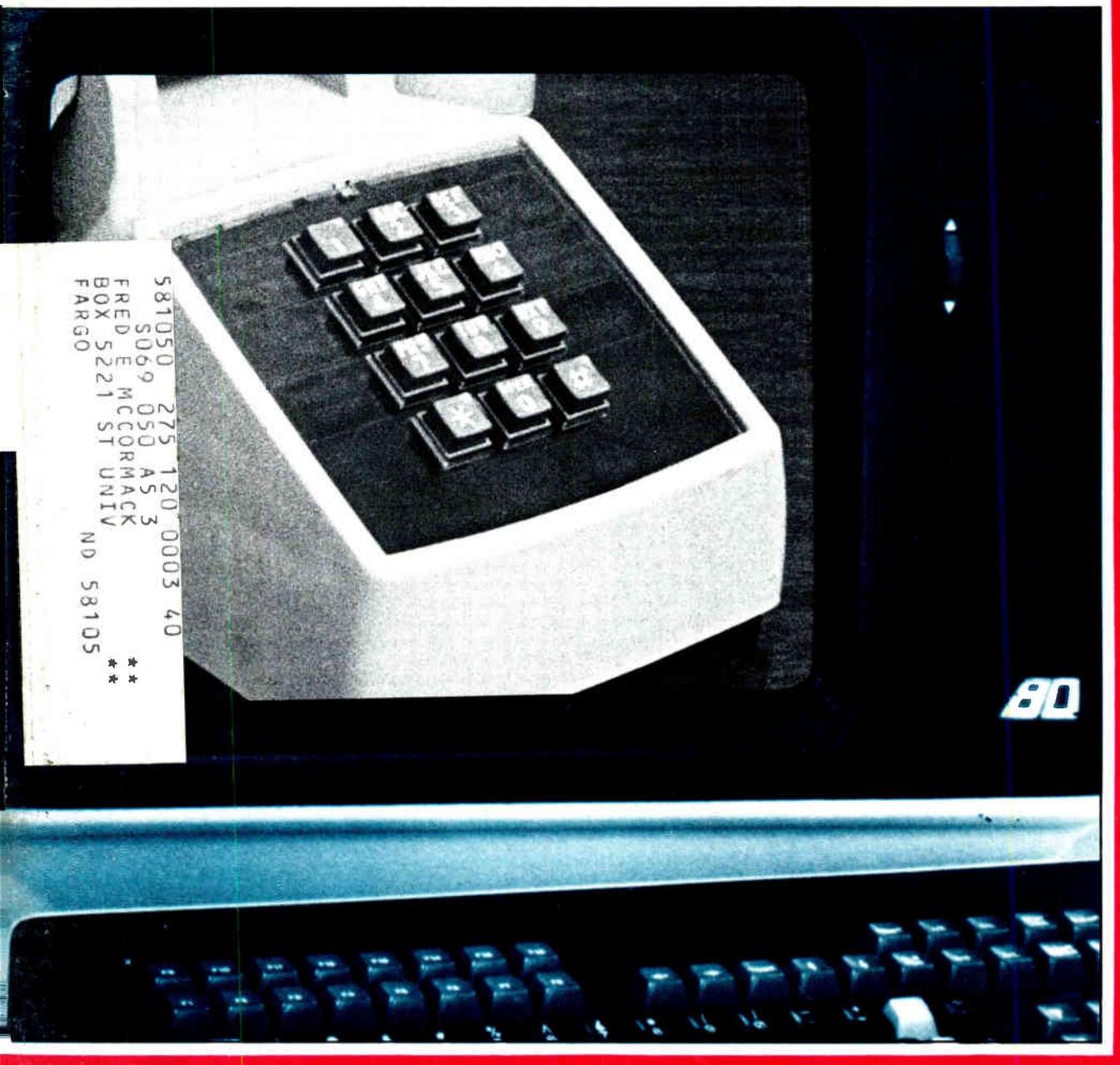


GEDTM

Two-Way Interactive Systems
Computers and Communications



Communications-Engineering Digest
Reporting the Technologies of Communications Engineering

August, 1980
Volume 6, No. 8

Addressability

Addressability



With the Oak addressable converter/decoder system, you get TotalControl.[®]

Addressability is the central ingredient of this computer-based system from Oak.

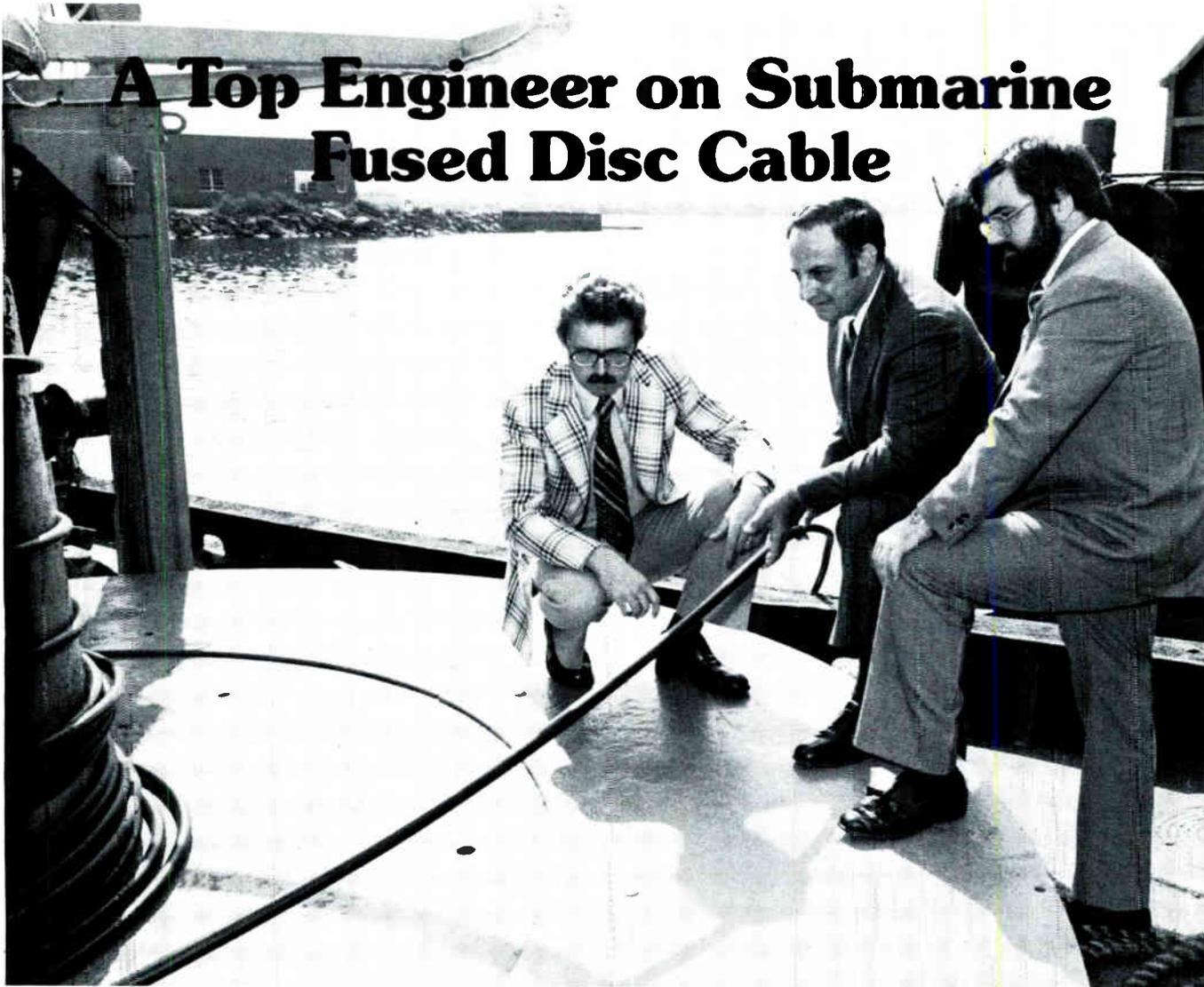
It gives you a new degree of control, not possible with ordinary decoders or simple on/off remote taps. The sophisticated TotalControl converter/decoder terminals are addressable to eight secure levels. This Oak system of tiering is so flexible, you can even offer "specials" on a pay-per-program marketing.

TotalControl also protects your investment. Send a "disconnect" address and your late-paying subscribers will be watching snow until you authorize service restoration.

For a free booklet on Addressability, call our Locator Operator toll-free at 800-323-6556 (in Illinois, 800-942-6345) and ask for the CATV information desk.

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A Top Engineer on Submarine Fused Disc Cable



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

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

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

"Your cable design incorporating helically applied round copper wires under the jacket provides an excellent optimization of these criteria and results so far have been highly satisfactory.

"Further, I was delighted at your ability to provide Fused Disc III cable for application at 400 MHz and beyond. VCC has been a leader in the development of 400 MHz systems and two-way services with one 400 MHz system in the pre-construction stage already and with several franchises pending where we have specified 400 MHz operation."

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C-ED News at a Glance

Tymshare Announces Shared Service System

Tymshare has announced a shared service for office automation based on an enhanced, easy-to-operate version of its AUGMENT integrated office automation system.

AUGMENT, which in its portable form Tymshare calls the "electronic briefcase," enables the manager and professional to work in an online mode using the system as a total, multi-functional work station. These capabilities include work, text, and file processing, document preparation, and storage and retrieval of this information.

Users are able to access the AUGMENT service from most asynchronous ASCII terminals already on the market. Tymshare also can provide the customer with terminals, printers, modems, and couplers, as needed.

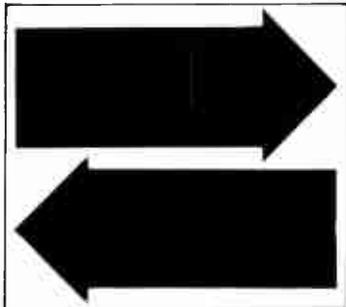
The company said that AUGMENT handles all the writing functions of a manager or editor, from initial memo or conception, through multi-input collaboration in drafts and review, to the final typeset text. The system can function as a programming or research tool, personal appointment calendar, and calculator. AUGMENT can also support graphic terminals for computer aided design functions and for producing line art for inclusion in a document.

Unlimited storage of text is available through timeshared access to powerful computer mainframes for printer output. Magnetic tape output allows production of documents on photo composition devices and computer output microfilm (COM). Tymshare can also install and maintain a dedicated minicomputer system at the customer's site, if he so chooses.

Known previously as NLS (No-Line System), AUGMENT was conceived in the early 60s by Dr. Douglas Engelbart at Stanford Research Institute's (SRI) Augmentation Research Center in Menlo Park, California. Engelbart felt that each terminal should function as a total work station and be used to expand a person's mind or, as he puts it, "the augmentation of the human intellect." Tymshare acquired the rights to the system in early 1978; moved the software, Dr. Engelbart and his staff from SRI to Tymshare's own facilities in Cupertino, California; further developed and refined the system; and renamed it AUGMENT.

AUGMENT has already proven its effectiveness in the marketplace through exposure to commercial and government users. At SRI, the system operated over the communications facilities of ARPANET, a data network of the Department of Defense's Advanced Research Projects Agency. Now, both ARPANET and TYMNET, the public packet data network operated by Tymshare's subsidiary, Tymnet, Inc., provide AUGMENT's communications links between points in the U.S.

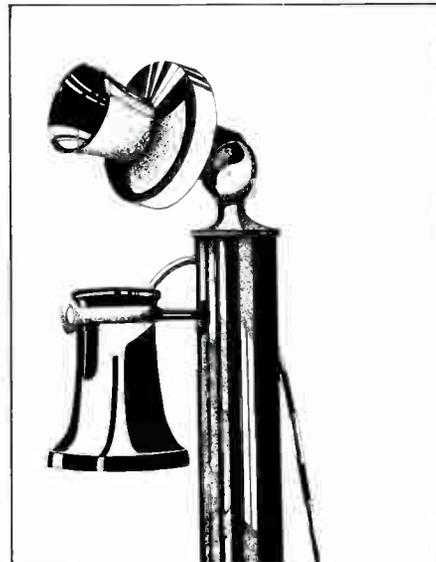
"AUGMENT belongs in the hands of the professional, the business executive, decision maker, writer, engineer, or scientists, and not just their secretaries," said Walter Eissmann, vice president and general manager of Tymshare's office automation division. "AUGMENT is an all-purpose tool for use by the professional to explore the unlimited possibilities the system presents to increase effectiveness and productivity, while reducing the paper burden and office costs."



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Editor's Letter

This issue of C-ED is devoted to the computer side of the communications industry. Although too broad a subject to cover in one issue, we begin here by looking at the present state-of-the-art cable/computer systems. In "The Brave New World of Two-Way Interactive Systems" C-ED's roving writer Jim Elmore looks at the systems that were on display at the recent NCTA show, and examines the features of each.

