CED™

Special Section: Frequency Chart

Communications Engineering Digest/The Magazine of Broadband Technology July 1982

Local Origination:

- Using Fiber Optics
- Studio Design

Product Profile:

Mobile Production Vans

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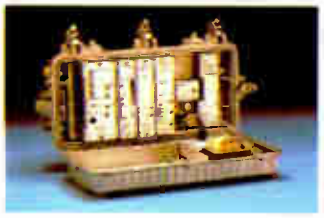
We can back our systems this well because they all have the quality and expertise of the established Magnavox reputation.

All the components of the Magna 440 system – including amplifiers, passives, subpassives, connectors, converters and our Digital System Sentry® line status monitoring system –are integrated for the same high channel capacity.



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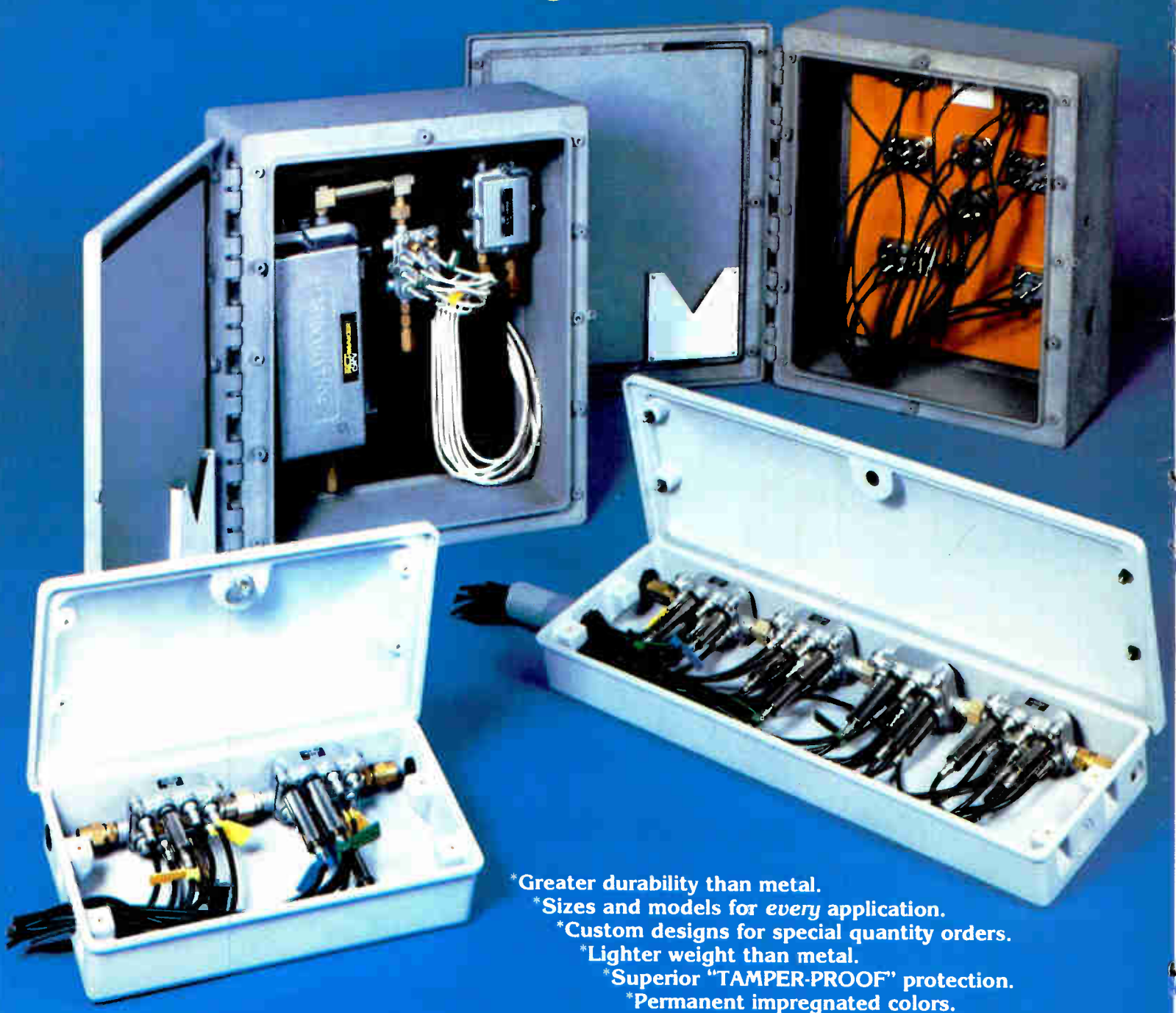

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CED

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About The Cover:

The Space Shuttle Columbia returned from a second voyage and television crews were there to cover it at Edwards Air Force Base, California. CBS News used fiber optic equipment supplied by Artel Communications Corporation for the ENG effort. Photo supplied by NASA.

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July 1982/5

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Our Agile 24 satellite receiver system makes things perfectly clear.

Standard Communications' new Agile 24M/S satellite receiver system does everything a broadcast studio model does—except cost as much.

The Agile 24M is a highly cost-effective, reliable satellite receiver featuring advanced circuitry like a fully synthesized phase-lock-loop tuning system, a pre-selector tracking filter, and a PLL demodulator. Dual conversion design converts the incoming signal twice for better selectivity and image rejection. The threshold extension circuit reduces noise by as much as 2 dB on dark scenes, delivering a static threshold as low as 5.5 dB carrier-to-noise. That means blacker blacks in dark scenes, with reduced sparkles.

The Agile 24M is a 24-channel, stand-alone master receiver with sufficient gain to drive as many Agile 24S slave receivers as required to satisfy *any* satellite communicatons system. The unique Agile 24S slave receivers offer all the operating features of the Agile 24M with the exception of the first block down converter. The active amplifier loop-through design of the Agile 24S is cost-effective, eliminating need for redundant passive power dividers.

Nearly all critical adjustments and test functions can be accomplished by accessing the front or rear panel of Agile 24/S receivers. The multi-function front panel meter permits zero tuning as well as carrier-to-noise metering, eliminating the need for special test equipment. Channel indicators display both transponder number and frequency in MHz.

The Agile 24 receiver system carries Standard's full technical support. System installation and alignment is facilitated by enlarged schematic diagrams and an illustrated technical manual. Standard's field engineers offer operator training as well as on-site repairs. Where factory service may be required, 48-hour turn-around and a loan equipment plan are available to minimize system downtime.

Look to Standard to handle all your TVRO system needs with a complete line of LNAs, down converters, earth station antennas and microwave interference filters.

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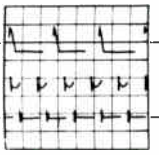


Low-Power Exemption

The FCC's rules authorizing low-power television officially took effect on June 17. The rulings carry a new exemption to the commission's ongoing freeze on station applications. Under the first-phase of several exemptions—this being tier one—applications will be accepted from areas where the transmitter site is at least 55 miles outside any of the top 212 television markets.

FCC staff members said they have received nearly 6,000 applications for low-power stations and have given approval to more than 200 so far. All of those stations are in rural areas. The commission had voted in favor of the low-power television plan last March.

Able To Leap Tall Buildings

It's not a bird, a plane or superman, but a new earth station atop Manhattan Cable's 23rd Street headquarters. The facility consists of two spherical antennas that resemble twin sloping walls. Each antenna is 22.5 feet tall and 36 feet wide, and is constructed with a series of rectangular panels on steel frames that form a reflector. The sophisticated equipment, designed and manufactured by United States Tower Company, will enable Manhattan Cable to receive transmissions from every satellite which casts a footprint across North America.

QUBE In "Beer City"

Warner Amex's QUBE is coming to "beer city." City officials gave the nod to Warner Amex, allowing it to seek a franchise in this 252,000-home city. Warner Amex has proposed a 1,165-mile plant with extensive use of fiber optic technology. The system will have capacity for 106 channels including the QUBE two-way interactive service. One hitch remains: the mayor has veto.

Solid Companies

Both C-COR Electronics and AM Cable TV Industries have recently received awards from nationally recognized business magazines. *Forbes* magazine chose C-COR as one of 27 companies from a field of more than 7,000 publicly traded securities to be recommended on the basis of earnings growth, return on equity and other criteria. Likewise, AM Cable was the recipient of an *Inc.* magazine award honoring America's fastest-growing, publicly held, smaller U.S. corporations. AM ranked 49th out of *Inc.*'s top one-hundred by posting a sales increase of $13 million (1080%) during the period 1977-1981. The bottom line criteria for both of these awards, as expressed by one observer was, "If a stock can be strong when the market is slipping, it is likely to do well when the market picks up."

Hughes Uplink Facility

NEW YORK—The Hughes Corp. has selected a depressed area of Brooklyn as the site of uplink facilities for its three new satellites, the first of which is slated for launch late next spring. The Brooklyn facility—tagged the Galaxy Satellite Station—will be one of two national satellite communications centers. Another will be constructed on the West Coast, a company spokesman said. National Satellite Services Inc., a Hughes subsidiary, will buy the city-owned property for $1.2 million and spend $15 million to build the complex. The facility, to consist of seven antennas and a 45-foot-high microwave antenna tower, will be used for satellite tracking in addition to uplinking. The project also will include a microwave network that will connect the transponder users' program studios in Manhattan to the center.

Space Call

If your long distance phone bills haven't been big enough lately, AT&T has found a new long distance service for you to spend money on. You can now call the space shuttle Columbia. If you've always wanted to be an astronaut, now's your chance; they say it's the next best thing to being there. You won't be able to actually *talk* to the astronauts, but you can listen in on their conversations via the Johnson Space Center in Houston. Beginning at 10 a.m. the day of the launch just call (900) 410-6272 and for 50 cents for the first minute and 35 cents for each additional minute, you can eavesdrop for up to 2½ hours. Listening for the full 2½ hours comes to a mere $52.65.

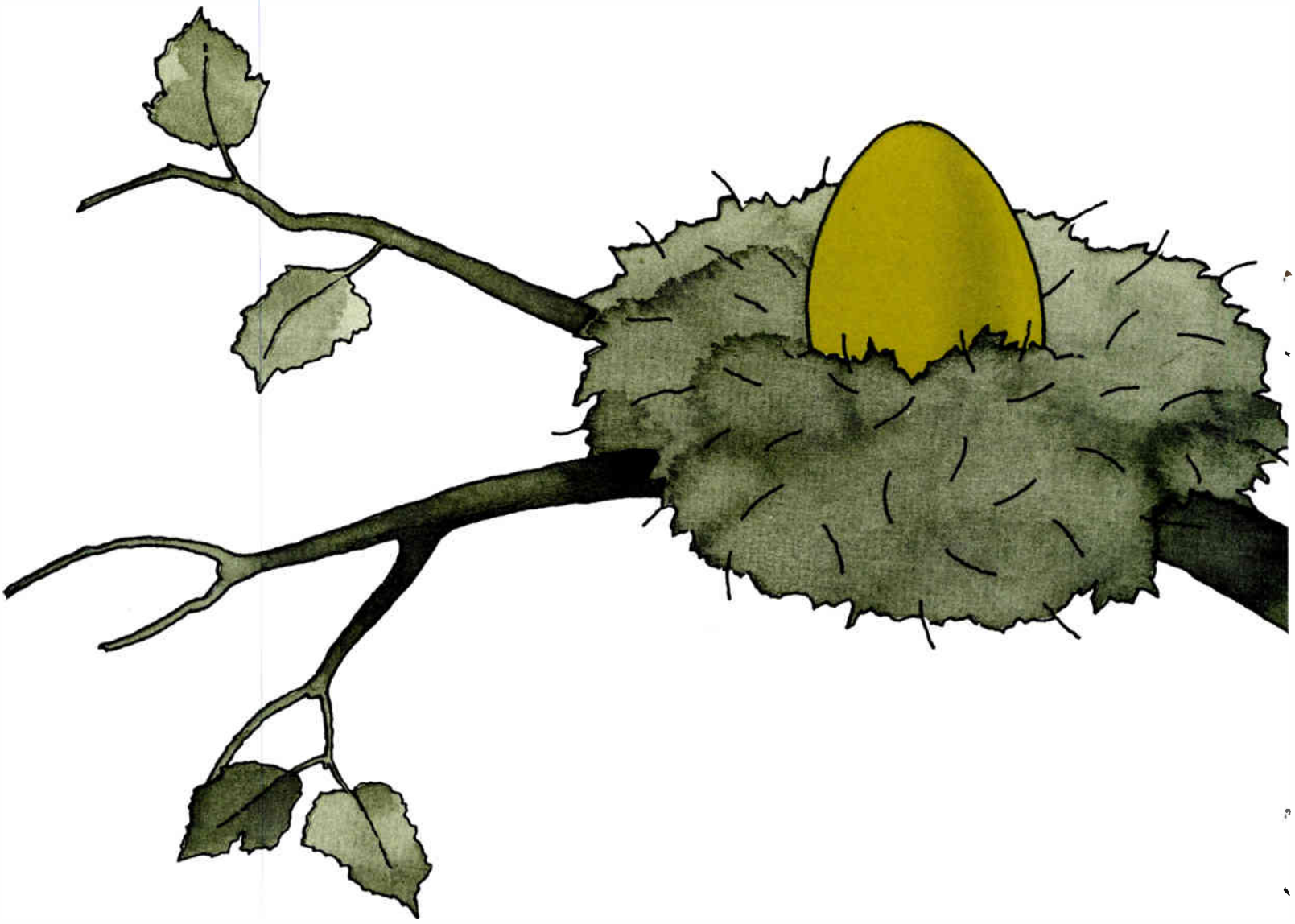
Shuttle Rate Launch

Satellite companies planning to put birds in orbit via the space shuttle may find the method more expensive than they previously anticipated. The National Aeronautics and Space Administration recently announced an 85 percent increase in the launching fees for commercial and foreign customers of the space shuttle. After introductory rates expire in 1985, it will cost $71 million (in 1982 dollars) to use the full cargo bay of the shuttle. However, it is expected that more than one satellite will be launched from the cargo bay on each flight. The charges do not include the cost of the payloads themselves or any extra propulsion systems required to boost the payloads to higher orbits after they are released from the shuttle. Communications satellite companies are expected to be among the primary users of the shuttle. The $71 million rate will be in effect from October 1, 1985 to September 30, 1988.

Father Of QUBE Stands Alone

The technical father of QUBE isn't Rubix, but James Fischer who was, until recently, Warner Amex Cable's senior vice president and chief scientist. For dreaming up all that interactivity, along with some other down-to-earth dabbling in security services, financial planning and corporate management tools, Fischer stepped forward on the closing night of the National Cable Television Association Convention to receive the 1982 Engineering/Operations Achievement Award. Now he's taking whatever blue-sky ideas he has left-over into his own consulting firm and swapping ideas with systems and ancillary data companies. Warner Amex, where Fischer spent his technology know-how since 1975, can still tap his brain for advice, or a friendly chat over cubes from that other inventor.

Addressability isn't equipment. It's a marketing concept.



It's time to think about addressability in terms of how you market your product. Your business may be great today. But subscriber tastes can quickly change, creating a new market that's not satisfied with yesterday's programming.

Addressability delivers more specialized entertainment.
Your subscribers will want selections tailored to their personal needs. They'll want a wider assortment of programming to choose from. In short, they'll want everything only addressability offers.

It pays you to go with addressability
There's almost no limit on the advanced program packaging you can sell with an addressable system. Like college courses, hobby classes, job enrichment programs, even business and personal financial programs. Plus all the revenue-building opportunities from pay-per-view, multi-pay marketing and tiering.

Make a change for the better.
With addressability, you can run cost analyses on all your programs to determine profitability. You can track viewing trends to change your offerings as the audience changes its tastes.

And when they do, you can change service levels quickly and efficiently right from the office. Only addressability puts at your fingertips an almost limitless number of ways to expand your market opportunities as well as your profit potential.

You'll be sold on Oak.
Of all the people selling addressable systems, why should you choose Oak Communications Systems (formerly Oak Communications CATV Division)? Experience. We've been involved in the cable industry as hardware/software designers and builders for over 15 years. We invented state-of-the-art addressability and introduced it in 1977.

Today, over 300,000 cable subscribers and 600,000 STV subscribers have Oak addressable systems. When you select Oak, you're in good company.

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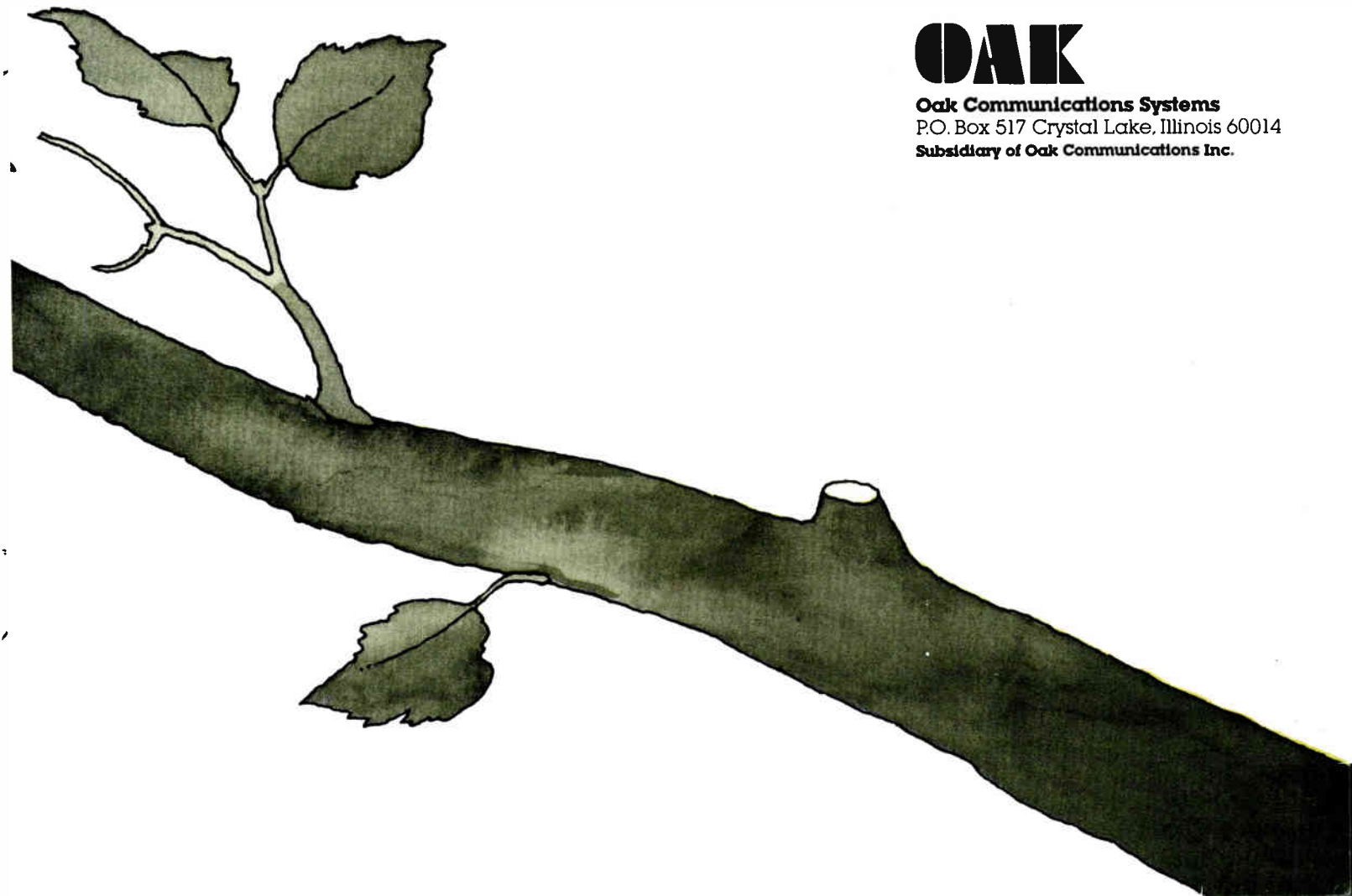
Oak: The first choice in addressability.



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At $695, SAM Jr. isn't the lowest-priced signal level meter you can buy. But it's the only low-priced meter that doesn't ask you to make sacrifices.

You don't have to give up performance with SAM Jr. The ±.75dB amplitude accuracy is lots better than the closest competitor. And it holds for the entire −35 dBmV to +60 dBmV range.

SAM Jr. doesn't ask you to compromise reliability and construction, either. The drawn aluminum case is tightly sealed and has a lexan-clad backprinted panel. Everything about SAM Jr. is built to take all the banging about a signal level meter has to expect. And it weighs less than 6 pounds.

SAM Jr. is available in a VHF version that covers 10 to 300 MHz in five bands of all-electronic tuning. (No adapters or compensators are needed). A 450 MHz range extension is optionally available. If you need to go even higher, we have a UHF version that covers the 470 to 890 MHz spectrum.

Another thing to remember: SAM's price includes rechargeable batteries and charger—usually offered as options on other meters.

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For details, contact Wavetek Indiana, Inc., 5808 Churchman, P.O. Box 190, Beech Grove, IN 46107. Phone Toll Free 800-428-4424. In Indiana (317) 787-3332. TWX 810-341-3226.

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SAM Jr. The meter by which low prices should be measured.

Seminars

July

3: The Ad Hoc Committee to form the **National Association of Radio and Telecommunications Engineers** will hold a meeting at the Red Lion Motor Inn, Portland, Ore. Contact Ray Thrower, (503) 581-4031.

9: Introduction to Digital Electronics Workshop taught by Joseph J. Carr, at the Baltimore Inner Harbor Hyatt Regency Hotel.

14-17: The **Florida Cable Television Association**'s annual convention will be held at the Dutch Inn, Lake Buena Vista, Florida. For more information contact the FCTA, (813) 688-3787.

14-17: The **Mississippi Cable TV Association**'s annual convention will be held at the Royal D'Iberville Hotel, Biloxi, Miss. Contact Susan Watts, (601) 266-4189; or Geary Stills, (601) 442-5418.

19-21: The annual convention of the **Cable Television Administration and Marketing Society**, "CTAM '82: The Winds of Change," will be held at the Hyatt Regency in Chicago. Contact CTAM, (202) 296-4219.

21: The summer conference of the **New England Cable Television Association** will be held at the Sheraton-Tara in Nashua, N.H. Contact Gary Cain, (603) 224-3373.

22-23: Telestrategies Inc. is sponsoring a seminar on "Interactive Two-Way Cable TV Technologies and Opportunities" at the Hyatt Regency O'Hare in Chicago. For more information call (703) 734-7050.

August

2-4: A **Community Antenna Television Association** basic technical seminar will be held in Boise, Idaho. Contact the CATA Engineering Office, (305) 562-7847.

4-6: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in Syracuse, N.Y. Contact Larry Richards, (315) 682-9105.

5-7: The first annual **SPACE** convention and exhibition will be held in Omaha, Neb. Contact Carole Sutter, (202) 887-0605.

8-9: Magnavox CATV Systems will be conducting a field traiing seminar with its Mobile Training Center in Syracuse, N.Y. Contact Larry Richards, (315) 682-9105.

18-20: The 1982 convention of the **Rocky Mountain Cable Television Association** will be held at the Hilton Inn, Albuquerque, N.J. Contact Oscar Davis, (505) 538-3701; or Ray Polvadore, (505) 867-4444.

22-24: The summer conference of the **Michigan Cable Television Association** will be held at the Hilton Hotel in Traverse City. Contact Sandra Applegate, (313) 235-6112.

30—September 3: A **Community Antenna Television Association** advanced technical seminar will be held in Phoenix, Arizona. Contact the CATA Engineering Office, (305) 562-7847.

September

1, 2, 3: A **Blonder-Tongue** MATV/CATV/Earth Station Technical Seminar will be held in New Orleans, La. in conjunction with Spivey-LeBoeuf Associates. Contact Glenn Stawicki or Gloria Rothfuss (201) 679-4000.

9-11: The annual convention of the **Southern Cable Television Association**, the Eastern Show, will be held at the Georgia World Congress Center in Atlanta. Contact Nancy Horne, (404) 237-8228.

