has proposed the use of lotteries if there is more than one applicant for any initial license or construction permit involving the use of the electromagnetic spectrum. The intent of the new procedure is to grant more permits to groups or organizations that are "underrepresented in the ownership of telecommunications facilities." The lottery, or "random selection system", could greatly reduce many commission costs, according to several FCC spokesmen. It would streamline the process and "minimize the attempts to delay" that often occur when several applicants wrestle over one license. Authority to use such a process was granted by Congress August 31, when President Reagan signed the Omnibus Budget Reconciliation Act of 1981, which included the lottery provision. During debate on the act, Senator Barry Goldwater (R-AZ) said the random selection process would be used primarily "for the grant of broadcast licenses." However, the actual authority is broader than that, giving the commission the ability "to allocate common carrier frequencies...in limited instances."

"Sold for $14.4 Million!"

While the FCC is considering lotteries as a means of allocating the electromagnetic spectrum's scarce resources, RCA Americom no doubt is celebrating over the results of its allocation method for satellite transponders. Last month RCA Americom put leases for seven transponders on Satcom IV up for grabs. In a 45 minute auction, RCA received $90.1 million in commitments. Fifty-three hopefuls participated in the auction, driving prices for leases up as high as $14.4 million. That price was paid by Transponder Leasing Company (representing Satellite Systems Corporation) for transponder 2. The big surprise of the day was a winning bid from a Chattanooga, Tennessee man affiliated with Faith Broadcasting. The man, Billy H. Batts, bid $14.1 million for transponder 3, beating out RCTV. Later on, RCTV won its place in the sky with a $13.5 million bid for transponder 11. Quick to respond, Home Box Office grabbed transponder 15 for $12.5 million. Not to be outdone, Showtime put up a fight for transponder 16, only to be shot down by Inner City Broadcasting which took the transponder for $10.7 million. Warner Amex Satellite Entertainment Company lost in its first effort to gain a transponder (transponder 2) but prevailed with a $13.7 million bid for transponder 4. UTV Cable Network finally got its piece of heaven with a $11.2 million bid for transponder 23. Only one thing remains before RCA Americom can take its money to the bank. The FCC must decide that the auction process is valid.

Announcement Expected

Not all the excitement at the Western Show will come from the programming side of the industry. Jerrold plans to make an announcement of some significance introducing an upgraded version of its Starline trunk amplifier series. The company will announce at the show that the Starline 400 series has been upgraded to 450 MHz. The state-of-the-art amplifier will feature modular construction along with one- and two-way capability. The triple beat of the new amplifier will be -80 dB for the trunk, and -56 dB for the bridger. The full gain has not been changed from the 400 series and will remain 24 dB for the trunk and 44 dB for the bridger, while the gain control range has been changed to 8.0 dB for the trunk and 9.0 dB for the bridger. The noise figure for the new amplifier is 7.0 dB.

Tightening the Rules

A final ruling on the signal leakage issue could come from the FCC later this month. The Cable Bureau has put the finishing touches on its report and the document needs the stamp of approval from the Interdepartmental Radio Advisory Committee before it can be placed on the commission agenda. According to a spokesman at the Cable Bureau, an "interval of assignment offset requirement" could be the final word. Two of the main opponents in the signal leakage debate are the Federal Aviation Administration and the NCTA. The FAA has called for the cable industry to offset channels in the 108-136 MHz and 225-400 MHz bands. On the other hand, the NCTA claims that cable use of these frequencies offers no threat to air traffic and contends that offsets are both unreasonable and unnecessary. The spokesman offered another indication of what to expect: "We're obviously going to be keenly aware of what the FAA considers necessary to protect its frequencies remembering that they are not even the ones that the commission has allocation power over [they are intergovernmental assignments]."

Under the Wire

Several weeks ago, the FCC accepted eight applications for direct broadcast satellite systems while rejecting five others. Recently, the commission sent letters to the losers, giving some valuable hints for companies that might wish to enter the scramble for DBS slots in the future. The FCC's biggest complaint was that the firms submitted their applications just to beat the July 16 filing deadline. In so doing, their proposals for DBS systems were less than sufficient. In most letters, the commission used such phrases as "not substantially complete" or "unacceptable for filing" to describe the applications. But the most crushing statement was saved for both Unitel Corporation and Satellite Development Trust, Inc. In explaining the deficiencies of their attempts to get in on the DBS rush, the commission wrote, "The application was also unsigned."

Correction

The October **CED** Product Profile on Test Equipment contained incorrect information on the model SA 440 spectrum analyzer from Comsonics, Inc. The correct specifications for the analyzer are as follows: Range: 500 kHz to 440 MHz; Amplitude Measurement, -60 to +90 dBmV; Resolution, 1.0 MHz to 1.0 kHz, four positions; Flatness, ±1.0 dB; Special Features: LED digital frequency display, 72 dB dynamic range, storage mainframe, phase lock, built-in calibrator; Availability: immediate; Single Unit Cost: $6,695 including storage mainframe, $4,500 without mainframe. **CED** regrets this error.

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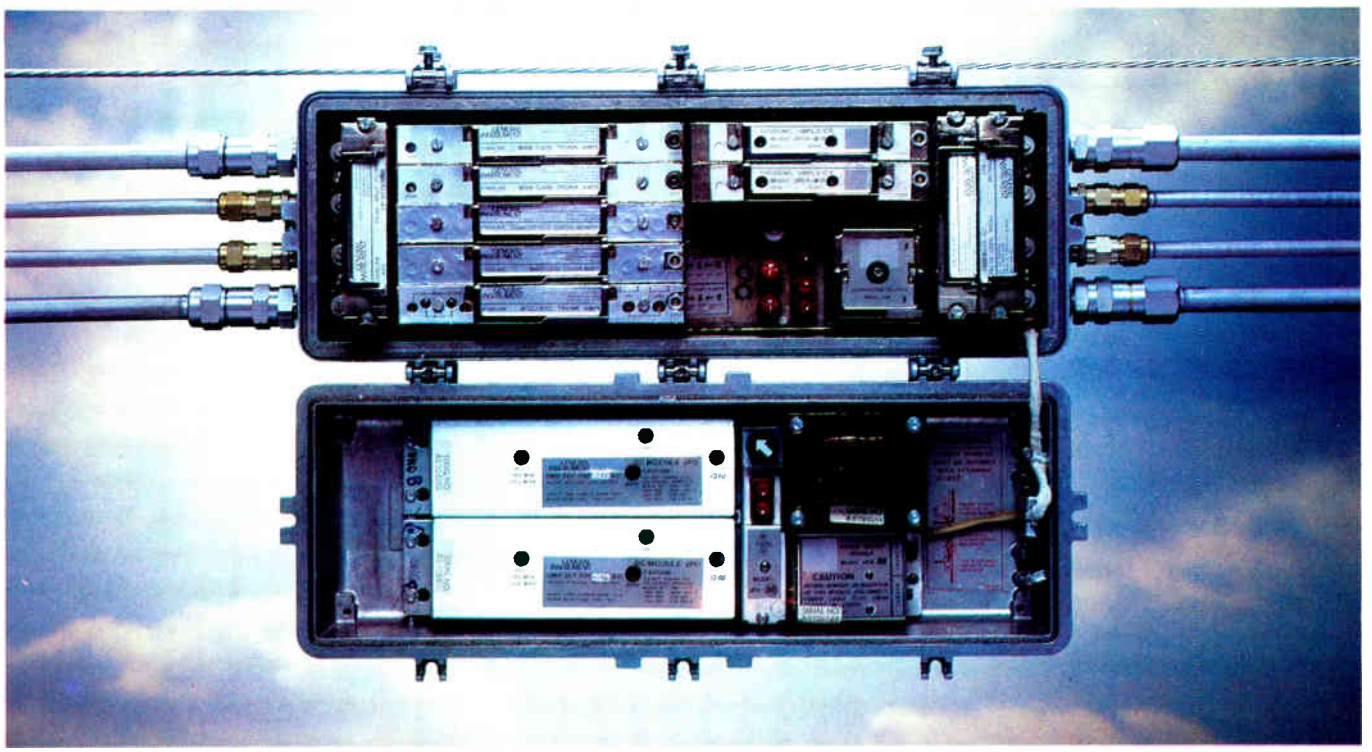

It's the 450 MHz amplifier designed especially for cable systems which plan to offer new two-way services. Home security. Pay-per-view. Shop-at-home. Electronic funds transfer. Others.

Every station can be fitted with redundant amplifiers and power supplies, plus status monitoring and feeder disconnect. They'll minimize service interruptions, help pinpoint problems, and let you schedule repairs during regular hours.

Starline 450's modular design gives you unsurpassed flexibility in a single housing. You can install it as a basic one-way system, a two-way subsplit or a dual cable system with the "B" cable midsplit. You can easily upgrade with plug-in modules later. For dual-cable, Super Trunk applications, it can amplify over 66 channels in each of two directions or over 132 in one direction.

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Seminars

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.
4-5: The **National Federation of Local Cable Programmers'** 1981 Southeast regional conference will be held at the Everglades Hotel in Miami. Contact T. Willard Fair, (305) 358-3237.
4-6: The 1981 fall meeting of the Midwest region of the **National Federation of Local Cable Programmers** will be held at the Howard Johnson Motor Lodge in Milwaukee. Contact Gary Ballsieper, (414) 272-5600.
7-8: A "Tele/Conferencing Technologies' seminar co-sponsored by **Colorado Video** and **Cross Communications Company** will be held at the Hilton Harvest House in Boulder, Colorado. Contact Tom Cross, (303) 499-8888.
7-8: Two seminars on the satellite industry—"Satellite Technology for the Nontechnical Manager" and "Programs and Marketing Opportunities"—sponsored by ***Satellite News*** and **PSF Seminars** will be held at The Vista International in New York City. Contact *Satellite News*, (301) 986-0666.
7-12: A **Community Antenna Television Association**-sponsored technical training seminar on system distribution, problems, failures, tests and measurements will be held at the Hotel Georgian Terrace, Atlanta, Georgia. Contact the CATA Engineering Office, (305) 562-7847.
8-9: An "Advanced Strategies" briefing by the **Yankee Group** will be held in Palo Alto, California. Contact Majorie Sugarman, (617) 542-0100.
9: "Telecommunications Vulnerability: Problems and Solutions" is the topic of a conference/seminar on security in satellite data transmissions in business applications sponsored by the **International Association of Satellite Users** at One World Trade Center, New York City. Contact IASU, (703) 442-8781.
9-10: An Electronic Mall Conference on enhanced services sponsored by **Arlen Communications** and **Online Conferences Ltd.** will be held at the St. Regis Hotel in New York City. Contact Gary Arlen, (301) 229-0909.
10-11: "Satellite Communications" is the topic of a seminar sponsored by **TeleStrategies, Inc.**, at the Hyatt Regency O'Hare, Chicago, Illinois. Contact TeleStrategies, (703) 734-7050.
16: A meeting of the **Atlanta Cable Club** will be held at the Atlanta Stadium Club in Atlanta. Contact Cathy Kuhn, (404) 231-5358.
17: A meeting of the New York Chapter of **Women In Cable** will be held at the Doral Inn in New York City. Contact Linda Broadsky, (212) 486-0012.

January

11-15: The fourth annual **Communications Networks 1982** exposition will be held at the Atlanta, Georgia, World Congress Center. Contact Bill Leitch, (617) 879-0700.
13: The **New England Cable Television Association** winter conference will be held at the Sheraton Tara Hotel in Nashua, New Hampshire. Contact Gary Cain, (603) 224-3373.
15-16: The Rocky Mountain Chapter of **Women In Cable** will be holding a two-day seminar on "Management Skills" with analysis for women at the Rodeway Inn in Littleton, Colorado. Contact Pat Cramer, (303) 779-5999.
25: A panel discussion entitled "Where are we now?" sponsored by the Rocky Mountain Chapter of **Women In Cable** will be held at a location to be determined. Contact Pat Cramer, (303) 779-5999.
28-30: The first national conference and exposition for low-power television, **LPTV '82**, will be held at the Sheraton Washington (D.C.) Hotel. Contact Conference Management Corporation, (203) 852-0500.

February

7-10: The annual convention of the **National Religious Broadcasters** will be held at the Sheraton Washington Hotel in Washington, D.C. Contact the NRB, (201) 575-4000.
9-10: A seminar sponsored by the **Cabletelevision Advertising Bureau** will be held at the Waldorf-Astoria Hotel in New York City. Contact Saralee Hyman, (212) 751-7770.
9-10: The **Arizona Cable Television Association's** annual convention will be held at the Phoenix Hilton Hotel. Contact the ACTA, (602) 257-9338.
14-15: The **Idaho Cable Television Association's** annual convention will be held at the Red Lion Rivershore in Boise. Contact Randy Merrell, (208) 785-5705.
17-19: The 22nd annual Texas Show sponsored by the **Texas Cable TV Association** will be held at the San Antonio Convention Center. Contact Bill Arnold, (512) 345-8888.
23-25: The **Cable News Network** will be conducting an affiliate production seminar at the Atlanta Hilton. Contact Jayne Greenburg, (404) 898-8500.
23-25: NEPCON West '82 will be held at the Anaheim (California) Convention Center. Contact Cahners Exposition Group, (312) 263-4866.

March

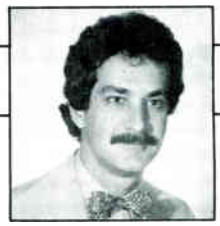
3-5: The annual convention of the **Arkansas Cable Television Association** will be held at the Arlington Hotel in Hot Springs. Contact the association, (501) 661-7676.
7-9: The annual convention of the **Ohio Cable Television Association** will be held at the Hyatt Regency in Columbus. Contact the OCTA, (614) 461-4014.
11-16: The **National Association of Television Program Executives'** 19th annual conference will be held at the Las Vegas Hilton in Las Vegas, Nevada. Contact NATPE, (717) 626-4424.
16-18: Information Gatekeepers Inc., is sponsoring COMSEC '82, the international communications security conference and exposition, at Boston's Hyatt Regency Cambridge. Contact Michael O'Bryant, (617) 739-2022.
29-31: The 1982 Information Utilities conference, sponsored by **Online, Inc.**, will be held at the Rye Town Hilton Hotel and Conference Center in Rye, New York. Contact Jean-Paul Emard or Jeff Pemberton, (203) 227-8466.

April

4-7: The 60th annual convention of the **National Association of Broadcasters** will be held at the Dallas Convention Center, Dallas, Texas. Contact the NAB, (202) 293-3500.

CED

Editorial



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A Conspiracy of Words

Every profession in any society has its jargon, the language of initiate, exclusive communication. It's the means by which people quickly identify with the other people who have and share the same expertise. At the same time, when that jargon is used in the presence of the layman, it identifies the speaker as someone apart, somehow different, having a professional knowledge the layman doesn't possess. It excludes the layman and at the same time establishes a community between the people who are the only ones with the expertise.

This is true of auto mechanics, heart surgeons, witch doctors, lawyers and street-corner hoods. It's also true of cable television engineers and technicians.

But the language of cable techs is not just a cold and arbitrary exclusionary medium. The jargon of cable techs reflects the work that they do and the form in which they think about what they do. It's a study in itself.

You can almost say that the words and phrases themselves imply a system mentality or the thinking of the thing being expressed in a physical perception. Take for example the word "drop." Most often the word encompasses all the equipment from the tap to the subscriber's set. The cable at the drop site actually "drops" down from the feeder. And then there's the word "feeder." It's the cable that supplies the signal to the drop, where it is consumed by the user.

Another expression like this is to "pull cable." When coaxial cable is installed either overhead on the aerial strand or run through conduits underground, it is pulled. Overhead it is pulled from a trailer across the span between poles and underground it is fed into the conduit and pulled through the other side.

A true "turn-key" construction of a cable system involves system design, strand or underground mapping, make-ready surveys, complete supply of equipment and labor, testing and proof-of-performance and the turn-on. In other words, the entire job is done, the gate is closed and locked, and the key is handed over.

These are some example of the jargon of cable engineers and technicians, the language of their profession. But who does it exclude? George Bernard Shaw, the Victorian wordsmith, once said, "All professions by definition are conspiracies against the laity." Could one group that the conspiracy of words used by engineers and technicians in cable exclude be management?

George Sell

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Receiving Two Satellites With One Earth Station

NEW YORK—In what could amount to a major breakthrough on the earth station front, Hughes Communications claims it has developed a technique for modifying earth stations that would allow simultaneous reception of programming from two satellites. For one-quarter to one-third the cost of building a second earth station, cable operators will how be able to alter their present antennas through the use of a double-beam feed system to receive all 48 transponders on any two adjacent satellites.

Clay Whitehead, president of Hughes Communications, says "this new technique addresses the practical needs of cable operators by providing a cost-effective way to maximize their access to program services."

The technology, which has never before been used on small earth stations, was demonstrated ten years ago by Hughes Aircraft Company. At that time, Hughes equipped a 35-foot antenna to receive signals from satellites three degrees apart. The implementation was not of significant commercial use, however, since most earth station operators use antennae 4.5 to seven meters in diameter. But according to Hughes engineers, any parabolic antennae greater than 4.5 meters in diameter can by modified to include the dual-beam feed system.

The modification involves the replacement of single antenna feeds with a dual-beam feed system. Signals are received from each satellite along two separate beams. They are then reflected off the parabolic surface of the antenna up to the dual-feed system. The dual-began feed system is suspended from an adjustable support structure. This enables TVRO (television receive-only earth station) operators to direct their existing antenna to two adjacent satellites in the geostationary arc and to adjust for variable geodesic location.

Hughes Communications officials indicate that the modification technique will be especially significant in 1983, when two particularly strong cable TV programming satellites, Hughes Galaxy I and RCA's Satcom III-R, will be in adjacent slots at 135 degrees west and 131 degrees west, respectively.

For Galaxy I, Hughes has lined up five programmers for 16 of the 18 transponders available for purchase: Time Inc. (six transponders), Westinghoue / GWSC (four), Times Mirror, Turner Broadcasting and Viacom (all with two each). Two more transponders remain to be sold. The remaining six slots on the 24-transponder bird (due to launch in early 1983) are planned for occasional use.

The modification technique is the product of a joint effort by the Ground Systems Group in Fullerton, California, and Microwave Communications Products in Torrance, California, both of Hughes Aircraft Company. It is being introduced, however, by Hughes Communications, Inc., a wholly-owned subsidiary of Hughes Aircraft Company.

Zenith's Addressable System Goes into Action

EDEN PRAIRIE, MINNESOTA—The first cable system utilizing Zenith's Z-Tac addressable converter system went into operation here last month. Rogers Cablesystems has invested $21 million in Z-Tac equipment for its 54-channel interactive system here on the outskirts of Minneapolis.

Rogers is also planning to use Z-Tac in its Portland, Oregon, system, which is scheduled for a fall 1982 launch, and in a system in California. To date, the Canadian MSO has ordered 150,000 units from Zenith.

The Zenith system uses a scrambling system based on SSAVI technology (synchronization suppression and active video inversion). The video portion of the signal is inverted to scramble the lumanance and color, and sync pulse suppression is used to scramble the picture on television sets that are not equipped with a decoder. Cable operators can randomly combine the two modes to develop a dynamic, highly agitated scrambled television signal.

The Z-Tac is capable of controlling 20 different program categories at a time. The Z-Tac contains four channel banks, and each channel bank has five program categories. The operator can assign channels and programs at the encoder at the headend.

Each decoder is assigned a unique address consisting of a market code and a subscriber number. The code, stored in the Z-Tac decoder's semiconductor memory, prevents a decoder from operating if it is moved to an unauthorized location.

NCTA Seeks Use of ENG On Microwave Bands

WASHINGTON, D.C.—The National Cable Television Association is urging the Federal Communications Commission to allow cable operators to use the new microwave spectrum that it may open for television broadcasters. To restrict cable to one band would give broadcasters an "unfair advantage," the NCTA states.

Prompted by complaints that the three existing bands are overcrowded, the FCC is considering permitting broadcasters to use two additional bands—38.6 GHz-40 GHz and 6425 MHz-6525 MHz—to beam electronic news gathering (ENG) and other remote feeds from the field to the station. The NCTA has requested that cable operators have the same access as broadcasters to the 38.6 GHz-40 GHz band.

Cable is a "viable competitor" of broadcasters in ENG and remote television and, therefore, should be able to use the additional bands, according to the NCTA. Warner Amex's QUBE system in Columbus, Ohio, for example, operates three mobile ENG vans which it uses to produce 12 hours a week of spot news and interviews.

The need for ENG bands will continue to increase as the cable industry continues to expand the scope of its services, said the NCTA. Also, cable systems outnumber broadcast stations by a factor of four (4,360 cable systems as compared with 1,020 broadcast stations). The number will continue to rise, according to the NCTA.

Satellites

Compact Video Tests High-Definition TV

BURBANK, CALIFORNIA—A high-definition television satellite transmission test has been successfully completed in California. The first phase of testing by Compact Video, Inc., of Burbank, California, resulted in the transmission of its signal to Comstar D2 and reception at Compact's headquarters here. The signal received reportedly had the same high-definition qualities, according to company officials.

Radiation Systems Plans Torus Antenna Production

WASHINGTON, D.C.—Radiation Systems, Inc., intends to begin its first production run of the Torus antenna this month. Michael Steinman, vice president of RSI, anticipated that the first units will be available sometime in February.

RSI will be manufacturing the Torus under an exclusive license from Comsat, which developed the specialized antenna. The Torus is the antenna that is

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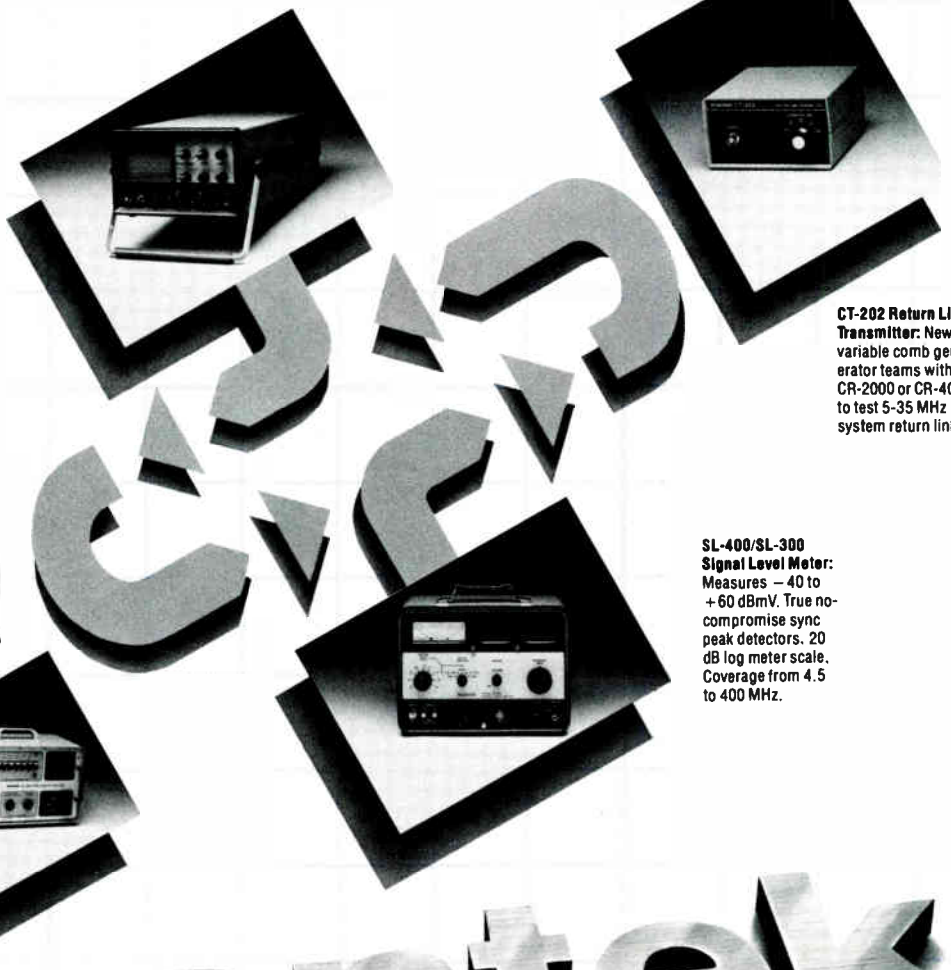

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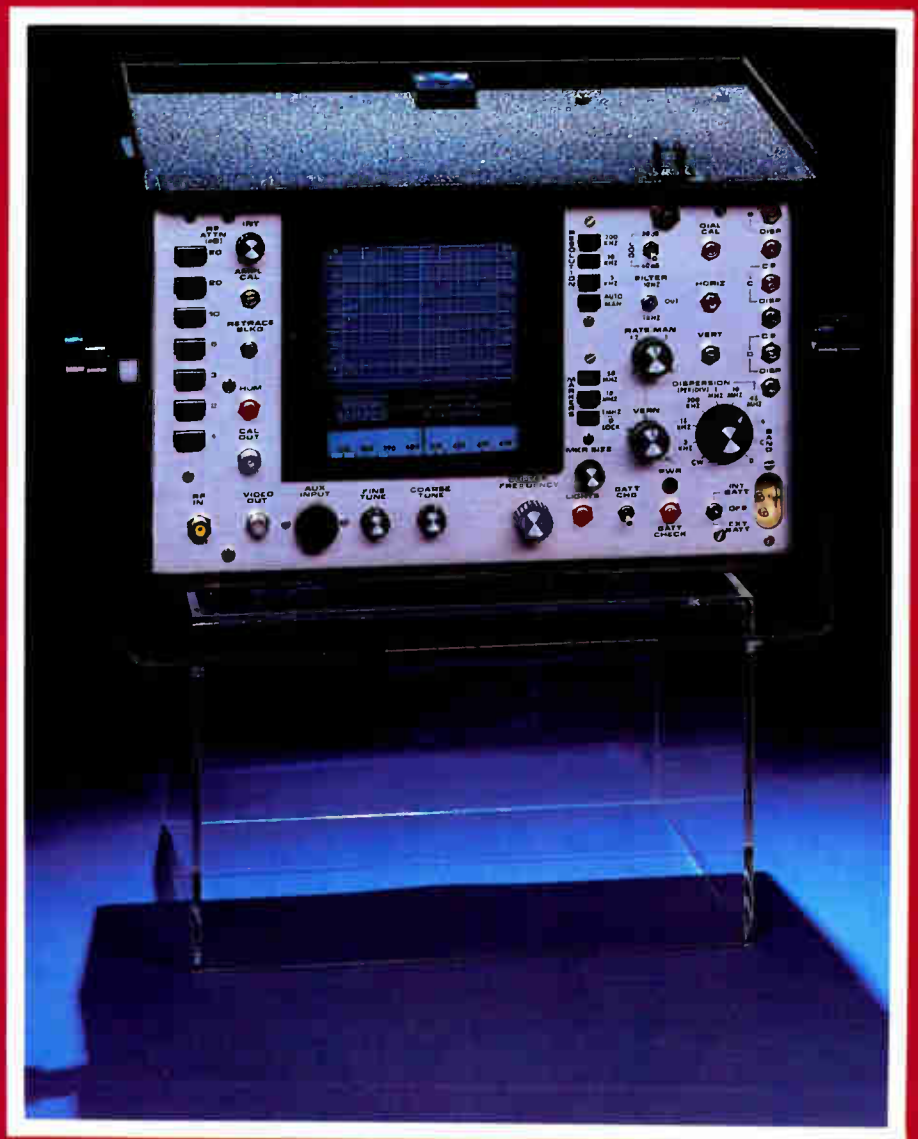

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capable of accessing several satellites at once over a 50-degree range. The model suitable for cable purposes could pick up as many as ten or 11 birds with the current satellite spacing.