We then take a look at the latest developments in computers "R & D Bringing New Computer Power" and we get a glimpse at the changing market for communications services in "Fast Growth predicted for Telecom Market," compiled from dispatches from our bureaus and elsewhere.

This is the introductory issue for C-ED's new managing editor, Dennis DuBe'. A native of Colorado's high country, he brings to C-ED over 15 years experience in printing and publishing. He is a graduate of the University of Colorado School of Journalism, and has edited or managed nearly a dozen publications since being "bitten" by the journalism bug at an early age.

In the September issue of C-ED, we will take a look at satellite communications: the current technology, the future, and the potential economic and engineering impacts on CATV systems.

Paul A. FitzPatrick



Protect your picture with our new expandable antenna.

The new Hughes earth station antenna will keep the "sparklies" from interfering with your game plan. Whenever you need extra gain, for any reason, our antenna easily converts from 5 to 6 meters, delivering 4.3% more receiving area and more than 1½ dB additional gain.

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SCTE Plans First "Best Of" Seminar in Hawaii

On September 8th and 9th at the Princess Kaiulani Hotel, Honolulu, the SCTE will present a series of lectures and presentations on various technical subjects for cable TV. This SCTE meeting is a down-to-earth "hands-on" technical session focusing on testing and test equipment, microwave, preventive maintenance and construction techniques.

If you're involved in any phase of cable technical operations—maintenance technicians, construction workers or installation foremen—this is *your* meeting.

The program's goal is to help those involved in the daily operations of a cable system to sharpen their skills. Topics to be covered include: **Preventive Maintenance:** Developing a Preventive Maintenance Program, Head-end, Cable, Spares, Repair and Retrofit; **Planning and Construction Techniques:** Planning and Design, Forecasting and Scheduling, Purchasing, Manpower,

Converters; **Microwave/Satellite:** Frequency Coordination, FCC Filings, Satellite, CARS FM; and **Testing and Test Equipment:** Signal Level Meters, Converters, Sweeping, Spectrum Analysis, Computerized Testing Techniques.

Speakers on the panels will represent a cross-section of manufacturers, suppliers, users and managers. They'll relate their experiences and give you the opportunity to ask the questions that will help you run a more efficient system.

Registration fees cover all sessions; two luncheons; breaks and refreshments, and your Certificate of Completion. Advance registration cutoff date is August 1, 1980. Registration fee *must* accompany all advance registrations.

For further information, contact the SCTE at (202) 293-7841. 6-12.

Conference Schedule

Monday, September 8, 8 a.m. to noon

Preventive Maintenance

Joe Van Loan, Viacom, Moderator; Dean Taylor, Systems Communications Cable, **Cable**; George Fenwick, Kaytek **Converters**; Fred Rogers, Broadband Engineering, **Repair and Retrofit**.

2 p.m. to 5 p.m.

Microwave Satellites

Jerry Parch, Liberty Communications, **Moderator**; Cliff Paul, FCC Cable Bureau, **Microwave Applications Procedures**; Cliff Fields, Farinon Video, **CARS (Cable Antenna Relay System) FM**; Dan Youst, Compucon, **Frequency Coordination**; Tom Humphries, Gardiner Communications, **Satellites**.

Tuesday, September 9

8 a.m. to noon

Michael Murphy, Warner/Amex Cable,

Purchasing; Also to be covered: **Planning and Design, Manpower, and Forecasting and Scheduling.**

2 p.m. to 5 p.m.

Testing and Test Equipment

Clifford Schrock, CableBus Systems, **Moderator**; Larry Dolan, Mid States Communications, **Computerized Testing Techniques, Signal Level Meters**; Raleigh Stelle, Texscan, **Converters**; Jack Kouzoujian, Matrix Electronics, **Spectrum Analysis**.

The meeting will be held at the Princess Kaiulani Hotel on Waikiki. Rooms are available for SCTE registrants September 6-12. Meeting registration must be accompanied by one night hotel deposit. Group travel arrangements are available through SCTE's authorized travel agent.

Deadline for advance registration and hotel accommodations is August 1, 1980. Payment must be included with advance registration. For further information, contact SCTE (202) 293-7841.

SCTE Fall Conference to Feature Teletext and Viewdata

SCTE President Lawrence Dolan has announced that "Teletext and Viewdata" will be the topic of the 1980 Fall Conference on Emerging Technologies, scheduled for October 15-16, Playboy Resort and Country Club at Great Gorge, New Jersey.

"Treatment of 'Teletext and Viewdata' as the subject of an Emerging Technology conference signals an exciting new avenue of growth for the cable television industry," said Dolan.

"Last February, at SCTE's Spring Conference, the 'Teletext and Viewdata Services' panel literally stole the show. I believe that the timing is perfect for an in-depth look at the issues and technology involved."

The emphasis of the meeting will be on international developments, experimental projects in the U.S., potential application, status and history. All of the original panelists from Phoenix have been invited to participate in the

Fall Conference.

Additionally, invitations have been extended to the Joint Council on Educational Telecommunications, Zenith Radio Corporation and Colorado Video, Inc.

Advance registration deadline is October 1, 1980. For more information, contact the SCTE office, (202) 293-7841.



Videotape on CARS Filings

The Society of Cable Television Engineers has just produced a 60-minute videotape on properly filling out FCC Cable Television Relay Station (CARS) applications, according to

Susan Queeney of the SCTE office.

The color tape takes system operators through the step-by-step procedures for avoiding problems when filing CARS applications with the commission, Queeney said. She noted that up to 25 percent of all CARS applications are rejected by the Commission because they are improperly filled out.

The \$125 tape includes timesaving techniques, checklists, and shows examples of the necessary exhibits and schedules related to FCC form 327. When ordering, specify tape size and format, and include correct shipping address. The Society requests that all orders be paid in advance.



Bob Bilodeau (right) SCTE president from 1972-78 was honored by the American Society of Association Executives (ASAE) on June 17, at a chair dedication ceremony at the new ASAE Conference Center in Washington, D.C.

Shown here is ASAE President Jim Lowe (left) with the plaque bearing Bilodeau's name and noting his years of service. The plaque will be mounted on one of the executive chairs in the Conference Center.

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ought
to be in
pictures.**

We're in pictures, and nothing but, 24 hours a day. We're **THE MOVIE CHANNEL**. We built our business on the simple proposition that what cable television viewers want is movies.

The facts: According to VideoProbeIndex*, 90 percent of cable subscribers list movies as the major reason they subscribe.

And that's why you ought to be in pictures.

THE MOVIE CHANNEL lets you offer what your viewers want the most of—without specials, sports, and other programming. What's more, during the last six months, nearly two-thirds of our movies did not appear on either of the other major pay programming services.

THE MOVIE CHANNEL gives you movies around the clock. **THE MOVIE CHANNEL** schedules on the basis of exclusive QUBE data—putting pictures on when people want to see them.

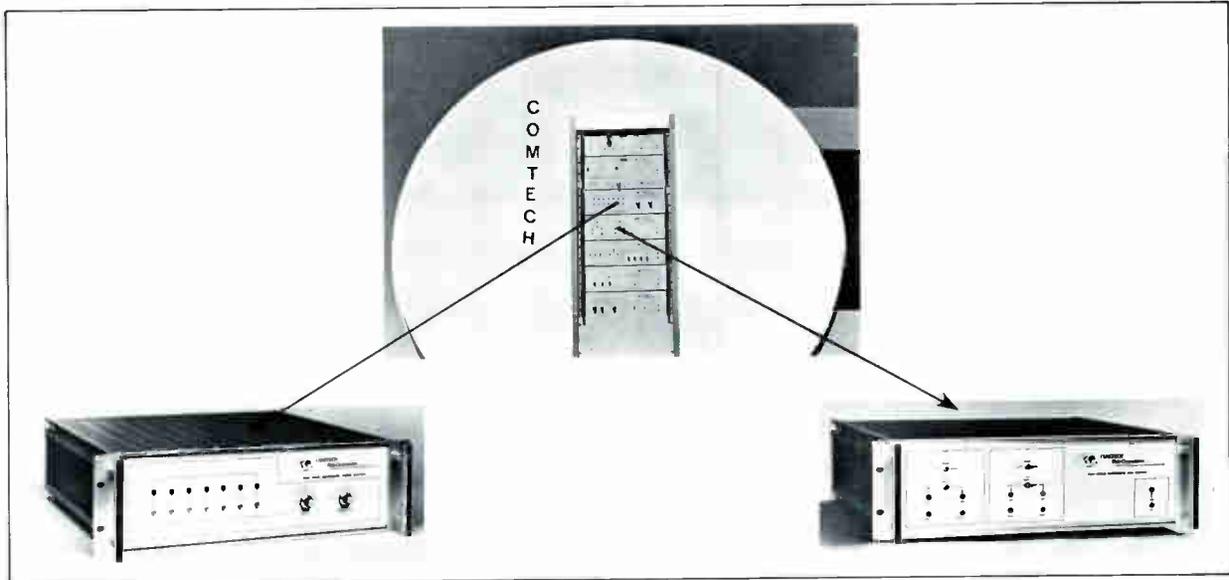
And **THE MOVIE CHANNEL** has a truly localized marketing and merchandising program. Nine out of ten of your subscribers want precisely what **THE MOVIE CHANNEL** shows.

You really ought to be in pictures.

*VideoProbeIndex, Inc.—Cablevision May 1979.



THE EXPANDABLE SYSTEM



As a reflection of the progressive development in the cable industry, we have designed a redundancy system to alleviate your problems today.

Rapid automatic switching upon unit failure relieves you from customer complaints due to "outages" for long periods, and helps you avoid the 10 p.m. failure expeditions to the headend.

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RCV-450S **Automatic Video Switch**

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RCV-450LS **Automatic LNA Switch**

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Looking for fast, efficient service? We've doubled our facility size and workforce to meet your needs. Orders for our standard filters, listed below, are filled in four weeks or less. What's more, Anixter Pruzan can now ship PICO filters for all channels on a daily basis.

So check our filter variety. Find what's best for your needs, then get in touch. Put PICO to work making profits for you!