9-11: The **S.B.E.** central states convention will be held at Stouffer's Riverfront Towers in St. Louis. Contact Andy Butler, (314) 644-1380.

13-15: The annual fall convention of the **Wisconsin Cable Communications Association** will be held at the Concourse Hotel, Madison, Wis. Contact Tim Hanson or Lynne Walrath, (608)256-5299.

14: The second annual dinner meeting of the **Southern California Cable Club**, with Turner Broadcasting President Ted Turner as speaker, is scheduled. Contact (213) 655-4150.

15-16: A **Blonder-Tongue** "Satellite TVRO Earth Station" seminar will be held in Lincroft, N.J. Contact George Chingery, (201) 679-4000.

15-17: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in Boston. Contact Larry Richards, (315) 682-9105.

15-17: The sixth international fiber optics and communications exposition, **FOC '82**, will be held at the Los Angeles Marriott Hotel. Contact Information Gatekeepers, (671) 739-2022.

19-22: The **Pacific Northwest Cable Communication Association** annual convention will be held at the Sea-Tac Red Lion Inn, Seattle. Contact Douglas Rice, (406) 245-3051.

20-21: A seminar entitled "Satellite Communications," sponsored by **Telestrategies Inc.**, will be held at the Key Bridge Marriot in Washington, D.C. For more information contact Telestrategies Inc., (703) 734-7050.

20-22: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in Boston. Contact Larry Richards, (315) 682-9105.

20-23: The annual convention of the **New England Cable Television Association** will be held at Dunfey-Hyannis Hotel in Hyannis, Mass. Contact Gary Cain, (603) 224-3373.

20-24: The International Symposium on Subscriber Loops and Services will be held at the Toronto Hilton Harbour Castle Convention Centre, Toronto, Ontario. For more information contact Douglas Peck at (416) 599-6840.

23-25: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in Boston. Contact Larry Richards, (315) 682-9105.

26-28: The fall convention of the **Kentucky CATV Association** will be held at the Marriott Resort in Lexington. Contact Patsy Judd, (502) 864-5352.

27-29: The annual convention of the **Minnesota Cable Communications Association** will be held at the Radisson South Hotel in Bloomington. Contact Mike Martin, (612) 861-1166.

Looking ahead

October 10-12: SCTE Fall Engineering Conference, Don Caesar Beach Resort Hotel, St. Petersburg, Florida.

October 19-21: Mid-America Cable TV Association Convention, Excelsior Hotel, Tulsa, Oklahoma.

October 22-24: National Association of MDS Service Companies (NAMSCO) Convention, Sheraton Hotel, Washington, D.C.

October 26-28: Atlantic Cable Show, Bally Park Place, Del Webb's Claridge and Brighton Hotels, Atlantic City, New Jersey.

November 7-9: Subscription Television Association convention, Los Angeles Airport Hyatt Hotel.

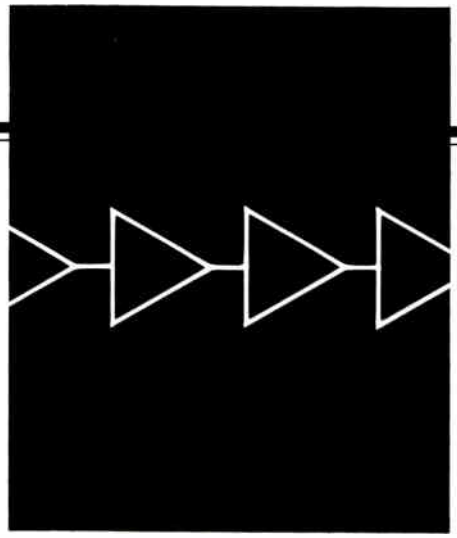
November 17-19: Western Cable Show, Anaheim Convention Center, Anaheim, California.

1983

February 2-4: Texas Show, San Antonio Convention Center.

June 12-15: National Cable Television Association convention, Houston.

How many 440 MHz amplifiers do you need to go 30 miles?



How many indeed? At two regular cable amplifiers per mile you'd need 60 of them. But you know a cascade that long won't work. All you'd get is noise and interference.

The AML alternative. If you use Hughes AML the answer to the headline question is "one." From our transmitter input to our receiver output 30 miles away, the composite triple beat and synchronous cross modulation is equivalent to just one cable amplifier.

But that's not all. Hughes AML now offers 60 channel capacity so you can deliver all the latest services. One-way and two-way transmission of video or data means you can offer local origination, institutional and subscriber interactive services. And AML handles the latest multiple tier and addressable converter scrambling systems.

Our latest but not our last model. We've never been satisfied. So every improvement we make is designed to be applicable to all previous models. We started with 12 channel capacity and worked our way up to 60. But even that first unit could be easily upgraded to match today's capacity and capabilities.

Count your customers. Then count the number of households within a 30 mile radius of your head end. Then send for more information on the amplifier with the 30-mile range: Hughes AML.

For more information on Hughes AML systems, write or call: Hughes MICROWAVE™ COMMUNICATIONS PRODUCTS P.O. Box 2999, Torrance, CA 90509, (213) 517-6233. After hours emergency service (213) 534-2170. In Canada: Micro-Sat Communications, Ltd., 975 Brock Road South, Pickering, Ontario Canada L1W3A4, (416) 839-5182.

NEW AML SYSTEM DESIGNS PROVIDE MORE THAN 160 CHANNELS

HUGHES

HUGHES AIRCRAFT COMPANY

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Editorial

Local Origination And Community Access: A Renaissance?

The franchising process in many communities across the country has committed multiple system operators and independents to providing local origination studios and equipment both for their own commercial use and the use by community groups through access channels. This issue of **CED** magazine features several articles that will be of interest to system operators currently operating, or soon to be operating, local origination services. The article by Richard Cerny of Artel Corporation offers technical information on the use of fiber optical equipment in remote ENG production with all the advantages of freedom from EMI and RFI that fiber optics bring. Tom Garofalo's article presents a good breakdown of the equipment required for local origination and their costs for the operator planning to offer LO facilities. The Product Profile this month features a list of two-camera remote mobile production vans including all the equipment specified by the various design and sales companies along with a single package price.

In earlier years, system operators who had local origination capabilities often lost money on them and many eventually shut them down. Due to franchise requirements, local access channels continued to be available but little interest was shown in them by the operators. But over the past couple of years, new interest and support is evident, due in part to new franchise requirements. Greater potential exists for local advertising on LO channels, as well as increased availability of programming sources, including teletext. System operators seem to have a greater awareness of the public relations potential for their system in the community they serve and are providing increased support for community access and use of their facilities. Local origination is no longer an afterthought.

And rightly so. A random telephone survey of cable television subscribers in the East Lansing, Mich., area in 1979 revealed some interesting numbers. Of the subscribers contacted, 75 percent were aware of community access channels and 53 percent watched regularly. Cable systems elsewhere are experiencing similar viewership.

Many system operators will say they are required to provide community access channels and equipment but that they are seldom used. While one hears this complaint much less often, one wonders whether it is true or just a cop-out because operators would rather not be required to offer community access.

An example of community use of the access equipment in a typical local system that seems to refute that complaint is the experience of Austin, Texas, Community Television. Operated by volunteers on a shoe-string basis, the logs of equipment checked out by community groups showed that in 1981, 1,295 entries were made. The editing equipment was in use for 5,414 hours in that year. Such high volume of use is indicative of the community's interest in having the equipment available to them. With greater support from system operators, use should increase.

According to Sue Buske, executive director of the National Federation of Local Cable Programmers (an organization now numbering over 3,000), local access programming not only raises the cable system's image within the community by presenting programming that is community oriented, it also gives the system more visibility in a tangible way. With community groups and their leaders actually going to the system's studios for access productions, the image of the system playing a real part in community activities is impressed on all participants. Also, Buske points out that if community groups are creating their own productions, there is a greater likelihood that those same groups will watch the productions on access channels.

Whether a renaissance is occuring in local origination and community access programming or not may be debatable. Is it strictly franchise requirement-driven or does the community demand it? System operators will not know the answer unless they give their full cooperation to community groups. Part of this support must come from the corporate offices of the MSOs in the form of employment of local origination specialists who can assist the system operators with community relations efforts and coordinate the access and use of the facilities.

George Sell

CED

Volume 8, No. 7

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Baby Bell Off To A Crawling Start

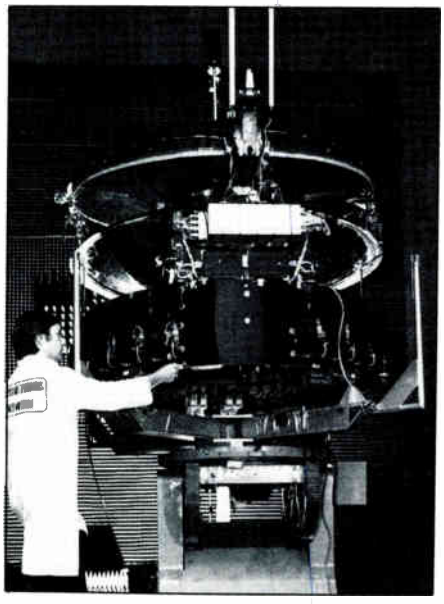
NEW YORK—American Bell, better known as "Baby Bell" the new AT&T subsidiary created for operation in non-regulated telecommunications markets, announced at a press conference here June 15, that it will be capacity-limited for the first year as it works out the bugs.

The Advanced Information Systems/ Net 1, the company's first technical offering, is a communications processing service that provides data storage and transmission, data programming capability and the management of data communications networks. Connection is through a common carrier, possibly including cable TV, which will provide an access line to one of 17 proposed service points nationwide. At the service point the necessary translations of various protocols used by data processing devices takes place and access to processing and storage are provided. A common carrier packet network is used to transport data among service points.

The actual program suitable for direct communication betweeen the user's device and the service point is stored by Net 1 and is user-programmable. The translation for interconnect compatibility is performed by Net 1. According to Sal Barbera, Chief Executive Officer for AmBell, Net 1 will do for data communications what the switchboard did for telephone.

AT&T Chairman Charles Brown, in his introductory remarks said, "At the risk of sounding overly dramatic, this is a major moment in our long history. It is the end of a long road towards establishing the Bell System on an equal footing with its competitors." Equal footing or not, the foot itself seems rather big. But, at least with this first offering, cable television does not appear to be targeted as one of the competitors. In fact, company officials stressed that if anything, CATV may be a likely customer for the service.

It seems AT&T's strategy for the future, with Net 1 as the cornerstone of their new enhanced services, is to seek control of the market for managing database access, storage, translation and transmission for the medium-to-small network user. But in this first year of operation, American Bell will be capacity-limited and is seeking use of the system by many users. AT&T officials said, "We are seeking feedback from users."



A Hughes Aircraft Company engineer adjusts one of 24 traveling wave tube amplifiers during a test of the communication equipment of the Westar V satellite. The layered "heart" of the communication satellite includes the electronics shelf (lower portion), the thermal barrier and the antenna reflector, which is shown in its folded position. Westar V, which was launched June 8, was built by Hughes Space and Communications group, El Segundo, California.

Westar V Joins The Cable Flock

CAPE KENNEDY—With the successful launch of Westar V last month, Western Union—the only domestic satellite carrier to have five orbiting birds—is on the way to becoming a major carrier of cable signals.

Put in orbit June 8, it is the third cable-carrying satellite to launch in six months. Satcom IV came before it in January, and Westar IV went up in February.

Weighing in at 422,700 pounds, the bird will travel at 6,876 miles per hour for 10 years. Without expendable parts and fuel, the satellite is slightly over 21 feet long and weighs 1,287 pounds. Stationary for the month of June for testing puposes, it will soon drift to its permanent slot, 123 degrees west longitude. Transmission is expected to begin this month.

Longest Glass Link

BALTIMORE, MARYLAND—A contract has been signed by Times Fiber Communications Inc. to supply Caltec Cablevision of Baltimore County, Maryland with the world's longest cable televison optical fiber system. The system, with approximately 32½ miles of optical fiber, will include four headends, three of which will be linked by the glass fiber cable. Each headend will have a 30-channel capacity.

For the entire 32 miles only 13 repeaters will be required as opposed to an estimate of 47 cable amplifiers. According to James Wright, vice president of engineering at Caltec Cablevision, fewer active electronics means, "a far more reliable system." The estimated cost of the system: $750,000.

STV Deregulation

WASHINGTON, D.C.—The deregulatory mood is going strong in Washington. In line with efforts to promote competition within the new technologies and television in general, the Federal Communications Commission has voted to eliminate certain regulations governing subscription operation. The commissioners unanimously approved the deletion of:

- Restrictions limiting STV operations to communities within the grade A signal contour of at least four commercial TV stations (known as the "complement-of-four rule").
- The requirement that an STV station broadcast at least 28 hours of conventional programming per week.
- The requirement stating that STV decoders must be leased and not sold to subscribers.
- The requirement that STV applicants ascertain the community's needs and interests regarding STV programming.

Justification for the relaxation of the rules was to foster further growth by STV, primarily so that it could get "an equal footing with conventional television," according to the commission. The FCC also concluded that elimination of the 28-hour requirement was reasonable because the non-pay programming offered by the STV operator provided no "concomitant public-interest benefit." As a result, it is expected that many operators will put an end to their non-pay programming, opting to expand the number of hours for the subscription service.

Whatever the reactions from the STV industry, the cable industry must realize

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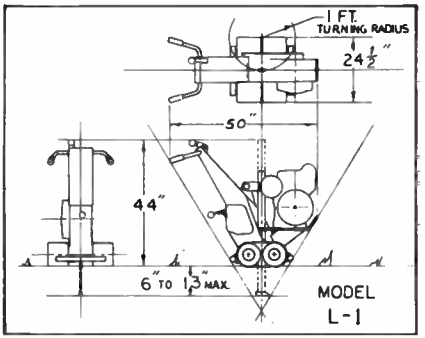

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that it can now expect further competition from that medium. Presently, there are 27 STV stations operating in 18 different markets, serving over 1.3 million customers. With 503 vacant TV channels, the majority of which are UHF, the rush to secure one for an STV service may well increase paperwork for the commission and worries from the cable industry.

Business Notes

★ **Multimedia Cablevision Inc.**, Wichita, Kan., has chosen **Scientific-Atlanta Inc.**, to supply security monitoring equipment for its new security division. The security division, Multimedia Cable Security Services Inc., plans to operate in most of Multimedia's 88 franchise areas. The initial purchase includes a central station consisting of a central monitoring computer, two line printers, two CRTs and a microprocessor-based headend scanner. Multimedia Cablevision has signed a four-year agreement to purchase Scientific-Atlanta subscriber transponders, which provide the interface between the monitoring system and residential alarm systems.

★ **Antenna Technology Corporation** has received a blanket purchase order from **General Electric Cablevision** for an unspecified number of Simulsat multiple beam satellite earth stations. The order, to be completed within six months, will place Simulsat in more than half of the GE Cablevision systems.

★ **TCS Engineering Services Inc.**, a CATV service company specializing in strand mapping, make-ready survey, as-built and system design has just opened in Houston, Texas. It is headed by Robert Almy, who has been involved with some major MSO's for the past five years. The company's office is at 6420 Richmond Ave., Suite 540, Houston, Texas 77057; phone (713) 781-9907.

★ **Tribune Company Cable Inc.** has changed its name to **Tribune Cable Communications Inc.** The company also announced another name change within its systems. **WGN Electronic Systems Company** is now **Tribune Cablevision Company**.

★ **Chyron Corporation** has announced the formation of a new cable/video products division to address the graphic requirements of the cable television industry. The new cable/video products division will initially offer cable stations complete low-cost character generating systems.

★ **Comtech Antenna Corporation** has filed, with the FCC, transmit and receive antenna patterns for its 3.8 meter reflector system. The filing conforms with both the present (32-25 $\log_{10}\theta$) and proposed (29-25 $\log_{10}\theta$) near-in sidelobe standards of paragraph 25.209 of the Federal Communications Commission Rules and Regulations.

★ **S.A.L. Cable Communications Inc.** has reported sales of $7,661,000 and earnings of $154,000 for the three months ended April 30, 1982. For the same quarter a year ago the company had sales of $5,327,000 and earnings were $223,000. Per share earnings for the quarter were 12 cents based on an average of 1,249,950 shares outstanding compared with 28 cents based on 800,000 shares last year.

★ **Orrox Corporation** announced today that its **SATCOM** subsidiary has received an initial $342,000 order for SATCOM's low-noise down converter (LNC) for 4 GHz transmission reception. The order is from a company serving the home television market, and follows their evaluation of the SATCOM technology and receiver system.

★ **Microdyne Corporation** has reported sales and earnings for the second quarter ended May 2, 1982. Sales decreased to $5,873,542 compared to $7,404,710 for the second quarter ended May 3, 1981. Net income decreased to $483,967 compared to $940,100 reported for the comparable quarter last year.

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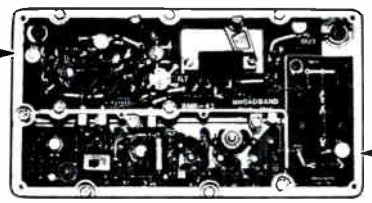

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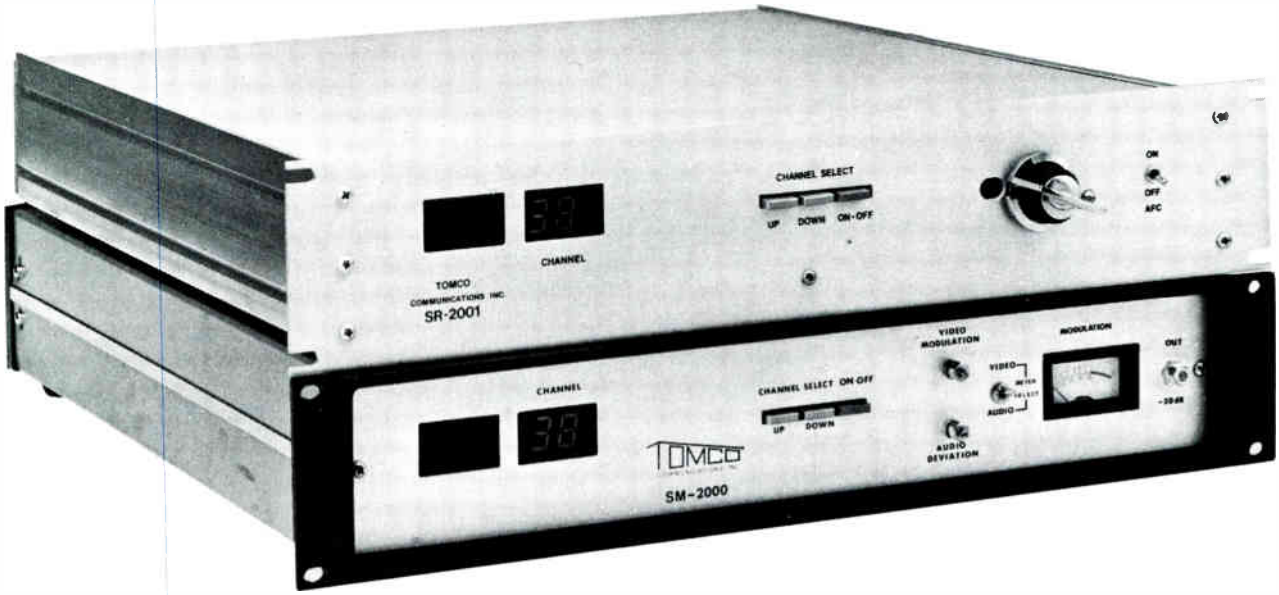

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Using Fiber Optics In CATV Local Origination

Fiber Optics Are Beginning To Have An Impact In CATV, But Not In The Application Areas Originally Expected. One Of Those Areas Is Local Origination.

By Richard Cerny and Tad Witkowicz, Artel Communications Corporation, Worcester, Massachusetts

Fiber optics have met with slow acceptance in the cable television industry, primarily because low grade video could be distributed to the home more economically via broadband coaxial cable. The applications to date where fiber optics have excelled are in the long haul trunking of video, where coaxial cable runs into severe noise problems due to attenuation and repeatering. Now, with the advent of "localism," fiber optics are being used as part of the EFP transmission mix, along with microwave, coax and multipair cable.

With the growth in electronic field production in local franchises, the technical equipment needs of the CATV operator come closer to those of the sophisticated television broadcaster. Local events, such as high school football games, may be covered by single or multi-camera remotes, and recorded or transmitted live from the van to the studio via microwave. Fiber optics are now finding their way into television field production as a means of transparently extending the camera-to-van distance, while improving performance and saving time and money.

Lightweight, Fast Set Up

Fiber optic cables are extremely lightweight and rugged, and can allow the ENG/EFP crew to roam up to two miles away from the truck or car, around any corners or obstacles. Coaxial cable and multiconductor cables are limited to around 500 feet before degradation becomes severe, although longer distance can be achieved with the introduction of equalization, which is also expensive and increases noise. Fiber optic cables save the time and expense of equalization, since fiber attenuation is constant regardless of frequency.

Fiber cable allows the crew to set up much faster than with coaxial cable, since the cable is lighter (only 5 lbs/1000') and significantly easier to install. Portable fiber optic terminal equipment is quickly plugged into the ENG/EFP camera and at the recording or microwave end. One non-technical person can carry and set up the whole system.

The fiber cable is a dedicated video/audio link between camera and control center, without the line-of-sight restrictions of microwave and without the interference potential. Fiber optic cable is immune to EMI, RFI, crosstalk interference and hum problems.

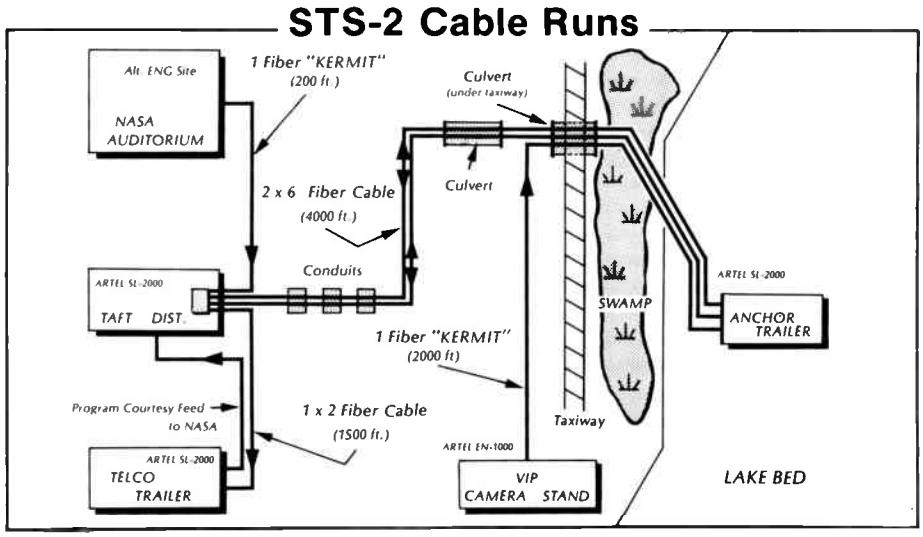
Fiber EFP vs. ENG

The transmission of video and audio in CATV remote field production can be categorized in two ways: single camera or multi-camera. Single camera transmission is a simple camera-to-van transmission of studio quality video and audio, much as a 13 GHz "window" microwave accomplishes in electronic news gathering (ENG) remotes. Return intercom is normally sent through walkie-talkies.

Multi-camera EFP has additional signal requirements in that all cameras must be synchronized with each other through the genlock return signal. Since video and audio can be simultaneously transmitted on a single fiber, return intercom and interrupted program feedback may be sent back to the camera location on a second fiber in the same cable.

In order to take advantage of fiber optics, one need not make any equipment changes other than the addition of a fiber optic system. If the proper choice is made, the fiber optic system is totally compatible with the EFP equipment now in place.

The fiber optic transmitter is a paper-



In CBS News Space Shuttle landing coverage, all broadcast video and audio signals pass through the fiber optic network, several of them twice. Valtec trunk cables and General Cable feeder cables interconnected Artel card frames and portable units located throughout the facility.