For the last several months, RSI has been investigating industry interest in the antenna. According to Steinman, the response has been impressive.

"We have had inquiries totaling well over a thousand," he said. "But we still have to decide whether our first run will be 25, 50 or 100."

Business Notes

★ **Compucon, Inc.**, has introduced a corporate profile brochure that highlights the engineering services, including market research and new automated coverage prediction, that Compucon offers to the telecommunications industry for communications planning. The firm, located in Dallas, Texas, is also offering a brochure on planning for a receive-only satellite terminal.

★ **Daniels & Associates** has begun a six-month field test in its Greeley, Colorado, system of the off-premise addressable converter SCAT system. SCAT is a product of **C-COR Electronics, Inc.** The purpose of the test is to gain first-hand operational experience with the SCAT System. Installation was performed by Daniels, who is measuring the effects of the system on equipment theft, signal piracy, churn, and connect/disconnect data. SCAT, an acronym for Security, Conversion of up to 58 channels, Addressability with 22 Tiers, delivers only signals authorized by the SCAT controller to the subscriber's TV set.

★ **S.A.L. Cable Communications, Inc.**, has established a toll-free, 24-hour telephone hotline for customers needing hardware or electronic components on an emergency basis. The hotline numbers are (800) 645-9062 and, in New York State, (516) 694-7110.

★ **CableBus Systems Corporation** has appointed **Anixter-Pruzan** as a national distributor for CableBus products. Anixter-Pruzan will sell CableBus CableAlarm™ equipment to the cable television industry.

★ **Comsearch, Inc.**, is offering a new service, providing digital termination system (DTS) design. The DTS can be used for digital electronic message services by providing microwave transmission of digital information based on cellular radio local distribution techniques. The 10.55 to 10.68 GHz common carrier band is used for each DTS nodal station with interconnection of the network accomplished with satellite earth stations and terrestrial microwave paths. Comsearch also provides frequency coordination services for satellite earth stations and terrestrial microwave paths.

★ Allen W. Dawson, chairman of **Siecor Corporation**, and John Mancino, president of **Carolina Wire and Cable, Inc.**, have jointly announced the merger of the two companies. Carolina Wire and Cable manufactures and markets insulated wire and cable for flame retardant products in markets ranging from aircraft and appliances to communication and data transmission. Siecor is jointly held by Corning Glass Works and Siemens AG. Siecor supplies a broad line of wire, cable and equipment, principally to the telecommunications industry. In explaining the merger, Dawson indicated that Carolina Wire and Cable served a very special market need, had high technology products and processes and had a product line which nicely complements Siecor's existing lines.

★ **M/A-COM, Inc.**, has announced it will market satellite communications services and equipment especially for the health care industry. Patrick Faris, who will direct this new marketing effort, said the equipment now available will enable medical institutions to transmit voice, video and data simultaneously within a building, between buildings, throughout a city or across the country.

upon receipt, places one of the lowest demands on the system at the present time. Actual news events occur with much less frequency than do trades on the world's stocks and commodity exchanges.

To build the signal, data enters database processing systems from a variety of external sources and from Reuters' news editing systems. It is then sent to a combination multiplexer and converter (see Figure 2), where it is transmitted to New York area cable systems and via microwave to RCA's Vernon Valley uplink facilities in New Jersey. The signal is then transmitted to Satcom I and rebroadcast across the U.S.

Downlinks in major urban centers are operated by IDR for Reuters, or, in some cases, are shared with local systems. There are also a number of private and corporate downlinks where users have leased or bought Reuters terminals to decode the signal.

First generations of the terminal have been designed to use professional (studio quality) screen monitors to obtain larger, more flexible data displays; there are plans in the works for terminals that connect directly to home TV sets and market research tests are underway.

Until now, Reuters has been the primary user of this technology from IDR. However, discussions are being held with other potential users, and IDR is producing various system configurations to meet a variety of informational needs. Those range from a small system with about 250 pages, to large systems with several thousand pages of data.

The Signal

As standard video, the signal can be transmitted at video baseband, as an FM double sideband modulated signal or as an AM vestigial sideband signal suitable for regular cable network transmission. Because of potential distortion as the signal passes through multiple carriers, provision is made for repeaters which regenerate the signal by monitoring vertical interval test signals (VITS) which are inserted at the primary transmission site. The repeaters are designed to insert new VITS as required.

Because of the high quality required to achieve low-error signal receipt at the terminals, a carefully monitored, well-tuned local distribution network and headend are required. Several years of successful commercial operation over Manhattan Cable in New York City, and elsewhere, have helped establish and refine basic operating environmental requirements.

Terminals

Professional terminals display up to 64 characters on each of 16 lines. Each of these displays is double the size of the basic 32-character lines, or rows, which form the standard display suitable for home TV use.

In addition to standard text, graphic displays can be constructed in eight colors, including black and white. Displays can have background color or symbol color on black or white background. Existing terminals provide for nine-by-12 cells to create individual characters, but additional resolution can be added to terminal capability for extra cost. The basic arrangement provides 3,072 elements per display.

Professional terminals are more complex and can not only build more intricate displays but can perform "off-screen" functions as well. A variety of capabilities are included in professional terminal software to meet business user needs including the capability to monitor personal stock and other portfolio holdings.

Additional features allow more than one display page on the screen at the same time, while other data is monitored in a "background" mode and there is the ability to gateway data in and out of the terminal through flexible input/output ports to peripherals and/or other computer systems.

Many years of Reuters experience in the creation and operation of large-scale retrieval systems for business, combined with US television technology has resulted in the creation of a one-way information stream of more the five million words (or 30 million characters) a minute, from which users with Row-Grabbing terminals (RGTs) can select information for display, printout or processing.

Row-Grabbing is actually a sophisticated full-field teletext system which had its first application in a new Reuters nationwide service which is using databases created by Reuters and is broadcast by satellite and cable in the USA and Canada.

Michael J. Reilly is the product planning manager for Reuters Limited and has been a journalist, correspondent and editor with Reuters since 1972. Prior to joining Reuters, Reilly was with the Associated Press as a journalist for three years.

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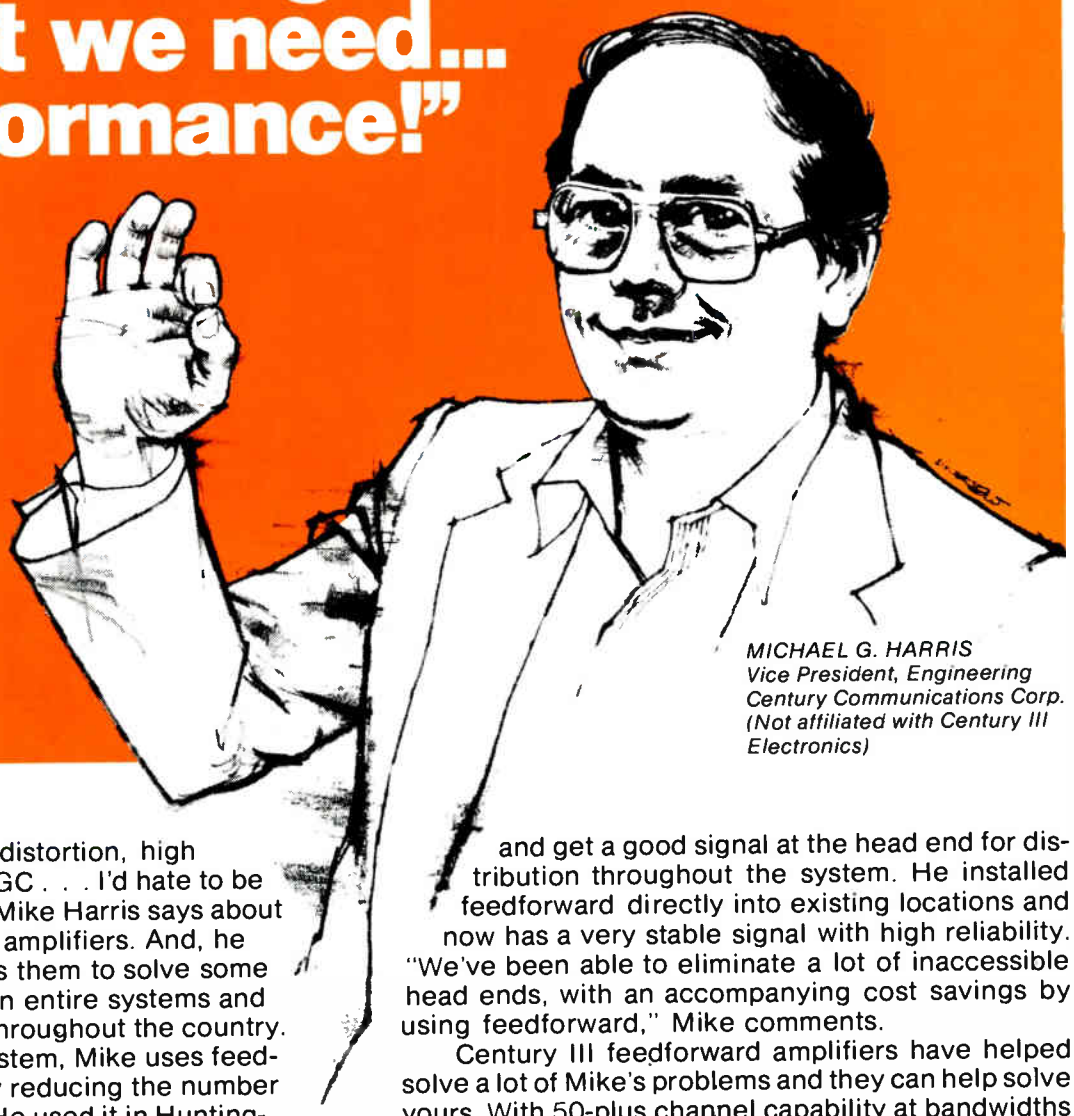

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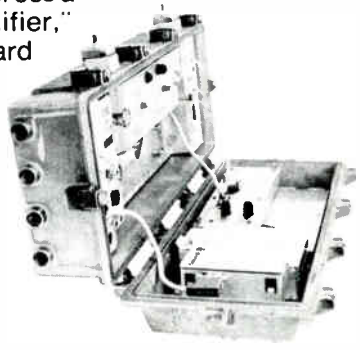

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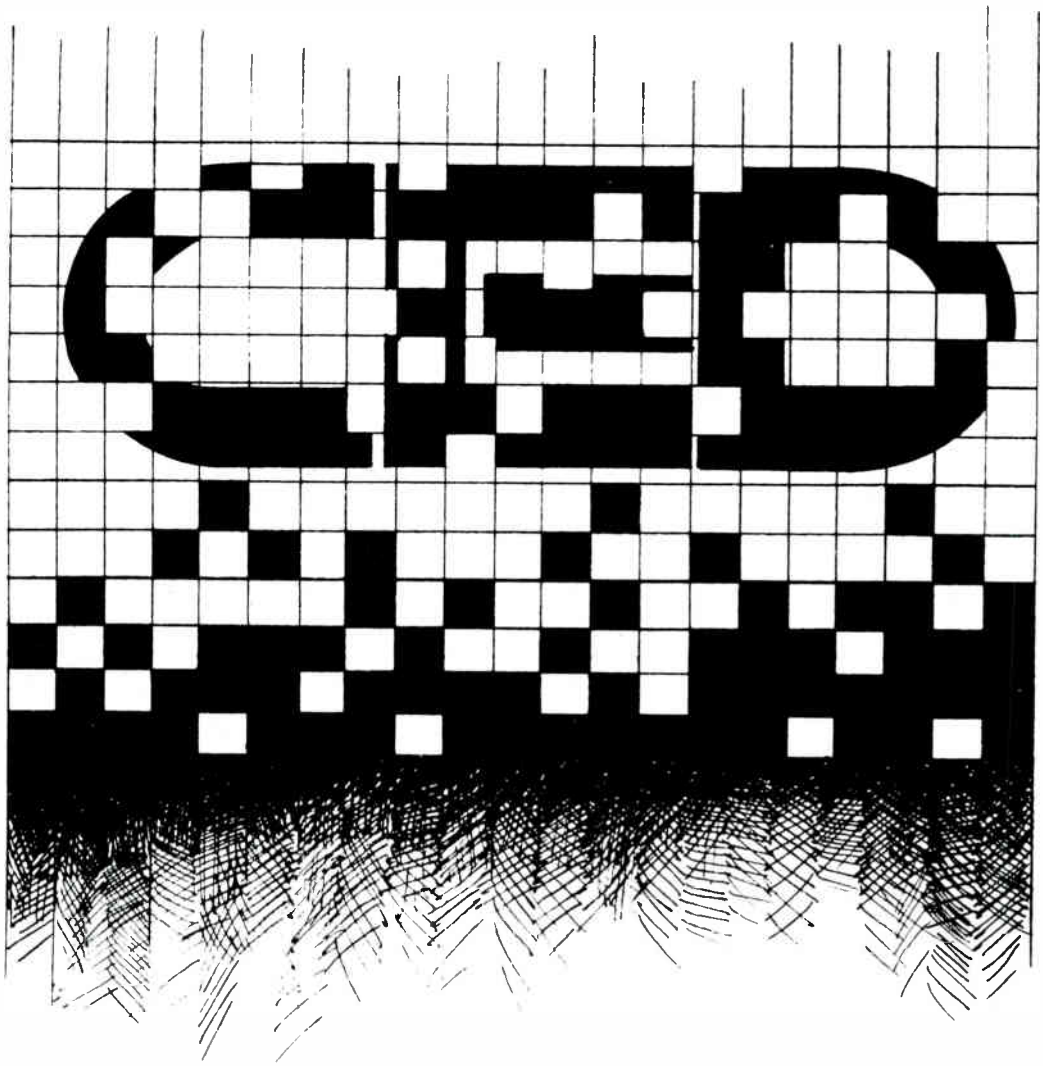

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Establishing Practices In International Teletext

By John Lopinto, director, technology development, Time Inc. Video Group, New York, New York.

For the past three years, the U.S. broadcast and cable industries have been scurrying like caged mice to implement, test and understand a technology called teletext. While marketing, editorial and business people seek to sort out the flurry of teletext activities, the technical principles are well defined.

Unlike other medias and their applications, teletext has its origins in the British and European technology community. This article will describe these origins and how they have evolved over the years to where we are today. The technical fundamentals are merely a specific application of more general forms of data transmission. When understood, advanced applications make teletext a versatile means of communicating information in video environments.

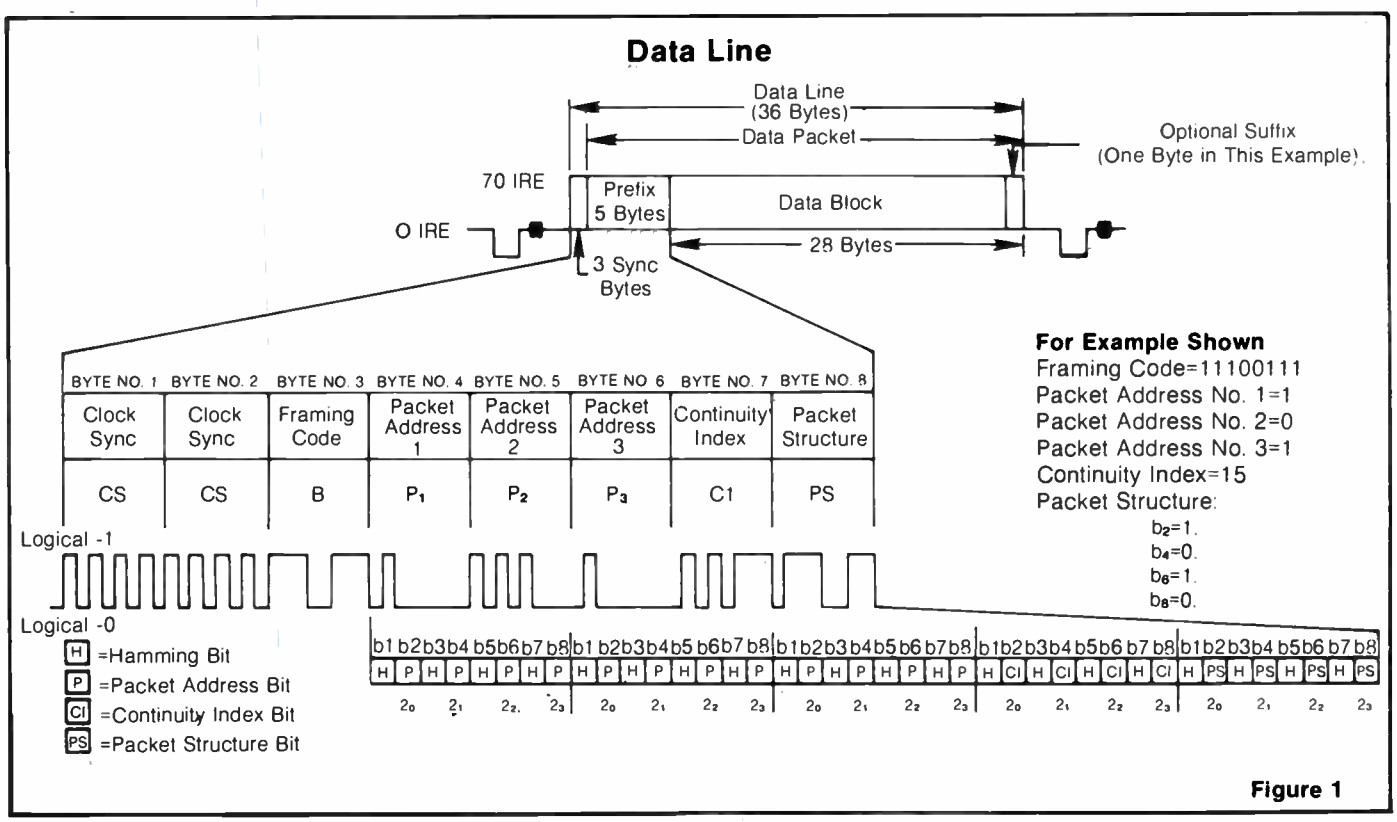
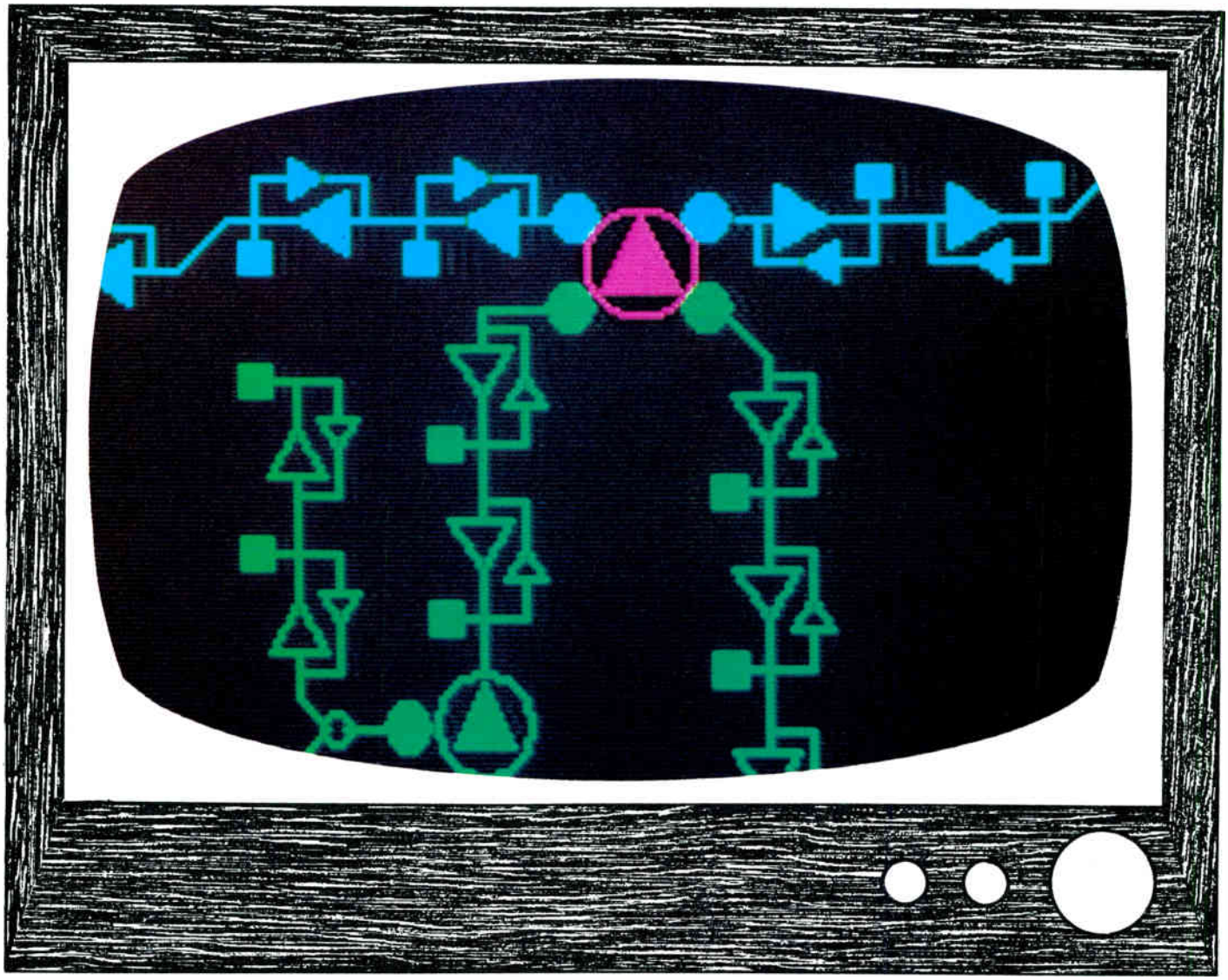


Figure 1



There are at present no FCC rules covering teletext and no EIA recommended practices. However, several major U.S. teletext service operators such as CBS, NBC, Time and AT&T have adopted a compatible standard for the transmission and display of teletext information. France and Canada, two of the three proponents of teletext standards for the U.S., have compromised on incompatible elements of their earlier proposals to produce this standard. It is the belief of many that this agreement and subsequent adoption by major national teletext service providers have all but ended the issue of standards. Many fine points still remain to be resolved. But it is clear a framework has been established to address them.

Basic Definitions

This article will deal with the principles of teletext in the context of this standard. The most noted exception to this standard, proposed by the United Kingdom, will be explained as to its major differences.

There are several terms which should be understood. Let's first review some basics which will serve us well.

Videography—This is a generic term describing all forms of communications of video text and graphics in digitally coded form.

Videotex—This is a specific application where a two-way communications channel is used between the source of the information (database) and the user who wants it. Only information specifically requested by the user is sent by the source addressed, by some means, to that user.

Teletext—In this application, only a one-way channel is used, and it is usually a video channel. All the information which is available at the source is transmitted through the channel over and over again. The user's terminal selects the requested information out of the data stream and presents it to the user. This is similar to conventional broadcast or cable TV where all TV channels are available to the user who selects what he wants on his TV receiver. Teletext is also known as broadcast videotex.

Interactive—Erroneously, this word has become synonymous with two-way videotex services. It is important to note that even teletext in a one-way environment can be "interactive" from the user's perspective.

Transmission Principles

The technology of teletext covers two areas of well defined technical parameters. The transmission principles concern themselves with the transportation of information on a video channel. This is done without regard, in most cases, to the informational content itself. Figure 1 shows one horizontal scan line of a television signal with the transmission components of the teletext signal. Each byte is composed of eight bits and several functions require more than one byte. The Data Block is the actual information which is being transported to the user.

The first two bytes are alternating 1s and 0s. This provides synchronization to lock the terminal's clock oscillator. Its purpose is similar to color burst in a

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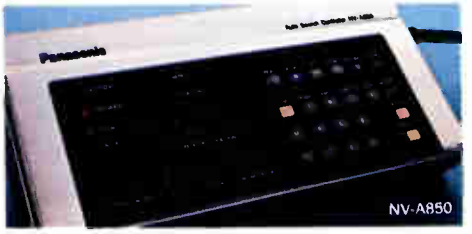

even pre-program it to automatically play back up to 15 segments in any order. The NV-A850 features LED readouts in hours, minutes, and seconds, as well as fast forward, rewind, pause, stop, and frame advance.