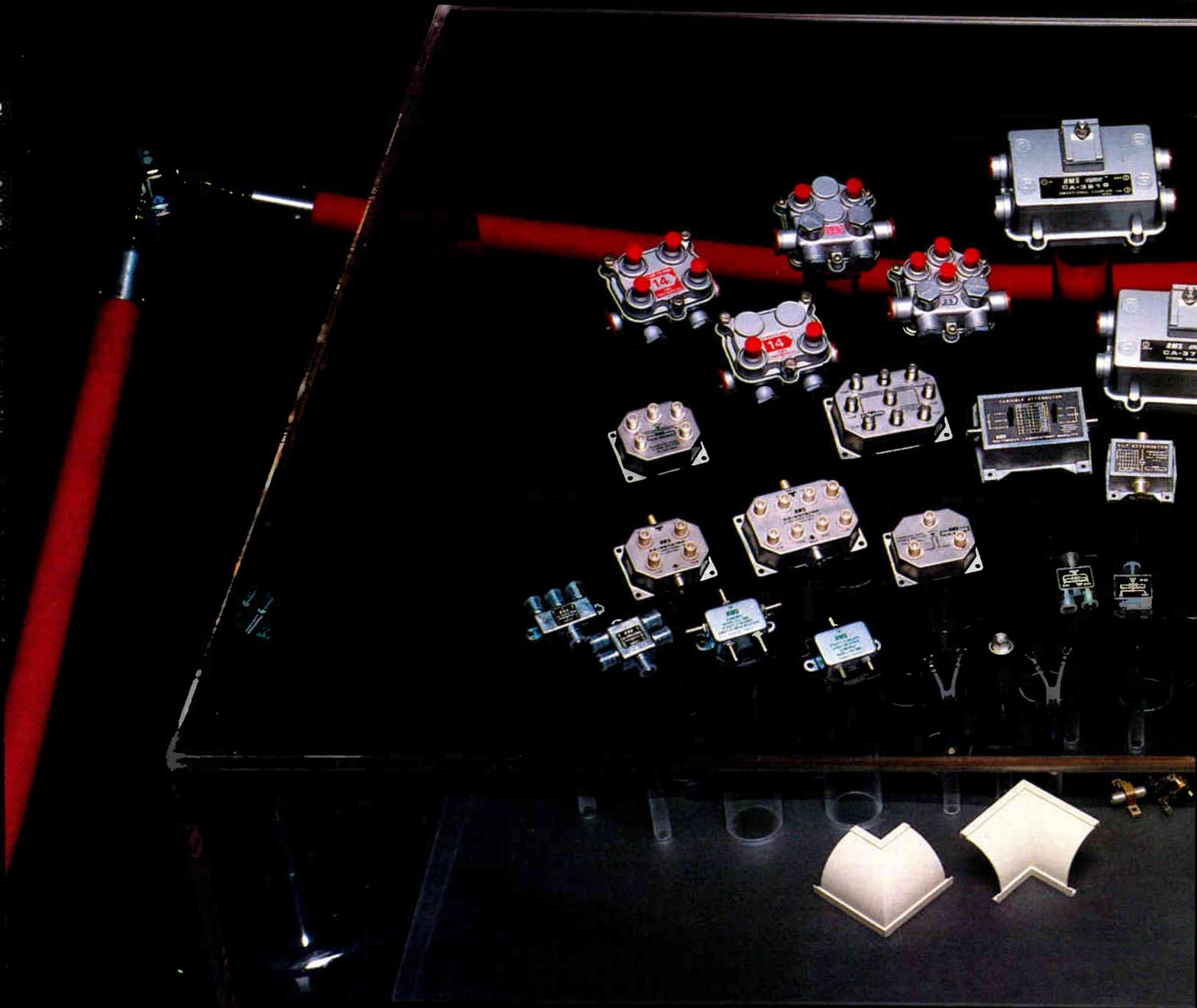
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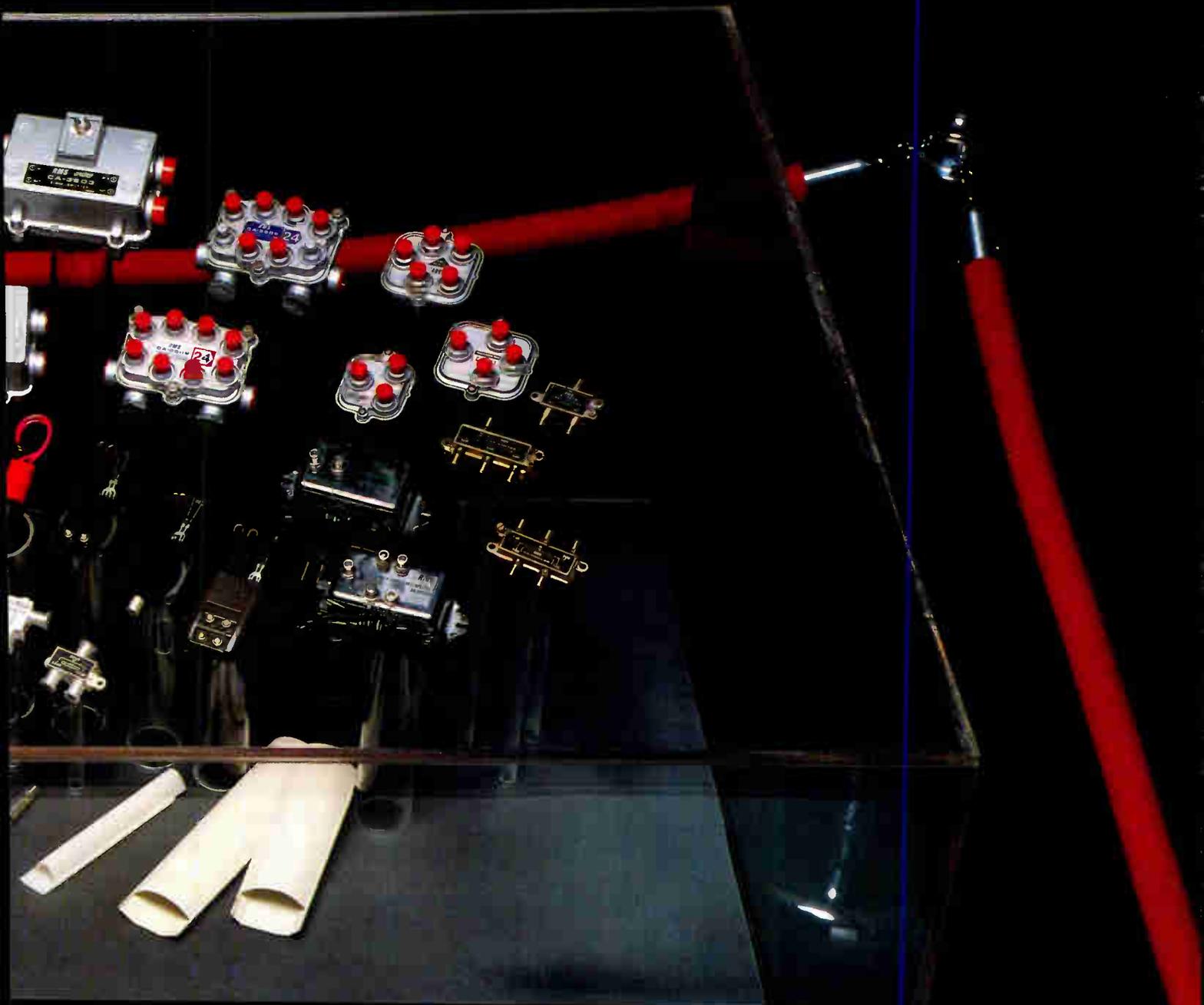


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Two Way "State-of-the-art" Systems Display

by Jim Elmore

There are two sides to the communications revolution; the world of fact, and the world of fancy. Despite the rapid pace of technology, the almost bewildering speed with which new products and services are starting to appear, the truth is that only a few companies are providing options for average cable systems when thinking "future services."

The hottest of the new two-way technologies to be coming on line were dutifully displayed at the NCTA show in Dallas. The new systems—shown by TOCOM, Pioneer/Warner, Scientific-Atlanta, and Oak Communications—utilize two-way capability to supply home security, medical alert alarms, data retrieval, pay-per-view programming, and a variety of new, futuristic services.

Oak began development on its "TotalControl Dimension 2," system in 1975 with the introduction of a complete security system for apartment dwellers. The system was installed, tested, and operated by Oak research and development engineers in Europe, with the operating CATV system in Dordrecht, Holland, becoming the first to install Oak two-way interactive products.

The system enhances revenue control as well. Late-paying subscribers can be remotely disconnected by computer command. TotalControl Dimension 2 also protects cable operators from "floating" terminals. Stolen terminals can be permanently deactivated. This capability is in itself a deterrent to terminal thefts.

TotalControl Dimension 2 is a fully addressable system. In addition to its sixteen levels of tiered program services, remote box connect/disconnect operation is standard. For programming flexibility, any channel or group of channels can be scrambled for premium programs. Subscribers can also be offered special programs on a pay-

per-program basis. The subscriber orders the program by means of the home terminal. This electronic order is sent upstream to the central system computer for automated program authorization and subscriber billing. Fully automated billing for other cable services will also be available.

Videotext Information Display

An important additional option with TotalControl Dimension 2 is the Oak Videotext information display system. Videotext can provide subscriber access to more than 2000 pages of color video information, containing alphanumeric information only or a combination of alphanumeric data and computer generated color graphics. Transmitted as a subcarrier, the Videotext signal conserves spectrum and is actually transmitted over an already occupied TV channel. Any number of channels can carry a Videotext signal or, if the operator desires, the entire Videotext service can be provided within a standard 6 MHz channel.

Simply by entering the desired page number on a home terminal keyboard, TotalControl Dimension 2 subscribers can select among such information displays as: news headlines, current weather conditions and forecasts, first aid or emergency information, cable TV program schedules, airline or other transportation schedules, community announcements, stock market updates, daily horoscopes, ads and even trivia questions.

Sauer stressed the versatility of TotalControl Dimension 2. He noted that it is designed to be expandable to meet cable system operator needs and subscriber interest. In addition to the basic two-way system capabilities, TotalControl Dimension 2 can accommodate such varied services as home shopping, remote utility meter reading, energy management systems, programmed TV classes, TV games, and home computers. Because these capabilities are designed into TotalControl

Dimension 2, system operators have the assurance that the system will be able to respond to new marketing opportunities for future subscriber service expansion.

Microprocessor-Controlled Terminal

In addition to the extensive services offered by TotalControl Dimension 2, system program security has been enhanced. Premium programs are scrambled with the Oak sinewave sync suppression encoding system. The subscriber's home terminal will unscramble only those programs which the cable operator has authorized; and because any channel or group of channels can be tiered, dedicated pay TV channels are not required.

The home terminal is frequency synthesized and microprocessor controlled for high stability and reliability. With 400 MHz design, subscribers can select from an extensive number of channel offerings from a touch-sensitive channel selection keyboard. There's even a "favorite channel" memory for ten programs. The channel selected is indicated on a bright, easy-to-read LED display. An optional infrared remote control provides convenience-minded subscribers with wireless access to the full capabilities of the system. Parental control is available via an exclusive electronic keylock.

QUBE III

The Dallas show provided the backdrop for Warner-Amex and Pioneer to introduce QUBE III. Spokesmen for the joint effort are calling the newly developed console unit a "major milestone" in the evolution of two-way interactive cable television.

The QUBE III home computer console, known as the Pioneer BT-1300, is half the size of present QUBE consoles, can accommodate up to 110 program channels and, say company representatives, it has the capacity to provide

any home service, data information retrieval or video entertainment programming currently available or that may develop in the next decade.

The BT-1300, developed and manufactured by Pioneer, is one of the most advanced systems of two-way communications in the nation and offers subscribers the ability to interact directly with the programs they are watching. By pressing buttons on the QUBE home computer console, subscribers can register opinions, vote on issues, participate in games, shop at home, and take educational courses, for example.

In addition to the program channels, QUBE III features eight narrow-cast channels or groups of channels for education and other services and twelve interactive response buttons on the home console. This means eight separate programs or groups of channels can be selectively addressed to individual subscribers.

The QUBE III console can support eight numeric digits of variable length data to and from the terminal which will enable home subscribers and commercial users to tie in with the QUBE III central computer in a variety of home service applications, including home financial management, teleshopping, security, information retrieval, pay-per-view programming and narrow-casting. In addition, subscribers will be able to instantly access a wealth of information from data information banks and use innovative services such as electronic libraries, energy management, and gather economic and market research data.

In home financial management, for example, a subscriber would be able to actually make deposits or withdrawals simply by punching in a digital code on the QUBE III console that would tell the computer which home terminal is requesting a service and that the service requested is banking. An additional check would be made by the computer to make certain all figures are correct. This would be followed by another verification of the transaction which would be relayed back to the subscriber.

QUBE III also allows for the simultaneous and independent access to both data information and video entertainment services within a given area. In addition, QUBE III technology permits a very rapid data transmission rate. According to John Lanpher,

spokesman for Pioneer, QUBE III is capable of handling up to 256 kilobits per second, compared with a present industry-wide norm of only 25 KBPS.

TOCOM 55 PLUS

Also unveiled at the Dallas show was the TOCOM 55 PLUS system, an intelligent addressable set-top processor with optional hand-held, wireless remote control unit. According to information available from TOCOM, the 55 PLUS system can process and descramble video from up to 55 CATV channels (50 to 400 MHz) and then output them on channel 3 or 4 under complete control of the system operator. With the optional A/B cable switch, up to 110 more channels can be processed by the 55 PLUS when used on a dual cable plant. Also, when used in conjunction with an expanded HT-3B home terminal or equivalent, the 55 PLUS provides a complete two-way interactive communications system, allowing pay-per-view, home security, opinion polling, channel monitoring, interactive information retrieval and, with additional equipment, energy management, home shopping, and home banking.

Control data protocol allows the system operator to control subscription TV services on a per channel, per service tier, per event, and with a full two-way system on a per-view basis.

The 55 PLUS also allows a complimentary data channel to be transmitted on the vertical interval of each of the incoming video signals when desired. It is then decoded and displayed by the 55 PLUS graphics generator. This capability frees all 55 of the 6 MHz video channels for entertainment or education, while retaining the importance and availability of news, weather, and other data or graphic transmission. Selective information retrieval and complete TV program schedule "display" is possible if a full dedicated video channel is utilized.

The remote control, hand-held unit is an optional feature having the same key layout as the keyboard on the TV set top 55 PLUS housing and providing full function control at either position.

The 55 PLUS set top processor is built around an intelligent, microprocessor control center. As a result, each unit can be addressed separately by the cable operator.

Program and channel descrambling occurs through instruction from the

head-end. Because of this design arrangement, the unit has built-in security and will not operate illegally through tampering or theft.

By utilizing vertical interval technology, each video channel is capable of producing full-screen alphanumeric text and five-color graphics separately or combined. These channels may be authorized as pay services are made available to everyone. They may be formatted to contain up to 10 pages of information which can be accessed by way of an on-screen index page and the keyboard. In addition, however, a full video channel can be set aside to transmit thousands of pages of data, accessed in the same way.

Another feature of the 55 PLUS system is that special emergency alert commands can be directed to all or selected 55 PLUS units at any hour of the day. When an alert is received, the 55 PLUS automatically turns the TV on, tunes it to a pre-selected channel, and increases the volume level. The emergency alert is then sounded and followed by an audio-video announcement.

The 55 PLUS allows on/off and complete volume control or sound muting from both the set top unit and the remote hand held unit by pressing the "sound up" and "sound down" or "mute" keys. Sound is always mute for channels or programs not enabled for viewing. In addition, the 55 PLUS allows the user to store and display up to ten preferred channels for quick access. Channels are stored and modified by pressing the "enter" and "pref" keys. They are selected instantly by pressing the "pref" key for each successive preferred channel.