A CBS News technician hand pulls 4000 feet of twin six-fiber trunk cable through swamp, culverts and desert floor at Edwards Air Force Base.

back book-sized unit that fits right onto the camera, or clips onto the cameraman's belt. The transmitter accepts 75 ohm video and 600 ohm balanced audio and turns it into a composite optical signal. The fiber optic cable attaches to the transmitter through a standard stainless steel SMA-type optical connector. The transmitter is powered right off the 12-volt camera battery.

The fiber optic cable runs a kilometer (3281 feet) to the van (a car may now be used instead because there is less cable size and weight to transport). If more distance is required, another kilometer of cable may be added by simply "barrelling" the connectors together. A one-kilometer reel of cable can easily be carried to the scene while paying the cable out, because the cable weighs only about 25 lbs. reel and all. The cable is rugged enough to withstand pulling, bending and crushing, and can be laid wherever coaxial cable is normally run. Fiber cable may be permanently installed in locations where repeat broadcasting originates, such as the city hall, auditorium or sports arena. Fiber optic terminal equipment may be then brought in and plugged in before the event begins.

At the receive end, the optical signal is reconverted into the respective electrical video and audio signals by the receiver which may be mounted in a compact modular 19-inch card frame or in a portable battery-powered unit similar to the transmitter. Return genlock and voice signals may be similarly routed back to the camera over the second fiber in a duplex fiber cable.

Networks Using Fiber For ENG/EFP

An excellent example of fiber optics in ENG/EFP is CBS News' use of Artel's fiber optic system as its sole interconnection medium in televising the second Space Shuttle landing at Edwards Air Force Base, California. CBS News proved that fiber optics are a totally transparent medium for broadcast quality video and audio, and that fiber optics dramatically decrease set up costs. The 68% set up time savings (12 man-hours vs. 80 for coax) represents a large percentage of the Artel equipment costs. CBS News used fiber optics for virtually every aspect of the broadcast including the trunking of NASA feeds to CBS, mobile ENG coverage and trunking of the switched resultant broadcast signals to Pacific Telephone Company microwave facilities a mile away.

CBS News has since used fiber optics for follow-on Space Shuttle landing telecasts and remote news gathering, such as coverage of President Reagan's

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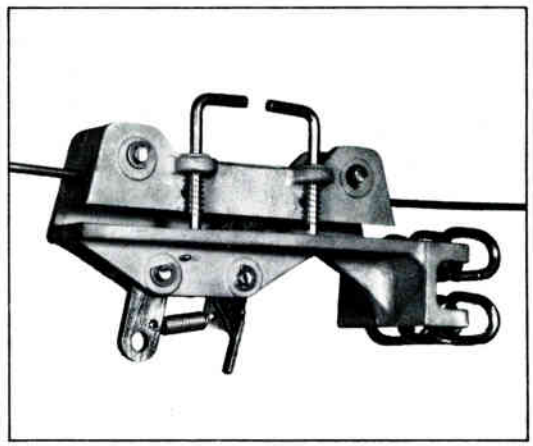

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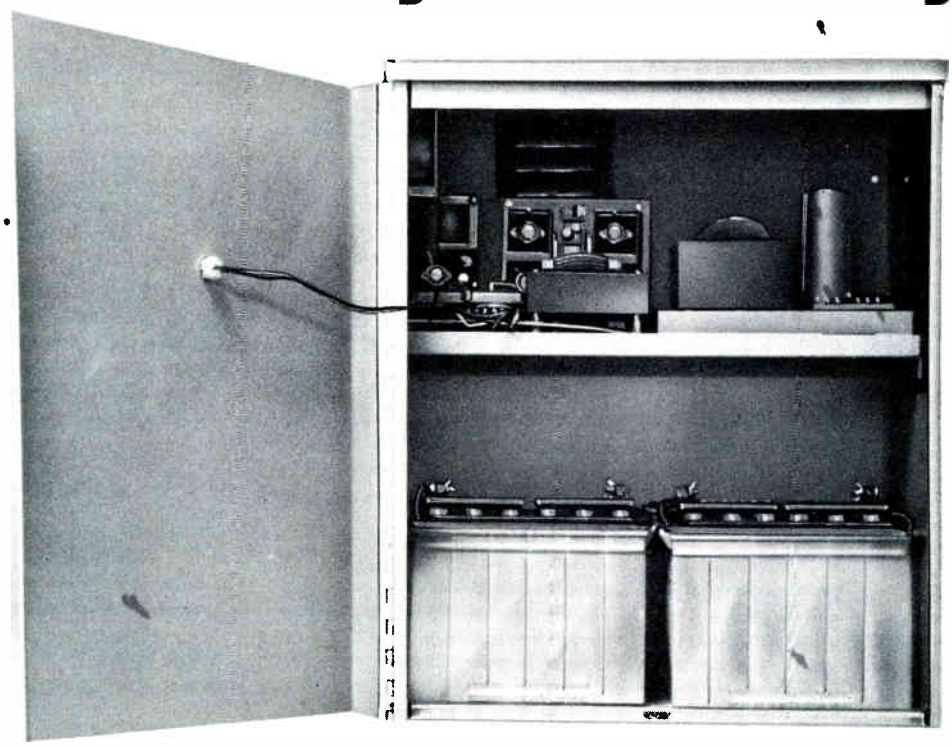

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Following lab approval, ABC News began using Artel's portable fiber optic systems for ENG/EFP. ABC News' first use of the system was in the live interview of former President Jimmy Carter from Plains, Ga., during a recent *Nightline* program on ABC. The Artel EN-1000 link was used to transmit video and audio from Mr. Carter's office, approximately 3500 feet from the Plains, Ga., water tower Southern Bell microwave relayed the program back to New York, where Ted Koppel conducted the teleconference interview.

ABC News used a 3600 foot (1.1 km) reel of single fiber, which was strung on telephone poles and tie wrapped to existing cables for the temporary feed. Prior to the broadcast, this temporary set up withstood a severe rain and hail storm as well as hot sun.

While fiber optics are experiencing excellent successes in satellite up/down link interconnects and in video-based local networks, mobile field broadcasting applications uniquely demonstrate nearly all the advantages of fiber optic video/audio transmission, including size, weight, frequency response, low loss, noise immunity and electrical isolation. Fiber optics will not be replacing all the coaxial cable or microwave links in remote CATV teleproduction. For very short distances coaxial cable is still an inexpensive medium. Microwave will continue to be used in one-way links where cable cannot be run. However, microwave frequency congestion will increasingly limit the broadcaster's ability to keep pace with the new demands of the industry.

Fiber optics have already proven their value in network television broadcasting. They will continue to have their impact in the more demanding transmission applications, and where cost, quality and convenience are key factors. Fortunately, there are commercially available systems and hardware that make the transition economical and easy.

Richard Cerny and Tad Witkowicz are the founders and chief operating officers of Artel Communications Corporation. Cerny was formerly marketing director of the fiber optic communications department for Valtec Corporation. Prior to that he worked with Corning Glass Works telecommunications products division. Witkowicz was formerly manager of fiber optic systems design for Valtec Corporation. He has done system design and engineering for Bell Northern Research and has designed several major fiber optic transmission systems including the terminal equipment for the Northern Telecom/Bell Canada fiber trial in Montreal.

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"Other suppliers had sold us gear without proper testing," adds Trednick. "We even experienced failure rates as high as 75% with some of the non-RCA equipment. With RCA, we received excellent service."

The residents of the St. Marys area and of the new Navy base under construction nearby enjoy the benefits of the 20-channel system. As residential expansion continues, Don Trednick's Kings Bay Cable Television System will be on with its RCA custom headend reliably meeting the programming requirements.

New RCA 400 MHz Converter 58-Channel Digital Control

RCA Cablevision Systems has introduced the new push-button KS series of remote-tuning, set-top converters. The KS series 58-channel (400 MHz) converters utilize the latest digital technology, featuring a microprocessor design that incorporates frequency-synthesized tuning and AFC for automatic, precise channel tuning.

The converters are field-switchable for standard, HRC and IRC channel assignments, eliminating the need to stock three different configurations. The field-programmable, all-channel, in-band decoder option accepts up to 16 levels of pay programming for optimal flexibility in tiering of services. RCA's unique new design provides simple, highly secure authorization of desired channels. The units have been designed to add a future addressability option that will provide control of subscriber service from a central office. An electronic A/B switch option expands the converter capability to 116 channels for application in dual cable systems. The memory of the RCA KS converter is capable of storing 15 channels which can be randomly selected from either the A cable, B cable, or both.

The new KS series converter joins the RCA family of subscriber devices. The M series of set-top converters now includes a 58-channel model. This series is distinguished by its compact, elegant design. The M series converters are available for 300 MHz applications.

For operators desiring to add premium channels to existing systems with converters, or who have 12-channel systems, RCA has its Encoder/Decoder system.

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CATV System Maintenance

A New Perspective On Maintenance In The Pre-Adjusted, Self-Regulating CATV System.

In the long term operation and maintenance of coaxial cable RF transmission systems we can clearly identify two major functions. The first of these is maintaining the continuity of service to subscribers and usually involves emergency response to service interruptions such as might be caused by failure of an amplifier, etc. The second major consideration is concern for the quality of transmission through the system. The required operations involve readjustments of equipment, quantitative measurements of signal levels and some analysis or judgment to ensure that readjustments do not compromise end-of-system transmission quality.

The level of sophistication required both of test equipment and maintenance personnel to satisfy both requirements is distinctly different. If this distinction between *service restoration* and *transmission quality* functions is valid it might be useful to examine each separately in some detail.

Service Restoration

We can logically assume that service interrupting outages will be predominately massive failures or gross irregularities in the system rather than gradual or minor variations in transmission levels. Might we further assume that service restoration will be by far the majority of emergency "call outs"? Service restorations can be sub-divided into basic work operations that are quite different in nature.

Fault Location

Obviously the point of system failure must be located and the ease and rapidity with which this can be accomplished will have a direct bearing on subscriber satisfaction. If we could expedite fault location it would be most beneficial.

The most common practice in CATV systems today is sectionalizing the loss of transmission by visiting intermediate stations and verifying by measurement the presence or absence of RF signals. By subsequent sectionalizing, the actual point of failure is eventually identified. One disadvantage of this technique is the mechanical disturbance of properly operating equipments as well as the travel time and exposure of personnel.

Recently, several status monitoring systems have been offered on the market to facilitate fault locating, but the sophistication and cost of such techniques is an important consideration for operators.

A possible alternative to this technique might be a method of discriminate, controlled, intentional leakage of RF energy out of the system. Adapting the techniques and equipment available for RF leakage testing, if we introduced into the system a unique, relatively low level signal within the FM band, and at selected equipment locations coupled some of this carrier through a restrictive band pass filter to a small radiating element, a receiver in the service vehicle tuned to that carrier could give audible indication of RF continuity in the system at normal driving speeds as the location was passed. Whatever a status reporting systems capabilities, however sophisticated or accurate, the response mechanism still requires the service person to travel to a specific location and in the course of such travel he must inevitably pass sections of the plant. The new technique would require some indication of loss of RF at the system extremities and, that same indication, transmitted back via coax cable, radio, leased pair or whatever, could be used to turn on the fault locating tone automatically. Thus, when the service person has restored continuity through the entire system, the end-of-system sensor would react and disable the fault locating tone automatically. This would be a positive indication that end-of-system service had actually been restored, eliminating, for example, confusion from two separate but concurrent outages.

Such a device would be completely passive at all radiating locations and could be discriminately employed almost anywhere in the system including the unused ports of subscriber taps if desired. Such a device would also be quite inexpensive and would require almost no maintenance.

Isolating Failed Equipment

After identifying the specific equipment location causing the interruption of service, the required function now is a determination of which item of equipment is at fault. Note that this determination does not demand a precise, quantitative measurement of RF signals or, for that matter, of AC or DC voltages. Their mere presence or absence is usually sufficient for positive isolation of the failure with some qualification.

Although it is common practice to utilize a Signal Level Meter (SLM) for such determination (together with a Volt-Ohm meter perhaps) this equipment is costly and fragile, and the accuracy can be questionable. We might consider a much lower level of sophistication in the form of a "Go-No-Go" device which simply indicates presence or absence at perhaps one or two discrete thresholds of level. Such a device might utilize Light Emitting Diodes (LEDs) as indicators and could be designed to satisfy AC and DC test requirements as well.

The lack of quantitative measuring capability will preclude service personnel from precise adjustment of a replacement unit, of course, which again is the common practice in CATV system maintenance. For the moment, let us assume that replacement equipment actually required no field adjustment. We realize that this is a radical departure from past practices, but if this were possible the advantages might be very attractive indeed. Service outage response could be effectively provided by relatively unsophisticated personnel using inexpensive, "rugged" devices with a high degree of confidence.

If transmission "quality affecting" field adjustments could be minimized or eliminated entirely, larger CATV operations might find manpower requirements easier to satisfy. Smaller, marginal rural situations

in which fully competent people may be completely unavailable or unaffordable may benefit likewise. We might explore this further by addressing the second primary service function; protecting and maintaining system transmission quality.

Transmission "Quality"

At first glance, since the responding personnel are at the equipment location anyway, it seems reasonable to simply rely on them for proper adjustment of any replacement units. This is the general practice in the CATV industry today. This does not necessarily escalate the relatively simple service restoration function to a "quality affecting" level. However, with a lead technician or comparable service personnel designation this is no real problem. But with lower levels of experience or knowledge we might not dismiss the consequences so lightly. Just what is involved in equipment adjustment?

First, of course, we introduce quantitative measurements using a meter of some sort with the concerns of fragility, expense, and calibration. And we introduce the possibility of misinterpretation particularly if the person involved is infrequently required to use the test equipment. In trunk plus feeder designs there may be several different operating signal levels for several different pieces of equipment. Someone less sophisticated or less familiar with the system may inadvertently introduce incorrect signal levels. Such errors, however small, could compound over a long period of servicing time which involved several such improper adjustments. The end result might not be an interruption of service, but a gradual degradation of the quality of that service.

But there is quite a bit more sophistication required. Consider the replacement, on an emergency restoration basis, of an Automatic Level Control (ALC) or Automatic Slope Control (ASC) unit. Locating the point in failure is essentially the same process, but the possibility for *not adjusting the replacement unit properly* is substantially higher. The correct adjustment of this equipment must take into consideration the temperature of the coaxial cable itself since this affects transmission loss and consequently input signal level to the unit. Confusion, error, or complete omission of any compensating correction can have a substantial effect on end-of-system quality.

This writer has, at an industry gathering, briefly polled 8 or 10 "old pros" with this question: "Of all the Automatic Control units in service, in all the coaxial plant in use in this country today, how many units would you assume to be improperly adjusted?" The concensus of opinion was more than 55% with some individuals indicating as much as 65%. But by design, in almost all of that plant, the Automatic Control units have been installed as infrequently as possible. Considering the factors of cable length and anticipated temperature excursions, etc. Automatic Control has been provided to accommodate for this. But that engineering judgment was based upon each Automatic Control device providing some consistent capability or range of correction, was it not? In practice, and particularly following a series of possibly (judging from the mini-survey) incorrect adjustments, the self-regulating capability of the system may well be less than adequate under extremes of temperature. We may have just been lucky in that the designs for Automatic Control have been sufficiently conservative to tolerate this loss of self-regulation, but it is equally possible that end-of-system "quality" has actually been compromised in many cases.

Again, given large revenue base operations which can support some depth in technical staff, the problem may not arise at all. But in smaller operations we enjoy no such assurances and eliminating (if possible) or minimizing quality affecting equipment adjustments may well be the wiser course of action.

Ideally, replacement equipment should require a minimum of *in field* adjustment and as little personnel as possible. It should tolerate a wide range of signal level variations with maximum protection or preservation of the "quality" of transmission at the end of the system. Can any such ideal situation be achieved?

Simplified Maintenance By System Design

In the design of any CATV system, ignoring economics for the moment, it is certainly possible to design an entire system utilizing only one, identical type of equipment at every amplifier location and to operate all such equipment at identical input and output levels. Quite obviously, the logistic advantages (in equipment spares inventory, etc.) would be attractive under such conditions. If the argument for the use of Automatic Control units has any validity, we might also design for a much higher level of self-regulation in the system without violating this principle of identical input and output signal levels.

If all system amplifiers are, in actual practice, presented with identical input signal levels and producing identical output levels, then perhaps replacement units for service restoration spares might be preadjusted under controlled, ideal conditions and then employed as direct "plug in" substitutions requiring no field readjustment whatever. This might relieve us of the necessity for precise quantitative signal level measurements. We certainly could approach service restoration work with a much lower level of personnel sophistication.

However, in the conventional trunk plus feeder designs for high density urban situations, deviating from the multiple transmission level design philosophy to amplifiers with standard operating levels is unrealistic. The economic advantages of trunk/feeder, given urban demographics, are decisively persuasive. We agree with this conclusion. A greatly simplified maintenance technique, even strictly limited to urban feeder plant, if demonstrated to be technically feasible, would suggest review of urban feeder designs might well be appropriate.

For the smaller operations, and particularly the truly rural installations, the concept we have outlined is by no means academic. The REA design does actually employ a single, identical amplifier at all locations. And with some minor exceptions for mildly dense situations, this design operates all amplifiers at identical input/output levels.

Although a much higher level of Automatic Control Self-Regulation is designed into REA systems it is not necessarily controlled at every single station. But in any event, the gain of each amplifier (AGC, ASC or manual) is still taken to be the same for nearly all amplifiers and thus the practicality of preadjusted, plug-in replacement is more realistic.

The basic, elementary idea is to "ruggedize" the system such that end-of-system performance is maximally protected against signal level variations. If we can provide a high level of "invulnerability" then we might tolerate the lack of precision in maintenance procedures. Even if some initial construction cost penalties were incurred (more frequent AGC, for example) such penalties might be offset across several years of lower maintenance costs.

Preadjusting Amplifiers

Let us review an actual field test REA conducted. By design, this system required +10 dBmV input to each amplifier gain module and +40 dBmV output. The input signals are equalized within the amplifier housing to present a "flat" input, that is, all RF carriers were of equal amplitude, or as nearly as possible, at the gain module input. The output signals were "tilted" 5 dB across the transmission bandwidth which in this case was 50 to 220 MHz.

This particular system was designed with AGC and ASC control in every amplifier, but the procedure followed during bench preadjustment would have been the same even if every other, or 2 out of 3, system amplifiers had been manual control types. The procedure was to set up and power, on the test bench, an amplifier housing. The unit under test (in this case an AGC module and a gain module treated as a set or matched pair) was equipped with a 0 dB pad and equalizer. Headend RF signals were presented to the input of the amplifier with all RF carriers adjusted to an identical +10 dBmV level.

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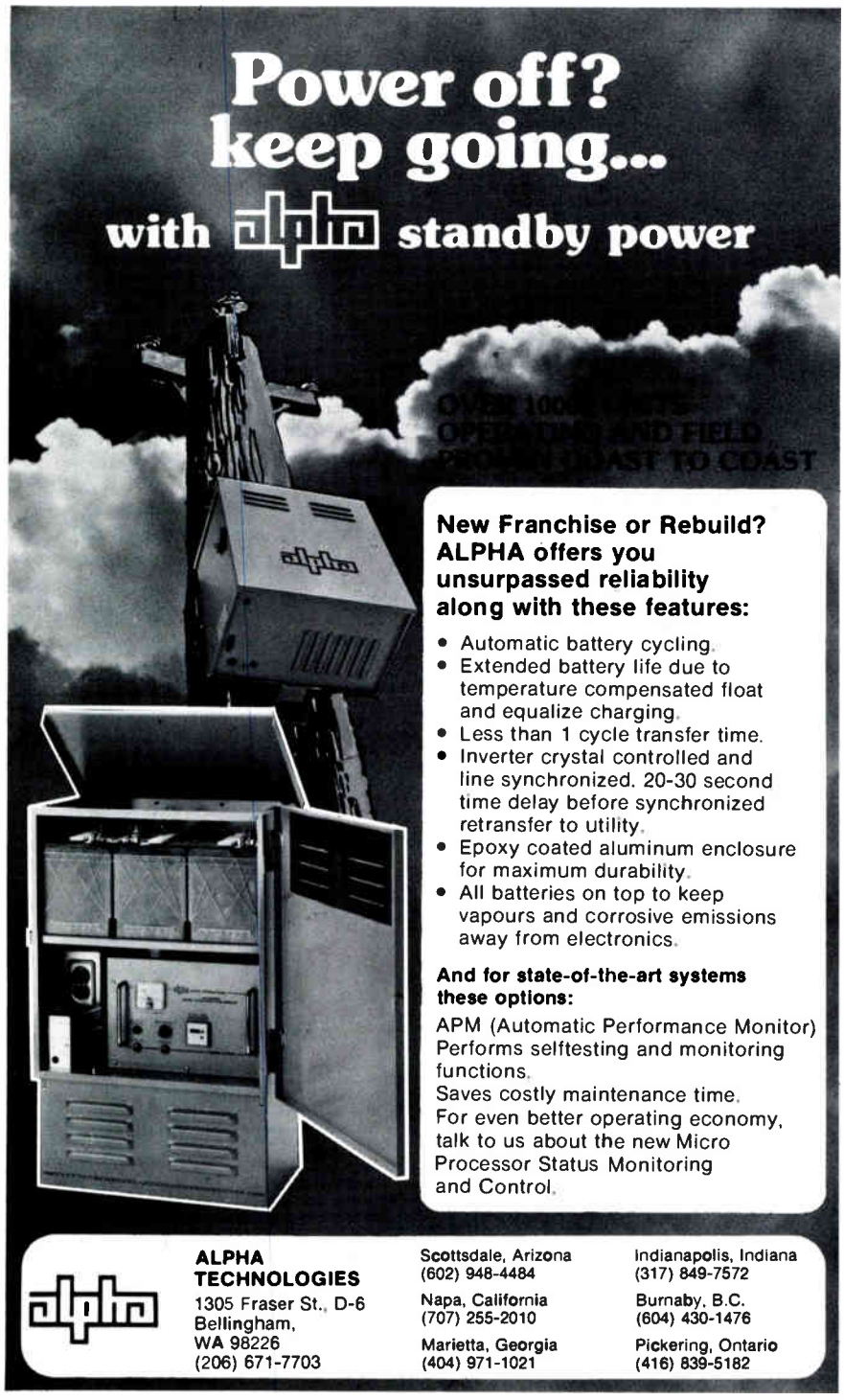

In the manual mode the amplifier was adjusted for +40 dBmV output at Channel 13 (211 MHz) and with "Tilt" such that Channel 2 (55 MHz) was 5 dB lower. In the Automatic mode the AGC/ASC module was adjusted to duplicate this output condition. Then an adjustable attenuator was inserted into the test setup just ahead of the amplifier and input levels were manipulated 4 dB above and 4 dB below the normal +10 dBmV input level. Output level was monitored for corrective readjustment by the Automatic Control unit during these manipulations.

This amplifier was then considered properly adjusted for field installation. If the system design had called for manual control amplifiers they would have been adjusted precisely the same way except no automatic mode adjustments or testing would have been necessary.

Field Installation Operation

The premise is that if input signals at each amplifier location in the system can be made identical, or nearly so, with the input signals applied to the units during preadjustment on the bench, then the units may be interchanged in the field with impunity and end-of-system transmission performance would be unaffected. This would be so even if no quantitative signal level measurements or no readjustments in the units were made in the field.

At each amplifier location a preadjusted unit (consisting of AGC and gain module) was installed in the previously powered housing. RF input signals to the gain module were measured and recorded by means of a Signal Level Meter individually tuned, in turn, to each visual carrier present. An equalizer was selected which most nearly provided a "flat" input to the gain module; that is, all RF carriers were of equal amplitude or nearly so at the gain module input.

A tentative pad selection was made so that all RF carriers were presented at the gain module input at +10 dBmV. But if this measurement were done under extremely high temperature, say one which would introduce 1.5 dB additional transmission loss, then a lower amplifier input level would be recognized as a normal result of the high temperature. In such an instance, the pad value selected was such that RF input to the gain module was not the designed for +10 dBmV, but was 1.5 dB lower or +8.5 dBmv or nearly so.