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To help you edit material exactly the way you want to present it, the Panasonic NV-A960 Editing Controller (optional) interfaces directly with the NV-8200 or NV-8170 so you can perform ½" to ½" assemblies. Or perform ½" to ¾" edits. Accurately. And fast.

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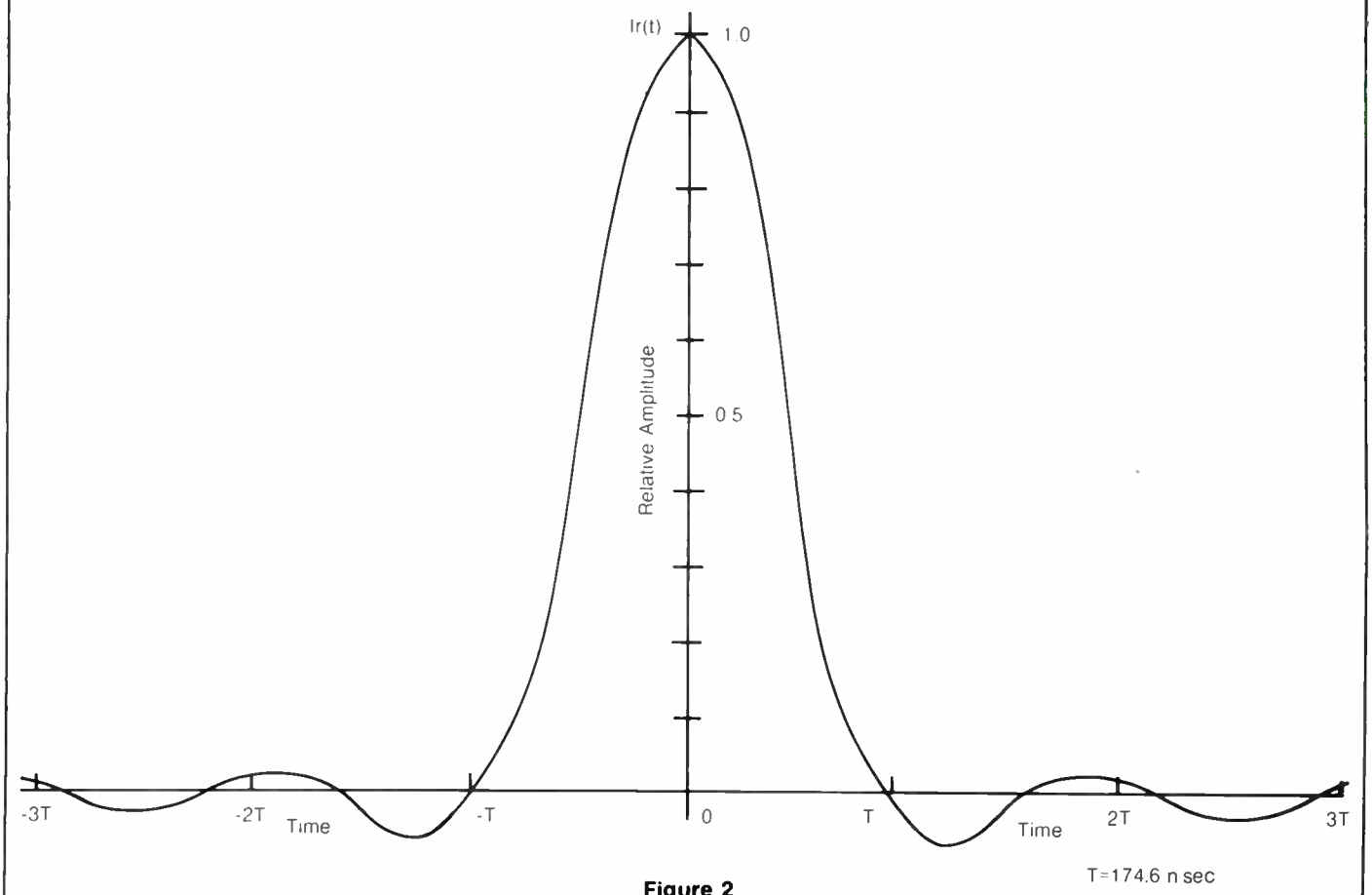


Figure 2

television receiver. The instantaneous bit rate is 5.727272 megabits per second.

Byte synchronization or the framing code is necessary to properly delineate the beginning and ending of an eight bit byte on the TV line. The actual eight bits that make up the framing byte were chosen to minimize false framing in the event of a single bit error during transmission of the framing code. The actual code is 11100111.

Bit and byte synchronization are constants transmitted on every teletext scan line. The next five bytes are the Prefix, which contains information relating to the Data Block. The Prefix consists of five Hamming-encoded bytes. Hamming-encoding is an error protection technique where four bits in a byte are used for data and four bits are the Hamming code used to detect errors in the four data bits. The Prefix is composed of the following information:

Packet Address (three bytes). These bytes yield 4096 possible addresses for data channels which may be time-multiplexed on a single video channel. In some applications, these are referred to as "magazine" numbers.

Continuity Index (one byte). This byte increments by one for each successive transmission of a Data Packet within a particular Data Channel. It is used to detect the loss of a Data Packet due to transmission errors.

Packet Structure (one byte). This byte contains information about the nature of the Data Packet. Specifically, it tells what kind, if any, error detection for the Data Block is used and whether or not the Data Block is full of bytes.

The 28-byte Data Block, which follows the Prefix, contains either additional control information or the Presentation Level Protocol (PLP), which is the actual information displayed on the user's terminal. The last byte in the Data Block is the Suffix (it may be as long as three bytes) and contains an error correction code which can correct one-bit errors in the Data Block and can detect multiple errors. Each byte in the Data Block uses odd parity to ensure correct interpretation when a one-byte Suffix is used.

The Control Header is transmitted in the Data Block at the beginning of a message. "Message" is a general term referring to any grouping of related information. In traditional teletext services this is a displayed page on the TV screen. The Control Header is used in instructing the terminal in processing the PLP which follows. These instructions are very detailed and allow for such things as:

- Page address—up to nine bytes;
- Indirect page addressing through jump instructions;
- Indexing of pages;
- Identification of new information in a broadcast cycle;
- Captioning;
- Multiple display options; and
- Multi-page documents.

The exact coding of these instructions is beyond the scope of this article. Additionally, their interpretation, in some instances, by the terminal is subject to debate.

As mentioned before, the instantaneous bit rate is 5.727272 megabits per second. This frequency is defined as being 8/5 the color subcarrier frequency. The actual shape of the data pulse on the TV scan line is created by passing the pulse through a filter which has a raised-cosine transfer function as shown in Figure 2. This filter limits the amount of energy

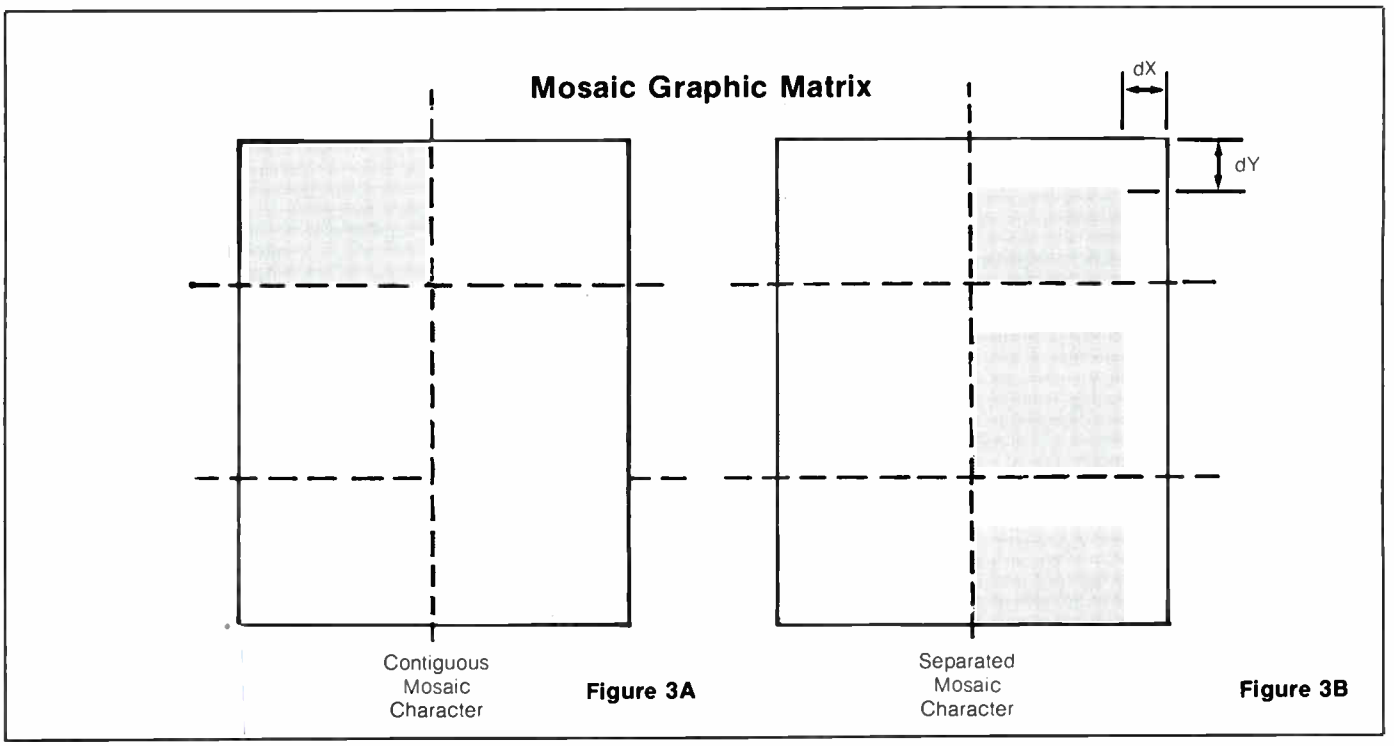


Figure 3A

Figure 3B

present in the pulse at the edge of the video channel at baseband. Additionally, it is intended to minimize distortion of the pulse as it is transmitted through the video channel. The amplitude of the pulse is 70 IRE to represent a "1" and O IRE to represent a "O"

Display Principles

The Presentation Level Protocol (PLP) is a specific language or set of instructions for displaying graphics and text on the user's terminal TV screen. The present PLP adopted by most U.S. cable and broadcast networks is the one proposed by AT&T in May 1981. Its main features provide for the creation of graphics by three coding techniques: mosaics, dynamically redefinable character sets or DRCS, and picture description instructions or PDIs.

In the mosaic method of displaying graphics on a TV screen, a single character location is subdivided into six smaller blocks. This is illustrated in Figures 3a and 3b. In a screen display of 40 columns by 20 rows, this yields 80 columns by 60 rows of mosaic elements. Each of the six mosaic blocks in a character cell can be turned on or off and can be connected to or segmented from its adjacent cell. This requires six bits to address the individual mosaic blocks for each character cell.

DRCS is an economic method of achieving relatively high resolution graphics. Here a character cell is subdivided into six by ten picture elements or pixels, yielding a screen resolution of 240 horizontal by 200 vertical pixels. In DRCS an individual character cell is defined pixel by pixel as shown in Figure 4. Once defined, the pattern is transmitted once

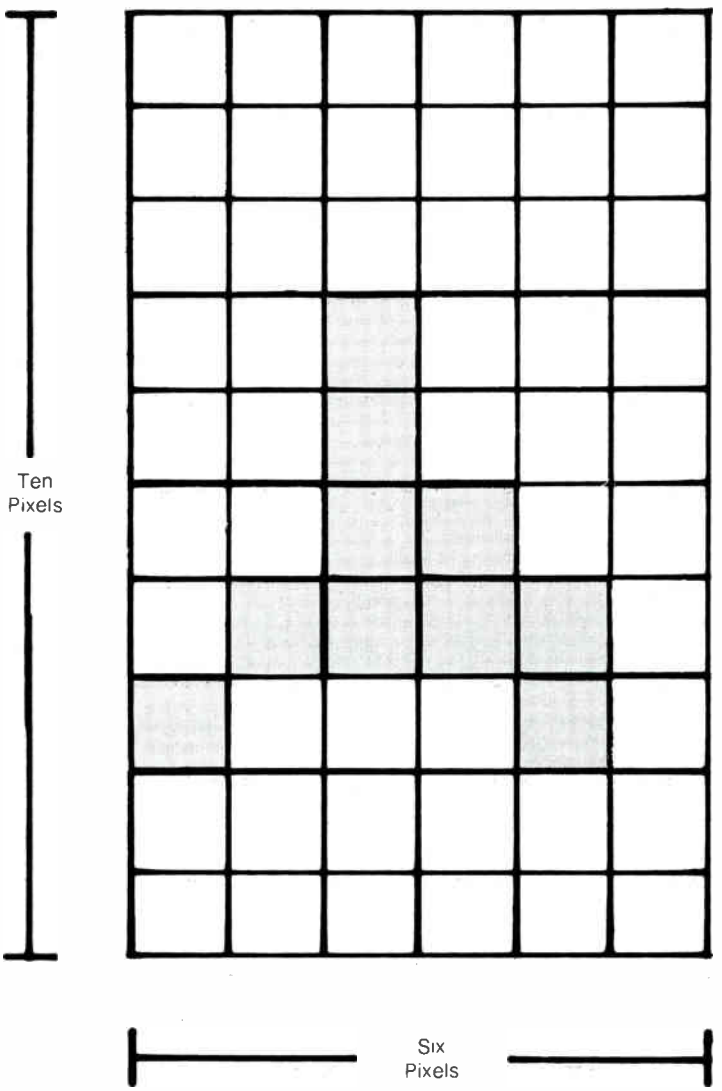
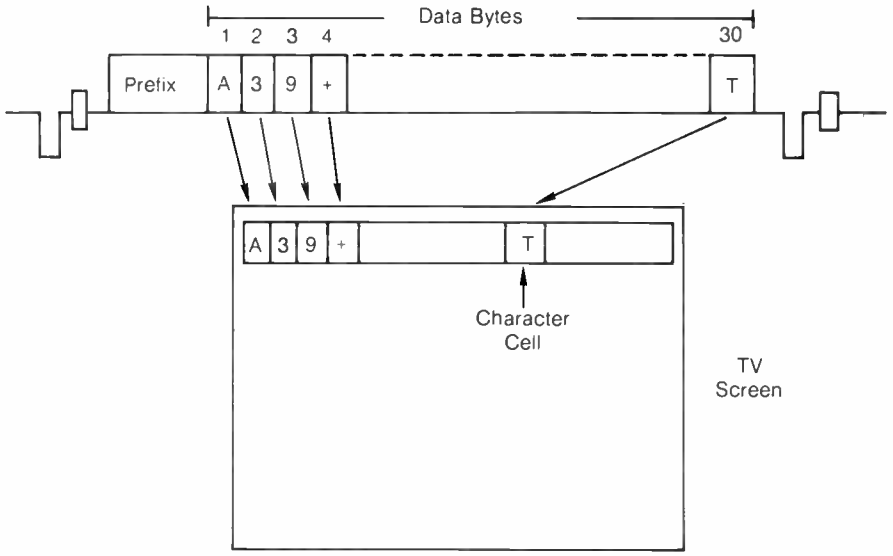


Figure 4



Example of "Gearing" in U.K. System

Figure 5

and stored in the terminal's memory. The DRCS cell can then be recalled as many times as necessary at various places on the screen. Many DRCS cells can be defined to achieve the desired graphic. DRCS is a powerful technique, which not only allows the creation of higher resolution graphics, but custom fonts for alphanumeric characters.

PDIs are instructions transmitted to a terminal which literally describe a picture. Every displayed picture is composed of a combination of several geometric primative elements: point, line, rectangle, arc, polygon and text. Instead of sending code describing individual mosaic cells or pixels as in mosaic and DRCS graphics, instructions are given, say, to draw a rectangle with a specific width and height. The terminal then calculates which pixels in the desired color must be illuminated on the TV display. Complex images are made by a combination of PDIs.

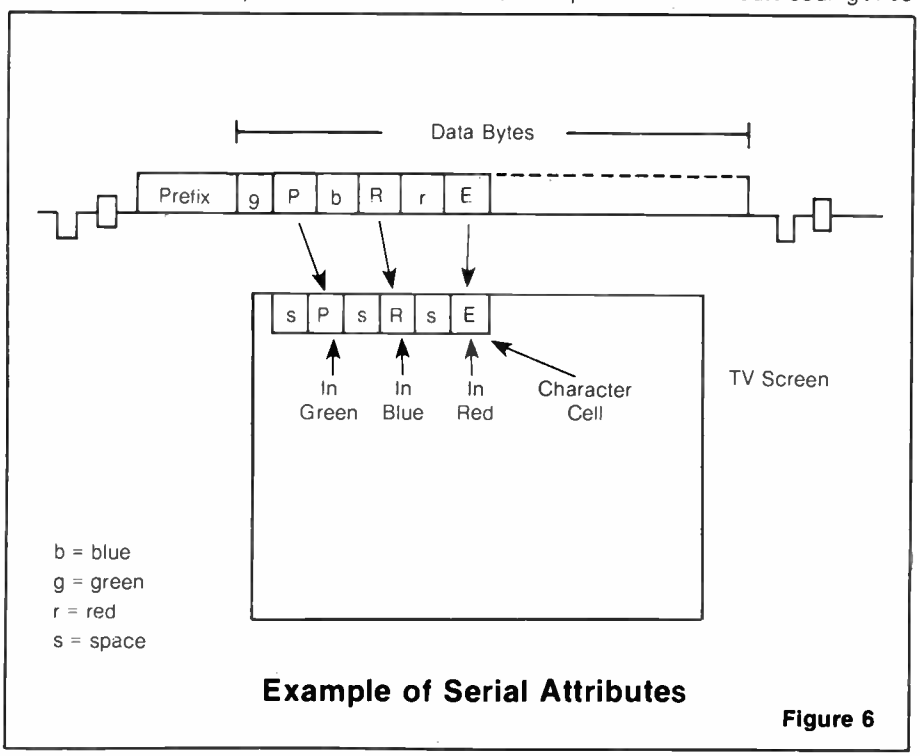
Each method of graphic display has its own set of advantages and disadvantages in terms of transmission time, decoder cost and susceptibility to display error. The choice of which method to use relies heavily on the specific graphic to be created. It is probably for this reason that the AT&T PLP accommodates all three methods. Common to all methods of graphics are a means of coding display attributes. Such things as color, underlining, character blinking and size and scrolling are coded in the transmission preceding the graphic or text they are to modify. Attributes can be combined and are usually in force until otherwise changed. Text is coded using a standard ASCII character set.

United Kingdom System

The telecommunications industry of the United Kingdom was indeed the pioneer of videography. Teletext was an adaptation of videotex using the same PLP but taking advantage of the inherent and stable characteristics of the television signal. The U.K. system has undergone several iterations in definition for the U.S. television system since its introduction in the U.S. three years ago. There are, however, some basic parameters of the U.K. system which make it unique.

In the transmission system previously described, the position of PLP data on the TV scan line during transmission had no relationship to where that PLP data was subsequently displayed on the terminal's TV screen. In the U.K. system this is not the case. As shown in Figure 5, a particular character cell of either graphic or text occupies, in coded form, a specific position on the TV scan line during transmission. This position is determined by which column, one through 40, it is to occupy when displayed. The row position is determined by five Hamming-protected bits in the prefix. This prefix also contains information as to the magazine in which it resides. The page number is transmitted in the first TV scan line for the page or packet 0. Subsequent packets one through 23 contain display information.

Two aspects become apparent in the U.K. system. First, since only 30 byte locations are available on a TV scan line for character cell coding, a TV scan line is used once in every four to transmit the remaining ten characters from the previous three rows transmitted. This concept, known as "gearing", allows the preservation of transmission and display location synchronism. Second, if a character attribute is to be changed, such as changing color from red to blue for a letter, the code for the attribute must occupy one of the character cell positions on the TV scan line during position. During the decoding and display processes, no text or mosaic character could occupy the attribute position. Figure 6 illustrates this point. To overcome this graphic limitation of serial attributes, the U.K. proposal for the U.S. provides for attribute coding to be



Example of Serial Attributes

Figure 6

transmitted on one of the so-called "ghost" rows. These row numbers, 24 through 31, are not displayable rows, but since five bits are used to code row numbers, they are used to transmit additional information about the display. This second level of the U.K. system allows attributes to be changed while simultaneously displaying a text or mosaic character. A lower level decoder would simply ignore the ghost rows without enhancing the display.

The third level allows for the transmission and display of DRCS while the fourth level accommodates PDIs. A fifth level is provided for the transmission and display of photographic-like images. However, the protocol for this feature is yet to be defined.

The philosophy of the UK system is one of low cost terminal equipment, transmission and display reliability, and increasing performance without obsoleting lower level terminal. The U.K. display techniques are similar in many ways to the AT&T PLP. The method of transmission of the PLP is significantly different than that which has been proposed by France and Canada and agreed to by Time, CBS and NBC.

Advanced Applications

Given the fundamentals of teletext technology, one can understand how its applications in a mass consumer marketplace have yet to be exploited. Perhaps the first application of advanced teletext yet to be understood in a commercial, national environment is that of full-channel teletext.

Here, every TV scan line, with the exception of the nine line vertical synchronization period, is used for teletext transmission. Traditional applications involve two-to-four lines per field during the vertical blanking interval. But when 253 lines per field are used, the increased throughput can be used to decrease maximum access time for the user and convey more information for a given access time.

Telesoftware is a technique where software for a terminal's microprocessor is transmitted along with the regular pages. This powerful application allows the information to be personalized for the user by using applications to process the otherwise static pages. Games and educational programs can interact with the user in a way previously available only to users of a two-way videotext system.

Although a defined manner for program captioning is now in use by ABC, NBC and PBS, CBS has chosen to use the mechanism of teletext to provide captioning for its network programming. While the economics of one system over another remains the subject of debate, there is no doubt that the technical parameters of teletext offer a viable means for captioning.

Clearly, much work needs to be done in the application of teletext technology. Adequate testing of bit rate in the CATV environment is of the highest priority to the NCTA Engineering Subcommittee on Teletext. What features of display and transmission protocols are most important to the user in a competitive, commercial marketplace remains to be seen. The year ahead will provide many long-awaited answers. As designers and users of this technology, we must indeed be innovative. Past and present realizations of teletext must not prejudice our concept of what it is to be.

John Lopinto received his BEE degree from Manhattan College in 1974. He immediately began work for the CBS Television Network in New York and in 1979 he joined Home Box Office as a regional engineer. Lopinto is now director of technical operations and development for the Video Group of Time Incorporated. He represents Time on the EIA Subcommittee on Teletext and is chairperson of the NCTA Engineering Subcommittee on Teletext and Data Transmission.