Finally, using the 55 PLUS, subscribers can interact with a TV program to express opinions, vote, answer surveys, answer test questions, and so forth. This is achieved through use of the "resp" and "enter" keys. Opinions or votes can be tallied almost instantly by the central data system.

Special factory-programmed 55 PLUS processors may be ordered which permit channel information to be monitored by the central data system. This feature is invaluable for rating programs and test marketing new products.

S-A's Interactive Information System

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a two-way interactive system on display in Dallas was Scientific-Atlanta. In sharp contrast to the new systems proposed by competitors, which spokesmen for S-A are quick to note are essentially untested as far as field work is concerned, Scientific-Atlanta's new Interactive Information System is based on several years' experience in the field. Scientific-Atlanta designed and demonstrated two-way interactive terminals even before it developed the line of distribution equipment," said Tom Smith, S-A's Director of Operations for Communications Products. "In fact, we developed a system back in 1969. Of course, it turned out that that was a little before its time; still, we could see even then the potential urban residential market for equipment to monitor fire and burglar alarms. So while that product was a little before its time, it did provide an opportunity for S-A to become familiar with the residential alarm business. As a result of that, we entered into a contract with Rollins Protective Services here in Atlanta to design and manufacture a wireless residential fire and burglar alarm system. Since 1971 we have had more than 40,000 residential alarm systems installed and working today. Of course, they don't work over cable, they work over telephone lines. Still, the differences between distribution systems can be overcome with extreme ease."

"In 1976 we got involved in managing energy for utilities. We provided a communication system for electric utilities to disconnect water heaters and central air conditioning compressors during times of peak demand," Smith said. This of course minimizes brownouts and prevents the local utility from having to buy power from neighboring power companies. We presently have over 70,000 energy management switches now installed in homes throughout the United States. Again, these don't work over cable, they work over radio channels. However, about two years ago we adapted this energy management system to work over cable for the system in Monroe, Georgia."

S-A is currently in the process of refining its final system specifications, so information on data rates and other design details are not yet available. Company spokesmen say the specs should be available in six to nine months.

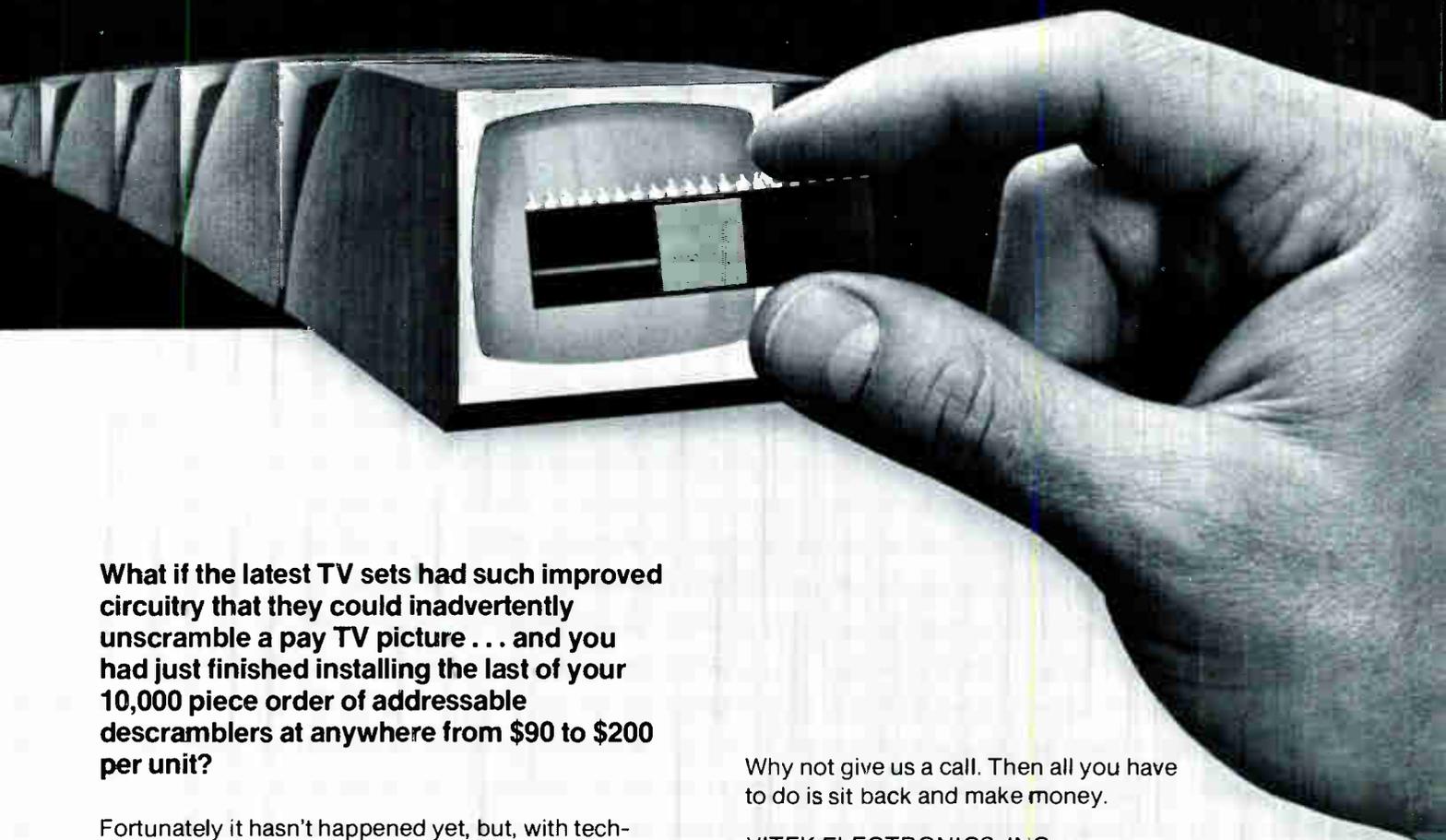
Basically, however, the system is primarily intended for remotely monitoring alarms and relatively slow data interchange. It is not directed at teletext decoding and other high volume, high speed data channel utilization. The important point here, notes Smith, is that the system's emphasis is different from teletext applications. "It is our analysis," says Smith, "that real high speed data will end up on dedicated frequencies or cables for specific large users in business and industry."

"There's no question that the technology is there," Smith continued, "for high-speed data transmission on a residential level. But, for us anyway, the big question is the impact of this technology on overall system cost. You can do effective load management on a one-way system—you don't need two-way. And while two-way capability is necessary to remotely monitor fire and burglar alarms, and for system performance monitoring, the fact remains that that sort of informational feedback can be accomplished very well at the lower speeds. And in comparison with this low-speed utilization, high-speed teletext applications are extremely expensive. Our product differentiation, therefore, is based on cost effectiveness. We envision the system as eventually having that high-speed capability. However, we anticipate that the design at that point will utilize an automatic switching device which will access the dedicated channel."

This line of thinking also explains S-A's philosophy of modular, add-on units. Rather than buying an entire system with everything all at once, S-A's system allows for the purchase of separate modules for each service. So, when the market begins to go beyond home alarm monitoring and load management, and into the data transmission area, S-A will be there with the appropriate module as it is demanded by the customer.

The new systems shown in Dallas present the vista of a future society in which information, security, merchandising, and financial transactions are all instantaneous, and electronically controlled. Alvin Toffler's "third wave" of technological development is at hand. And, as the Dallas show graphically demonstrates, the cable industry is in the vanguard of that development. **C-ED**

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P&D Bringing New Generation of Computer Power

Just as the development of the transistor heralded the beginnings of the solid-state era, the push by the Department of Defense to take IC technology to a new level promises to usher in a new era of communications and data technology.

The importance of new computer research cannot be overstated. American technological development has been rapid since the beginning of World War II, but it has undeniably accelerated with the race to develop VHSIC (Very High Scale Integrated Circuit) technology. Virtually all consumer level gadgets, and certainly most of the communications devices existing today, are a result of technological fallout from Defense research.

Now that CATV systems are breaking into the higher realms of penetration (and profits), the potential impacts of computer-communications technological advances are much greater. Consumer studies indicate that certain types of interactive services will soon be sold as soon as they are installed, and future-looking forecasts indicate that channel space will be occupied as fast as it can come on line for at least a decade.

The following is a short digest of computer R & D news, relevant to communications engineers.

Super Computers Due In The 1990s

New developments in superconducting technology may be heralding the end of the transistor age. In any event, the introduction of new super-computers in the 1990s will be as dramatic to the electronics industry as the development of the transistor a generation ago.

Semiconductors very possibly will have a diminished role in the computers of the future, if researchers at IBM, Bell Labs, and other facilities have their way. Superconducting Josephson devices may well take their place, according to reports in *High Tech* and *I R/D*.

Superconducting technology currently under development has already achieved switching speeds 10 to 100 times faster than current LSI (Large Scale Integrated Circuit) devices, in a fraction of the space. The new techniques allow for greater packing densities on circuit chips, reaching densities as much as 20 times greater. Improved ability to dissipate heat, as well as new circuit techniques that lower heat production, are allowing computer designs that are limited by the speed at which signals can travel from one

switch to another, and not on the speed of the switches themselves.

Resting on what is a clear lead over the rest of the world in superconducting technology, IBM engineers have demonstrated that no major technical obstacles stand in the way of achieving superconducting super computers. Using Josephson junctions, they have already exceeded the performance levels of the most advanced computer technologies based on semiconductors. The Cray-1 computer, probably the world's most advanced, gives a signal cycle time of 12 nanoseconds. Josephson circuits have been built and demonstrated with a cycle time of 10 picoseconds (trillionths of a second) combined with heat outputs of only a few microwatts—thousands of times less than semiconductors.

This means that 100,000 superconducting circuits would produce only about one tenth of a watt of heat, compared with 3 kilowatts using semiconductor technology. Experimental Josephson memory devices have achieved packing densities of 400,000 bits per square inch with access times of 7 nanoseconds. Others, based on superconducting vortices, may achieve memory densities of up to 25 million bits per square inch, the same as current bubble memory techniques, but with switching speeds hundreds of times faster.

The supercomputer of the future might just be the smallest part of any data processing system. IBM engineers envision a mainframe computer four inches on a side, including the CPU, cache memory, and main memory, with a 16-megabyte memory and a capacity for 70 million instructions per second. The following generation of supercomputer may demonstrate "monsters" one inch on a side, with 64 to 128 megabyte memories and a capacity of a billion instructions per second.

The development of such speeds and capacities will make possible computer applications heretofore impossible. Virtual real-time weather forecasting, for example, will soon be a possibility with new computer systems being designed by Harris, IBM, and others, as well as instant speech recognition, and real-time human interaction with huge data bases. Impossible under current technologies because of switching speeds and memory capacities, the science-fiction type computer that carries on conversations with operators and performs complex data searches almost instantly, could well be possible.

Electroline Extra Broad Band Filters

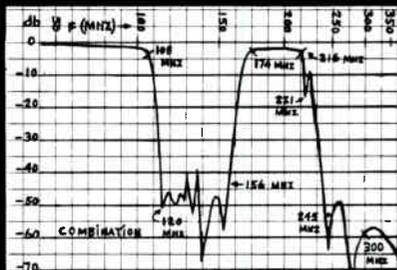
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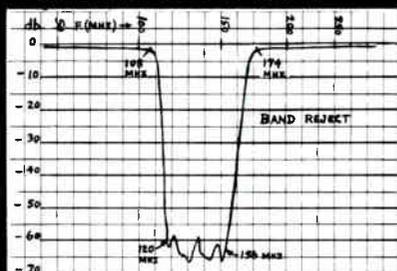
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120-156 MHz	40.0 db
174-216 MHz	1.8 db
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300 MHz	50.0 db

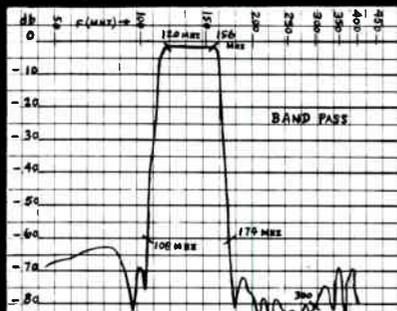
THE BAND REJECT FILTER



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0-108 MHz	0.5 db
120-156 MHz	58.0 db
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Communications impacts could include the development of modulated microwave devices that operate at frequencies far above those obtainable by American technology today. Experiments have shown that arrays of junctions tend to pull themselves into coherent oscillations, suggesting the possibility of communication links with data speeds of up to a trillion bits per second.

Defense Department Pushes VHSIC Research

The Soviet military machine has been expanding both its arsenal and its capabilities during the last twenty years, according to a strategic report, issued by the Institute for Strategic Studies. The study places Warsaw Pact superiority over NATO forces at 3:1 for tanks, 3:1 for artillery, and nearly 2:1 for aircraft.