The AGC/ASC module would compensate for this lower input of course and would, as previously demonstrated during bench preadjustment, restore the correct +40 dBmV output level. As temperature dropped, cable loss would be lower and RF input would rise eventually to the desired level +10 dBmV. At this time the AGC/ASC control would have reduced effective amplifier gain to maintain the designed for +40 dBmV output and thus, at the design normal temperature of

+68°F, the module would have maximum Automatic Control range for both higher or lower RF input levels.

Making thermal compensations in this manner relieves the maintenance staff of any subsequent thermal calculations or compensation. In replacing any failed unit they need only transfer the plug-in equalizer and pad from the inoperative "in service" unit to the preadjusted replacement unit.

When pad and equalizer selection was completed the RF output of the amplifier was verified by quantitative measurement. With no further adjustments whatsoever the amplifier was considered operative, the housing was closed and the next amplifier was installed. Note that no sweep signals or complex test set-ups were employed at all. In this manner, a total cascade of eighteen preadjusted amplifiers was actually installed. The procedure followed in each case was precisely as described here.

Test System Performance Results

Certainly there was nothing difficult, startling, or revolutionary about the mechanical implementation of the program. The cascade was eighteen amplifiers deep. The calculated transmission performance operating at these transmission levels (+10 input and +40 output with 21 channel loading) along with the meticulously measured performance was as follows:

	Calculated	Actual
System C/N Ratio	47.1 dB	47 dB
System Cross Mod.	-59.5 dB	-57 dB
System 2nd Order	-63.8 dB	-65 dB
System Comp. Triple Beat	-59.7 dB	-66 dB

The peak-to-valley frequency response is not presented here as a measurement made at the end of the system.

All amplifiers were initially adjusted to be as flat as possible before gain and "tilt" adjustments were made on the bench during the preadjustment process. But the test system was "loaded" with 45 taps and 34 other passive devices and quite obviously the "signature" of all these units was introduced into the system overall frequency response.

We also measured end-of-system performance after substituting pre-adjusted equipment on a plug-in, no field adjustment basis with the following results:

Test Condition	C/N Ratio	Cross Mod
Orig. 18 units	50 dB	-57 dB
4 units replaced	50 dB	-56 dB
8 units replaced	50 dB	-56 dB
11 units replaced	50 dB	-56 dB

For convenience all these measurements were made on a single, mid-band carrier.

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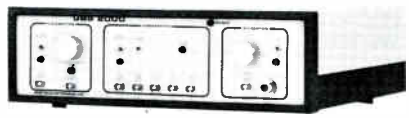

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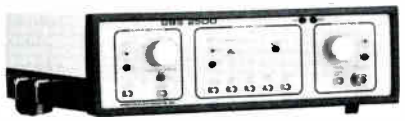

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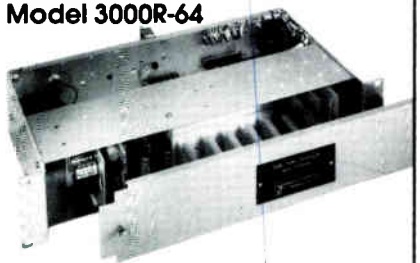

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The impact of these substitutions is quite nominal and certainly acceptable.

Readers interested in pursuing this question further may wish to review the REA paper entitled "A Report on a Field Test Program to Evaluate the REA Design Concept for Rural CATV Systems." In this paper we report on a rather vigorous test which included massive substitutions of "in service" amplifiers with preadjusted units and meticulous measurements of end-of-system performance as the substitutions were effected.

The point of all this is that equipment, individually preadjusted, can be indiscriminately introduced into a system, either massively as an initial installation, or individually as subsequent service restoration substitutions, without significantly degrading end-of-system performance. Translated to long term maintenance, this means that the basic concept of plug-in, "fixed gain" replacements of equipment are not only possible, but technically feasible. We use the term "fixed gain" here to denote no field readjustment. This does not mean the actual physical absence of electronic controls or adjustments.

General Discussions of Automatic Control

The question of Automatic Control in an REA type design has been subject to some misunderstanding. The intent is to provide, by design, an unusually high degree of system self-regulation. The density of control equipment throughout the system is not mandated by this concept. Some lower density of Automatic Control is possible. This is particularly true of rural systems where we anticipate much of the cable will be placed underground and thus will not be exposed to gross thermal excursions.

The use of Automatic Control (AGC/ASC) in every amplifier in our test system was primarily dictated by a desire to evaluate the stability, performance, and effects of a long cascade of such units. Given a total amplifier cascade of eighteen stations, evaluating AGC stability through every third station would be of questionable value. Thus, this particular installation was fully equipped with AGC/ASC at every station.

It can be argued that the introduction of the additional electronic sophistication alone (control circuitry at every station) might reduce the long term reliability of the system and thus impose some higher maintenance cost penalties, though our experience with the equipment available today does not support this.

Without question, designing a system with absolute minimal regulation does impose a higher probability of unacceptable or out of specification end-of-system performance if even minor variations in equipment operation or adjustment are experienced. In effect, the system has a low tolerance or margin for error.

A design introducing a higher level of self-regulation cannot reduce the probability of equipment failure nor does it eliminate the possibility of improper adjustment by servicing personnel.

It can, however, reduce the impact on system performance of either of these conditions. Since the system can compensate for even relatively gross signal level variations, regardless of the root cause, the "vulnerability" of the system is reduced significantly. We submit that maximum protection for the end-of-system transmission quality may translate to lower maintenance complexity, less frequent maintenance requirements and, consequently, lower maintenance costs.

The cost for AGC/ASC in the test system was approximately $70 higher per station than a manual control station. Assuming even 2.5 amplifiers per mile (a conservative estimate for rural applications) the cost penalty per mile for 100 percent Automatic Control (AGC/ASC every other station) is only $87.50. One would expect this nominal penalty would be easily offset across several years of operation by any reduction in maintenance cost. In any event, the 100 percent Automatic Control commitment is not mandatory and some lower level is an available alternative based upon local engineering and business judgments.

Conclusions

The simplified maintenance technique as originally discussed here appears to be both technically acceptable and economically attractive. The question of repetitive equipment replacements on a "fixed gain," pre-adjusted basis is presented in much greater depth in the REA Field Test Program referenced earlier. Our conclusion that this technique is valid was basic upon the results of those comprehensive tests.

This paper was intended to expose the concept to technical review by the industry at large and to stimulate discussion or comment. Readers interested in reviewing the entire report can secure a copy from Director, Telecommunications Engineering and Standards Division, Rural Electrification Administration, U.S. Dept. of Agriculture, Washington, D.C. 20250, or from the Society of Cable Television Engineers.

William Grant is a communications specialist with the Future Network Development Branch, Rural Electrification Administration, U.S. Department of Agriculture. Prior to joining the REA in 1979, Grant spent many years with the Jerrold Division of General Instrument. He is a member of the SCTE.

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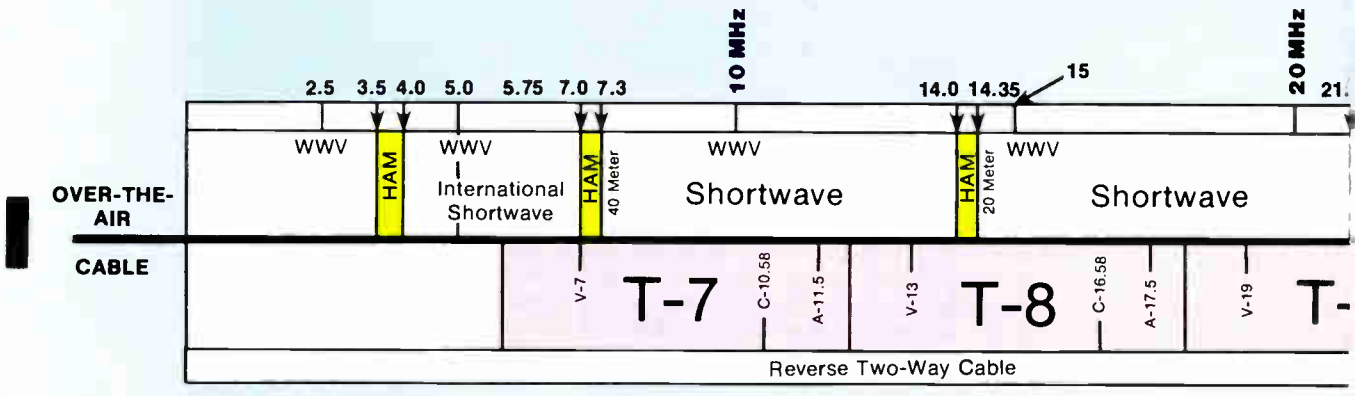
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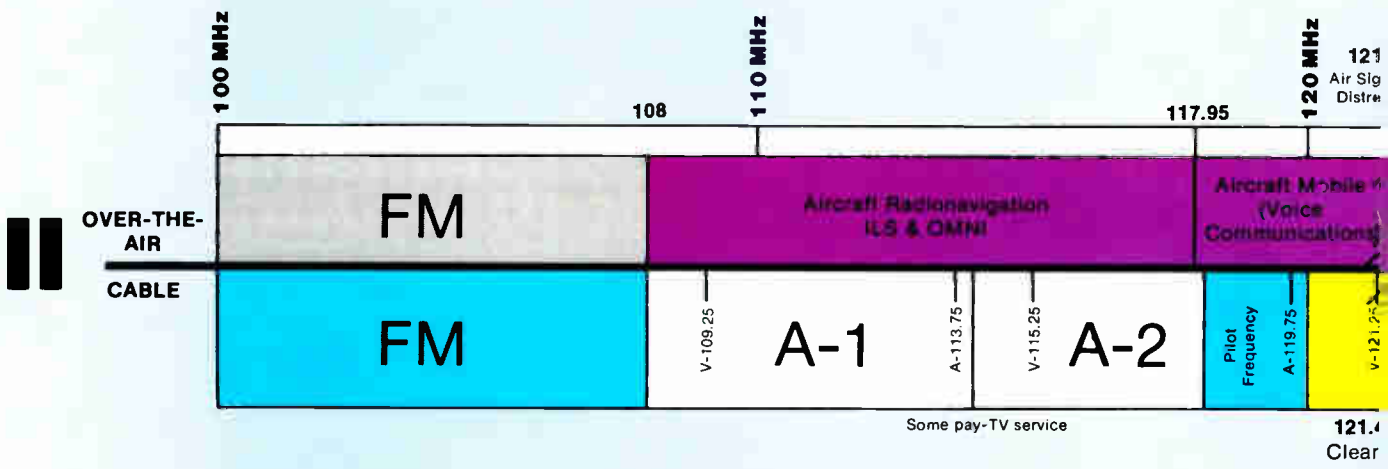
Reverse Two-Way Cable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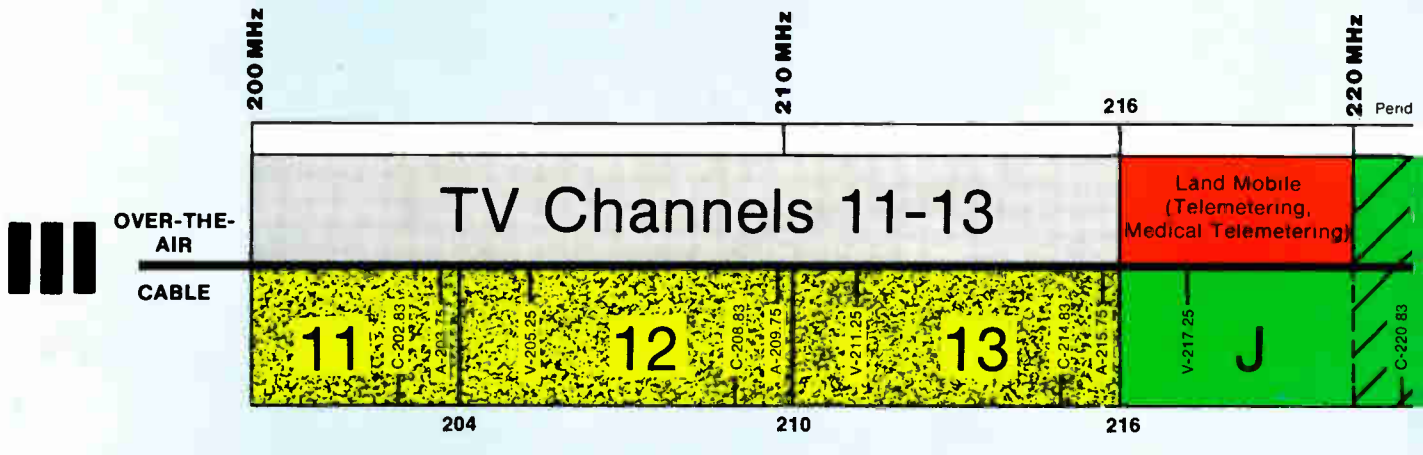
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A-203.75
V-205.25
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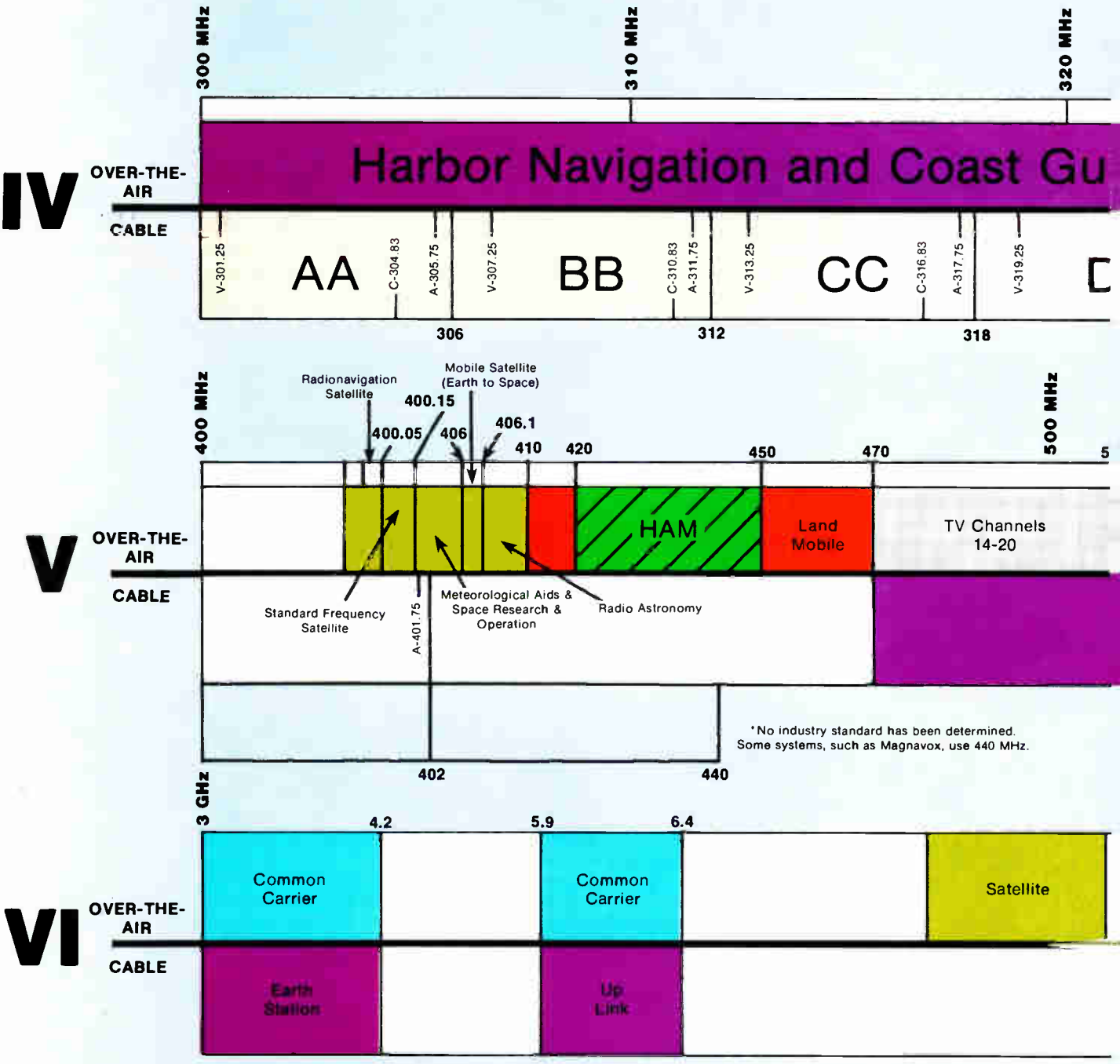
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C-310.83
A-311.75
V-313.25
CC
C-316.83
A-317.75
V-319.25
306
312
318
V
OVER-THE-AIR
CABLE
400 MHz
500 MHz
Radionavigation Satellite
Mobile Satellite (Earth to Space)
400.15
400.05
406
406.1
410
420
450
470
HAM
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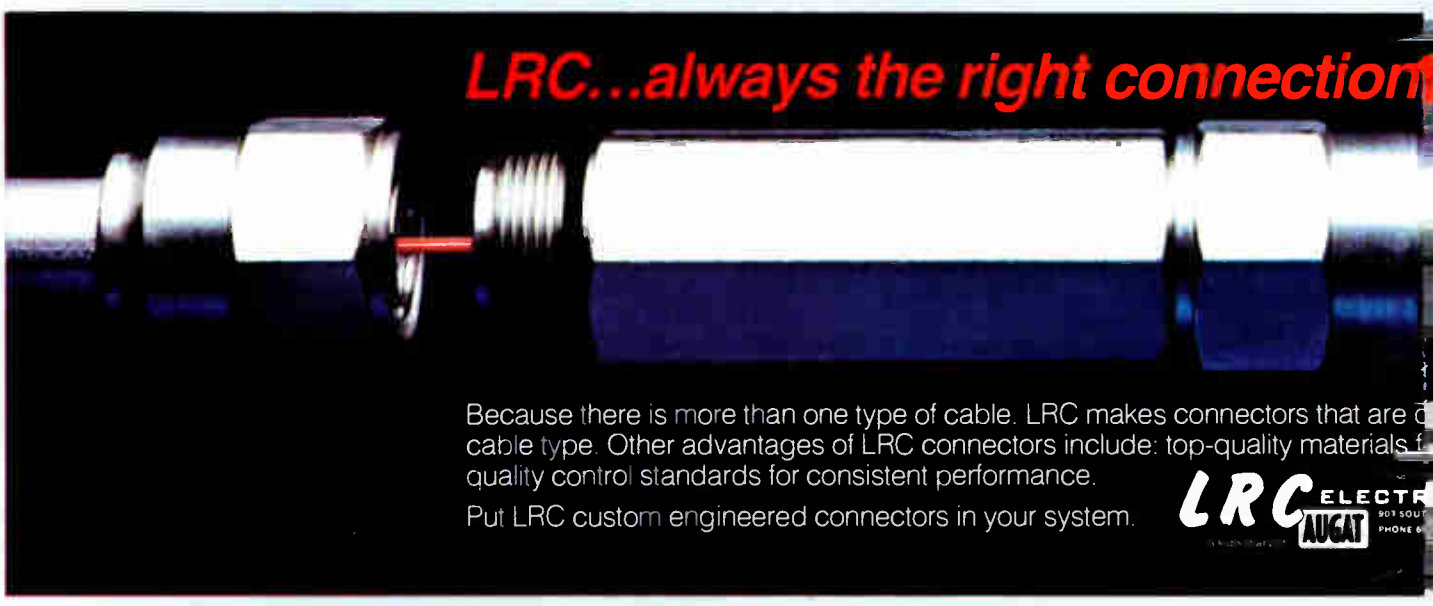
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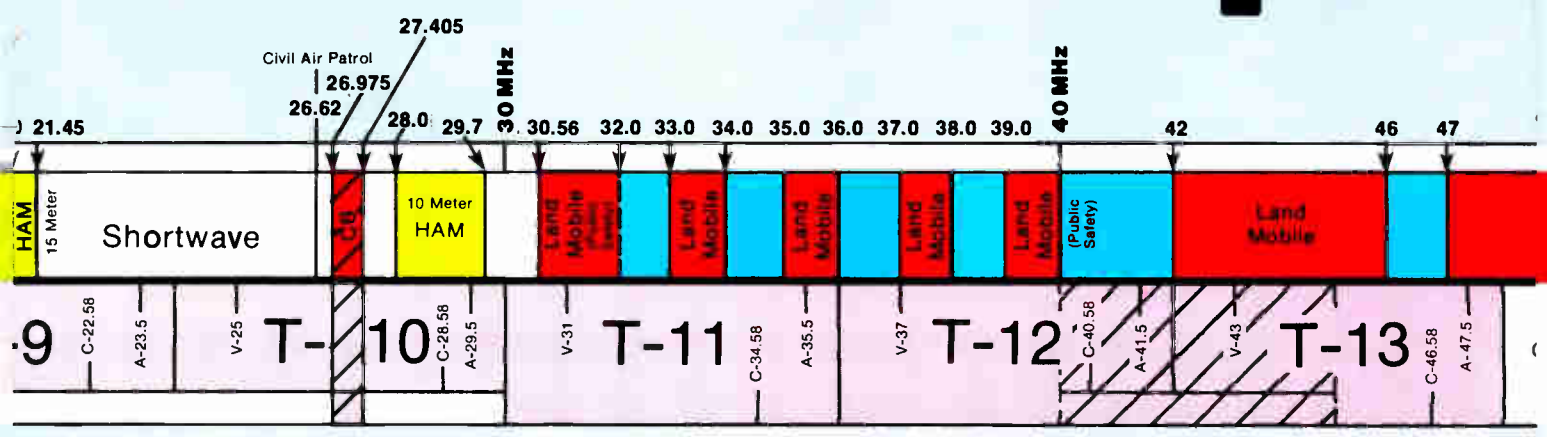