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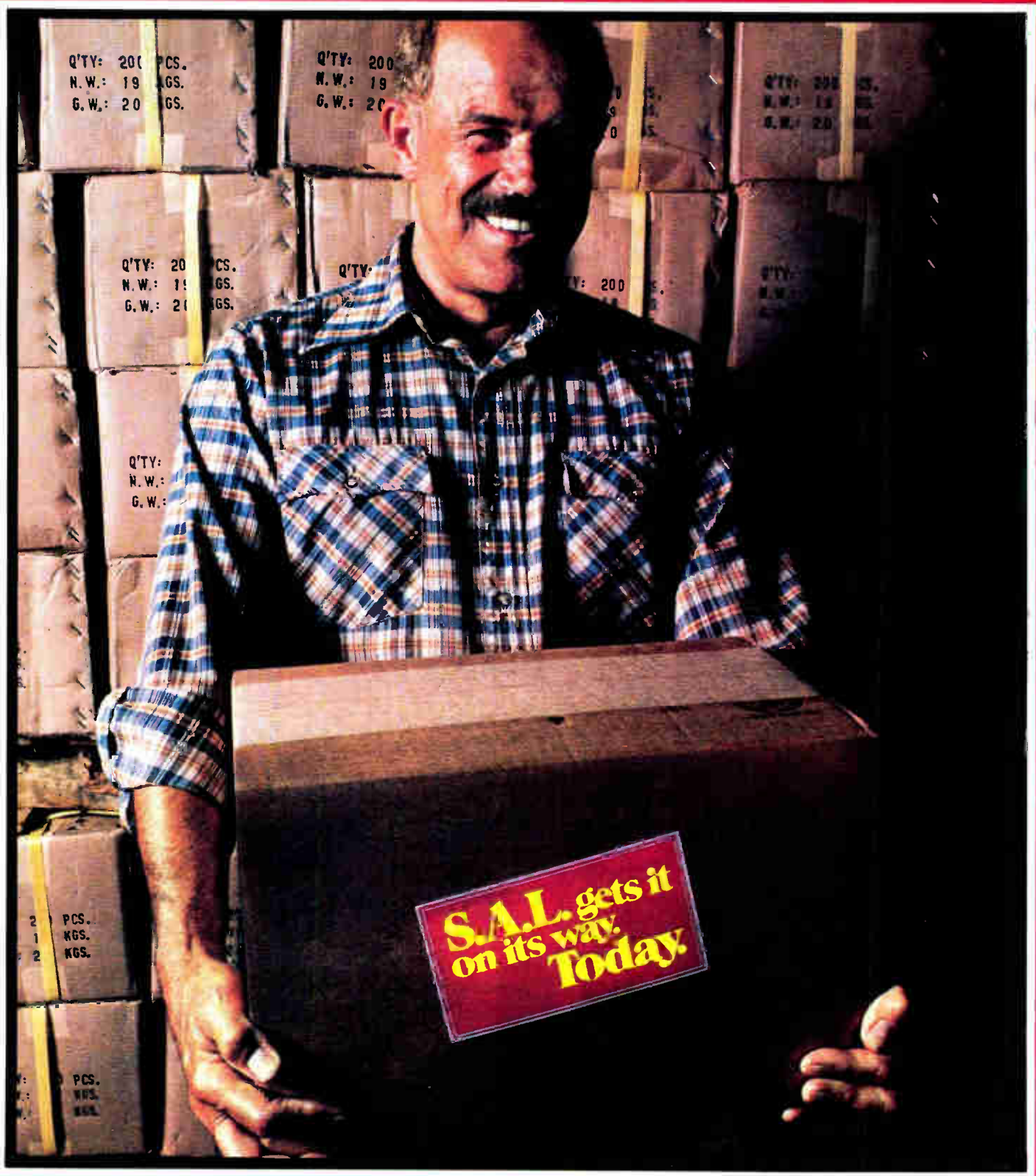

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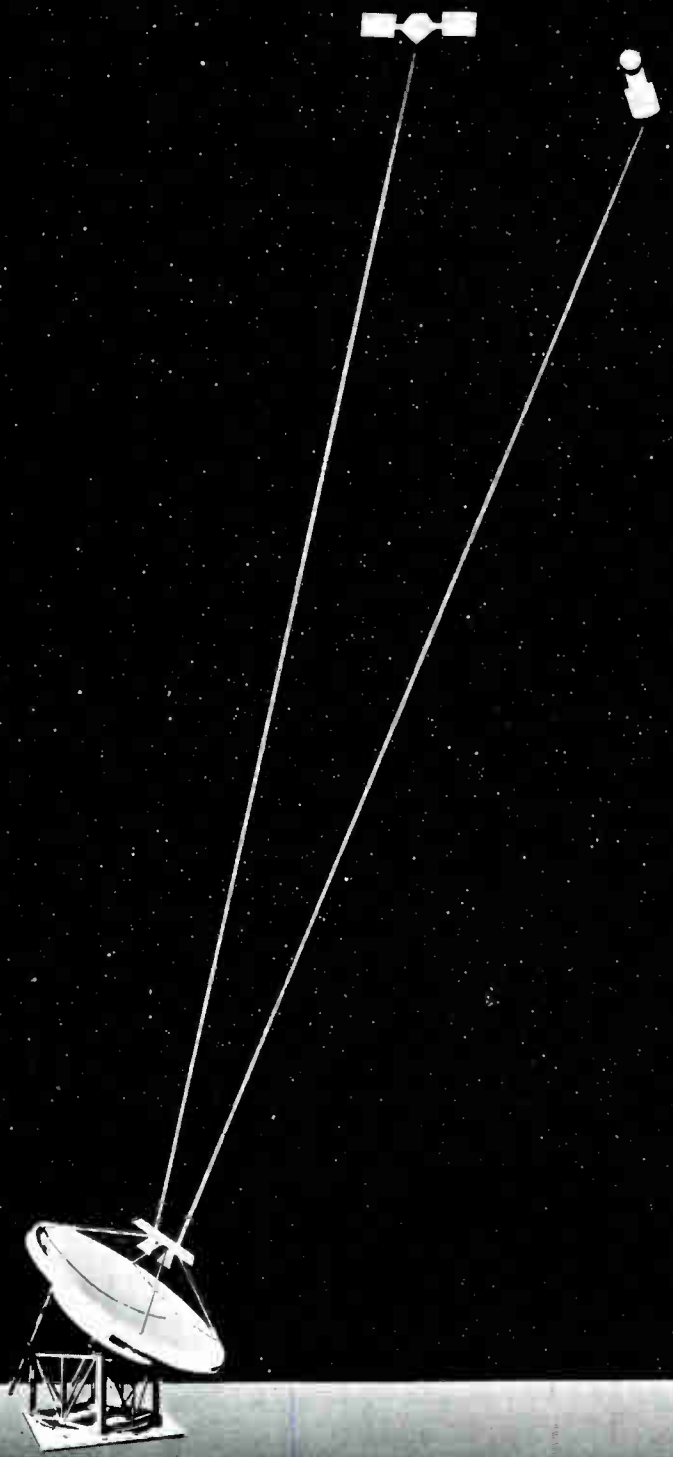

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wasn't too difficult for him to install a notch filter in the subscriber drop cable and eliminate the unpaid-for channel. Now, with many more premium channels available, the cable operator cannot afford this exercise, especially when numerous pay-per-view events are offered.

An addressable system must have these specific qualities:

- Cable plant compatibility
- Operational simplicity
- Reliable performance
- Tamper security
- Ease of maintenance
- Reasonable cost

Considering the various addressable systems available, the key qualities a cable operator must consider are the cost and protection from unauthorized use of premium service. Tampering with cable equipment within reach of a subscriber is a frequent occurrence. Subscribers skilled in electronic technology devise methods of defeating a system, which may result in tremendous losses of revenue to the operator. Some addressable systems available today use highly sophisticated techniques to ensure security, but at a price difficult to justify.

Addressable Alternatives

Not long ago, the addressable converter took the spotlight. Sophisticated converters, headend processing equipment and software were introduced. Scrambling and descrambling equipment began to be extensively used. Cost of investing in capital equipment by the operator is increasing now, and with the growing need to supply cable service to multi-dwelling units, the requirement for secure, tamper-proof addressable systems at an affordable cost has become very real.

The addressable tap is rapidly becoming recognized in the CATV industry as an answer to the problems associated with supplying premium service. First, only those channels paid for by the subscriber will appear at the customer's TV receiver. All other unauthorized channels are eliminated at the tap. Since the control electronics are out of reach, tampering is essentially eliminated. Secondly, a tap is for the most part a passive device. Therefore, design simplicity provides reliability and ease of maintenance at a comparatively low cost. The operational simplicity of the system reduces the need for highly skilled technical personnel.

Several years ago, Merrill Cable Electronics (MCE) developed an inexpensive two premium level 5.0-300 MHz passive addressable tap capable of being controlled from a cable headend by a simple digital to RF processor. The addition of any garden-variety computer terminal, which could be located at a central office, would complement the system by providing remote control and storage of data for billing purposes.

Recently, MCE recognized the need for additional premium level control and began to develop the five-level, 5.0-400 MHz addressable tap. Now in its final developmental stage, the tap will be offered in early 1982.

This article describes the MCE two-level and five-level addressable systems.

Two-Level Tap

The MCE four-port CAP tap (controlled access point) is a two premium channel addressable system in an environmentally designed housing, suitable for either aerial or pedestal mounting, in home-run cable systems. Each tap has the capability of supplying service to four individual subscribers, each of which can be independently controlled via a simple processor from the system's headend.

The tap design utilizes the concept of negative trapping whereby the visual carrier of any channel is "notched out". The attenuation of the visual carrier by these notch filters is sufficient to completely eliminate both picture and audio.

Referring back to Figure 1 on page 43, the CAP tap receives an "address word" from the headend processor on a high frequency carrier typically centered at

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about 109 MHz. This digital information can select one tap out of 27,000 possible taps or as many as 108,000 subscribers in a cable system. A discriminator tuned to the processor pilot frequency decodes the data and channels it to a selected address card. Within the address word specific data bits via the control logic circuitry select which of four subscribers connected to the CAP tap are to be controlled. In this manner, each subscriber can be provided basic service, either or both premium channels, or complete service disconnect.

The MCE Century Commander (Figure 2 on page 49) is used as the main central processor. Its main function is to generate a tap address, a port and a command code in a binary logic format. This processor has on its front panel a standard push-button keyboard similar to that used on a touch-tone telephone, plus an eight-digit read-out, a rotary switch which is used to select source of the data such as the keyboard, external computer or internal memory and an on/off switch. This switch is in the form of a key-lock for purposes of security.

To command a CAP tap anywhere in the cable system, the operator enters the address of the tap on the keyboard with a five-digit number, then enters a single digit to address the port the subscriber is connected to and then enters the two-digit command number. Each time a number is entered it will be indicated on the digital readout. Once all eight digits are entered and the readout display is full, the transmit button is pressed. Immediately this data will be transmitted out over the cable system and the function is complete.

If the operator makes a mistake while entering a command, he can press the clear button and start over again. Also, if the operator fails to enter completely all eight required digits and presses transmit, the processor will ignore the command and wait until the entry is complete. Or, if the operator tries to enter more than eight digits, the processor will ignore data entered beyond the first eight digits and wait until the operator presses transmit.

The processor is equipped with an RS-232 interface module. By rotating the select switch to the RS-232, the operator may control all taps in the systems from a remote computer terminal.

The data generated by the processor is applied to an internal FSK modulator that modulates any high frequency carrier falling within the 50-300 MHz range. Typically, the pilot frequency offered is 109 MHz, but the cable operator may select a lower frequency depending on FCC authority.

Sixteen-Port Tap

The 16-port addressable apartment unit known as the Channel Sentry uses circuit commonality of the four-port CAP

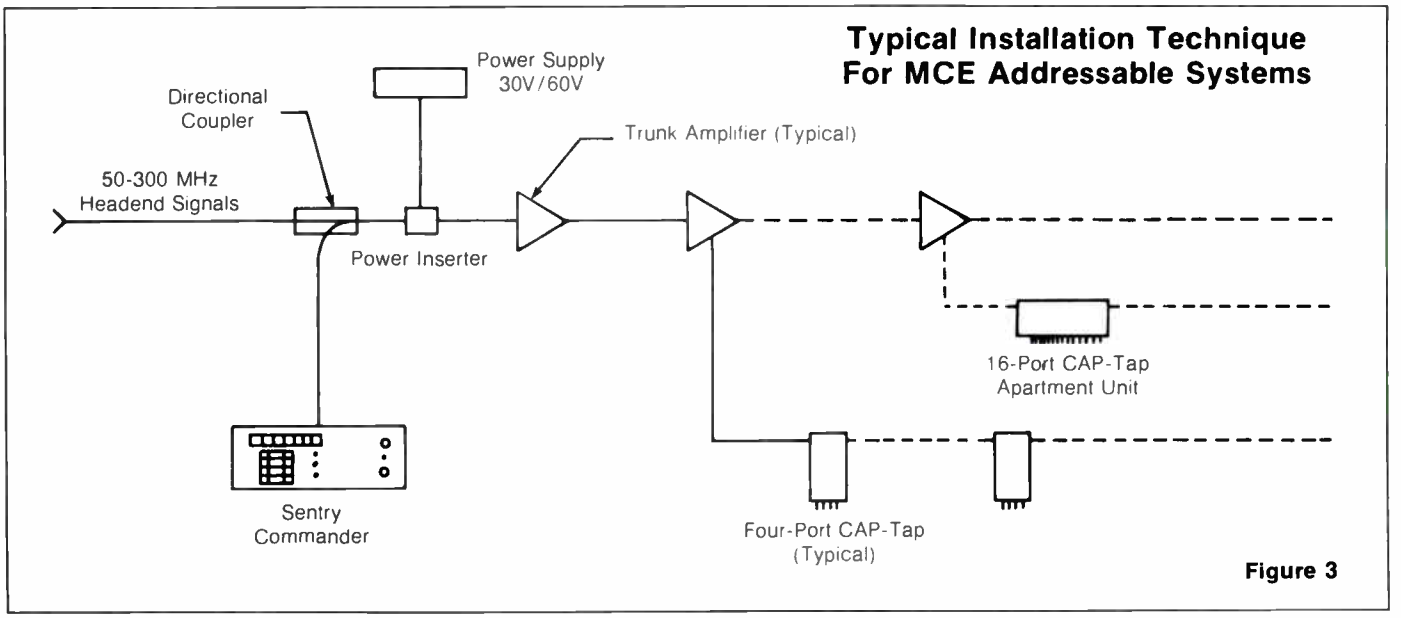

Figure 3

tap. Its design is specifically intended for apartment dwellings, office buildings, hospitals and educational institutions. It is primarily intended for indoor use. The same processor used with the four-port CAP tap also controls the Channel Sentry. Therefore, a cable operator can easily have a mix of four-port and 16-port taps in the cable plant, as in Figure 3.

The Notch Filter Concept

The idea of using notch filters for CATV is not new. Unfortunately, the nature of these filters is such that at high frequencies the 3.0 dB bandwidth is so wide that the lower adjacent channel audio is degraded. This fault prevents adjacent channel operation in the mid-range frequency band.

There are multi-pole notch filters available that, to a degree, correct this problem, but their present physical size and packaging techniques preclude their use for printed circuit applications. That is: as the number of premium channels to be controlled increases, adding more notch filters only adds to space requirements in the tap. Also, signal losses increase. As filters are added, their inherent insertion losses reduce the pass band signal level to the subscriber's port. At first glance, a low level amplifier that would make up for losses might be an answer. But, once again, complexity and cost are major considerations. Until notch filter designs catch up with current state-of-the-art equipment and for their demand in this type of application, the notch filter concept is limited to only a few channels of premium control. Because of this, MCE has limited the use of the notch filter to two per channel in order to maintain effective performance of the two level addressable tap.

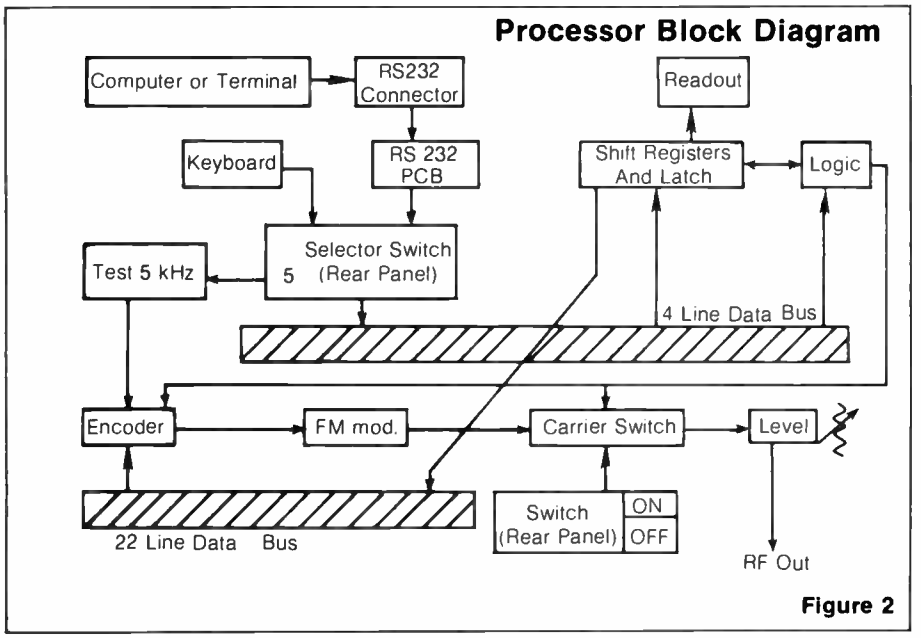

Figure 2

Multi-level Addressable Tap

Recognizing the limitations associated with the notch filtering concept, MCE has developed a completely different method for premium channel addressability. The process uses the principle of video carrier suppression. The concept of carrier suppression has existed for a long time, and single sideband or double sideband suppressed carrier transmission techniques are commonplace. To create a suppressed carrier, the modulated video carrier is mixed with an unmodulated signal at the same frequency in a balanced modulator. Proper phasing of the signals results in a modulator output of only the sidebands of the original video carrier. If this process occurs at a tap, only the remaining sidebands of a channel appear at the TV receiver. Only an exceedingly clever subscriber—at great personal expense—might devise a method for reinserting the suppressed carrier at his TV receiver and successfully recover the video intelligence. Like the notch filter, carrier suppression is a powerful tool for providing security against unauthorized use of premium service.

Figure 4 on page 55 shows how the system works. The main trunk signal passes through a series of directional couplers and power splitters. The directional couplers serve to isolate the main trunk signal from the rest of the circuits. The power splitters divide the headend signal into four separate subscriber paths. The new MCE multi-premium addressable tap will provide five individually controlled channels. Each subscriber is provided an individual plug-in control module containing up to five low level, temperature stabilized oscillators. Each oscillator is tuned to the premium channel visual carrier. The spectral bandwidth of each oscillator is controlled in such a way as to allow for frequency variations of the visual carrier and are adequately filtered

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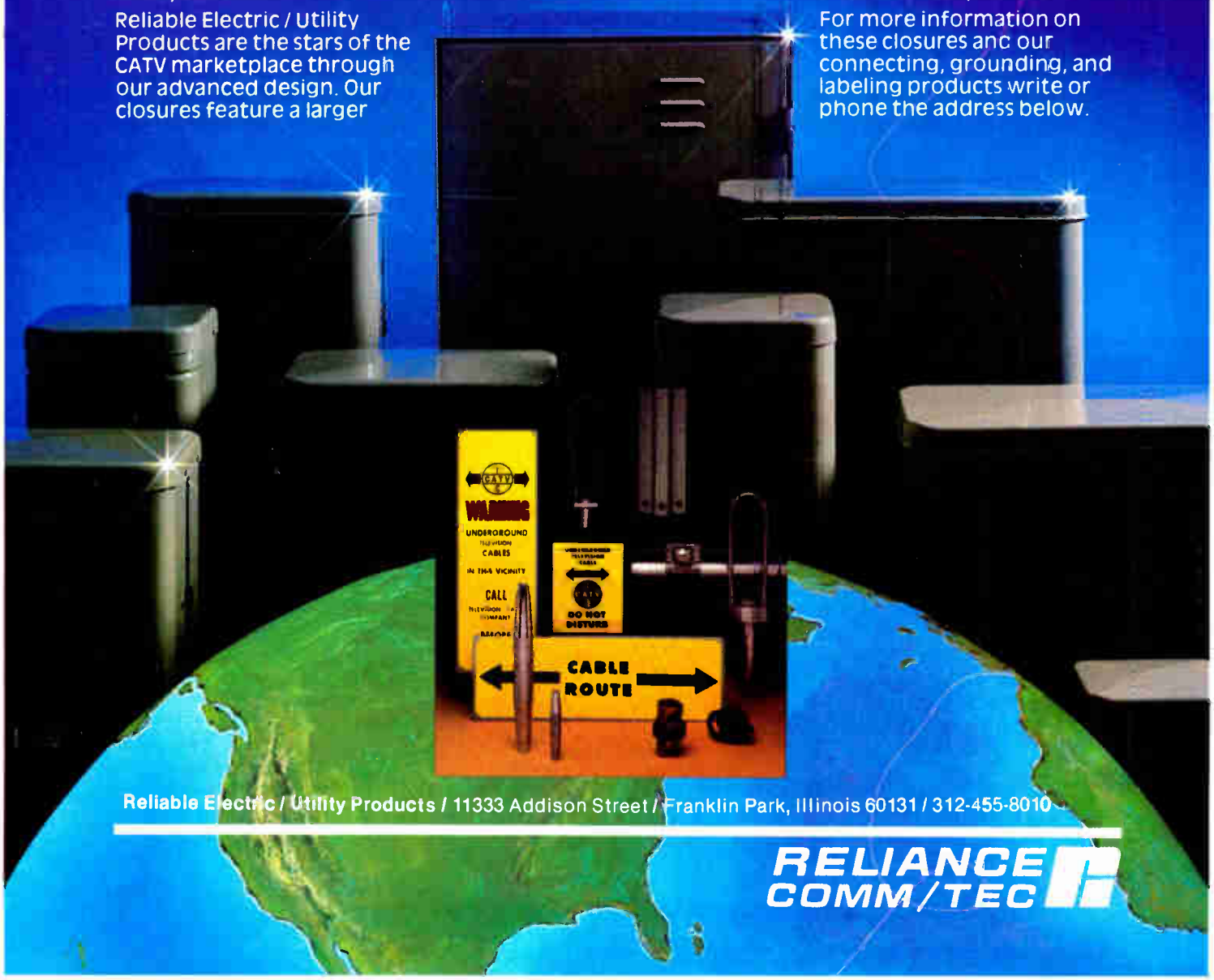

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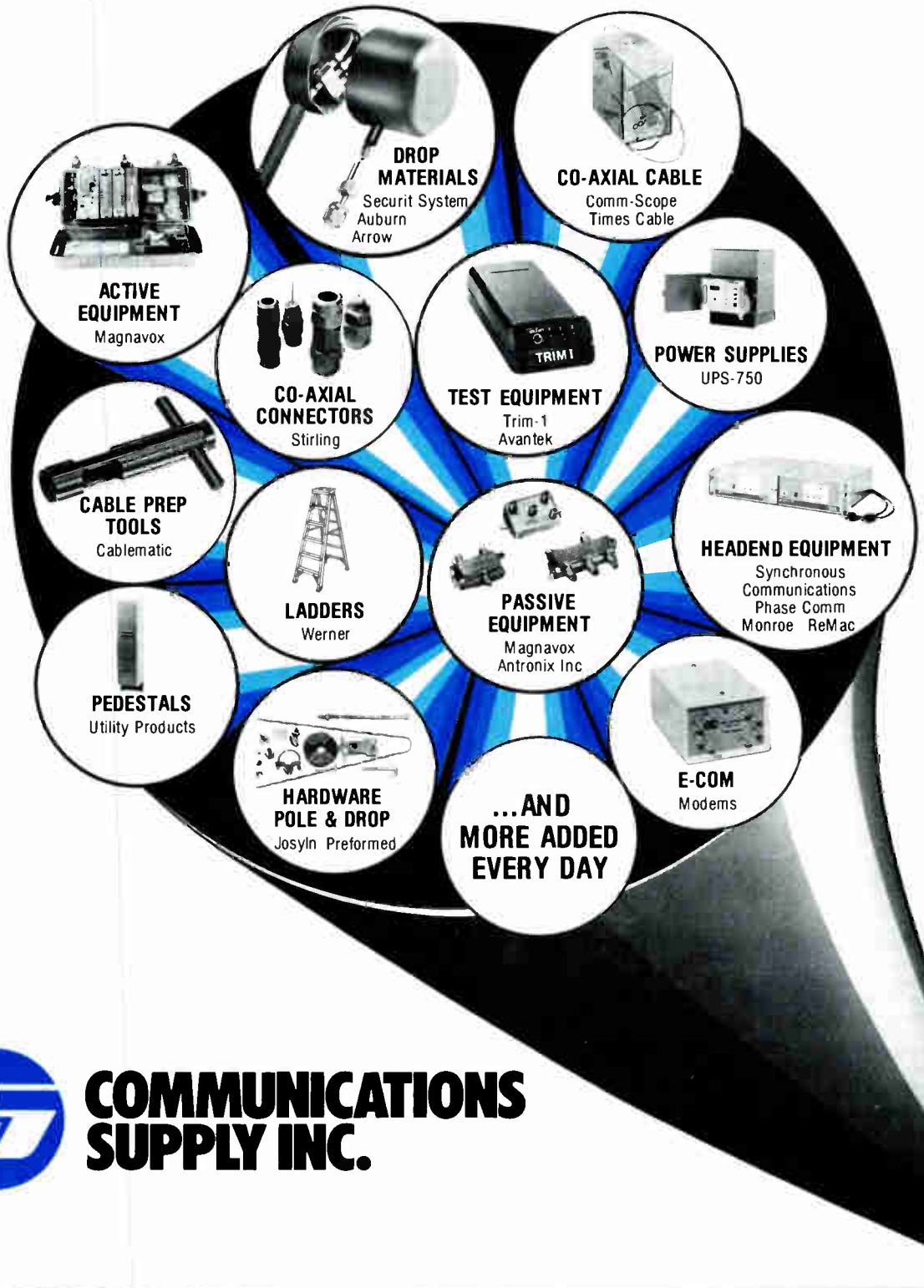

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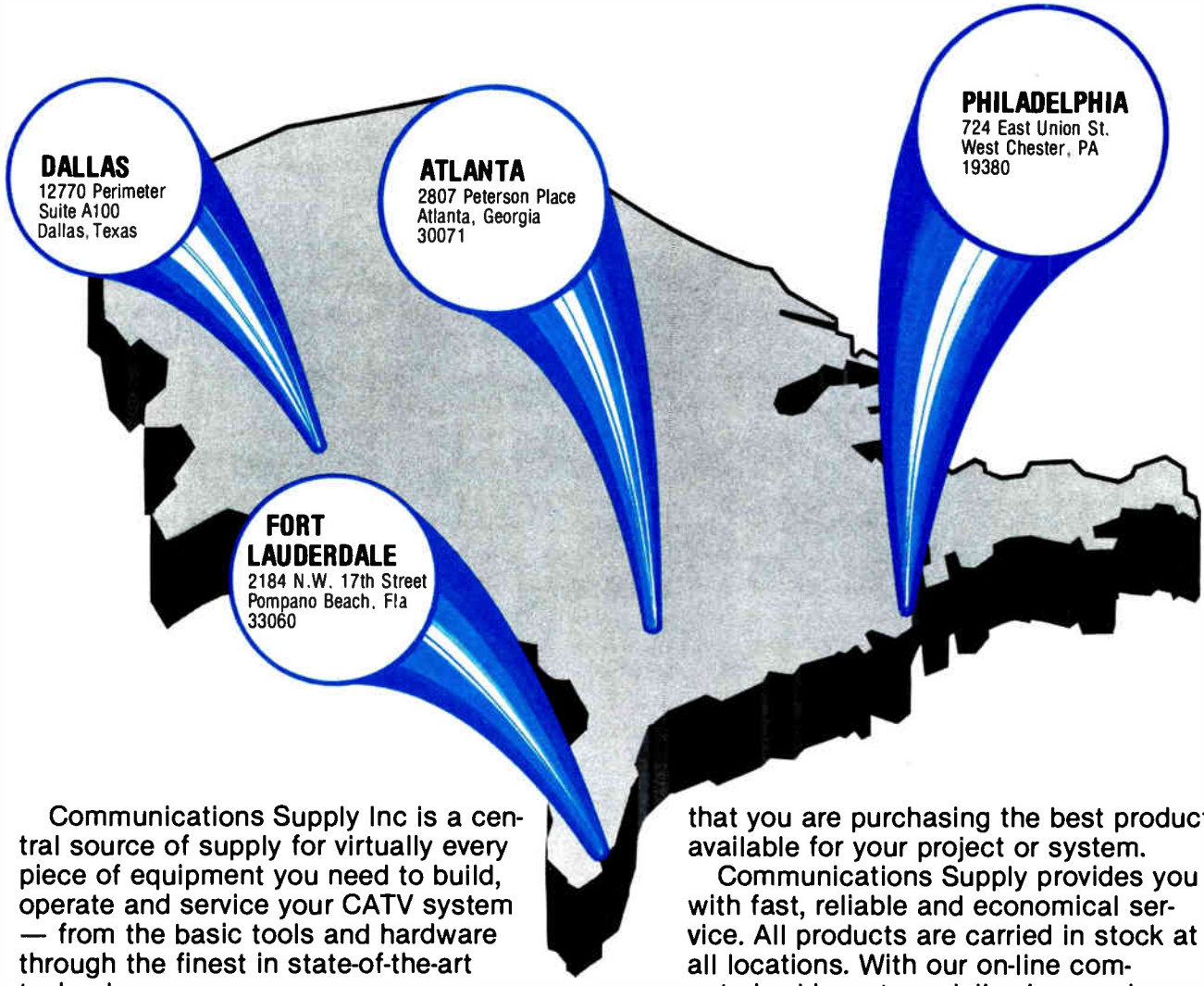

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"I know that Pioneer has been a world-wide leader in high technology design and manufacturing for many years. So I'm not surprised that in less than two years of marketing their products to the entire cable industry, Pioneer has become a leader in the design and manufacture of converters and interactive systems. You see, many people can design answers to technological problems, but can never mass manufacture that same quality product.