NATO's response to the steady buildup of communist forces has been to go for improved technology. Unable to match Warsaw Pact countries for sheer numbers, the NATO forces have sought to counteract the buildup by using more sophisticated electronic systems that provide aircraft and ground units with greater combat power.

The electronic warfare (EW) and countermeasures market has been heating up for several years, and has recently been fueled by a Department of Defense initiative to take American electronics technology to the next level of development, according to *Electronics/Countermeasures* magazine.

DoD is stressing the development of VHSIC (Very High Scale Integrated Circuits) to replace the current generation of EW gadgets, to counter the Soviets growing expertise in this area. The EW market has been growing rapidly, and the DoD push is sure to make it even more fertile.

Electronics in general is becoming an ever-larger part of the defense budget. In the current fiscal year, nearly 13 percent of the defense budget will be spent on acquiring electronics gear. If facilities and manpower are factored out, this percentage rises to 35.

The EW market has been growing about 25 percent a year, expanding from \$500 million in 1974 to \$3 billion in 1979. It is estimated that EW sales worldwide will top \$4 billion within two years.

Over one hundred scientists and engineers attended a recent DoD conference on the Department's new VHSIC initiative. They were told that government funding of VHSIC would rise to \$225 million through 1986, a substantial increase from the \$1.6 million budgeted for 1979.

The future potential for spin-offs in technology for other industries is great, observers at the conference felt, citing the rapid pace of "fallout" from today's military technology in such areas as satellite communications, computers and computer terminals, intelligent household gadgets and toys, and automotive technology.

In response to the DoD program, IBM announced the opening of a new facility in Manassas, Virginia, dedicated to VHSIC research. Under IBM's Federal Systems Division, the new 13,000 square foot facility will be used to "push the frontiers of semiconductor technology" according to a company spokesperson. The facility will conduct research at the two-micron level and above, will be dedicated to NMOS silicon gate technology, and might expand into CMOS, gallium arsenide, and other technologies.

A key part of the Manassas facility will be on-line Electron-beam technology, developed by IBM. Although the company does not plan to commercially market its E-beam

products, they are being made available for other Defense Department projects.

Chipmakers Considering Impacts of VHSIC Technology

American chipmakers are considering the impacts on their industry of the introduction of VHSIC (Very High Scale Integrated Circuits) technology, and believe that the trend through the 1990s will be toward fewer, larger companies engaging in chip making.

Citing increasing costs of manufacturing equipment, the high cost of capital, and the rapid rate with which equipment becomes obsolete, chipmakers are evidencing reluctance to get into high-technology fabrication techniques involving electron beam sputtering and exotic substrate materials.

The IC industry is now riddled with takeovers, due to the obsolescence and capital problems. Only seven of the 36 new IC makers started since the mid 1960s still remain independent. One industry observer predicted that, within the next several years, the industry may see a large part of the designing and building of VHSIC components take place at users facilities.

An offshoot of the growth in the VHSIC market is the boom in process equipment. The US market for IC production and test equipment is expected to increase by 17 percent this year, and Frost and Sullivan reportedly predicts continued growth to \$2.3 billion by 1989.

Signal Processing Technology Leads To Consumer Fallout

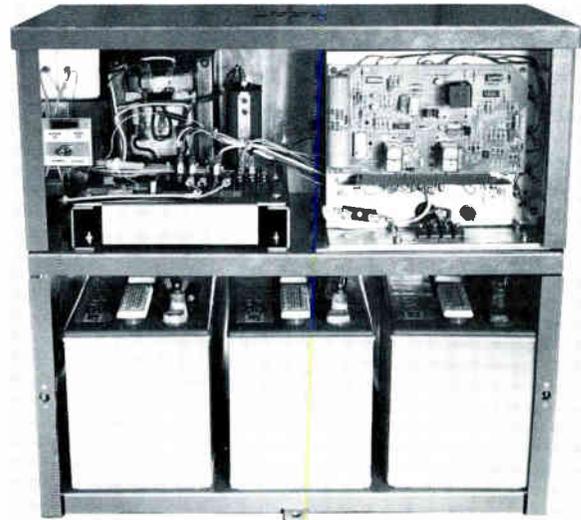
New signal processing chips developed by semiconductor companies, largely as "fallout" from military sonar and radar programs, will lead to the introduction of a new generation of "super-intelligent" electronic games and toys, and other consumer products. By 1984 there will be "voice-response" toys which recognize the owner's commands "just like dogs" according to a report by International Resource Development.

The continuing race to develop electronic equipment capable of fooling enemy radar and weapons guidance devices has acted as a major stimulant to the signal processing market during the past twenty years, according to the report, and has resulted in the production of low-cost, ultra-fast LSI signal-processing chips, which are key components in "black box" devices.

Signal processing technology has played a critical role in the development of Computerized Axial Tomography (CAT) scanners, and is now contributing to the rapid growth of ultrasound and infrared medical imaging equipment markets, says the IRD report. Digitization of speech, store-and-forward voice switching and other important telecommunications applications have also resulted from the continuing fallout of military signal-processing know-how.

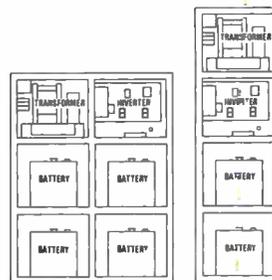
Signal processing may be as important in the 1980s as data processing was in the 1960s. "In a sense, the trend towards advanced uses of signal processing techniques is part of a technological evolution towards capturing data at its source" said study manager Celeste Hynes. "Data processing deals with structured number sets, while word processing deals with strings of text; thus word processing is more directly concerned with 'real world' information than data processing," she said. "Signal processing is the logical next step, in that analog data is captured at its source and is manipulated and processed in real time."

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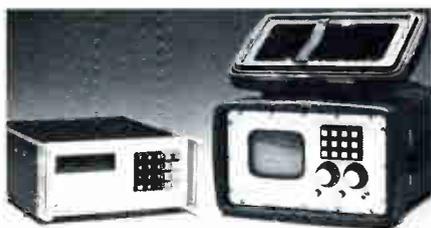
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CATV Threatened by Emerging Technologies

Just Another Pretty Revolution?

The global communications industry is undergoing another major technological revolution, the consequences of which may dwarf the impact of the invention of the transistor.

Today's golden age of electronics began with that solid state breakthrough, but it will be the new generation of VLSI/VHSIC devices, combined with a high user demand for channel space and processing, that will mark this new information explosion.

Two developmental streams are merging to cause this. The advances in device ability and channel space, and the increasing sophistication of users, are combining to produce vast new potentials. This combination, along with educated and profitable consumer demands, will result in a steep increase in the use of channel space, sophisticated terminal devices, and sophisticated system services.

Computer speed and capacity have outstripped our ability to fully utilize them, and, yet, great leaps in speed and density are just on the horizon.

It is no longer a matter of providing channel space, according to Steve Elliott, a computer communications consultant. "Channel space is being eaten as fast as it comes on line," he said. "It is no longer a matter of providing clean service. The communications industry is now faced with the task of catching up with the user, as the user is just learning how to fully use his systems."

Just as CATV systems are beginning to achieve significant penetrations in metro markets, thanks to pay

TV, other technologies are coming on line that could seriously erode CATV's seemingly placid market. Ranging from direct broadcast satellites to potential telephone company moves, the new distribution systems are all eyeing CATV's market with envy.

The challenges to the communications industry include a bewildering flood of new products and services, which will soon hit the market. Almost all communications-oriented, and almost all intelligent, the new products and services will become "standard features" instead of "blue sky options." Security systems, home and business information services, and direct marketing services will present unique problems and opportunities to systems, especially in the areas of compatibility, reliability, information security, processing capability, and customer relations.

This special issue of C-ED looks at some of the latest developments in computer and communications technology. Digested from trade journals, industry reports, and news items, the following information is designed to give you a taste of what is to come.

Fast Growth Predicted for Telecom Market

Use of telecommunications in the U.S. will grow at least five fold during the next 20 years, according to studies performed for NASA by U.S. Telephone and Telegraph and Western Union. The studies predict that space communications will gain an increas-

ing share of the market.

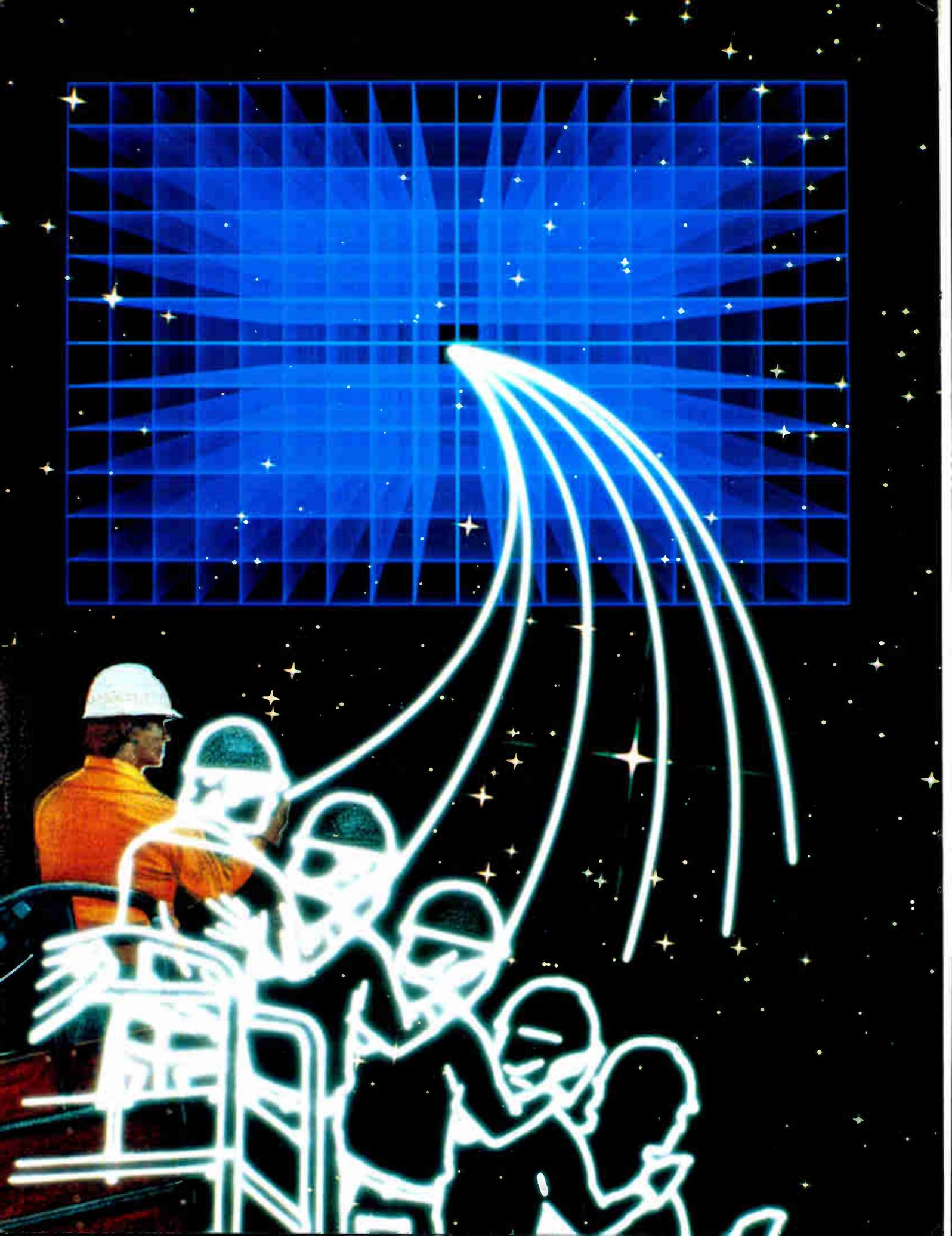
Conventional voice services, including message-toll service and private-line traffic, will continue to predominate. By the year 2001 up to 25 percent of all long-distance (MTS) voice traffic will be carried by satellites, along with up to 50 percent of all data and video traffic, according to the studies.

NASA recently announced a decision to renew programs directed at advanced communications satellite research and technology, according to reports published in *IR/D*. Primary emphasis will be placed on frequencies up to 30 GHz, intended for commercial use during the next 20 years.

The studies show that the demand for MTS services will have saturated the nation's existing domestic satellite capacity in the 4-6 GHz and 11-14 GHz bands (C- and Ku-bands) by the early 1990s. More flexible satellites are on the drawing boards to accommodate this expansion into the short ranges, the studies say. A major attraction of the 20/30 GHz band, called the Ka-band, is the broad frequency range allocated to communications satellite use, up to five times the band widths allocated at C-band and Ku-bands. Advanced technologies using the Ka-band could have message capacities of 50 to 100 times those in the C-band.