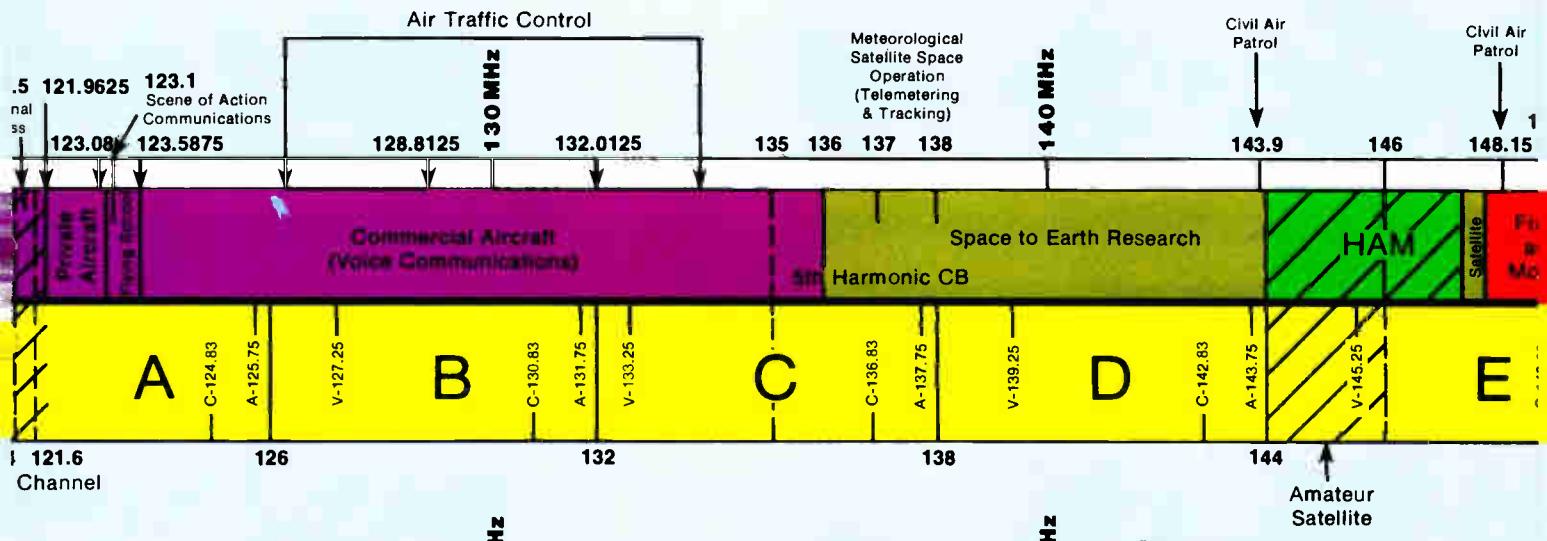

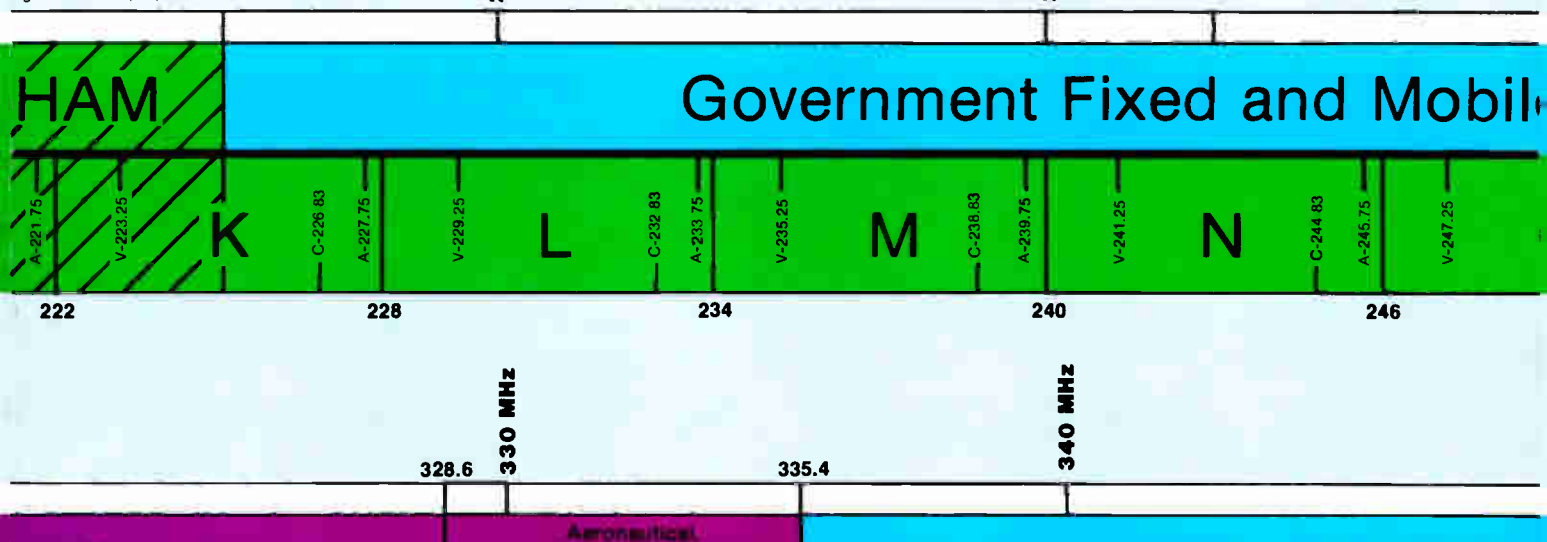

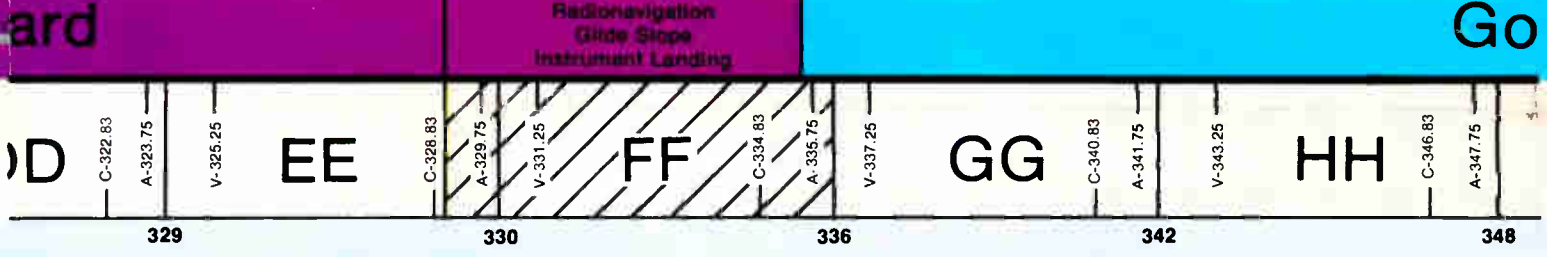

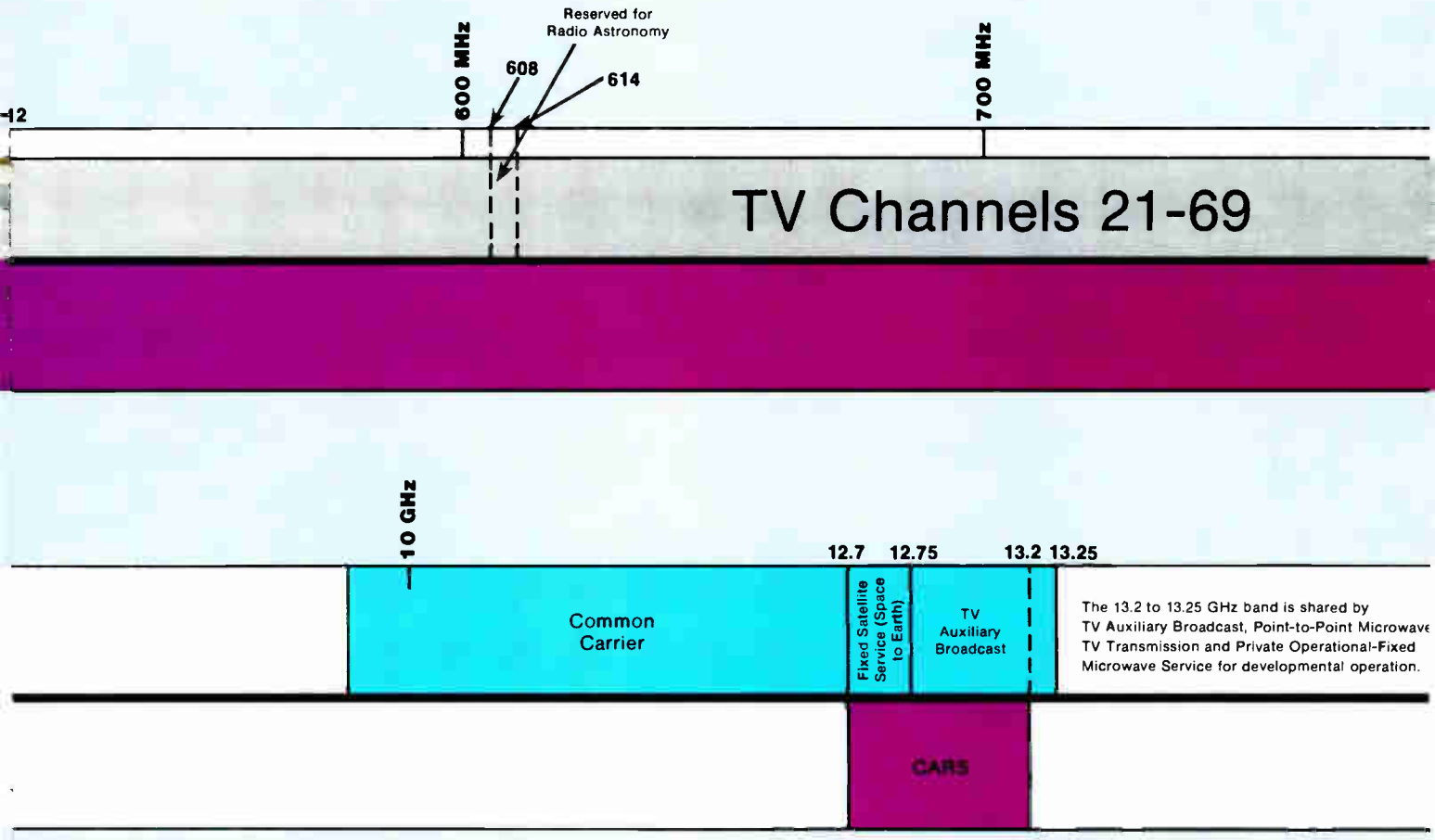

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For a sample of this remarkable new T4 cable, contact TFC today at P.O. Box 384, Wallingford, CT 06492, (203) 265-8500.

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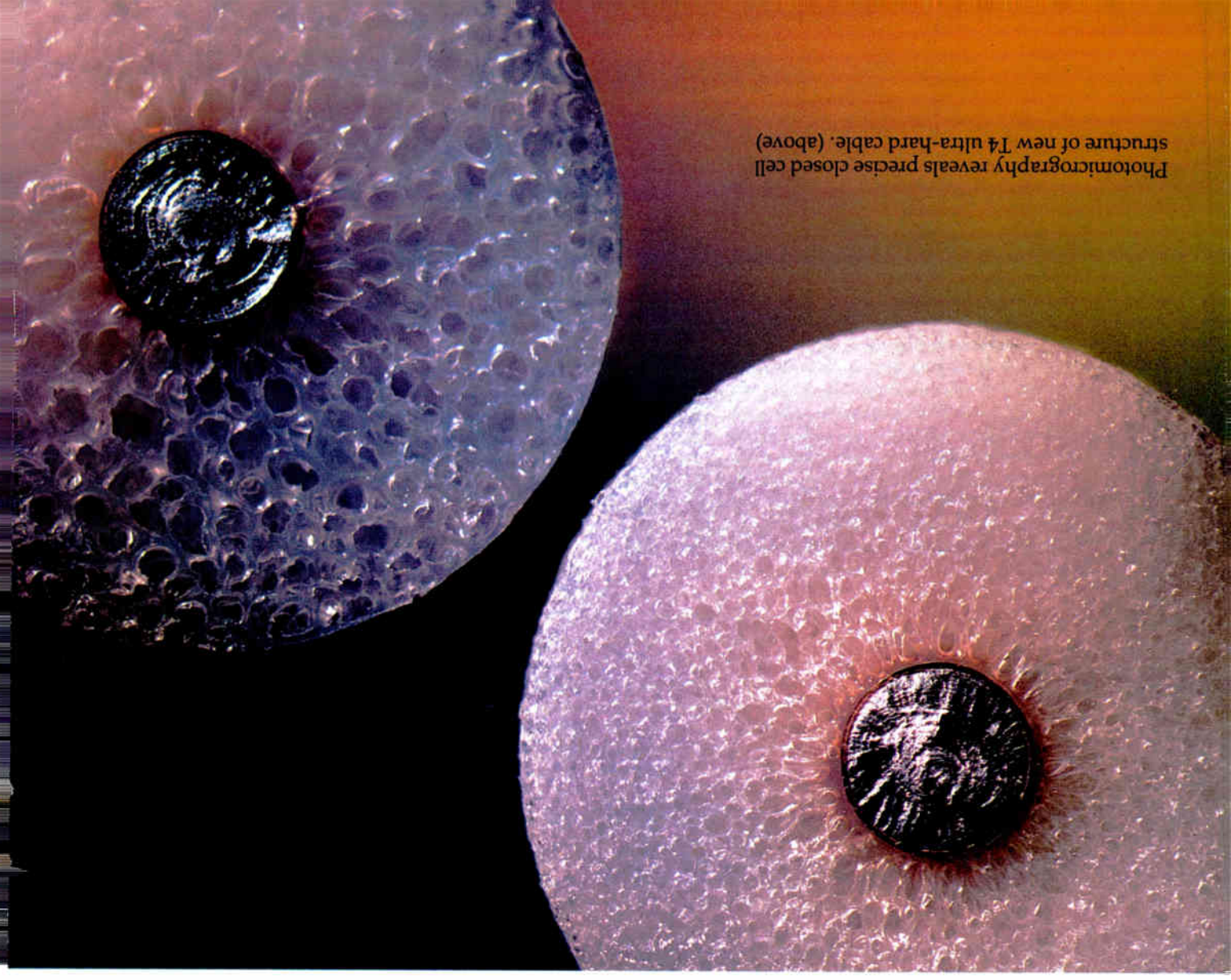

Photomicrography reveals precise closed cell structure of new T4 ulta-hard cable. (above)

Special Section

CED's CATV Frequency Allocation Table

1982 Edition

(Pull out for entire chart)

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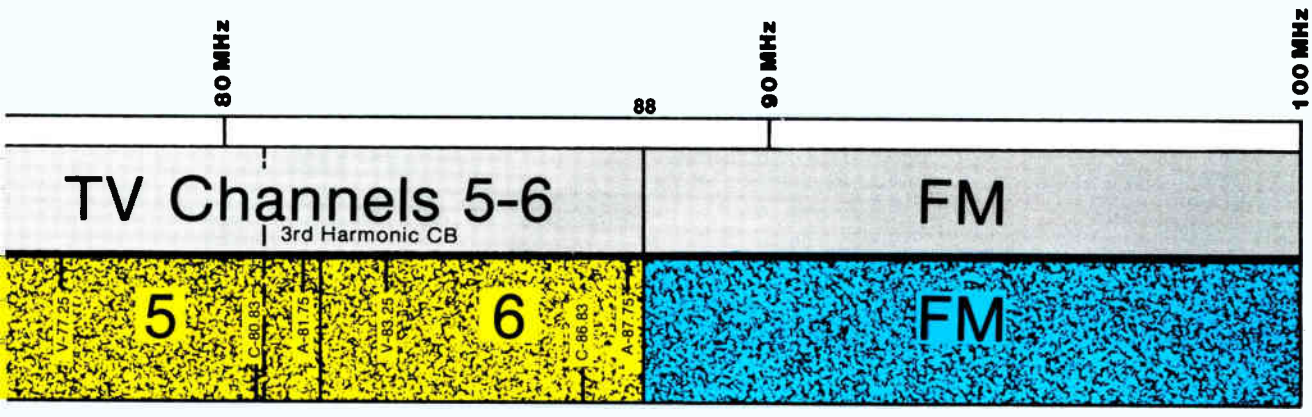

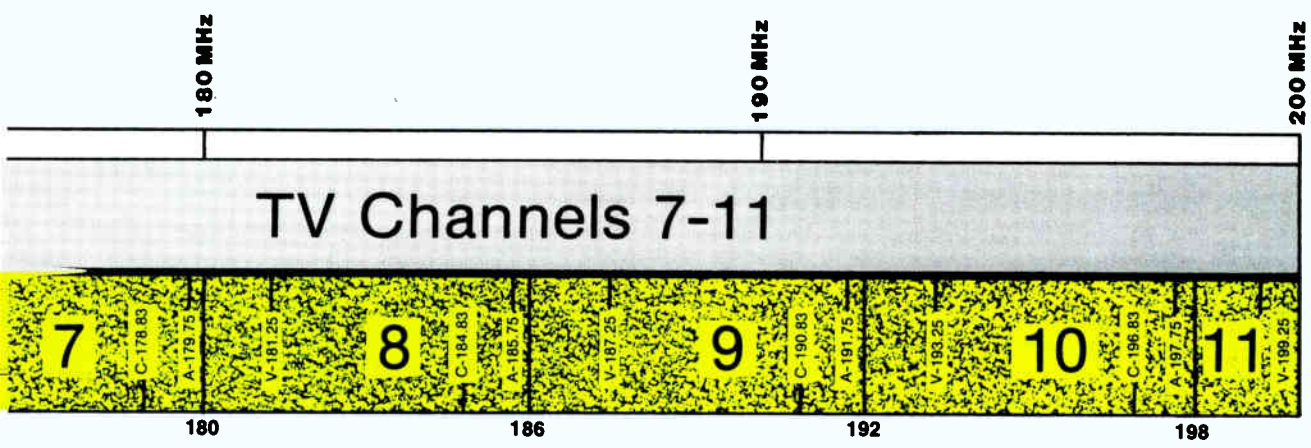

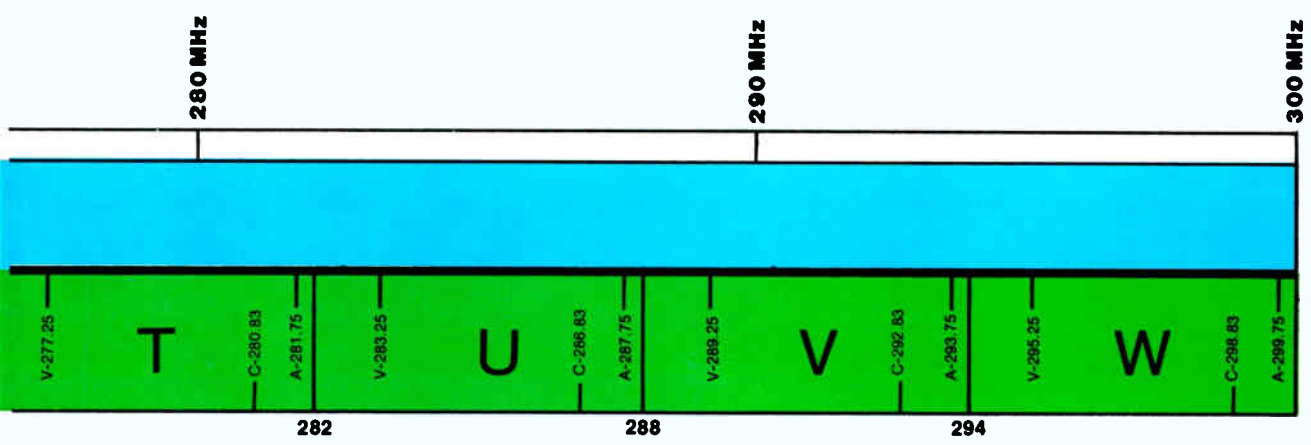

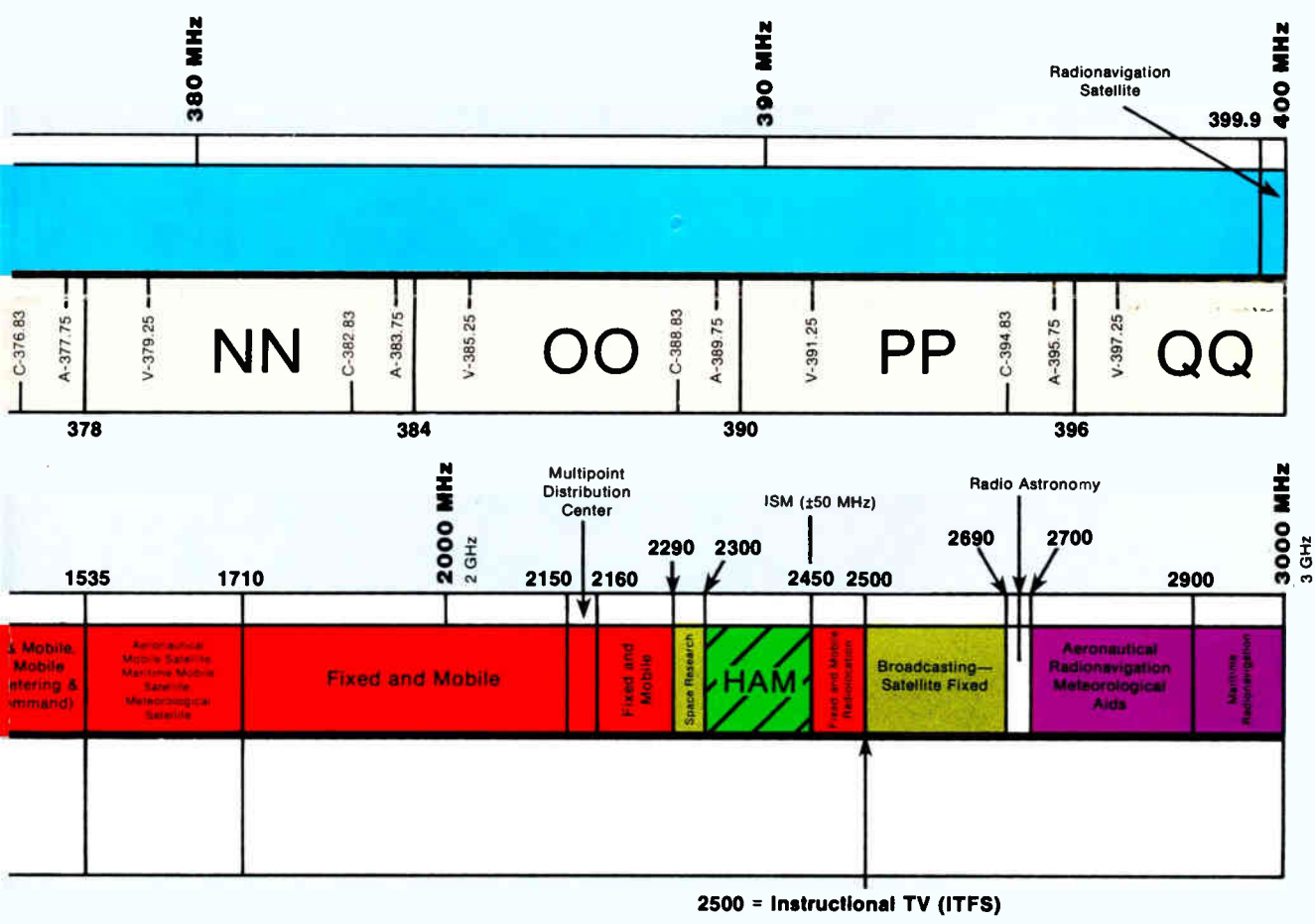

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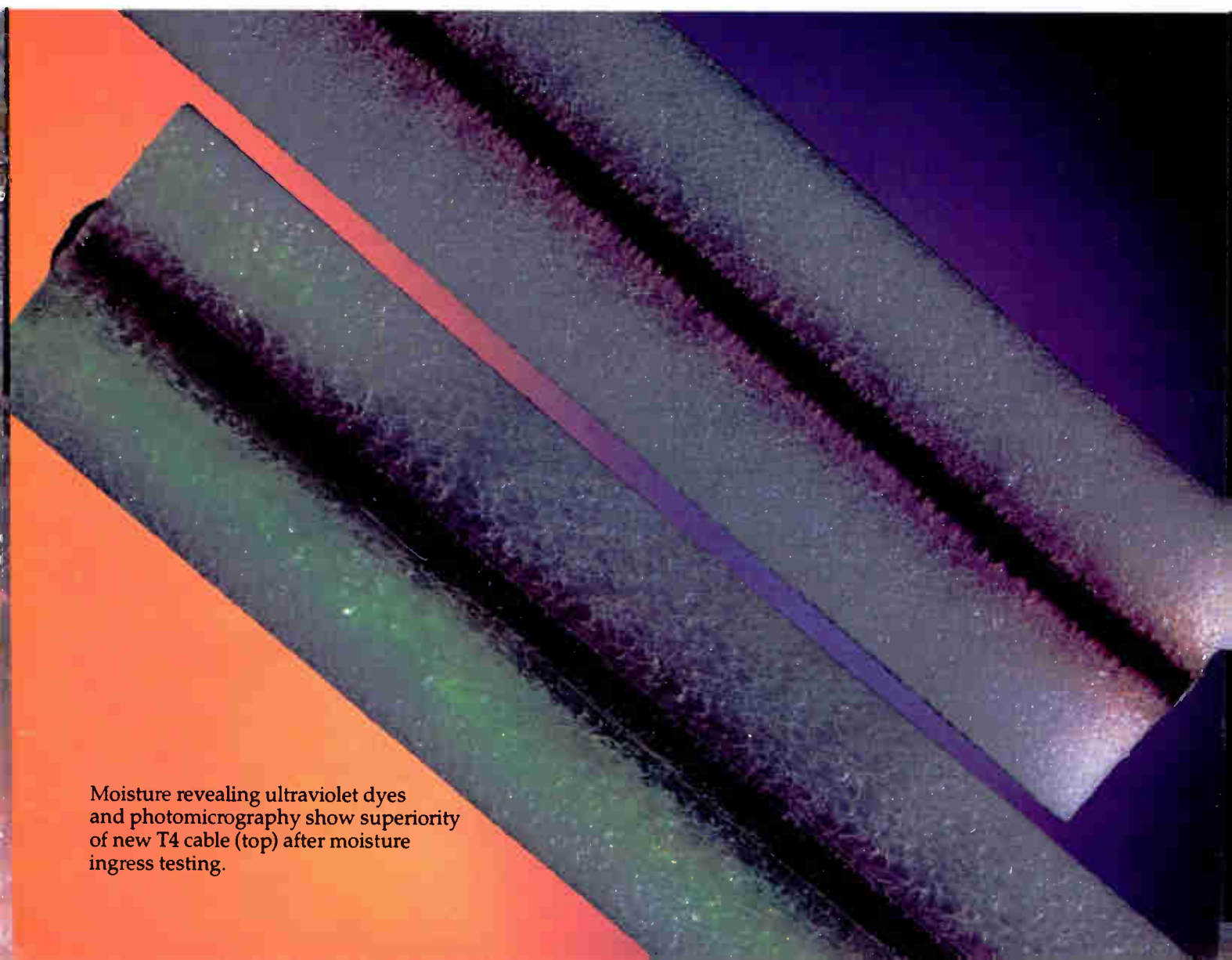


Moisture revealing ultraviolet dyes and photomicrography show superiority of new T4 cable (top) after moisture ingress testing.