At Pioneer, manufacturing engineers work side-by-side with design engineers during the developmental process for a new product. That team approach assures that every converter installed in a subscriber's home and every system purchased by a cable operator meets, and will continue to meet, the rigid specs designed into the product.

Each new project is taken through at least five prototype states. The final prototypes must have maintained every quality specification originally designed into the product and must also be mass manufacturable.

Pioneer's specifications for active components exceed the military specs that most manufacturers try to achieve. Each final prototype goes through testing that includes all types of environmental and aging conditions. Next, 500 preproduction units are made and subjected to the consumer electronics industry's most rigorous testing. That testing is continued during the entire production cycle, as long as the product is made.

The engineering excellence at Pioneer is just the beginning of the quality assurance that extends from product development through product service. Ask anyone who has purchased systems or converters from Pioneer. They'll tell you. Pioneer does what they say they'll do. Pioneer seems to be one of the companies that the cable industry can trust.

The folks at Pioneer would like to talk to you in person. Give them a call."

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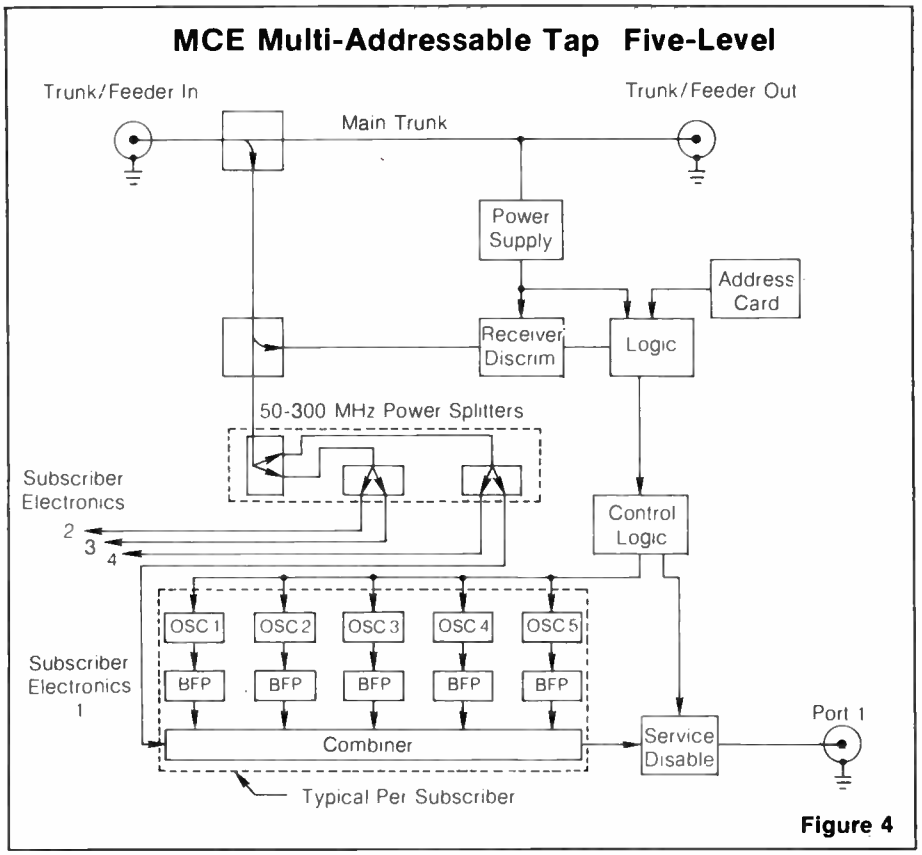


Figure 4

and shielded to prevent the possibility of radiation or conduction into the main feeder cable or adjacent channel. Like the two-level control logic, the addressing control signals are decoded by a discriminator circuit, applied to a logic circuit, which in turn directs which oscillator is to be turned on. Each oscillator activated from the headend processor is combined with the headend signal in a unique, balanced, passive circuit. The combiner, through the principle of phase cancellation, eliminates like frequencies. Therefore, the selected oscillator frequency corresponding to the channel frequency to be eliminated is cancelled in this circuit preventing any video information sufficient in level to be seen at the TV receiver. All other channels not cancelled in this way at the tap will appear at the TV receiver. If total service must be disconnected, a control signal from the headend processor will disconnect the RF signal path to the subscriber.

The modulator packaging concept, as illustrated in Figure 5 on page 57, allows for system expansion and ease of service. Careful design techniques provide exceptional reliability, reducing downtime to almost nil. Since total subscriber electronics is on a plug-in module the cable operator may install only one module or as many as four. This concept is a major factor in the design of the 16-port, five-level apartment unit, where the number of subscribers, and therefore the number of suscriber modules that must be initially installed or kept in inventory, may vary.

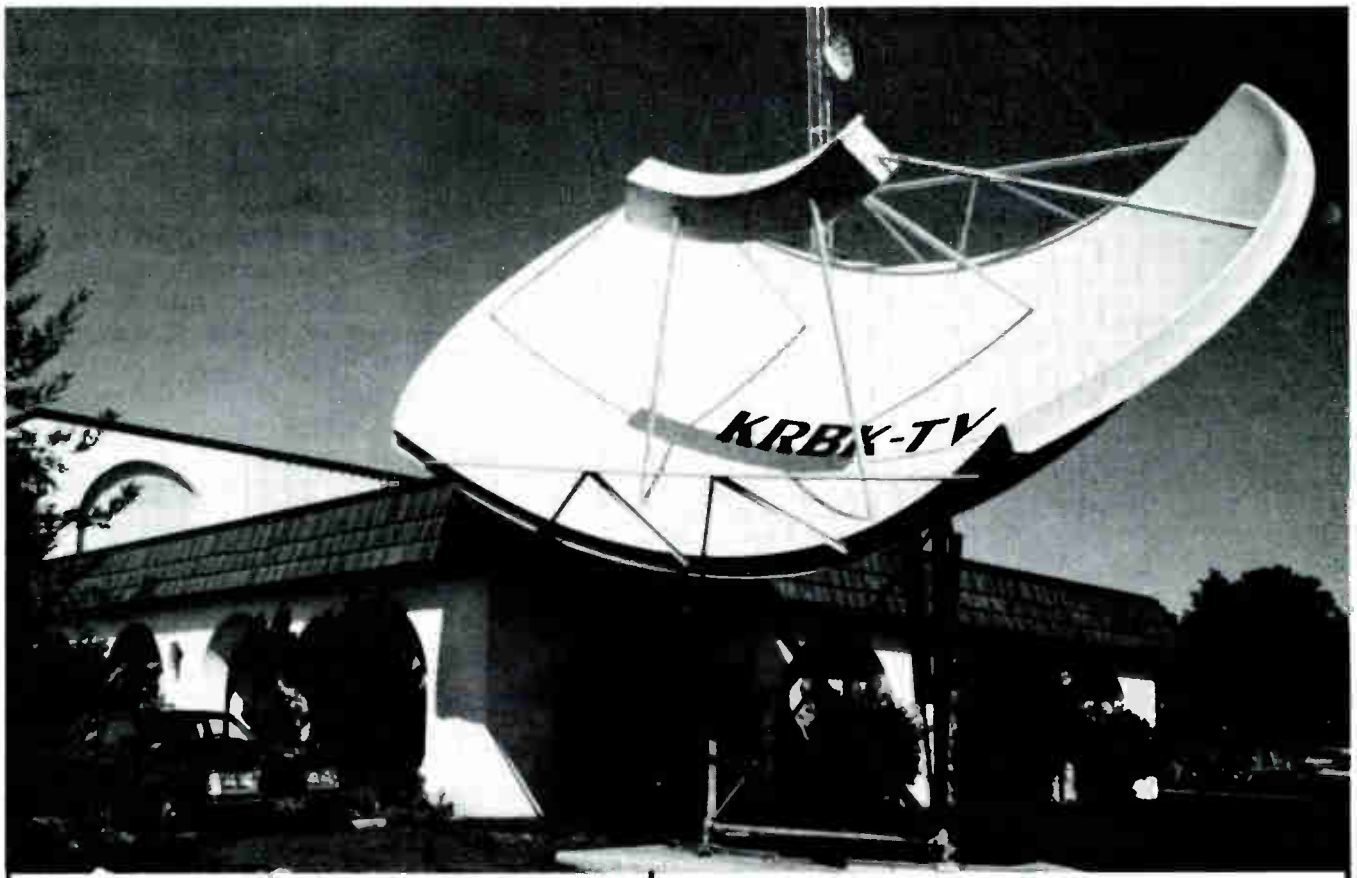
System Application

As stated, the two-level addressable tap was primarily intended for home-run cable systems. Being a passive device, the two-level tap has an in-line insertion loss of 1.5 dB at 300 MHz. This limits the number of taps that might be cascaded. However, the five-level addressable tap has reduced the in-line losses to approximately 0.1 dB, making the system an ideal candidate for not only a large cascade of taps but also an ideal candidate for loop-through systems. A loop-through cable system usually necessitates supplying service to a large number of subscribers from a single feeder line or drop cable, particularly in an apartment complex. This cable drop supplies service first to one subscriber, then to the next and the next, until the last subscriber has received service. This is in contrast to a home-run system where a drop cable services only a single subscriber.

As in Figure 6, page 57, a modularized approach to subscriber plug-ins allows for loop-through systems applications. A subscriber module, plus a simplified version of the tap logic and receiver, may be easily attached to walls and covered with a standard wall plate having a type F connector for cable connection to the TV receiver.

The addressable tap is a cost effective method of supplying a large number of subscribers remotely controlled cable service. System simplicity allows the addressable tap to be installed in any existing cable plant with little or no system

DISCOVER THE BENEFITS OF OUR MULTIPLE-BEAM ANTENNA



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Simulsat is not just an idea on the drawing boards, it's in operation today, working for major MSO's and Television Broadcasters.

New programs and services are constantly being added to a continually increasing number of satellites. In the past, multiple satellite reception required the construction of an Antenna Farm. Simulsat can save you valuable capital and real estate. Make a smart investment for your business and let Simulsat be your plan for the future.

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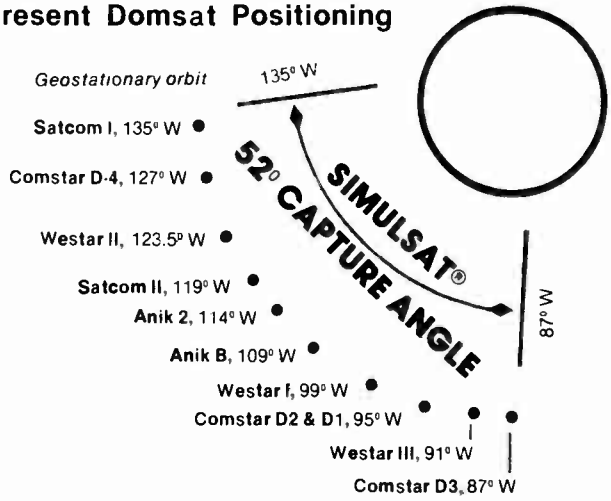

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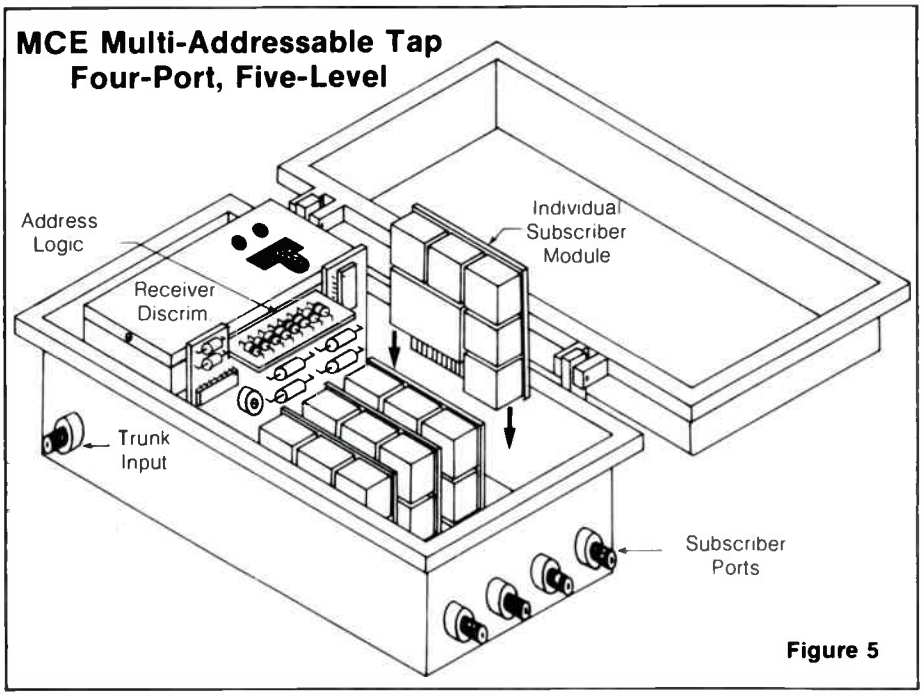
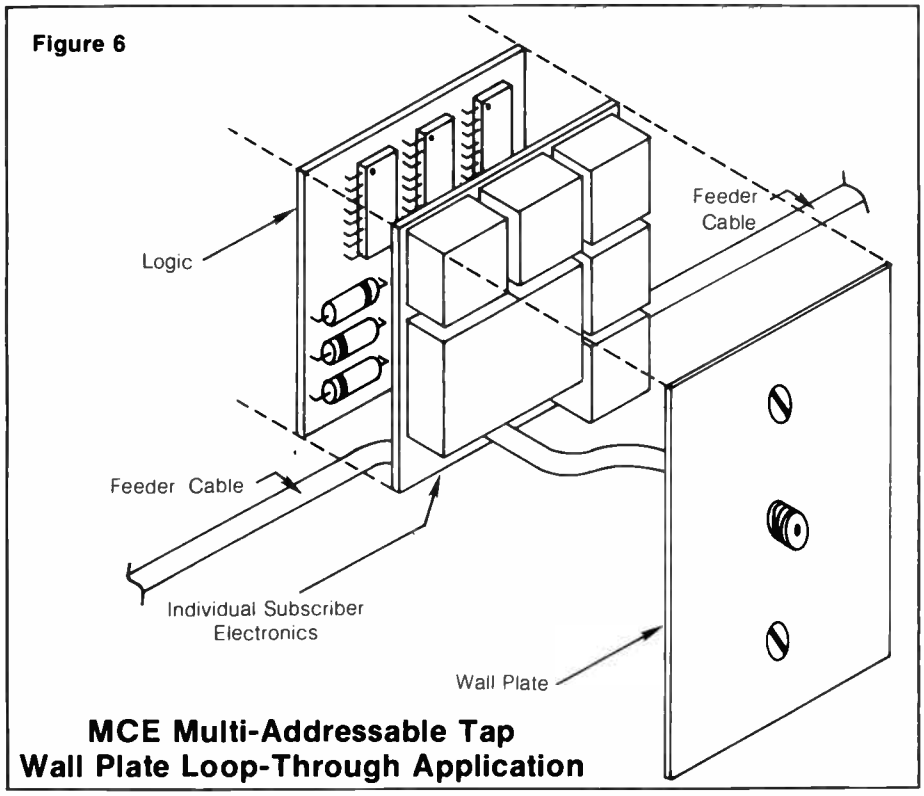


Figure 5

Figure 6



MCE Multi-Addressable Tap
Wall Plate Loop-Through Application

modifications, and no highly specialized technical talent is required.

There is more to come. For example, developments are underway for a low-band, mid-band and super-band addressable tap. Here the cable operator selects what combinations of the frequency bands in which to provide service and then has the capability to address each pay channel within that frequency band. Just in the wings waits a 54-channel addressable tap compatible with any existing standard non-addressable converter.

Herm Braun joined Merrill Cable Electronics of Pheonix Arizona, in early 1980 and currently holds the title of director of engineering. Braun also holds a professorship at DeVry Institute in Phoenix, Arizona. Prior to joining Merrill Cable Electronics he was a self-employed consultant. Braun obtained the BSEE and MSBA from the University of Michigan and is an active member of the IEEE, NCTA, SCTE and the Arizona Cable TV Association.

58 channels

at your finger tips

RCA's new pushbutton KS series remote tuning converters are microcomputer based and designed with field switchable standard, HRC or IRC channel assignments.

The field programmable all channel in-band decoder option accepts up to eight levels of pay programming for 256 possible tiers. This eliminates the need to stock different converters for each pay package offered on your system. An electronic A/B cable switch option expands the converter to 116 channels for use in a dual cable system.

RCA has the subscriber equipment for large and small systems, with or without premium channel decoding and a price that we think will fit your budget.

To find out more, call or write your nearest RCA Cablevision Systems represenative and ask why so many MSO's are converting to RCA.

RCA

KS series 58 Channel Set Top Converter

M series 58 Channel Set Top Converter

M series 36 Channel Set Top Converter

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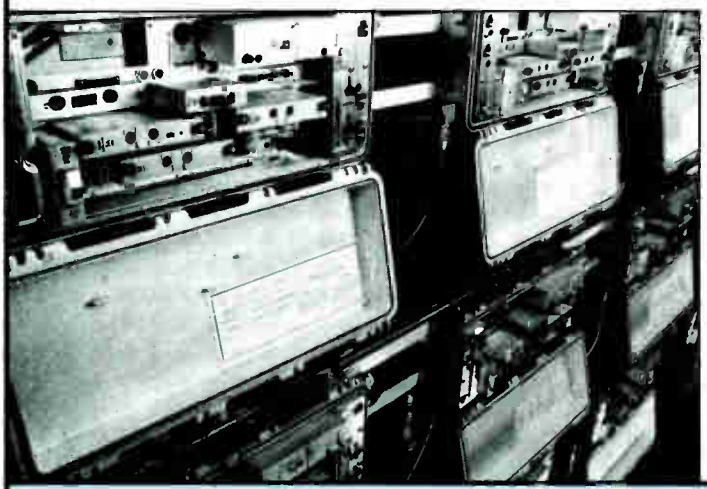
Product Profile

Featured this month in **CED**'s Product Profile is a list of trunk amplifiers with automatic gain control/automatic slope control (AGC/ASC). Due to the complexity and diversity of modular amplifier stations, other configurations of amplifier stations, including the so-called mod-kits, will be featured in future Product Profiles.

CATV trunk amplifiers with AGC/ASC provide the boosting of signals from the headend to feeder cable. Cascading—that is, the placing of amplifiers in sequence down a single stretch of trunk cable—requires that amplifiers be electrically spaced to compensate for signal losses inherent in the cable. The gain specification of a given amplifier indicates the total capability of the amplifier to boost the signal to the next amplifier which, in turn, boosts the signal further down the cable.

The attenuation of coaxial cable is variable with temperature variations and changes more at high frequencies than at low frequencies. Therefore, it is required that level controls (AGC/ASC) be incorporated in the amplifiers to compensate for this change in levels over temperature.



The modular construction of CATV amplifiers permits plug-in modules to be configured such that system operators can be specific in ordering amplifiers to meet their needs. Manufacturers should be contacted for complete information on and technical specifications for other modules and configurations as well as availability and prices.

The chart on the next three pages displays information on trunk amplifiers with AGC/ASC. Critical specifications for each model will aid the reader in selecting several appropriate amplifier manufacturers for further inquiry.

The January issue of **CED** will not feature a Product Profile due to the coverage of technical news from the Westen Show in Anaheim, California. The February issue of **CED** will include a Product Profile on earth station antennas.

Trunk Amplifiers

Product Profile

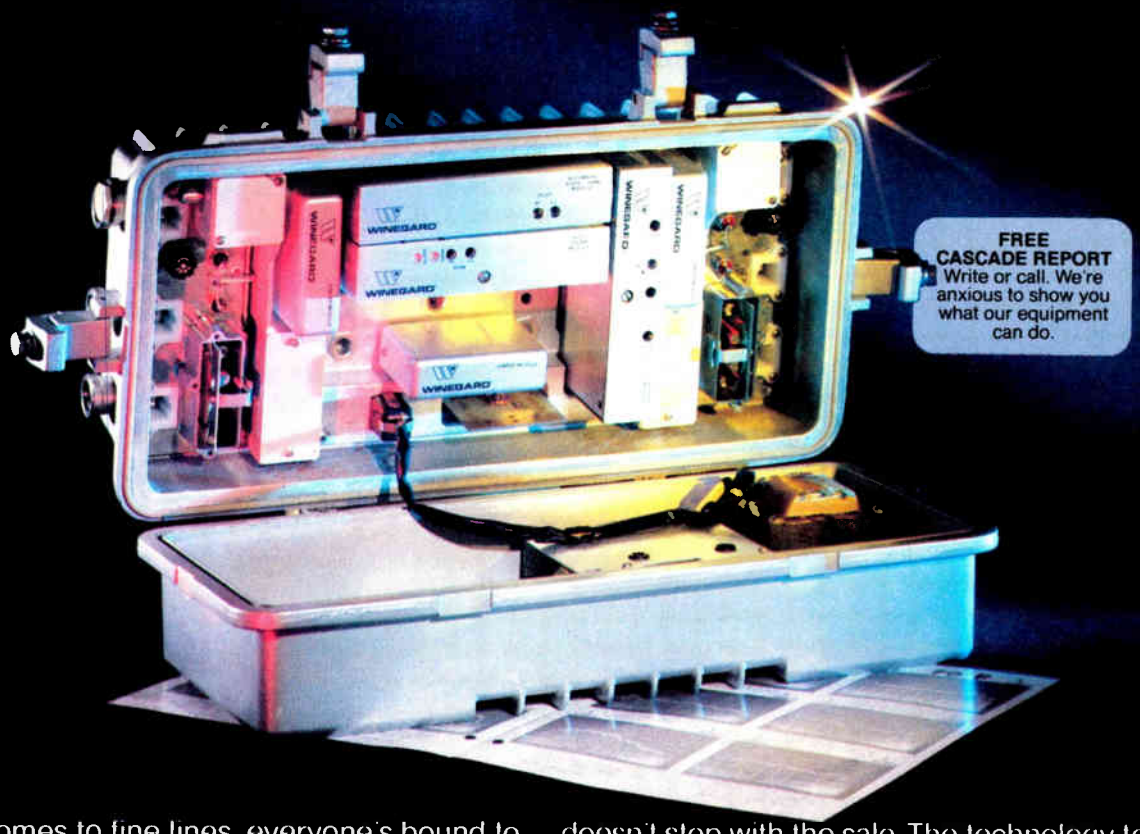
Model	Upper Bandwidth Limit	Triple Beat	Full Gain	Gain/Slope Control Range	Noise Figure	Special Features (Modular Construction, unless otherwise noted)
Broadband Engineering, Jupiter, Florida						
CL-3 Hybrid One-Way	300 MHz	-89 dB	26 dB	8.0 dB	7.0 dB	Single active module; AGC/ASC using video carrier; optional 5.0 to 30 MHz return capability.
C-COR Electronics, Inc., State College, Pennsylvania						
T-501-060 Hybrid Two-Way	245 MHz	-95 dB	26 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-500-060 Hybrid Two-Way	220 MHz	-97 dB	26 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-502-060 Hybrid Two-Way	270 MHz	-93 dB	26 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-503-060 Hybrid Two-Way	300 MHz	-91 dB	26 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-504-060 Hybrid Two-Way	330 MHz	-89	26 dB	6.0 dB	10 dB	AGC/ASC pilot or video.
T-505-060 Hybrid Two-Way	360 MHz	-90 dB	26 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-506-060 Hybrid Two-Way	400 MHz	-86 dB	26 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-510-060 Hybrid Two-Way	220 MHz	-94 dB	30 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-511-060 Hybrid Two-Way	245 MHz	-92 dB	30 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-512-060 Hybrid Two-Way	270 MHz	-90 dB	30 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-513-060 Hybrid Two-Way	300 MHz	-88 dB	30 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-514-060 Hybrid Two-Way	330 MHz	-87 dB	30 dB	6.0 dB	9.0 dB	AGC/ASC pilot or video.
T-520-060 Hybrid Two-Way	220 MHz	-84 dB	36 dB	8.0 dB	7.0 dB	AGC/ASC pilot or video.
T-521-060 Hybrid Two-Way	245 MHz	-82 dB	36 dB	8.0 dB	7.0 dB	AGC/ASC pilot or video.
T-522-060 Hybrid Two-Way	270 MHz	-80 dB	36 dB	8.0 dB	7.0 dB	AGC/ASC pilot or video.
T-523-060 Hybrid Two-Way	300 MHz	-78 dB	36 dB	8.0 dB	7.0 dB	AGC/ASC pilot or video.
Century III Electronics, Inc., Anaheim, California						
3122H/220 Feed-Forward One-Way	220 MHz	-103 dB	34 dB	8.0 dB	9.0 dB	AGC/ASC dual-pilot or video (optional).
2102B Push-Pull One-Way	300 MHz	-118 dB	26 dB	9.0 dB	9.0 dB	AGC/ASC dual-pilot or dual video (optional).
3122H/300 Feed-Forward One-Way	300 MHz	-100 dB	34 dB	8.0 dB	10 dB	AGC/ASC dual-pilot or video (optional).
3113/300 Feed-Forward One-Way	300 MHz	-98 dB	25 dB	8.0 dB	10 dB	AGC/ASC dual-pilot or video (optional).
4122H/400 Feed-Forward One-Way	400 MHz	-86 dB	34 dB	8.0 dB	10.5 dB	AGC/ASC dual-pilot or video (optional).