One Quarter U.S. Homes To Have Smart Terminals

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types of 'intelligent' terminals by the end of the 1980s, according to a report from International Resource Development, (IRD).

Capable of utilizing new information and transaction services, home terminals will account for a multi-billion dollar industry by 1990, and the revenues derived from the provision of the new services may exceed \$3 billion by 1990.

The development of "viewdata" and other print services, continued growth in CATV systems, and deregulation of the telephone and CATV industries are the keys to this growth.

The telephone industry will be faced by stiffening competition in provision of telephone instruments and in long-distance services. Other interconnect companies are expected to get into the MTS market, but the established telephone companies are expected to retain more than 80 percent of the residential service, the report notes.

The new types of terminal devices are likely to include two main types. The viewdata-equipped television set will incorporate electronics to capture and decode the frames of information. The more affluent seem likely to favor

the "integrated video terminal," which will include video tape capability and will also be programmable, with many standard software packages available.

The study notes that 250,000 microcomputers are currently installed in the U.S. Many of those being shipped now are destined for business or professional applications, but the installed base of "home computers" is large and growing. Increasing numbers of microcomputer users are equipping their systems with communications interfaces, allowing them to communicate with other microcomputers or with timesharing service computers. The growth of these devices in the home represents another significant delivery vehicle for home information services in the 1980s.

The major types of new information services will include news, directory, data-base, entertainment, and educational programs and services. The new terminals will open the way to home transaction services, notably "teleshopping" and "bank-at-home" services. "Find/seek" classified ads will generate revenue for the service suppliers, and be a convenience for the user.

CATV companies see themselves

as being well-positioned to take advantage of the expected market developments, but in fact they face two serious hazards. One the report notes, is the sheer size and muscle of the firms moving into the information services business. The other is the possibility of telephone companies taking over the CATV business (which the FCC has already permitted in small communities). Additional dilution of the market position of the CATV vendors may come from the spread of home satellite earth stations, which Sears, among others is developing in conjunction with Comsat.

CATV Converters Will Become Home Computers

Cable TV converters will be the personal home computers of the future, according to Dr. Gary S. Tjaden, Vice President of Engineering and Technology for Cox Cable Communications, Inc. of Atlanta. Competition for franchises is forcing CATV companies to develop technologies that will meet increasing consumer demands, he says, with the newest technology involving the use of addressable converters with microprocessors to provide a wide range of

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channel selections. The use of microprocessors is growing in significance because of the potential it offers the cable TV subscriber, Tjaden said. "Once you have a microprocessor in every home and a computer at the other end of the cable, you are getting very, very close to having a home distributed processing system," he said.

Dr. Tjaden cited the potential use of CATV converters for home security in a Cox system in Norfolk, Virginia as an example of a distributed processing system. A minicomputer used as the central data base will be linked to a remote data system. The remote has a Z-80 microprocessor which sends out "polling" signals. "These signals, sent every three seconds, check the condition of units connected to home terminals," Dr. Tjaden explained. "That terminal must send a response back to the station."

Home terminals are connected to alarm devices, such as smoke sensors, and magnetic door and window latches, and medical panic buttons.

"We're talking about a computer controlled terminal in every home subscribing to the security system. That, to me, is a rudimentary home

computer system," he said. "It is designed for a particular service, but it has all the things in it you would need to have a home computer connected to a cable, which is a distributed processing system."

Another innovative way in which CATV converters are being used is in an energy management system being tested by Cox in Pensacola, Florida. At the heart of the cable system is a computer headend that operates the controls of the furnaces, water heaters, and air conditioners in participating homes. "Into the computer is put a schedule of events for each household," Tjaden said, "so that the furnace is turned up before the family gets home at the end of the day, or the water heater is turned on before the family rises each morning. The pilot program has resulted in an energy saving of 30 percent.

Another example of expanding technology will be completed this summer in Orland Park, a Chicago suburb. The first 4080 Megahertz, 52-channel system in the country is now being installed by Cox in Orland Park.

"The converter being installed at Orland Park is starting to look like a computer terminal," said Dr. Tjaden.

"It has a keyboard input, a digital readout, and a microprocessor inside. Channel selections are keyed in—not dialed.

The unit is one piece, field upgradable to two pieces, with wireless remote control operation and a hand-held key pad. "The microprocessors going into the terminal are programmable processors driven by a program placed in a read only memory. They are true general purpose programmable computers with addressing capabilities," said Dr. Tjaden.

"As technology advances, there are good reasons for us to upgrade the converters we put in the homes," he said.

Rapid Growth of Direct Marketing Via Viewdata Predicted

The technology, capital, applications, and markets needed to implement home "pushbutton shopping" are now here, according to LINK, an information consulting firm. The study, "Viewdata and Its Potential Impact in Direct Marketing," says that changing attitudes among both businesses and consumers insure the steady growth of home shopping and transactional services through the 1980s.



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Cable Programming For August

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders	Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
C-SPAN (times approximate) Mondays 9:00 a.m. to 6:00 p.m. Tuesdays 10:30 a.m. to 6:00 p.m. Wednesdays 9:30 a.m. to 6:00 p.m.					195*/# F1, #9 Thursdays 9:30 a.m. to 6:00 p.m. Fridays 10:30 a.m. to 5:00 p.m.				
CBN					24 hrs. No F1, #8				
ESPN Monday thru Thursday 6:00 p.m. to 4:00 a.m. Friday, 6:30 p.m., to following Monday, 4:00 a.m.					F1, #7				
Front Row					2:30 pm-2:30 am 481*/# E,C F1, #12 P,M F1, #10				
HBO	August 1	5:00	4:31	Program	F1, #24				
	August 2	3:00	3:28	729*/#	F1, #22				
	August 3	3:00	1:17	Scramble	F1, #23				
	August 4	5:30	1:26	835*/#	F1, #20				
	August 5	5:00	1:17	Duplication					
	August 6	6:00	1:43	940*/#					
	August 7	5:00	2:11	Take-2 E.					
	August 8	5:00	3:54	592*/#					
	August 9	2:00	3:30	Take 2 W.					
	August 10	2:30	2:19	681*/#					
	August 11	6:00	2:16						
	August 12	6:00	2:13						
	August 13	5:30	3:08						
	August 14	6:00	1:28						
	August 15	6:00	2:56						
	August 16	2:30	3:46						
	August 17	2:00	2:40						
	August 18	6:00	1:39						
	August 19	5:30	1:24						
	August 20	5:00	1:50						
	August 21	5:00	1:38						
	August 22	5:30	3:30						
	August 23	2:00	4:09						
	August 24	2:00	2:27						
	August 25	5:30	3:00						
	August 26	5:00	2:40						
	August 27	6:00	1:01						
	August 28	5:30	2:00						
	August 29	5:30	3:59						
	August 30	3:30	3:41						
	August 31	2:00	3:15						
	HTN					8 pm-10 (11) pm 517*/# F1, #21			
KPIX (time permitting)					2-4 hrs. per day No F1, #1				
KTVU					7 am-1 am (weekdays) No F1, #1 7 am-4 am (weekends)				
MSG Sports	August 1	8:00 p.m.	438*/#†	F1, #9					
	August 2	1:30 p.m.							
	August 3	1:30 p.m.							
	August 6	10:00 p.m.	10:30 p.m.						
	August 9	1:30 p.m.							
	August 10	1:30 p.m.							
	August 13	9:00 p.m.							
	August 20	8:00 p.m.							
	August 23	1:30 p.m.							
	August 24	1:30 p.m.							
	August 29	8:30 p.m.							
Modern Talking Pictures					12 pm-5 pm (weekdays) 048*/# F1, #22 7 am-12 pm (weekends)				
Newstime					24 hrs. 276*/# F1, #6				
Nickelodeon					9 am-11 pm (weekdays) 749*/# F1, #11 8 am-11 pm (weekends)				
PTL					24 hrs. No F1, #2				
Reuters					4:00 a.m. to 7:00 p.m. Monday thru Friday No F1, #18				
SPN					429*/# auto switch to commercial, on/off respectively F1, #21 10 pm-8 pm (Mon.-Sat.) 517* end SPN, begin HTN 24 hrs. (Sun.) 517* end HTN, begin SPN				
Showtime					576*/#†† E, C, F1, #12; P, M, F1.				
August 1	3:30	3:33	August 17	1:30	2:58				
August 2	1:30	2:33	August 18	3:30	3:13				
August 3	1:30	3:41	August 19	3:30	4:13				
August 4	3:20	2:34	August 20	3:30	2:12				
August 5	3:30	3:51	August 21	3:30	2:36				
August 6	3:00	3:25	August 22	3:00	3:28				
August 7	3:30	2:38	August 23	1:30	2:55				
August 8	3:30	2:55	August 24	1:30	2:55				
August 9	1:30	3:11	August 25	3:30	2:27				
August 10	1:30	3:29	August 26	3:30	2:47				
August 11	3:30	3:18	August 27	3:30	3:28				
August 12	3:30	3:51	August 28	3:30	2:35				
August 13	3:30	2:23	August 29	3:30	2:36				
August 14	3:30	2:38	August 30	1:30	2:37				
August 15	3:30	2:41	August 31	1:30	1:46				
August 16	1:30	2:53							
SIN					24 hrs. No Westar II #6				
The Movie Channel					24 hrs. 311*/#E. F1, #5 519*/#W.				
Trinity (KTBN)					24 hrs. No F1, #14				
WGN					5:42 am-3 (3:30) am (Mon.-Thurs.) No F1, #3 24 hrs. Sat. & Sun. Ends 3 am on Sun.				
WOR					24 hrs. F1, #17				

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

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

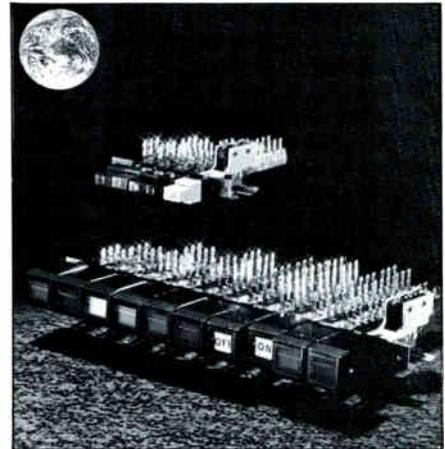
† Commercial substitution 601*/#; Thurs. baseball 706*/#.
†† On-line 679*/#; off-line 753*/#; access 843*/#.

Switchcraft Brochure Features Tini DW Multi-Switch® Switches

A new eight-page brochure in full color describing Tini DW Multi-Switch® switches with 10 mm and 15 mm centers is available from Switchcraft.

The new brochure discusses basic design features of the sub-miniature Tini DW Multi-Switch switch, the first American switch made on 10 mm centers. Switching functions, material specifications and terminations are described. Special features including available pushbuttons, legends and the new Switchcraft "Flip-Flop" pushbuttons are also covered.

The subminiature Tini DW Multi-Switch switch has been specially designed for applications where size, low cost, and reliability are prime factors as in analog and digital computers, analyzers, transmitters and receivers, intercoms, numerical control devices, ground support systems, instruments, home entertainment, appliances and control panels. These non-illuminated switches are available in up to 18 stations in a single row. For further information or a copy of the new brochure "Tini DW Multi-Switch® Switches" (NPB-349), write to Switchcraft, Inc., 5555 North Elston Avenue, Chicago, Illinois 60630.



New Component Selector From Cornell-Dubilier

A colorful new 96-page catalog from Cornell-Dubilier Electric, Newark, New Jersey, contains complete specifications and selection data on the CDE line of DC capacitors, relays, EMI filters and AC capacitors.

Product lines detailed in the "CDE Component Selector" include: aluminum electrolytic, film dielectric and mica capacitors; general purpose, miniature, sub-miniature and time-delay relays; all-purpose APF/EMI noise filters; and by-pass, non-PCB and "Soggy Foil" AC capacitors. Included are product specifications, engineering data, cross-reference and selection tables. For a free copy, write: Marketing Communications, Cornell-Dubilier Electric, 150 Avenue L, Newark, New Jersey 07101.

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RF Test Equipment

Wide Band Engineering Company, Inc. has released catalog #180. This eight-page catalog contains specifications and applications for RF test instruments produced by WBE, Inc.

Several new products have been added in this catalog. These include an expanded amplifier and directional coupler line. Also added are UHF products in the 1-900 MHz range including a 30 dB RF sweep amplifier, RF analyser, RF comparator, fixed impedance bridges, and 50/75 ohm impedance converter.