The Local Origination Studio: Balancing Cost and Function

By Tom Garofalo, Video Images, Milwaukee, Wisconsin

Almost every CATV franchise carries the responsibility of supplying the hardware and space needed for a local origination (LO) studio. As a showpiece of your system, the LO studio is characterized by its more sophisticated productions of newscasts, talkshows and commercial spots. Preconstruction planning of this facility is usually initiated by considering two questions:

1) What site preparation should be considered before deciding on the studio's physical layout and,

2) Comparisons of production equipment performance with price and usefulness.

Focusing on a multi-camera studio with special effects and editing, this article will outline areas of special interest in site preparation and equipment choice.

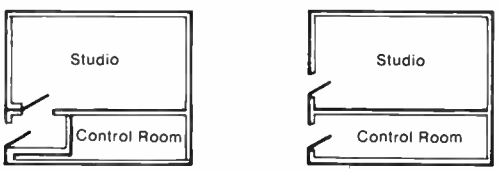
Site Preparation

A. Floor Plan Generally regarded as an area reserved for architects and their ideas of space conservation, the intelligent video designer will approach a studio floor plan with a critical eye. Traffic flow must be contained within specific boundaries in order to assure the least amount of interruption and the maximum use of the space available.

Since the studio is usually designed to have access to the control room and rest of the building, some ideas of door placements are in order.

For low traffic patterns, use one corner of the control room to locate an entrance from a hallway and mount your studio door on the adjoining wall. Higher traffic patterns dictate a separate entrance to the studio. (figure A).

Figure A



Low Traffic **High Traffic**

This free-flowing traffic pattern will assure the least amount of temptation to those individuals who might otherwise pass close enough to "tweak" on knobs and buttons.

Any engineering or production function that a window serves is better off left to a low cost black and white security camera mounted in the studio. Locating racks, consoles, and other hardware along the windowed wall often becomes an aesthetic dilemma, with the rear of the equipment being exposed to the studio.

A good compromise is a three-by-three-foot window located as close to the control room/studio door as possible.

B. Production Personnel Locate all equipment controls with thought to the number of production personnel available. Common sense dictates smaller, more compact control areas for those operations with smaller staffs.

Group the video, audio, and editing controls within a three-bay area if only one or two people are available. With a larger crew, control areas are separated into engineering, audio, editing, graphics and video switching.

C. Acoustics Whether your studio was built from the ground up or carved from existing office or warehouse space, pay special attention to acoustics.

Use your architect's input to arrive at a sound insulation factor of 60 or better. However, once insulated from the outside world, avoid the "hollow" or "echoing" sounds by using a cyc curtain, ceiling panels and wall coverings.

D. HVAC High volume, low velocity, low noise, is the key phrase when specifying HVAC requirements.

Cooling loads are largely determined by the number of studio lights in use at any one time. Leave this estimation to the experts but remember: studio ceilings and HVAC ductwork do not have to look pretty —they just have to be quiet and efficient.

E. AC Power Plan now for your ultimate power needs. This can generally be estimated from two areas: lighting and equipment.

Expect that your equipment power needs will double and possibly triple within the next ten years. This is not an overestimate, but a time-proven reality in our industry.

Be adamant about two variables. One, insist that all AC power to the equipment racks and to any other devices that are connected to these racks (headends, modulators) are on the same AC phase. This will prevent the common occurence of AC ground loops or "hum".

Two, a good, solid ground connection to a reliable source is essential to prevent disturbances generated by the dimmer panel or outside sources such as motors, copiers, etc.

Production Equipment

The following categories will outline the price and performance range of the products available for you to use in your local origination studio.

A. Cameras Generally, three types of color cameras are available in today's market: a. single tube convertible cameras, b. multi-tube convertible cameras and, c. multi-tube cameras.

The convertible camera addresses both studio and portable applications. Affixed with a 1.5-inch viewfinder and battery, the convertible camera connects easily to a portable recorder for location taping. For studio operation, a five-inch viewfinder, remote operation panel and rear lens controls are used.

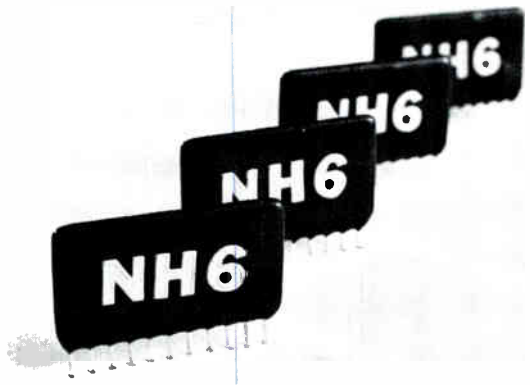
The studio camera usually offers larger seven-inch viewfinders, larger pick-up tubes (for better resolution), larger yokes (for better registration) multiple intercom circuits and a camera head that handles the larger zoom lenses.

Figure B compares studio and convertible cameras with 10:1 lenses, engineering remote controls and studio viewfinders.

Figure B

Class	Specs	Cost
Convertible single tube	300 lines/48dB	$6,000-$7,000
Convertible multi-tube	550 lines/53 dB	$8,000-$18,000
Studio multi-tube	600 lines/54dB	$25,000-$35,000

B. Special Effects Generators Special effects generators (more commonly referred to as switchers or SEGs) represent a large product group to choose from.



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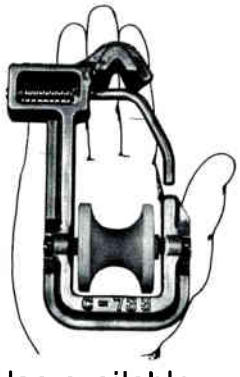

ANSWER:

Lemco's new C-733 feeder block used to support single feeder cable, up to ⅞" bare, during pull out and lashing operations. Frame is made of high strength aluminum. Also available in a dual model no. C-645.

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Features to consider are:
A. Number of special effect patterns
B. Number of mix-effect amplifiers
C. Colorizing options
D. Key options
E. Number of inputs
F. Synchronization to the total system

Figure C compares single mix/effect SEGs:

Figure C

Features	Price
6-inputs, internal sync and color bar generator, 6 effects	$2,100
10-inputs, internal sync and color bar generator, 10 effects, positioner	$4,000-6,000
10-inputs, external sync, colorizer, positioner, 10 effects	$3,900-4,600

Figure D compares dual mix/effect SEGs:

Figure D

Features	Price
9-inputs, external sync, colorizer, positioner, 12 effects, pattern modulators, chroma keying, shared mix/effects bus	$8,000-9,500
10-inputs, external sync, colorizer, positioner, 16 effects, pattern modulator, chroma keying, separate mix/effects bus	$17,000-20,000

C. Tape Machines The most common video tape recorders that are used in the LO studio are the 3/4" U-Matic variety. When properly maintained, these VTRs will produce acceptable results to third generation tapes.

For comparison, we have listed editing systems which consist of one source VTR, one editing VTR and one controller (figure E).

Figure E

VTR Format	Price
½" VHS or Beta	$ 8,750
¾" U-Matic	15,000-17,500
¾" Broadcast U-Matic	25,000-30,000
1" Type "C"	132,000-150,000

Video tape recorders may be treated as synchronous inputs to the special effects generator with the addition of a vertically locked time base corrector. This will allow special effects and dissolves, as if the prerecorded material was "live in the studio".

Figure F illustrates TBCs and their approximate costs:

Figure F

Specifications	Price
V-locked only ½"-¾" VTRs	$ 5,000-10,000
V-locked with image enhancement and noise reduction ½"-¾" VTRs	8,000-12,000
V-locked for use with 1" VTRs	22,000-26,000

D. Audio Basic components of the audio system are:
a. Mixer board for mics and VTRs/ATRs
b. Turntable w/cartridge and preamplifier
c. Cartridge recorder
d. Reel to reel recorder
e. Processing devices such as equalizers, limiters, reverbs, etc.

Generally, we keep the LO studio wiring in a two-wire shielded unbalance mode. This is generally dictated by the expense of an all balanced, in and out mixing board (usually $10,000-$15,000. more for the same features). If the area surrounding the control room is not exposed to RFI or EMI, the unbalanced audio mixer provides a convenient and inexpensive means of combining your audio signals.

Audio processing or "sweetening" is viewed on a one-by-one basis. The production personnel may desire more fullness, shaping, reverberation, etc. A multi-point patch panel is usually installed to accomodate the insertion of these devices into the audio flow. Figure G is representative of audio components and their costs.

Figure G

Features	Price
Mixing boards- 6 inputs—unbalanced	$ 250- 600
Mixing boards 10-16 inputs—unbalanced	2,000- 5,500
Turntable	250- 500
Cartridge recorder	2,000- 2,500
Reel to reel recorder	700- 1,800
Processing equipment	1,000-2,000 per item

E. Lighting The success of your production is largely dependent on lighting. Even the most expensive camera cannot substitute for the mood or feeling that a well lit set can create.

To enhance productions in the LO studio, larger ceiling-supported lighting instruments can be used.

"Backlighting" will separate the subject from the background and give an illusion of greater studio depth. Smaller four- to six-inch fresnels are used here so as to concentrate on specific objects rather than general areas.

Focusable fresnels, eight to twelve inches, allow individual subjects to be highlighted. This "key lighting" creates the subtle suggestion to the viewer that this is an area of main interest.

Twelve- to sixteen-inch scoops provide broad illumination for the entire set. These "fill" lights increase the average illumination level without calling attention to any one specific area.

Complete lighting systems are shown in Figure H. Included are an adequate number of instruments, plug strips and dimmer panel and patch panel to match the studio size.

Figure H

Size of Studio	Price
10' × 15' (non dimmed)	$ 4,000
15' × 20'	16,500
18' × 25'	24,000
20' × 30'	33,000

Outfitting a local origination studio can be a real learning experience! Make the decision process a lot easier by visiting expositions, talking with your peers and, most importantly, listening closely to those who have done it before!

Tom Garofalo has been a sales engineer/consultant with Video Images, Milwaukee, Wisconsin for seven years. He is a graduate of the University of Wisconsin at Milwaukee and has been involved in the design, engineering and installation of studios for Continental Cable, Cox Cable, Storer Cable, Warner Amex and Total-TV.

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– EBP-MB	Mid Band, Band Pass
– EHP	High Pass
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– EBP	Single Ch. Band Pass
– EFMR	FM Reject
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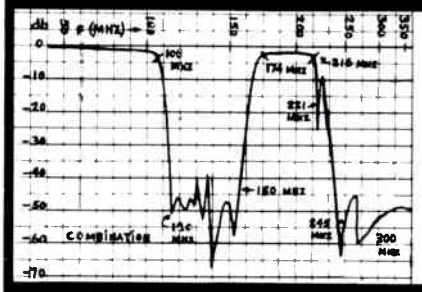
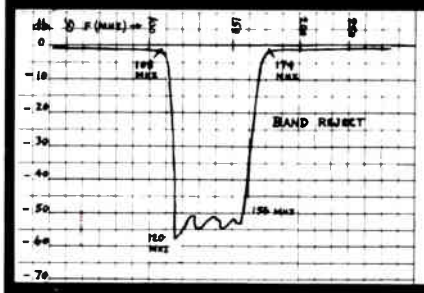
COMBINATION MID & SUPER BAND REJECT FILTER



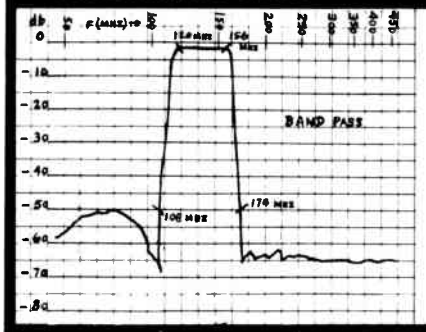
Typical Insertion Loss
0-100 MHz 0.5 db
108 MHz 1.0 db
120-160 MHz 40.0 db
175-216 MHz 2.0 db
223 MHz 25.0 db
300 MHz 45.0 db

THE BAND REJECT FILTER



Typical Insertion Loss
0-108 MHz 2.0 db
120-156 MHz 50.0 db
174-400 MHz 1.5 db

THE BAND PASS FILTER



Typical Insertion Loss
0-108 MHz 50.0 db
120-156 MHz 1.8 db
174-400 MHz 50.0 db

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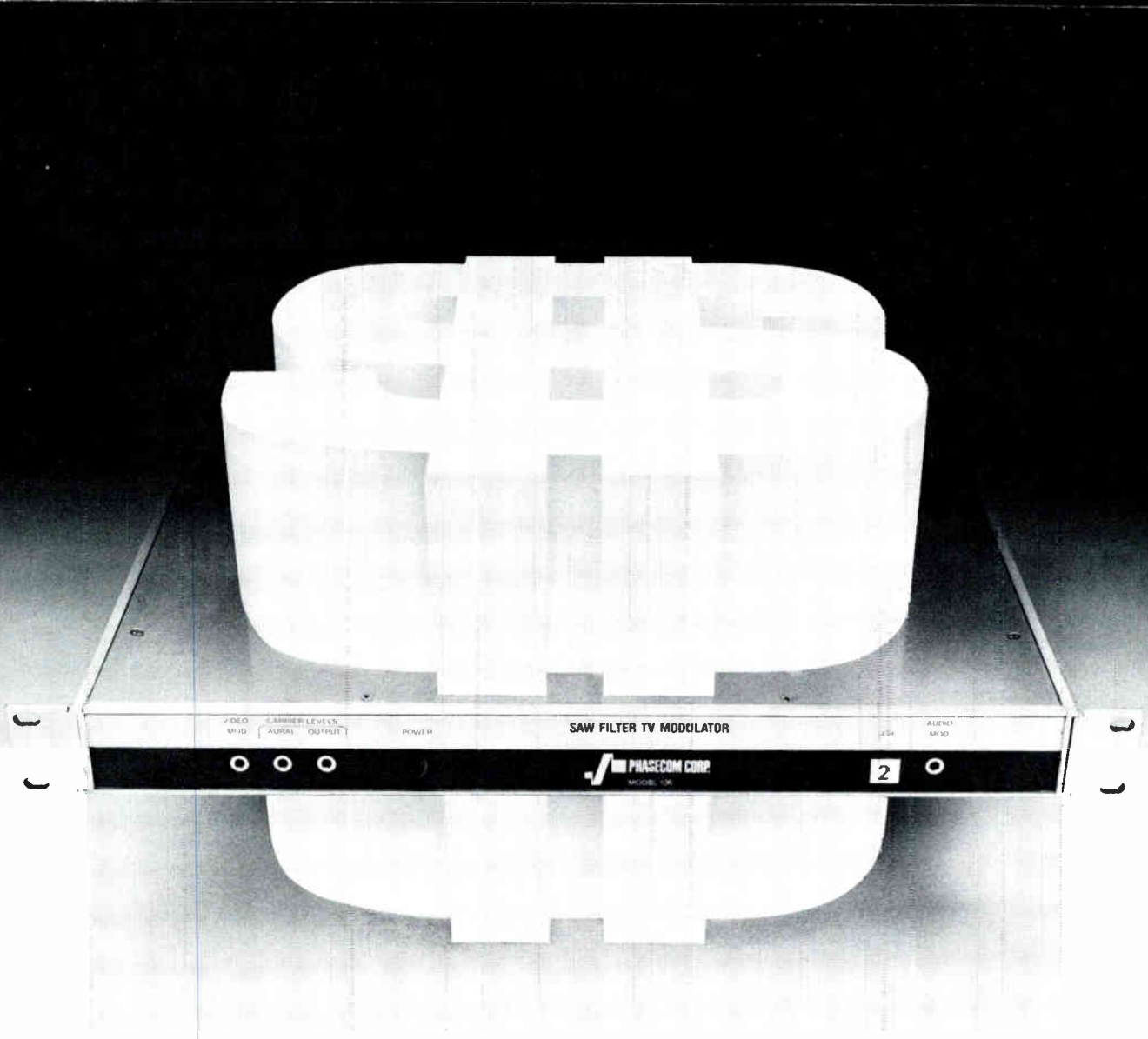

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Phasecom's New Earth Station Modulator

High Performance/Low Cost

The Model 106 is a full specification modulator ideally suited to interface with satellite receivers. It also has a very modest price tag. With features like a SAW filter, output AGC, 60dB down spurious at a full +60 dBmV output; all in a quality package. No one can match it at *$895. So now, every time you add a new satellite service, you don't have to compromise with a low performance modulator.

*Channels 2 - 13: $895.00: Channels A - W: $995.00

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Los Angeles, CA 90045
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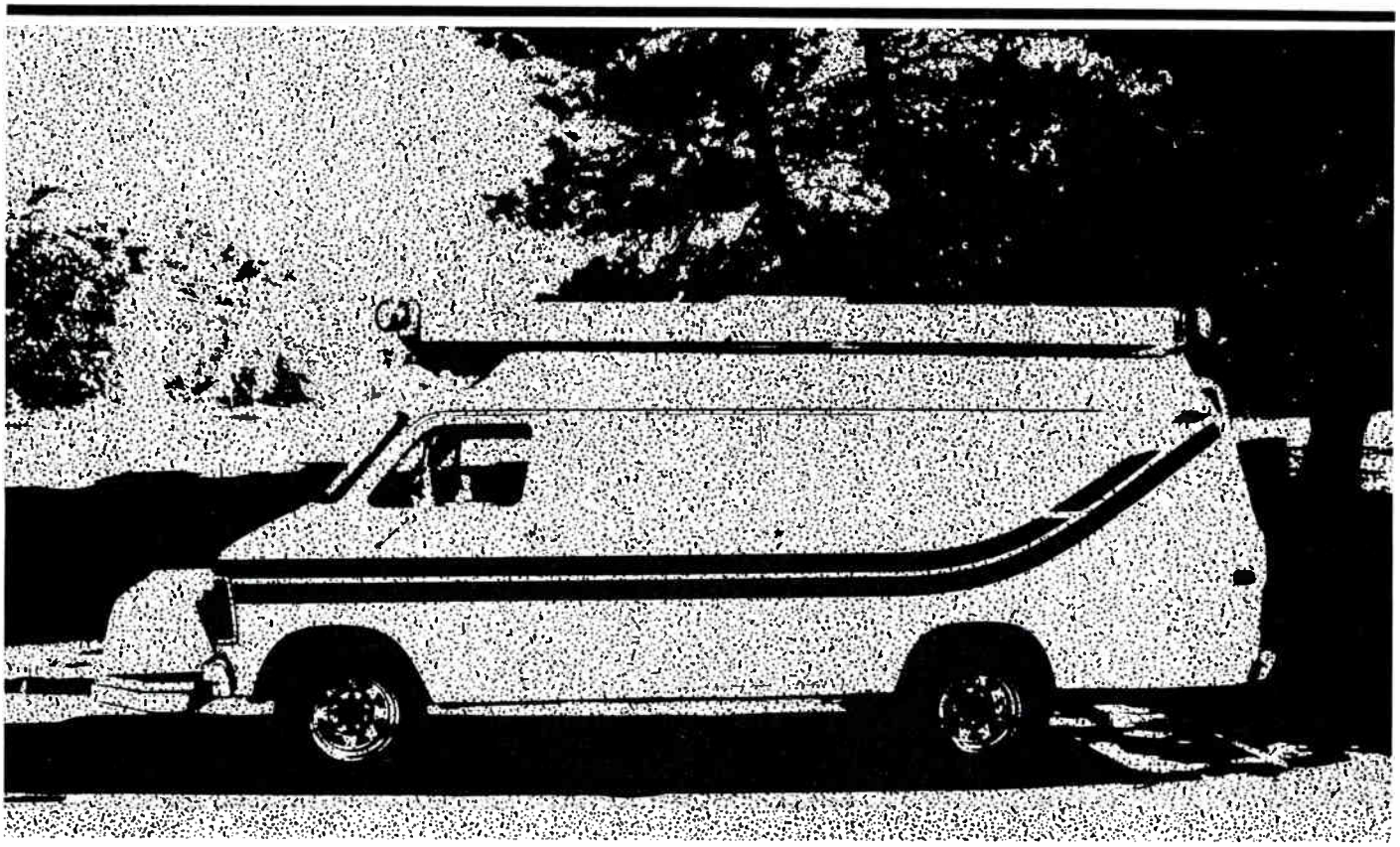
The Model 106 is manufactured in Jerusalem, Israel by PHASECOM (ISRAEL) LTD., a wholly owned subsidiary.

Product Profile



Mobile Production Vans

In this month's **CED** Product Profile we are featuring electronic field production (EFP) mobile vans. The chart on the following pages includes six vans that are suitable for remote production on location by cable television systems. We have selected companies that are committed to supplying vans to CATV and do the complete design, construction and outfitting of all necessary electronic equipment and sell the vans as a package with a fixed price. Of the various units that these companies supply, we have selected the basic two-camera offering for comparison. The chart displays the standard equipment specified by these suppliers so the reader can make a judgement as to the overall costs of such vehicles.

The tradition in the industry has been for mobile production vans to be designed and built on an individual "customized" basis with buyers specifying their needs prior to the design work. This tradition will, no doubt, continue to be the standard practice. But for the system operators considering a first-time mobile van purchase, the availability of pre-packaged and outfitted vans can save the trouble of doing the design research necessary to the cost/efficient, "no-nonsense" production van. Also, the practice of supplying a standard "off-the-shelf" model allows the manufacturer to employ economies of scale in purchasing the equipment for outfitting the vans which can then be passed on to the buyer at lower cost.

The standard models listed in the following chart can, through consultation with the supplier, have some custom touches added. Many options are offered by suppliers in which case the price will differ from those listed. Also, the prices listed may vary with changes in the cost of equipment on the wholesale market. Readers should consult more than one manufacturer before purchasing any mobile unit.

The equipment specified in the following chart is the complete package offered by the six manufacturers. Specific details on the construction of the van itself, with special insulation, air conditioning, cabinetry and paneling, painting, shock absorption and suspension, wiring and lighting has not been included. In many cases this work can be significant and the individual suppliers should be consulted. In most cases the electronic equipment provided in the package has been identified by manufacturer and model.

Remote local origination by means of mobile production vans is no longer a luxury for the cable operator. News events, sports and government coverage are important aspects of LO and a mobile van can increase profits and improve the image of your system in the community.

Next month's **CED** Product Profile will feature signal traps.