Product Profile

Model	Upper Bandwidth Limit	Triple Beat	Full Gain	Gain/Slope Control Range	Noise Figure	Special Features (Modular Construction, unless otherwise noted)
4113/400 Feed-Forward One-Way	400 MHz	-93 dB	25 dB	8.0 dB	10.5 dB	AGC/ASC dual-pilot o. ieo (optional)
4113H/400 Feed-Forward One-Way	400 MHz	-89 dB	29 dB	8.0 dB	10 dB	AGC/ASC dual-pilot or video (optional).
Delta-Benco-Cascade, Rexdale, Ontario						
Type B Unicom 703-009 Push-Pull Two-Way	270 MHz	-105 dB	26 dB	8.0 dB	10.5 dB	Super and mop-up a] .lications, optional gain to 39 dB; AGC or TLC.
Type A Unicom 701-008 Push-Pull Two-Way	310 MHz	-90 dB	25.5 dB	8.0 dB	10 dB	AGC or TLC; gain options to 39 dB; status monitoring.
Type B Unicom 703-008 Push-Pull Two-Way	310 MHz	-90 dB	25.5 dB	8.0 dB	10 dB	Super and mop-up applications; optional gain to 39 dB; AGC or TLC.
Gamco Industries, Inc., Roselle, New Jersey						
Futura 12-426 Mainline AGC One-Way	225 MHz	N.A.	26 dB	6.0 dB	10 dB	No need for external equalizers.
1-301 Super One-Way	300 MHz	-78 dB	32 dB	5.0 dB	9.7 dB	Bi-directional option; AGC or tilt with pilot or video options.
Futura 300-252 Push-Pull AGC One-Way	300 MHz	N.A.	29 dB	12 dB	11 dB	
1-400 AGC-ATC One-Way or Two-Way	400 MHz	-74 dB	26 dB	5.0 dB	10 dB	Video AGC option.
GTE Sylvania CATV Division, El Paso, Texas						
Series 1000 Multipurpose AGC One-Way or Two-Way	300 MHz	-90 dB	26 dB	8.0 dB	6.9 dB	Retrofitting earlier models.
Series 5000 Multipurpose AGC One-Way or Two-Way	400 MHz	-80 dB	24 dB	7.0 dB	7.0 dB	Status monitoring; AGC pilot or video.
Jerrold Division, General Instrument, Hatboro, Pennsylvania						
Starline 20/400 SJS-3/E Push-Pull One-Way or Two-Way	400 MHz	-48 dB	26.5 dB	8.0 dB	8.0 dB	Redundant amplifiers; status monitoring; feeder connect/disconnect option.
Starline 20/450 AGC One-Way or Two-Way	450 MHz	-80 dB	24 dB	8.0 dB	7.0 dB	61-channel capacity; redundant amplifiers; status monitoring; feeder connect/disconnect option.
Lindsay Specialty Products Ltd., Buffalo, New York						
TA-1001 AGC One-Way or Two-Way	300 MHz	-57 dB	23 dB	8.0 dB	7.5 dB	Status monitoring.
TA-1041 AGC One-Way or Two-Way	400 MHz	-51 dB	25 dB	8.0 dB	9.0 dB	Status monitoring; forward and reverse by-pass.
Magnavox CATV/Systems, Inc., Manlius, New York						
5-MTC AGC/ASC One-Way or Two-Way	440 MHz	-87 dB	26 dB	10 dB	9.0 dB	Status monitoring.
5X-2TC AGC/ASC One-Way or Two-Way	330 MHz	-112 dB	26 dB	10 dB	8.0 dB	Status monitoring.
Merrill Cable Electronics, Inc., Phoenix, Arizona						
NOVA-300 TA AGC Hybrid One-Way or Two-Way	300 MHz	-106 dB	25 dB	8.0 dB	8.0 dB	Thermal equalizer option.
RCA Cablevision Systems, Van Nuys, California						
452 Hybrid Two-Way	400 MHz	-85.5 dB	25 dB	8.0 dB	8.0 dB	Modules compatible with model 152; AGC pilot or video; dual equalizers.
252 Hybrid Two-Way	330 MHz	-89.5 dB	26 dB	8.0 dB	7.5 dB	Modules compatible with model 152; AGC pilot or video; dual equalizers.
Scientific-Atlanta, Inc., Atlanta, Georgia						
6540A/400 Hybrid Two-Way	400 MHz	-79.5 dB	25 dB	8.0 dB	10 dB	AGC pilot or video.

There's a fine line in 400 MHz amplifiers

The Winegard Line



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Before you commit to distribution equipment, check into the Winegard 400MHz line. It's the fine line that makes all the difference.

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SEE US AT THE WESTERN SHOW

Putting Computers To Work In Follow-Up Systems Design

By Ron Gunn, technical director of television, Lawrence Livermore National Laboratory.

Computers are commonly used to lay out larger trunks and systems in the CATV and MATV world, but they aren't commonly used for the follow-up jobs that come later and later and later (forever and ever). A microcomputer can really help with that smaller class of job, but it helps best only if it is set up to take advantage of the things it can do that a calculator can't.

The thousands of people charged with system expansion and maintenance deserve major assistance over the long haul, and microcomputers can help them. We go into this knowing that in systems work, the designer always suffers, because the better the system works, the less visible he is to any customer or any level of management.

How Should A Microcomputer Do It?

What should a microcomputer do for you in follow-up design? First, it should provide graphics to tell you what cables, distances and components you are working with. Try that on a hand calculator! On a computer you can get a picture, and everyone knows that a picture is worth 1k words. When you can see a captioned graphic it all comes together. You don't make mistakes when the picture is right there in front of you.

Second, cable and system tap attenuation factors should be stored for use when needed, and then appear, automatically. Input of cable type and length should be enough to define any cable loss. Input of simple parameters should define the tap to be used.

Third, overall system minimum limits should automatically appear and should allow a choice of continuing on, or providing amplification at that point. You should know when your predetermined limits have been reached and should have complete control of the choices you have available to continue your analysis of the situation.

All of these attributes should appear in addition to the accuracy and precision that you expect of a digital calculating machine, be it called computer, calculator or abacus.

It Already Exists

A program that does CATV drop calculations with graphics, stored attenuation factors and dynamic designer options already exists, and it is in the public domain! The program is called, simply

Look into the new Sylvania converter and you'll see the future.

Operator programmed Channel Inhibit will eliminate both audio and video on any or all channels.

Built-in software provides for later addition of a Subscriber Response option for up to 100 separate response entries.

Brown-out protection feature restores converter operation even after line voltage drops below 102 VAC.

Light touch, spill-proof keyboard has a shield to protect the microcomputer against static electricity.

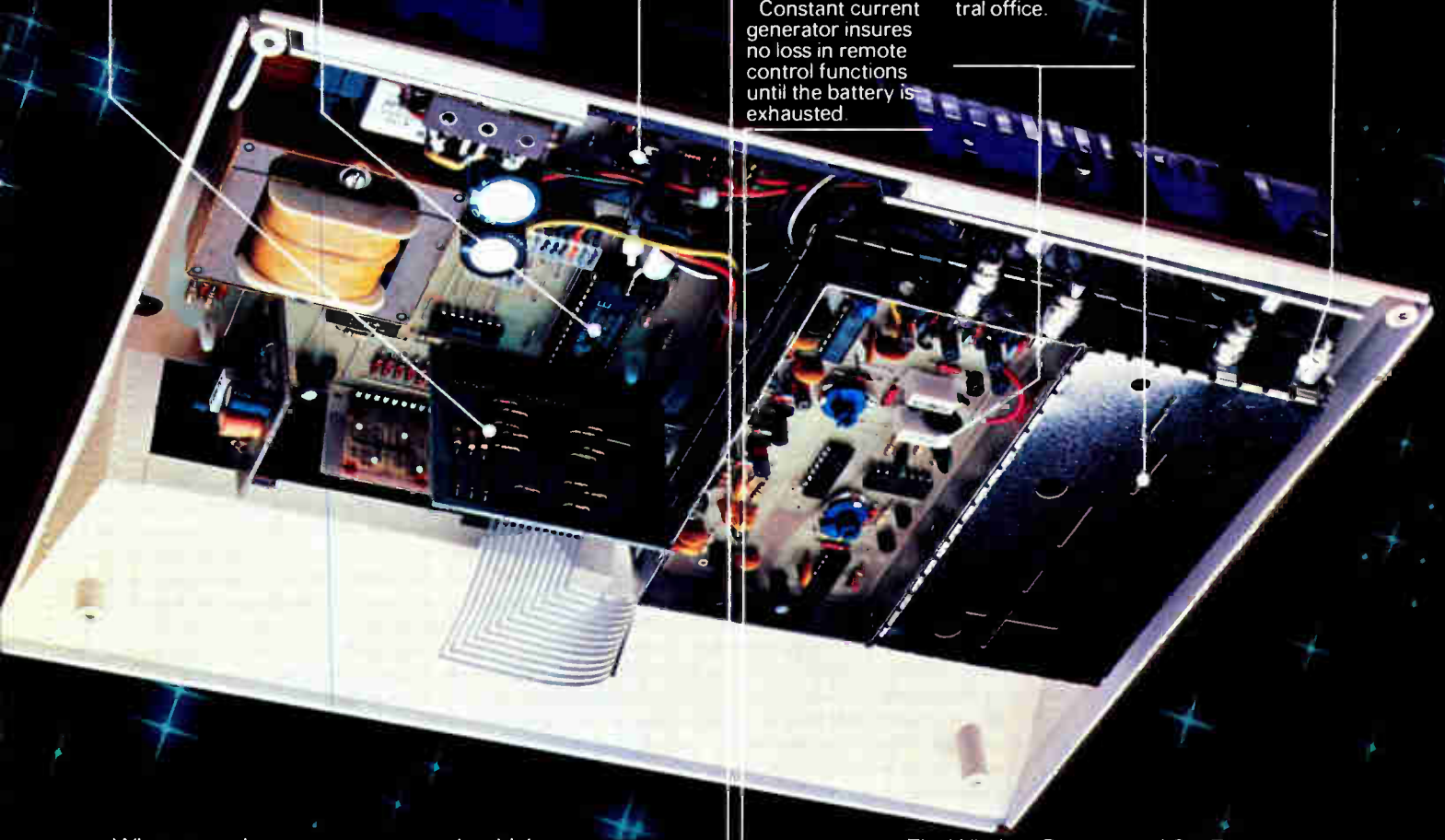
Wireless remote control option will perform all functions except security code entry for channel inhibit.

Constant current generator insures no loss in remote control functions until the battery is exhausted.

In-band descrambler has a field-proven sync suppression method and can descramble any or all channels.

In the future, you'll be able to add an addressability option that lets you control subscriber's service from a central office.

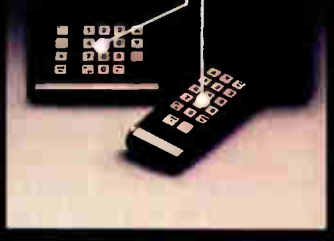
Plug-in modular design allows you to change options without soldering or unsoldering wires.



When you select a converter, you shouldn't just ask what it can do for you now; you should find out whether it will keep up with the changing needs of cable television tomorrow.

Look into the Sylvania 4040 Set Top Converter and 4042 Wireless Remote Control. This handsome, ruggedly built 400 MHz programmable unit uses low-power microcomputers for all functions like no other unit on the market.

Your customer may store and recall 16 favorite channels, clear entries made by mistake, and change channels one step at a time with a single button.



The Wireless Remote and Set Top Converter is designed to last well into the future, too, with built-in surge protection and a large heat sink to keep the Set Top unit cool. The digitally-controlled, phase-lock loop frequency synthesizer eliminates the need for fine tuning.

For more information, contact your local Sylvania CATV sales office, or phone toll free (800) 351-2345 within the continental U.S., except Texas. From Alaska, Hawaii and Texas, call (915) 591-3555 collect. In Canada, call our distributor, Micro-Sat Communications at (416) 839-5182.

This is a converter that really has a future.

SYLVANIA CATV Transmission Systems | GTE

See us at the Western CATV Show at Booth #115, Dec. 2-4.

enough, "tap", and it will accurately assist you in the never-ending task of keeping your cable system current with the latest changes, all the while keeping track of the signal level for you.

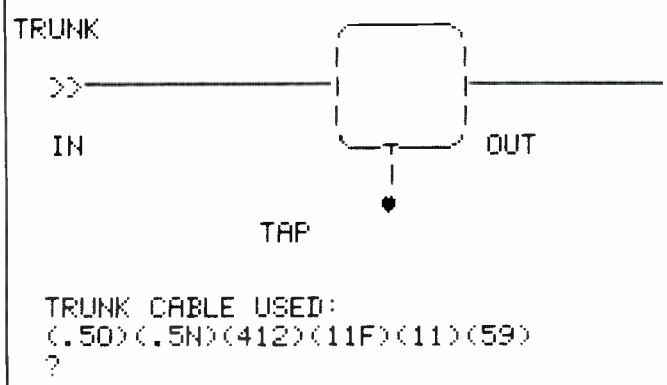
Tap runs as is in any BK or larger Commodore PET or CBM microcomputer with cassette input. No printer is used and disk is optional. The program could be translated to your Apple or Radio Shack, but you will spend a fair amount of time doing it, because of the absolute incompatibility of microcomputer graphics. This program has a lot of them.

What You Get

You will be able to select the correct tap from your trunk to any length drop that it can drive. When an amplifier is required to maintain minimum system levels, you will be told. See Figure 1 for the basic tap graphic.

When you specify a tap point, you will be shown the correct tap that must be used to maintain system levels to the point of delivery. If a different cable will make the difference, you will be able to try it on the screen and see. From CATV to MATV, tap calculations will be easier and alternatives more obvious when you can see them on the screen.

Figure 1



The tap graphic. You are looking from left to right out the cable system. The contents of the box are up to you.

Starting

The tap program is set up for minimum trunk levels of +10 and minimum final drop levels of +9. Both of these parameters can be changed when you start. You will also get to choose the output level at which agc type amplifiers would be assumed to operate. When these system choices are made, you are ready to do design work. Get out your lance, we are looking for windmills!

The Figure 1 graphic now comes up. You are on the trunk line, looking out from left to right. The input trunk line is shown, then a circuit element with an auxiliary outlet, then the output trunk line. These are the elements that tap has been created to help you manipulate.

Putting Labels on the Graphic

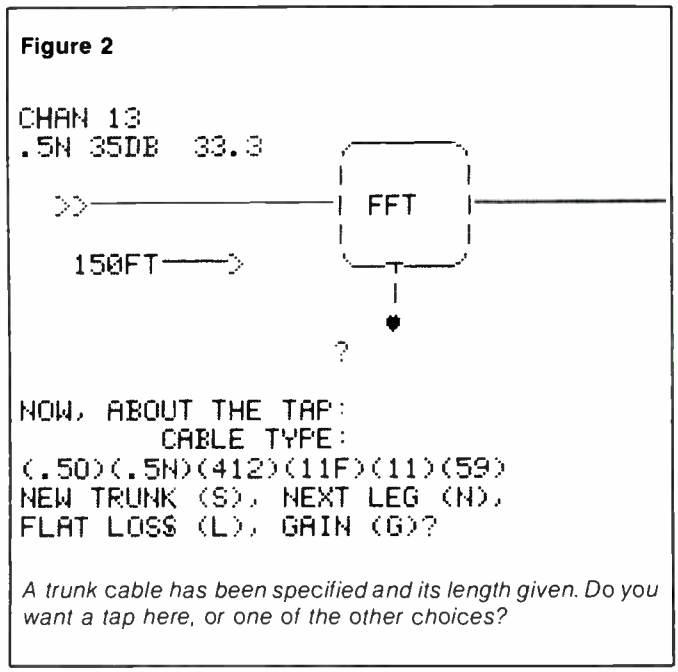
The first questions launch you into it: what is your input signal level, what kind of cable are you using, and how far is it to your next circuit element?

Looking at Figure 2, you now see: input signal level, trunk cable type, length of trunk cable run, and the signal level at the end of that run (the input of your next circuit device).

At this point you get to choose what is next: specify a NEW TRUNK; go past the circuit element to the NEXT LEG of this trunk; put in some FLAT LOSS; specify some GAIN; or define a tap by entering the CABLE TYPE to be used.

If you are indeed designing in a tap, input the cable type and you will be asked for the length. The correct TAP will show and the output trunk level will be calculated.

Figure 2



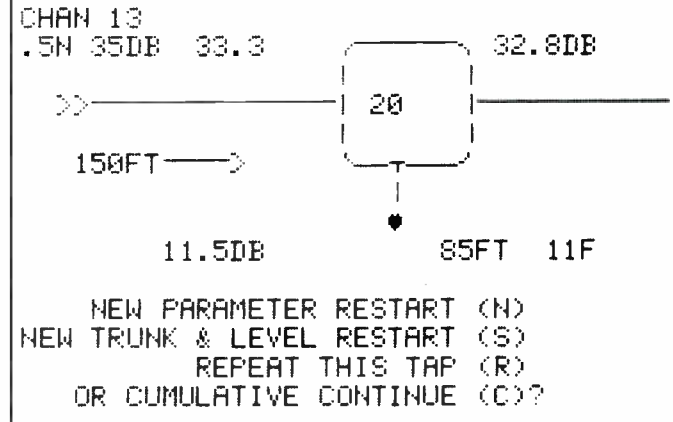
A trunk cable has been specified and its length given. Do you want a tap here, or one of the other choices?

TAP Design Complete

Looking at Figure 3, you now see: the input signal strength, the type and length of trunk cable, the device input and output trunk signal level, the tap number, the type and length of cable on the tap, and the signal strength at the end of the drop cable.

Figure 3 shows a starting trunk level of +35. Looking 150 ft. down the .5N trunk, the level is 33.3. An FFT-20 is located there and the trunk level at the output of the tap is 32.8. Looking at the drop, at the end of 85 ft of RG11 foam the level is 11.5.

Figure 3



A tap cable type and its length have been input. With that information, the above display will come up. This tap has been designed.

Choices now are: NEW PARAMETER RESTART, which is the same as typing RUN; NEW TRUNK & LEVEL RESTART, which puts you on another trunk cable; REPEAT THIS TAP if you want to try it over with another cable type or cable length; CUMULATIVE CONTINUE if you want to accept what you see and go on to the next circuit element.

If you do decide to accept that one and go on, the remaining trunk line level is transferred to the left (input) of the graphic, and you get to go on to the next element in the system from there. You can trace a leg of the system to its end, putting in gain, loss and

With SAM I at your side, you're ready for any kind of signal analysis situation that comes down the cable. This superior measurement system handles amplitudes from −40 dBmV to +60 dBmV with an accuracy of ±0.5 dB. A built-in calibration system assures that accuracy by letting you calibrate SAM at operating temperature, with the same jumper you'll be using for tests. The five-band tuning dial gives 1 MHz resolution from 4 MHz to 300 MHz (400 MHz optional).

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taps as needed in the system design.

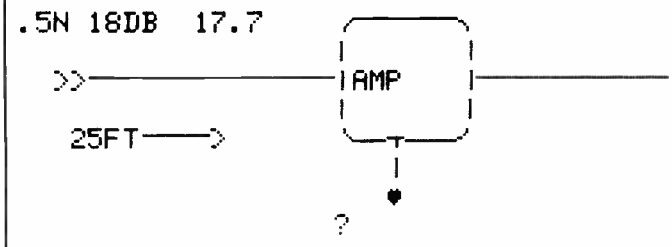
Loss is included so you can walk your way down a cable and can put in flat (frequency independent) insertion losses for passives to keep track of your levels as you go.

When You Run Out of Gas

When you see the trunk level getting low, you can select a spot for an amplifier. The screen will look like Figure 4. As you can see, there are two ways to specify amplifier gain. If you are running agc amplifiers on a main trunk line, you said what the output level was when you were starting up. You will select that output level with a Y and go on.

If you are on a feeder line, you will want to specify the gain of a fixed-gain amplifier. Select G and then put in the dB gain. The amplified level will appear on the screen for you to work with.

Figure 4



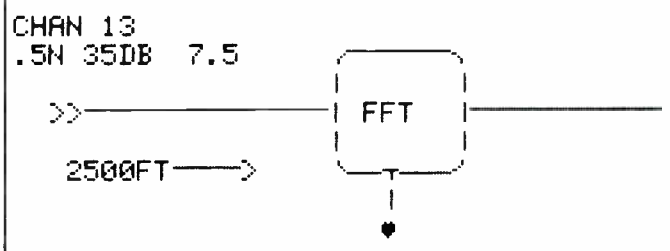
DO YOU WANT THE STANDARD AMPLIFIER OUTPUT OF 35 DBMV HERE (Y), OR DO YOU WANT TO SPECIFY SOME GAIN (G)?

Gain has been requested. A trunk agc amplifier can be put in, or any fixed-gain amplifier can be specified.

Sometimes you will involuntarily run out of gas. If you cut your cable, the signal that poured out wouldn't even drip on the floor. If you drop below the overall system level you have specified, you will have to accept the resulting out-of-spec levels or you will have to add gain.

This choice is clearly defined as you can see in Figure 5. The only other choice is to go back to the last system element and modify it to give you more to work with.

Figure 5

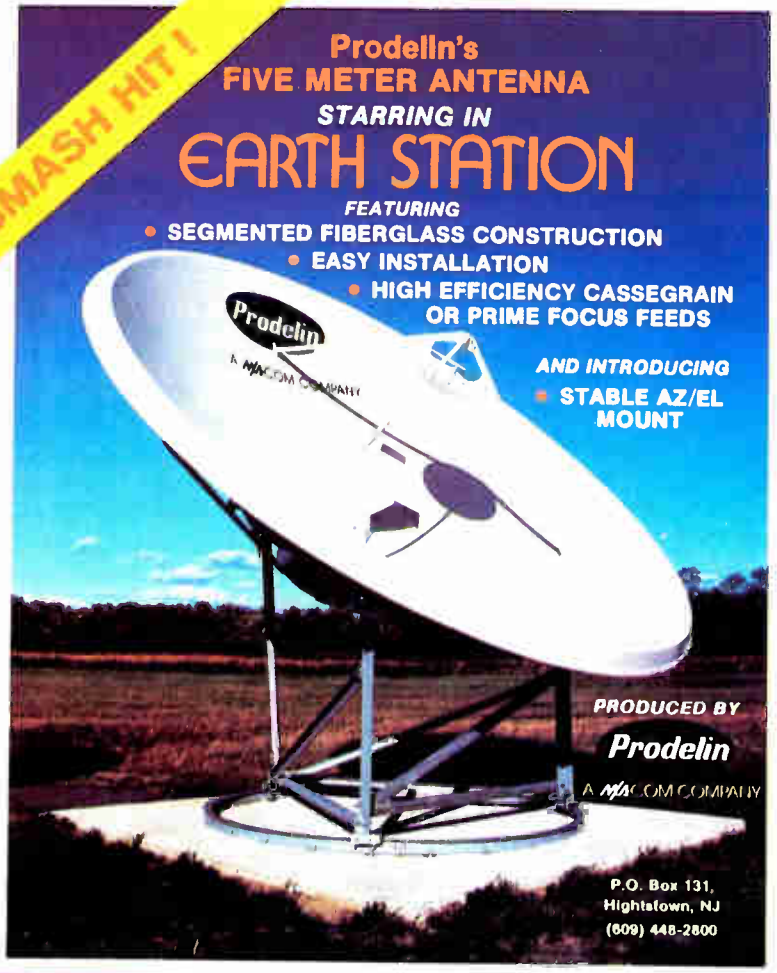


TRUNK LEVEL BELOW RANGE. YOU ARE AT THE LAST TAP LOCATION. YOU CAN ACCEPT THE LEVEL SHOWN (A), OR YOU CAN INSERT GAIN (G)?

You have ignominiously run out of gas. The trunk level at the input to this circuit is too low.