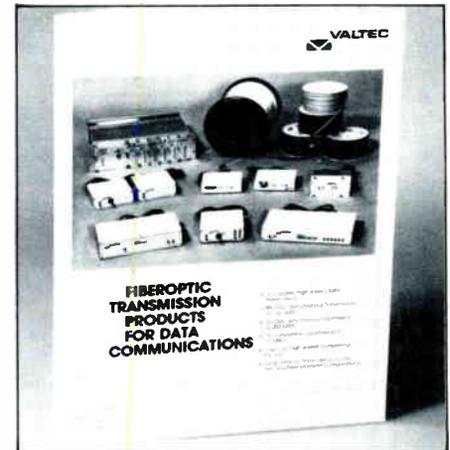
Other products include precision hybrids, coaxial RF switches, filters, detectors, RF analysers, RF sweep amplifiers and variable impedance bridges. All products are available in 50 or 75 ohm impedance with a number of connector options. For a free copy, write Wide Band Engineering Company, Inc., P.O. Box 21652, Phoenix, Arizona 85036, or call (602) 254-1570.

Newsletter, Data Communications Brochure Available from Valtec

Valtec Corporation, Communication Fiberoptics, is now publishing a newsletter on new products, applications and technology advances in the field of fiberoptic communications. Published quarterly, "FiberTopics" covers company and industry activities in the telephone, broadcasting, CATV, military and data communications markets.

A new fiberoptic data transmission product brochure is also available from Valtec. Highlighted in the brochure are Valtec's low-cost eight-port multiplexer, high-speed RS-232C synchronous and asynchronous data links, TTL-compatible links and multi-kilometer data transmission links.

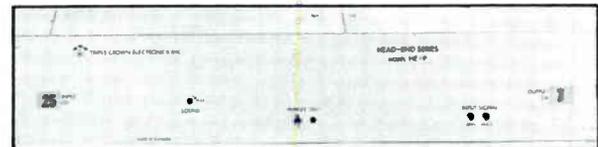
Valtec is a manufacturer of fibers, cables, electro-optic interfaces and systems for the voice, video and data communications industries. Further information can be obtained by writing to Valtec Corporation, Communications Fiberoptics, 99 Hartwell Street, West Boylston, Massachusetts 01583, or call (617) 835-6082.



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NICKELODEON has just won the ACT Award for 1979.

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Since its first birthday in April, NICKELODEON, The Young People's Channel, has been honored with 3 prestigious awards.

At the NCTA Convention in Dallas, *Pinwheel*, the preschooler's program, received the ACE Award for Excellence in a children's program series. And another ACE Award was presented to *America Goes Bananaz*, the teenage talk show, as the best entertainment program series.

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Printers

Dataproducts 180 CPS Matrix Printer

Dataproducts Corporation has expanded its family of dot matrix impact printers to include the model M-120 printer. This new unit offers the same operating characteristics of its "big brother," the M-200 printer, except for a slower speed and lower price.

The printer uses a single column, seven-wire print head allowing it to be very favorably priced.

Delivery for the M-120 will begin in the first quarter of 1980 with 30-day delivery ARO. OEM pricing can go as low as \$1,350. The new M-120 provides crisp, easy-to-read print using a 7x7 half-dot matrix font in standard or expanded characters. The print speed is 180 characters per second in a bidirectional, logic-seeking mode.



Work throughput ranges from 75 lines per minute for full, 132-character lines, to 200 lines per minute with 40-character lines. Average throughput is 120 lines per minute.

Other significant features of the M-120 include a unique, operator replaceable head, good for more than 200 million characters; long-life ribbons in clean and easy to load cassettes; and no required preventive maintenance.

For further information, contact the marketing department of Dataproducts Corporation, 6200 Canota Avenue, Woodland Hills, California 91365, or call (213) 887-8451:

Tally Drops Serial Printer Price

Tally Corporation has reduced prices on its model T-1602 serial printer from \$2645 to \$1995. The 24 percent price cut on the 160-character-per-second printer is the third major price cut the company has recently announced for models within its serial line.

The Tally T-1602, one of the first printers to offer microprocessor-controlled optimized bi-directional printing for increased throughput, is a quietized, desk-top, 132-column impact matrix printer designed for high volume data processing applications. The T-1602 features dual sprocket feed tractors for positive paper positioning and fast paper advance. The tractors adjust from either side of the carriage and handle multi-part forms from 4 inches to 15 inches wide.

A 7x7 half space dot matrix font produces highly legible, sharply defined characters. Standard features on the T-1602 include a 96-character upper/lower case character set, self test, forms length selector, forms thickness control, paper out alarm, double-wide character printing and a convenient snap-in ribbon cartridge inking system.

Optionally, the T-1602 can be equipped with a Quick Tear attachment for fast and easy forms removal immediately after printing. The Quick Tear provides better forms utilization and saves the substantial expense of forms wastage.

For further information, contact Frank Batchelor, Tally Corporation, 8301 South 180th Street, Kent, Washington 98031, or call (206) 251-5524.

Terminals

Hazeltine Announces new Smart "Executive 80" Terminal Series

A new line of sophisticated, high-performance computer terminals, offering a wide variety of configurations, was announced by Hazeltine Corporation.

Named the "Executive 80", the new series is designed to be easily customized to fit the precise needs of a broad range of systems applications. It suits the requirements of smaller modular computer systems, as well as

those of large host computers with highly distributed terminal networks

The "Executive 80" series consists of two basic terminals, the model 20 and model 30, designed with a high degree of flexibility for applications such as data entry, form fill, data inquiry and software development. The model 20, whose list price is \$1295, is a buffered video display terminal with an extensive set of video highlight and formatting features. The model 30, correspondingly priced at \$1695, is a very high-performance editing terminal whose functional differences over the model 20 are characterized by expanded function key capability, additional transmission modes, paging and data validation.

Standard features include video highlighting, line drawing, status line, programmable function keys and a horizontal split screen display, plus enhanced video option which selectively displays characters at normal font size, twice the normal height and width, or in a 132-column format on a 15-inch monitor.

For further information, contact Hazeltine at 500 Commack Road, Commack, New York 11725, or call (516) 462-5100.

New Display Terminal From Human Designed Systems Emulates DEC's VT-52 CRTs

A new display terminal that emulates DEC's VT-52 and provides a wide range of applications capabilities and design features has been introduced by Human Designed Systems, Inc.

The concept 520 series terminals offer users of DEC's popular alphanumeric CRT the ability to continue to utilize their VT-52 for existing applications, while adding an inexpensive resource that can serve as a keystone for future uses in range of areas. It is available in both ASCII and APL versions, with either one or four full pages of display memory.

The concept 520 family emulates the standard features of the VT-52, including cursor control; left, right, up, and down; home cursor; direct cursor addressing; reverse line feed; clear functions; and alternate keypad mode. Each of the four members of the family is totally compatible with DEC software. In addition to VT-52 compatibility, the

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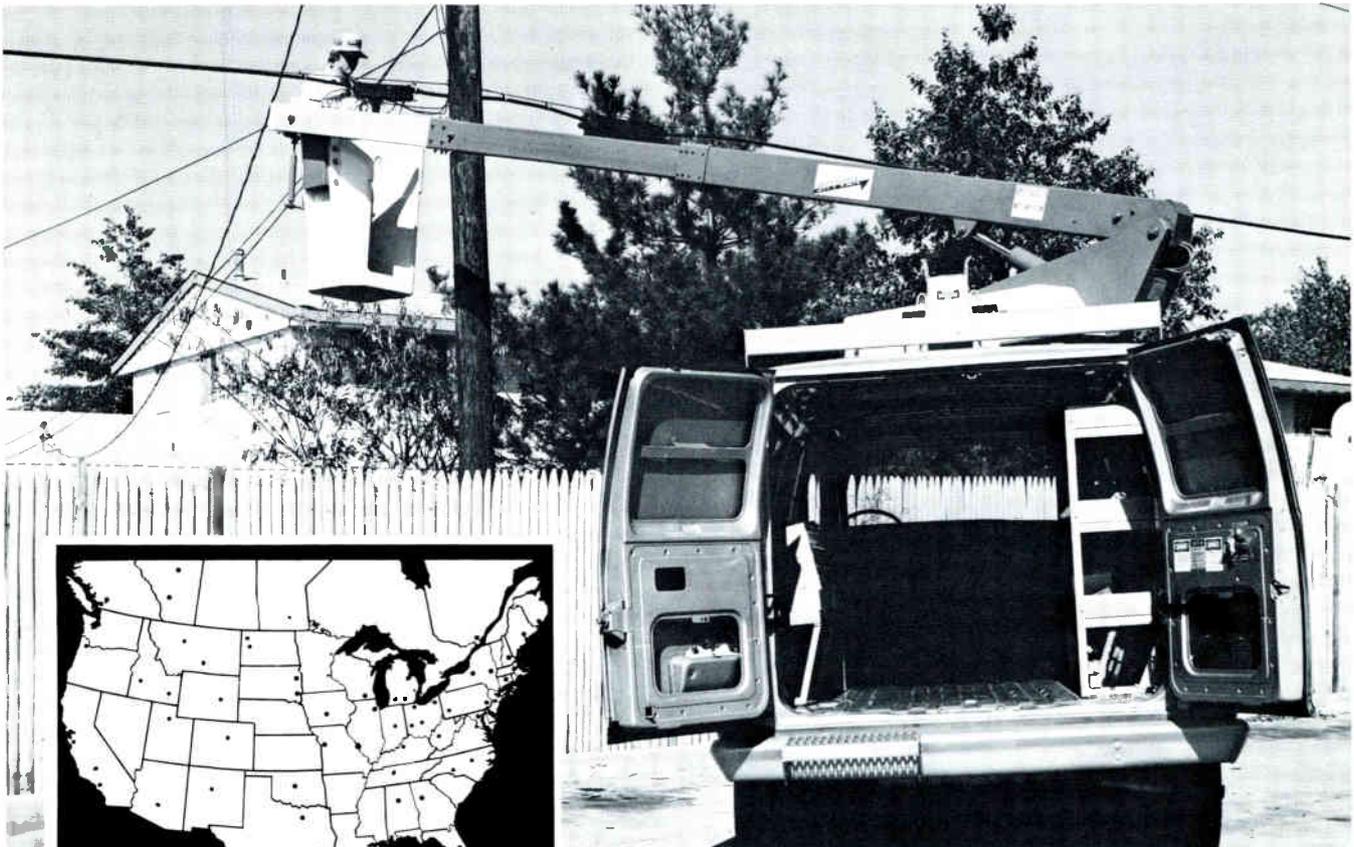
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series offers a wide range of standard features, including windowing, programmable function keys, functional support for word processing and data entry/retrieval applications, business graphics, multiple character sets, and multiple I/O ports (e.g. printer port).

The standard concept 520 (ASCII version, with one full page of display memory) is priced at \$1675 in single quantities; \$1330 in quantities of 75. It is available 30 days ARO.

For further information, contact Human Designed Systems, Inc. at 3700 Market Street, Philadelphia, Pennsylvania 19104, or call (215) 382-5000.

New Tape Mounting Display from Scientific Measurement Systems

Scientific Measurement Systems has introduced a new tape mounting display and control system that utilizes an easily readable and highly reliable display system. Called the "Center of Attention," the new mounting display and control system is designed to provide improved control of tape and disk mounting operations by helping to reduce mistakes, save time, simplify operator interaction with peripherals, and improve man-machine communi-

cations. The primary goal, according to the company is to help improve operational efficiency in data centers.

The mounting display and control system takes its instructions directly from the computer, and communicates them to operators, using a three-light series of flashing color indicators to alert operators, and an eight-character alphanumeric unit to display actual volume serial numbers and appropriate handling messages. A tape mounting display and control system, utilizing a combination of eight-character alphanumeric displays, and a controller, starts at \$16,000. They are available 30 days ARO.



For more information, contact Scientific Measurement Systems at 26 Olney Avenue, Cherry Hill, New Jersey 08003, or call (609) 424-5220.

12-inch Touch Screen Digitizer from TSD

TSD Display Products, Inc. has introduced a touch screen digitizer for use with 12-inch diagonal CRTs. The touch screen incorporates an entirely new concept in data interaction. It enables completely untrained personnel to use a CRT terminal equipped with a touch screen to interface quickly and easily with a computer system by simply touching an appropriate menu item that is displayed on the screen.

The 12-inch touch screen matches the curvature of most 12-inch CRTs and features a minimum of parallax optimizing the operator's pointing accuracy.

It provides fast and convenient data access, no operator training is required and the unit has high stability and outstanding reliability.

Depending on the application, the touch screen digitizer can be supplied with or without a power supply and RS232 interface. A special introductory "evaluation unit" is available for purchase by new customers. Prices for the 12-inch touch screen digitizer range from \$950 for a unit with parallel unfiltered data output to \$1,200 for a

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unit with filtered RS232 data output and power supply. The special one-time evaluation unit with RS232 interface and power supply is available for \$995, with OEM pricing available upon request.

For further information, contact TSD at 35 Orville Drive, Bohemia, New York 11716, or call (516) 589-6800.

Attachments

Wespercorp's New TC-180 Data Cartridge Magnetic Tape Controller

Wespercorp's Western Peripherals Division has announced a new TC-180 Data Cartridge Magnetic Tape Controller. The TC-180 is designed for use with DEC PDP-11 computers, and is the latest in a series of controllers which permit the user the handling convenience and compact size of the 1/4" (3M type) data cartridges.