Model & Price	Truck	Camera Equipment	Switchers
Centro Corporation, San Diego, California			
C-1000—$165,000	Ford E350, air conditioning, power steering & brakes, swivel bucket seats, deluxe interior trim.	Two each; Hitachi FP-21 head including Saticon tubes, 2H enhancer, operating panel, AC adapter, 10.1 lens w/servo zoom and studio kit, 4.5" and 1.5" viewfinders, 150' camera cable, O'Connor 50D fluid head w/clawball case, O'Connor 50 handle, O'Connor tripod, Birns & Sawyer spreader, Birns & Sawyer wheel set.	ISI 902 production switcher w/666C key edger, colorizer 501 and 505 rack frame and power supply. Panasonic WJ-225R vertical interval switcher.
E-N-G Corporation, Concord, California			
EFP Van—$105,256	Ford E350, roof air conditioning, aluminum roof rack & platform, two 4000kw gas generators.	Two each; Ikegami ITC 730 cameras w/Fujinon 730-OP 14X10 zoom lens, Ikegami remote A/D units; Ikegami CCU-730 controls, Ikegami 5" viewfinders, ITE T13 tripods, ITE H14 fluid heads, ITE D6 dollies, (two sets) 50m cables.	Panasonic WJ-5500A.
Leero Electrical Corporation, Philadelphia, Pennsylvania			
Mobile Van—$198,500	Ford E350, on board power & air contitioner.	Two each; FP 22 Hitachi cameras w/automatic microprocessor set-up, Hitachi 5" viewfinders, Lisand tripods, O'Connor fluid heads, operational panels, (two sets) 50' camera cable.	Grass Valley production switcher.
Midwest Corporation, Cincinnati, Ohio			
M-1—$99,800	GMC Vandura, air conditioning, power steering & brakes, custom interior panels, racks, roll-around chairs w/tie-downs, security system.	Two each; Hitachi FP-21 cameras w/head, three Saticon tubes, 2H enhancer, 1.5" viewfinder, AC adapter, tripod adaptor, 10X servo zoom lens, Hitachi ROU-21 remote unit w/15m cable, Hitachi 5" viewfinder w/adapter; Hitachi cable drive kit, (two sets) 50m cable, battery & charger, Quick-Set tripod w/elevator, cam head, handle, dolly.	Crosspoint Latch 6114 production switcher, Panasonic WJ-220R 6X1 passive switcher, Panasonic WJ-220R 6X1 active switcher.
Shook Electronic Enterprises Inc., San Antonio, Texas			
Supervan IV—$97,500	Ford E350, air conditioning, 5KVA isolation transformer, 6.5 Kw generator, chairs w/tie downs; security system, worklights, roof shooting platform w/ladder, automatic transmission, power steering & brakes.	Two each; JVC color cameras, 5" viewfinders, AC adapters, JVC RS-2000 camera control, (two sets) 50m cable, (two sets) 20m cable, HZ-ZM 14U cable drives, HZ-FM 14U cable drives, Davis Sanford tripods, fluid heads & dollies.	Shintron 373DX production switcher.
Tele-Measurements Inc., Clifton, New Jersey			
CAV-1—$98,024	Ford E350, air conditioning, worklights, 6.5Kw generator.	Two each; Sony DXC-1800 color cameras, power zoom 6X1 lens, 1.5" viewfinder, 5" viewfinder, lens conversion kit, camera control unit, 82' and 165' CCU cable, 6' VTR cable, 14 pin to pin 6' cable, AC adapter, charger and battery, ITE T-6 tripod, ITE D-3 dolly, ITE H-15 fluid head, RHM right handle, MHT adapter.	3M vertical interval switcher.

Effects Generators	Video	Audio	Test Equipment	Miscellaneous
Portac KDB-2 character generator w/"C" option 6 color background, "X" option superimpose external video, "24" option 24-page memory.	Sony VO-5850 VTR, two Trompeter jack panels, Lenco video & pulse distribution amplifiers, two Ikegami TM-14-8RC color monitors w/rack slide, three Panasonic TR-932 dual 9" monochrome monitors.	Yamaha M-508 audio mixer w/8 inputs, Switchcraft TT audio jack panel, Technics RSM-85 cassette recorder, AB Systems 105 audio amplifier, ROH audio distribution amplifier, two Visonics speakers, RTS SPK-20RM speaker stations, RTS PS30RM power supply.	Tektronix 528A waveform monitor, Tektronix 1420 vectorscope, Tektronix 016-0115-02 rack frame, Lenco sync and test signal generator.	Four RTS SPB-202 belt packs, three Setcom dual and three Setcom single muff w/6' cord.
Microgen character generator.	Sony 5850 VTR, Sony 5800 VTR, Sony 440 editing system, Videotek VM8 PRD dual 8" color monitor, Panasonic WV-5203 triple 5" monitor.	Shure M-267 audio mixer w/rack, two Shure power strips, audio/video patch panel, Clearcom hardwire intercom, two EV-635-A microphones & cables, two microphone holders, two 2H Nicad batteries.	Tektronix 528-A waveform monitor, Tektronix 1420 vectorscope, Tektronix dual rack.	Quick charger unit.
3M 16-page character generator.	Three Sony ¾" VTRs, Convergence editor, DPS-1 time base corrector, Panasonic B&W monitoring, Sony color monitoring.	Quantum 8X4 equalized audio board, audio/video patching, speakers.	Tektronix waveform monitor, Tektronix vectorscope.	RTS intercom system.
Systems Concepts MG-100 character generator.	Sony VO-5600 U-matic VCR, four Lenco PVA-350 distribution amplifiers, two Hitachi 2m VTR cable, Lenco PFM-300 mainframe & power supply, Videotek VM-8PRD dual 8" color monitor, two Panasonic 5203B triple 5" B&W monitors.	Microtrac 6455B-BA audio mixer, Tascam 122 audio cassette deck, four Electrovoice microphones w/100' cable, ATI amplifier, Technics speaker, four Telex CS-81 intercom headsets, two Hitachi MC30C microphones.	Videotek TSM-5 waveform monitor, Videotek VSM-5 vectorscope, Videotek dual rack-mount frame.	Two Lenco PBL-306 blank panels (double width), Lenco PBL-305 blank panels (single width), Olympic 98/99 collapsible cable reel.
Quanta microgen single channel character generator.	Sony 5850 ¾" VTR w/slides, two Sony PVM-8200 MB color monitors, two Panasonic TR-932 dual 9" B&W monitors.	Shure SE-30 audio mixer w/rack adaptor, two Sony F-520 microphones, Videotek audio monitor w/speakers.	Two Videotek waveform monitors, VAC 8-PM-1 burst phase monitor.	N/A
Sony SEG 2000 color special effects generator w/6 inputs, Shintron 505 character generator w/16-page memory.	Two Sony VO-5850 ¾" color VTR edit unit, Sony RM-440 edit controller w/interface cables, Sony PVM-8200 MB dual 8" color monitor, Sony PVM-441 B&W quadruple 4" monitor.	Panasonic WR-450 audio mixer, two Sony ECM-50 PS lavalier microphones, Electrovoice 635 microphone w/windscreen, RTS intercom system.	Tektronix 528A waveform monitor, Tektronix 1420 vectorscope.	N/A

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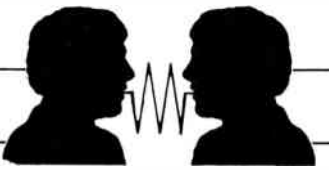

Referencing Line Extenders And Amplifiers

Every month, *CED* Magazine will present an award for a new idea, helpful hint, or solution to a common technical problem in operating CATV systems. Ideas selected for publication will be awarded $25. Submissions should be sent to Editor, *CED* Magazine, Titsch Communications Inc., 488 Madison Ave., Fifth Floor, New York, N.Y.10022

Submitted by Douglas Medina, chief engineer, Cablevision of New Jersey, Cresskill, N.J.

Basic Problem: The larger the cable television system, the more difficulty there is in coordinating activities between the service department and the maintenance department. Precise communication between the two departments, wasted labor time, duplication of efforts and the critical need to rely on the calibration of field strength meters (FSM) used by technicians are problems that can be minimized by amplifier and line extender referencing.

Requirements

In today's modern systems, we find that larger systems require more specialized personnel. Hence, you have service and maintenance as two specialized departments with separate responsibilities and a critical need for coordination. The interfacing and communication of precise information between the two can make or break your overall technical service to the subscriber.

When faced with an amplifier outage, the service technician must replace the old amplifier with a new but unbalanced device. The service technician now has to balance the amplifier and his primary concern is merely to set the gain of the newly installed amplifier. Usually this requires a trip to the next functioning amplifier in line toward the headend to check levels. Levels recorded for the information of the maintenance department presuppose a recent calibration of

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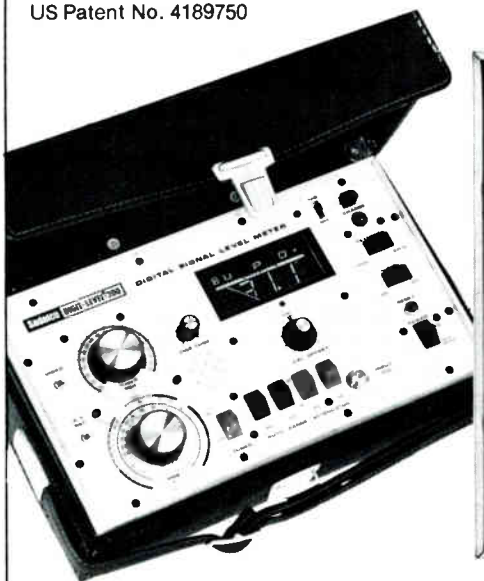

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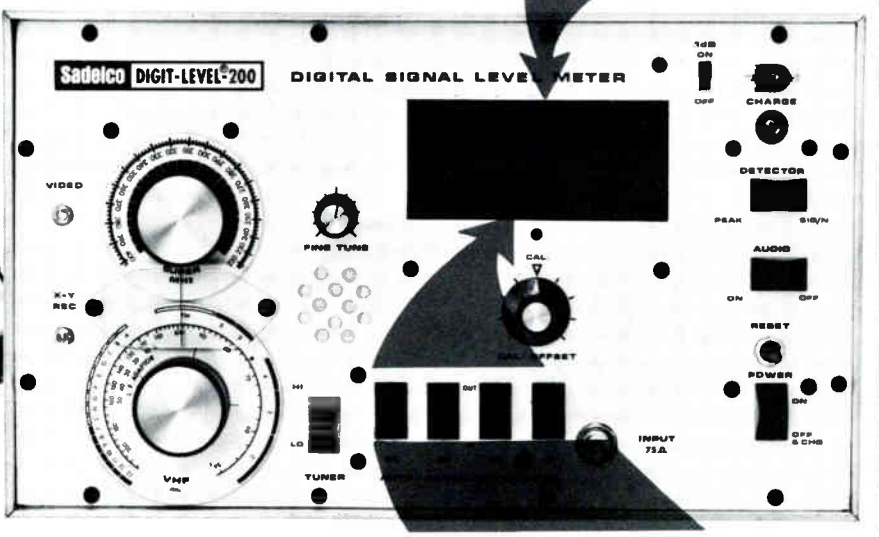

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the FSM, an assumption that can rarely be made with FSM's in constant use.

Solution

Our problems in this area were reduced by the referencing of our amplifiers and line extenders in the context of a change-out situation. Our approach is as follows: The original input levels into the amplifier stations are recorded in the lids of the amplifiers. In a new balance situation, this reference is checked against actual levels. For the information of the maintenance department, the difference in levels is recorded and passed on to the maintenance department as a correction factor to be attended to by them.

The service technician has to balance the newly installed amplifier. He takes the original levels recorded on the lid and uses his compensator on the FSM to establish new settings corresponding to the original inputs. He balances the amplifier to the ideal output (a volume amount) with the newly established compensator settings. This method always has the service technician balancing to ideal outputs. It will track uniformly a high or low band suckout by making an identical suckout occur within the compensator in the meter.

An example

Here is an example of how the method works. Read the high and low end input levels on the FSM set to the latest calibration settings. Make a note of this and the + difference between the inputs recorded on the amplifier lid. The + difference is now the correction factor (to be communicated to the maintenance department). Now set the compensator on the FSM to correspond to the input levels recorded on the amplifier lid. Thus, you have entered the difference in levels, as an amount, into the FSM. Using the new compensator settings, go to the output and balance the amplifier to ideal settings.

Results

We have found this approach has developed a good mesh between trunk and feeder maintenance. It eliminates redundant balancing, wards off future trunk and feeder problems and heightens the service technician's awareness of the importance of inputs and middle-of-the-road trunk levels. The overall method places key emphasis on the ability of your test equipment to measure differences in level rather than its latest calibration.

Douglas Medina joined Cablevision of New Jersey in 1977 after 2 years of electronics school and 6 years of prior cable television experience. Presently, he is the chief engineer of this 800 mile system. The MSO is Cablevision System Development Company.

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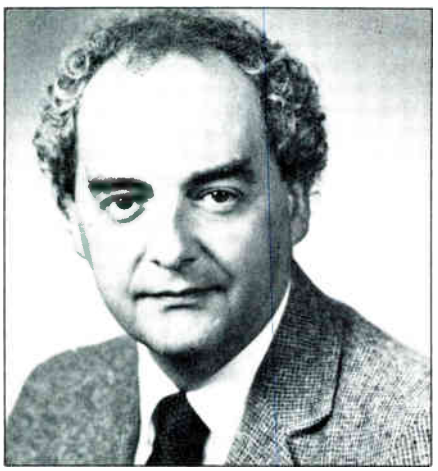
People News

★ **C-COR Electronics Inc.** has announced the promotion of **Stanford Cook** to vice president, manufacturing. In his new position, Cook will continue to handle the manufacturing function of the company. Cook joined C-COR in June, 1973, as manager of manufacturing engineering. In April, 1974, he was promoted to director of manufacturing, a position he held until this recent promotion. Prior to joining C-COR Cook held a management position with RCA for fourteen years.

★ **Henry Klerx** has been named vice president, product operations, for the **Sony Broadcast Products Company**.

Klerx joins Sony after a 29-year career with RCA Corporation where he was most recently the managing director of RCA Jersey Ltd. in the Channel Islands.

In his new position at Sony, Klerx's responsibilities will include managing all product planning, coordination and development as well as marketing support for the Sony Broadcast product line.



Roi Agneta

★ **Roi Agneta** has been appointed to the position of vice president, engineering for the Telesystems Division of **Chyron Corporation**.

Agneta was responsible for the design of the new CHYRON IV and the new RGU-2 systems.

Formerly employed by Potter Instrument Company and Grumman Data Systems as a designer of computer peripherals, he joined the technical staff of Chyron Corporation in 1973.

★ **John Walsh**, director of engineering for Orange/Seminole Cablevision, Orlando, Fla., has been selected 1982 Engineer of the Year for **ATC**. Walsh was selected Engineer of the Year based on his performance of assigned responsibilities, special projects, community and industry involvement and willingness and ability to teach and help other employees. Orlando is one of the largest cable systems owned and operated by ATC with more than 80,000 subscribers.

Also at ATC, **John Rigsby** has been named to the newly created position of vice president, video product development.

Rigsby's responsibilities will focus primarily on marketing ATC's SSAVI system, a patented device for securing over-the-air pay television video transmission.

James Fitzpatrick

★ **James Fitzpatrick** has been promoted to vice-president of **Blonder-Tongue Laboratories Inc.** Fitzpatrick joined Blonder-Tongue as staff counsel and continues in that position. He graduated Fairleigh Dickenson University with a B.S. in business management and received his juris doctor degree from Seton Hall University School of Law.

Also promoted at Blonder-Tongue was **Andrew Rybicki** to chief engineer, data communications. Rybicki will be responsible for all engineering functions relating to the design and development of products and systems.

★ **Kevin Rice** has assumed duties as vice president, operations, for the telecommunications group of **Heritage Communications Inc**.

Rice will supervise operations for cable systems serving 53 communities in Iowa, Illinois, Wisconsin, Minnesota, Mississippi, Tennessee, Alabama and Colorado.

Arthur Johnson

★ **Anixter Communications** has announced three appointments within the company. **Arthur Johnson** has been appointed a vice president at Anixter. Johnson was formerly director of addressable systems for Oak Communications.

Everett Hirsh has been appointed vice president, construction projects for Anixter. Hirsh will co-ordinate communications supply sales efforts on major construction projects across the country.

Also at Anixter, **Bob Grubbs** has been appointed district manager at the Anixter Communication Facility in St. Louis, Missouri.

★ **Arvin/Diamond** has announced the appointment of **Reed Farris** to the position of sales manager, CATV components. Farris' sales responsibilities include management and coordination of the company's 400MHz tap and A/B coaxial switch product lines. He brings five years of electronic sales background to Arvin/Diamond.

★ **Century III Electronics International Inc.** has announced the appointment of **Tim Roberti** to the newly created position of national sales manager. Roberti will direct all U.S. sales activities.

★ **Broadband Engineering** has announced the appointment of **David Chavez** as national sales manager. Chavez will be responsible for planning, directing and coordinating the marketing of the firm's several product lines. He comes to Broadband from Anixter-Pruzan.

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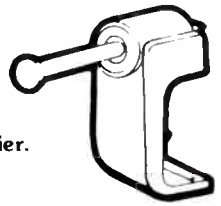
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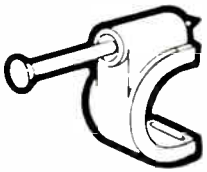
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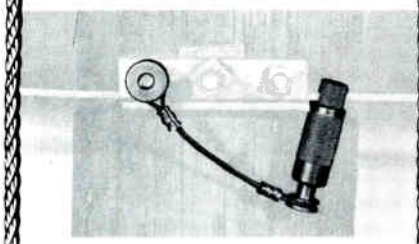

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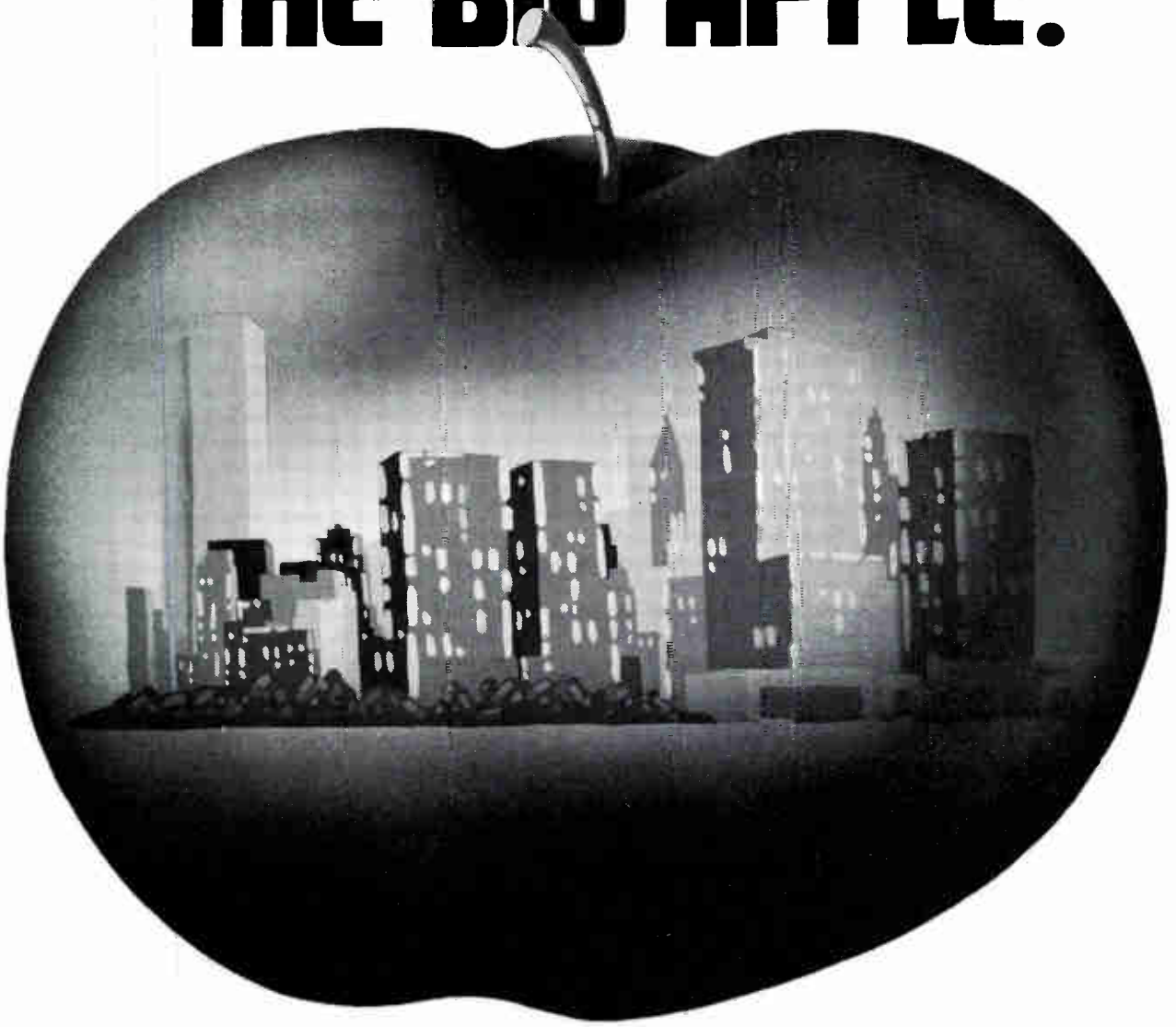


CableVision magazine is now available at selected newsstands in Manhattan. Look for it along Madison Avenue, Wall Street and the major television headquarters. Only $3 on the stands.

Titsch Communications, Inc., P.O. Box 5727 T.A. 2500 Curtis Street, Denver, Colorado 80217 (303) 573-1433

Product News

Scalloped Waveguide

Airtron has introduced a new family of lightweight WRD-350 assemblies designed for use in TV satellite applications. Using a unique "scallop" technique, the weight of the assembly is greatly reduced by etching out material in the double ridges and notching around the waveguide. This "scallop" technique achieves a typical weight reduction of 20 percent over standard aluminum construction.

Price is $1,500-$1,700 depending upon quantity and delivery is 90 days ARO.

For additional information contact Alan Egger, Airtron, 200 East Hanover Ave., Morris Plains, N.J. 07950, (201) 539-5500.

Hamlin MLD-1200

Anixter Stocking Hamlin, Colormax

Anixter Communications Supply is now stocking Colormax 400 MHz taps, a full line of Hamlin converters and the Hamlin MLD-1200 multi-level descrambler.

The Colormax series of multi-taps provides four-way subscriber taps over a broad range of tap values to meet all CATV system requirements. Stainless steel hardware is used throughout. Housing and ports have separate moisture sealing gaskets and puncture sealing rubber membranes on F connectors.

Hamlin converters currently in stock include the model MLE 1200 encoder, the SPC 4000 single piece converter, the CR 4000 cordless converter, the MLD 1200 decoder and the MCC 400 remote converter with cord. Also available through Anixter are the Pioneer and Standard component block converters and the Pico positive and negative taps.

The Hamlin multi-level descrambler adds 12 levels of scrambled pay TV and offers operators a way to keep pace with the growing variety of pay programming. The MLD 1200 is compatible with such multichannel converters as Oak, Jerrold and Sylvania, and offers control information in the vertical interval. The Hamlin system provides the best signal-to-noise ratio available, wastes no spectrum space and needs no pilot carrier.

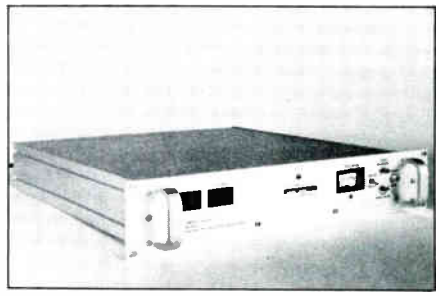
For more information call the Anixter hotline at (800) 323-0436.

LNR LNA

LNR Communications Inc. has introduced a high performance FET low noise amplifier for satellite communications earth stations. The model CF4-60 covers the 3.7 to 4.2 GHz band and makes use of solid state cooling to provide good noise performance in a low cost, compact, maintenance-free package.

The model CF4-60 is available in single, redundant and the TRIDUNDANT® one-for-two configuration for frequency reuse. Other options are also available.