If you do specify some gain, then you get to say what the next distance on the trunk will be. In Figure 6, 25 dB of gain has been specified and the length to the next circuit element is being asked

NOW SHOWING



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```
1320 IFQ=0THEN1150
1330 PRINT:INPUT"HOW LONG, IN FT  0■■■■";R
1340 G6$=STR$(R)+"FT  "+Q$+"   "
1350 REM          CALCULATE
1360 K=(D*C)+(Q*R)
1370 FORI=13TO0STEP-1
1380 IFS-(K+PO(I))>0THEN1400
1390 GOTO1410
1400 X=I:I=0
1410 NEXT
1420 M1=S-(K+PO(X)):M5=FNY(M1)
1430 M2=S-((C*D)+PL(X)):M6=FNY(M2)
1440 G7$=STR$(P(X))+"   "    :GOSUB1010
1450 G5$=STR$(M5)+"DB          " G2$=STR$(M6)+"DB  "
1460 GOSUB970
1470 GOSUB1030
1480 IFRIGHT$(STR$(R),1)="1"THEN1530
1490 IFX=0THENGOSUB1770
1500 IFX=0THEN1730
1510 IFM2<SMTHENGOSUB1770
1520 IFM2<SMTHEN1730
1530 PRINT"■■■■■■■■■■■■■■    NEW PARAMETER RESTART (N)"
1540 PRINT"NEW TRUNK & LEVEL RESTART (S)"
1550 PRINT"          REPEAT THIS TAP (R)"
1560 INPUT"   OR CUMULATIVE CONTINUE (C)
     C■■■■";N$:N$=LEFT$(N$,1)
1570 IFN$="N"THEN180
1580 IFN$="S"THEN370
1590 IFN$="R"THEN1720
1600 IFN$<>"C"THENEND
1610 LS=M2:REM TAKE M6 FOR ROUNDED #
1620 GOSUB2460
1630 GOSUB880
1640 S=M2:GOSUB1030
1650 LN=FNY(S):LT=0
1660 G1$=C$+" "+STR$(LN)+"DB      " G2$="
1670 G3$="              " G5$="          TAP " G6$="
1680 GOSUB970
1690 G7$="FFT   "
1700 GOSUB1010
1710 GOTO410
1720 G5$="                    " GOTO1140
1730 PRINT:PRINT"OUT OF RANGE; PLEASE ADJUST AND "
1740 PRINT"TRY AGAIN. PRESS ANY KEY."
1750 GET2$:IF2$=""THEN1750
1760 GOTO1140
1770 REM OUT OF RANGE
1780 GOSUB1030
1790 PRINT"(THIS OUT-OF-RANGE CHOICE WILL BE"
1800 PRINT"ACCEPTED IF CABLE-FT ENDS IN '1')"
1810 RETURN
1820 PRINT"□THIS CATV PROGRAM GIVES LEVELS AND TAP"
1830 PRINT"VALUES FOR CHAN 13 OPERATION.":PRINT
1840 PRINT"(CHAN 2 IF TRUNK CABLE TYPE HAS"
1850 PRINT"LEADING *)IE: *.5N":PRINT
1860 PRINT"IT ASSUMES +9DBMV AT THE END"
1870 PRINT"OF EACH DROP CABLE."
1880 PRINT:PRINT"IT WILL BALK WHEN TRUNK LEVELS GET"
1890 PRINT"DOWN TO +10DBMV."
1900 PRINT:PRINT"IF +9 AND +10 ARE OK,
     PRESS RETURN.":PRINT
1910 PRINT"OTHERWISE ENTER ACTUAL LEVEL WANTED AT"
1920 INPUT"END OF DROP CABLE  G■■■■";AD$
1930 A=VAL(AD$):IFA<>0THEN1950
1940 A=9:SM=10:GOTO1960
1950 INPUT"DESIRED TRUNK MINIMUM (DBMV)";SM
1960 PRINT:INPUT"TRUNK AGC AMP OUTPUT LEVEL (DBMV)";DB
1970 RETURN
1980 GOSUB1030
1990 PRINT"TRUNK LEVEL BELOW RANGE. YOU ARE AT"
2000 PRINT"THE LAST TAP LOCATION. YOU CAN ACCEPT"
2010 PRINT"THE LEVEL SHOWN (A), OR YOU CAN"
2020 INPUT"INSERT GAIN (G)  A■■■■";Y$
2030 IFY$="A"THEN780
2040 IFY$="G"THEN2060
2050 GOTO1980
2060 Q$="G":N$="R":D=0:LT=0:LN=FNY(S)
2070 G7$="GAIN ":GOSUB1010
2080 G1$=C$+STR$(LN)+"DB      ":G3$="0
2090 GOSUB970
2100 GOSUB1030
2110 GOTO2140
2120 G7$="AMP   " GOSUB1010
2130 GOSUB1030
2140 PRINT"DO YOU WANT THE STANDARD AMPLIFIER"
2150 PRINT"OUTPUT OF"DB"DBMV HERE (Y), OR DO"
2160 PRINT"YOU WANT TO SPECIFY SOME GAIN (G)";
2170 INPUT"  Y■■■■";Y$:IFY$="Y"THEN2400
2180 Q$="L"
2190 PRINT:PRINT"HOW MUCH GAIN (DB)":GOTO2240
```

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To meet the sharp increase in demand for CATV amplifiers, some equipment manufacturers were forced to modify their specifications to accommodate substitute hybrid amplifiers because we couldn't manufacture our originals fast enough.

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The difference is so dramatic, we'll be happy to test our hybrids against any substitutes—you name the place and the time. You'll immediately understand why you should specify and demand TRW CA 5000 Series hybrids when you buy amplifiers. The equipment won't cost you any more. But you'll get a lot more performance.

Contact TRW Semiconductors 14520 Aviation Blvd., Lawndale, California 90260, (213) 679-4561.

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```
2200 G7$="LOSS ":GOSUB1010
2210 GOSUB1030
2220 INPUT"HOW MUCH LOSS (DB)  0■■■■";AG
2230 AG=AG*(-1):GOTO2250
2240 INPUT"    0■■■■";AG
2250 G7$="      " GOSUB1010
2260 G7$="+"+STR$(AG)
2270 IFSGN(AG)=1THEN2290
2280 G7$=STR$(AG)
2290 GOSUB1010
2300 GOSUB1030
2310 LS=(S-(D*C))+AG LS=FNY(LS)
2320 N$="C"
2330 GOSUB880:REM CLEAR TITLES
2340 G1$=C$+STR$(LN)+"DB"+" "+STR$(LT)+"  " G2$=STR$(LS)
2350 G3$="              " G4$="?———————>    " G5$="
2360 GOSUB970
2370 GOSUB1030
2380 S=(S-(D*C))+AG
2390 GOTO690
2400 S=DB
2410 GOSUB880
2420 G3$="?———————————>"
2430 G1$=C$+STR$(S)+"DB":GOSUB970
2440 GOSUB1030
2450 GOTO690
2460 I$=STR$(LS)
2465 FORI=25TO4STEP-1:PRINT"■■"TAB(I)I$
2470 PRINT"□                                    "
2480 NEXTI
2490 RETURN
2500 N$="S"
2510 PRINT"□"
2520 GOTO370
2530 S=S-(D*C):LN=FNY(S)
2540 GOSUB1030
2550 GOSUB880
2560 G1$=C$+STR$(LN)+"DB    "
2570 GOSUB970
2580 GOTO690
2590 REM HERE IS TAP DATA. FIRST NAME,
     THEN LOSS TO THE TAP, THEN TRUNK
2600 REM THRU LOSS. SEE LINE 2610 FOR
     THE PRECISE FORMAT.
2610 DATA4,3.5,3.5
2620 DATA4,3.5,3.5,7,6.7,3.6,10,10.4
2630 DATA1.6,14,14,1.1,17,17.1,.7
2640 DATA20,20,.5,23,23,.4
2650 DATA26,26,.4,29,29,.4
2660 DATA32,32,.4,35,35,.4
2670 DATA38,38,.4,41,41,.4
2680 REM NOTE: DATA ON THE LOWEST TAP
     IS DUPLICATED. THAT IS IMPORTANT AND
2690 REM IS DONE SO THAT AN IN-RANGE
     AND AN OUT-OF-RANGE LOWEST TAP CAN
2700 REM BE PROVIDED.
2710 IFC$=".5D"THENC=B2
2720 IFC$=".5N"THENC=B1
2730 IFC$="412"THENC=B3
2740 IFC$="11F"THENC=B4
2750 IFC$="11"THENC=B5
2760 IFC$="59"THENC=B6
2770 RETURN
2780 IFQ$=".5D"THENQ=B2
2790 IFQ$=".5N"THENQ=B1
2800 IFQ$="412"THENQ=B3
2810 IFQ$="11F"THENQ=B4
2820 IFQ$="11"THENQ=B5
2830 IFQ$="59"THENQ=B6
2840 RETURN
READY.
```

Ron Gunn has served as technical director of television at the Lawrence Livermore National Laboratory for eight years. His articles have appeared in Radio-electronics, 73, CQ, Compute *and* Educational Industrial Television. *Gunn would like to thank three of his colleagues in the electronics department of the Lawerence Livermore National Laboratory, Dick Rufer, Ken Wyman and Don Davis, for their data, constructive criticism and interest in this software project. Gunn will provide a cassette copy of the TAP program that is guaranteed to load into PET/CBM for $5 postpaid and is interested in learning about efforts to convert the TAP program to other computers. Gunn can be contacted at Box 5504, L-20, Livermore, California 94550.*

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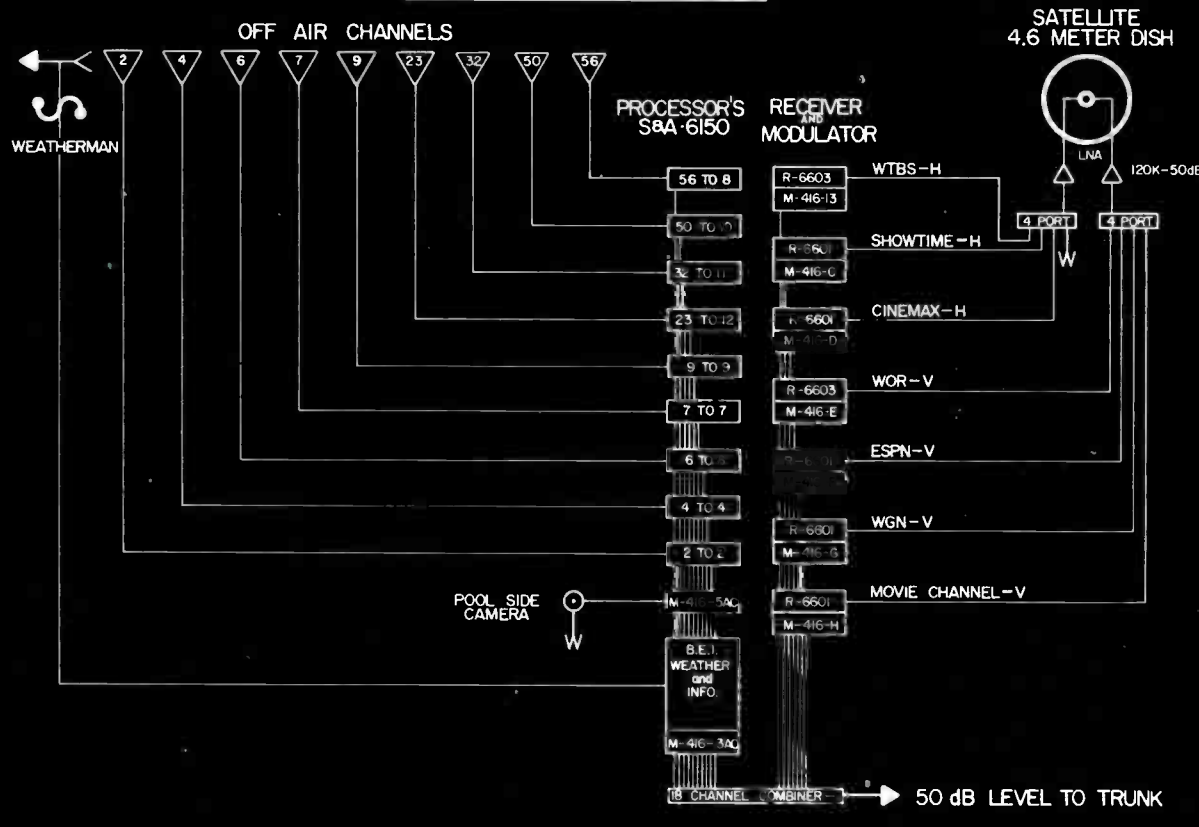

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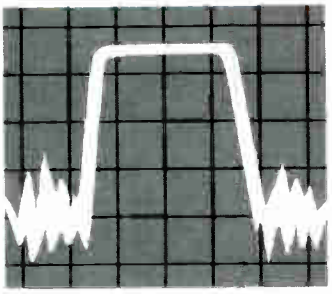

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Q. We have a service call problem that is a bit odd. At first, it appears to be a standard problem; a snowy picture caused by low system levels. The low band is affected more than the high, with Channel 2 the worst. Now the odd part. If you disconnect the cable at the set for a reading you will get a good level; hooking it back on the set will now yield a good picture. In fact, we have found that disturbing the drop at any point for a reading will restore picture quality. With level restored we cannot confirm the location of the fault and it will recur in a few days. Our repair procedure is to replace drop fittings at the pole first. If it recurs, we replace fittings on ground block and splitters. There have been stubborn cases where ground blocks, splitters, converters and drop wire replacement were necessary.

We use only one manufacturer's cable, and I have noted that sometimes the center conductor has a tarnish-type coating. Is it possible that some form of electrolysis is set up between cable and passive drop line devices? Even though we are dealing in microvolts, the cable and passives are dissimilar metals. Disturbance of the line causes, if you will, miniature surges that temporarily break down the electrolysis. When the junction forms again, the problem is back.

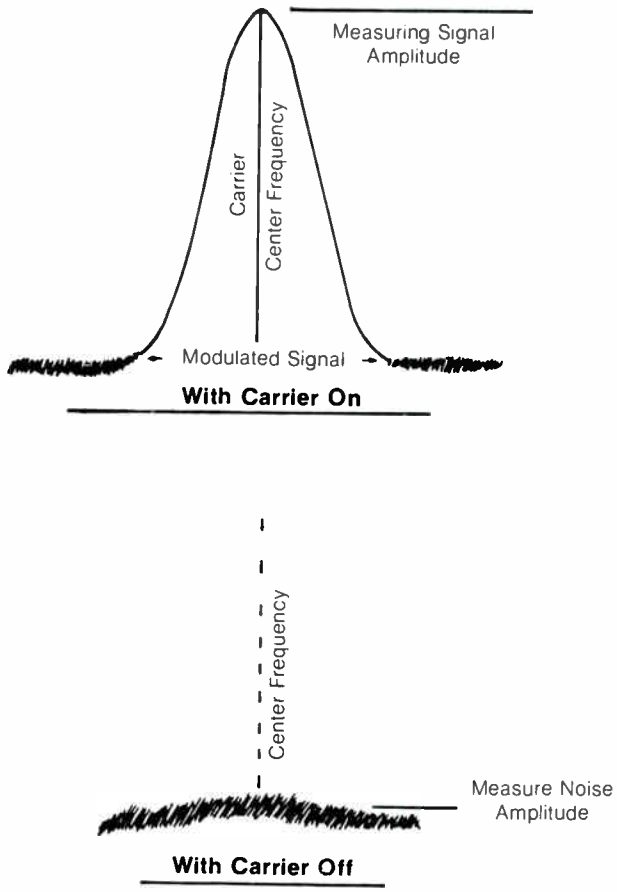
We can service this problem for our subscribers, but an explanation of it will settle what seems like a mystery. We also have had four similar problems on feeder cables which are from the same manufacturer. Can you tell us if we are on the right track for an answer?

A. You could be experiencing a corrosion problem caused by current passing through dissimilar metals. However, you must also be getting moisture in the junctions. To help isolate the problem, we suggest that you try to make the connections moisture-proof with shrink tubing, rubber boots or tape. This should eliminate the problem. Silicone grease should be used on all connector threads.

Try this first on some drops where the problem has occurred. If the problem does not recur, extend the sealing to existing and new connectors.

Q. I am working for a CATV company in Port-au-Prince, Haiti, with only two channels: 2 and 4. We do not have any off-the-air programs. Most of our programs are either from local origination or from videocassette. With two channels, we should not have too many problems as far as cross-mod, second order, etc. One thing we have not been doing at all, and for which I am looking for a simple procedure, is measuring signal-to-noise ratios. I would like you to formulate a simple procedure to check signal-to-noise, and I shall add cross-mod. Can you recommend an inexpensive spectrum analyzer?

A. We cannot recommend any specific make or model of spectrum analyzer. Many are available, and all are good, although not all are inexpensive. The simplest and most accurate procedures for checking signal-to-noise on a system use either a spectrum analyzer or an accurate signal-level meter. Measurement is easily accomplished by reading and recording the level (amplitude) of the modulated visual carrier. The carrier is then turned off. Without changing frequency of the test equipment, remove attenuation until you receive an indication that can be measured. The ratio of (difference in level between) these two level measurements is then corrected for bandwidth of the test equipment. The instruction book will give correction factors. The result is the signal-to-noise ratio. The figure below illustrates this type S/N measurement.



Example: Signal Amplitude = +30 dBmV
Noise Amplitude = -27 dBmV
Uncorrected S/N/R=57 dB

Adding test equipment bandwidth correction to above number will give actual signal-to-noise ratio.

People News

★ **Fred Raymond McDevitt** has been appointed to the newly created position of vice president, technical operations of **Warner Amex Cable Communications**.

McDevitt will be responsible for the management of Warner Amex's Corporate engineering functions, including future systems engineering for such major metropolitan areas as Dallas, Houston, Cincinnati, Pittsburgh and the greater St. Louis and Chicago areas.

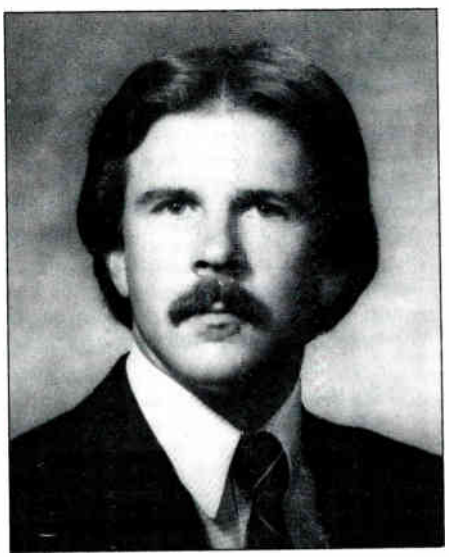
A recognized authority in fiber optics technology, McDevitt joined Warner Amex from International Telephone and Telegraph, where he was director of the Fiber Optics Laboratory of ITT's Electro-Optical Products Division. He also served at the Harris Corporation from 1968 to 1978 as program manager for engineering progams. McDevitt is a graduate of Auburn University where he earned a B.S.E.E. in 1966 and an M.S.E.E. in 1968.

Fred Raymond McDevitt

★ **Viacom Cablevision** of Long Island has announced the appointment of **Stephen Spyker** as chief engineer. Spyker has been a free-lance television consultant since 1978.

★ **Steve Gautereaux** has become operations manager for **Cox Cable San Diego**. Gautereaux's responsibilities include system development, inventory, plant maintenance and staff engineering. Gautereaux formerly managed the administrative department.

First employed with the company 15 years ago, Gautereaux has steadily advanced in supervisory and managerial positions in construction, installation, inventory and system development. He now reports directly to the general manager.



Steve Gautereaux

★ **Storer Cable Communications** has appointed **Neal Allan Olmstead** director of the New Services Department. In this newly created position, Olmstead will be responsible for the development of non-entertainment services, including security, data and text retrieval, energy management, home shopping and electronic banking.

Most recently, Olmstead was general manager for Storer's Aitamonte Springs, Florida, system. Prior to joining Storer, Olmstead was assistant general manager of American Television and Communication's Orlando, Florida, system.

In another move at Storer, **Leslie Easterling** has been appointed manager of system standards. She will monitor the company's franchise requirements to assure that Storer systems comply with ordinance provisions on an on-going basis.

★ **Continental Cablevision** has appointed certain individuals to key system management and regional staff positions in Michigan. The appointments were made in anticipation of substantial growth in the Detroit area, according to Jeffrey T. Delorme, Southeastern Michigan regional manager.

Jerald Vallender, formerly systems manager for the company's Madison Heights franchise, has been assigned to the City of Southfield cable television system construction project as construction supervisor. A Continental employee for five years, with more than ten years experience in the cable television industry, Vallender has established new regional construction headquarters in Oak Park, Michigan.

Replacing Vallender in Madison Heights will be **Scott Westerman**, a former radio broadcast industry operations manager. Also a 1976 Michigan State University graduate, Westerman obtained his broadcast experience at radio stations in East Lansing and Cadillac, Michigan.

In another development, **Robert J. Austin** has been named chief technician for Continental Cablevision's Roseville system.

Austin is assuming the top technical position from **Richard B. Smith** who is transferring to Continental's new Southfield franchise. Austin, who transferred to Continental Cablevision of Roseville from Continental in Jackson, Michigan, was instrumental in the technical development of the system from initial construction through serving the needs of the 9,000 customers currently receiving cable TV programming.

Austin has received graduation certificates as CATV technician and chief technician through the National Cable Television Institute.

★ **Richard Wadman** has been promoted to regional manager of MDS operations for Colony Productions, Ltd., a subsidiary of **Colony Communications, Inc.**

Wadman replaces **Jeffrey Wayne**, who was recently promoted to national sales manager for Colony Communications. Colony Productions distributes the Home Box Office signal in Boston and Springfield, Massachusetts, and Providence, Rhode Island, via over-the-air multipoint distribution service.

Richard Wadman

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PLANT ENGINEER/FLORIDA	$25-30K
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CORPORATE ENGINEER/WISCONSIN	$35K
FRANCHISING ENGINEER/DENVER	$30-40K
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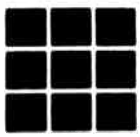

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PED 6000 PED 8000 PED 10000
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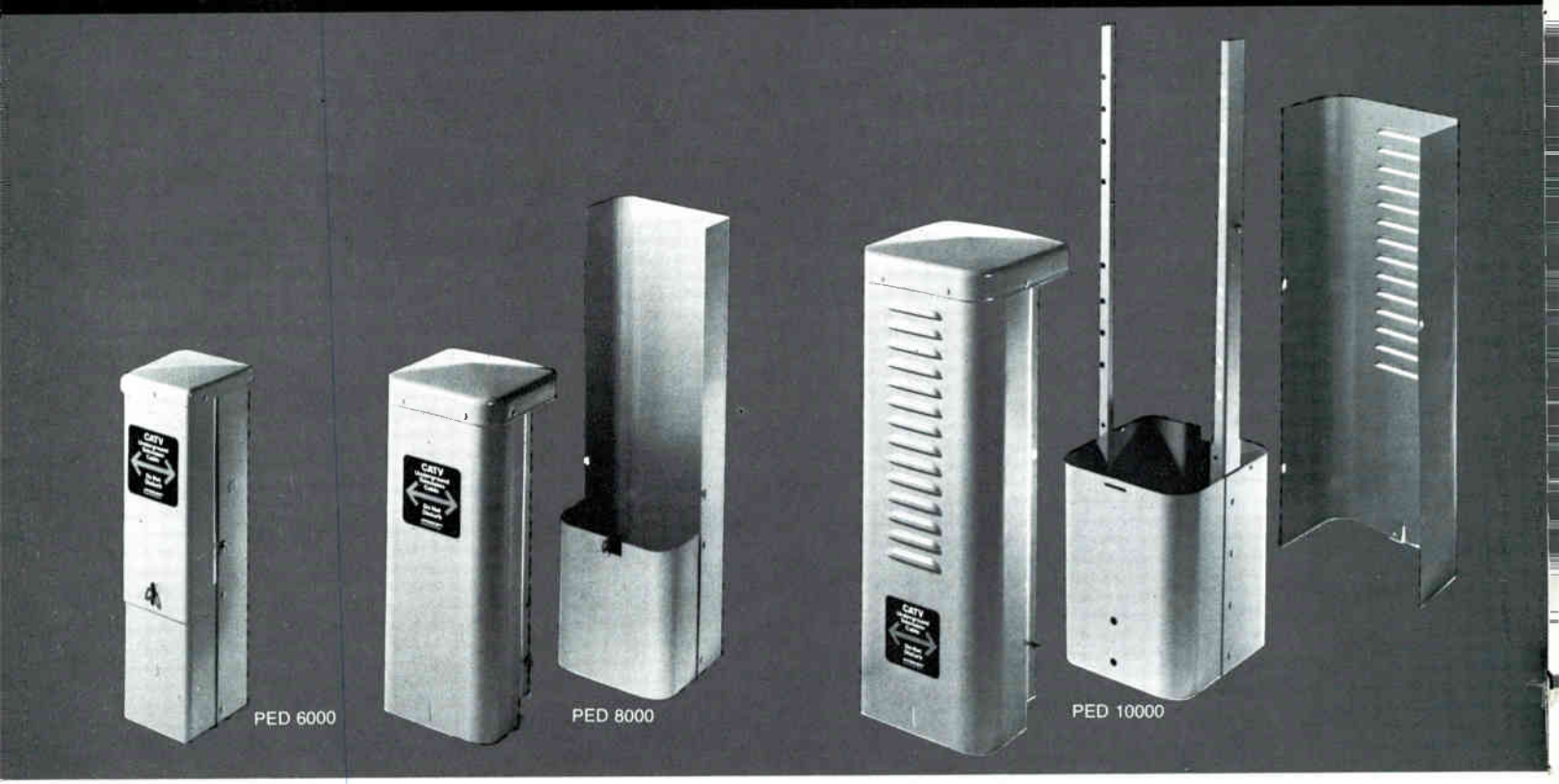

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- Our Ramsburg electrostatic painting system gives a superior porcelain-like finish
- Attractive low silhouette design
- Choose from 3 sizes for easy mounting of passive and active equipment
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The Intercept metal cable closures are used for mounting trunk, distribution and related equipment for underground construction. The units feature a low silhouette design with lockable padlock hasp. The closures are fabricated from heavy gauge hot-dipped galvanized steel to protect against rust.

The durable porcelain-like finish is obtained on our own in-house fully automatic electrostatic paint line featuring a three stage cleaning and phosphatizing process in a 60′ baking and curing oven.

PED 6000 and PED 8000 have removable top and front covers. Both units have a drop wire knockout in the front lower cover for ease of installation.