The TC-180 is a high-performance, full DMA controller which is transparent to the DEC operating system because it emulates the DEC TM-11/TU-10 1/2" magnetic tape system. There is no need to write drivers or

special software. A built-in tri-mode formatting permits the user to select the drive and format best suited to the application.

The 6400 bpi MFM formatting offers unformatted capacities up to 17 mb per cartridge, making the unit an ideal backup to eight-inch Winchester disc drives. Data is written on four tracks in serial mode, one track at a time, yielding high tape utilization factors. The controller interfaces cartridge drives from DEI, Kennedy, Quantex, DRI and Tandberg at densities of 1600 to 6400 bpi.



The two-card controller is designed to mount in any two adjacent SPC slots and connects with the cartridge drive via two ribbon cables through the

computer. The TC-180 is supplied with drive cables, documentation, diagnostics, and a one-year warranty. Delivery time is 30 days.

For more information, contact Western Peripherals at 14321 Myford Road, Tustin, California 92680, or call (714) 730-6250.

Miscellaneous

Heuristics' Low Cost Speech Recognition

The first low-cost, industry-compatible speech recognition unit, making available speech input capability with virtually every computer terminal, is being introduced by Heuristics, Inc.

The Heuristics 7000, which will sell for about \$3,000, has an RS-232-C interface to give all users the advantages of hands-off operation.

The unit has a spectrum analyzer that uses state-of-the-art digital filtering and pattern matching techniques to analyze audio input. The output is automatically transferred to the computer in standard ASCII format. The unit recognizes up to 64 words or



The CR-1 gives you a radiation alert.

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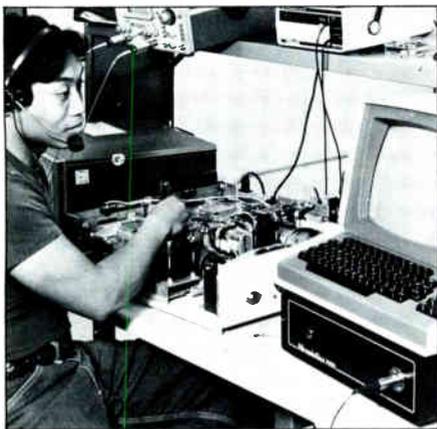
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phrases, each up to three seconds in length, and is compatible with all common programming languages, such as FORTRAN, COBOL, PASCAL, and BASIC. It can be trained or re-trained as often as necessary to accept the voice or voices of the users, and will automatically reject utterances significantly different from the vocabulary set.

It comes with a noise-cancelling headset microphone.

For information, contact Heuristics at 1285 Hammerwood Ave., Sunnyvale, California, 94086, or call (408) 734-8532.



New Editing Controllers Cover User Needs

A new line of three videotape editing controllers from US JVC Corp. meets the specific needs of both the beginning and advanced video user.

The line is being introduced to "match features and price with every class of professional video user," explains Herman Schloss, vice president of US JVC Corp.'s Professional Video Division.

The line consists of the RM-70U Remote Control Unit, the RM-82U Automatic Editing Control Unit and the RM-88U, a full-function Automatic Editing Control Unit.

Each "RM" has a large rotary search dial control so a user can quickly locate any portion of a videotape program. This shuttle search mechanism can vary the playback speed of any controlled videocassette recorder (VCR) from still to 5 times normal speed in both forward and reverse. It also maintains any selected playback speed automatically when a user releases it during operation.

Each of the new "RM" units is also constructed on a full logic circuit based on a microprocessor. This inno-

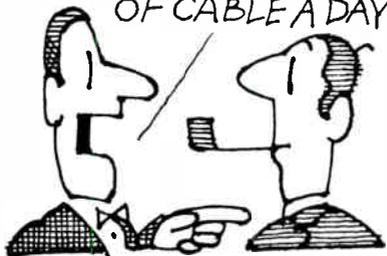
vation keeps power requirements low and operating functions precise.

The RM-70U is designed for a user needing complete remote control of a VCR with limited editing requirements. The RM-82U can be the controller in a high-quality editing system where the purchaser must keep initial costs low. The RM-88U is aimed at the professional videotape post-production center, which must incorporate every aspect of electronic editing and time-saving technology.

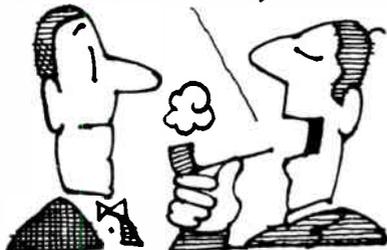
The RM-70U has a suggested list price of \$360.00 and will be available in July, 1980. The RM-88U price and availability will be announced. For information, contact JVC at 5875 Queens Midtown Expressway, Mass-peth, New York, or call (212) 752-8610.



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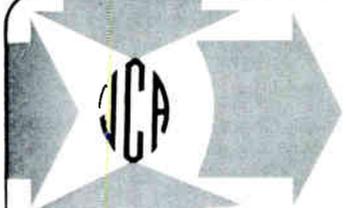
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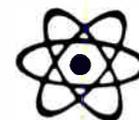
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★ **Irving Kolodny** has been appointed vice president, research and technical services by **General Cable Company**, a division of GK Technologies, Incorporated.

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Mr. Kolodny holds a B.S. degree in electrical engineering from New York University College of Engineering. He is a licensed Professional Engineer in New Jersey, chairman of the International Wire and Cable Symposium

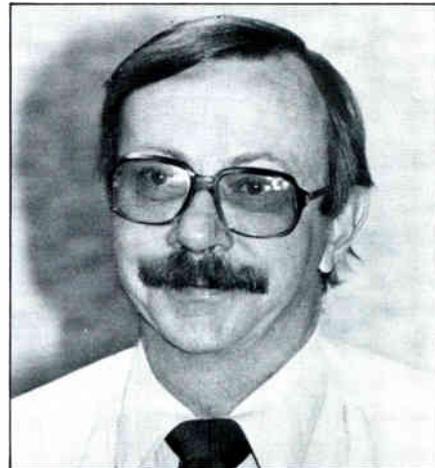
Committee, and vice-chairman of the Institute of Electrical and Electronics Engineers' Standards Board. He is past chairman of the Transmission Systems Committee of the IEEE Communications Society and was recently elected a member of the Advisory Council.



★ **Phillip Killebrew** has been named senior quality engineer in the supplier quality assurance department of **ITT Cannon Electric**, Santa Ana, California.

Marvin Shults, manager quality assurance, said Killebrew will be responsible for performing supplier surveys and supplier corrective action and developing new techniques in receiving inspection.

Prior to joining ITT, Killebrew was a supervisor inspection operations at Master Specialists Company of Costa Mesa.



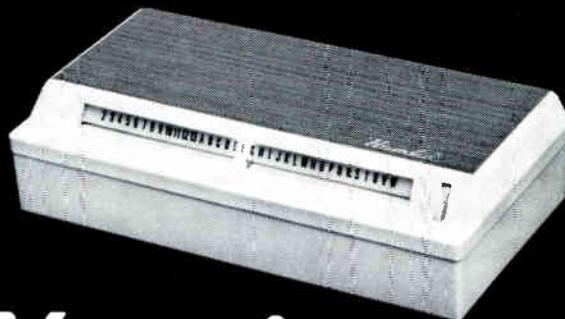
★ **William D. Couper** has been appointed an engineering supervisor for **ITT Cannon Electric**, Phoenix, Arizona.

Prior to joining International Telephone and Telegraph Corporation, Couper held management positions for the Cory Corporation, Chicago, AMP Inc., Harrisburg, and E.I. DuPont, Wilmington, Delaware.

Couper attended the University of Pittsburgh and M.I.T. and earned two degrees in electrical engineering and one in industrial management.

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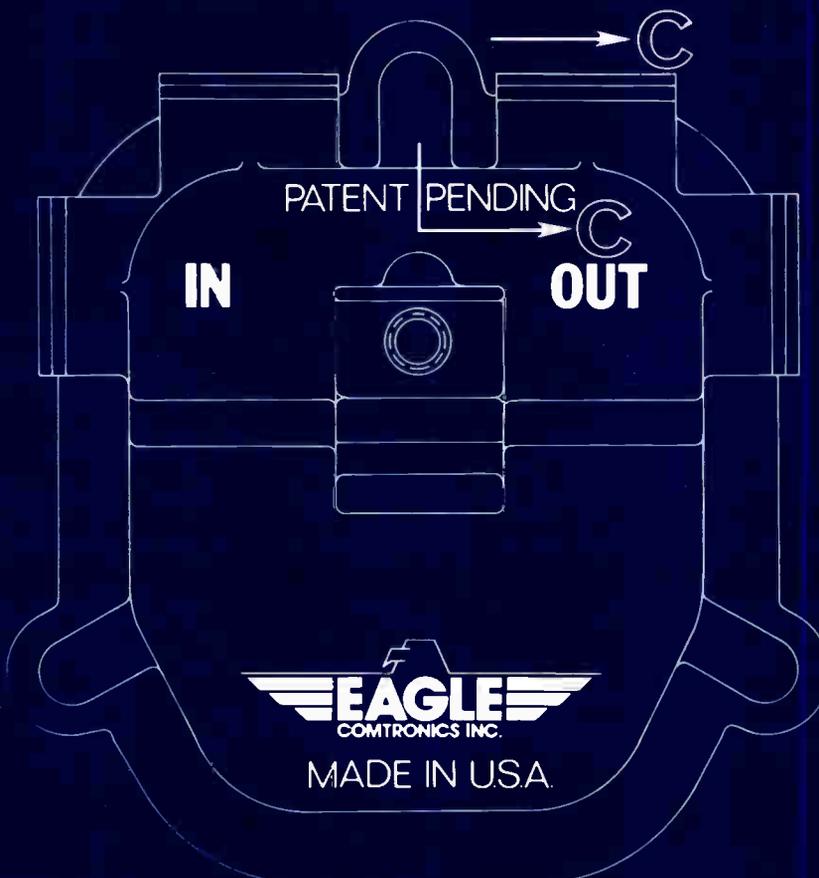
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COLOR CODE	orange	gold	white	black	green	purple	yellow	red	silver	blue
TAP LOSS										
INSERTION LOSS										
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300 MHz		2.7	1.4	.7	.5	.4	.3	.3	.3	.3
400 MHz		3.1	1.6	.8	.6	.5	.3	.3	.3	.3
450 MHz		3.2	1.7	.9	.7	.6	.4	.4	.4	.4
ISOLATION - out to Tap										
5 MHz		30	32	34	40	43	46	49	52	55
300 MHz		30	32	34	38	41	44	47	50	53
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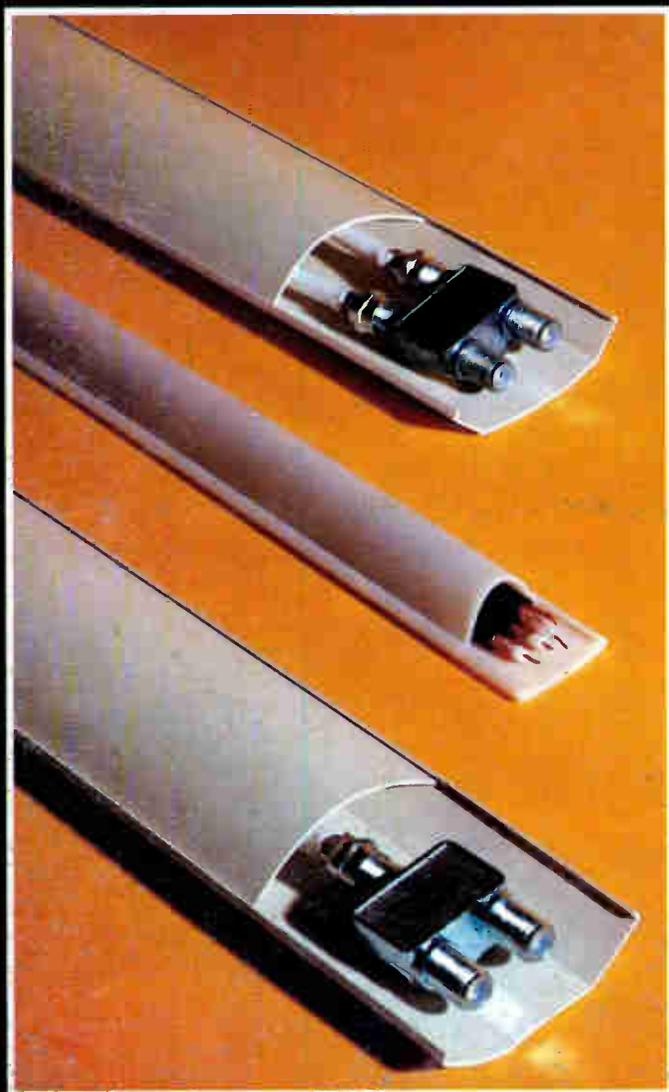
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