For further information, including complete technical specifications, price and delivery, contact the marketing department, LNR Communications Inc., 180 Marcus Blvd., Hauppauge, N.Y. 11788, (516) 273-7111.

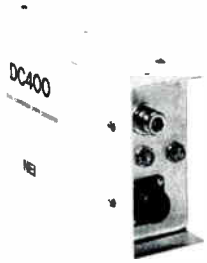


Tomco SM-2400

Tomco Modulator

Tomco has announced their new 38-channel TV modulator, the SM-2400.

The SM-2400 is a synthesized modulator which brings an IF modulated frequency agile unit within reach of any CATV



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system. A built-in battery back-up holds channel selection during a power blackout. The unit offers full scrambler capability assured by the provision of Aural and Visual IF loops.

For more information contact Tomco Communications, 4800 Patrick Henry Drive, Santa Clara, Calif. 95054, (408) 988-7722.

Catel Stereo Processors

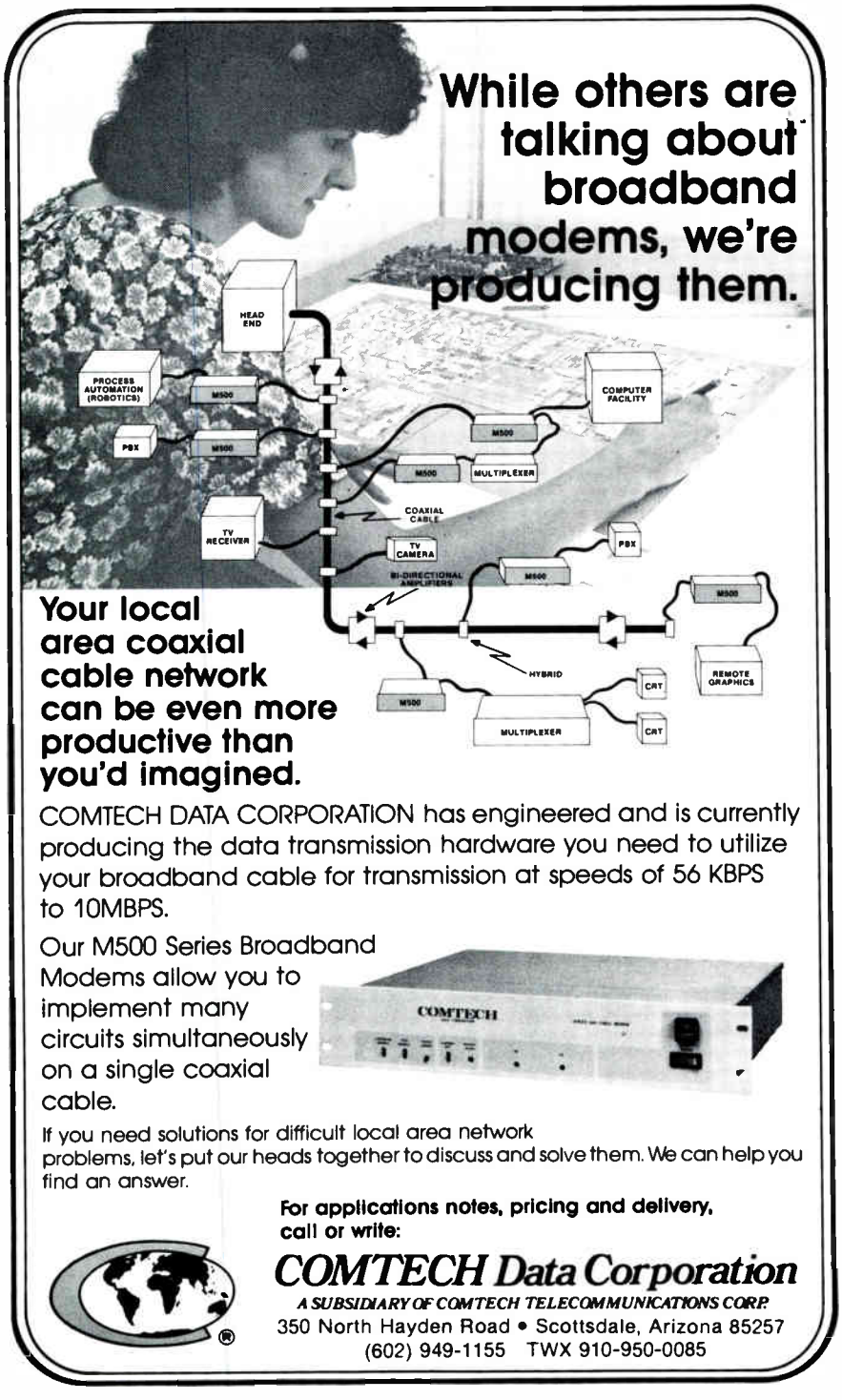
Catel has announced two new satellite stereo processor systems, the FMU-2150C and the FMU-2150CX.

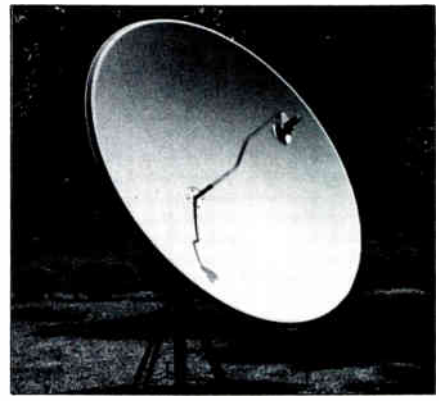
The FMU-2150C processor features a state-of-the-art frequency agile FM stereo modulator which can be programmed on any frequency in the 88-108 MHz range. Dual tone decoders provide all the necessary functions for commercial insertions. An internal matrix/stereo generator converts L&R audio from commercial inserts to true stereo.

The FMU-2150CX offers the same frequency agile modulation as the FMU-2150C. Frequencies in the 50-200 MHz range can also be accommodated on special order for either system.

Both systems are compatible with satellite services using separate L+R and L-R subcarriers.

For more information contact Catel, 4800 Patrick Henry Drive, Santa Clara, Calif. 95054, (408) 988-7722.





Microdyne Apollo X10 antenna

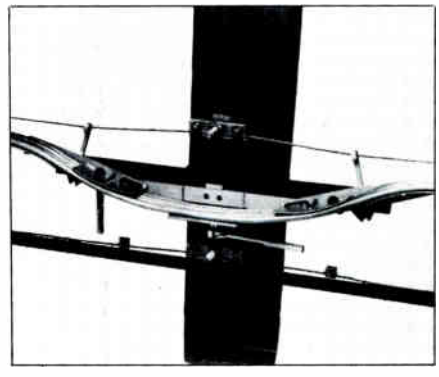
Apollo X10

National Microtech Inc. has announced the addition of the Apollo X10 antenna to its product line.

According to the company, the Apollo X10 antenna utilizes a ten-foot eight-segment compression-molded fiberglass reflector that provides exceptionally high strength-to-weight ratio and significantly reduces the size of the shipping container, providing savings on handling and transportation cost.

The individual reflector segments are interchangeable and field replaceable, utilizing indexing tabs for position and self-alignment. The X10 delivers 40.1 dB gain at 3.95 GHz. The textured front surface diffuses sunlight and reduces solar heating at the focal point.

For more information contact National Microtech Inc., P.O. Drawer E, Grenada, Miss. 38901, (601) 226-8432 or (800) 647-6144.



Lemco G-120 "Looper"

New Lemco Tools

The Lemco Tool Corporation has introduced a new series of compact designed cable pullers and a mechanical loop-forming tool which they have engineered, field tested and are now manufacturing.

The cable pullers come in three sizes:

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the J1234 to pull single feeder cable, the J1234-5 to pull up to five cables and the J1234-10 to pull up to ten cables.

The model G-120 "Lemco Looper" forms 12-inch flat bottom loops which are six inches deep with a maximum capacity of forming dual .750 trunk and dual .500 feeder at one time. A combination of simple mechanics guides the cables into the accepted flat bottom configuration. This combined tool action moves the cables into the loop form with minimum force and eliminates stretching, rippling and premature cracking of the aluminum conductor.

For more information contact Lemco Tool Corporation, R.D. 2, Box 330A, Cogan Station, Pa. 17728, (800) 233-8713, (717) 494-0620 in Pennsylvania.

Soil Compaction Rammer

A new 132 pound soil compaction rammer has been introduced by **Multiquip Inc.** The Mikasa MTR-55 features a 1640 pound impact and is capable of traveling 58 feet per minute.

Powered by a 3.3 horsepower gasoline engine, the MTR-55 has a simple float type carburetor which requires no adjustments. The engine is OSHA quiet and is totally rebuildable.

The MTR-55 is available standard with a 11.2 inch wide shoe; also available is a 4.5 inch wide shoe—a perfect match for the narrow trenches required for laying underground cable.

Complete information on the Mikasa MTR-55 soil compaction rammer is available from Multiquip Inc., 19600 Wilmington Avenue, Carson, Calif., (213) 537-3700.

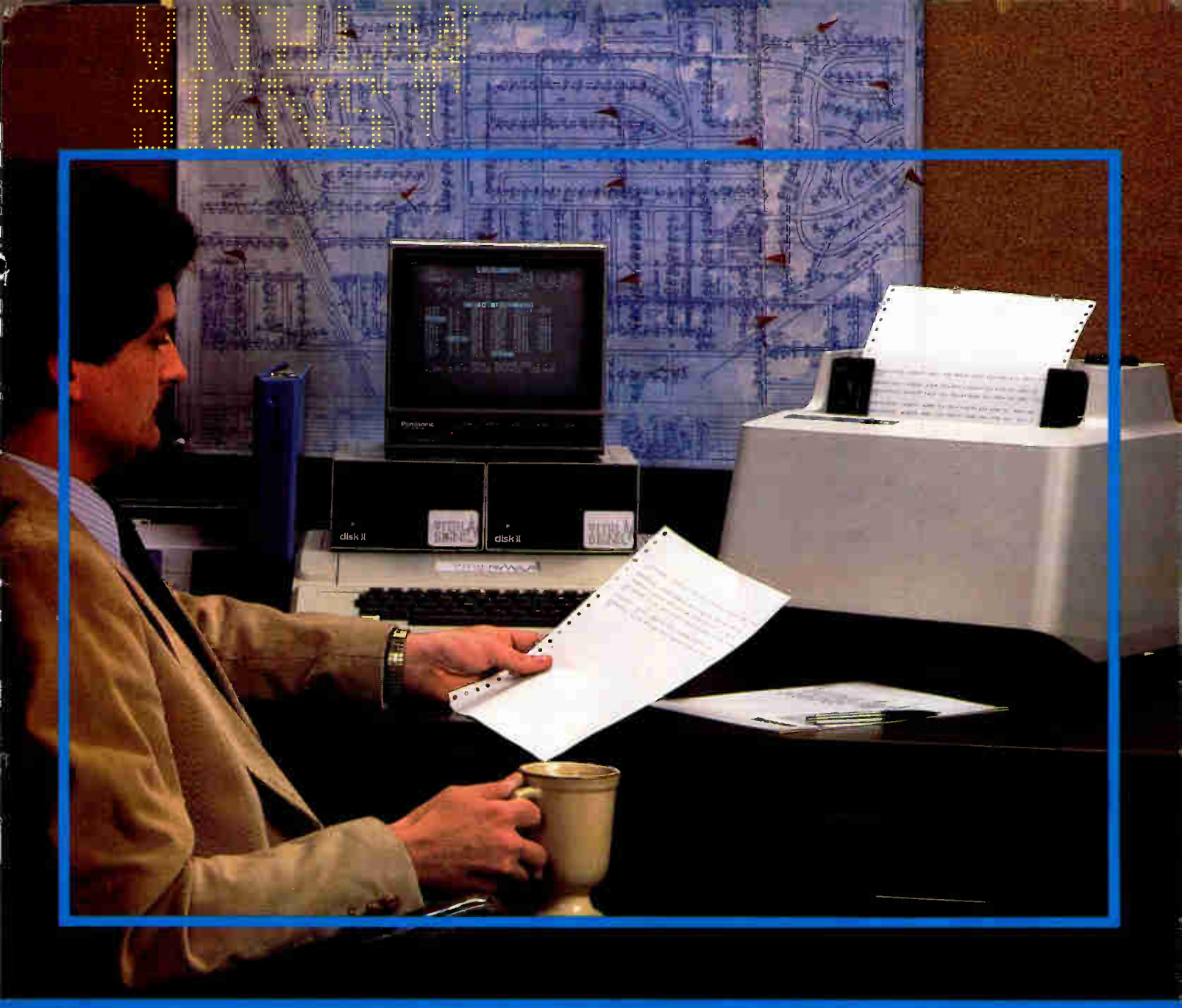
Microdyne MAPS II

Microdyne's *MAPS II* antenna positioning system is the latest addition to their broadcast line. The system is comprised of two microprocessor controlled subsystems including a rack-mounted data processor/control unit and a keyboard/display unit. The system also utilizes E^2 PROM technology in which all satellite locations are permanently stored. The 20-key keyboard features an access code required for memory storage to restrict unauthorized entries and a battery back-up RAM for power outage protection.

For more information contact Microdyne Corporation, P.O. Box 7213, Ocala, Fla. 32672-0213, (904) 687-4633.

Underground Line Protection

Terra Tape, from **Reef Industries**, is a 1,000 foot long continuous roll of brightly colored plastic that comes in widths from two inches to 36 inches. It bears a continuous printed message such as: CAUTION BURIED COMMUNICATIONS LINE BELOW. A company's name and



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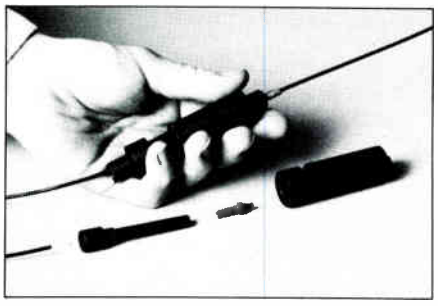

Fotec fiber optic attenuator

Fotec Fiber Optics

Fotec Inc. has introduced two new products to the fiber optic market; a test instrument that measures the optical power in fiber optic communication systems in units of watts or dB simultaneously, and a miniature attenuator that can attenuate signals up to 30 dB or more with continuous adjustment capability.

The tester can be used to measure the optical power coupled into the fiber by LED or laser diode sources, or the total power transmitted through the complete system, including cabling. The model C200 is battery powered for field service but is equally suited to laboratory applications.

The attenuators, priced from $225 to $250, are almost ten times less expensive than other attenuators now available and are a fraction of the size and weight. The Fotec model A400 attenuators are available with AMP Optimate and SMA-type connectors.

For more information contact Fotec Inc., 560 Harrison Ave., Boston, Mass. 02118, (617) 542-1719.

3M Heat Shrink Tape

A heat reactive tape for splice protection and sheath repair has been introduced by **3M**'s TelComm Products Division.

The heat reactive tape shrinks, upon application of heat, to provide a weathertight, watertight bond on buried, underground or aerial cable. Subsequent temperature variations will not alter the integrity of the seal.

For more information contact 3M, P.O. Box 33600, St. Paul, Minn., 55133.

Wire/Cable Catalog

Belden Corporation's Electronic Division has published a new illustrated Electronic Wire and Cable Catalog (No. 882). This catalog is a comprehensive source of cable information and products for data communications, instrumentation, broadcast, computer and other electronics application.

For a copy of the 1982 Electronic Wire and Cable Catalog (No. 882), write: Manager, Marketing Communications, Belden Corp., 2000 S. Batavia Ave., Geneva, Ill., 60134.

Scientific-Atlanta 1982/1983 Cable Products Catalog

Scientific-Atlanta Inc. has published its 1982/1983 Cable Communications Product Catalog. The 213-page catalog describes Scientific-Atlanta's complete line of cable communications products including distribution and data products, coaxial cable, headend equipment, set-top terminals, satellite receiving equipment, off-air antennas and product support services.

New products featured in the catalog include the Series 8500, 400 MHz set-top terminals models 6402 and 6410 broadband data modems, the Series 2400 cable security system and KU-band receive-only earth station.

The new catalog, and other printed material, is available by writing to Scientific-Atlanta Inc., Box 105027, Department A/R, Atlanta, Ga., 30348.

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This Jerrold time proven J-Series Antenna is specifically designed for commercial antenna installations. Its heavy duty construction assures reliability under severe climatic conditions and provides long life and trouble free operation.

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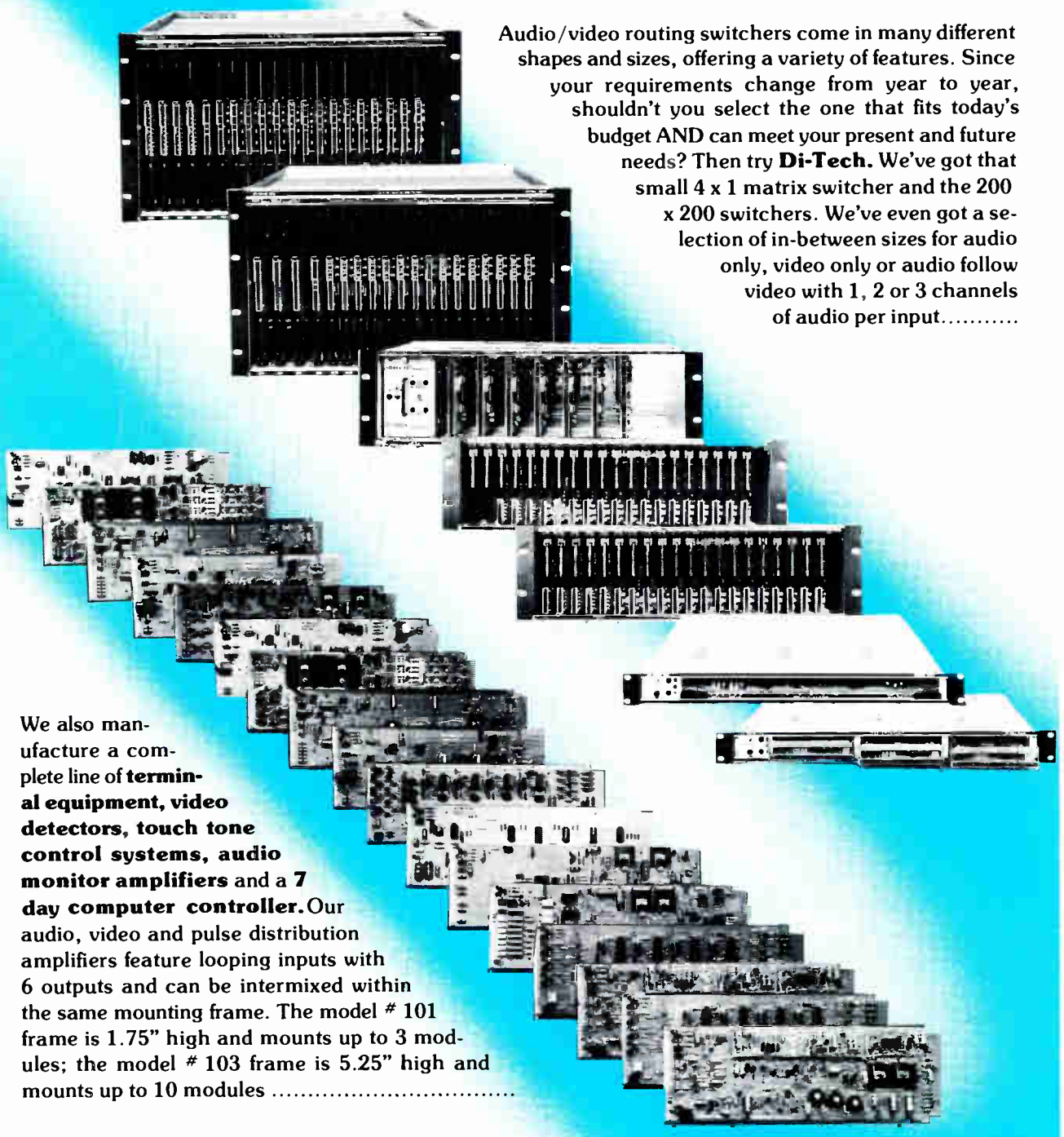

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Bravo		8:00 p.m. / 6:00 a.m.		Satcom IV #6
CBN		24 hrs	None	Satcom III-R, #8
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Cinemax		24 hrs	None	Satcom III-R, #20 (E,C) Satcom III-R, #23 (M,P)
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CNN2		24 hrs	None	Satcom III-R #15
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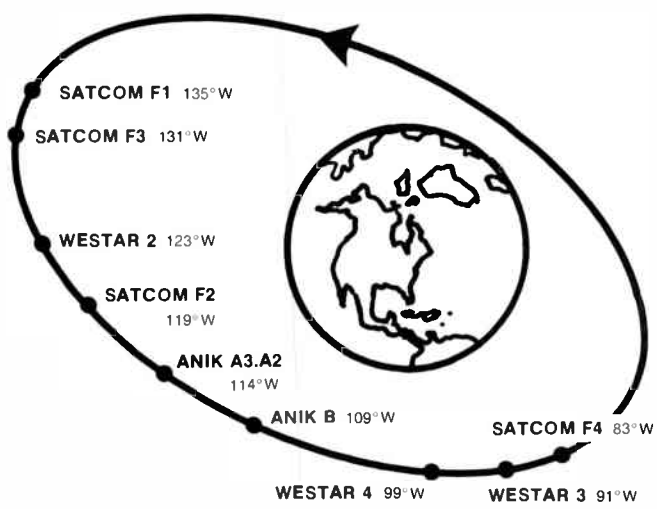
Eros	Thurs.-Sat.	10 p.m. / 2 a.m.		Westar IV #10D
Escapade		8:00 p.m. / 6:00 a.m.		Satcom IV #7
Eternal World Television Network		7:00 p.m. / 11:00 p.m.		Westar IV #10D
GalaVision	Weekdays Weekends	11 p.m. / 11 a.m. 24 hrs		Westar IV #12D
HBO		24 hrs	Program 729°/# Scramble 835°/# Duplication 940°/#	Satcom III-R, #24 (E,C) Satcom III-R #13, #22 (M,P)



Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
HTN		8:00 p.m. / 2:00 a.m.	207°/#	Satcom III-R, #21 (P)
HTN Plus	Daily	4 p.m. / 4 a.m.		Satcom III-R #16
The Movie Channel		24 hrs	None	Satcom III-R, #5
Modern Satellite Network	Weekdays	10 a.m. / 1 p.m.	243°/#	Satcom III-R, #22
MTV: Music Television		24 hrs	None	Satcom III-R, #11
National Christian Network		6:00 a.m. / 8:00 p.m.	073°/#	Satcom IV #7
National Jewish Television	Sundays	1 p.m. / 4 p.m.		Satcom III-R #16
Nickelodeon		8:00 a.m. / 9:00 p.m.	311°/# (E,C,M) 519°/# (P)	Satcom III-R, #1
North American Newstime		24 hrs	None	Satcom III-R, #6
PTL		24 hrs	None	Satcom III-R, #2
Preview Channel	Weekdays	10:00 a.m. - 1:30 p.m.	207°/#	Satcom III-R, #21
Reuters	Weekdays	4 a.m. / 8 p.m.	None	Satcom III-R, #18
SIN		24 hrs	None	Westar IV #3x
SPN		24 hrs	None	Westar IV #11x
Showtime		24 hrs	None	Satcom III-R, #12 (E,C) Satcom III-R, #10 (M,P)
Spotlight		24 hrs	None	Satcom III-R #4
Trinity (KTBN)		24 hrs	None	Satcom 4 #17
USA Cable Network	Daily Weekends	3 a.m. / 10 p.m. 10 a.m. / 2 a.m.	438°/#	Satcom III-R #9
WFMT		24 hrs	None	Satcom III-R, #3 Subcarrier
WGN		24 hrs	None	Satcom III-R, #3
WOR	Daily	24 hrs 10 a.m. / 5 p.m.	None	Satcom III-R, #17 Westar IV #5X
WTBS		24 hrs	None	Satcom III-R #6
The Weather Channel		24 hrs	None	Satcom III-R #21

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