The PED 10000's front and back covers are removable to allow a full 360 degree access for easy mounting of larger active equipment. Both covers have large screened louvers to eliminate insect nests while reducing heat build-up.

See us at the Western Show at Booths #1306, #1308.

Dimensions

PED 6000	5¾″ wide, 5¾″ deep, 20″ high
PED 8000	8½″ wide, 8½″ deep, 26″ high
PED 10000	10½″ wide, 10½″ deep, 38″ high

Accessories

24″ heavy gauge anchor post
42″ heavy gauge anchor post
Mounting bracket for Jerrold FFT Multi-Tap (PED 6000)
Cylinder lock assembly with dust cover

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Intercept Corporation, 215 Entin Road, Clifton, N.J. 07014 Tel. 201-471-2212

New Products

Video Equipment

Video Data Systems Announces Video Newspaper

Video Data Systems™ has announced the VNS-2500 video newspaper™ system. According to Barry Kenyon, marketing director, the system enables a newspaper to develop a complete "sight and sound" presentation.

The VNS-2500 video newspaper™ from Video Data Systems.™.

The newspaper channel is automated and can include live and taped newscasts, videotaped commercials, background music and audio spots, visuals stored on a "slide store" disk, glossy photos, static messages and animated graphics, said Kenyon.

For information, contact Video Data Systems™ at 5630 Waterbury Way, Suite B102, Salt Lake City, Utah 84121; (801) 272-9296.

US JVC Corporation Announces VHS Player Recorder

US JVC Corporation has introduced VHS player and recorder units as an extension of its video "TapeHandler" line.

The BP-5300U player and BR-6400U recorder are standard ½-inch VHS videocassette units, built on an aluminum diecast chassis designed for heavy-duty use. Functions include motorized automatic front cassette-loading, which leaves the top of each unit clear for stacking or other uses.

Both units have high-speed search capability at fixed ten-times normal speed in both forward and reverse, with picture and sound. Variable speed playback from still-frame to five-times normal in forward and reverse is also featured.

The BR-6400U recorder also features automatic editing control. Use of the pause button during recording automatically back-spaces the tape and sets it up for the next recorded segment. The recorder includes two-channel selectable audio dubbing, and dual audio level meters with a selectable audio limiter circuit. A tracking meter function, which uses the Channel 2 audio level meter, enables a user to make precise tracking alignments for playback and editing.

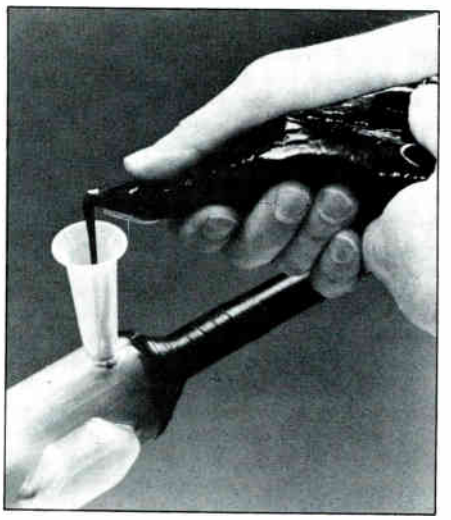
Both units interface with JVC's "TapeHandler" ¾-inch RM-88U Automatic Editing Control unit, which allows ½-inch to ¾-inch editing. Both feature Dolby noise reduction.

For information, contact US JVC Corporation, 41 Slater Drive, Elmwood, New Jersey 07407.

Cable Equipment

3M TeleComm Develops Clear Plastic Closures

Three new clear plastic closures for CATV field cable splice protection are available from **3M TeleComm** Products Division. The CX-8990 closures vary in length from 153 mm (7 3/16 in.) to 397 mm (15 5/8 in.) and handle cable diameters from 16 mm (1/4 in.) to 38 mm (1 1/2 in.). Finished splices can be strung overhead or buried.



3M's CX-8990 closures come with a moisture-proof hard encapsulant.

The closures come with 3M 4407 moisture-proof hard encapsulant for physical protection. The material is packaged in two-part unipak bags for mixing and pouring without the need for tools or a container.

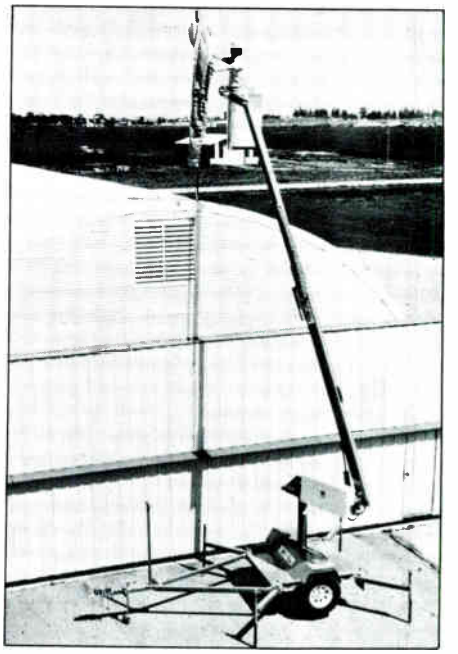
The CX-8990 closures provide a splice life that is equal to or better than the cable itself, according to 3M.

For information, contact 3M, TelComm Products Division, Department TL81-33, P.O. Box 33600, St. Paul, Minnesota 55133; (612) 733-1186.

Construction

Durnell Unveils Trailer-Mounted Lift

A trailer-mounted one-man aerial personnel lift has been developed by **Durnell Engineering, Inc.** The telescoping TML-33 Dur-A-Lift® has maximum working height of 33 feet, with 18-foot, three-inch reach over side at 20-foot working height. Boom travel is -2 to +83°.



Durnell Engineering's TML-33 Dur-A-Lift®.

Lift, trailer and outriggers have been designed and welded into a single, integral unit. Power source is electro-hydraulic, with battery pack wired to an on-board battery charger. Motors actuating lift and 360° rotation (non continuous) are controlled by the operator in the bucket. Two-speed operation of both elevation and rotation is standard. A second set of controls, with safety override, is mounted in the enclosed trailer compartment.

A molded fiberglass bucket with removable tray is standard, with steel work platform available as an option. The bucket levels by gravity and is fitted with a positive pin type locking mechanism. To dampen excessive movement, a heavy-duty snubber is attached to both bucket and boom. The 110 volt outlet in bucket requires an outside power source. Bucket capacity is 300 pounds at all configurations.

For information, contact Durnell Engineering, Inc., Highway 4 South, Emmetsburg, Iowa 50536; (712) 852-2611.

General Cable Unveils Telsta A-28C Lift

General Cable's Apparatus Division has brought out its 1982 model Telsta A-28C maintenance vehicle. The unit has a working height of 33 feet and a side reach of 20 feet. The truck also features a small mounting pedestal to maximize storage space, according to the company. The A-28C is available with three power sources: DC motor-driven; chassis engine-powered; or auxiliary engine/generator driven.

For information, contact General Cable, Apparatus Division, P.O. Box 666, 5600 West 88 Avenue, Westminster, Colorado 80030; (303) 427-3700.

Vermeer Expands Utility Trencher Line

A 30 hp rigid-frame utility trencher has recently been developed by **Vermeer Manufacturing Company**. The Vermeer V-430 is equipped with four-wheel drive, power-steering and three-speed mechanical drive. The 2,861 lb. (1,296 kg.) unit is powered by a 108 cu. in. air cooled Wisconsin gas engine or a 1.196 liter VM Diesel power plant with a consumption rate of only 1.56 gph.

As a trencher, the V-430 digs five- to 16-inch (13-41 cm) wide, down to 60 inches (152 cm) deep. It features heavy-duty crumber, 43,000 lb. (19,479 kg) tensile-strength digging chain and a large diameter end idler for smoother digging and increased chain/cutter life.

A four-way, 60-inch (152 cm) backfill blade—with replaceable grader edge—lifts, tilts and angles 30° left and right. A hydraulically-controlled boring attachment may be attached to the blade for work under streets, sidewalks and driveways, etc.

The V-430 trencher from Vermeer Manufacturing Company.

Also standard on the Vermeer V-430 are a limited slip differential in the rear axle, a frost boom for better digging chain stability, modular attachment mounting and integral welded-on R.O.P.S.

For information, contact Vermeer Manufacturing Company, Pella, Iowa 50219.

Amplifiers

Century III Unveils Three Amplifiers

Century III has introduced three new amplifiers, the model 4130B feed-forward line amplifier, the model 2100B/400 trunk amplifier, and the model 2130B/400 line amplifier.

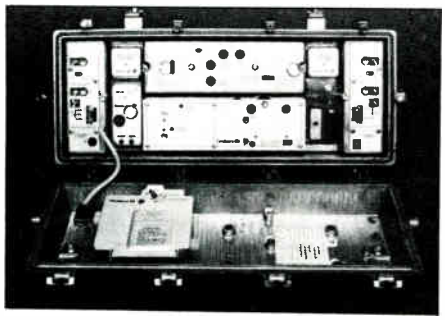
The model 4130B is effective in producing an overall system that is relatively free of noise and distortion, according to the company. The ability to cancel distortion products of the amplifier allows implementation of long coaxial cable systems which maintain quality signals at the extremities.

The amplifier is designed to provide 5.0 to 30 MHz reverse transmission with the addition of a reverse module. A switchable power director provides in, through and out powering modes. Plug-in equalizers are available in 8.0, 12, and 16 dB values of fixed slope compensation, while a variable slope control provides 6.0 dB of continuous range.

The model 2100B/400 is designed for use in both one-way and two-way CATV systems and provides a wide range of capabilities to meet the demands of any CATV trunk distribution system which requires forward signal transmission in bandwidths to above 400 MHz, according

to a spokesman of the company.

The model 2100B/400 trunk amplifier features the same corrosion resistant finned housing that has proven successful in minimizing internal temperature in other Century III products. A modular construction permits six distinct amplifier station model configurations within the common eight-port housing. A common motherboard accommodates MGC trunk,



The model 2100/B400 trunk amplifier from Century III.

AGC/ASC trunk, MGC trunk bridger, AGC/ASC trunk/bridger, intermediate bridger and terminal bridger functions by use of appropriate modules. Hybrid integrated circuits provide push-pull signal amplification for both the trunk and bridger functions. Signal levels are maintained by automatic gain and slope control (AGC/ASC) circuits which respond to either dual modulated, unmodulated, or video carriers. Three gain options are available in both trunk and bridger modules, providing added flexibility in system design.

Conversion of the model 2100B/400 trunk amplifier to a two-way sub-split or mid-split trunk amplifier station is possible with the installation of appropriate modules.

The model 2130B/400, designed for use in CATV feeder applications in systems operating at bandwidths to above 400 MHz, features hybrid integrated circuit design, including a multi-stage circuit for RF amplification. The unit provides full gain of 28 dB and improved distortion performance. Optional reverse modules provide active and passive reverse functions.

Additional features include a built-in diplex filter, plug-in gas tubes for protection of RF circuits and plug-in equalizers available in 8.0, 12, 16 dB values of fixed slope compensation. A variable slope control provides 7.0 dB of continuous range, and a switchable power director provides in, through, and out powering modes. A switchable transformer tap selector provides four input voltage ranges to the regulated power supply which supplies stable DC power for the RF circuits.

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

Miscellaneous

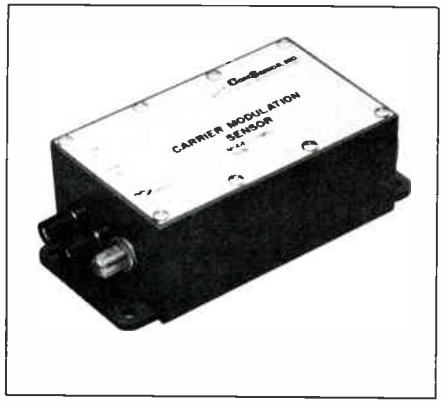
ComSonics Markets Modular Relay System

ComSonics is offering a "modular system" of coaxial switching relays. Selective purchasing of this format enables an operator to build and expand a system's switching capability to keep pace with growing demand, according to the company.

The modular system includes three principal models.

The Standard Coaxial Relay is triggered by command switching voltage and permits selective interconnecting for maximum channel allocation, such as the sharing of one channel among multiple programming sources.

The Video Sensing Relay (VSCR) is a standard relay with a video sync sensor added. The unit automatically manipulates switching of baseband video signals which can originate from a variety of sources. The VSCR provides a system with automatic back-up video signal insertion and/or channel pre-empting.



ComSonic's line of modular coaxial switching relays.

The RF Sensing Relay is a standard relay with an RF/IF sensor added. The unit, like the others, extends to a frequency of 450 MHz. Sensing video-modulated signals, it can provide automatic RF/IF and video switching capability. Sensing of signal change due to carrier or modulation signal completion or failure, it switches between primary and secondary input ports. The signals may originate from any of several sources.

In addition, ComSonics offers a Carrier Modulation Sensor—a unit which will indicate presence or failure of TV modulated carrier or TV modulation signal (on the carrier); a Video Sync Sensor—the unit will sense video presence or failure; and a Power Supply—a rack mounted type (12 or 24 Vdc) which will power and allow for the mounting of several relays.

Each relay uses RF coaxial reed assemblies.

For information, contact ComSonics, P.O. Box 1106, Harrisonburg, Virginia 22801; (703) 434-5965.

Basic Systems Develops Earth Station Controller

Basic Systems has developed a control system for positioning television satellite receiver dishes. The system consists of a telescoping actuator, an enclosed gear motor, a limit switch assembly and a control panel that contains all of the indicators and controls for positioning receiver dishes up to 12-feet in diameter.

Designed for use on polar type antenna mounts, the actuator, gear motor and limit switch are located at the antenna site, and the control panel is wired into where the television set is located. The control box has a three-digit LED display which shows relative antenna position, plus a red and a green indicator light to show when the actuator is at its upper and lower limits.

A memory reset push-button and yellow indicator light is also supplied to reset the display in the event of a power failure.

Antenna position is controlled by a center-off type rocker switch on the front panel. With the actuator installed on an 18-inch radius arm, the antenna can scan approximately 90 degrees and will reach all of the existing and planned satellites.

For information, contact Basic Systems, 12929 East 21 Street, Tulsa, Oklahoma 74108; (918) 437-7066.

Electroline Markets Multidrop Addressable System

Electroline Television Equipment, Inc., has developed an addressable system designed to control subscriber access and/or subscriber premium service in "home-run" wired multidrop buildings. Called Electroline's Addressable System (EAS), it uses continuous scanning to control subscriber service or service level from a central location.

The EAS is modular, allowing the cable operator to build the system to his specific needs, according to the company. The system provides for easy audit of subscriber status and can be utilized for apartments, hotels, hospitals and other applications where management of CATV service is required.

The EAS consists of three elements: the EAS-1024 microprocessor control unit; the EAS-64 demodulator/decoder unit; and the EAS-16 wideband multitap switch assembly. The control signals are transmitted in a selected band via the cable network to the EAS-64M demodulator/decoder unit and the EAS-16 switch assembly for control of subscriber services. In applications where the control unit is in close proximity to the switch assembly, interconnection between the model EAS-1024 control unit and the EAS-64/EAS-16 switch assembly is made through external cable using RS-422 standard.

The system can be installed in two configurations depending upon the desired location of the control unit.

For information, contact Electroline, 8750 8th Avenue, St-Michel, Montreal, Quebec, Canada. H1Z 2W4; (514) 725-2471.

Lenco Adds PCE-462 To Color Encoder Family

Lenco, Inc., has added the model PCE-462 to its family of color encoders. The unit produces an NTSC/EIA color signal from either a three- or four-channel video source. The fourth or luminance channel is optional.

The encoder requires red, blue, green, sync, subcarrier, and blanking signal inputs. A full or split field color bar generator is incorporated into the PCE-462 to simplify set up and maintain levels without constant readjustment, according to the company.

All inputs are 75 ohm impedance with loop through bridging greater than 20K ohms. The PCE-462 can be operated on a 110/220, 50 or 60 Hz line. The use of input video clamping eliminates low frequency noise and color errors, according to Lenco.

The encoder's front-panel control includes: color bars ON/OFF, burst

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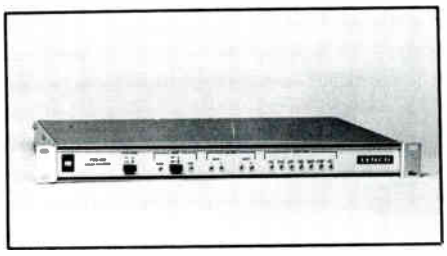


The model PCE-462 color encoder from Lenco, Inc.

ON/OFF, burst phase, burst amplitude, black I & Q balance, white I & Q balance, sync level, set-up level, composit level, aperture correction, chroma level, chroma phase and video level.

For information, contact Lenco, Inc., 300 North Maryland Street, Jackson, Missouri 63755; (314) 243-3147.

Catel Releases Sheet On Stereo Synthesizer

Catel has now made available a new data sheet on its Catel 245M stereo synthesizer. The product creates lifelike psuedo-stereo from mono signals without causing a change in spectral balance or the slightest audible noise or distortion to the mono signal.

The unit can be adjusted with two dimension controls, one for the lower mid-range and the other for the upper mid-range. The 245M is compatible with the Catel SM-2200 stereo generator.

For copies of the data sheet, contact Claudia Davis, Catel, P.O. Box 1389, Mountain View, California 94042.

Belden Introduces 12-Conductor Camera Cable

A 12-conductor TV camera cable for electronic field production and electronic news gathering applications has been introduced by **Belden Corporation**'s Electronic Division.

The Belden 9170 consists of color-coded vinyl-insulated 24-ga. conductors comprising five twisted pairs, each with its own Beldfoil® aluminum foil-film shield and 24-ga. drain wire; and two color-coded miniature 75-ohm coaxial cables (similar to Belden 8218) with cellular polyethylene dielectric, 93 percent braid shield, vinyl jacket, and an attenuation of 12.5 dB/100 ft. at 400 MHz.

The assembly is cabled together inside a chrome vinyl jacket with an overall outer diameter of 0.490 inches. Standard putups are 250, 500, and 1000 feet.

For information, contact Belden Corporation, 2000 South Batavia Avenue, Geneva, Illinois 60134.

Scientific-Atlanta Develops Broadband Data Modems

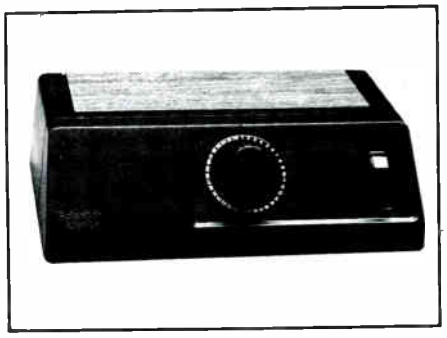
Scientific-Atlanta, Inc., has introduced two modems designed to enable cable television systems to offer data transmission services, the model 6400 and the model 6410.

The model 6400 Broadband Data Modem translates high-speed voice and data for transmission over local cable systems. One feature of the 6400 modem is its frequency agility. The customer need not specify frequency upon ordering the unit, but can manually adjust both transmit and receive frequencies at the business sight.

The model 6410 Broadband Data Modem is a low-to-moderate speed modem offering superior flexibility, according to the company. The modem can be manually adjusted to any data format or mode of operation the customer might require at any speed between 110 bits per second and 19.2 kilobits per second.

The 6410 low-speed modem, coupled with Scientific-Atlanta's model 6402 high-speed modem, broadens the company's line of business communications products that translate data for transmission over coaxial cable. Broadband cable offers business the advantages of low cost and greater capacity for communications within a city. It also provides for transmission across town to the common carrier uplink for communication by satellite between cities.

The broadband data modems enable cable operators to lease spectrum currently not being used on the entertainment network for point-to-point data



The model 6780 36-channel set-top converter from Scientific-Atlanta.

communications. CATV systems with institutional "B" cable can now fully utilize this secondary system as a business communications network.

Scientific-Atlanta has also expanded its cable TV set-top product line with the model 6780 36-channel set-top converter. The converter is designed for CATV systems with input frequencies ranging from 54 to 300 MHz where the traps secure premium channels. The new converter takes an input signal ranging from 0 dBmV to +20 dBmV, with a minimum gain of 2.0 dB and maximum gains of 8.0 dB. Noise figures average less than 12.5 dB, with a maximum of 14 dB.

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

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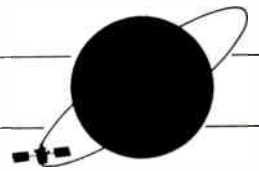

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
ARTS		9:00 p.m./12:00 a.m.		F1,#1
ACSN	Weekdays Weekends	6:00 a.m./4:00 p.m. 6:00 a.m./1:00 p.m.	192°/#	F1,#16
AETN	Mon.-Sat. Sunday	4:00 p.m./7:00 p.m. 4:00 p.m./6:00 p.m.		F1,#16
BET		11:00 p.m./2:00 a.m.	018°/#	F1,#9
Bravo		8:00 p.m./6:00 a.m.		Comstar D-2, #3H
CableText		24 hrs.	None	F1,#6 Vertical Blanking
CBN		24 hrs.	None	F1,#8
CBS Cable		4:30 p.m./4:30 a.m.	524°/#	Westar III, #6
Cinemax		24 hrs.	None	F1,#20 (E,C) F1,#23 (M,P)
CNN		24 hrs.	None	F1,#14
C-SPAN	Weekdays Sundays	10:00 a.m. to 6:00 p.m. Precedes USA Network, three to four hours	195°/#	F1,#9
ESPN		24 hrs.	None	F1,#7
Escapade		8:00 p.m./6:00 a.m.		Comstar D-2,#4V
Eternal Word Television Network		7:00 p.m./11:00 p.m.		Westar III,#12
GalaVision	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
HBO	Dec 1	5:30 p.m.	3:57 a.m.	Program F1,#24 (E,C) 729°/# F1,#22 (M,P) Scramble 835°/# Duplication 940°/#
	Dec 2	5:30 p.m.	2:12 a.m.	
	Dec 3	5:30 p.m.	3:04 a.m.	
	Dec 4	5:00 p.m.		
	Dec 5			
	Dec. 6		1:52 a.m.	
	Dec 7	5:30 p.m.	3:27 a.m.	
	Dec 8	5:30 p.m.	2:03 a.m.	
	Dec 9	5:30 p.m.	3:07 a.m.	
	Dec 10	5:00 p.m.	2:45 a.m.	
	Dec 11	5:00 p.m.		On December 27, HBO goes 24 hours, eastern and central time zones. On December 31, HBO goes 24 hours in mountain and pacific time zones.
	Dec 12			
	Dec 13		2:04 a.m.	
	Dec 14	5:00 p.m.	3:07 a.m.	
	Dec 15	5:00 p.m.	3:03 a.m.	
	Dec 16	5:00 p.m.	3:14 a.m.	
	Dec 17	5:30 p.m.	2:39 a.m.	
	Dec 18	5:30 p.m.		
	Dec 19			
	Dec 20		2:08 a.m.	
	Dec 21	5:00 p.m.	2:14 a.m.	
	Dec 22	6:00 p.m.	2:29 a.m.	
	Dec 23	5:00 p.m.	3:20 a.m.	
	Dec 24	3:00 p.m.	4:04 a.m.	
	Dec 25	1:30 p.m.		
	Dec 26			
	Dec 27		5:44 a.m.	
	Dec 28	6:00 p.m.	6:36 a.m.	(M,P)
	Dec 29	6:00 p.m.	6:27 a.m.	(M,P)
	Dec 30	6:30 p.m.	5:43 a.m.	(M,P)
	Dec 31	6:00 p.m.	6:29 a.m.	(M,P)
HTN		8:00 p.m./2:00 p.m.	517°/#	F1,#21 (P)

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
Lifestyle		24 hrs.	None	F1,#3
The Movie Channel		24 hrs.	None	F1,#5
Modern Satellite Network	Weekdays Weekends	noon/5:00 p.m. 8:00 a.m./1:00 p.m.	243°/#	F1,#22
MTV: Music Television		24 hrs.	None	F1,#11
National Christian Network		6:00 a.m./8:00 p.m.	073°/#	Comstar D-2,#4V
National Jewish Network	Sunday	noon/4:00 p.m.		F1,#16
Nickelodeon		8:00 a.m./9:00 p.m.	311°/# (E,C,M) 519°/# (P)	F1,#1
North American Newstime		24 hrs.	None	F1,#6
PTL		24 hrs.	None	F1,#2
Preview Channel	Weekdays	10:00 a.m.-1:30 p.m.	207°/#	F1, #21
Private Screenings	Fri.-Sat.	12:00 a.m./3:00 a.m.		Westar III,#7
Reuters	Weekdays	4:00 a.m./7:00 p.m.	None	F1,#18
SIN		24 hrs.	None	Westar III, #8
SPN		24 hrs.	None	Westar III, #9
Showtime		24 hrs.	None	F1,#12 (E,C) F1,#10 (M,P)
Trinity (KTBN)		24 hrs.	None	Comstar D-2, #9V
USA Network		24 hrs.	None	F1,#9
Calliope Weekdays 6:00 p.m. to 7:00 p.m. Saturdays 8:30 a.m. to 11:30 a.m.				
The English Channel Tuesdays 9:00 p.m. to 11:00 p.m., except Dec. 1 11:30 p.m. to 1:30 a.m., Dec. 15 11:00 p.m. to 1:00 a.m., Dec. 22 12:30 a.m. to 2:30 a.m. Saturdays 12:30 p.m. to 3:30 a.m., except Dec. 12, when the show will not be shown. Sundays 10:30 p.m. to 12:30 a.m., except Dec. 27 11:30 p.m. to 1:30 a.m., and Dec. 20 when it will not be shown				
WFMT		24 hrs.	None	F1,#3 Subcarrier
WGN		24 hrs.	None	F1,#3
WOR		24 hrs.	None	F1,#17
WTBS		24 hrs.	None	F1,#6

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

Alert tones listed are for sign-on, sign-off.

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

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